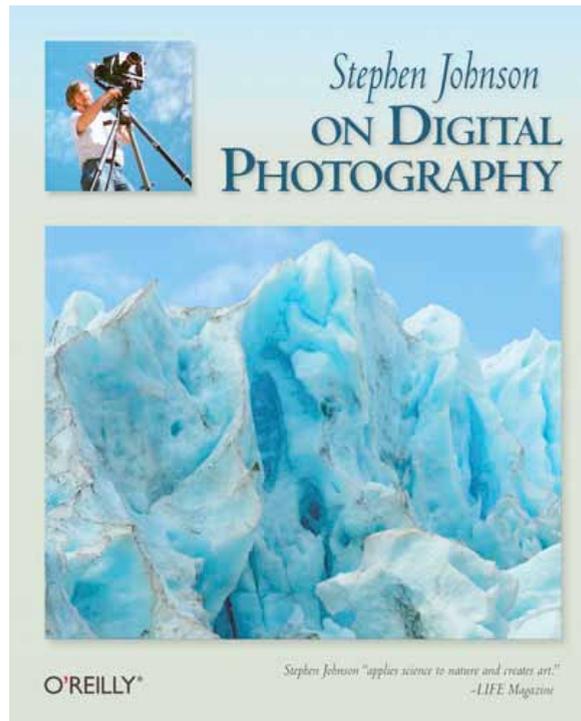


This pdf is an excerpt from
Stephen Johnson on Digital Photography
and is provided here as a source of information and
encouragement to purchase the book.



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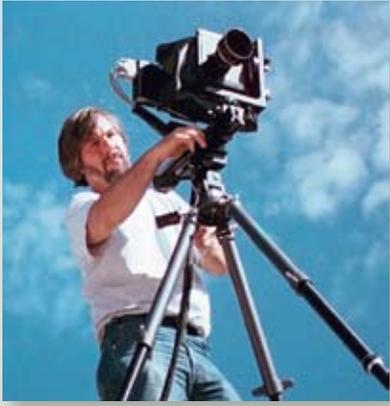
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Stephen Johnson ON DIGITAL PHOTOGRAPHY



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*Stephen Johnson "applies science to nature and creates art."
-LIFE Magazine*

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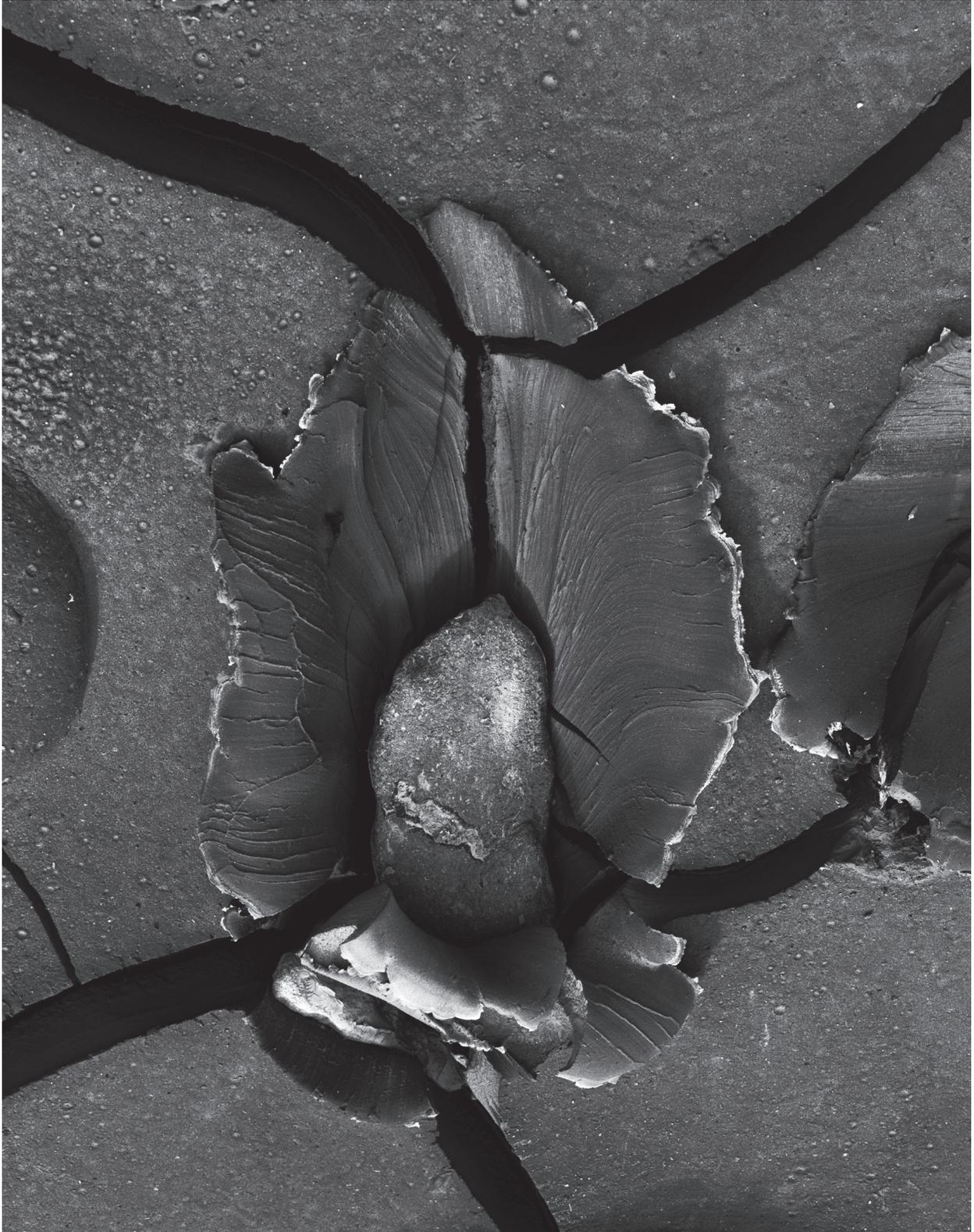
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Mudflower, Death Valley, 1978.
6x7cm Ilford FP4 negative. Scanner: Imacon Precision II scanner.

Chapter 12: Duotones and Photographic Reproduction

Printing technology has evolved dramatically since Guttenberg and his movable type. After the invention of photography in the 1830s, the desire to reproduce photographs on a printing press was frustrated until the development of the halftone screen in the 1860s. (The effort to develop color printing was its own hill to climb.) But basic photographic reproduction lacked the beauty of the photographs themselves. This challenge was experimented with for most of the 20th century, and by the 1950s and 60s, high-craft multiple-ink printing was being skillfully explored as a means of reproducing fine-art photographs. By the late 1970s, high-end drum scanners and laser-based imagesetters were addressing the issue with even greater potential.

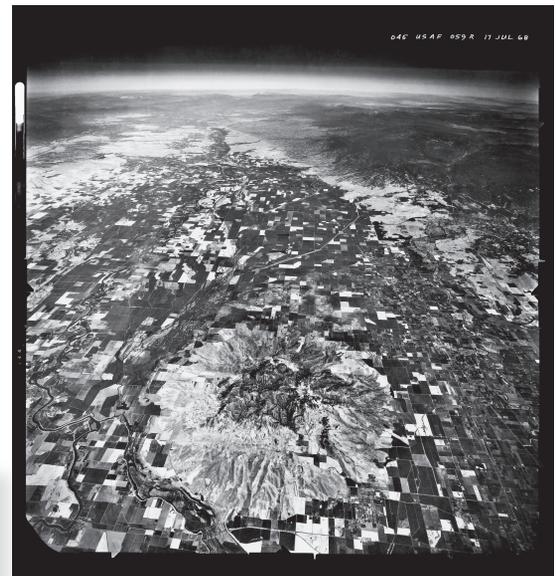
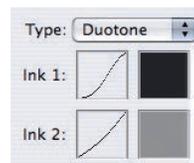
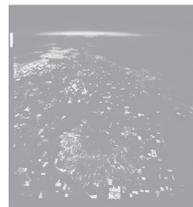
Halftone Reproduction in Black and White Photography

Single-color halftone reproductions of photographs don't fully imitate the tonal range of a black-and-white photographic print. Blacks and whites are sacrificed and turned gray in order to hold detail in both the shadows and highlights. Duotone, tritone, and quadtone reproduction allows for up to four printing plates and ink colors to be used to print a black-and-white photograph. The Photoshop Duotone feature is designed so that up to four inks (with differing tonal curves and inks) can be applied to a single grayscale image. Thus the feature allows a high level of customization of ink color and printing density, which will reproduce rich tonal ranges and imitate color casts that might be found in historical or toned work.

For example, the use of black ink might be restricted to printing only the shadow detail and some midtone values, while light gray ink might be used to print highlights. By distributing different tonal ranges in the print to specific ink colors, many of the shortcomings of photomechanical reproduction are overcome. Additionally, the process allows for a great deal of freedom to reinterpret the photograph on the printing press, because different areas of the tonal range can be lightened or darkened without effecting other critical areas in the image.

Duotone Techniques from *The Great Central Valley Book*

Reproduction of the black-and-white photographs in our book posed a number of challenges. First, the quality of the historic photographs we chose varied widely. Some images had great contrast, while others were quite flat. Nevertheless, I wanted all the images in the book to visually belong together and reproduce as beautifully as possible. I adjusted the scans considerably (and frequently re-scanned), but often the real opportunity to achieve my goal came when creating Duotone curves for reproduction. I was able to create curves that allowed for no black ink in the highlights. The upper ranges of tones were carried entirely by a light gray ink (PMS 423) well suited for the tonal areas it represented.



Sacramento Valley from 60,000 feet. 1968. USAF. Scanner: Agfa Horizon. Source Images: USGS 9x9 inch print. left: Progressives (black plate and gray plate) and Duotone curves. top: Conventional single color halftone. lower above: Duotone.

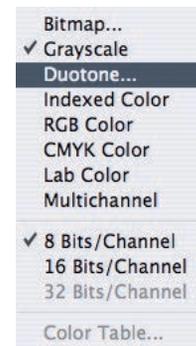
A Duotone Primer

The main reason to create the Duotone feature was to allow for rich tonal reproduction of black-and-white photographs on printing presses. It allows for special colors of ink to be used to customize the reproduction. Additionally, special colors used on a job can be applied to images for thematic and tone enrichment purposes.

The Methodology

Here's the basic methodology for creating effective Duotone images:

1. Start with a grayscale image.
2. Transform it to Duotone under the Image/Mode menu.
3. Load one of my Duotone presets, or build your own custom inks and curves.
4. Use two or more colors of ink to reproduce a black-and-white grayscale image. For a silvery fine-art black-and-white reproduction, choose a light gray ink and a black.
5. For greatest fidelity to the original black-and-white print, choose black ink for shadows and lower midrange values, and use a second ink color (chosen to match tint of image) to print the upper midrange and highlight values.
6. Distribute the tonal range so that color and tonal values can be adjusted on press.
7. Screen angles should be 30 degrees apart for each color of ink. Setup is through Photoshop's Print/Output drop down/Screen button.
8. Save out as EPS or PSD file for maximum compatibility. Make sure that the ink colors called for are the exact same names as you have previously assigned in your page layout software or additional color plates will be generated. Unneeded plates or film might be made or images dropped from where you expect them to be.



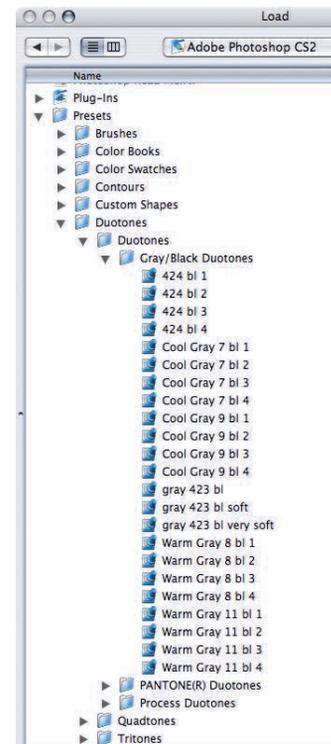
Proofing Duotones

Inkjets do not proof Duotones unless you have the special inks in the printer and the software to control them. Approximations can be created by changing the Duotone file to RGB, then printing.

The only prepress proofing that I am aware of that works for Duotones uses the Cromalin process mixing special colors with toner powders and imaging from separation film. It is expensive, but does proof your prepress film with good accuracy.

Checking Duotones on Press

1. Check the Duotones on press—don't leave it up to the printer to interpret what you are trying to achieve with your Duotones. You really do need to be on press.
2. If you have prepared the file for the black plate to print shadows and gray ink for midtones and highlights, you have a great deal of flexibility to vary the ink on press to achieve the look and feel you like. Most of the adjustments made will likely be in the black ink, which can also affect your type on the page. (Ideally you would have a second black unrelated to type for your Duotone.)
3. Reduce black for a grayer reproduction, and increase it for denser shadows. Depending on the steepness of the contrast curve used on the black printer, either your black inks will creep into the midtone and darken your overall reproduction or it will only affect shadows.
4. Be careful of varnishes on your image, as they can yellow over time and change the image color.



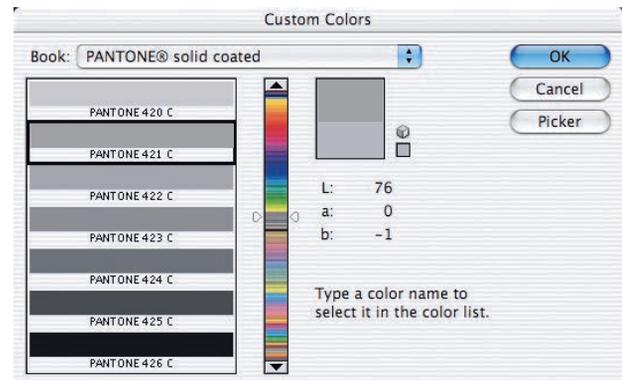
above: the gray/black Duotone presets.

Duotone Curves

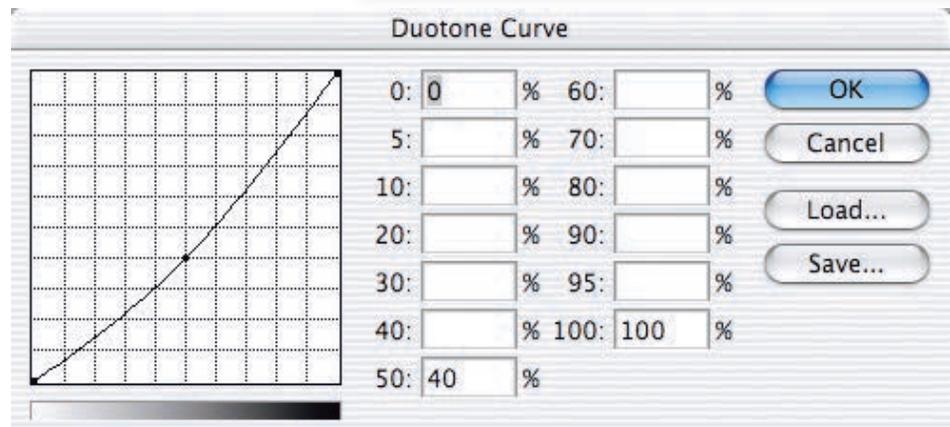
A Duotone curve controls the contrast and ink distribution on the reproduction printing plates. The Duotone mode (under Image>Mode) controls and previews this function. Editing a Duotone curve can, at first, be a strange experience—they take a little getting use to. On the upper right of the curve graphic below is the shadow point (or 100% ink density); on the lower left are highlights (0%). The shape of the curve determines the distribution of ink in the image. Unedited digital files open with straight-line curves, where each of the data points will print as commanded by the density of the digital information in the file (50% as 50%).

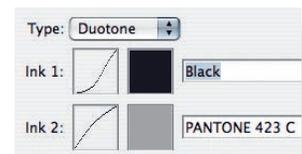
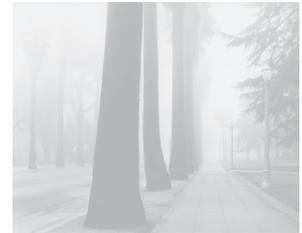
The Curves dialog box essentially lets you remap the distribution of up to four different ink colors applied to the image. If you want the midtones darker in a particular ink color, simply click on that ink's curve and pull the 50% point on the curve to a higher point on the graph (or type a larger number into the 50% box on the percentage boxes). Conversely, if you want a lighter tonal range, pull the curve downward. The changes you make can be previewed on the screen, in full color, by clicking the Preview checkbox. As I mentioned earlier, I've generally achieved the best results by limiting the application of black ink to the shadows and midtones, and calling for a lighter gray ink to carry the highlights.

Photoshop comes with 137 sample curves I wrote for Adobe. These curves are arranged in Duotone, tritone, and quadtone folders, and are further divided by black and gray combinations, process colors, and special Pantone ink combinations. I included multiple versions of many of the Duotone curves, in a series from 1 to 4, where 1 is the most intense application of the second color and 4 is the most subtle. My curves should give you some ideas and get you started, but every photograph needs slightly different treatment—so experiment.



above right: Duotone Presets.
middle right: Custom Colors
selecting a gray ink (PMS 421)
for midtone and highlights.
right: Photoshop's Duotone Curve
dialog box.





Fog, Downtown Sacramento, 1989. Stephen Johnson.
Scanner: UMAX 1200, CCD flatbed scanner.
Duotone Separations: Adobe Photoshop.
Source Images: 6x7 Agfapan 25 negative.

upper right: Progressives (black plate and gray plate)
and duotone curves.
upper left: Duotone.
left: Conventional single color halftone.

Duotone Examples

These images are good examples of the range of photographs in the Central Valley book. The USAF photograph on the opening pages of this chapter had been printed in the darkroom to reveal maximum information; consequently, the print was quite gray. I was able to achieve a much wider range of tones with my custom Duotone curves, building rich blacks and snowy whites into the reproduction.

The fog photograph from Sacramento brings back many memories of long foggy winters in the valley. The silvery quality of fog was particularly well suited to letting the gray 423 carry all highlight detail, with a somewhat contrasty black plate deepening the darker values in the trees.

Duotone Options

Type: Duotone

Ink 1: Black

Ink 2: PANTONE 423 C

Preview

Duotone Curve

0:	0	%	60:		%
5:		%	70:		%
10:		%	80:	68.8	%
20:		%	90:		%
30:	5.6	%	95:		%
40:		%	100:	100	%
50:	20.6	%			

Duotone Curve

0:	0.5	%	60:		%
5:		%	70:		%
10:		%	80:		%
20:		%	90:		%
30:		%	95:		%
40:		%	100:	100	%
50:	70	%			



Buck and Tommy, Merced, 1976.
Scanner: Leafscan 45, CCD film scanner.
Duotone Separations: Adobe Photoshop.
Source Images: 4x5 Kodak Plus-X negative.



Duotone Options

Type: Duotone

Ink 1: Black

Ink 2: PANTONE 423 C

Preview

Duotone Curve

0:	0	%	60:		%
5:		%	70:		%
10:		%	80:		%
20:		%	90:		%
30:		%	95:		%
40:		%	100:	100	%
50:	36.3	%			

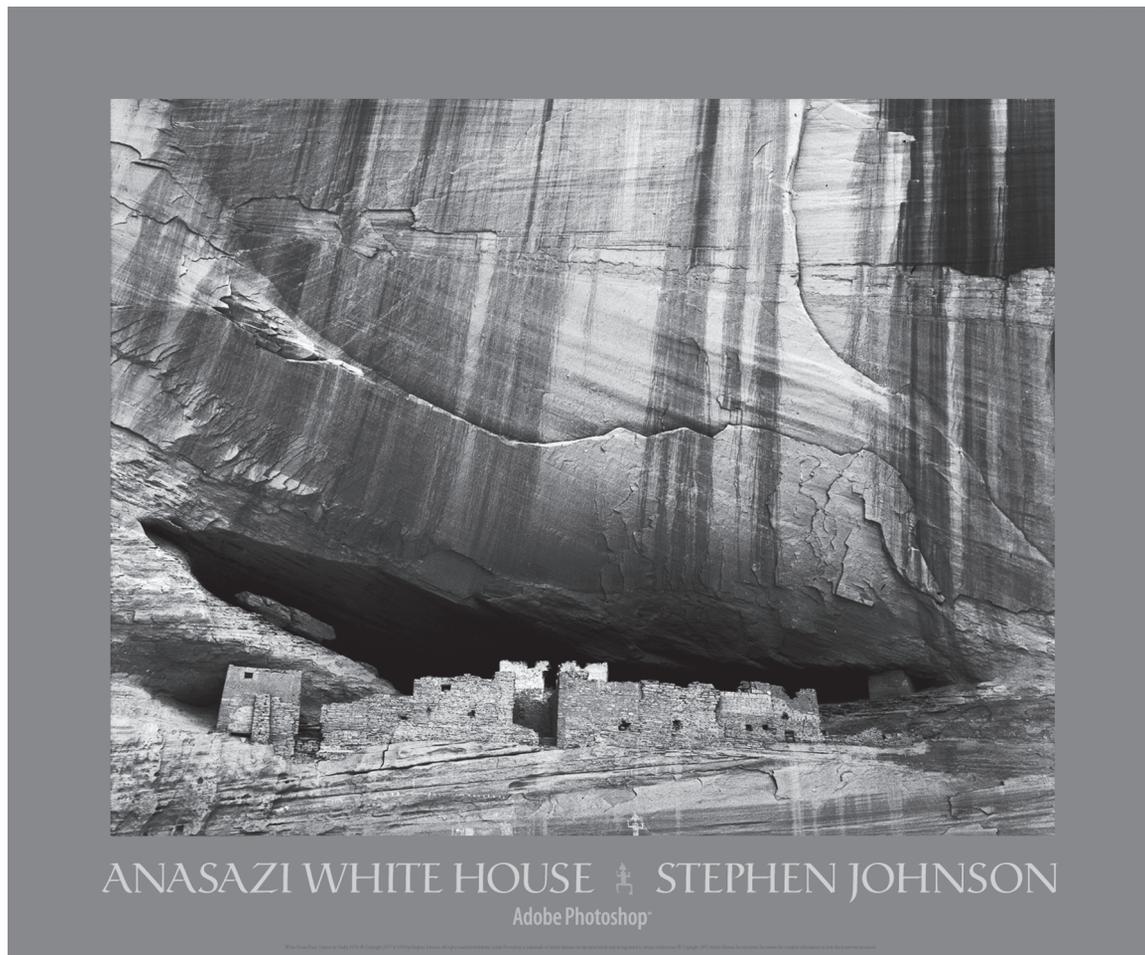
Duotone Curve

0:	0.5	%	60:		%
5:		%	70:		%
10:		%	80:		%
20:		%	90:		%
30:		%	95:		%
40:		%	100:	100	%
50:	38.1	%			

The upper right reproduction used a heavy application of the 423 gray, carrying all of the highlight and most of the midtone values. The reproduction above has a more equal application of both inks, with less detailed, deeper shadows. These curves using PMS 423 are based on the black/warm gray 8 curves 1 and 4 in the Duotones folder.



Merced River Canyon, infrared, Yosemite National Park, 1994.
BetterLight Scanning Camera. 6000x7520 pixels. 12-bit. Tri-Linear Array.



About 20,000 posters were distributed at the Adobe booth during Seybold San Francisco in the fall of 1993. As posters were brought in, the stacks stood five feet tall, but shrank rapidly, requiring constant replenishment. The poster is still in print from me.

The Adobe Anasazi Poster Project

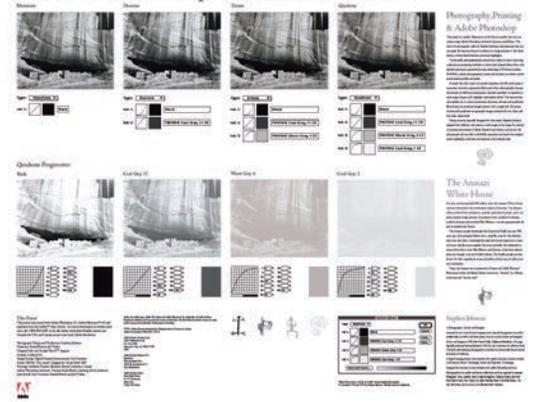
In 1993, our second Duotone promotional poster for Adobe used my photograph of the White House ruin from Canyon de Chelly National Monument in Arizona. It was printed as quadtone with dull and gloss varnish. We wanted the poster to be beautiful and informative, so the back contained a fairly complete tutorial on how the poster was assembled.

As a quadtone project, a series of four inks were chosen to build density and image color:

- ◆ Black for the shadows
- ◆ Pantone Cool Gray 11 for midtones
- ◆ Warm Gray 4 for the upper midtone values
- ◆ Cool Gray 1 for the highlight casts

(posters available at www.sjphoto.com)

Adobe Photoshop® Reference: Duotones



Original Poster Credits.

This poster was created with Adobe Photoshop 2.5, Adobe Illustrator™ 5.0. Photograph, Design and Production: Stephen Johnson. Direction: Russell Brown, Jeff Parker. Original Film: 4 x 5 Kodak Plus-X™ negative. Scanner: Leafscan 45. Image Setting: Digital Prepress International, San Francisco. Printing: Hemlock Printers, Burnaby, British Columbia, Canada.

Stephen Johnson ON DIGITAL PHOTOGRAPHY



Stonehenge at Dawn, 1996.

Perspectives & Techniques from a Digital Photography Pioneer Exploring the Intersection of Art & Technology

This practical guide from master photographer Stephen Johnson chronicles his own expedition on the bleeding edge of digital photography's evolving frontier. He explores a wide range of subjects, from basic camera techniques, to the ethical issues of digital imaging, to technological innovations for the future. What sets this book apart is its approach and execution. This isn't a Photoshop book, although Photoshop is part of the story. It's a book that reflects a master teacher and photographer's lifetime of showing others how to understand and take great photographs.

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- ◆ *Teaching photography*
- ◆ *The future of digital imaging*



photo by Steve Somers

Stephen Johnson is internationally recognized as a digital photography pioneer. His photographs are part of the collections of many institutions, including the J. Paul Getty Museum, the Oakland Museum, the City of New York, the U.S. State Department, and the National Park Service. *With a New Eye*, his digital national parks project, literally made photographic history.

His work in digital photography is renowned. His consulting has influenced products at the core of digital imaging for such clients as Adobe Systems, Apple Computer, Eastman Kodak, Epson, Foveon, and Hewlett-Packard. His work with Adobe includes consulting on the development of Photoshop since 1992 and the creation of Photoshop's Duotone feature.

In 1999, *Folio* magazine declared the publication of Johnson's digital photographs in *LIFE* magazine to be one of the "Top 15 Critical Events" in magazine publishing in the 20th century. He was named to the *Photoshop Hall of Fame* in 2003 for his achievements in Art.

Johnson is "...the preeminent digital landscape photographer." He creates images "unlike anything possible on film..." His prints are "remarkably vibrant, and the details seem to jump out from the image."

—Photo Insider