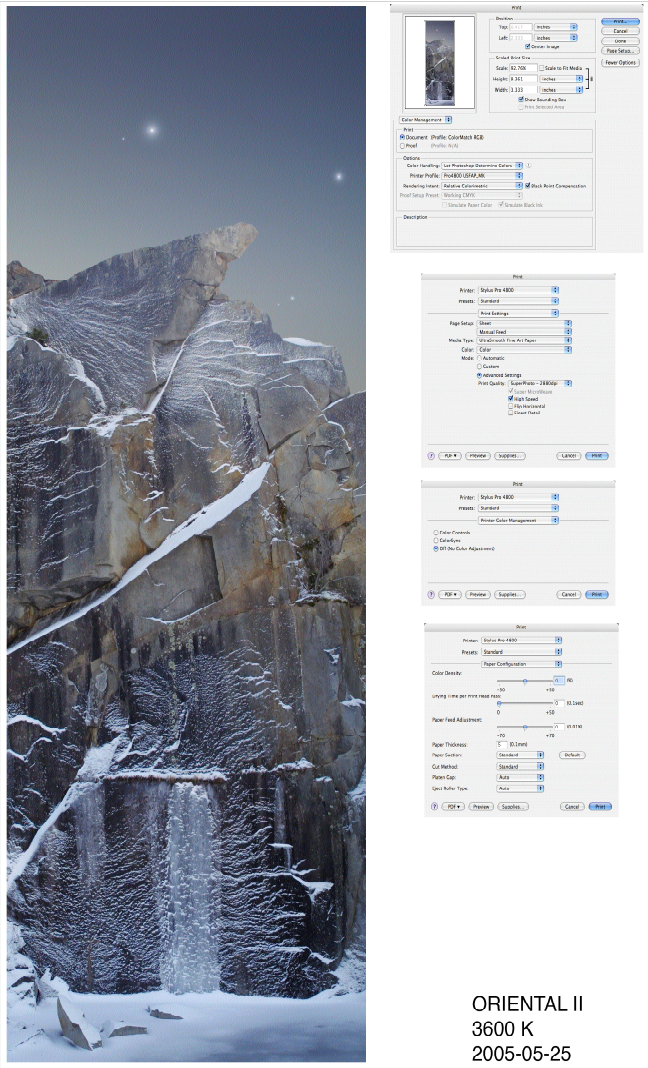
TECHNIQUE

THE ART OF PROOFING



1. A typical BAT proof at reduced scale including notes.

Proofing: Evaluating an image printed on a particular substrate, making adjustments, reprinting, reevaluating the image, and repeating until optimum results are achieved. Some think it's a lost art. It's not. Some aren't aware that they're doing it. You probably are.

If you're not doing proofing, it's highly likely that you could make even better prints. If you are proofing, you'll find that structuring and refining your proofing process will have many beneficial effects on the print quality you achieve.

The limits of soft proofing

Soft proofing: Simulating the appearance of an image printed on a specific substrate, with a specific printer, driver, output profile, and rendering intent – before it's printed (View: Proof Setup: Custom). For some, those who think calibration and characterization alone match color for all possible substrates rather than showing a digital file in an ideal non-device-specific color space, it's the missing component of color management. Others who have mastered soft proofing may have been misled into thinking that a perfect match is attainable. If close is close enough, soft proofing is all you'll need. When it comes to making the very finest prints, some proofing is required.

Soft proofing has limits. If a profile is slightly inaccurate the soft proof will be inaccurate too. While some profiles are vastly superior to others, I've never seen a perfect profile. Even with the finest profiles, you will need to compensate for small inaccuracies when making a final proof. With rare exception (ImagePrint RIP) output profiles are created for a standard viewing light of 5000K even though a majority of prints are viewed under very different light temperatures.

Some compensation will be required if prints are to be viewed under a different light temperature.

Soft proofing can't display the differences between color management routes (use the same profile using two different color management methods and you will get slightly different results). Test this by comparing proofs made using Let Printer Determine Colors and proofs made using Let Photoshop Determine Colors.

Soft proofing can't fully represent the impact of scale. Monitors have one size. Prints can be made in sizes

much smaller or much larger than the monitor used to view a digital image. As well as being able to see the full image and the relationships between various elements in an image, at different scales, there are optical effects involved with scale as well – larger images appear to be lighter and contain less contrast and vice versa. A monitor's resolution rarely matches a print's resolution, so distortions in scale are required in order to assess detail, sharpness, contours, and noise. This makes very precise assessments of these factors difficult. Soft proofing can't show the sensual characteristics of a substrate surface. A monitor has only one surface, but you can choose between a marvelous range of substrates from super glossy film to fibrous watercolor paper – each of which adds a unique aesthetic dimension to the final print.

Even with today's technological advances, we have a limited ability to display the profound translation from transmissive to reflective color spaces. Glass or plastic emitting light (transmissive) at one scale simply looks different than paper absorbing light (reflective) at another scale. While you can use one to make sophisticated predictions about the appearance of an image on another, in the final analysis they look different. Subtle shifts in luminosity, hue, and saturation may not be apparent onscreen. In the end, in order to achieve the best quality possible, it's highly likely that you will want to adjust an image after you see it printed out or proofed. You may need to do this several times to achieve optimum results.

Proofing is not a substitute for color management

The fact that we still make proofs doesn't mean color management and soft proofing don't work. It's amazing that they work as well as they do, and they're getting better all the time. It means there are limits. And it helps to know the limits. Proofing is not a substitute for good color management practices. Good color management will save you time, materials, and money. Good color management will improve print quality. There are certain things you cannot solve with proofing if color management is poor. Good color management will get you the best first proof possible. Good color management policies will allow you to trade in subtleties when proofing. Properly implemented, color management will get you 90% of the way there. To get the last 10% you need to proof. It's the last 10% that separates good prints from great prints.

Here is a set of practices that will help you structure your proofing process and identify important print characteristics to monitor along with compensations to make. By its nature, proofing is media specific so proof with the materials you'll use to make the final print (printer, media, driver, and profile).

Take notes

It's a good idea to make notes of the kinds of adjustments you make while proofing. This will help you structure your problem solving when facing a challenge. It will also help you make sense of a number of similar pieces of paper. Working with adjustment layers and layer sets will not only provide you flexibility it will also keep a record of the type of adjustments you make and the order you make them in. Make adjustments as adjustment layers filed in a layer set. Appropriately label each adjustment layer. The layer set title should include the printer, paper, profile, rendering intent and any other pertinent information affecting printing conditions. You may wish to take screen shots of your printer driver settings and nest these images as layers in the appropriate set. You can also use the Text tool in Photoshop to make print notes on the proofs. The Notes tool in Photoshop can also be used, but will not print, so they are best used for notations that you don't want seen on proofs. If you're printing the same image to multiple substrates or on multiple printers you'll want to have separate layers sets for separate printing conditions. Turn them on only for printing with that specific set of conditions otherwise leave them turned off.

Survey and select substrate

It's essential to evaluate the effects of surface on images. Print the same image or images on a wide variety of

substrates and evaluate the proofs side-by-side. You'll need a unique profile for each substrate you test. Once you've done this testing, you'll be able to make informed decisions about your choice of substrate for future images and bodies of work. As new materials become available test the same image or images on them and make comparisons to your previous proofs.

You may choose a surface because of its ability to reproduce detail and smooth gradation, or because of its ability to produce a superior cool bright white or dense black or saturated hue, or because its sensual characteristics are compelling, or because of its longevity and durability, or because it offers the best combination of all of these factors. While it's important to consider all of these factors, how to prioritize them is up to you. Subject matter or the context of a work's presentation may dictate certain choices. On the other hand, your choice may be an aesthetic decision that is highly subjective. If this is the case, trust your instincts.

Evaluate color management

Before you continue proofing, evaluate your color management. Is the soft proofed image reflecting the proof with a reasonable degree of accuracy? It's a good idea to have a test file on hand that contains a wide variety of hues and known targets such as neutral patches with known densities; this can be used when first evaluating printing conditions but need not be used before printing individual images. (Remember to evaluate this proof under the light temperature the output profile was intended for, classically 5000K.)

Is the output profile producing neutral grays, good gray balance, smooth gradation, adequate tonal separation in shadows and highlights, and reasonable level of saturation? If not, recheck your color management (monitor calibration, color settings, driver navigation). If your color management practices are sound and the proofed results are not adequate, find a better output profile and reproof. If the proofed results are adequate (perfection is rarely achievable) continue proofing.

Compensate for viewing light

The color of light matters. While the vast majority of output profiles are optimized for the cooler 5000K light, the vast majority of prints are viewed under warmer light temperatures, typically around 3500K. (Galleries use halogen 3800K, homes use tungsten 2800K, daylight varies 2000-8000K.) If a proof/print is evaluated under 5000K and later displayed under 3500K light it will look too warm. To compensate for this, adjust the file by making it look cooler. Evaluate proofs under the light temperature that the prints will be viewed under. (If you can control the light your prints will be viewed under, consider Solux's full spectrum lights.)

Proof for fine adjustment

Because the match between transmissive (monitor) and reflective (substrate) color spaces cannot be absolute, some level of fine adjustment is typically required. When making fine adjustments to an image during the proofing process, structure your approach. Solve the biggest challenges first. Favor addressing, in this order, luminosity, hue, and saturation. Address them separately. If you tackle too many variables at once you may not be able to assess each one accurately. To increase efficiency, bracket proof; make a stronger correction than needed with a gradient mask. Proof. Identify the area of the proof that is most pleasing and use that percentage of the correction without the gradient mask.

Are the kinds of corrections you will need to make during proofing ever local? Yes. Just like correcting a digital file, it pays to address issues globally before working locally as the same deficiencies are likely to exist throughout the entire image. When that is not the case, selective correction is necessary. Favor tools that will allow you to work selectively on an image without having to make complex selections. For instance, Curves will allow you to target a specific range of an image's tonal structure while Hue/Saturation will allow you to target a specific range of

colors. Some features like Select by Color Range will select a specific set of color for you. That said, there are times when manual selection is necessary.

Proof at reduced scale

You can save considerable time and materials (both mean money) by proofing images at a reduced scale. It's even possible to use paper scraps, damaged paper, or proof on both sides of double-sided paper. Just remember, for proofing to be meaningful, you have to proof on the same substrate under the same conditions that you will make the final print on.

Proof at full scale

There are some things that you must proof at full scale to evaluate: fine detail (including the final evaluation of sharpening), edge quality (in images and in masks), noise, and banding. You may proof either the entire image or a slice of an image containing areas that will enable you to evaluate all of these characteristics.

Compensate for changes in scale

Smaller images appear to be darker and have more contrast. Larger images appear lighter and with less contrast. If you proof at a scale that differs significantly from the scale of the final print, you'll want to make adjustments for this. Darken an image 1 point every time the total image area is increased. And vice versa.

Customize ink limit and print speed

The amount of ink applied to a substrate has a significant impact on print quality. More ink yields higher dmax and greater gamut but excessive dot gain can subdue detail and even create spattering. One way to allow for more ink layout without excessive dot gain is to allow more time for the ink to dry by slowing print speed. The key is to get an optimum balance. Many printer drivers will allow you to customize these settings. Using the Epson driver you can customize Color Density and Drying Time when accessing the Paper Configuration dialog box. Epson has done an excellent job with their settings, which are specified by a selection of Media Type. You may wish to confirm this with your own testing. The ability to customize these settings is particularly useful when using third party or exotic substrates. Under Print Settings choose the nearest Media Type and then customize Paper Configuration from that point – as the latter refines the former. As Color Density rises increase Drying Time. Guard against excessive dot gain. Watch for loss of shadow detail. Watch for spattering in highlights and midtones. Raise the amount of ink laid out to a maximum without encountering these adverse side effects. This is the kind of test you can do once and expect the results to hold when you print with the same substrate. As an aside – using these tools to speed or slow the rate at which a substrate advances through the printer can cure banding (dark lines) or microbanding (light lines).

Compensate for loss of shadow detail

Classically inkjet prints are over inked. This produces dense blacks and rich midtones, but it often sacrifices deep shadow detail. Some printer drivers enable you to reduce ink limit to prevent this. The side effect is that midtones are weakened. If this is not an option or an unacceptable trade off, select and mask the deep shadows only and lighten them to compensate. This is a similar to compensating for dry down in the traditional darkroom. As inkjet prints emerge from the printer almost dry and the majority of drying occurs in the first twenty minutes, it's rare that drying has a significant impact on the appearance of a print. Inkjet prints dry lighter, so when in doubt print slightly (very slightly) dark.

Address banding

If you encounter banding in a proof, typically at full size, first check the digital file. If the banding is in the digital file, try adding a little noise on a separate layer. (New Layer set to Overlay blend mode, filled with 50% gray, and filtered with a small amount of

monochromatic noise.) If the banding is not in the file but exists in the proof, try to improve data transfer to the printer with a faster connection (Firewire) or by minimizing the use of the computer during printing to printing only. If banding persists, use the printer driver to reduce print speed.

Keep a BAT

For centuries it has been a time-honored tradition to keep a final proof on file, something to refer to when you evaluate prints over a large run or decide to print an image again. BAT: *Bon A Tirer*, French for "good to pull".

Though you may wish to, it's not necessary to keep all the proofs from a proofing session. You might consider keeping the very first proof pulled without additional adjustments as this can be used to compare previous printing conditions with current printing conditions separate from session specific adjustments. At a minimum keep the final BAT, which you can use to evaluate all other prints and proofs. Replace old BATs with new BATs after each new proofing session.

Reproof

If a significant amount of time has passed since you initially proofed an image, make a new proof using all previous proofing conditions to confirm that conditions have not changed. If slight shifts have occurred, continue proofing from that point until you get the results you want.

In a few cases the final proof may be more pleasing to you than the image on the monitor. In this event, consider adjusting your master file to reflect these changes. Make the file look like the proof. Add an adjustment layer to make appropriate changes. Use it for all future proofing conditions. But, turn it off for the current printing conditions; you generated the final proof you like for these specific print conditions without it.

Performance printing

Ansel Adams remarked, "The negative is the score. The print is the performance." Today we may need to shift terms (The digital file is the score. The print is the performance.) but the principle remains the same. Digital printing does not eliminate the performance aspect of fine printing. The digital printmaking process may be less hands-on, but this doesn't mean printmaking is deemphasized. It simply means that control over the essential elements of an image/print is exerted in other ways. With digital printing, you start farther along in the process and you can go farther. Many of the moves you would make when printing in the darkroom are now made before printing. In many respects, the printer is a default device. You have limited points of control over it. You can choose an ink, a substrate, a driver, a profile, a rendering intent, an ink limit, and a print speed. Period. This means that in order to affect additional changes you need to go back to your digital file (negative) and change it before printing.

Proofing is largely concerned with making fine compensations for specific printing conditions. While they are comparatively very stable digital printing conditions still change and compensations need to be made. Printer, ink, ink lot, substrate, substrate coating, driver, output profile, ink limit, and print speed can and most likely will change over time. Even environmental shifts can affect print quality, such as dramatic shifts in humidity. Because digital printing conditions are more stable than traditional printing conditions, it's easier to repeat a performance. This stability can be used to allow artists to focus on the nuances of a performance rather than struggling to repeat the broad strokes again and again. While it's easier to repeat a performance, a performance can always be changed. Most importantly, you may change. Your vision will evolve. Take heart; throughout the history of photography this practice has been accepted and encouraged. Every day is a new day. And every print can be a new print. As technology advances, I've seen my prints get better and better. And so will you.