

Darkroom *vs.* Digital Prints

*Using Epson, MIS VM, and
PiezographyBW Inks*

by Ron Harris

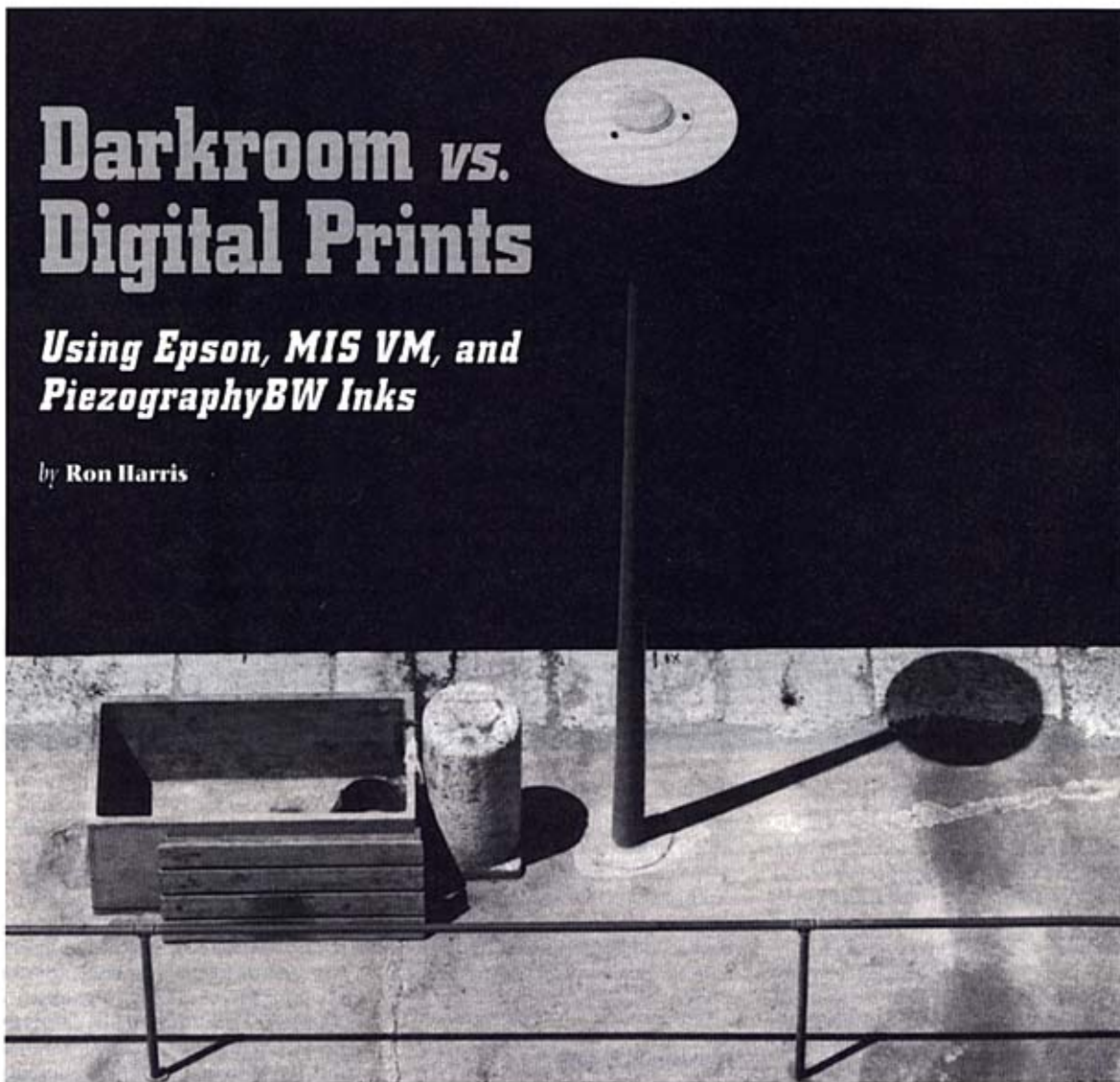


Figure 1. *Lamppost, St. Jean Cap Ferrat, France. MIS VM cool-tone print.*

Recently, I compared black-and-white darkroom prints with Epson digital prints, using three different Epson printers and ink sets.

Starting with the ideal negative in the darkroom, you can make a straight print onto Grade 2 printing paper and get an ideal print. The characteristic curve for the printing paper expands the compressed dynamic range of the negative in just the right way to accomplish this. However, a direct print from a digital scan of this negative will not match the darkroom print. The tonal range of different parts of the image must be adjusted in Photoshop, making it difficult to achieve a match.

Trying another approach, I worked with two different darkroom prints: *Lamppost, St. Jean Cap Ferrat, France* (Figure 1), and *Gas Plant, Robert's Cove, Louisiana*, (Figure 2). The first contains strong blacks and subtle highlights, and the second, silvery pipes that look wonderful in the darkroom silver print.

Scans and Photoshop Adjustments

Attempting to preserve the color of the darkroom print by working in RGB was not successful. The color of the print is too subtle. Matching the grayscale tonal range in the print was best achieved by converting RGB scans to grayscale using Channel Mixer in Photoshop, and adjusting the RGB sliders

to maximize the quality of the image.

Numerous adjustments were required in Photoshop, both overall and to specific regions, using mostly using Levels, Curves, and Contrast/Brightness. One obvious problem was apparent in the scan of *Lamppost*; light reflections from the black areas of the print reduced the depth of the black. These regions had to be selected and adjusted to black. Also, I could not resist making subtle enhancements that would have been difficult to achieve in the darkroom.

Printing Issues: Tonal Range, Color Cast, and Color Depth

Black-and-white images from an Epson printer using black ink only are lacking in



Figure 2. Gas Plant, Robert's Cove, Louisiana. A. Epson 1280 color ink; B. MIS VM neutral-tone; C. MIS VM warm-tone; D. PiezographyBW Standard ink; E. PiezographyBW Selenium-Tone; F. Epson 2200 color ink.

tonal range and image quality. This is because the print is created by printing black ink dots at varying spacing...close together for dark tones, wide apart for light tones. This limits the tonal range, causing the image to have a gritty appearance.

Printing black-and-white using color inks results in excellent prints with a full tonal range and strong blacks. However, the human eye is very sensitive to color tints on a grayscale, and these prints usually have a slight color cast and color crossovers, which varies with paper choice and ink formulation. In the past, I've been fairly successful in tuning out these color errors by applying color-shifting layers in Photoshop prior to printing.

Another potential problem is metamerism, the varying color cast of a print as seen in different lighting, typically moving toward green as the print is moved into ambient window lighting from incandescent lighting. There seems to be a relationship between maximum black and the amount of metamerism.

Darkroom prints are toned slightly in selenium, or some other toner. The amount depends on the strength of the toning bath, the time in the bath, and the printing paper. This is a matter of personal choice. This toning strengthens the dark tones and adds a "depth" to the image. A perfectly neutral black-and-white print is not very attractive and looks flat. It is the color depth of a

black-and-white darkroom print that makes it most appealing.

The goal of creating the tone and color depth of a toned black-and-white print may seem elusive for those printing digital black-and-white prints. I found this possible using the third-party inks discussed in this article.

Maximum Black

Black-and-white darkroom photographers tend to prefer air-dried, fiber-based printing papers rather than high-gloss papers with their plastic appearance and distracting reflections. The maximum black achievable in a black-and-white, selenium-toned, fiber-based darkroom print is a density of about 2.2, or 130:1 reflectance ratio.

On matte papers, such as Epson Archival Matte paper, the Epson 1280 dye-based inks come in at about 1.9, or 80:1; and the Epson 2200 pigment-based inks, as well as the grayscale pigment-based inks discussed in this article, reach about 1.7, or 50:1.

On Epson Premium Glossy paper, dye-based inks can print black with a density of about 2.3, or 200:1, which exceeds that of the darkroom print. Pigment-based inks are generally not suitable for use with glossy papers; they don't adhere well to the surface. This is one reason that black-and-white digital printers prefer matte papers. Another reason is that display print life is

usually greater with images on matte paper.

While the human eye can perceive a large range of luminosities, it is said that in any one moment the eye can perceive a 100:1 range. Note that this is twice the 50:1 reflectance ratio achievable with pigment-based inks. Fortunately, the response of the eye is logarithmic, so that a reflectance ratio of 50:1 is not viewed that differently from a 100:1 ratio. It's apparent, however, that the black-and-white digital printer must make good use of the reflectance range that is available in the digital print.

Epson Printers with Grayscale Pigmented Inks

Several companies offer archival grayscale pigmented ink sets—quadtone and hex-tone—for various Epson printers. These inks can be used with many different papers, including those made by Epson, and also fine art printing papers, such as Somerset Photo Enhanced. Print color can range from warm to cool, depending on the ink, the paper, and whether metamerism is minimal or non-existent. Depending on the ink and the mix of tones, prints with an attractive tone and color depth can be created.

However, head clogging is a problem with third-party pigmented inks. Turning off the printer when not in use, which parks and seals off the print heads, can min-

imize this. The printer should be turned on frequently and head cleaning, nozzle checks, and head alignment checks run prior to each print session.

Images that make good prints using Epson inks may produce flat, dull images with the grayscale inks discussed here. Image tonal adjustments have to be made to optimize the image prior to printing with any ink set.

Print Life

The normal display life of digital prints has been increasing dramatically over the past few years. Using Epson inks on their matte paper, Epson 1280 prints will last some 40 years; Epson 2200 prints some 80 years, and all the grayscale inks discussed will last more than 50 years (some much longer).

Ink Choices

Epson 1280 with Epson Ink

In the past, I made very good black-and-white prints with minimal metamerism and undesirable color casts and crossovers using an Epson 1280 printer with Epson ink and Epson Archival Matte paper. However, Epson recently changed the ink formulation and it is now more difficult to achieve this. The print of *Gas Plant*, using the new ink formulation is slightly magenta under incandescent lighting and slightly warm-greenish under ambient window lighting.

Epson 2200 with Epson Ink

The Epson 2200 is the newest in their line of photo printers. This is a seven-ink printer using the new, pigmented, Ultrachrome inks, including a special ink, Matte Black, for use with matte papers.

Tonal separation and image detail are excellent. There is a small amount of metamerism that is particularly noticeable in black-and-white prints. Under incandescent lighting the lighter tones are shifted toward magenta, and under ambient window lighting there is a tonal shift toward a very faint green. Some may not find this objectionable, since, for the most part, isolated black-and-white 2200 prints appear neutral in all lighting. It is possible to apply color corrections in Photoshop prior to printing that will make the print neutral under one particular source of illumination. However, the print will continue to shift in color when moved into different lighting.

MIS Variable Mix Inks

MIS VM ink (www.inksupply.com) developed by Paul Roark (www.paulroark.com) is an archival grayscale pigmented ink set to which a pigmented blue ink has been

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added. The regular Epson driver is used; no special software is required. Paul furnishes toning curves, to be applied in Photoshop, which can produce prints that are warm, medium-warm, neutral or cool. Using the magenta slider in the Epson printer driver, fine tunes the print color.

Prints that resemble the warm tones in a platinum print or the cool tones of a selenium-toned darkroom print can be made with these inks. Good image tone and color depth, good blacks, and a good tonal range are achievable.

PiezographyBW Ink:

Standard Inks

PiezographyBW inks and software were developed by Jon Cone (www.piezography.com). These are archival grayscale pigmented inks. Prints are made using a Photoshop plug-in, and with standard inks have an "oyster" color, which resembles platinum prints on the right paper. The printer driver has two nice features: it supports printing of high-resolution images, and it provides paper profiles for many different printing papers.

PiezographyBW Ink:

Selenium Tone Inks

Jon Cone recently released PiezoTone Selenium-Tone inks, which are archival pigmented-inks designed to match the tone of a selenium-toned black-and-white darkroom print. I made some prints using this ink and placed them on a table along with some selenium-toned black-and-white darkroom prints that were made by different photographers on different papers, and examined them under various light sources. The color and tonal range of the digital prints certainly fell within the spectrum of the darkroom prints. To my eye, under ambient window lighting, these digital prints have very slight "plum" midtones and very slight "blue" highlights. The color shifts slightly toward neutral under incandescent lighting.

PiezographyBW Ink:

Warm Neutral Inks

This is another ink in the PiezoTone series. It has very good color depth, producing images with good tone, separation, and blacks. The prints are similar to that of a lightly selenium-toned darkroom print on a warm paper, like Ilford Gallerie.

Both MIS and Jon Cone offer other inksets which photographers may find appealing. Please check their websites for additional information.

Conclusion

Photographers who compared the digital prints accompanying this article with the darkroom versions tended to prefer the digital ones. This was particularly true with those digital prints with good color depth. The small digital enhancements that were made to the images were also a factor. The subtle highlights and black tones in *Lamp-post* were rendered well, and the silvery luminosity of the pipes in *Gas Plant* was preserved in all of the prints.

Comparisons

PiezographyBW (standard and PiezoTone inks) and MIS VM inks are capable of making archival black-and-white prints that resemble both selenium-toned darkroom silver prints and platinum prints. Both inksets offer good image tone, color depth and tonal range, with very little metamerism.

The PiezoTone Warm-Neutral ink probably comes closest to matching my darkroom silver prints made on warm paper. MIS VM neutral and PiezoTone Selenium-Tone ink come closest to matching my darkroom silver prints made on cool paper. Of course, the amount of toning is a matter of choice.

Color casts and metamerism keep black-and-white prints made with the Epson 1280 and 2000P color inks from comparing favorably to fine-art darkroom prints. Color casts for a particular lighting can be tuned out using the Epson 2200, and photographers who are not concerned with a small amount of metamerism will like this printer. It is easy to use, has minimal head clogs, and very good tonal separation with good blacks.

The debate among photographers will probably continue as to which process is best—wet darkroom or digital. Clearly, it's a matter of choice. However, it is definitely possible to make black-and-white digital prints that can compare favorably with fine art darkroom prints. When displayed under glass or acrylic in a gallery, these prints appear very similar to traditional darkroom prints.

I have chosen to use digital methods in my photography because it enhances my ability to create artistic images. The process is also quicker and friendlier to the environment. ■

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