4c

Techniques for Fixing Common Flaws

Cropping, rotating, and changing size and resolution are all basic editing techniques that really improve your photos. These techniques only scratch the surface of what you can do. You can also fix the pictures that you weren't quite happy with. Here are some of the common flaws and how to get rid of them.

The first thing you need to understand about editing photos is that there's often more than one way to get to the same result. One of the issues we'll be discussing in this chapter, for example, is how to edit a picture to make unwanted objects disappear. There happen to be several ways to do that: you can copy a relatively large area from another part of the image and paste it over the part that you want to get rid of; you can use a cloning tool to copy a relatively few pixels at a time; if the spot is small enough you can use a smudge tool to make it go away, just like you would rub away a real spot on a table with your finger; and so on.

Red Eye

Red eye is a good example of a feature that different programs approach in different ways. Most photo editors offer a simple way to get rid of red eye, but virtually every program seems to have invented its own way.

The red in red eye is primarily in the pupils, because that's where the reflected light comes out from the eye. Since pupils normally look black, getting rid of red eye is just a matter of replacing the red with black. In some programs, you do that by zooming in on the eyes, choosing the Red Eye command, selecting a small area

around the eyes, and giving the command to reduce red eye. The program finds any red inside the selected area, and turns it all into black.

A variation on this approach lets you designate the area to fix by clicking on the red areas to leave two markers—one on each eye—as in Figure 4-11. With the areas defined, you can give the command to fix red eye. Here again, if all goes well, the program replaces the red with black.
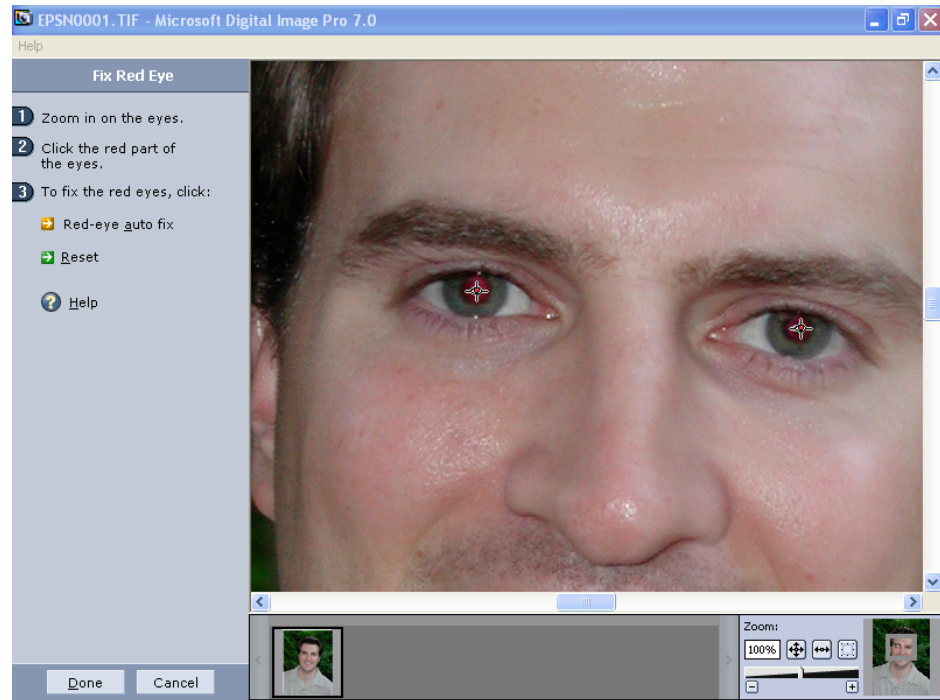

Figure 4-11.

In some programs, you can target the area to fix for red eye by selecting a small area around each eye or by clicking on the area to leave a marker.

In still other programs, you choose the Red Eye command, then click on the red in the eye to instantly replace it with black. In yet others, you choose the Red Eye command, and then hold the mouse button down as you move the mouse cursor over the red in the eye. As you move the cursor back and forth, the program replaces the red with black.

If your program doesn't provide a Red Eye command, or the feature doesn't get rid of all the red, you can often zoom in on the eyes, use a selection tool to select the pupils, and fill the selection with black. (Look for a selection tool that will let you

select a circle, to define the entire pupil. Then look for a Fill command that will fill the selection with a specific color. Choose black as the color for the fill.)

If all else fails, look for a paint tool that will let you zoom in on the pupils and paint them a different color, using a brush or similar feature. This sort of freehand painting takes longer than automatic red-eye tools, but it works just as well.

Adjusting Color

Sometimes, the colors you wind up with in a photo don't look quite right. We've seen photos come out a little yellowish, greenish, or shifted in other directions. Sometimes the color shift shows both on screen and in output from the printer. Sometimes it shows in the printer output only. Most often, the problem is not that the camera, monitor, or printer are doing something wrong, but simply that they don't agree on how to describe colors. Whatever the cause of a given color shift, however, most photo editing programs give you a way to fix it by adjusting the colors in the photo.

Adjusting colors is a tricky topic to talk about. There are any number of different approaches to adjusting colors—and you'll often find more than one way available in any given program. Alas, few of them are easy to understand without a lot of hands-on experience adjusting the settings and seeing the effects. For example, one of the most common approaches lets you adjust the amount of red, green, and blue in the image, or the amount of cyan, yellow, and magenta using sliders, as shown in Figure 4-12.
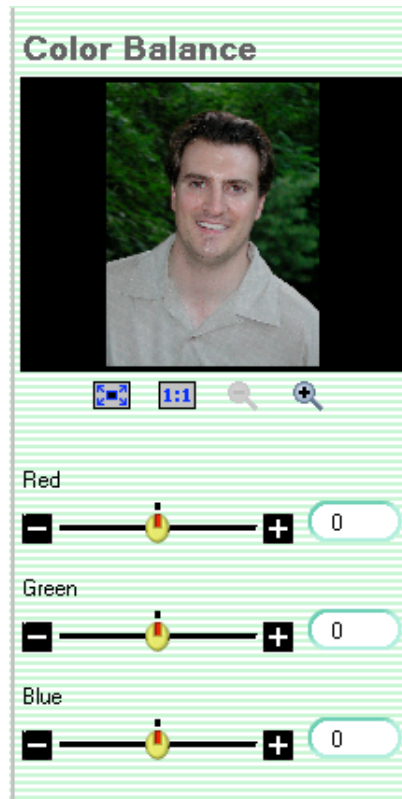
Figure 4-12.

Some color adjustment features adjust red, green, and blue levels.

Unfortunately, this is an almost useless feature to most people, even with a preview of the photo that changes as you change the settings (which makes it a good thing that this particular program also offers other ways to adjust color.) Changing the proportions of red, green, and blue is how cameras and monitors handle colors; changing the proportions of cyan, yellow, and magenta is how printers handle colors. Neither has any relationship to the way people perceive colors. For example, given sliders for red, green, and blue, it probably would not occur to you that if grass looks too yellow in a photo, you can fix it by cutting down the amount of red and green.

A more useful approach lets you adjust the hue, saturation, and brightness (or some variation on this approach). *Hue* is what most people would think of as the color—red, orange, yellow, green, blue, and so on. *Saturation* is the intensity of the color. A pale pink isn't as saturated as a red rose. *Brightness* is the brilliance of a color. A yellow daisy is brighter than a yellow mustard color.

Adjusting color using hue, saturation, and brightness controls is a lot easier than trying to adjust the amount of red, green, and blue, or the amount of cyan, yellow, and magenta, because it's close to the way people perceive colors. You'll see colors as a little muddy, for example, and know that you need to increase brightness, or you'll see grass as a little too yellow, and know that you need to move the hue setting toward green. But if you have to move sliders to make the changes, it's still not all that easy to adjust colors this way.

The problem with sliders is that first you have to figure out which sliders to move and in what direction; then you have to guess how far to move each one; and then you get to see how far off you are, so you can do it again.

It takes a fair amount of practice before you get a feel for how to adjust colors this way. (Although it takes far less practice with hue, saturation, and brightness settings than with red, green, and blue settings.)

Adjusting for Your Printer

One of the most common reasons for needing to adjust color is that the colors don't look right when you print, even though they look fine on screen. This is most likely to happen with older printers. Recent models almost all use the same, now nearly standard, color management technologies to make it easier to translate colors from a camera to a printer. The older the printer, the less likely it is to use the same color management schemes.

Alas, a mismatch in colors between the screen and printer means you have to change the color so it looks *wrong* on screen for it to look right at the printer. Making the colors look wrong on screen is easy. The challenge is making them look wrong in just the right way.

The trick is to compensate for the printer. If your combination of camera and printer tends to shift the colors toward green when you print, you can shift them in the opposite direction (which happens to be magenta) before you send the photo to the printer.

If your photo editor doesn't offer a visual guide to color variations, finding the right correction will be harder, and will likely involve some trial and error. If you can figure out the color the printer is shifting the color to—in terms of red, green, blue, cyan, yellow, and magenta—you can correct for it by adding more of the complementary color to the photo. The bad news is that it takes most people a lot of practice before they can look at a photo with shifted colors and tell which of these six colors the image is shifted to. Table 4-1 will help you find the complementary colors.

Table 4-1 Complementary Colors

Color Is Shifted to	Add Complement	Or Equal Parts of
Red	Cyan	Green and blue
Green	Magenta	Red and blue
Blue	Yellow	Green and red
Cyan	Red	Yellow and magenta
Yellow	Blue	Cyan and magenta
Magenta	Green	Yellow and cyan

Adjusting Brightness and Contrast

The auto-exposure feature in digital cameras does its job well enough that for many photos there's no need at all to adjust brightness and contrast. In some cases, however, the photo can benefit from tweaking these settings a bit. In still others, you may find that part of the photo—but only part of it—is too dark or too light. Or the problem may be that the brightness and contrast is better than you want it to be. For example, you may want to hide a face in shadow for artistic effect, instead of being able to make out whose face it is. Most photo editors have tools to let you deal with all of these possibilities and more.

Automatic Adjustments

It's worth checking out your photo editor's automatic brightness and contrast adjustment feature, which may be hiding under a name like Quick Fix, Instant Fix, Auto Fix, Auto Balance, Auto Enhance, Auto Levels, or even Auto Brightness and Contrast. Assuming your photo editor has a feature like this, you ought to try it on each photo you're considering printing or showing. Even if you don't see anything wrong with the photo as is, you'll often find that the automatic adjustment perks up the photo, as in Figure 4-13.

The original version of the photo is on the left in the figure, and the brightness and contrast are good enough so you might not think to change anything. But it looks dull compared to the version on the right.

Figure 4-13.

A single photo, before and after using the auto fix features in Digital Image Pro.

Manual Adjustments

Any photo editor worth the name will have brightness and contrast adjustments. In addition, most will have other settings that affect brightness and contrast in more sophisticated (read: more complex) ways. Typical controls for these other adjustments go under the names gamma; curves; tone; equalization; and dark, midtone, and bright levels (also called shadow, midtone, and highlight levels).

All of these features have two things in common: they affect both brightness and contrast, and they affect contrast differently at different levels of brightness. These settings can let you change the contrast in, say, the dark areas of the photo without affecting the contrast in light and midtone areas. Or they can let you change the contrast in light areas without affecting the contrast in dark and midtone areas. The next few photos, starting with Figure 4-14, show what this idea means in practice.

Figure 4-14.
The lower half of this photo shows almost no detail.

In this photo, the bottom half is a nearly solid mass of black. You can't fix this sort of problem very well with brightness and contrast controls. You can raise the brightness to lighten up the bottom half of the photo, but that raises the brightness in the sky too, which begins to lose details in the clouds. Raise the contrast as well, to make the details in the ground stand out better, and the clouds disappear into the sky, as shown in Figure 4-15.

If your program has controls that let you change the contrast in the dark area without affecting the light area, you can adjust the picture to look like the one in Figure 4-16. As you can see in the figure, this lets you adjust the dark area so you can see detail in the ground without affecting the details in the sky at all.

Figure 4-15.

Adjusting brightness and contrast brings out detail in the ground, but at the cost of losing all detail in the sky.

Figure 4-16.
Your program may let you adjust the dark area without changing the light area.

We created the particular version of the photo in Figure 4-16 in Digital Image Pro by using the Adjust Lighting option and adjusting the Add Flash slider. We also managed to produce essentially this same fix in various programs by adjusting the midtone settings (for programs that let you set shadows, midtones, and highlights separately), changing gamma settings (gamma is a common option that changes contrast differently for different levels of brightness), and adjusting a curve that defines how shades of gray in the file look on the screen.

There are, in fact, so many different ways to do this, and they vary so much from one program to the next, that it's pointless for us to go through the details of each approach here. Instead, we suggest you look through your program for any of the features we've mentioned, or any other feature that seems to let you change the mapping for shades of gray. Then check the program's manual or help file to find out how to use the particular feature. Be forewarned that in many programs the feature will be both complicated and technical. But you should be able to figure it out with a combination of the instructions that come with the program and a little hands-on experimentation. It may also help to keep firmly in mind that what you're trying to do

is adjust contrast in dark areas separately from adjusting contrast in bright areas. The next section, "Contrast, Brightness, and Mapping," should help you understand the process as well.

Contrast, Brightness, and Mapping

Before you read this, be aware that we're about to talk about one of the more complicated subjects in this book, so don't be surprised if you have to go over this section a couple of times to get it.

Let's start with mapping, which determines how each level of gray in the image gets displayed on screen or printed. Cameras and monitors create all the colors you can see from just three primary colors—red, green, and blue. And they need only 256 shades of each color to produce enough colors for photographic quality color. By convention, these 256 shades of each primary color are often called shades of gray.

When your camera takes a picture, it assigns a specific shade of gray to each primary color in each pixel. Call them shades, or levels, 1 through 256. When your monitor shows an image, it likewise uses a specific shade of gray for each primary color in each pixel. You might assume that if the camera assigns, say, a level 1 shade to a particular pixel, your monitor will use level 1; if the camera assigns level 2, your monitor will use level 2; and so on. This isn't necessarily true.

When you crank up the brightness on the monitor, what you're really doing is telling the monitor to assign all the shades of gray in the image to higher numbers on the monitor. So what was level 1 is now mapped to, say, level 51, level 2 is mapped level 52, and so on.

When you do this in software and apply the change to the file, the changes become permanent because they're stored in the file itself. Note too that the levels only go as high as 256. So if you crank up all the levels by 50, all the levels from 206 to 256 get converted to 256. That's why you lose details in bright areas of your photo as you move to higher levels of brightness: all the bright pixels turn into the same shade of gray. Similarly, you can lose details in dark areas if you adjust brightness downward.

When you adjust contrast, you change mapping in a different way. Crank up contrast, and you essentially put more distance between shades of gray as they existed in the original file. For example, levels 100, 101, and 102 in the original file may map to levels 100, 105, and 110. This brings out details, because it's easier to see the differences between nearby areas if the shades of gray are further apart. The price you pay is that you lose both the brightest and darkest shades of gray in the original file, since there's nothing below 1 or above 256 for them to map to.

Some photos have both light and dark areas, like a tree line against a bright sky. In many of those photos, one of the two extremes—light or dark—may have good contrast and brightness even though the other doesn't. In those cases, you need to

adjust the contrast—which means changing the mapping—for one extreme without changing the mapping for the other. In short, you need to adjust the contrast differently in the dark areas and light areas, which is what we mean by adjusting the contrast differently at different levels of brightness.

One other thing: if you draw a graph with the 256 shades of gray for the original file on the x-axis (the horizontal) and the 256 shades of gray for the adjusted file on the y-axis (the vertical), you'll start out, before making any changes, with the graph as a straight line, starting at the 0 point, as in the left side of Figure 4-17.
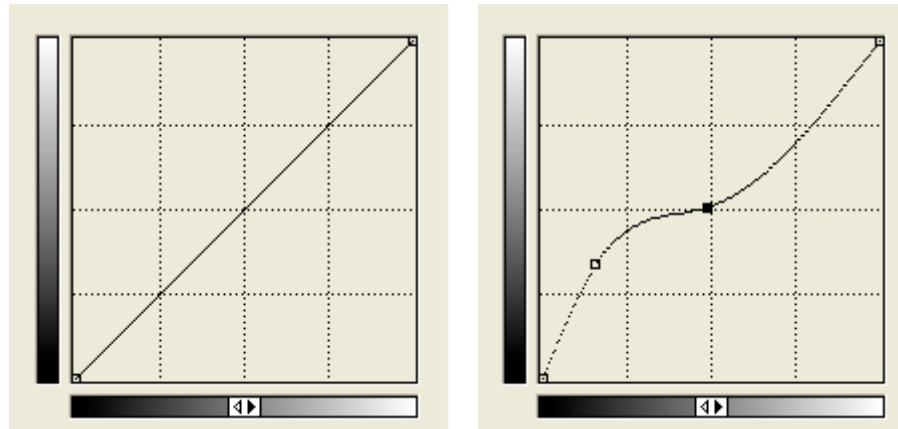

Figure 4-17.
These two graphs show how the grays you start with map to the grays you end up with before making adjustments (on the left) and after (on the right).

If you adjust brightness, the graph remains as a straight line parallel to the original line, but moves the starting point to some higher level on the x or y axis. If you adjust the contrast, the slope of the line—meaning the angle relative to the x- or y-axis—changes, but it's still a straight line. However, once you start mapping the shades so different areas of brightness have different levels of contrast, the shape of the line changes from straight to curved, as in the right side of the figure. In this particular case, the mapping for the bright shades is virtually untouched, but the midtones and dark areas are changed significantly.

Some programs will actually show you the graph, and let you adjust the mapping by adjusting the shape of the curve, using the mouse to drag it to a new shape. This is the most powerful, and most difficult to master, tool for fixing problems with contrast and brightness. If your program has this feature, it's worth spending the time learning how to use it. As you drag the line, try to visualize what you're doing in terms of changing the dark pixels to lighter shades, or lighter pixels to

darker shades, as appropriate. And try to visualize how that change will affect the image. With enough practice, you'll be able to predict what changes you need in the shape of the curve to adjust the brightness and contrast the way you want it.

Spot Fixes

There's one other tool—or pair of tools—for adjusting brightness and contrast that you should be aware of: burn and dodge tools. You'll find that they can be incredibly useful.

The terms *burn* and *dodge* both come from techniques photographers use with chemical film in a darkroom. To create a print from a negative, you shine light through the negative to fall on the light-sensitive paper that will become the print. The more light that hits any given spot, the darker the spot will be. Darkroom photographers talk about *burning in* the image. If they want to darken a particular area of the photograph, they will let light shine on that area, while shielding the rest of the photo. That effectively adds extra light to the area, burning in and darkening the image just in that area. If there's an area that's too dark, however, they can lighten it in the print by shielding that area somewhat so it gets less light, a technique called *dodging*.

Photo editing programs don't deal with light, but some offer tools that will give you the same effect. If your photo editor has a burn tool, you can run it over an area to darken it. If it offers a dodge tool, you can run it over an area to lighten it.

Burn and dodge tools are best used on relatively small areas, but they can work wonders. Suppose, for example, that you're trying to sell a stained glass window and want to post a picture of the window on a Web site. You don't have a good way to show the window off to its best advantage so you lean it up against a sliding glass door and wind up with a picture like the one in Figure 4-18.
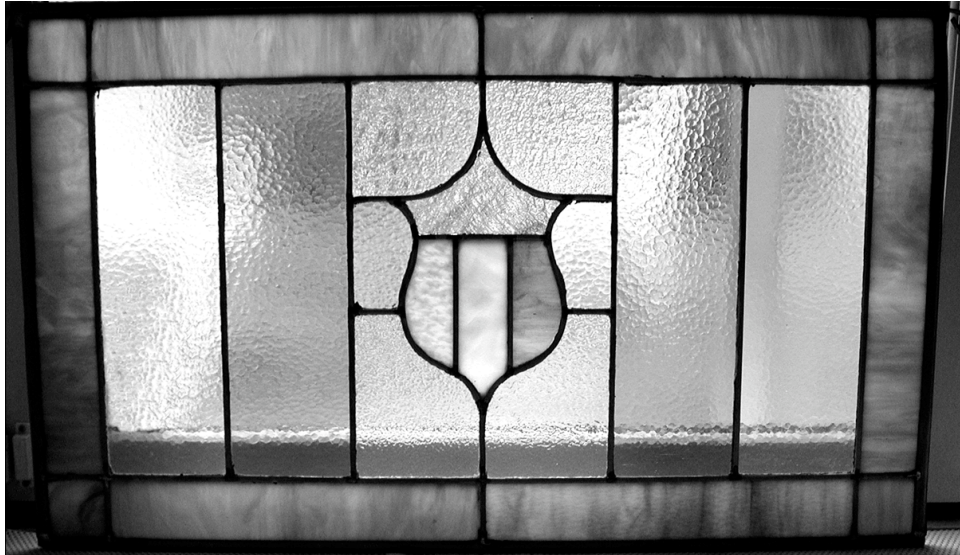
Figure 4-18.

This shot is a little dark in some areas, particularly the lower left corner.

In the color version of this photo, the entire outside frame of colored glass looks dull; there isn't much light getting through it, with the door frame in the way. Even in the black-and-white version you can see that the lower left corner is far too dark. With a dodge tool, you can easily lighten the lower left corner and the outer frame. Simply turn on the dodge tool, then click and drag your mouse cursor over the area you want to lighten. Figure 4-19 shows the finished result after lightening with the dodge tool in Photoshop.
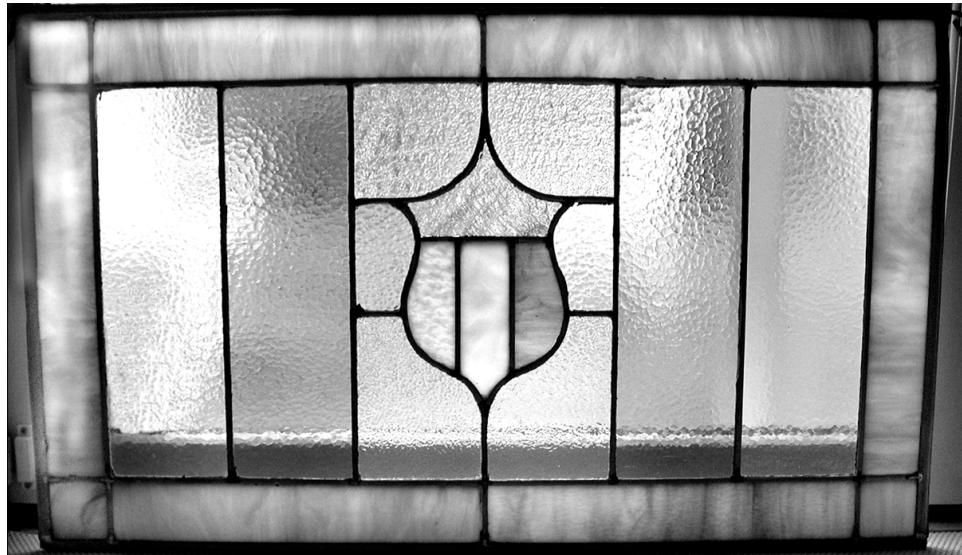
Figure 4-19.

You can use a dodge tool to lighten specific areas in a photo.

You can't see the full effect of the improvement in black and white, but you can certainly see that Figure 4-18 is brighter than Figure 4-19—and only around the outside. In particular, the lower left corner is no longer lost in the dark.

Burn tools work the same way, but to darken rather than lighten. Some programs even let you use the same tool for both functions—using the mouse by itself for lightening, say, and the mouse plus the Alt key for darkening. In this book, we've used a burn tool once or twice to add shadow to faces, and make them unrecognizable, in cases when we didn't have permission to use an individual's picture.

Fixing Specific Areas in a Photo

As we mentioned, the burn and dodge tools work best for small areas. Try them on too large an area and you may leave visible streaks from successive strokes. However there are ways to fix larger areas—not just for brightness and contrast, but for most adjustments you can make.

The secret is to select what you want to adjust, and then give a command to make an adjustment. With most programs, the change—whether brightness, contrast, color correction, or anything else—will apply to just the part of the image that you've

selected. The key to making this trick work is learning how to select exactly what you want to change. The hard part is finding a tool that will let you do that.

Most photo editors, even the most limited, have at least one or two tools for selecting specific areas of the photo. Some have much more than that. Common choices let you select a rectangle (including a square), ellipse (including a circle), and a freehand drawn section. (The last is generally a bad idea, because it's hard to draw the area neatly with a mouse.) Some programs also offer a polygon tool that lets you draw straight lines automatically from point to point to define a selection. An even more interesting choice is a magic wand tool that will let you click on a spot to automatically select all nearby pixels that match the pixel you click on.

You'll need to explore the choices in the program you have, and look for additional features, like the ability to add to the selection you've already made or delete part of the selection. Then try the technique with a picture that needs improvement. Consider, for example, Figure 4-20.

Figure 4-20.
The area around the fireplace in this photo is too dark.

This raw version is far too dark in the area around the fireplace. We fixed it by selecting the area with a polygonal selection tool. First we zoomed in on the area we wanted to work with to make the selection easier. Then we chose the polygonal tool, and clicked on each successive point to extend the selection, working our way around the fireplace and back to the starting point. Figure 4-21 shows a zoomed-in view of the photo, with the selected area indicated by a white dashed line.
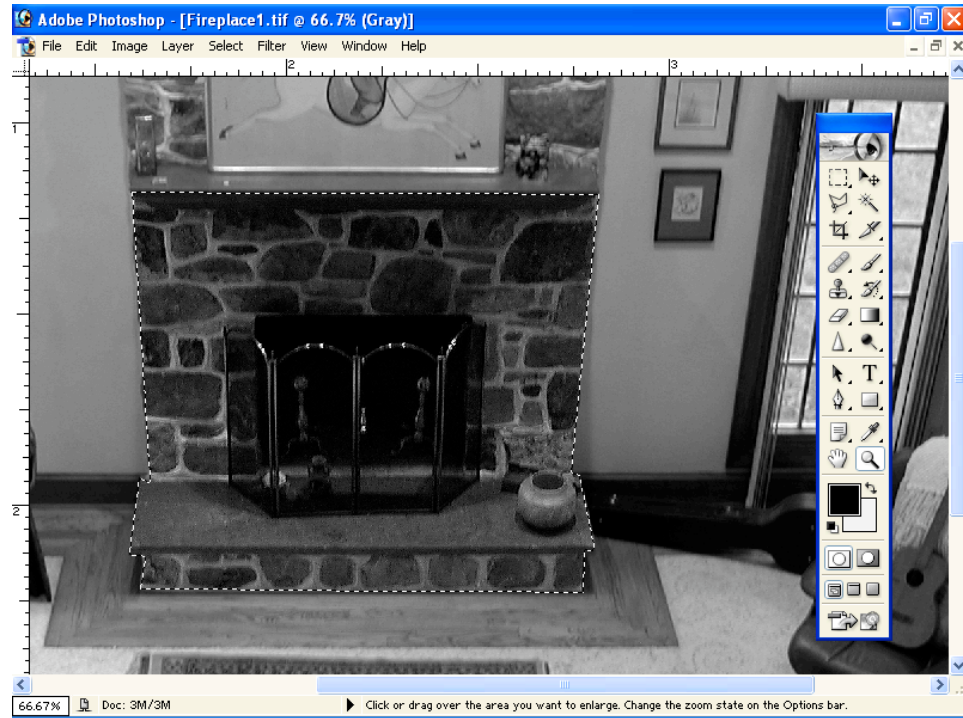

Figure 4-21.

Note the white dashed line that indicates the selected area.

With the area selected, we zoomed out to see the entire photo again, and adjusted the brightness of the selection to match the rest of the photo. Figure 4-22 shows the image in midadjustment, with the brightness purposely set far too high, just to show clearly that you can adjust the selection without affecting the rest of the image.
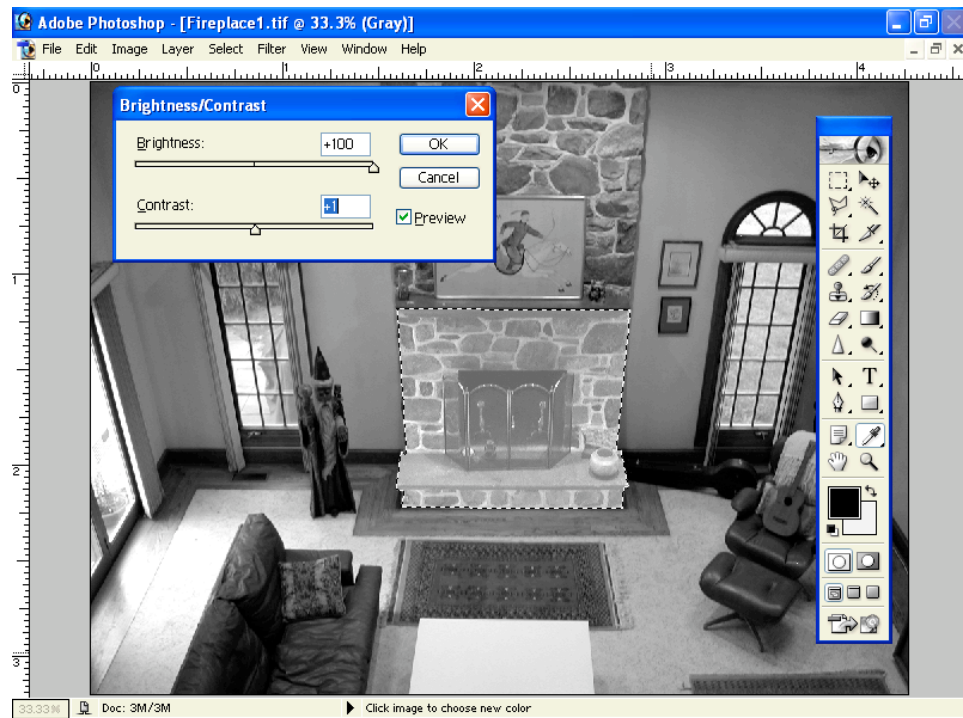
Figure 4-22.

You can adjust the brightness in the selection separately from the rest of the image.

Figure 4-23, finally, shows the finished version, with the fireplace area adjusted to match the rest of the photo.

Figure 4-23.
After adjusting the one area, the fireplace matches the rest of the photo.

Here again, the best advice we can give you for learning how to do this in the photo editing program you have is to first scour the program looking for selection tools, and then practice using them, looking for options that let you select exactly what you want. The better you get at selecting the areas you want, the better the adjustments to your photos will look.

Removing Unwanted Objects

Improving your photos by fixing flaws like color shifts and poor contrast is one thing. Improving them by changing the photo is a quantum jump up in concept. One of the more impressive things you can do to fix a photo is get rid of things. Whether it's a blemish on someone's face, a car in the middle of a field, or an unwanted person taking up a good portion of the shot, you really can get rid of it if you know how. Here's how.

4c.20

Cleaning Up Small Areas

Let's start with something small, meaning that it's taking up just a small part of the photo. In Figure 4-24 we've zoomed in on a close-up of a face to show just the area around the mouth and nose. If you look carefully, you can see a small mole on the subject's right check (the left side of the photo), and a small white spot—probably a flaw in the photo—just under the nose on the left side.
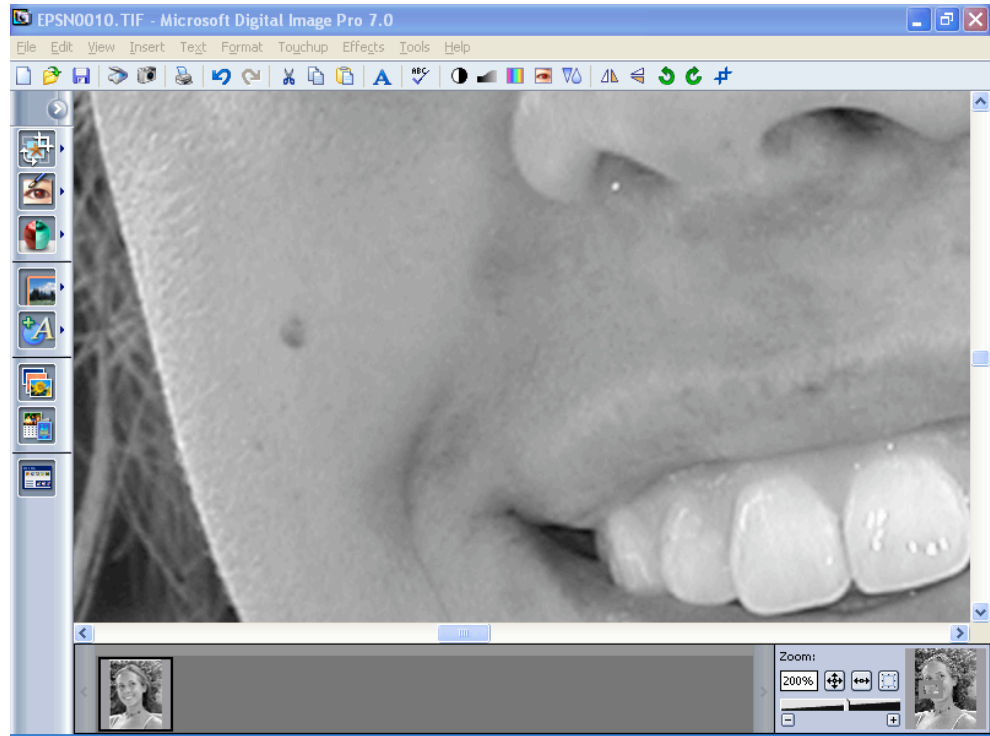

Figure 4-24.

The close-up shows a mole on the cheek and a white spot under the nose.

These aren't major flaws by any means, but the white spot could be distracting if you print this at, say, 8 _ 10 inches. And just for argument's sake, let's assume the woman in the photo hates the mole and would rather that it not show in the picture.
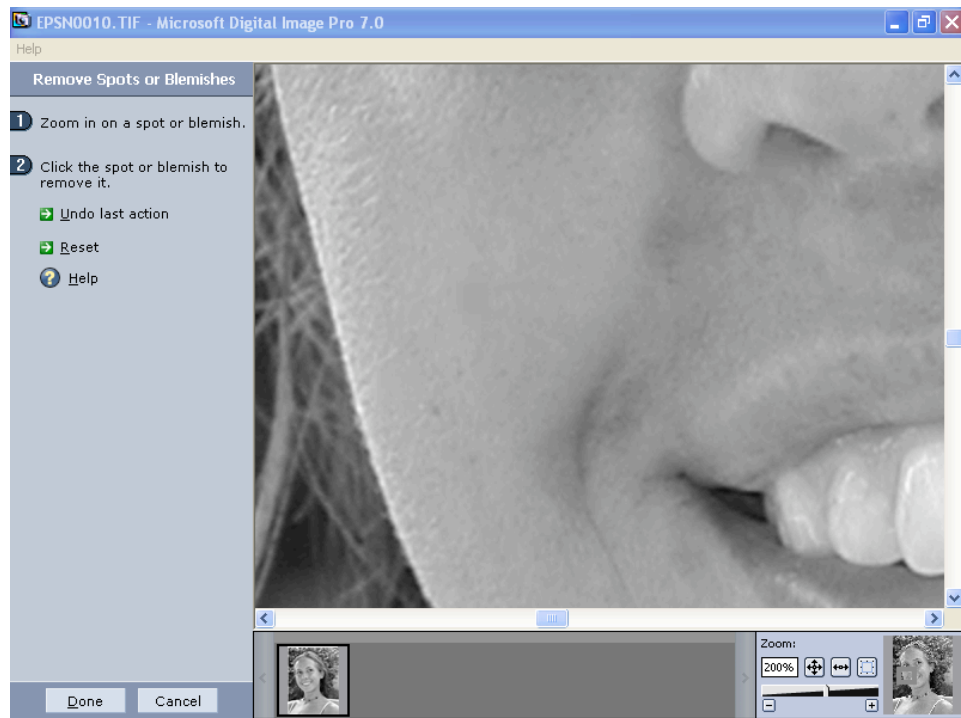
Figure 4-25.

The same picture, after removing the blemishes.

A fair number of editing programs offer a cloning tool that's easy to use. With a cloning tool, you first click on a spot you want to clone, or copy from. To cover the mole, for example, that spot would be somewhere nearby on the cheek. Then you click on the area you want to cover—the mole in this case—and either move the mouse and click again, or click and drag the mouse back and forth to clone from the area around the first spot you chose.

The idea with cloning is to pick a spot that is similar enough to the area you want to cover so the cloned pixels will match the surrounding area. The result will be indistinguishable from the fixed version of the picture you see in Figure 4-25. Depending on the program, you may be able to adjust the brush size and other aspects of the cloning tool as well.

Still another approach to fixing small spots like these is one we mentioned earlier—a smudge tool or blur tool. Look for a drawing tool that will let you drag the mouse over an area to smear or smudge—essentially mixing the pixels together with other nearby pixels—to effectively make the spot go away.

Removing Large Objects and People

Large objects are nearly as easy to remove from a photo as small objects, but the techniques are different. Take a look, for example, at Figure 4-26.

Figure 4-26.

There's something missing from this photo, because we eliminated it.

You wouldn't know it from looking at the photo—at least, not without looking at it closely—but there's something missing. In the original, there was a highway in the frame, complete with two trucks. Figure 4-27 shows the original picture. We removed the road to give us a picture of something approaching unspoiled wilderness.

Figure 4-27.

The original version of the picture, complete with the road.

　　To get rid of the road, we started by selecting a rectangular area roughly a third of the way from the bottom of the picture, copying it, and then pasting it over the area where the road curves to the left. Then we used the polygonal tool to define an odd shape from the area in the lower right corner of the picture, and copied and pasted that section. Figure 4-28 shows an early stage of the process.

Figure 4-28.

Covering up an unwanted element, piece by piece.

   We repeated this basic procedure with one or two additional shapes. Figure 4-29 shows the photo with the road almost entirely covered up. At this point in the process, you can see sharp lines where the copied pieces overlap.

Figure 4-29.

A later stage in the process of covering up the road.

Finally, we used the cloning tool to copy small areas over the lines and hide them. Depending on the image, a smudge tool may be the preferred choice for this step. The final result is the one we showed first, in Figure 4-26.

Not all programs will give you all the tools you need to do something like this, but a surprising number do. It's certainly worth exploring the program you have to see if you can pull off tricks like this.

One last tip if you try this: some programs will insert each copied piece onto a separate *layer*, the electronic equivalent of putting the copy on an overlay that sits on top of the photo. This lets you move each piece around, and even modify it without disturbing the picture underneath. If you decide you don't like what you did, you can delete the image on the layer and get the original picture back. When the time comes to blur the edges, however, be sure to merge all the layers into one. The typical command for this is to *flatten* the image.

All of which brings us to the end of the line for the subject of fixing flaws in photos. We don't want to imply that we've taught you everything there is to learn

about fixing photos, but if you've followed us through this chapter and the one before, you've learned enough to fix some significant problems in your pictures. What you need to do now is practice what you've learned. Along the way, you'll pick up lots of details that you can get only from hands-on experience. If you're like us, you'll find that spending time working with your photos to improve them is so absorbing that you lose track of time when you're doing it. If so, we can only say, enjoy yourself.