

# The Electronic Darkroom: Turning Bad Photographs into Useful Line Art

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## ABSTRACT

Photographs of artifacts available for presentation often times are underexposed, scratchy, and lacking in highlights and contrasts that help illuminate the important features of their subject matter. Adobe Photoshop CS2 software is an important tool for the process of recording and illustrating archaeological data. Using this software, a quick and efficient technique for turning bad photographs into useful line art and for accurately conveying information about an artifact is shown here. While good photographs help tell an artifact's story, line art helps focus the reader's attention to the fine details being described in an article.

## Introduction

More times than not, the only diagnostic photographs of artifacts available for presentation are underexposed, scratchy, and lacking in highlights and contrasts that help illuminate the important features of their subject matter. Old photographs and negatives are equally challenging since they have faded with time. Digital cameras and scanned images have made the process of artifact recording easier. The digital camera allows for quick, efficient production of images for documentation during the process of excavation and conservation and for creation of computerized archives. Digital images also allow for photo enhancement and manipulation. Using Photoshop CS2, the following illustrates a quick and efficient technique for turning bad photographs into useful line art.

With its advanced browsing tool (Adobe Bridge), raw file image processing capabilities (CS2), and streamlined workflow capabilities for processing large quantities of photographs, Photoshop CS2 has new aspects that make this program more important than ever for archaeological imaging. This latest version of Photoshop is an impressive tool for desktop and in field processing of images. Adobe Bridge seamlessly integrates files and images making the preparation of reports almost effortless.

Based on personal experience, the learning curve for effectively using Photoshop CS2 (Version 9) is surprisingly short. In very little time, the powerful Adobe Bridge tool gave a different perspective on integrating images and files associated with many dissimilar programs. Without a doubt, this is the most powerful computer tool available for creating and converting digital images into useable line art for inclusion in field notes, site reports, and final publications. While spending less time processing images, the filing, processing, and archiving of the central photographic information, housed in a *metadata* window, allows users to input applicable data one time and apply information to an entire series of images. Metadata information includes dates of photographs, f-stop, filter, camera body serial number, augmentation dates for photos, and much more.

The mechanics and basic architecture of most photo-enhancement computer programs are strikingly similar, but Photoshop CS2 has modifications that benefit archaeologists since the data-storage capabilities of Adobe Bridge allow the user to input location, artifact numbers, and other vital information that sometimes get scrambled between the field paperwork and the laboratory data translation. Most importantly, users of earlier versions of Photoshop will find that frequently used applications are still available, although some filters and parameters for use have been greatly enhanced.

Methods described below are the most straightforward for converting photographs of bone, leather, and wood into line art for curation records or publication. When processed, these artifacts have a surface texture, along with the general shape of the artifact, that give the final image a sense of dimension and realism.

## The Photograph and Its Manipulation

The challenge was to convert a photograph of two conserved wooden knife handles recovered from the Texas Historical Commission excavation of La Salle's vessel, *La Belle*. The photograph was taken using a Canon EOS 20d,

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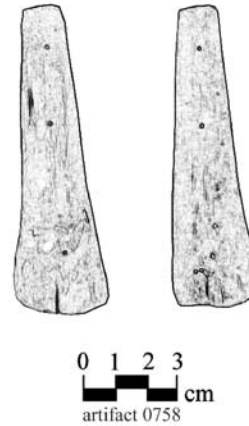


Figure 1. Dark original photograph (left) and image of the artifacts after rendering and reconstructing the scale and identification number (right) (Figure by author).

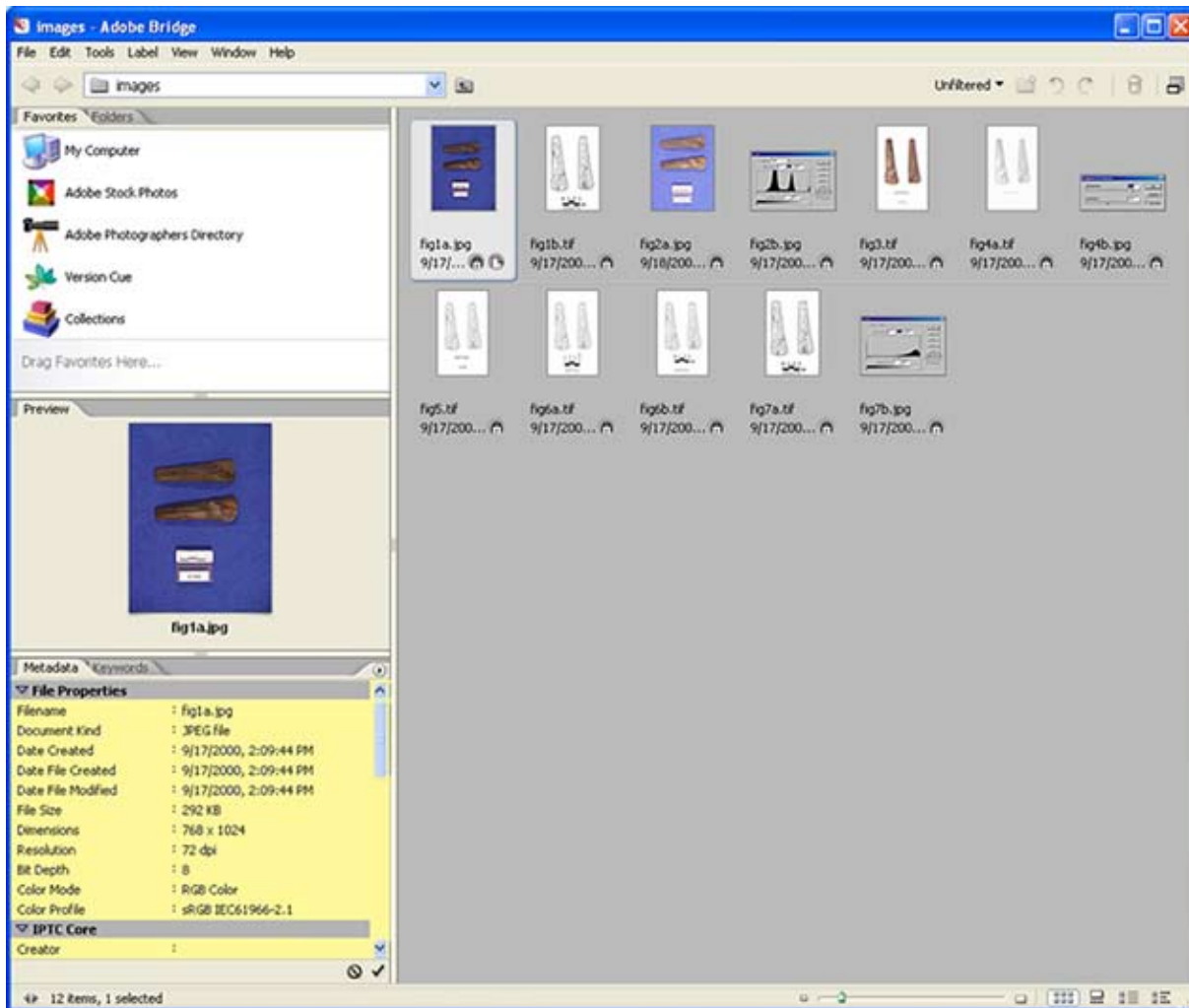


Figure 2. Adobe Bridge, illustrating file properties window (lower left) and image browsing window (right) (Figure by author).

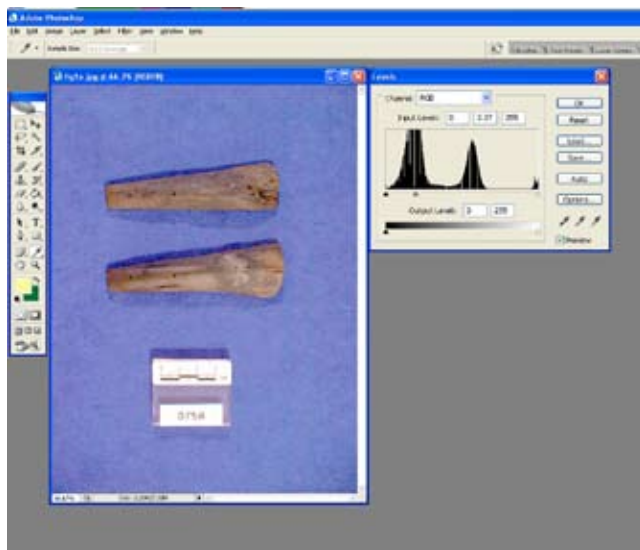
single lens reflex (SLR) digital camera (Figure 1). The photograph was taken using available light, resulting in muted tones that act to hide the important details of the specimens. More importantly, the dark blue background excessively darkens the picture, making handle-edge details obscure. The powerful archiving feature of Adobe Bridge has recorded important information about this photograph. A metadata box, highlighted in yellow, archives information that can be used to sort and file photographs (Figure 2). Converting this photograph into useable line art can be accomplished in six basic steps.

*Step One: Adjust Input Levels*

Using the levels adjustment tools (go to Image-Adjust-Layers), adjust input levels. In this case it was from 0, 1.00, 225 to 0, 1.32, 255. This lightens the image substantially and makes it easier to differentiate the sides of the artifacts from the dark shadows around them (Figure 3). Do not adjust output levels at this step

*Step Two: Open a New Image and Select Details*

Note the width height and resolution of the original image (go to Image-Image Size menu) and open a new image,



**Figure 3.** Photograph lightened using input level (right) and levels adjustment bar (right) (Figure by author).

preset with a white background, using the same specifications as the original photo. Applying the magnetic lasso tool, select and move the image details (in this case the handles), artifact number, and scale into the new image. It was necessary to use the magnification tool to zoom in on the scale and number, simplifying the task of selecting each element. Details of the wooden handles are improved, but image quality of the scale and artifact number remains poor (Figure 4).

*Step Three: Covert Image to Grayscale and Adjust Brightness*

The target publication for this image required submission of images in black and white format. Since typical line art consists of stippled pen-and-ink drawings, the first task was to convert this image to grayscale (go to Image-Mode-Grayscale). Converting the image to black and white format *before* moving the images to the white background would have made the task of differentiating the background from the artifact more difficult. Next, adjust the brightness of the image (go to Image-Adjust- Brightness/Contrast). For this photograph it was adjusted to +74, and contrast was adjusted to -18. Each image is unique, and after completion of step 3 the image may continue to be of poor quality (Figure 5).



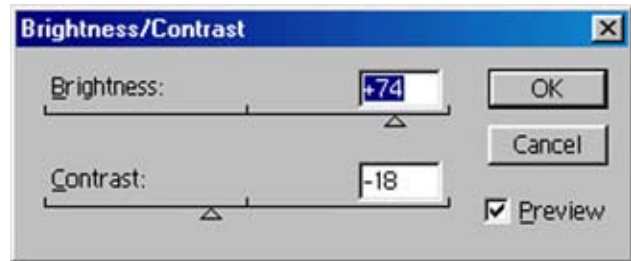
**Figure 4.** The handles stand out against the white background but the scale and artifact number need improvement (Figure by author).

*Step Four: Render the Image*

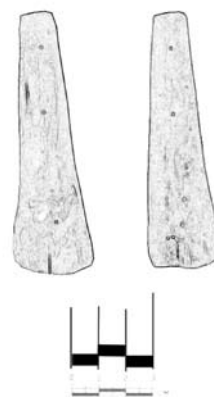
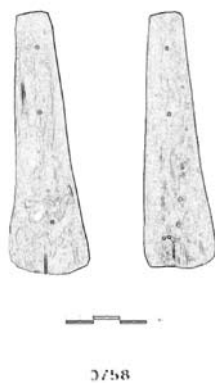
Select the details using Photoshop's standard marquee tool and use the Find Edges filter (go to Filter-Styleize-Find Edges) to render the image (Figure 6). The density of the image will affect the overall look after using the Find Edges filter. If, after applying this filter, the results continue to be poor, the image may be adjusted to lighter or darker tones. This photograph required lightening the image and reducing its contrast slightly of the two handles.

*Step Five: Construct New Scale and Labels*

Often, it is easier to construct a new scale than to attempt improving one that is out of focus. It is advisable to keep even the worst of scale images for this very reason. Use a line weight of 2 to draw the centimeter marker lines, extending above the old scale. Next, using a light weight of 20, draw the horizontal lines between the marker lines. Use the marquee tool to trim the excess length of the marker lines, giving the scale a uniform look (Figure 7). After labeling the scale, use the marquee tool to select



**Figure 5.** The image looks pale and washed out (*left*) after using the Brightness/Contrast filter (*right*). This image is now ideal for continued treatment with other filters (Figure by author).



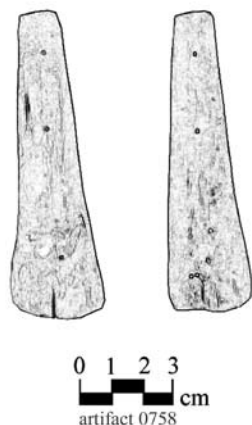
**Figure 6.** After applying the Find Edges filter, the handles start to take shape. The scale and artifact number still need work (Figure by author).

**Figure 7.** Extending lines above the old scale and using broader horizontal lines to fill in between the marker lines improve the edges of the scale (Figure by author).

and delete the old scale. If necessary, create a new artifact number for the image and, using the marquee tool, delete the illegible number. After arranging all of the components of the image, flatten the image using the Layers-Flatten Image command.

*Step Six: Touch Up and Adjust Output Level*

Use the Eyedropper tool to select color and the Pencil tool to do touch-up work. The Eyedropper tool was used to select the color of the darkest section of the outline of the image in the bottom lower portion of the knife handle on the left. The Pencil tool was then use to do light touch-up work in the faded section of the outline of the handle, visible in figures 6 and 7.



**Figure 8.** Completed image with new scale and artifact identification (Figure by author).

To make the entire image bolder, adjust output level settings (go to Image-Adjust-Level). The amount of output level adjustment will be governed by publication needs. This image was adjusted to values of 0, 0.67, 255 (Figure 8). If an image will be greatly reduced for publication purposes, it is unwise to increase output levels too much. With reduction, the image may become dark and run together in appearance.

## Conclusions

Rendering photographs into line art requires patience and a willingness to experiment with combinations of input levels and brightness/contrast filters to achieve satisfactory result. With experimentation good results may be achieved quickly. In less time than it would take to complete a poor quality drawing by hand, it is possible to produce a satisfactory image for printing on the back of a conservation treatment card. The same image can be used in the conservation report or for publication.

Previous versions of Adobe Photoshop were powerful tools for imaging editing and illustration. Photoshop CS2, however, is an indispensable tool for archaeological imaging and report writing. Adobe Bridge makes image management and record keeping an easier task. Most important, workflow and batch file editing reduces the time needed to process and label images.

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