

# Restoring Damaged

With your computer and an image-editing program, you

Text and photos by Jack and Sue Drafahl

There's nothing more frustrating than going through your slide files looking for a favorite image only to discover it has been damaged. You may find that it has faded, been scratched, or has the beginnings of a fungus experiment growing on its surface.

It would nice if we could say there were just one answer to these problems, but nothing in photography is that easy!

## Improper Storage and Handling

Before we get into tips on how to repair your damaged slides, we need to look at the causes in order to minimize any future damage. The two biggest factors affecting the life of a slide are improper storage and handling. Moisture, heat, and excess light will all directly attack the color dye layers in slide films. Unfortunately, they do not attack the layers equally, so you will find that most slides will have a faded color shift toward red. The process is usually gradual at first, but accelerates with time. You may not even notice any change until you remount an old slide. There will be a noticeable darker area where the image was protected by the edge of the mount.

Touching either side of the film with your fingers will transfer fingerprints to the surface, which encourages fungus growth. Photographic cotton gloves are the best defense. This is why you will see most professional lab staff wearing these gloves when they handle film. Since slides get constant handling, gloves are important for increased life expectancy.

Kodachrome was developed in 1935 and the Kodachrome 35mm color slide has been



# Slides

can work miracles

around since 1936. It was followed by the different Ektachrome films and their E processes that have slowly evolved to the E-6 process and films of today. You will find that most of your faded slides were from the early E-process films like E-2 and E-4. This is because film stability technology was not as evolved as it is today. Kodachrome film, on the other hand, has survived all these years because it used a more stable dye process and stabilizing coating in the final process.

We have found that most types of liquid cleansers used on Kodachrome slides to remove fingerprints can possibly remove this stabilization coating. If this occurs, the images will start to fade quickly. We also found that cleaned Kodachrome slides will take a severe blue shift when duplicated.

You will also find that color slide films processed in a home darkroom generally start to fade before those processed in a commercial photolab. We attribute this to lack of processing control, especially in the stabilization process.

## Damage Repair

No matter how you were lucky enough to obtain damaged slides, the fact remains that you have

1. This old superslide image of the famous woman diver Eugenie Clark was faded over the years.
2. Adobe Photoshop 6's Variations feature made it easy to fix the faded photo. This screenshot of the Variations menu shows a ring-around. Notice that the best image is the one to the left of the center image.
3. The same image after being processed through the Variations menu of Adobe Photoshop 6.

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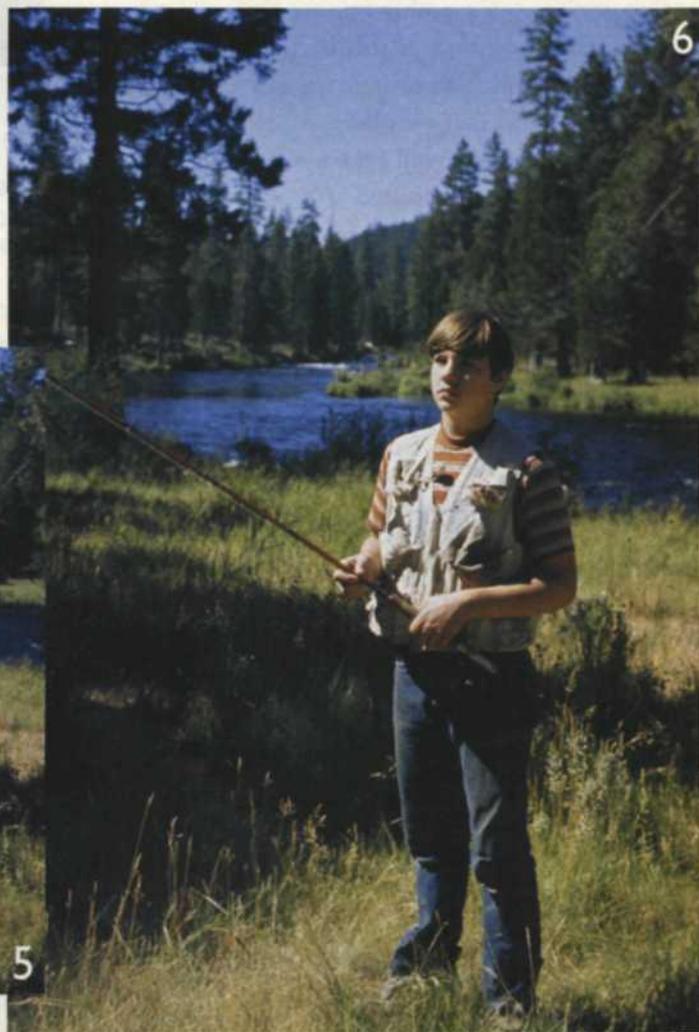
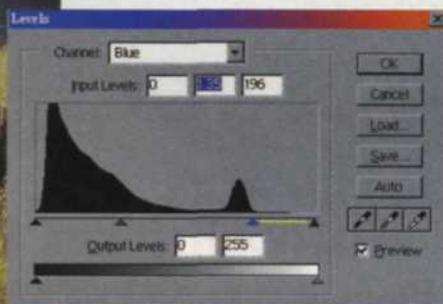
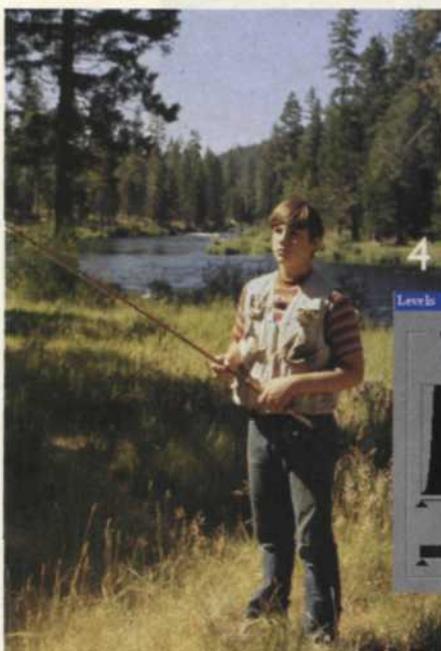
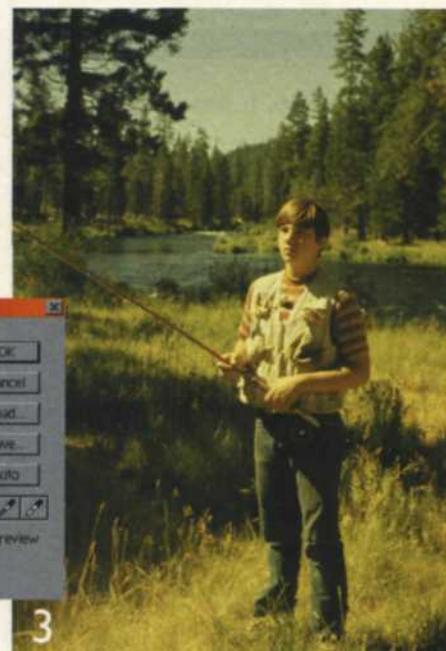
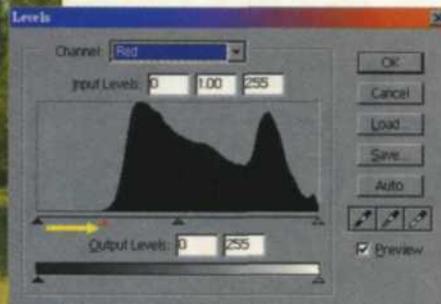
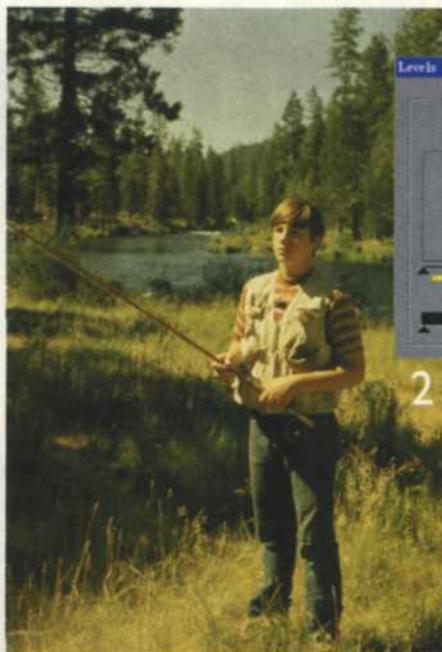
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Here, the image was improved using Photoshop's Levels feature.

1. The original faded E-4 color slide.
2. Using the red portion of the gamma chart, we moved the shadow triangle to the right to reduce the amount of red in the shadows.
3. Using the green portion of the gamma chart, we moved the shadow triangle to the right to reduce a slight green shift in the shadows. We also moved the highlight triangle to the left to add some green to the highlights.
4. Using the blue portion of the gamma chart, we moved the blue highlights triangle to the left to increase the amount of blue in the highlights.
5. Image brightness was reduced using the brightness control in Photoshop.
6. Remaining artifacts in the sky were removed using the clone tool in Photoshop.

damaged images. Is there any hope in salvaging the images? If so, what can you do to fix them? Relax, because most damaged slides can be repaired. Thanks to the digital technology of today, damaged slides can be fixed quickly and inexpensively. Best of all, with a few simple tools, you can perform the repair work yourself.

You will need to scan the damaged slide into your computer for repair. Film scanners today are quite impressive. Many have software and hardware controls that reduce grain, remove scratches, and sharpen the image as it is being scanned. When you set up a problem slide for scanning, you have the option of making color corrections, exposure modifications, varying the contrast, and most important, gamma control.

We usually try to get the scan close, but do all the final corrections in the editing software. Image-editing software, (Adobe Photoshop is the most popular with serious photographers, but there are a variety of others as well) provides more versatility for correction than scanners. They all offer a variety of correction tools to cure just about any problem found with damaged slides.

## Auto Levels

The first adjustments you will need to perform on your images will probably be regarding exposure, contrast, and color balance. Photoshop has instant help for you when you access the Image → Adjust pulldown and select the Auto Levels function. The program automatically adjusts color balance, contrast, and brightness. Sometimes the software makes the right choice, and other times it is way off in left field. Give the Auto Levels a try first and if you don't like what the computer selected, then simply press the Undo and move on to plan B.

## Variations

In the same Image → Adjust pulldown menu, you will find a function at the bottom called Variations. When you select this

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function, a special screen called a ring-a-round appears. Your image is displayed in the center with color variations circling it. If you select a color variation that looks better than your original, it then moves to the middle, and a new ring of colors forms. You can keep selecting different color variations until your image looks just right.

To the side of the ring, you will find three exposure variations. Your image is in the middle, with lighter and darker versions displayed above and below. When you

select one of the exposure variations, it then moves to the center and becomes the new image. At the top of the screen you will find a copy of your original image and the last change you made featured side by side for easy comparison.

When you first start editing images, it is best to use this Variations method when making corrections to exposure or color. This is a great learning tool because you can easily see the effect of each selection you make. Selecting the correct color balance and exposure is very subjective and is an acquired skill that often takes time to hone, so have patience.

## Gamma Control

Every photograph is broken down into a curve that plots the image's density vs. exposure. An image with good whites, midtones, and excellent shadow detail has a good photographic curve. A histogram is a visual display of all the digital data contained in an image displayed from black to white on a scale from 0-255. It can either display all the color layers at once in RGB mode or one layer at a time as R=red, G=green or

B=blue. You then can either adjust one color layer at a time or adjust all the curves at once.

At the bottom of any histogram you will find three sliding triangles that control the shadows (left triangle), midtones (center triangle), and the highlights (right triangle). These sliders can be moved to adjust the gamma. When you first bring up the histogram, look to see if your image fits within the full digital curve range. Frequently, there is a small space at the left or right with no data. Using the mouse, move the left and right sliders over until they approach the data in the curve. When you release the mouse, all the data in the image will readjust to fit the photographic curve correctly.

Often the black area will also have a red color shift. To correct this, select the red channel at the top of the histogram menu and move the left triangle over to the right until it is under the data. The curve will realign

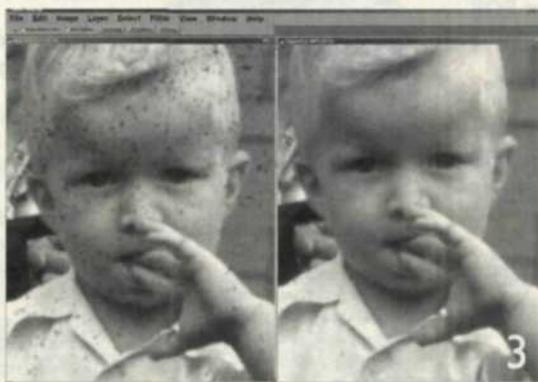
and distribute the data correctly. It is also a good idea to check the other color channels to insure that there are no additional data deficiencies.

## Contrast and Saturation

Even when you have made all the possible corrections, the image may still look flat. Try the Contrast control under the Image → Adjust menu. If the image still doesn't look right, you might want to try the Saturation control, also located in the Image → Adjust menu. As you move the slider, the color saturation increases, but be cautious not to overuse this tool.

## Scratch Repair

Most of the scanners today have a feature called cleaning. As each slide is



The Applied Science Fiction ICE feature in our film scanner makes it easy to eliminate dust and scratches.

1. The actual image scanned in without the use of the ASF-ICE technology
2. Artifacts separated from image.
3. Screen shots showing the comparison of images scanned with (right) and without (left) the ASF-ICE technology.
4. Scanned image using the ASF-ICE technology.

scanned, the hardware and software removes any superficial scratches that mar the surface of the slide. This doesn't always repair all the damage, but it makes a good effort. Any scratches or fingerprints that aren't removed during the scanning can be repaired using the Clone tool in the editing software.

### Saving to CD

Once you have all the color corrections made, save your image with a new name. You don't want to overwrite the original scan in case you want to rework your editing. This also enables you to compare the before and after version of the damaged slide.

We like to archive our images to CD. If we have a quantity of slides that need to be fixed and have no time for editing, we scan them in and save the raw, unedited images to CD. This in effect, stops any more deterioration to the damaged slides. When we have repair time, we edit them and save them to another CD.

### Film Recorder Output

Once you have repaired your damaged slides, you will probably need to output 35mm slides with a film recorder. Instead of the final information being output to a printer, the data is transferred to a machine that exposes it onto 35mm film. Once completed, the 35mm slide film is processed and you have finished slides. Film recorders are rather expensive and if you don't require slides often, you might resort to using a service bureau for output. You will need to contact your service bureau ahead of time, to make sure that you prepare your files to match their machine.

### Final Thoughts

You may have noticed that this article only addressed problems that occur with damaged slides. In a future article we will be addressing the problems with faded, torn, and stained color prints and negatives. Stay tuned as more damage control is on the way. ■

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