Making a fine Piezography print

We have to set aside that wonderful Ben Shahn quote that "Meaning is in the shape of Content". We have to set aside content, subject matter, meaning, greatness in vision, etc. for this topic. Making a great print is always dependent upon something that transcends both medium and subject. The greatest vision can be interrupted by a poorly made print. In this paper, I am only talking about making a fine print – rather than aesthetics or discussing the criteria by which great photographs are judged (with the exception of tone, sharpness, and execution of medium).

Many people think it takes tremendous skill to pull off a fine Piezography print, or that somehow the technique practiced by the Piezographer is responsible for the inherit beauty of a Piezography print. The reality is that it requires only competence to make a fine print. If your Epson OEM skills are deplorable, then Piezography will not correct that. But, if you have the skill to make a good Epson, Canon or HP inkjet print, then Piezography will attenuate that skill. If on the other hand, you consider yourself to be an excellent black and white printmaker with Epson, Canon and HP - then Piezography is going to allow you to fully exceed what you are capable of doing on the OEM systems.

Let's break this down into what one needs to do in order to produce a fine Piezography print - and in later papers I will discuss great Piezography techniques.

Because the Piezography system has been pre-engineered to provide great quality that exceeds what the OEM can produce on its own equipment, most of the work has been done for the photographer. The photographer's responsibility is to insure that the system has been installed correctly (http://www.piezography.com/PiezoPress/about/technical-support/), that the system is being used correctly (user guides on the above link).

This means that the manual for using QTR must originate from Piezography and not QTR itself, and that the ink assignments are correct, and that a Piezography produced media profile is being used that matches the media.

Naturally, the printer must have routine maintenance performed and the inks cannot be allowed to get stale or settle within bottles, ink lines, and cartridges.

Because Piezography with four or as many as seven distinct shades of ink can separate more tonal values than can the OEM three shade systems, it is important to start with very smooth image files that have a long tonal scale. Without going into mathematics and the virtues of using overlapping shades of Piezography inks rather than the interlinking shades of the OEM, the Piezography system produces tens of thousands more gray value combinations than can the OEM. So think in grays with black & white on the ends, rather than think in black and white with grays in between. There is a subtle distinction in where your attention should be.

If you have defects in your image file that may escape the OEM driver, Piezography will faithfully reproduce them. If one prints a high contrast image with few tonal variations, Piezography will faithfully reproduce it, but will not add any additional grays to the print. On the other hand, if the photographer has an image with interesting and contrasting ranges of smooth tone adjacent to each other, Piezography will add a significant amount of beauty to the print that the OEM cannot. Piezography inks are simply beautiful in how they reflect light.

Think tone rather than punch! A fine Piezography print should draw the viewer in, making them want to inspect the beauty of the surface and the detail and the tonal separation. So you need to do that first! Look beyond the aesthetics of your images and towards the aesthetics of your medium. That should go without saying in any medium – but often it needs to be reminded.

If the photographer is interested in fine detail and uses large format film, Piezography because it uses additional shades of ink rather than depending upon dithering, will realize significantly more output resolution than the OEM can. Even though the Epson ABW system is run on the Epson driver and engineered by Epson – does not mean that it is the best way in which to print black & white on an Epson printer. To the contrary, additional shades of ink in combination with the QTR printer driver means that the minute unprinted areas of the paper media as found with the OEM dithering, will instead be filled with Piezography ink carrying detail. In this case, a significant amount of scanning resolution that does not exceed the optical limits of the scanner will produce more detail than the OEM.

In fact, anyone will tell you that anything more than 360 ppi is wasted on the Epson printer driver. But, printing at 1000 ppi with Piezography actually results in significantly more detail. You would not want to add this resolution to the image file by resizing. Resizing is actually less effective as a way to increase the printed image size than simply scaling in the printer driver. But, if your scanner as a high optical resolution, and you do not exceed the amount of silver grains in your negative, by all means scan at the highest optical resolution you can. Optical resolutions are a specification usually much lower than the highest possible setting in your scanners operating software. Check your scanners specifications.

We can say that smooth tone and high optical resolution are certainly welcome, though not necessary. I routinely shoot with a blackberry cell phone camera and realize beautiful Piezography prints from very low optical resolution. The jpeg artifacting of the cell phone looks like film grain, and the prints are very smooth and appear to have more resolution that the small cell phone would seem capable of producing. So do not let 6 mega pixels or low-resolution scans frighten you away. I routinely print 3 mega pixel blackberry cell phone images. In fact, I take my cell phone captures very seriously. I have several years worth of portfolios I have produced using blackberry phones. Some of which I have bought for the quirky camera I have become so endeared with.

The old adage of "garbage in garbage out" certainly holds true for Piezography. If the work originates as a scan, it is most certain that the work needs to be scanned correctly. It is still easy to secure drum scanning from studios including Cone Editions Press (Vermont), but its expensive. On large format film, drum scanning definitely allows the process to exceed even one's greatest imagination of what a fine print can be. But, an OEM print would be improved with drum scanning. So it's not a requisite for Piezography – just a shortcut to a higher level of Piezography.

A consumer level scanner such as the Epson Perfection V750 (which I also own) can be used to produce scans provided that the film negative's film base+ fog and fully exposed film leader are chosen as the end points. They can be dMin and dMax if scanned as a negative. However, often consumer grade scanners scan without imposing some "algorithm of tone destruction" when the negative is scanned as a positive and inverted later in Photoshop. In this case the film base+ fog will end up being the dMin and the fully exposed leader the dMax.

By setting these two end points and turning off automation (*the most important thing to do is turn off automation and take responsibility*) in the scanner, everything that is denser than film base+ fog and lighter than fully exposed film leader will scan as detail for the print. If you can identify the 50% gray in your negative, try and get that to be the mid-point or about 128 in RGB talk - 50% in grayscale language.

If I sound like I am simplifying it, I am. Scanning negatives for print is an art. But, if you're not sure what you are doing it often is no more than a matter of identifying the white and black points and setting the mid-point. The white and black points should always be the film without exposure and fully exposed so that everything else falls correctly in place. Later as you begin working more and more with your scanner, you may be able to apply a correction curve that maps out more than the mid-point.

Almost all scanners allow the user to set tone curves for correction. When you turning off the auto contrast and auto adjustment features, look for tone curves and end points… It is better to scan in the correct tone space than to repair it later in Photoshop. The same would be said for working with OEM systems!

Once the film is scanned, or an image captured from a digital camera, it is best to make a proof before making too many Photoshop adjustments. In order to preview your work, you must work in Photoshop using Grayscale Gamma 2.2 as your grayscale workspace setting when you work on your Grayscale file. Gamma 2.2 must be assigned to the file. The reason for this is that Piezography K7 curves print with a Gamma of 2.2. If you prefer to work in RGB Grayscale, then your working space should be a Gamma 2.2 RGB Space such as Adobe RGB 1998. I prefer to use a single channel 16 bit Grayscale. But, QTR will work with 8 or 16bit RGB Grayscale or 8 or 16bit Grayscale images.

Naturally, this means that you need to follow our examples when printing out of Photoshop on Macs. Photoshop versions CS3 and earlier work differently than versions CS4 and later. Common mistakes are using the Gray Matte profile as recommended by the QTR manual. You must read our manual. You must follow our instructions or the perfect tonal linearization will not occur. That possibly is the biggest pitfall of trying to do things in Piezography without reading my manual, or reading the wrong manual (QTR manual). Piezography is not compatible with standard QTR workflow. We use a variant to make the K7 curves. You need to follow that variant when you print.

Calibration of the display to an output device is not as easy today as it used to be with CRT displays. So I advise always that you respond to the print rather than the display unless you can count on the accuracy of your display calibration. If you're lucky enough to have a hardware calibrated Eizo like I have, you will find it easy to calibrate to your output using their Navigator and a supported instrument.

But, if you have LCD displays in which the brightness cannot be turned down to match the brightness of a print - you are a little disadvantaged. Often these exceed 110 candelas of illumination. 80-85 is about the correct brightness for calibration to print. 110 would be better for matching to another LCD or to video, or film output that is intended to be backlit. Prints are not that bright. Their dynamic range is very short in comparison to a fully bright display.

But, in any event, resist doing what most the Photoshop gurus advise about enhancing your images prior to printing. Most of the popular Photoshop gurus do not print Piezography and are more experts in the use of Photoshop than they are fine printing. It is rare to find a workshop that focuses on printing by printing experts.

Those who are experts in fine printing understand that the generalizations made for printing black & white images with color inks systems do not apply to Piezography, because Piezography can print what these color (including ABW) systems can not - and you may wish to include the nether regions of shadows and highlights in your work, rather than punching up the contrast as most Photoshop gurus like to teach. Just make a proof! Look at the proof. Respond to the proof. Let the proof tell you what to do.

In other words, you may not "have" to equalize an image or move the end-points in towards where the first data are in the histogram. You certainly would not have to do that with a subject matter such as low contrast landscape, etc. Make the proof first to arrive at critical decisions like this, rather than following the advice of Photoshop books. We called that *willy nilly imaging* when you do what you think you are supposed to do without thinking why you are doing it in the first place beyond that you read you are supposed to.

Never sharpen the image unless you are at pixels view (100% magnification). If it looks too sharp - it is! Try this basic setting of unmask sharpening at 150%, 0.7, 0. Take a look at this standard - and use

the new Photoshop smart sharpen tools in a way that does not exceed the contrast line built by my USM settings. You should not be able to see contrast lines - they print with Piezography. Contrast lines form between the very light and very dark tone areas of your image when you apply to much sharpening.

Black? My University professor said I had to have a "real" black in all my silver prints. It was not until an exhibition of my work in 2003 that I dared not print a pure black and a pure white. An old school photographer came up to me and told me I was "real brave" for making prints like that. He further said he has never seen such naturalistic landscape photography, and noted that they were well beyond the craft he could carry out in the darkroom. I almost shocked him when I said they were digital captures printed with Piezography inks on an inkjet printer. The point is that they were fine prints, and that the use of black and the use of white are not requisites.

Black and white are rarely found in nature. Unfortunately, silver film often can't capture what is just inside them, and silver paper certainly cannot fulfill what silver captures. So the human eye and many digital cameras can actually capture a much wider range of tone than traditional photographers may be used to. For many coming to digital and Piezography simultaneously – this can be unsettling. Scanning negatives once believed to be too thin or too dense for printing, and capturing full range negatives will reveal detail in shadows and highlights not previously printable in the darkroom. So easy on those Levels! Make a proof and see what you wish to keep in these regions. You don't have to be brave to make a fine print, but it does crank it up a level when you can fully realize the tone.

Since Piezography only prints black when a pixel has a value of 0. Pixel values of 1 actually print lighter than Black. In an OEM system they won't. In an OEM system black and near black are usually printed as black. The eye can see shadow detail in a Piezography print as it increases from 0. The eye can differentiate every tone from 0-255 in a Piezography print. The seven shades of ink produce tens of thousands of gray values on the print, so this type of tonal separation is part of the correct Piezography process.

So do you really want black where you could instead have detail? Don't just move the end points in to destroy all that wonderful detail. Use a technique like (Where is the black? In the Technical Support section of www.piezography.com) to selectively enhance blacks while keeping many of the other tones untouched.

We were taught to make blacks in silver prints because the darkest gray was so far up the tonal scale. But, in Piezography, the darkest gray is just a hair away from black. So this is the new area for which you have to play with. If you are scanning negatives, silver paper cannot print this area. It's locked into the film like a secret. So this might be new territory for you - and it might appear to make your prints "flat". But, I assure you that with some experience, and the realization that pure black is rare in nature - you will find this the richest area of your Piezography exploration.

Now this is not to say that if you hate shadow and highlight detail (and prefer to blow these out in favor of a strong black and or white) that your Piezography prints will not be fine. They will be fine representations of that style of printing. I was simply giving a hint as to what the Piezography print can unlock for you.

If you find that you need to correct your exposure, than use a Photoshop curve rather than levels. Of course in Raw you accomplish so much more. But, if you must rely on fixing with Levels or Curves, choose Curves. Keep the end-points where they are (0, 255) and use the curve to add contrast without clipping the end points, as Levels would do by moving the end-points in. This will allow you to extend the tone outwards towards black and or white as you need, but without losing detail. It will punch some holes in 8 bit images, but unless the move is very severe, the human eye cannot detect as much as you have been told.

When you print, make sure you follow the instructions that we set forth rather than the Roy Harrington or Tom Moore QTR manuals. K7 curves are incompatible with the QTR manual workflow. It makes a big difference. Use the Jon Cone Manuals (http://www.piezography.com/PiezoPress/about/technical-support/).

Choose a good paper. If really black blacks are important to you, then you need a paper coating such as found on Hahnemuhle, Canson or JonCone Studio papers. Moab and InkPress papers are adequate for images that do not depend upon contrast or deep blacks. They are about a full stop less dark capable than the first papers I suggested (if you are using Piezography inks). If you are using Piezography Glossy, you must overprint with Piezography Gloss Overprint.

Never use a K7 curve that is not explicitly designed for the media you are printing. Custom K7 curves are available from inkjetmall.com. Make certain that your curves follow this format K7(orK6)-2880-xxxxxx.quad where xxxxx is the paper name. All of our K7 and K6 curves are made at 2880 dpi printer settings. All of them start with either K6 or K7. If the one you have selected does not start with the K6 or K7, you have probably not installed your QTR system completely or are using the wrong printer setup. There are many QTR printer setups, but only a few Piezography setups. Read our manual!

Push the button.

Your work is done.

You've made as great a print as you can of your black & white image.

In subsequent papers, I will write about great Piezography techniques, so we can help you become an even greater printmaker.

I hope this paper proves useful to you!

Happy printing,

Jon Cone