The Digital Fine Print Workshop

Adobe Photoshop CS

16-bit Layer Workflow Supplement

Special

Optipix 2

Edition

Overview
16-bit Layer Workflow

Step 1: Input and Copy (Background Layer)
Input (Scanned 16-bit file or 16-bit Camera
Raw file) converted to TIFF or PSD format into
Photoshop CS. Make a copy and use this as the
Background for the Layer Workflow.

All Blend Exposure and gross dynamic range
changes with Optipix 2 should be done at this
stage and incorporated into the Background.
We want to start with as optimized an image as
possible for the single Background image.

When you get an Optimized Background Layer,
create a copy of it by draging it to the New Layer
icon at the base of the Layers Palette. Rename
this Layer **local contrast/color**. Just above
the local contrast/color layer create a Levels
Adjustment Layer and rename it global contrast/
color. Above the global contrast/color layer
create a final Layer (by clicking on the New Layer
icon at the bottom of the Layers Palette) and
rename it cleanup. Refer to the diagram on page
4.

Step 2: Global Contrast Correction, Proof Setup, and Global Color Correction (global contrast/color layer)

With a color image we can first make a Proof Setup in Photoshop to put the image in the correct color profile of the paper and ink we want to print on before we correct the Global Contrast and Color. With the Levels Adjustment Layer (global contrast/color layer) we can perform both the Global Contrast and Color at the same time.

Step 3: Local Contrast and Color Correction (local contrast/color layer)

Using the History Brush in various ways we can lighten, darken, and correct the contrast of local areas in the image and paint in local color corrections.

Step 4: Cleanup (cleanup layer)

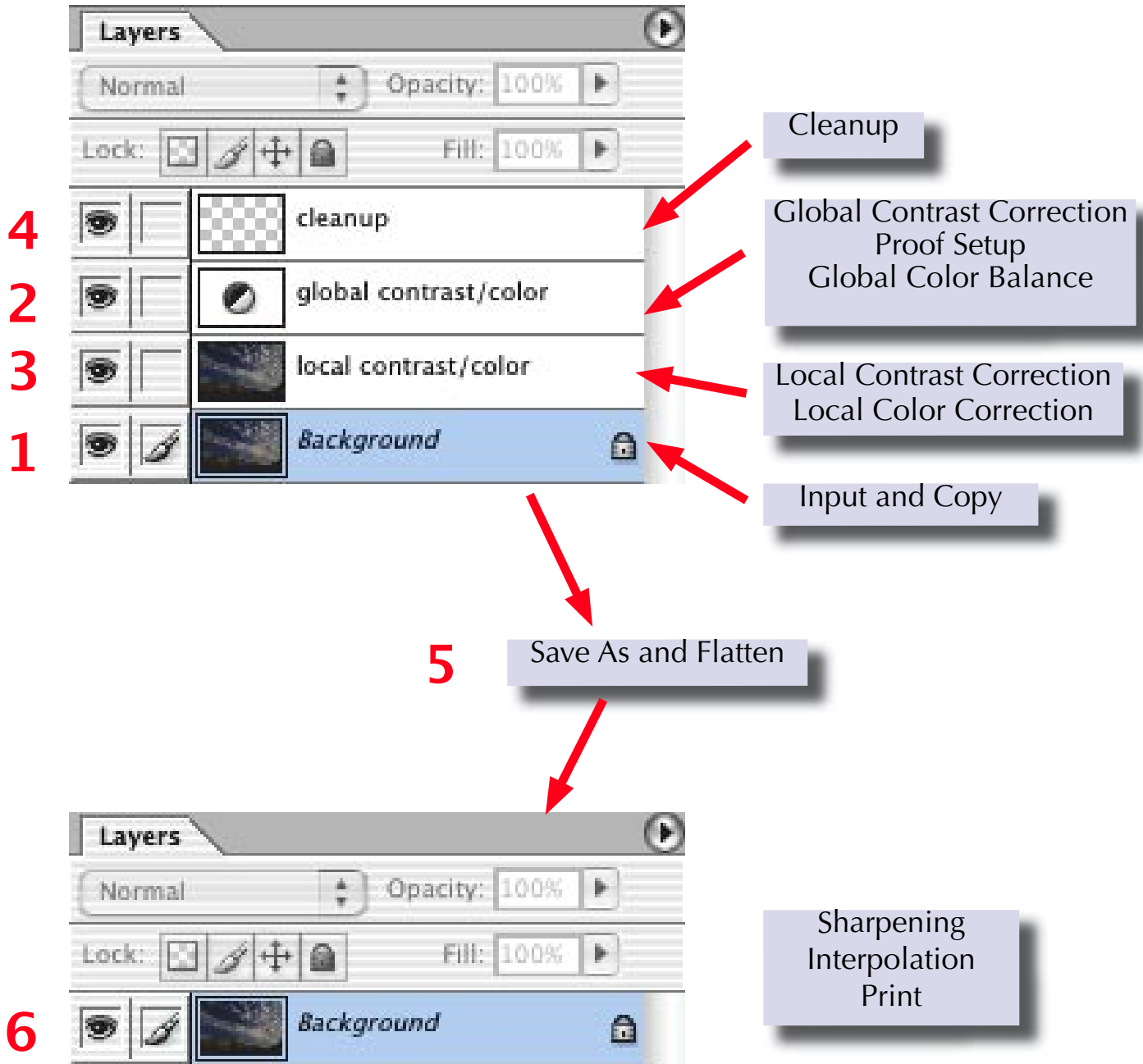Cleanup involves the use of the Clone tool and the Patch Tool to get rid of defects.

Step 5: Save As and Flatten

After Step 4 Save As the image in PhotoshopCS, rename it and flatten the layers in the new file.
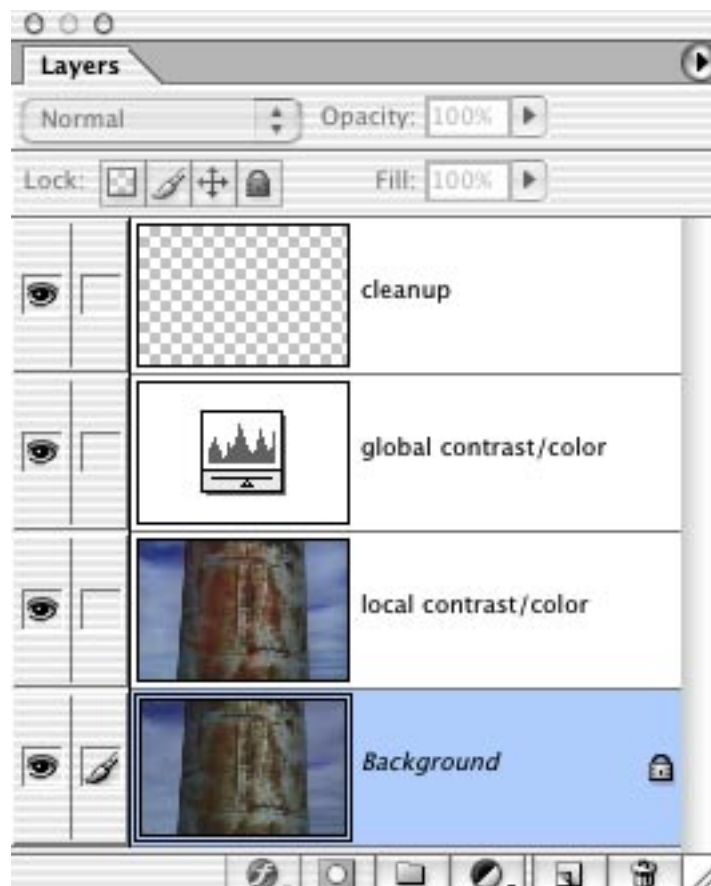
Step 6: Sharpening, Interpolation. Print

The flattened image can now be sharpened with Safe Sharpen or Detail Sharpener and interpolated (upsized) if necessary. Print using the printer's software or appropriate RIP.

16-bit Layer Workflow

Cleanup

**Global Contrast Correction
Proof Setup
Global Color Balance**

**Local Contrast Correction
Local Color Correction**

Input and Copy

Layers panel (top):
- Normal · Opacity: 100%
- Lock: · Fill: 100%
- **4** — cleanup
- **2** — global contrast/color
- **3** — local contrast/color
- **1** — Background 🔒

5 — **Save As and Flatten**

Layers panel (bottom):
- Normal · Opacity: 100%
- Lock: · Fill: 100%
- **6** — Background 🔒

**Sharpening
Interpolation
Print**

Step 1
Input and Copy
(Background Layer)

Input and Copy

When you import a 16-bit image into Photoshop the first thing you should do is make a copy (File > Save As) of it and put it into a folder made especially for that image on the desktop. *If there are two or more images that are going to be used for optimizing the dynamic range of the image, such as the Detail Sharpen Technique or Blend Exposures, perform these operations (described on pages 6-13) before making the Layer stack for the workflow.*

Copy

Photo 1 folder

Controlling Contrast in 16-bits

In Photoshop CS we are limited in controlling contrast. Optipix2 overcomes this problem with a number of solutions. First, for contrasty images (where the Histogram is slightly clipped on the White and Black ends), especially those with problems both in the highlights and shadows, is done with Levels Optipix's Detail Sharpener, and Auto Contrast. Another method offers complete control over severe contrast with Blend Exposures in Optipix2. For underexposed or flat images Optipix2 offers the Auto Contrast control for correcting overall contrast.

The whole idea behind correcting overall contrast in 16 bit files is to begin the workflow with the very best image you can work with and maintain that quality throughout the process of editing and optimizing until a high quality print is produced.

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Levels / Detail Sharpener / Auto Contrast

The trio of Photoshop Levels, Optipix 2 Detail Sharpener, and Optipix 2 Auto Contrast combine to allow an image that is terminated and slightly clipped at both ends to be optimally corrected for overall contrast.
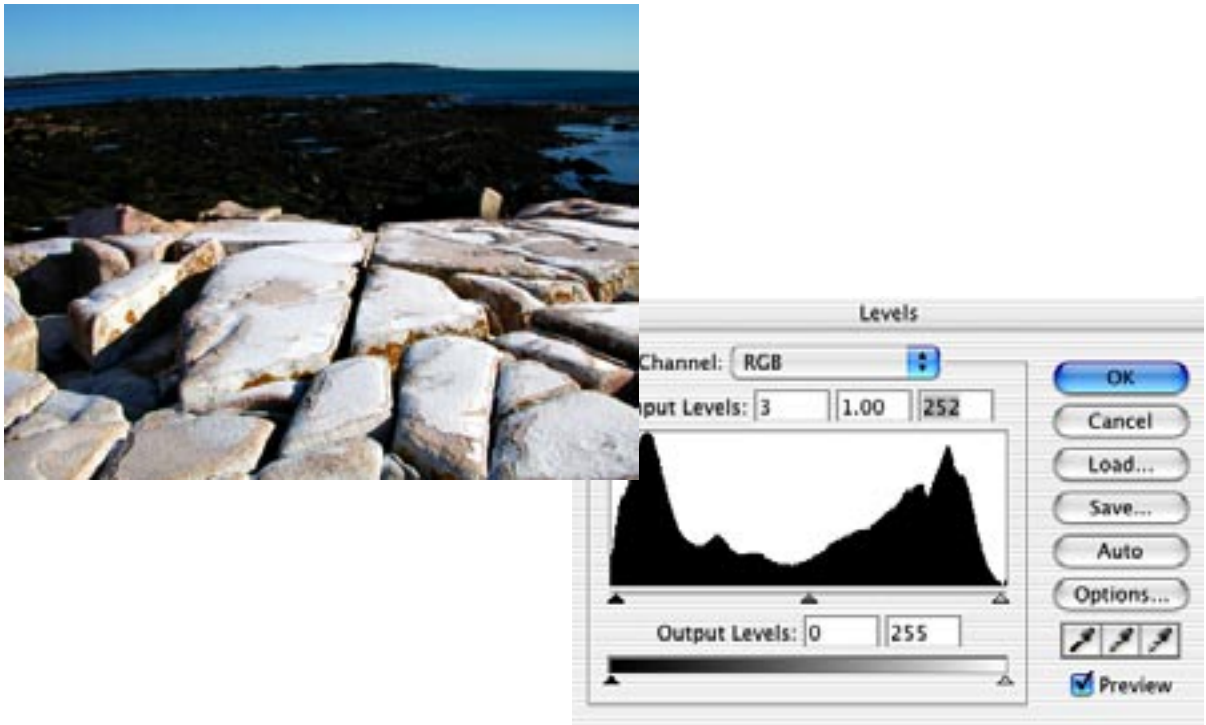

Notice how both dark and light areas of the image are almost devoid of detail and how the Histogram reflects this situation by a terminated and slightly clipped display. The problem here is to reduce the luminance range, improve the detail in the highlights and shadows, and then correct the overall contrast.

Levels / Detail Sharpener /Auto Contrast

Adjust the Output Levels
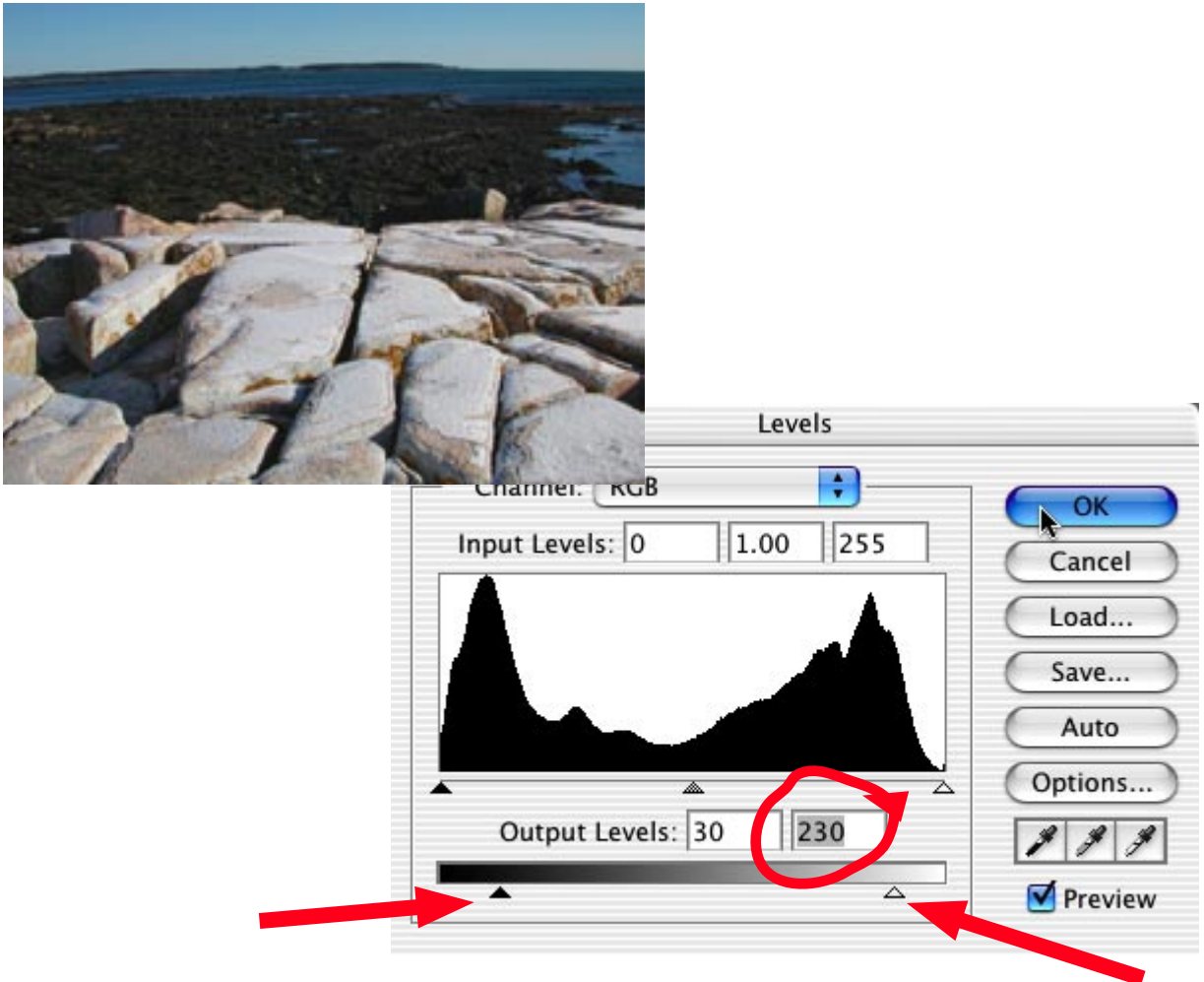
Move the Black and White Output Levels sliders inward to approximately 30 and 230 respectively. This reduces the overall contrast, but the detail in the highlights and the shadows is now flat and uninteresting. Because you have a 16-bit image, no detail will be lost.
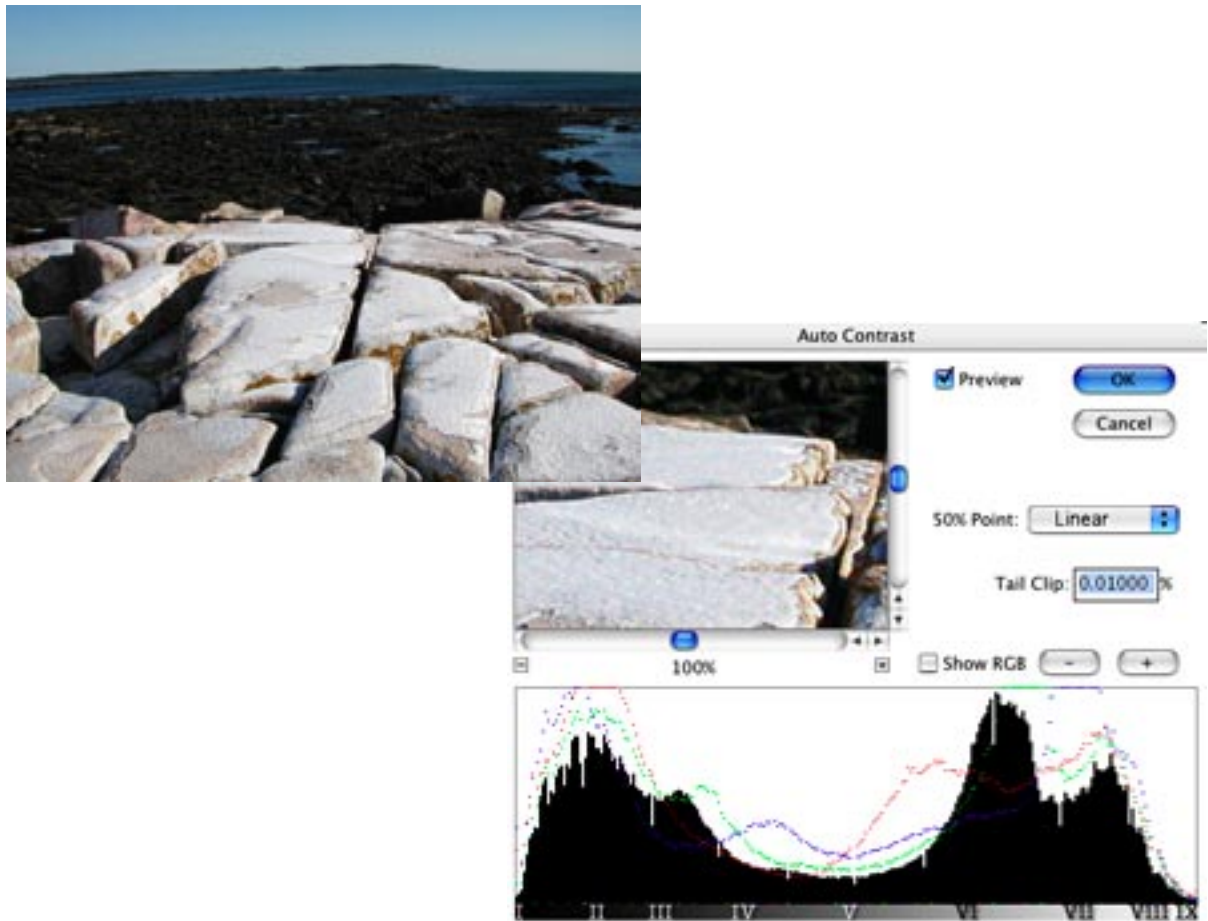
Levels / Detail Sharpener / Auto Contrast

Detail Sharpener

Go to Filter > Optipix > Detail Sharpener and set the Neighborhood Radius at 10, the Color Tolerance at 20, and the Detail Emphasis at 100. These numbers are arbitrary and you will need to play with them on each image to determine the correct settings. Notice how the quality of the detail is improved. The highlights and shadows are greatly improved from the previous photograph.

Levels / Detail Sharpener / Auto Contrast

Auto Contrast

Go to Filter > Optipix > Auto Contrast, set the 50% Point to Linear and the Tail Clip to 0.01. This correction gives a slight increase in contrast but does not affect the color or the detail rendered in Detail Sharpener. Clipping is so small that it is not noticeable by the human eye.

Blend Exposures

If a scene contrast is too great to accommodate both the highlights and the shadows of the image, Put the camera on a tripod and take two exposures one overexposed one stop and one underexposed one stop (you may want to take more exposures if the scene contrast is extreme).

1. Open both exposures in Photoshop and select the Underexposed image as the active photograph.
2. Choose Filter > Optipix > Setup 2nd Image.
3. Select the Overexposed image.
4. Choose Filter > Optipix > Blend Exposures.
5. Choose Image > Duplicate.
6. Rename and Save.

Blend Exposures

Underexposure

Overexposure

Blended Exposures

Background Layer

Step 2
Global Contrast Correction, Proof Setup, and Global Color Correction
(global contrast/color Layer)
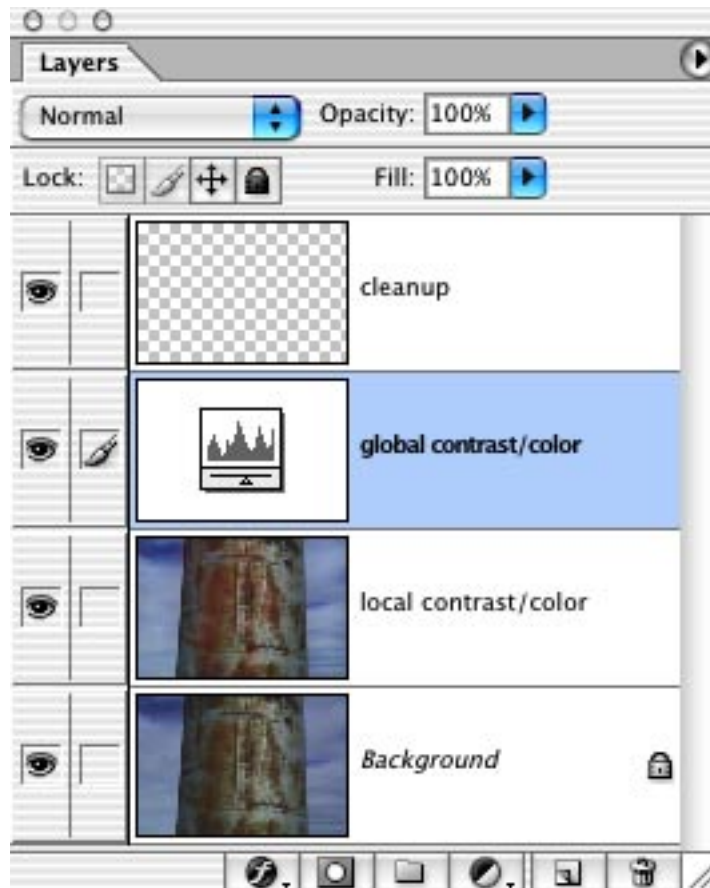
Proof Setup

If you are printing out of an inkjet printer from the desktop, you need to view the image in the correct Proof Setup, or Profile, for the screen picture to match the printed one. Many photographers advocate making this proof at the end of the workflow, but there is a compelling reason to do it here: You need to view the image correctly, as it will be printed, before you balance the overall color. If you don't, you'll be balancing the color twice, once for the Color working space (Adobe RGB 1998) and again for the Proof Setup profile. You need to make another copy of the image at this point so that you have an image in the working color space and one for the profile you need to print with.

1. View > Proof Setup > Custom.
2. Select the appropriate ICC Profile for your
    paper and ink in the Custom popup dialog box.
3. In the next dialog box choose:
    Preserve Color Numbers: NOT Selected
    Intent: Perceptual
    Simulate Paper White: Unselected
    Check Preview Box
    Check Save and name
    Click OK

Proof Setup

Original Adobe RGB Working Space

Proof Setup

Notice in Proof Setup that the picture is muddier and darker than the original viewed in the Adobe RGB Working Space. The next step is Overall Color Balance to correct this.
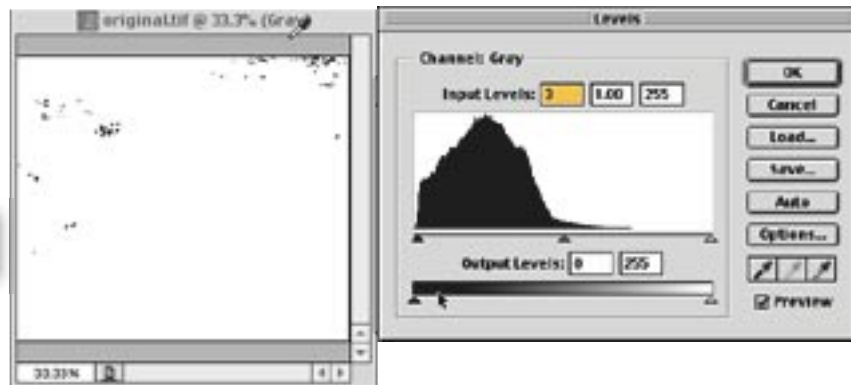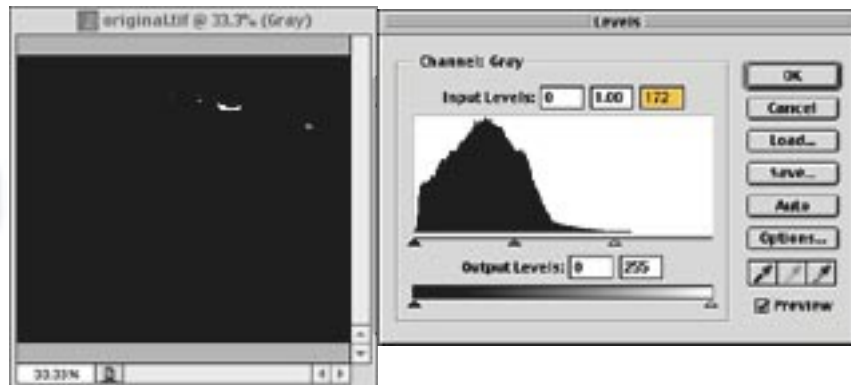
Global Contrast for Grayscale Images

1. Open a Grayscale Image.
2. Open the Levels dialog box (Command L).
3. With the Option (Alt on PC) key held down, drag the black slider to the right until the very first black pixels appear in the blank white image. This is the Black Point.
4. With the Option key held down, drag the white slider to the left until the very first white pixels appear in the blank black image. This is the White Point.

Original

Black Point

White Point

Adjusted Image

Global Contrast and Color Balance for Color Images

This procedure is exactly the same as finding the White & Black points for Global Contrast for Grayscale Images, but we do it in each of the Red, Green, and Blue Channels separately instead.
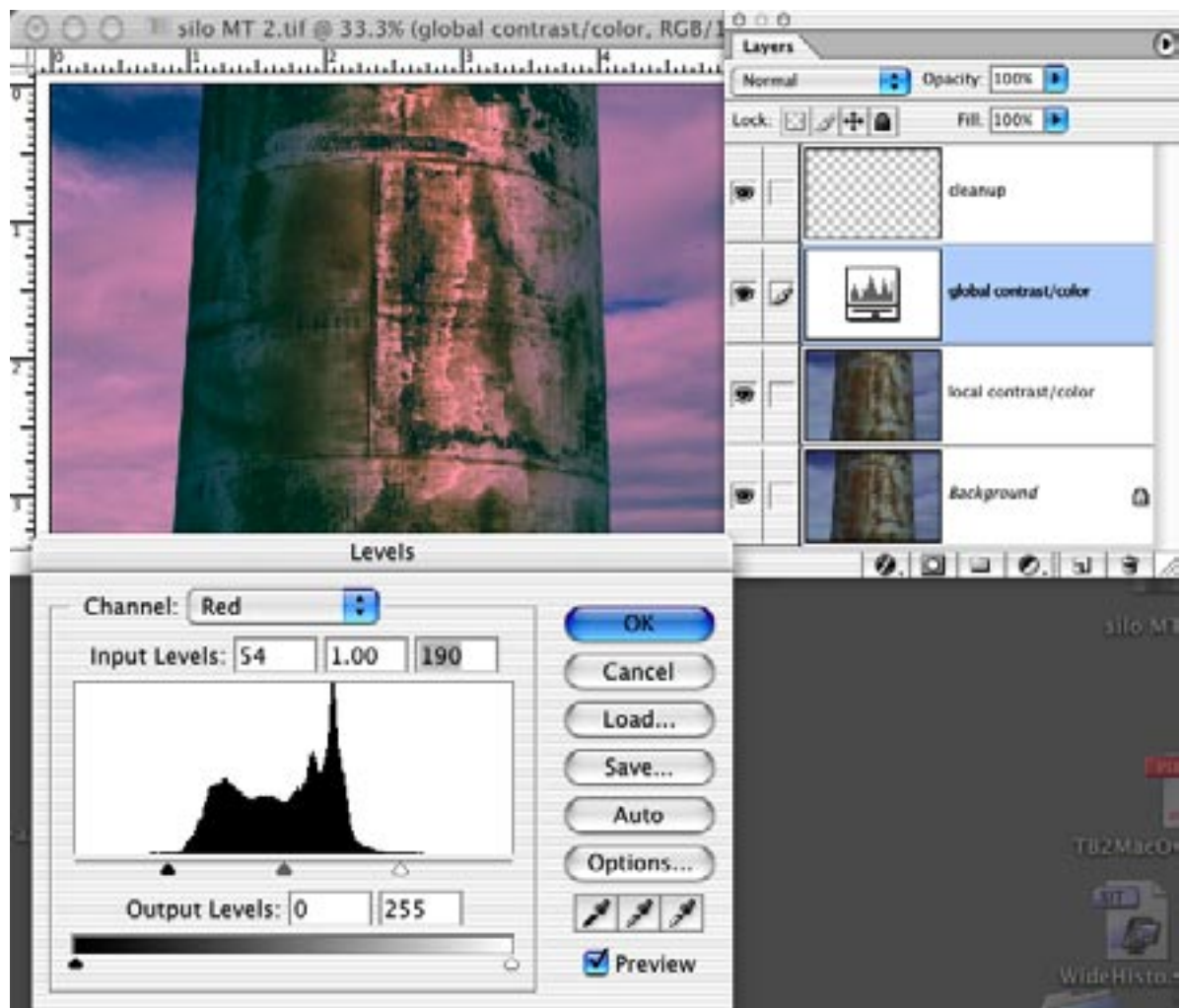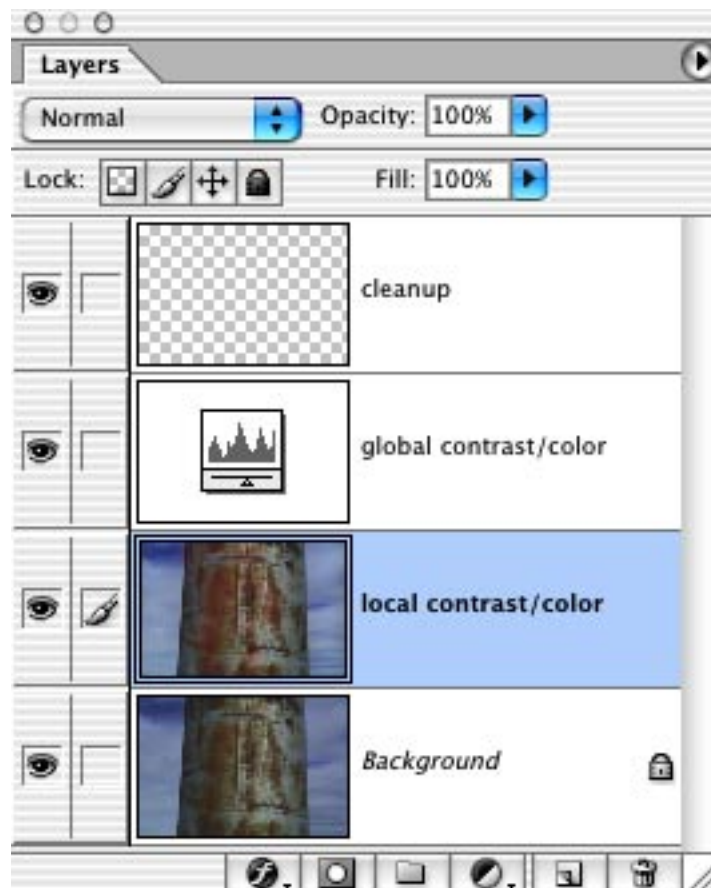

Red Channel
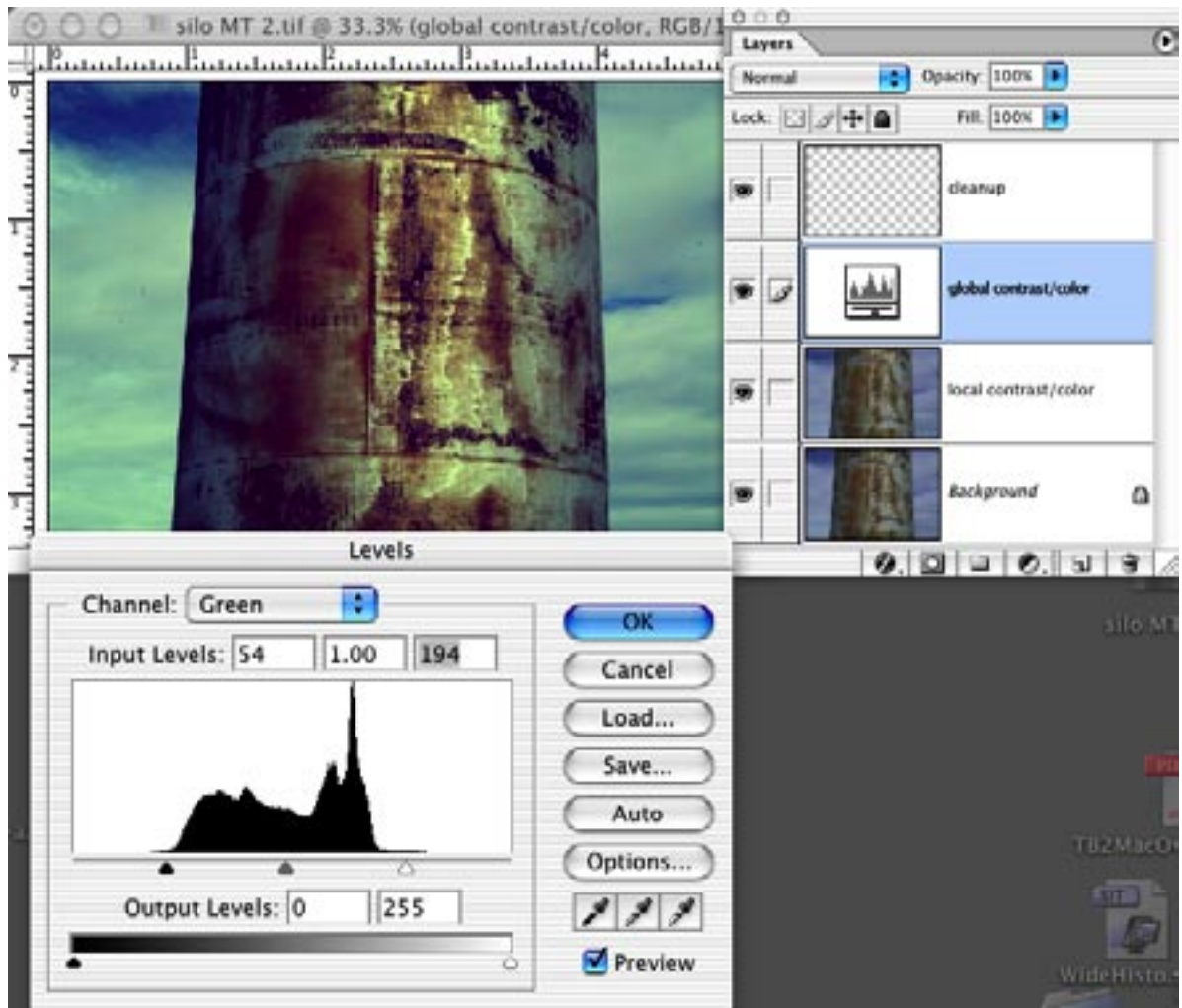
Green Channel
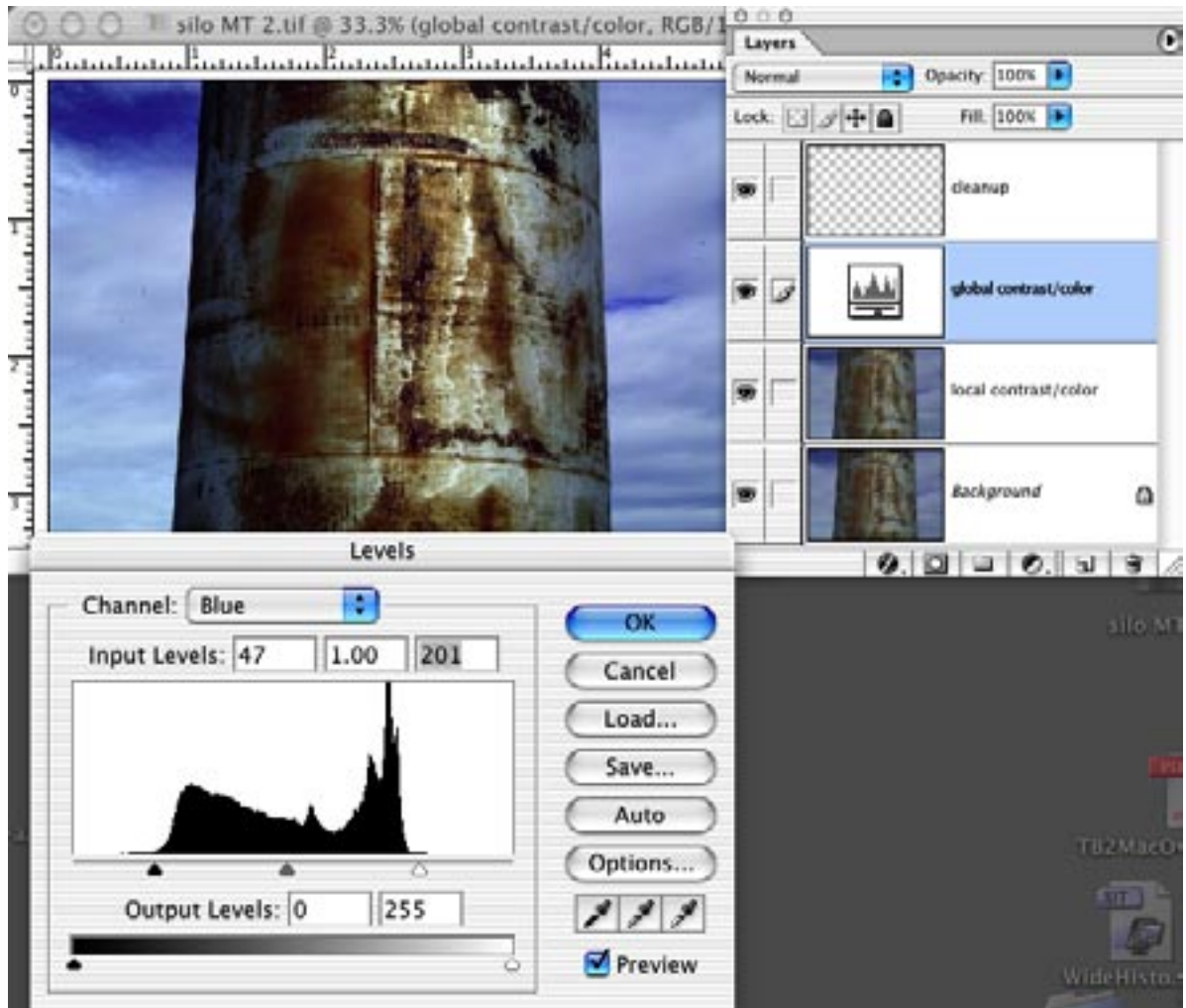
Blue Channel

Original Background Image


After Proof Setup,
Global Contrast, and Color Correction

Step 3
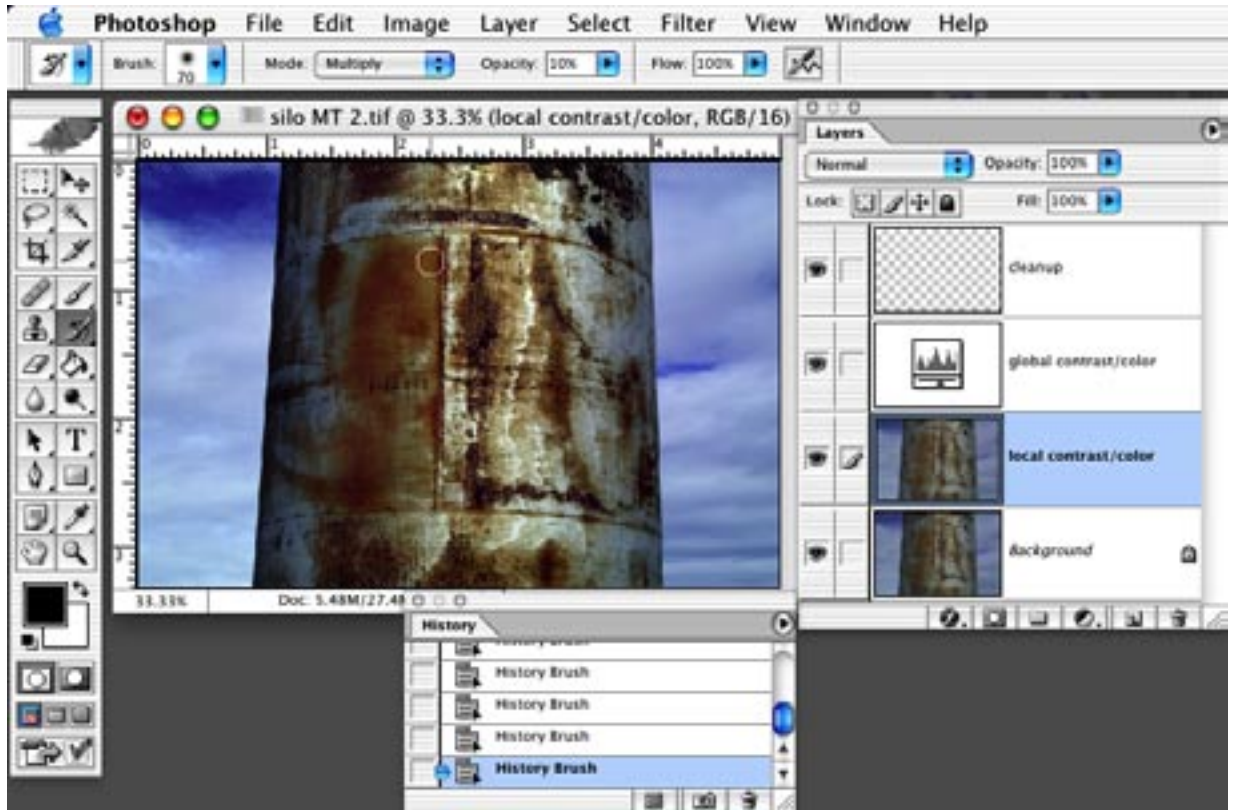# Local Contrast and Color Correction
(local contrast/color Layer)

Local Contrast Correction

This photograph needs a great deal of burning, dodging and contrast enhancement to make it look good. I'll use Multiply, Screen, and Overlay with the History Brush to do this. I'll start with an image that has already been optimized for global Contrast and Color. The History Palette should be on the desktop and show the top History State as "Open." Make sure that the History Brush is assigned to the little square to the left of the image file in the History Palette, choose the History Brush from the Toolbar, select Screen from the Mode popup, and set the Opacity at 10% to lighten(dodge). Paint in the correction, lightening the left side of the silo and the sky using the History Brush.
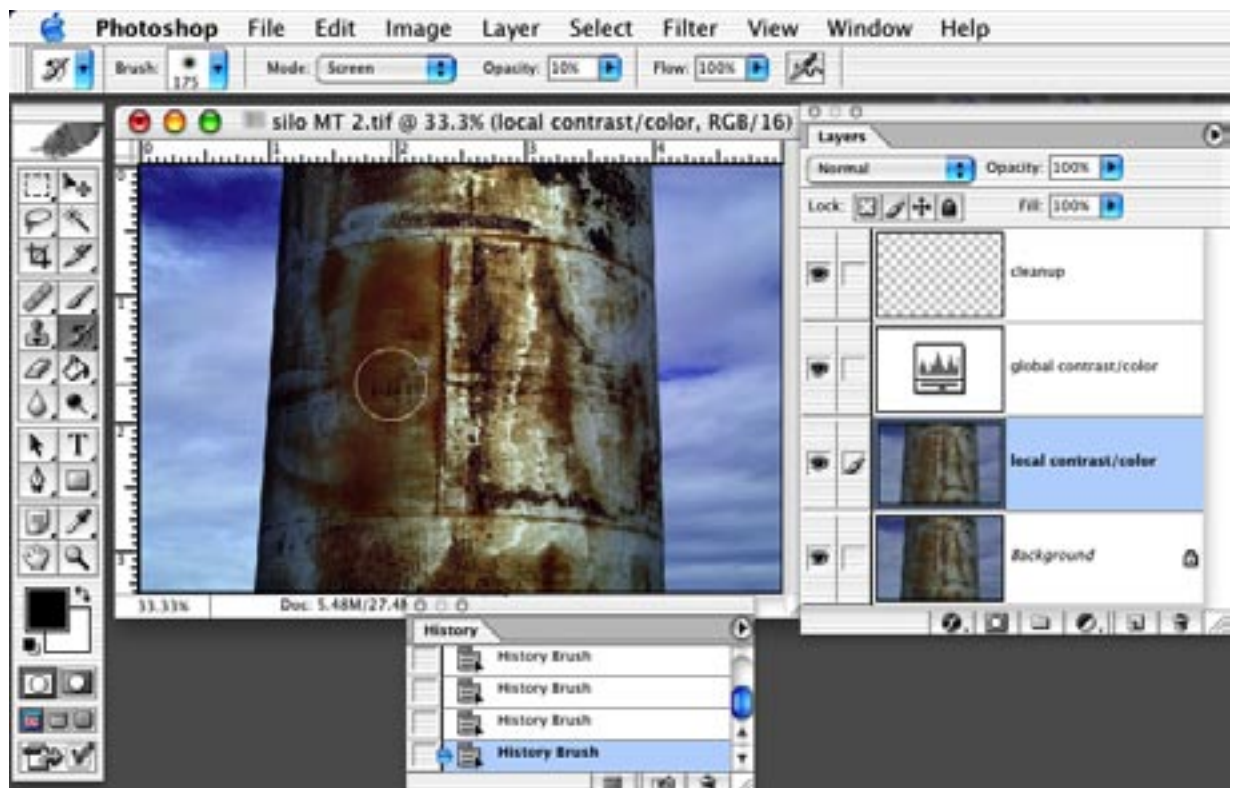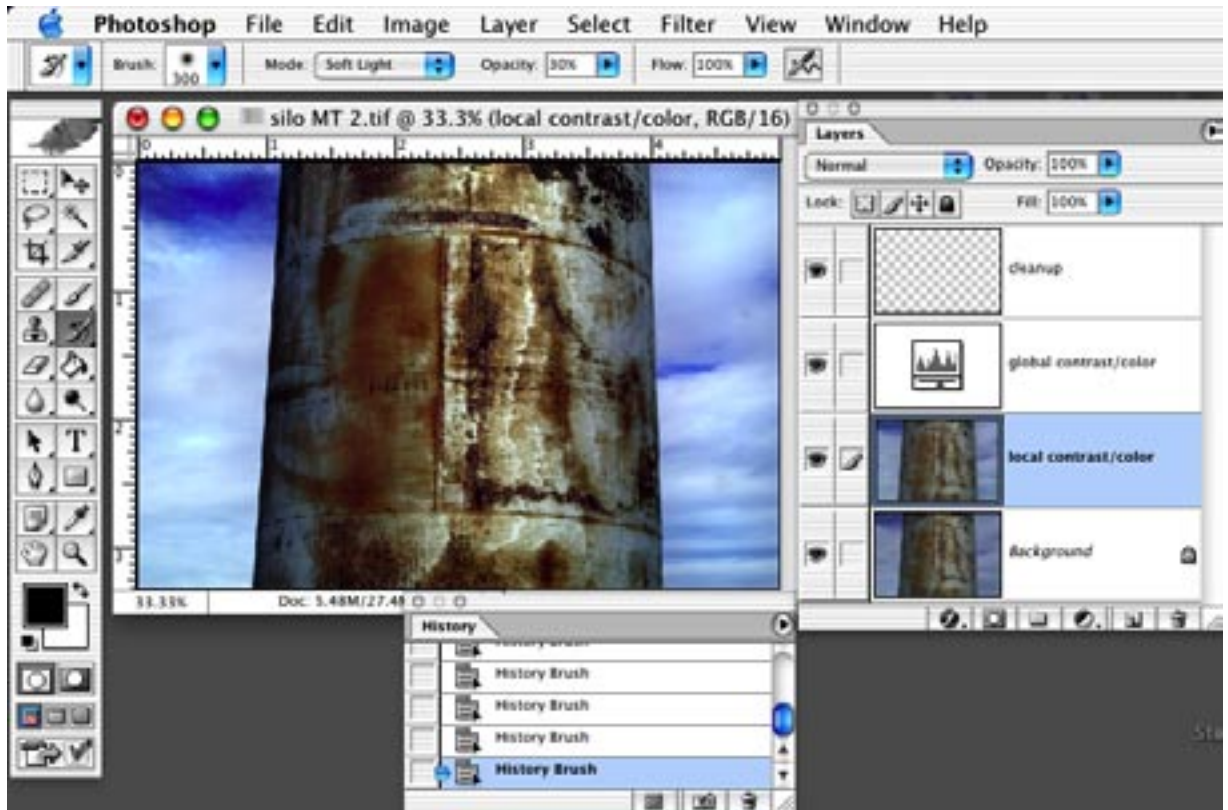
This time use the Multiply Mode with 10% to darken(burn) the red rust.

Finish off the local contrast corrections by using the History Brush, Soft Light and 30% Opacity to add contrast to the sky.

Local Color Correction

In the silo photograph we want to make the red of the rust slightly redder than it is on the original. Do do this first go to Image > Adjustments > Color Balance and make a global change using the Red slider making sure that the red of the rust is the color you want it.
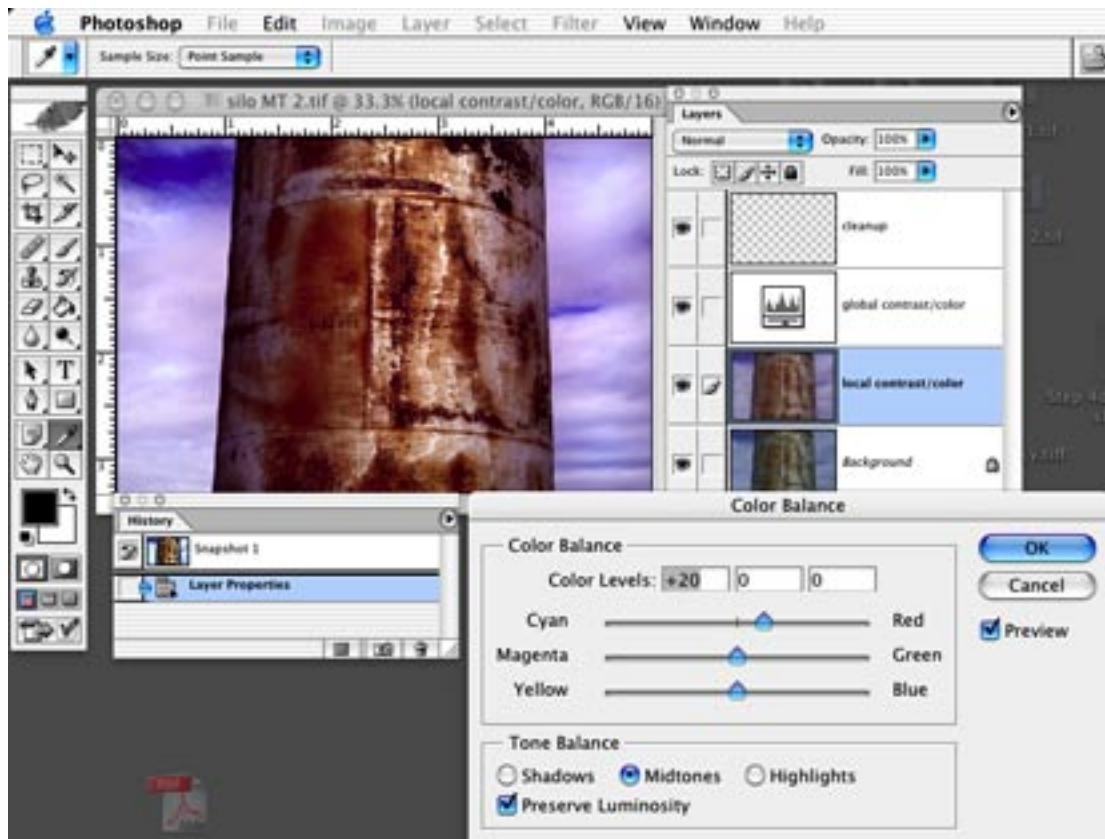
Detailed outline of the History Brush

Always begin the History Brush technique with a newly saved, opened, and flattened image.

1. Apply Curves, Levels, etc., to the entire photograph, but pay attention only to what is happening to the area you want to change in the image.

2. Open the History Palette and make a Snapshot by clicking on the middle icon at the bottom of the palette.

3. Trash the techniques you applied in #1 by dragging them to the trash can icon at the bottom right of the History Palette.

4. Assign the History Brush to the Snap shot by clicking the square on the left side of the Snapshot Layer.

5. Select the Background Layer on the History Palette by clicking once on it.

6. Select the History Brush on the Tool Bar and choose brush size.

7. Apply correction using the History Brush.

Using the instructions on page 28 use the History Brush to color in just the rust areas you want changed. You are actually painting the Snapshot you took of the red ColorBalance Correction and applying it locall to the areas you want.
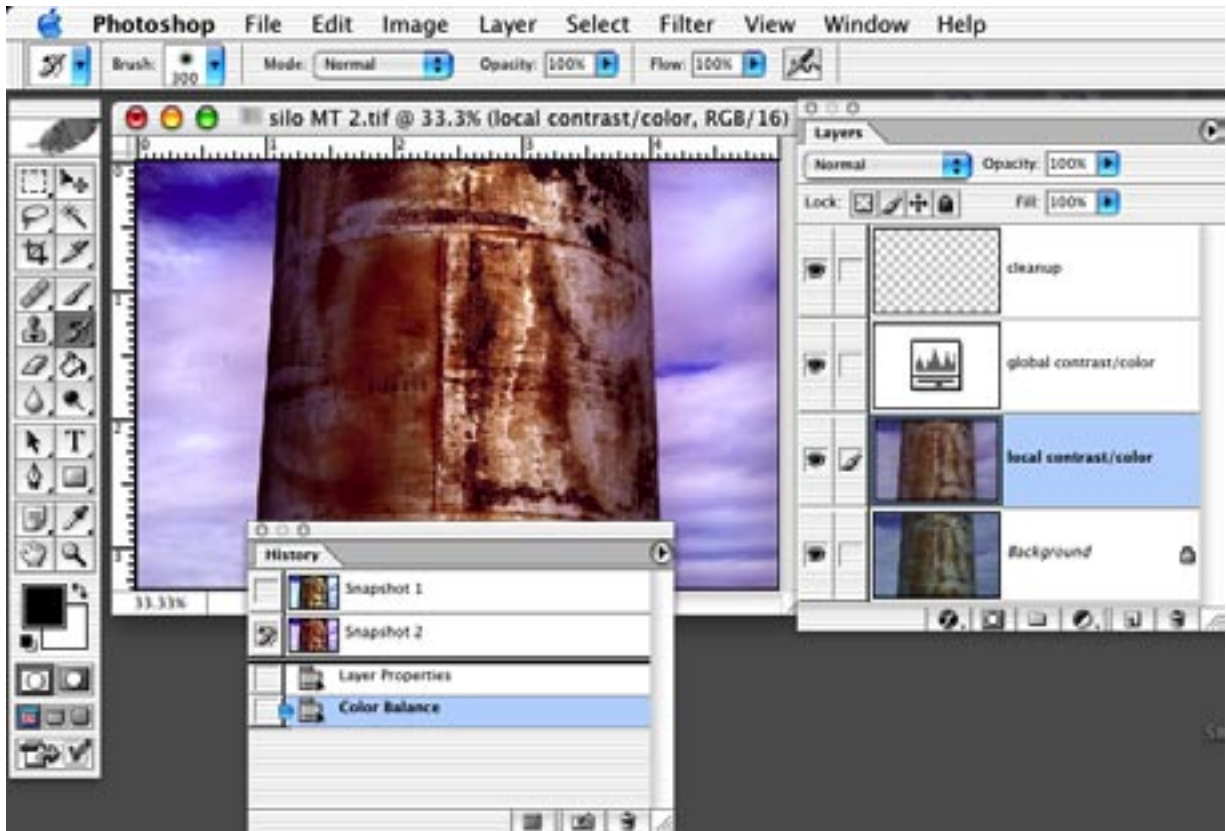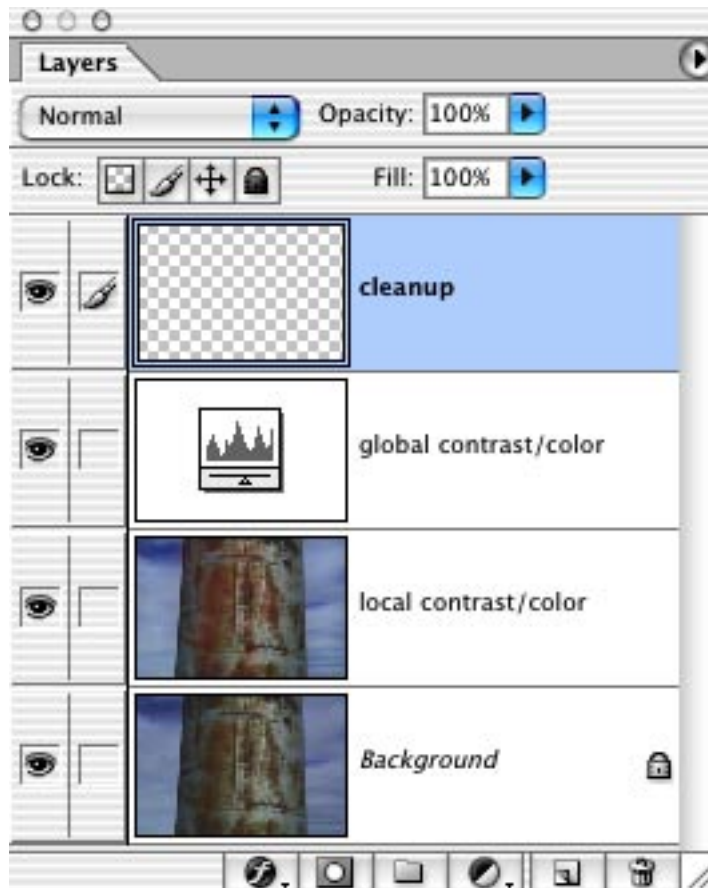
Proof Setup,
Global Contrast, and Color Correction

After Local Contrast and Color Correction

Step 4
Cleanup
(cleanup Layer)

Cleanup

Clone Stamp Tool

The Clone Stamp Tool (on the Tool Bar – "s" is the keyboard shortcut) allows you to copy pixels from any place in the image and put them someplace else. It is the Photoshop equivalent of photographic spotting. It is the tool for getting rid of Defects. Option (Alt –PC) click on the area you want to copy and then click the mouse button on the area you want to replace. Use a click here/click there spotting technique rather than painting. It's also a good idea to keep changing the source point you're copying.

Remember to use a soft brush for this tool and use the bracket keys to make the brush size smaller or larger(Left Bracket key – smaller brush: Right Bracket Key – Larger Brush).
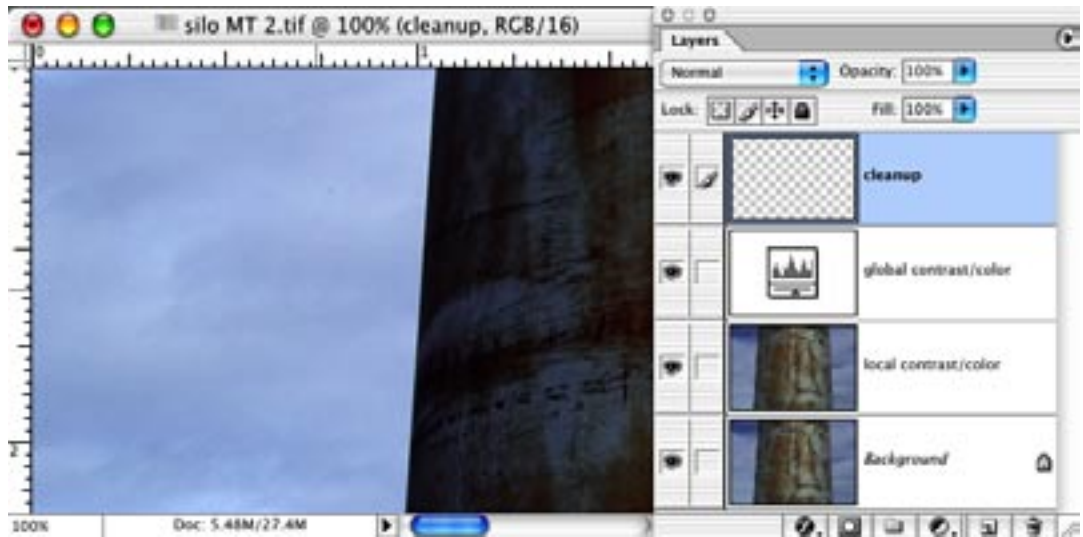
Option/Click the area you want to copy

Move the cursor to the place you want to get rid of

–Click–

Bad spots all gone!
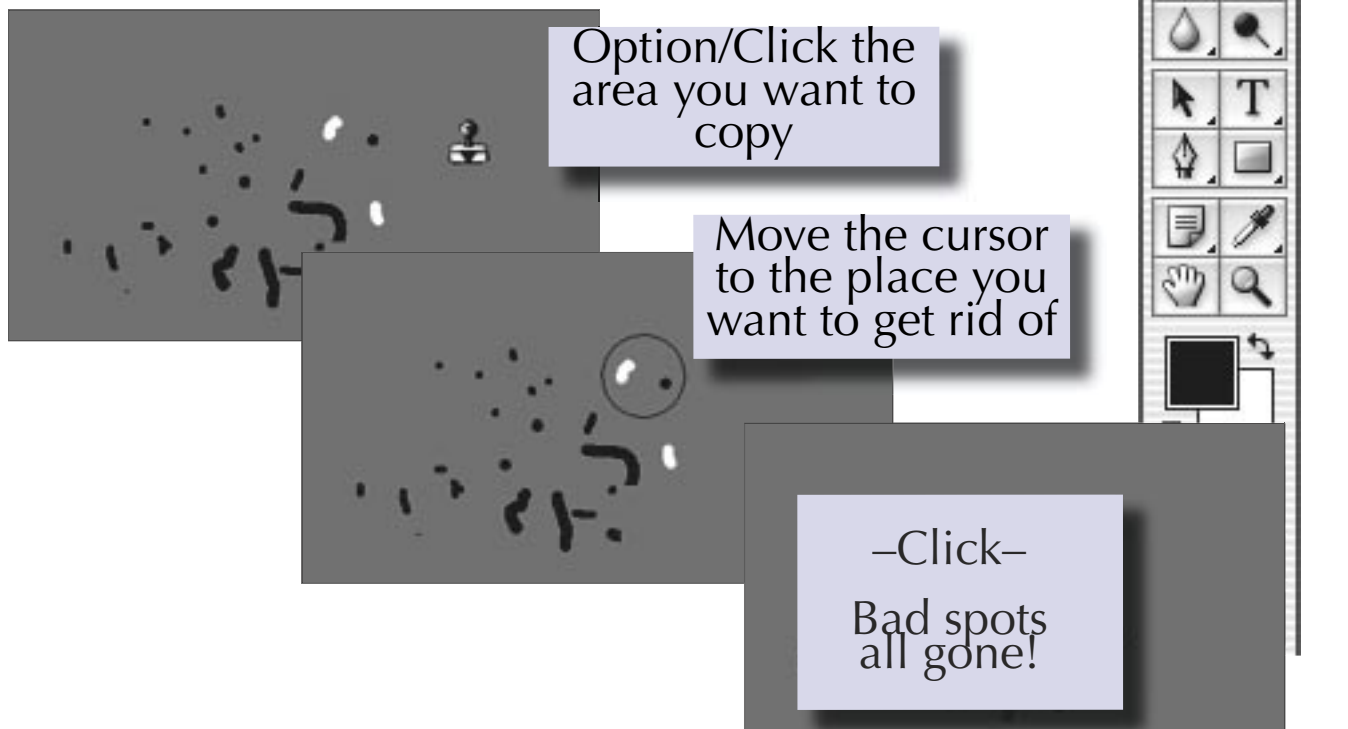
For most digital cameras, the Clone Stamp Tool suffices to get rid of defects, but the Patch Tool (just above the Clone Stamp Tool on the Toolbar) is also handy.
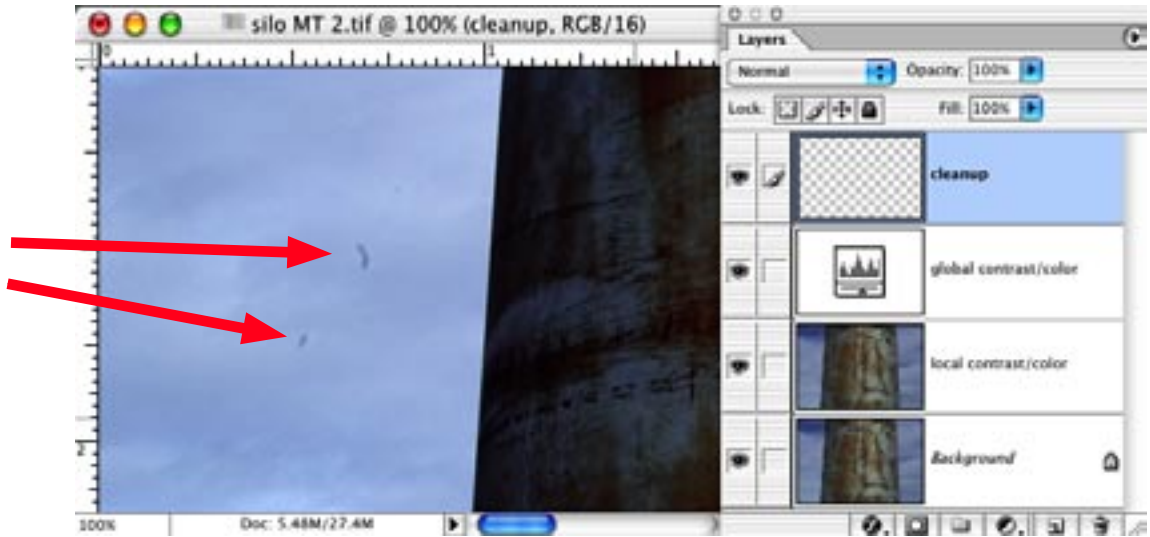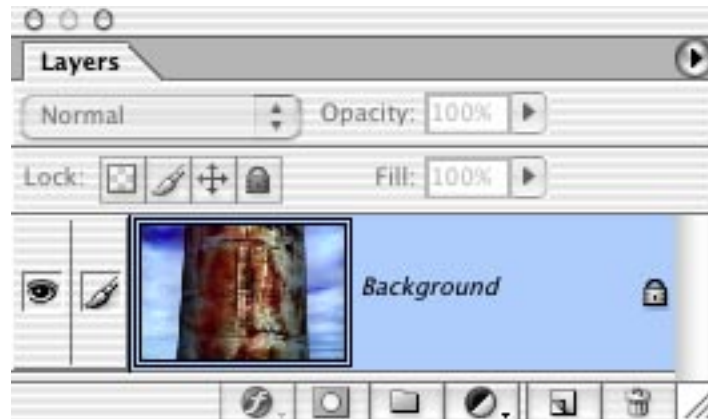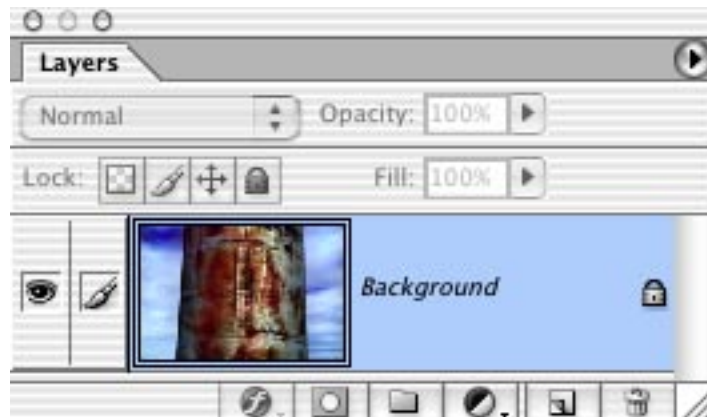
Before Cleanup

After Cleanup

Step 5
# Save As and Flatten

Step 6
Sharpening
Interpolation
Print

Sharpening

There are more ways to sharpen an image after contrast and color correction than any other Photoshop technique. Optipix2 uses three very special Sharpening tools: Edge Enhancer, which favors edge sharpening, Safe Sharpen, a global sharpen that works for most pictorial images, and Detail Sharpener, which increases detail contrast without "halos". All are explained in the User's Manual, and I don't need to repeat them here, but I tend to favor Safe Sharpen and Detail Sharpener because they're fast and don't blow out the colors or tail clip. For pictorial images Safe Sharpen is hard to beat. The best thing about Safe Sharpen is that it undersharpens, sort of like a wisp of Vermouth over a glass full of Gin that makes a very dry Martini. If it's not enough, you can add a little bit more.
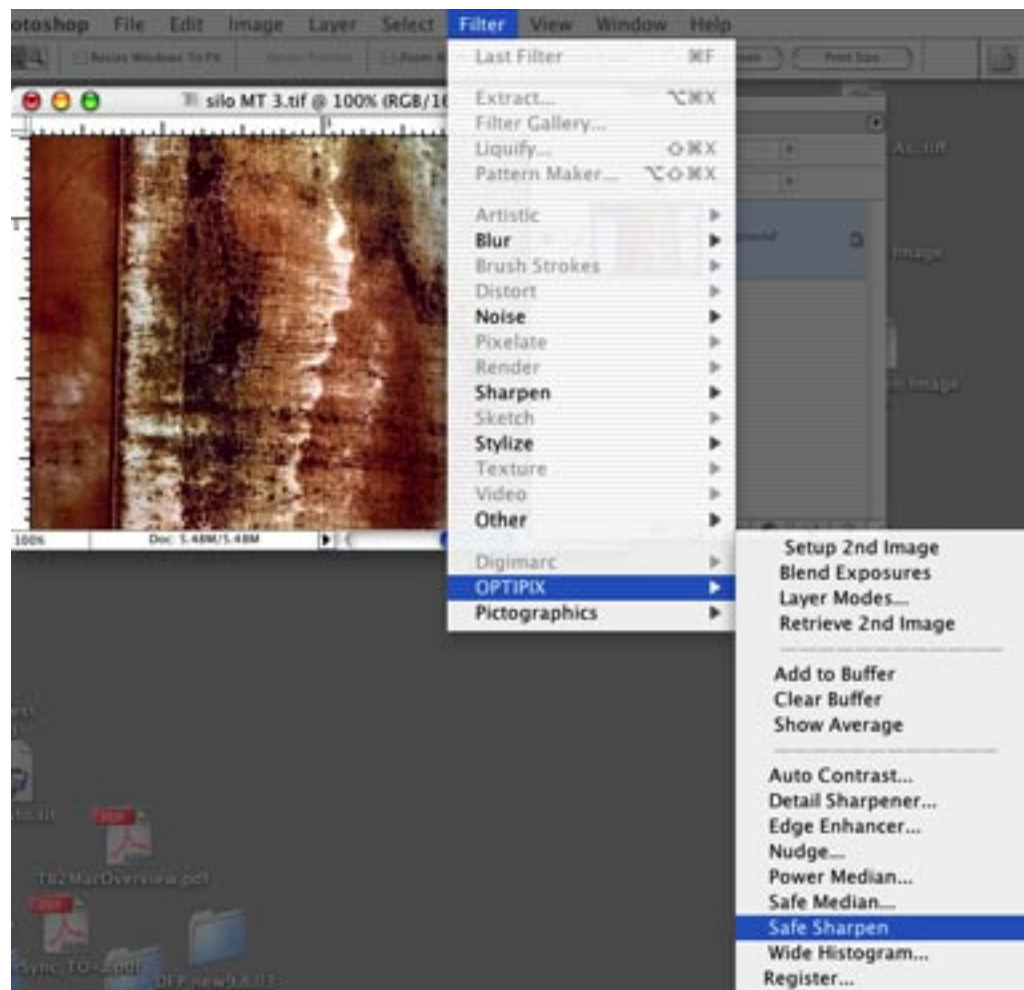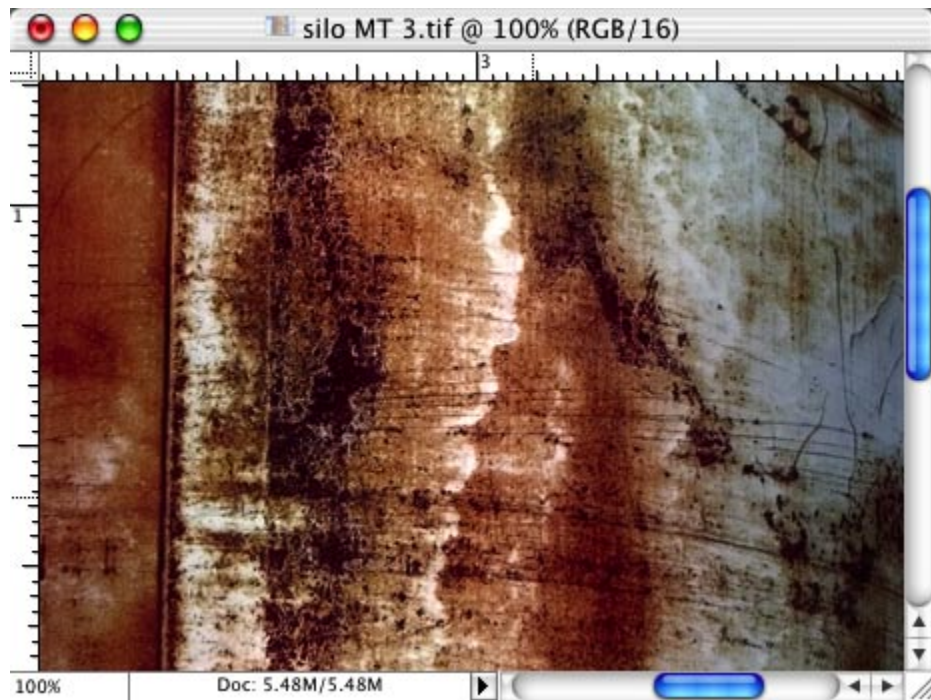
Before Safe Sharpen
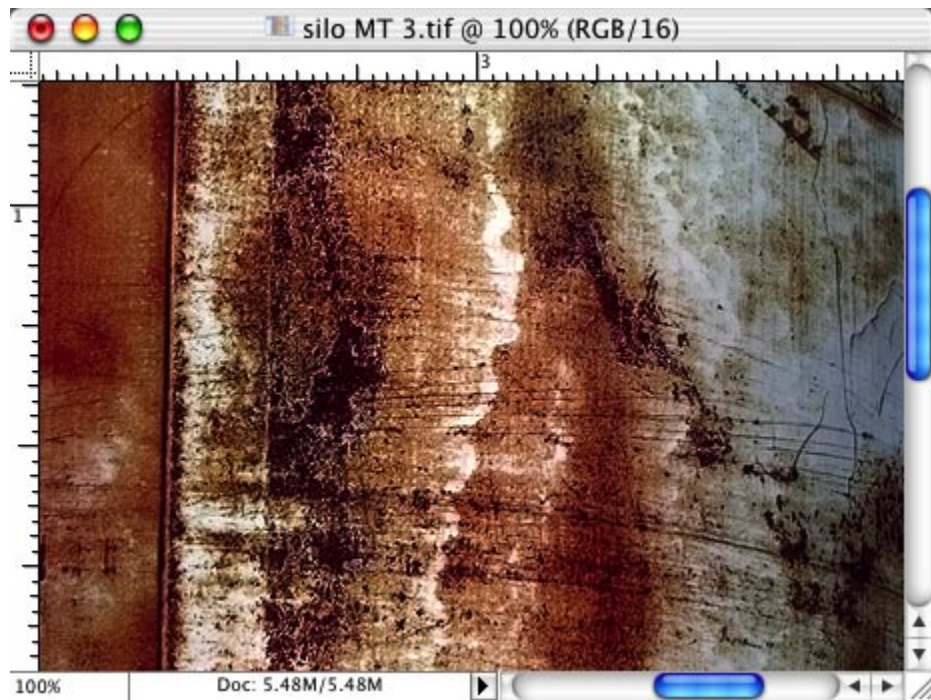
After Safe Sharpen

Interpolation

Digital Imaging was invented in 1961 at the Jet Propulsion Laboratory in Pasadena, California, to send back pictures from the Lunar Orbiter missions. And, you guessed it, the most important aspects of the images were clarity and size, so what we call Interpolation and Unsharp Mask had their beginnings in looking at craters on the Moon and , when the CIA got its hands on digital imaging, Russian tanks is Siberia.

Interpolating an image is like getting something for nothing. Non–image data is added to the real data of the picture to make it look like you are getting a bigger one. That's basically all Interpolation is. It's mathematical (formula) and algorithmic (a way of doing something) parameters, however, are highly proprietary.

Of the many forms of Interpolation, I've found Fred Miranda's Stair–Step Interpolation to be the best (www.fredmiranda.com). He uses Photoshop's native Bicubic Interpolation, but applies it a little at a time, to create a larger image. I use Interpolation any time my file gets beyond 480 ppi for a scanned image or 240 ppi for a RAW file (RAW files come maxed out when you import into Photoshop, but scanned images are resized down to 480).

Print

At this point in time (October 2003) there are only six inkjet printers worth buying for high quality and archival output: The Epson 1280, 2200, 4000, 7600, 9600, and the HP 7960. These all print color extremely well and can be used with custom profiles (recommended) from places like www.inkjetmall.com and www.profilecity.com. For those who want to print Black & White you'll need to purchase the ColorByte ImagePrint RIP software from www.colorbytesoftware.com. Workflows for both Color and B&W are included in the Optipix 2 CD at www.reindeergraphics.com and along with The Digital Fine Print Workshop CD available from www.georgedewolfe.com