

# **The Hidden Power™ of Photoshop® Elements 3**

*RICHARD LYNCH*

**SYBEX®**

# The Hidden Power of Photoshop Elements 3



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RICHARD LYNCH

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*Dedicated to all  
those users who  
want a little more  
from Elements.*

## Acknowledgments

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*The list* of names that help me with these books grows longer as I do more of them, but the core of those who help day-to-day remain much the same. While I am sure I would get up most mornings anyway, Sam, my faithful, furry alarm clock-helper makes sure I am up and at it. My wife, Lisa, and children, Julia and Isabel, patiently not only allow the work to go on, but put up with the always-elongated projects—that cut into vacation and family time—and put up with the massing piles of equipment, programs, and wires, as well. Murphy doesn’t contribute much these days but a pose, lap warming, or occasional hairball that can all, in their own way, be welcome distractions. Inanimate objects, like my computer, which continues to function through obvious adversity, and my shower, which somehow is a companion in hashing out the most complicated procedures, both play a silent part in helping me get the work done. ■ Companions in “the business” include Al Ward (<http://actionfx.com>), Greg Georges ([www.reallyusefulpage.com](http://www.reallyusefulpage.com)) and Fred Showker ([www.graphic-design.com](http://www.graphic-design.com))—friendlier, more insightful folk I am unlikely to meet, each willing to give their time and lend an ear when it is most important. Doug Nelson ([retouchpro.com](http://retouchpro.com)) and Susan Stewart I thank for their like willingness to test and offer consistently valid opinions—and for the free time they give to helping answer user questions. Thanks to many nameless others who have lent a hand, posted a review, sent a friendly e-mail, or mentioned the book in a forum or newsletter. ■ The strangest of thanks to Jeff Schultz of Pearson for having the foresight to cut off several book projects that were in the works at Que to make me all the more determined to succeed in a bigger way elsewhere—contracts be damned, Jeff. ■ Thanks to all those in publishing who have helped get me started, including Stephanie Wall and Mitch Waite (both formerly of Waite Group Press), and those who kept me going, including Beth Millett and Bonnie Bills. Thanks much to the current Sybex crew who have put their stamp on this edition of *Hidden Power*: Lori Newman (who pushes, kindly), Pete Gaughan, Jeff Foster, and Sharon Wilkey. Thanks to those others behind the scenes: Dan Brodnitz, Senoria Bilbo Brown, Rodney Koenekke, Dan Mummert, and Rodnay Zaks. ■ A grand thanks to all the readers who purchased the book and any additional Hidden Power tools or who downloaded the free stuff, confirming for me and assuring the publisher that there really is a market of advanced Elements users out there who need to get more from Elements.



# Foreword

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*Some of the best* friendships are often unexpected. About three years ago I posted a note to a Photoshop forum hosted by Richard Lynch. After a bit of conversing I realized that not only did this guy know his way around Photoshop, but he's a heck of a nice guy to boot. I'm pleased to call Richard not only my peer, but my friend as well. ■ I have to admit, I used to be a Photoshop purist. I was one of those people who scoffed at the idea of any software being worth its salt against the Big Daddy. Imagine my disbelief when Richard asked me if I'd ever consider teaching or writing about Photoshop Elements. But with a little effort, Richard eventually opened my eyes to the fact that Photoshop Elements is an incredibly powerful and capable program. ■ Photoshop Elements has the functionality to edit and create professional images and graphics. And with the new features in Photoshop Elements 3, it's even easier for users to achieve corrections and manipulations that at one time only Photoshop could do. ■ As I learned, the potential of Elements may not be immediately obvious, and that is where Richard's book steps in. *The Hidden Power of Photoshop Elements 3* reveals capabilities you might never know existed in the software. It also provides Richard's power-boosting tools that further shorten the list of things Elements "can't do." ■ If you haven't already, BUY THIS BOOK. I stand by my assessment that there is no other person on the planet who knows Photoshop Elements like Richard does. Once again he converts a kid's bike into a Harley: He takes Elements, a very affordable piece of software, and shows how it can tackle tasks just like its big brother Photoshop. Other books give you the basics; this book gives you both the tools that help make your images look great and the skills to use those tools. With Richard Lynch leading the way, you'll be a pro in no time.

—Al Ward, certified Photoshop addict, author, and trainer; webmaster, Action Fx Photoshop Resources (<http://actionfx.com>); author, *Photoshop for Right Brainers: The Art of Photo Manipulation*, *Al Ward's Photoshop Productivity Toolkit: Over 600 Time Saving Actions*, *Photoshop Elements 2 Special Effects*



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# Introduction

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*I'd been* a photography-book editor, digital retoucher, and Photoshop author for 10 years, using Photoshop as my primary image-editing tool, when someone asked me to look at Photoshop Elements for the first time. I was a little reluctant, having heard it was nothing but a dumbed-down version of Photoshop. I expected that I wouldn't find it very interesting and I'd just be wasting my time. From what I understood, the tools I used all the time were missing, including channels, Curves, masking, CMYK tools, and Blend If. I was pretty sure I'd never be able to take the program seriously.

It just goes to show: Never judge a book by how someone else describes the cover.

Instead of being bored with the simplicity of Photoshop Elements, I became fascinated by the possibilities. After toying with Elements for only a few minutes, the program and the possibilities piqued my interest—it seemed there was more to Elements than I'd heard, and it seemed like a pretty powerful program. I continued to explore the program, and within a few days I had discovered ways to either use or imitate every feature I'd heard was missing. Elements could do a lot more than most people thought, and more than even the manufacturer let on. It got to the point where I began wondering what Photoshop Elements *couldn't* do, rather than worrying about what the differences were between this program and Photoshop. I looked around to see if there were other sources that said the same thing, and I couldn't find any. It was then that I realized that I should write a book to tell about what I'd learned and show what Elements could really do.

Since I started working with Elements, one idea became clear to me: fancy tools can actually stand in the way of learning. You don't learn much by pressing a button—no matter how sophisticated the button is. Some tools in image editing programs help you forget about fundamentals entirely, and can isolate you from the process. You end up pressing buttons and not really understanding what is going on. For example, ask almost anyone (who hasn't read this book) to make an RGB separation without using channels. This is something that anyone serious about image editing should understand conceptually and be able to do, because it is fundamental to working with and displaying the image. Yet many of the most experienced digital professionals wouldn't be able to do it. Knowing how components separate offers a whole different historical and scientific basis

for evaluating, altering, and correcting digital images and color. And understanding how to separate components provides a solid foundation for understanding the way images are created and stored—on film and digitally. That is why this book not only gives you tools that simplify complicated processes, but it explains exactly how each works, step-by-step. I have found that understanding the process is a better, more fundamental, way to look at and understand images from the ground up.

I learned a lot in the process of discovering Elements, and as a result I've gone back to the fundamentals of working with images. I wrote *The Hidden Power of Photoshop Elements 2* to capture that discovery in hopes of helping other users understand the power of the program and what they can do with digital images. Now, in *The Hidden Power of Photoshop Elements 3* the goal is to clarify and expand on that first attempt based on the feedback I received, as well as create a toolset compatible with the changes in the Elements program and interface. Both books free up powerful image properties and provide tools for users that help make Elements a serious professional image-editing tool.

As a 12+ year veteran of digital image editing, I use Elements every day for even the most challenging image-editing projects. With the addition of 16-bit support and the ability to import RAW files, there is really almost nothing that Elements can't do. This book shows you how.

## What Makes a Good Image?

Photoshop Elements gives you the power to alter any pixel in an image. You can technically do anything. Like a brick-worker building a building, you can get in and create your image one pixel at a time to get exactly what you want. If you know what you like and what you don't, it should be easy to improve and create images. Just look at the image or canvas and know what you want to see. Once you know—and can trust—what you want to see on-screen, all you have to do is make whatever changes are necessary so that your image looks the way you imagine it. The whole process should be simple, right? Just click a button and fix it; then print and be done with it.

But it isn't always that easy.

The problem starts because of numbers and possibilities. There can be millions of pixels in an image. Each pixel can be one of millions of colors. Every pixel can be altered with numerous tools and options in groups or separately, with changes based on surrounding pixels or considered on a pixel-by-pixel basis. The color and tone of each pixel has to be

orchestrated to work together with other pixels adjacent to it to form a recognizable whole. When you are finished, that whole has to look as you imagined it. Getting that picture out of your imagination certainly isn't as easy as taking a picture. And building images one pixel at a time overcomplicates the problem of creating what you want to see. Not knowing where to start and what tools to choose just makes the process of working with images that much more difficult.

You have to simplify the approach.

Elements gives you what is potentially a big heavy tool box. Some people blindly fall into a trap, thinking they have to understand and use every tool, filter, and effect, and strap all those tools to their tool belt in order to be able to use the program efficiently or to do anything the "right" way. There are two things wrong with that idea:

- You don't need to know how to use every tool, filter, or effect; you just need the right ones. There are probably many tools (and shortcuts!) that you never use.
- There isn't really a right way and a wrong way; there are harder and easier ways, and ways that are more and less effective.

In Elements there are numerous tools. Not all are essential, some are redundant, some are merely toys, and some are gimmicky, trendy, or unpredictable. While almost all have their place when you get to know them, the ones that are the most powerful, most useful, and most often used—just like the hammer and screwdriver in a carpenter's tool belt—are often not the most spectacular.

A few others have to be coaxed out of hiding, which is part of what the *Hidden Power* title is all about, and some of what the book will do for you.

Not everything that makes an image look better requires a lot of creativity. There are techniques you can use to make an image look better that require very little thinking at all. In fact, much of the initial process of image correction should be nearly automatic. If there is a dust speck in a scan, you'll need to remove it; if color correction needs to be done, you'll need to correct it. Although there are several ways to approach making any change, if you have a few favorite tools and techniques, the process of correction becomes much simpler.

In other words, applying a somewhat limited number of tools and techniques can get you most of the effects you will ever need to improve your images. Using what you have in an image and making the most out of that is often key to getting the best results. Some of

the most helpful and powerful information in images is hidden or ignored. This book helps reveal that image content and simplifies the tools you will need to use and apply. With fewer tools (and rules) to remember, you can concentrate on what to do with the images rather than pondering options or quizzing yourself as to how to apply the tools. Using image content to leverage selective changes can help target corrections in ways that freehand work nearly never will. It is a fundamental approach. By using fewer tools, you won't be weighed down by the heavy tool belt. Concentrating on a smaller set of tools and using a structured approach will simplify the corrections you make in any image.

## But What Corrections Do You Make?

Say you go to the airport to pick up your cousin who has been in the African jungles for a decade. No one has seen him in all that time, let alone seen the talking monkeys he was on the trail of. It sounds like a great photo opportunity, so you grab your camera and head out the door.

You meet him at the airport gate and take some snapshots of him all haggard and weather-beaten from his grueling years living in nature. He looks fresh out of *National Geographic*.

Later, when you open the images on your computer, they seem to have come out pretty well. But the first thing you probably *won't* do in this situation is add an effect that sets his head on fire. Besides occasionally applying a special effect, the biggest wow you can get from your images will usually be achieved by

- Taking a good picture that clearly shows an interesting subject
- Using targeted corrections to make those images look the best you can

Most people viewing your picture will want to see the subject of your image, and you can't get that by burying the subject in flames. Special effects have their time and place, but when the subject and image can be good enough on their own, you can do more to improve the look of your photographic images with good corrections. The idea behind this book is to give you a from-the-ground-up method not only for making better images by correction, but also for understanding what makes a better image in the first place. You will find the hidden power not only in Photoshop Elements, but also in your subjects and images. The goal of this book is to make people viewing your images say "Wow!" not in response to flames or other effects or magic, but because your images look great.

Much of what used to be my standard process in image correction has been rearranged because of my experience with Photoshop Elements. The result is that my process is now simpler and my images have changed for the better. That was a somewhat shocking change to have happen after 10 years of experience editing digital images. It was like a carpenter looking at his hammer and suddenly realizing that it actually had two sides and could do more than just bang the nails in. The more shocking thing is that the techniques you'll read about in *The Hidden Power of Photoshop Elements 3* tear down the wall of difference between Photoshop and Elements. I use the same techniques in both programs these days, and—except for a few differences in the interface—I often forget which program I'm in. The most obvious fact is that it doesn't matter, but the hidden fact is that I learned my current techniques from Elements, not Photoshop. Using the techniques in this book, you won't often be left using Elements limply and apologetically, as if you were banging in screws with your hammer; you'll be using a regular screwdriver—the proper tool—to fasten your screws.

## The Goal of This Book

The goal of *The Hidden Power of Photoshop Elements 3* is to take apart the process of correcting images and the images themselves. You'll learn professional corrections that can be applied with simplicity, and you'll become familiar with the powerful tools you need to know and how they apply to any image. This dissection of process and getting back to fundamentals starts immediately by looking at an essential toolset. The dissection of images starts by looking at tone and separating color into tone before color correction or editing. There can be millions of colors in an image, but there are only 256 grayscale tone levels in a single 8-bit color component...and that number is much easier to handle. Grayscale tone is the essence of color and content—and creating a better image starts from that simple representation.

### **This book is for**

- The serious Photoshop Elements user who may feel they are outgrowing or could get more from the program
- Photographers moving into digital imaging who need powerful tools for image correction
- Graphics professionals who thought their only choice for working with digital images was Photoshop
- Anyone who wants to make their images look better



### **The focus of the book is on**

- Learning a process of approaching images with proven methods and the right tools to make your image corrections
- Learning new tools that Elements supposedly doesn't have to bolster your editing arsenal
- Working through what you need to do in realistic situations with realistic images by using realistic expectations to get real results

### **The book is *not* about**

- Exploring every last tool in the interface in excruciating detail
- Making crazy effects

The techniques provided here will help you take your corrections to a professional level without hocus-pocus or steps that are impossible to comprehend. It will reveal how to do many things that are generally thought to be impossible using Elements, such as using Curves and channels, implementing duotones, working in CMYK, and applying image snapshots. The solutions are used right in Photoshop Elements—with no plug-ins, additional investment, or other programs to learn. You'll see what happens behind the scenes in step-by-step procedures, and you'll be given the tools—customized Hidden Power tools created just for this book—to move through those steps quickly. Though created for this book, the tools will work with any image. These tools empower you to make the most out of Photoshop Elements, and they can be found nowhere else but in this book.

## **How This Book Is Organized**

As you go through the book you will discover a mixture of practical theory, examples of the types of changes you'll make in images, and projects to work on to help you understand the process as well as why it works. Projects are put together so that you don't just complete an exercise or press a button and ogle the result, but so that you see what goes on behind the scenes to help understand what you have done. When you understand, you can apply that understanding to other images predictably—either by using tools provided to drive a process, or by manually applying learned techniques. There are clear goals from the outset of the procedures, and the examples provided ensure that you can see the change when they have created the desired result. This understanding will enable

you to apply the techniques you learn to other images so that your images can be improved consistently.

You will learn to take apart image color and tone entirely by using several color-separation methods, and to isolate color components, image objects, and areas in a number of different ways. When you can isolate colors and image areas, this enables you to correct those areas separately from the rest of the image and exchange, move, and replace elements to make better images. After images are corrected and manipulated, you will learn about options for output, including making custom separations to CMYK and duotones. The section on the Web includes everything from how to include your images on a web page to creating animation and rollover effects. Hidden Power tools are introduced throughout to reveal functionality and simplify procedures.

**Chapter 1: Essentials of Images and Image Editing** In this chapter you'll learn the basic concepts for simplifying your approach to images and corrections. First you'll learn the basic procedure as a step-by-step process for approaching any image manipulation. Then there is a listing of tools you'll need in different stages of correction and a breakdown of what you want to use them for. You'll also learn all the background you need for understanding the nuts and bolts of your images—not the mathematics and obscure calculations, but the solid theory at the bottom of what you see and how that translates to digital images on your computer.

**Chapter 2: Separating Image Components** This book is not mostly black-and-white by accident. The raw fact is that color in digital images is stored as a tonal representation of color light components. To make good corrections and manipulations, it is best to become an expert in extracting and working with tone. You'll see how to split color into simpler tonal representations, and we'll look at how black-and-white tone can become color again.

**Chapter 3: Correcting Image Tone** Tone is integral to implementing color and making effective color changes. Understanding how to work with tone can make a big difference in the color results. We'll look at doing minor cleanup, evaluating images, and adjusting tone with Levels, Curves, basic sharpening, and advanced masking to isolate image areas.

**Chapter 4: General Color Correction: Applying Levels and Curves** Levels and Curves corrections learned in tonal correction in Chapter 3 are applied to color images to show how

general corrections of tone and color parallel. You'll see the advantages of both tools in color correction and work through specific examples applying each tool.

**Chapter 5: Specific Color Enhancement** Once you've completed general color correction, it is time to get into more selective color corrections. Changes can be initiated by special controls inherent in specific tools, or combined to produce highly targeted and effective results. This chapter introduces color range, color-specific masking, history application, duotoning, channel mixing and calculations, CMYK, and controlling printed results.

**Chapter 6: Altering Composition** Similar to how you can take apart image color, you can extract image elements from an image and then replace, adjust, or remove them. This gives you control over image composition by giving you control of all the objects in an image.

**Chapter 7: Reshaping Image Elements** With image elements separated and corrected, you are free to reshape, redesign, and repurpose image parts. Creating new objects is sometimes a good solution for correcting problems, and it brings together many of the techniques you've learned to this point. You'll learn to manipulate tone and color to create object shape and depth and work through an example to create an image object entirely from scratch.

**Chapter 8: Vectors** Vectors provide another way to control image content, which can be valuable in making resolution-independent, scalable artwork and using printer capabilities to their fullest extent. Do more of the impossible by creating and storing your own custom shapes and applying clipping paths.

**Chapter 9: Options for Printing** More options exist for printing than just working with your inkjet printer at home. In this chapter, we look at how to get the best results at home, in addition to other options that may be more attractive and less costly than you think. Learn how to print to the edge of the page and get real CMYK prints from your custom separations.

**Chapter 10: Creating and Using Web Graphics** Web graphics generally follow the same steps for creation as regular images, but some special attributes keep them distinct from images you use in print. Learn to get your images into a web page, and also how to implement a rollover and create image animation.



## The Hidden Power Tools

One of the most important parts of this book is the collection of Hidden Power tools provided on the CD. The tools are meant for readers of this book only and should not be shared freely. Tools must be installed into Photoshop Elements to be accessible.

To install the tools, first locate the proper Hidden Power installer for your computer system platform on the CD. Installers are supplied for both Macintosh and Windows for Photoshop Elements 3. Tools have not been tested on earlier versions of Elements. After you have chosen the installer for your operating system, initiate the installation by double-clicking the installer. Target the installation by choosing the Elements program folder when prompted; be sure to carefully read the instructions as they appear on-screen. You'll need a password for the installation, and these are provided here:

Operating System	Installer	Password
PC/Windows	HpforPE3.exe	hiddenpower3
Macintosh	Hidden Power for Elements 3	hiddenpower3

If you have any trouble with the tool installation, please read the troubleshooting file on the CD, and visit the [hiddenelements.com](http://hiddenelements.com) website for information that becomes available after publication.

After you've installed the tools, you'll be able to access them in the Styles and Effects palette. Open the Styles and Effects palette by choosing Styles and Effects from the Window menu (Windows users should be in the Image Editor rather than Organizer). With the Styles and Effects palette on-screen, choose Effects from the drop-down list at the top-left of the palette—this will populate the effects categories in the drop-down list on the right. Choose the Power categories (PowerSeparations, PowerTools1, PowerTools2, and PowerBonus) to reveal the power tool listings. The use of most of the tools is discussed in the book. The bonus tools are extra tools. These are described in the readme file for the tools on the CD and can be discussed on the forum for the book (visit the website for the forum link: [www.hiddenelements.com](http://www.hiddenelements.com)).

These Hidden Power tools will enable you to access additional tools for Elements such as Curves or Color Balance, and they will condense some of the longer step-by-step procedures you'll learn in the book into clicks of the mouse. I expect to expand on these tools even more after the release of this book. Check the website and newsletter for additions (you can subscribe to the newsletter from the website).



# Practice Image Files

All images used as practice files in the book are provided on the accompanying CD so that readers can work along with the exercises. They are Mac- and Windows-compatible and are provided in common formats supported by Photoshop Elements. These images are for educational purposes only and should not be used freely elsewhere.

# Compatible with Windows and Macintosh

Just as Photoshop Elements and the Hidden Power tools work on both Macintosh and Windows operating systems, the book always gives shortcuts for both so that users on either platform can successfully use the book and techniques. The standard notation for shortcuts gives Mac and Windows keys at the same time: Mac / Windows + keystroke. For example, Command/Ctrl+O will open an image, that is, use Command+O on a Mac, and Ctrl+O on a PC. The following table of keyboard equivalents will cover almost any situation:

Macintosh	Windows	Example
Shift	Shift	Shift+X
Option	Alt	Option/Alt+X
Command	Ctrl	Command/Ctrl+X
Control+click	Right-click	Control+click/right-click

When following along with the book's step-by-step instructions, use the methods suggested in the steps for accessing the tools, or procedures may not function correctly. For example, opening Levels with the keyboard shortcut (Command/Ctrl+L) will open the Levels dialog box but will not produce an adjustment layer, and this can affect the outcome of a procedure that depends on the adjustment layer being created.

When three or more keys are required, the Mac and PC keystrokes are included in their entirety. For example, stamping visible content to the currently active layer is the rather extended shortcut: Command+Option+Shift+E / Ctrl+Alt+Shift+E for Mac / PC.

# Going Further with Hidden Power

There are several ways that you can contact me via the Internet. I am interested in your questions and comments as a means to improve the book in the future, to put frequently asked questions to rest, to develop new tools, and to correct any typos or other errors that

may have slipped in when I wasn't looking. Use [r1@ps6.com](mailto:r1@ps6.com) or [thebookdoc@aol.com](mailto:thebookdoc@aol.com) to contact me directly. Depending on volume, I'll respond personally to e-mail as often possible, and I look forward to your input. Frequently asked questions will be answered in the *Hidden Power of Photoshop Elements Newsletter*. Additional information can be found on the website for the book or the Sybex website.

## The Hidden Power Websites

I've set up a website with more information about the book at [www.hiddenelements.com](http://www.hiddenelements.com). The site includes information for readers, including links to the newsletter, additional tools, tutorials, a forum, and a contact page where you can enter comments, questions, and other feedback.

Sybex also strives to keep you supplied with the latest tools and information you need for your work. Please check their website at [www.sybex.com](http://www.sybex.com) for additional content and updates that supplement this book. Enter the book's ISBN, 4385, in the Search box (or search for *lynch*), and click Go to get to the book's update page.

## The Hidden Power Newsletter

The *Hidden Power of Photoshop Elements Newsletter* keeps you up to date on any changes, notifies you of any tools I've made available, and answers frequently asked questions. I send the newsletter to all subscribers; the frequency of the newsletter depends on the volume of questions. All you have to do is subscribe by submitting your e-mail address to get it. You can sign up at the Hidden Power site: [www.hiddenelements.com](http://www.hiddenelements.com). Subscription is free, and the newsletter is available to anyone who wants to join.

Hopefully you see from all this that I don't plan to leave readers stranded in deep water. If you have questions about the book, tools, or installation, contact me by e-mail or in the forum; other people will have those same questions, too, and I'll be glad to answer them as time allows.

Now let's get on with uncovering the Hidden Power of Photoshop Elements.



# Part I

## Preparation and Concepts for Serious Image Editing



Serious image editing requires serious preparation. Problems in your images that you can ignore when you are just starting out become far more important as you gain experience editing.

What you don't want to do when you work on images is spend hours correcting something that would have taken moments to fix at the time of capture. So your first task in working with any image should be to always take the time to capture the best image information that you can. Get the best capture as a photo or scan, instead of one you will just plan to fix later. The better the information you start with, the more likely you'll have what you need to make the best result.

Capturing the best information and getting the best results require understanding the images themselves and how image information is retained and displayed. Before getting into image editing, there are some concepts that must be clear. Understanding these concepts and setting up images correctly can help you bring the right information into Photoshop Elements, optimize image processing, and develop an approach to the processing itself. This part of the book lays the groundwork you'll need for stepping into more advanced concepts.

### Chapter 1 Essentials of Images and Image Editing





# Chapter 1

## Essentials of Images and Image Editing

There are really only a few types of change that can be made in an image, and they revolve around altering content. You choose the tools to use and then work with tone and color to change the composition. That's it. If your process covers tool selection, color correction, and composition changes, you are doing what you should for every image.

Following a process and understanding the possibilities gives you a solid foundation to work from. Although the actual changes for each image may be very different, you can use the same set of tools and the same editing process just about every time. The purpose of this chapter is to outline the process and concepts for you. With this foundation, you can then jump into making your images better.

### The Image Editing Process

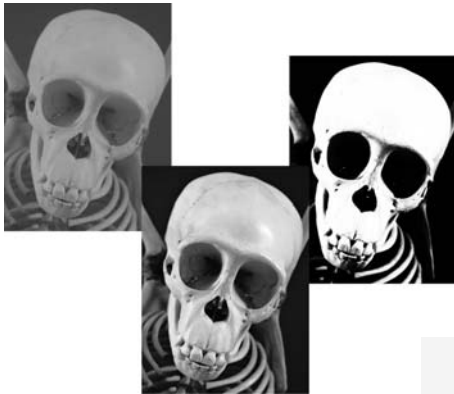
#### The Tools You'll Need

#### Basic Concepts of Tone, Contrast, and Color

#### Understanding and Using Color Management

#### Resolution

#### Knowing Your Equipment and Images



## The Image Editing Process

When you go on a vacation, it is a good idea to make a checklist to help you remember everything you have to do before you go and everything you want to bring along. When approaching image correction, a checklist can help ensure that you've covered all the essentials. The list should cover everything you will have to do to an image, and you'll want to do the steps in a particular order until you develop your own preferences and methods.

The process that follows is one that I have developed over many years of working with digital images, and it covers all the steps you will need to take in correcting images. For some images you'll skip a step, and for others you might spend hours indulging one step or another. During the process of correction, you will generally want to work from global changes down to smaller and more specific changes.

The steps come in three parts:

**Preparation** Be sure your system and program setup are correct and that you know what you want to do with the image.

**Correction** Take specific steps to achieve your goals in correcting the image.

**Purposing** Finalize the image to target it to specific output.

### Image Correction Checklist

Each set of steps in the image editing process is outlined in the following checklist. Consider this checklist your plan for editing images. It is the roadmap that all of the technique covered in the following chapters falls into.

#### Preparation

1. Be sure that your monitor is calibrated and that you have set up your preferences and tested your output. Doing so ensures your best chance of getting the results you intend. (See “Understanding and Using Color Management,” later in this chapter.)
2. Store the original image file safely and work with a copy to do all of your image editing. If any step goes awry, you will want to be able to return to the original image to start over, or you may want to repurpose the original in the future.
3. Consider resolution and color. Have in mind a target range for the resolution and a color mode for the final image. You may work at different resolutions and in different color modes throughout, but knowing what you need from the outset can help you work smarter, with fewer color conversions (which you generally want to try to

avoid). See “Types of Color” and “What Image Resolution to Use,” later in this chapter.

4. Evaluate the image. This analysis can include looking at color and tone, determining the image type (high-key, low-key, high contrast), evaluating the extent of work to be done, and considering the composition. The result of the evaluation should be a short list of things you want to improve or change. See “Evaluating Image Tones” in Chapter 3.

## Correction

5. Make general color and tonal corrections. Be sure to make a good general correction at this point, but don’t spend a lot of time getting it exact. A good general correction will point out some flaws that may otherwise lurk in the image until later in the process. While it isn’t bad to double back during the process, it can unnecessarily increase the amount of time you spend on images. See “Redistributing Tone with Levels” and “Snapping and Fading Contrast with Curves” in Chapter 3 and “Levels Correction for Color” and “Curves Correction for Color” in Chapter 4.
6. Make general damage corrections, such as eliminating dust from scans, fixing cracks and holes in scanned images, and reducing digital noise. See “Doing Minor Cleanup First” in Chapter 3 and “Minor Cleanup for Color Images” in Chapter 4.
7. Make more involved color correction. This means do more intensive tonal and color adjustments, but not spot adjustments (using selection or masking). Those corrections will come later. See “Snapping and Fading Contrast with Curves” in Chapter 3 and “Curves Correction for Color” in Chapter 4.
8. Crop and size the image so that you are working with only the image area you really need. See “Cropping as a Tool for Composition” in Chapter 6.
9. Make major specific compositional changes and corrections, including replacing parts of the image with replacement parts you have created. This is the final compositional change. See Chapters 6 and 7.
10. Make targeted color and tonal corrections to selected parts of the image. You’ll revisit techniques from Chapters 1 through 7 to select and mask changes to specific areas of an image. Chapter 5 might hold the most to mine in this step.
11. Make final fine-tuning adjustments to sharpening, contrast, and brightness.
12. Save the layered RGB version of the image. Be sure to give the file a new name, so you do not save over the original.

## Purposing

13. Simplify the image as appropriate. This step may include flattening the image or merging layers, altering the color mode, or removing extraneous image information.

Don't delete or merge shape layers that may be important to your output.

14. Make final color and tonal adjustments to optimize the image for output and use. This step can include such changes as setting white and black points and making device-specific color changes. See suggestions in Chapter 9, "Options for Printing."
15. Save the image in output file format.
16. Package the image for output and use.

This checklist may seem long, but each step will often not be very involved. Some steps you will do naturally, and some take just a moment. Practicing correction by following the steps in the list can ensure that you make all adjustments and corrections that you intend to in achieving your goals for the image. The tools to use in each of these steps are reviewed in the next section. While this provides a solid process, using the process correctly depends on how well you understand your images. The sections that follow the checklist provide the fundamentals you need to use the process.

## The Tools You'll Need

In each step of the image editing process, you can use a small subset of the tools and commands in Elements to accomplish your goals. Having a list of these tools helps you know what tools to concentrate on and master, while leaving other tools safely behind. Concentrating on the smaller tool set will help streamline your image processing and keep you on target during the editing process.



The tool set listed in Table 1.1 is based on the steps described in the preceding section. Most of these tools are standard tools you already have in Photoshop Elements; others are add-ins you will find on this book's companion CD. These "Hidden Power tools" can simplify processes or add new functionality to Photoshop Elements. See the "Hidden Power Tools" section of the book's introduction for instructions on how to load and access these tools.

You may occasionally reach outside this suggested tool set for a special purpose, but this listing offers a general guideline to simplifying the tools needed to get excellent and consistent results. The choices are based not on which tool is easiest to use, but on which will provide the best results.

PROCESS STEP	TOOL	USE THIS TOOL TO DO WHAT?	LOCATION
1 : Calibrate the monitor.	Adobe Gamma (PC) or Display Calibrator Assistant (Mac)	Do free, easy monitor calibration and ICC profile generation in one process.	Adobe Gamma is on your computer's Control Panel or the Photoshop Elements CD. Display Calibrator Assistant can be found in the Displays System Preferences by clicking the Calibrate button under the Color tab.
2: Store the original image.	Save As	Save your image with a specific name and location.	File → Save As
3: Specify resolution and color settings.	New	Set the color, size, and resolution to use for new images.	File → New
	Image Size	Change the size and resolution of an open image.	Image → Resize → Image Size
	Mode	Change the image color mode of an open image.	Image → Mode
	Scanner or digital camera	Use equipment settings to adjust image color and resolution at capture.	
4: Evaluate the image.	Eyedropper	Sample to check color and tone values in specific image areas.	Eyedropper tool in the toolbox
	Info palette	Display sampled readouts.	Window → Info
	Histograms	View a chart and statistics showing tonal mapping of the image.	Image → Histograms
	Levels	View image histograms as part of the Levels dialog box display.	Enhance → Adjust Brightness/Contrast → Levels
5: Make general color and tonal corrections.	Levels	Use simple sliders to adjust tonal dynamic range.	Enhance → Adjust Brightness/Contrast → Levels
	Reduce Color Noise	Reduce color noise associated with digital capture.	Hidden Power Tools under Effects on the Styles and Effects palette, in the Power-Tools1 category
	Basic Color Correction	Adjust tonal levels and balance color as a process.	Hidden Power Tools under Effects on the Styles and Effects palette, in the Power-Tools1 category
6: Make general damage corrections.	Clone Stamp	Make brush-style corrections via sampling of other image areas.	Clone Stamp tool in the toolbox
	Healing Brush	Make smart brush-style corrections via sampling of other image areas.	Healing Brush in the toolbox
	Masking	Customize selections by using masking.	Hidden Power Tools under Effects on the Styles and Effects palette, in the Power-Tools1 category

*Continues*

Table 1.1  
Tool Set

*Continued*

PROCESS STEP	TOOL	USE THIS TOOL TO DO WHAT?	LOCATION
7: Make advanced color corrections.	Copy	Copy the selected image area to the clipboard.	Edit → Copy
	Paste	Paste a copied area from the clipboard into a new layer.	Edit → Paste
	Luminosity and Color, RGB, and RGLB separations	Split images into component colors and tone (channels) to simplify and target adjustments.	Hidden Power Tools under Effects on the Styles and Effects palette, in the Power-Separations category
	Curves	Make custom multirange adjustments to tone, contrast, and color by using one of the most powerful correction tools.	Hidden Power Tools under Effects on the Styles and Effects palette, in the Power-Tools1 category
	Hue/Saturation	Adjust color by using slider controls to alter hue, increase/decrease saturation, and affect general lightness and darkness.	Layer → New Adjustment Layer → Hue Saturation
	Color Balance	Adjust color by balancing the influence of color opposites.	Hidden Power Tools under Effects on the Styles and Effects palette, in the Power-Tools1 category
8: Crop and size the image.	Crop	Change the image size by cropping out or adding extra canvas area.	Crop tool in the toolbox
	Image Size	Change the physical dimension and/or number of pixels in an image.	Image → Resize → Image Size
9: Make specific compositional changes.	Marquee and Polygonal Lasso	Select regular and irregularly shaped image objects.	Polygonal Lasso tool in the toolbox
	Masking	Customize the visibility of layered image parts and control the intensity of selections.	Hidden Power Tools under Effects on the Styles and Effects palette, in the Power-Tools1 category
	Copy	Copy a selected image area to the clipboard.	Edit → Copy
	Paste	Paste a copied area from the clipboard into a new layer.	Edit → Paste
	Transform	Reshape an isolated object.	Image → Transform
	Guides	Place nonprinting edges for alignment.	Hidden Power Tools under Effects on the Styles and Effects palette, in the Power-Tools2 category
	Add Noise	Roughen up tones that are unnaturally smooth.	Filter → Noise → Add Noise

*Continues*

*Continued*

PROCESS STEP	TOOL	USE THIS TOOL TO DO WHAT?	LOCATION
10: Make targeted color and tonal corrections.	Gaussian Blur	Smooth out tones that are unnaturally rough.	Filter → Blur → Gaussian Blur
	History Brush	Paint in adjustments from filtered results (for example, to target Dodge and Burn).	Hidden Power Tools under Effects on the Styles and Effects palette, in the Power-Tools1 category
	Gradient Map	Influence specific tones and colors by using gradients.	Layer → New Adjustment Layer → Gradient Map
	Masking	Customize the visibility of layered image parts and control intensity of selections.	Hidden Power Tools under Effects on the Styles and Effects palette, in the Power-Tools1 category
	Blend Mask	Influence specific tones and colors by using tone and color measurement.	Hidden Power Tools under Effects on the Styles and Effects palette, in the Power-Tools1 category
11: Make final fine-tuning adjustments.	Unsharp Masking	Work with both local and fine contrast in the image to improve edge definition and contrast in color and tone.	Filter → Sharpen → Unsharp Mask
12: Save the image.	Save As	Save with a new filename.	File → Save As
13: Simplify as appropriate.	Merge	Remove extra layers and image content when there are no vector layers to preserve.	Layers → Merge Linked, Layers → Merge Visible, Layers → Merge Down
	Flatten	Remove extra layers and image content when there are no vector layers to preserve.	Layers → Flatten Image
	Text To Shape	Globalize type handling by converting type to vector layers.	Hidden Power Tools under Effects on the Styles and Effects palette, in the Power-Tools2 category
14: Optimize the image for final output and use.	Mode	Convert to final color space.	Image → Mode
	Levels	Make final adjustments to tone.	Enhance → Adjust Brightness/Contrast → Levels
	Blend Mask	Adjust white point.	Hidden Power Tools under Effects on the Styles and Effects palette, in the Power-Tools1 category

*Continues*



*Continued*

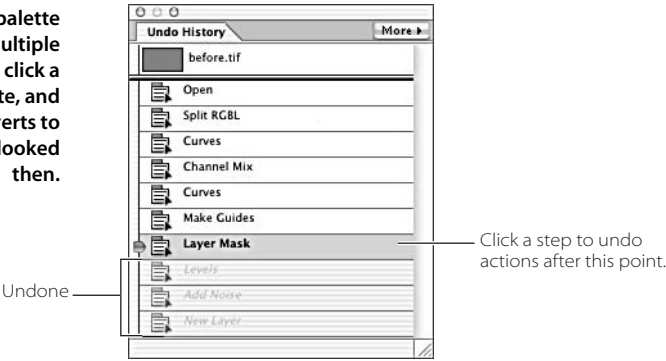
PROCESS STEP	TOOL	USE THIS TOOL TO DO WHAT?	LOCATION
	Separations (CMYK and Duotone)	Create separations for print ready files.	Hidden Power Tools under Effects on the Styles and Effects palette, in the Power Separations category
15: Save in output file format.	Save As	Save with a new filename.	File → Save As
	Save For Web	Save Web images with limited color and transparency.	File → Save For Web
	DCS Templates	Use custom files to allow unsupported color modes (CMYK and spot color).	Hidden Power Tools folder included on the book's CD
16: Package the image for output and use.	Permanent and/or temporary storage devices	Assemble the image parts and organize the content to complete purposing and storage.	

The tools mentioned here will all be explored in this book as part of the exercises in making image corrections. This listing cuts out many tools, most of which provide redundant (and sometimes inferior) means of completing tasks. If you use these tools to follow the methods described in the book, you will find that other tools are seldom necessary. Several other minor tools will sneak in at points during the exercises; while they are not specifically mentioned, they are mostly related to or substitutes for tools covered in the categories in the list.

One tool that does not fit into any particular step, but is very useful, is the History palette, shown in Figure 1.1. When doing serious correction and experimentation, it should become a good friend. For example, when you have taken several steps that have

not accomplished what you hoped, a single click on the History palette can step you back to an earlier point in the development of the image so you don't have to start all over again. This lets you undo multiple steps at once, or compare before and after changes at a click. It's a real time-saver and a helpful tool.

**Figure 1.1**  
The History palette acts like a multiple Undo. Just click a previous state, and the image reverts to the way it looked then.



## Basic Concepts of Tone, Contrast, and Color

Without light, there would be no images. Light is what shapes the subject of images. It strikes an object that you are photographing, reflects back through the camera lens, and creates the color and tone captured in the exposure for the image. Light shapes the object, because shadows and highlights reveal object contour. The subtle interplay of tones, contrast, and color gives shape to objects and defines the subject of an image.

*Tonal range* is the difference between the lightest and darkest image areas. The greater the difference is between the lightest and darkest areas of an image, the greater the tonal range. The way light and dark tones play against one another is *contrast*. The more stark the difference is between light and dark image areas, the greater the contrast. If tonal range and contrast are not balanced correctly, an image will appear too light, too dark, too flat, or too harsh and contrasty, as illustrated in Figure 1.2.



Too light



Too dark



Too flat



Too harsh



Balanced

Figure 1.2

One image can look many different ways, but the best way usually uses full range and flattering contrast.

Creating a dynamic image starts with making the most of the tonal range that exists in the image. Contrast (or lack of contrast) between tones within that range helps define image character. Not every image will naturally have high contrast and a broad tonal range. Some images may be naturally high-key (light, usually with moderate to low contrast), low-key (dark, usually with moderate to low contrast), or simply low contrast. Usually, the goal of correction is to maintain the natural character, or *key*, of an image while adjusting tone and contrast to enhance and improve dynamics. If there are 255 possible grays for your image, and you use only 100 of those, the image is really only 40 percent as dynamic as it might be. If you adjust the tonal range, the image can become more visually dynamic; if you adjust with care, you won't lose the natural quality of the image.

Both tone and contrast work in almost the same way in color and black-and-white images: you want to make the most of and expand tonal range and dynamics while maintaining image character. The difference is, when you extend the tonal range in a black-and-white image, you get more potential grays; when you make similar adjustments in color images, you get more potential colors.

## Color as Tone

Color is a pretty simple thing to manage if you're picking out clothes, drapes, or upholstery. In those cases it is already mixed and applied for you. If you don't have experience with color mixing, it isn't until the first time you actually try to correct the color of an image that the complexity of color comes alive. If you've never had any training in art and color theory, understanding how color works can be a little confusing. Add to that the existence of different *color modes* (theoretical ways of defining color), and color becomes still more complex. Even more confusion can grow from the fact that color is stored in your digital images as grayscale. Because color can be split into simple grayscale components, it is important to understand how grayscale (tone and contrast) can also define color. However complex, you have to understand color and how it works in digital images to apply it and achieve the results you want.

For the most part, images that you will work with in color will be in RGB mode. *RGB* stands for red, green, and blue. It is an additive light-based color theory: different combinations and intensities of red, green, and blue lights make up the set of available colors. As the red, green, or blue lights are made brighter and applied with more intensity, the resulting color gets brighter, and colors mix in these varying intensities to form other colors. Full intensity of red, green, and blue results in white; lack of red, green, and blue results in black. It is a theory that works great with projection, such as on your monitor and some projection TVs. Breaking images into their component RGB colors is how your monitor displays color.

Each color you see in an image is made up of these three colors in different combinations. Each of the three colors has 256 intensities in 8-bit images (Elements does have 16-bit capability, which is discussed more later in this chapter and in the “Bit Depth” section of the appendix). The grayscale representations of the intensity of the red, green, and blue are stored as grayscale information in your image files. Light coming into a camera or sensed by a scanner is actually broken into these three components to be stored. Later the information is reassembled, allowing your computer to reproduce full-color images from the RGB.

This theory and practice have been around for quite a while. One of the earliest photographers to create color images did it in Russia in the early 1900s, before there was color film. Sergei Mikhailovich Prokudin-Gorskii (1863–1944) made glass plates three at a time when he took pictures with a specially designed camera, filtering for the red, green, and blue components of light to record the strength (tone) of each component on what was essentially grayscale film. The plates would record the captured light as grayscale, and then using a special projector, Prokudin-Gorskii would project the images simultaneously with red, green, and blue filters to reproduce the color images on a screen. Figure 1.3 shows one of Prokudin-Gorskii’s images; a composited version of this image is also presented in this book’s color section. (These plates are from the collection at the U.S. Library of Congress, which can be accessed at <http://lcweb2.loc.gov/pp/prokquery.html>.)

Inside each of your color images are the primary source colors: red, green, and blue. These source colors are stored as grayscale representations and mappings of the intensity of red, green, and blue light in every pixel in your image. When you work on color images, the changes that you make affect all three of the source colors at the same time. The grayscale color components can be separated out of your images and retrieved for use in adjusting your image dynamics, tone, contrast, and color.



Red



Green



Blue



Composite

**Figure 1.3**

**This image by Prokudin-Gorskii, titled *Man in Uniform, Seated on Chair, Outside*, was taken around 1910 by separating color into grayscale RGB plates. Scans of the glass plates can be composited to achieve a full-color result (as shown in this book’s color section).**

Photoshop has a palette called Channels, which is not included with Elements. The Channels palette, like the Layers palette, enables you to edit color components and manipulate them separately (in RGB as well as other color modes). This can be a great tool in making complex color corrections. Even though there is no formal Channels palette, this book shows you how to access and alter channel information easily, just as if you had a Channels palette working for you. The channels are referred to as *components*.

Breaking down color information into color components may not always be to your advantage when making corrections, but it can often be helpful when trying to isolate damage and perform advanced color correction. The ability to make separations into image components is a key concept of this book. If you understand how to make component separations and how these separations combine to create your images, it opens a world of possibility for improving images.

As Prokudin-Gorskii did in creating his “color” images, we can re-create representation of color as grayscale by filtering digital images. When the color components are separate, they can be adjusted one at a time, simplifying the way you work with color. This can help when correcting color-specific defects, in simplifying an approach to images and corrections, in developing a better understanding of what happens when you apply a tool to color images, and in doing the most complex color alterations and corrections. Let’s look a little more at color types and color management.

## Types of Color

Color in your images can be measured in several ways. Photoshop Elements uses color modes, which as I said earlier are really just different ways of depicting color and tone. The following are the four modes you can use:

- RGB
- Indexed Color
- Grayscale
- Bitmap

Later in this section and elsewhere in the book I’ll talk about other color modes, including LAB, CMYK, RGBL and Duotone. These are not technically working color modes in Elements, but you can achieve these separations and save the separations to files using Elements.

Image color mode and file type are two very different things. Knowing which color modes appear in which file types (and which file types to use with a certain color mode) is often essential for correctly purposing your images.

For the most part, people using Photoshop Elements will be working with 8-bit color images in RGB mode. This mode offers the broadest flexibility for tool use, and is the mode most images are in when captured or created. As I have said, RGB refers to the type of color storage; in this case information is stored as red, green, and blue components. *8-bit* refers to the exactitude of the color representation, or the number of variations that can be stored per pixel in a color component. There are 16 million potential colors in 8-bit RGB, based on 256 possible tonal variations in each of the three color components ( $256 \times 256 \times 256 = 16,777,216$  possible variations). That's one big box of Crayolas! In fact, it is the largest color set of any of the color modes you will be working with in Elements, except when using 16-bit RGB. A larger number of possible colors in your image allows finer distinction between colors and helps changes that you make to images blend more evenly.

*16-bit* is perceived to be an advantage over 8-bit: with 35,184,372,088,832 potential colors, images can theoretically have better integrity, and changes are less apt to damage image information. When working with 16-bit images, however, some important tools and functions are not available for image correction—most notable of these is layers. Other drawbacks to 16-bit include greatly increased file size, greater computer horsepower needed to process the images, and the lack of ability to use output from a 16-bit file (at present, information must be converted to 8-bit for print processing and display).

Regardless of what you read elsewhere, 8-bit files can be returned to 16-bit in Elements. This will not magically restore 16-bit information that may have been lost or unavailable, but it will enable you to restore the advantage of 16-bit editing to 8-bit images. See the "16-Bit Images" sidebar later in this section.

Generally, you will work in 8-bit RGB for the best access to tools and the most predictable behavior of images. When the image is complete (that is, all changes you are going to make have been made), then you can consider converting the RGB image to other modes as required for your final purpose. You can save RGB files in many formats, but you will probably most often use TIFF (print), Photoshop (archive), JPEG (Web), and PDF (portability).

*Indexed Color* is a much more limited color mode than RGB and is almost always associated with GIF Web images. This color set has a maximum of 256 colors. The colors are created as a table by using *hex values*: six-character codes that represent specific colors (see the Hex Code Chart on the Hidden Power CD). The colors cannot be mixed, and must be one or another of the colors in the table. The goal of limiting colors, especially in the case of Web images, is to simplify files and make them smaller. In the case of Web images, this helps transfer them more quickly.

Even without any experience in converting to Indexed Color from RGB, it may be obvious that converting all of your 16 million potential colors from an 8-bit RGB into a measly set of 256 colors for Indexed Color may not always produce the best results. In converting to Indexed Color from RGB, almost all of your original color will have to change. Of course, the results can be disastrous when imposed on a full-color image. However, there are color tricks (such as dithering) that can make Indexed Color's color sets appear larger than they really are. Because color is applied rather than mixed, Indexed Color is a difficult color mode to work in. Moving to this color mode will almost always be a last-step conversion, and almost always will be done in converting images for display on the Web (when JPEG is not used). They are almost always saved in GIF format.

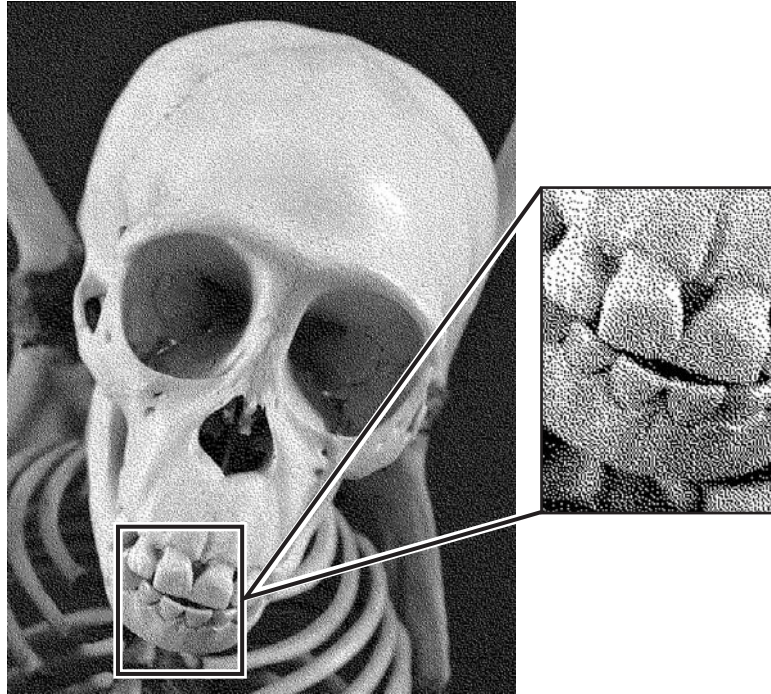
*Grayscale* (Figure 1.4) is also limited, but to no color at all. This “color” mode has 256 levels of gray tones (in 8-bit mode) that make up all you see in standard black-and-white images, or when working with individual color channels (such as color components extracted from RGB images). Generally you should convert images to grayscale when you are printing images without color, so that you can get the best depiction of tone (without depending on the color device to convert color for you). Taking the color out of an image can be simple, but it can also be considered an art, because what looks good in color may not look good at all in a straight conversion to black-and-white (though we will look at various ways to improve your results). Grayscale images are most often used in black-and-white print jobs.

*Bitmap* images are like grayscale, but are more strictly formed in black or white—using no grays. Pixels are either white (off) or black (on), as illustrated in Figure 1.5. For the most part, bitmap images are used with line art (pen-and-ink-type line drawings). Bitmap will probably be the least used color mode of those available. You will probably save Bitmap mode images in TIFF or BMP formats. High-resolution bitmap images are sometimes used for line art and other special purposes for print, such as creating dithered drop-shadows for use in layout.

Figure 1.4  
Grayscale gradients showing black-to-white gradients in (a) 10 steps (10 percent darker in each), (b) 25 steps (10 levels darker in each) and (c) 255 steps (every level of gray).







**Figure 1.5**  
The magnification of a portion of the original bitmap image reveals the bitmap patterning.

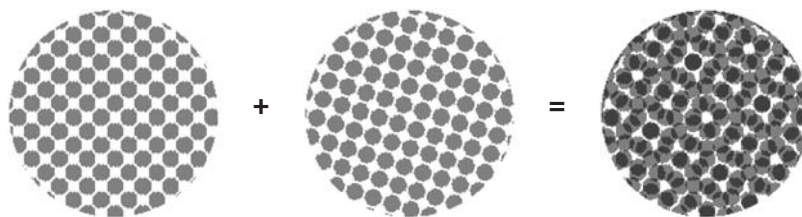
These BMP bitmap images are different from the color bitmaps used in screen shots and other images as a common file format on Windows computers.

*CMYK* color (depicting images with cyan, magenta, yellow, and black) is a common printing color scheme that is not really available to Elements users as a color mode. It is how color is most often depicted in print. While you will not work in a *CMYK* color mode in Elements, you will usually print with *CMYK* color. The theory is similar to *RGB* in that a limited set of colors are used as inks to create the visible color set. At the same time, *CMYK* is perceptually the opposite of *RGB*. While *RGB* is based on additive color (the more light or color you add, the brighter it gets), *CMYK* is subtractive (the more ink/color you add, the darker it gets, because the light striking the color is absorbed). Figure 1.6 shows how two ink halftones combine for a darker result.



Figure 1.6

Samples of black (45°, left image) and cyan (108°, middle image) halftone dots as grayscale. When the halftone dots are printed over one another (right), colors combine to absorb more light.



Conversion from RGB to CMYK is often disappointing, because CMYK can portray fewer colors even though there is one more color in the set. The easiest way to understand this is to consider efficiency. While light is pretty much 100 percent efficient when projected, the absorption of light by ink pigments is not. Because pigments do not provide perfect light absorption, the color they reflect is not perfect in conversion. Black is added to the CMY color set as an attempt to increase the efficiency of absorption. As an additive, it produces only redundant color (color that should have been reproducible in a 100 percent efficient CMY pigment set). As a result of the inefficiency, the CMYK color set suffers, and results in less dynamic color and tone than RGB.

There is a supposition that you cannot work with CMYK images in Elements because it is not a supported color mode, but this is not entirely true. Although the program is not set up to handle CMYK directly, an indirect approach can enable you to make custom CMYK separations and usable CMYK images that can help you improve printed output. The file format used with CMYK is often TIFF, PDF, or Photoshop EPS. Regretfully, none of these will work directly. However, later in the book I will show you how you can essentially hijack another file format (DCS: Desktop Color Separation) that will allow saving and manipulating files as CMYK.

### 16-BIT IMAGES

Some users wonder—and even worry—about using 16-bit mode for image editing. 16-bit images offer more color detail: whereas 8-bit can reproduce “only” 16 million colors per pixel, 16-bit can reproduce more than 35 trillion (based on Photoshop’s color handling). While this difference between 16-bit and 8-bit may be significant for archival purposes, for most cases in the real world, it should not make a noticeable difference in your images. You might see the difference if you are making extreme changes to an image or trying to rescue image detail from shadows and highlights. However, most output devices can’t handle the additional image information in 16-bit images, and it is questionable whether technology will meet the 16-bit challenge in the near future, or if human perception can really distinguish between the results.

Photoshop Elements supports some 16-bit color adjustment as of version 3. Previously it would convert 16-bit images to 8-bit when opening. The only real gain you have for 16-bit images is in importing original 16-bit information or temporarily extending the usable color space for your images while you work on them. If you have a camera or scanner that creates 16-bit images, be sure, as suggested, to store copies of original images before converting to 8-bit.

When possible, working in 16-bit rather than 8-bit can provide an advantage for grayscale images, arguably more so than color. The measly 256 colors in the single grayscale component can more easily run out of image room and variation than the 16 million variations per pixel in 8-bit color. While you can't apply all tools in 16-bit (Elements does not, for example, support layers with 16-bit images), you can make some corrections using 16-bit, and you can switch back to 16-bit after making 8-bit modifications (using Hidden Power techniques).

To temporarily switch to 8-bit, do the following:

1. Have a 16-bit image open.
2. Duplicate the image (File → Duplicate).
3. Put your new filename in the As field. For this example, use **Temp 8-Bit**. Click OK.
4. Change the mode of the Temp 8-Bit image to 8-bit (Image → Mode → Convert To 8-Bits/Channel).
5. Make any corrections you want involving layers, and so forth, that you can't do in 16-bit mode.
6. Make a selection of the entire image using Select All (Command/Ctrl+A), Copy (Command/Ctrl+C). Then activate the original 16-bit image and Paste (Command/Ctrl+V).

When you paste, the image information you have been manipulating in 8-bit will convert to 16-bit. There are, of course, some limitations to the effectiveness of this conversion, but you can return to 16-bit mode and save the manipulation as a 16-bit file.

You can also convert files that were originally 8-bit images to 16-bit:

1. Have a flattened 8-bit image open. Check the Height and Width in pixels by using Image Size (Image → Resize → Image Size) and note the values.
2. Make a selection of the entire image using Select All and Copy.
3. Open the Hidden 16.psd image on the Hidden Power CD.
4. Resize the image (using Image Size again) to the Height and Width determined in step 1. Accept the changes by clicking OK.
5. Paste.

This will paste the 8-bit information into the 16-bit file, converting it during the process. Changes that you make while in 16-bit mode will reflect the advantages of 16-bit files. You can now fluidly move from 8-bit to 16-bit files in Elements.

See the appendix for more information on 16-bit images.

## Understanding and Using Color Management

A buzz phrase in image correction is *color management*. If you are not familiar with this term, or if you have heard of it but don't know quite what it is, this section covers most of what you need to know. Although it is something you should take seriously, color management does not have to be as complex or mysterious as it tends to be. This brief discussion will help you become familiar with it, poke it with a stick, and see that it is dangerous if completely ignored. We'll look at your options, get set up, and get on with the main course of editing images with confidence as you pass color management by with a better understanding and a knowing grin.

Color management is supposed to be a means of helping you get better color consistently. That sounds good, and it is usually the reason why people think it is something they can't do without. By using color management, the goal is to have a better chance of your images looking the same from a variety of outputs (print and display). Color management uses profiles that describe how your display handles color to help translate what you see to other devices and how those devices handle color (via a common color palette and profiles of those other devices). The profile from your monitor or working color space can be embedded (saved) with your image file to act as the color interpreter for other devices (monitors and printers).

This section deals only with Elements Color Management options. For more information on using printer profiles, see the "Printing with a Profile" section in Chapter 9.

Every device has its own profile, which acts as the interpreter on its end, so the devices can speak the same color language and adjust for differences. The key to full color management is that every device has to have a profile to be able to interpret other profiles, so the translation will work reliably. The embedded profile will affect images behind the scenes, both to help represent color correctly on-screen and to serve as a translator to other devices. In theory, that results in a better image. All this automatic translation sounds very appealing, like I'm serving the chocolate cake first.

This is all nice in theory, but the sad fact is, it doesn't necessarily work in practice. There are a lot of points in image processing where detours or errors can occur. Your profile can get dropped, changed, or ignored, or it can just plain be wrong. Profiling can occur where you don't expect it, and other profiles can be wrong, causing information in your image to be misinterpreted. Any of these can cause unexpected results.

First, you are responsible for building yourself a color profile—unless you use a generic one (not recommended). You have to set up the profile correctly, and there is no guarantee that you will (even if you follow instructions) because the process involves

your assessment of color by eye (if you don't use a profiling device), and that may not be entirely accurate. Second, every step between saving your image and sending it to the printer has to both respect the color management and process it correctly. This is where the chocolate cake turns to mud pie.

Although profiling was planned to function behind the scenes and stay with your image, you can't be sure that the results you get are based on the choices you have made to embed your monitor profile in the image—unless you manage each step of the process. You also can't be sure that you really want the process to respect your profile (for example, if it is not correct). Embedding a profile doesn't work consistently because it can't be enforced: even if you embed a profile, some device or person along the way can drop your settings. There are devices that don't recognize color management settings; there are services that don't use them in processing. If your results depend on the color management, and the wrong color profile is embedded or the profile is missing, you are just as likely—or more likely—to get a bad result than you are without embedding color profiles.

Your only chance for guaranteed success using embedded color profiles is to make a study of how the profiles work, and become intimately knowledgeable about the output types and processes you use. Reading your printer manual is not necessarily intimate knowledge; it goes somewhat deeper than that.

Even with this additional effort, using color management and embedding profiles requires testing. Funny thing is, you have another choice: *not* embedding profiles. Not embedding profiles can have pitfalls and also requires testing. It does, however, remove the potential added complexity of using embedded profiles. In the long run, if you set up your system correctly by calibrating your monitor and creating a monitor profile (an ICC profile that describes your monitor), not embedding profiles can often lead to more predictable results. You should not entirely dismiss color management, and you should create a monitor profile—even if you are not embedding profiles in your images. This helps calibrate your monitor and adjust the view of your screen. Embedding profiles in your images, on the other hand, is like an extra half-step in a staircase that can just as likely trip you up as ease your progress up the stairs—depending on how much you are paying attention. My experience is that you are more likely to trip over that half-step and swear at it than praise it.

None of this is to say that you can't embed profiles with success! You can, and if you do currently, don't change what you do. My perspective on using or not using profiles is a lot like my perspective on images: don't change what works, change what doesn't. If you currently use embedded profiles and everything works fine, stay with them. If you don't use profiles with success, don't use profiles, or you have never looked at them, or you

don't understand what they are and how to use them, practice color management with the following fast, safe, and effective system:

1. Calibrate your monitor and create a monitor profile (I'll show you how to do this in a moment).
2. Don't embed profiles.

To be reasonably successful with color management, the Photoshop Elements user needs to calibrate, create a monitor profile (which Elements uses for image viewing), and choose how to handle profiles by making a selection in Color Settings. Even if you choose No Color Management, you are still using color management—you just choose not to embed profiles in your images. Calibrating your monitor and creating the monitor's color profile helps ensure that you see a best representation of the images on your display. This best representation should show what your image will look like on most other displays—and, for the most part, what it will look like in print. The next few sections present in a little more depth what you should expect to see on your monitor, how to calibrate, and what to do to build an ICC profile for your monitor.

## What You See Should Be What You Get

One problem with trusting your visual sense is that it assumes that what you see on-screen is the right thing. Regrettably, that is not probable without calibration. All monitors are different, and the settings for display and color will affect what you see. If you haven't calibrated, colors on your screen might look different from colors on someone else's—and worse, they might not match or even come close to the color that gets printed.

If you are looking at a screen that is shifted green and you depend on the color to be accurate, a good correction will tone down the greens to make the image look right on-screen. This will cause output of any kind to be shifted toward reds (the opposite of green). Calibration will help compensate for shifts by flattening the response of your screen.

The goal of calibration is simple: you want to be able to trust what you see on your monitor, within reason. If you can trust what you see, you can mostly use your visual sense to correct your images.

I say *mostly* because even if you've calibrated your monitor, you have merely adjusted it for best performance. You are going to get the most out of your monitor, but the monitor itself may have some limitations—and there are inherent limitations in printing, so it is likely that there will be some differences between what you see on-screen and the result in print. Although you probably won't reach perfection, calibrating your monitor gives you a far better chance of at least coming close. With some selective checking, you should be able to feel confident in what you'll get as a result.

## Calibrating Your Monitor and Building an ICC Profile

In this section you'll look at how to calibrate your monitor and create a monitor profile. Creating the profile helps your system adjust previews so images on-screen appear accurately. Before you begin, you should know several things about the response and performance of your monitor, including the manufacturer-suggested color temperature, gamma, and phosphor settings. These settings should be available from the manufacturer (call tech support and ask for an engineer if necessary).

What you use for calibration may vary. In the past, Adobe provided Adobe Gamma for monitor calibration for Mac and Windows users. It is no longer provided for the Mac because the Display Calibrator Assistant is a standard utility on OS X and above. Wizi-WYG is another free utility from Praxisoft for Mac and Windows, available from their website ([www.praxisoft.com](http://www.praxisoft.com)).

In the following steps, I describe the sequence (and show the screens) of Adobe Gamma for Windows; alongside these, I include some matching screens for Display Calibrator Assistant for Mac OS X (the order will be slightly different). Each of these utilities is similar in respect to what they do, and any will work for purposes of calibration and creating the profile. For the most part, you can simply start them up and read the directions as they appear on-screen. If you are lucky enough to have a calibration device (such as the Spyder by ColorVision), use that for calibrating your monitor instead of the following procedure; calibration by hardware calibration devices will be more accurate than calibration by eye.

*Color temperature* reflects the monitor display color for the *white point*, which really measures the color of white on your monitor. It is usually 6500, 7500, or 9300 degrees on the Kelvin scale. The higher the number, the more blue (or cool) there is in the white; the lower the number, the more red (or warm) there is. It is an inherent characteristic of your display and can subtly affect the appearance of color on-screen.

*Gamma* is a measure of tonal response, often a number between 1 and 3 with two decimal places. *Phosphors* are a set of six numbers with *x* and *y* coordinates for red, green, and blue; these numbers can have up to three decimal places. These settings vary between monitor brands and models, so don't make assumptions about them or copy someone else's. Find the settings in your manual or contact the manufacturer (via the website or technical support—again asking for an engineer if necessary).

Monitor manufacturers don't always put monitor specs for phosphors, white point, and gamma in the manuals. You'll likely have to seek it out. When you obtain the information, write it down. I usually write the settings right on the cover of the monitor manual for easy reference.

Your monitor should be in an area that will minimize glare, and lighting (except where noted during the calibration) should be as you will have it when you are most frequently using the computer and monitor. Lighting should generally be subdued and indirect if possible. Changes in lighting will require recalibrating the monitor. The monitor can be calibrated to different light conditions, but it is easier to maintain a consistent room lighting than to add it as a variable in color corrections. Extremely bright or overly dark rooms might cause some problems with calibrations and monitor viewing. Optimally, room lighting should be bright enough that you can read and view materials that are not on the screen, yet not so bright that it causes glare or washes out the display. After creating your profile, be sure the lighting where you work remains the same as when you calibrated the monitor.

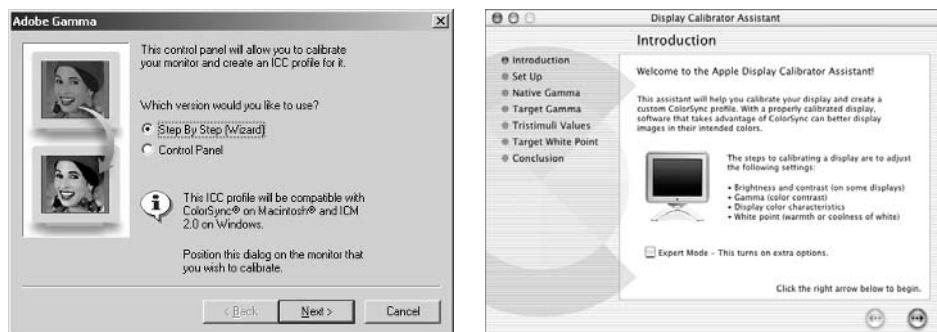
Before you begin, you should also locate the monitor's brightness, contrast, and color controls. If your monitor has an option to reset to factory settings, do it now. If there is no reset option, use the monitor controls to normalize the screen by eye. Grays should look flat gray rather than a little warm or cool. After resetting or adjusting color, leave these controls alone and do not change them after calibration. Now you are ready to start calibration.

Calibration will be slightly different in every operating system and OS version, though the options in various dialog boxes will be similar.

1. Turn on your monitor and system, and let the monitor warm up for at least 30 minutes.
2. If you haven't done it yet, read the owner's manual for the monitor to see if it provides suggestions for calibration.
3. Open Adobe Gamma by double-clicking the icon in the Control Panel folder. You should see the screen illustrated in Figure 1.7. If Adobe Gamma is not in the Control Panel folder, find it on the Photoshop Elements CD.

Figure 1.7

**The initial Adobe Gamma and Display Calibrator Assistant screens**



4. Click Step By Step. This will lead you through the process of calibrating and creating an ICC profile for your monitor. Click the Next button.
5. In the Description field, type a name for the profile you will be creating (Figure 1.8). You can enter a lot of information here, but it's best to keep it short. I find it handy to name the monitor and add the date, so the profiles are easy to identify. If you use output white point settings (step 12), you may also want to include this value in the name. Click the Next button.

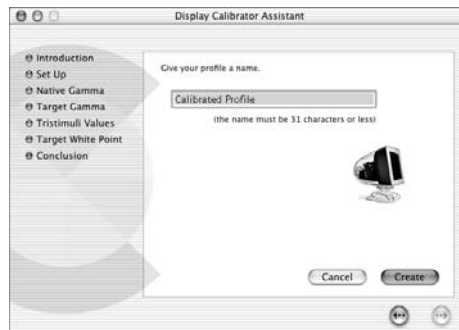


Figure 1.8

**Type the profile name in the Description field. (The opportunity to name the calibration comes last in Display Calibrator Assistant sequence.)**

6. Using the monitor controls, set the contrast all the way up and then adjust brightness until the smaller gray box in the center is dark enough that it is just barely discernable from the larger black box surrounding it (see Figure 1.9). If you notice the white frame beginning to darken at any point, stop darkening the screen. If necessary, adjust the brightness setting to lighten the screen a bit until the frame is bright white again. As you fine-tune this adjustment, it may help to squint or use your peripheral vision to get the center square as dark as possible without losing the brightness of the white frame. When you are satisfied with the adjustments, click the Next button.

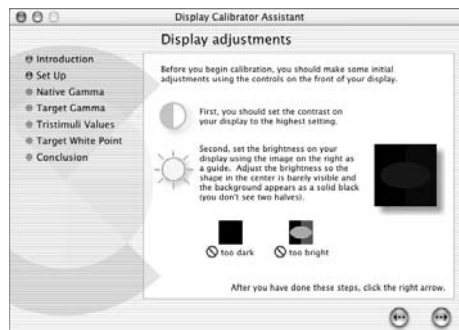


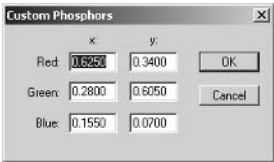
Figure 1.9

**Concentric squares in Adobe Gamma, or a square and oval in Display Calibrator Assistant, help you adjust the screen contrast by observation while making adjustments to the physical monitor settings.**



7. On the screen that appears, select Custom to open the Custom Phosphors screen shown in Figure 1.10.

Figure 1.10  
Phosphor values describe the monitor's response to color. (Display Calibrator Assistant does not allow custom value entries.)



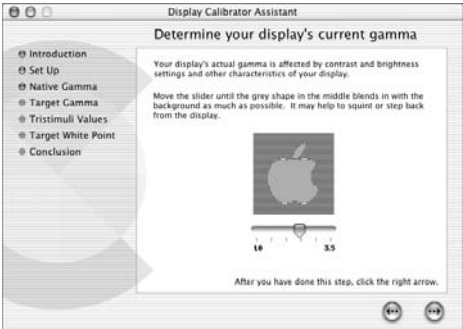
8. Type the six values obtained from the manufacturer of your monitor in the appropriate fields. You don't have to know what each number means, but you do have to place each one correctly. Click the OK button to close the Custom Phosphors screen and accept the changes. This returns you to the Adobe Gamma Assistant dialog box.

9. Click the Next button. The screen that appears (Figure 1.11) enables you to adjust gamma. Select the View Single Gamma Only check box. Using the slider, adjust the appearance of the outer square (the alternating lines of black and white) so that it matches the tone of the 50 percent black center. Adjust the appearance by squinting at the screen (to blur the box slightly in your vision) while moving the slider. The goal is for the entire square to seem to have a uniform tone.

If you change monitors, you will obviously have to build a new profile. Other less-obvious reasons to build a new profile are monitor aging and changes in response due to use, replacing your system hard drive, and changing room lighting (or computer placement).

10. In the Gamma field, type the Gamma value you got from the manufacturer. You will be able to enter a two-decimal value, but Adobe Gamma will round the value off when you save the entry.

Figure 1.11  
Sliders help you visually adjust for the monitor gamma.



11. Click the Next button. The screen that appears (shown in Figure 1.12) allows adjustment of the monitor's white point. Set the monitor's white point by choosing the value in the drop-down list that corresponds with the number you got from the manufacturer. (If you do not know what value to choose, see the following note.)

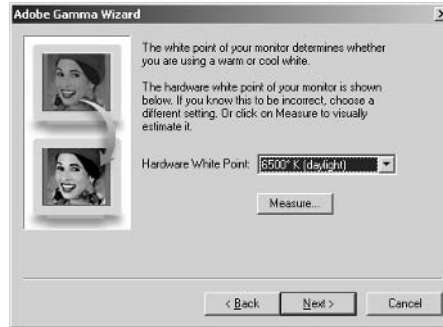


Figure 1.12  
White point is a measure of the “color” of the brightest parts of your monitor, measured in degrees Kelvin.

A second option on this screen enables you to measure the white point. To do this, dim (or turn off) the lighting in your work area and click the Measure button. A set of three gray squares will appear on a black background. Click the square that seems most flatly gray and repeat until the test closes.

12. Click the Next button. The screen that appears (Figure 1.13) will enable you to select a white point for output. This selection should be based on the color temperature of the intended output media. If you are unsure, or you are creating images for the Web, use the Same As Hardware setting.
13. Click the Next button. The next screen (Figure 1.14) enables you to compare calibration before and after the adjustments you made in the previous steps. Click to toggle the Before and After buttons several times, comparing the appearance of your screen as you toggle back and forth. Specifically, note the grays in the dialog box and see whether the color appears more neutral before or after adjustment. The more neutral (lacking any color, and looking flat gray), the better the calibration.

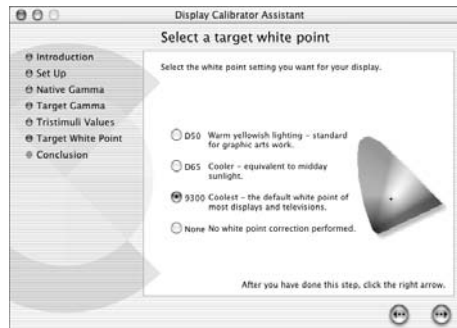


Figure 1.13  
Output white point differs from monitor white point. This setting should reflect the color temperature of your output. This may be another monitor, paper, or a projection screen.

14. If the before and after results are noticeably different, run through the process again (steps 3 to 13).
15. Click the Finish button to accept the changes.

I never calibrate one time and sit back satisfied—even when using a calibration device. I run through the process a few times to be sure I have the best calibration.

What you have just done is calibrated your monitor and created an ICC profile for it. The calibration helps you to be sure the image information you see on-screen is reasonably accurate. The ICC profile is a description of how color appears on your system. This information is used for previews, and can be used if you embed profiles in your images to help describe color in your image to other ICC-aware devices.

Although Adobe Gamma is an adequate tool for visual calibration, calibration devices (see the example in Figure 1.15) can measure more accurately than your eye, and will probably measure a greater number of gray levels and create more accurate profiling. The devices take measurements directly from your screen and create a profile based on those measurements. Using such a device can ensure that your monitor is calibrated properly, and it may actually save some time during calibrations.

## Color Preferences

Most Preferences settings in Photoshop Elements are just a matter of personal preference, and they can be changed at any time as you see fit. However, the one group of settings that you will be required to make a choice about and stick to is Color Settings. This is where you can define how Elements handles images with profiles that you open, what color space you want to work in, and whether profiles get embedded in your images by default. The choice you make can be important to your results, and will certainly affect how you work with

images. If you are not sure about what to select, or if you are unfamiliar with some of the terminology just used, that's OK. Your options and explanation of terms are covered here.

Before we dive in: how much of this do you really need to know? Probably not that much if you use the techniques suggested in this book. The following explanation attempts to clarify why certain suggestions are made.

**Figure 1.14**  
Compare the Before  
and After settings by  
toggling the radio  
buttons.





Figure 1.15  
The ColorVision Spy-  
der device attached  
to a monitor

## Understanding Color Space

The *color space* is a defined color set—a mapping of what colors are possible for your image. Some spaces are said to be *larger* than others, and this isn't technically accurate. All 8-bit RGB images have the same number of potential colors. On the other hand, different RGB color spaces are mapped to cover a wider or smaller *range* of potential colors—not *bigger* color spaces with more colors, just broader spaces that cover a greater range. Because different RGB color spaces map to different color sets, all RGB is not the same, though it is born of the same theory.

The difference between one color space and the next is the range or set of colors that the color space covers. In other words, the numbers in two files defined by different color spaces can be exactly the same, as numbers, yet the display or print result would end up different because the numbers in those files represent different colors (however slight the difference). What you really need to focus on here is what the mappings intend to cover. You can know the name of the color space, but that may not tell you a lot about what you are working with. Two common workspaces applicable to Photoshop Elements are sRGB and Adobe RGB.

Each RGB file has the same number of potential colors—no matter what color space you choose to use.

The difference between color spaces is the range of color in their mapping.

*sRGB* is a “limited” RGB color space in that it assumes some limitations of a common RGB monitor to display all RGB colors. Because of inherent limitations in monitor projection, *sRGB* is mapped to enable you to record color in your files that most monitors should display correctly. All this really means is that colors are not mapped to the full potential gamut of RGB. The images you make in *sRGB* color space are more likely to be compatible with what can generally be displayed on other monitors. In other words, it is a generic and friendly color space if you are sharing images for viewing on monitors. This is usually the assumed profile if an image is not tagged (that is, does not have an embedded profile).

*Adobe RGB* (1998) is a wider-gamut RGB color space than *sRGB*. It maps to a color set that attempts to better describe colors available on CMYK printers (notably purer cyan). Because it maps a broader range of colors than *sRGB*, Adobe suggests that it may be a better choice for working with images that are intended for print. The drawback to using *Adobe RGB* is that you may be manipulating color that you can’t see accurately on screen. If color management actually works as designed, however, optimized images for either *Adobe RGB* or *sRGB* should appear very nearly the same on monitors or in print.

A third profile you can use for color management in Elements is the custom ICC monitor profile you created for your monitor after calibration. You’ll see it as the Embed Color Profile choice in the Save As screen when you are using No Color Management—if you have correctly set up the profile per earlier instructions. This profile attempts to describe the way your monitor handles color. It is used by Elements as a means of attempting to create an accurate preview of colors in conjunction with your working color space.

When you’re working with your images and profiles are not embedded, devices using the color file have to make an assumption about the color space. Generally the assumption will be that a generic RGB space was used; that means *sRGB* rather than *Adobe RGB*. Therefore, numbers may be interpreted differently than you intend. An *Adobe RGB* image opened as an *sRGB* image will desaturate because of the wider gamut numbers being mapped to the smaller gamut color space. The only real choice when using *Adobe RGB* is to embed the profile (tag the files as *Adobe RGB*) and ensure, along the route of the image, that the profiles are respected. In other words, using *Adobe RGB* is a commitment to using embedded profiling and, most likely, full color management.

## The Color Settings Dialog Box

The Color Settings dialog box pops up the first time you open Elements, before you do anything. If you have already dismissed this (or want to change preferences after reading this), you can revisit the settings by opening the Color Settings dialog box (Edit → Color Settings), which is shown in Figure 1.16. The three choices seem straightforward enough, but the names really don't tell you what the settings do—and they may be a little deceiving. People might choose Full Color Management simply because that wording seems the most savory choice. Regretfully, that may not be the best choice, and the Help button isn't much help.

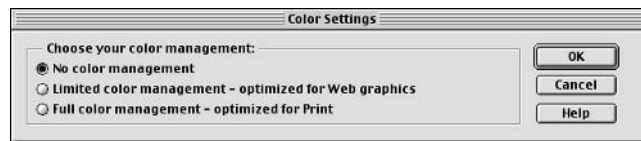


Figure 1.16  
Many users may not understand what the options on this dialog box really mean.

Here are descriptions and some important background information for each choice:

**No Color Management** This choice ignores any existing profile in an image if one is present when you open it. On saving, Photoshop Elements will not embed a profile with your image. The option to embed a profile is available by choosing Save As from the File menu; to embed a profile, you simply select the Embed Color Profile check box. The profile embedded will be based on the ICC profile you created for your monitor.

If you change the Color Settings while an image is open, changing to Limited Color Management will offer the option to embed the sRGB profile if using Save As, but will not embed a profile otherwise. Changing to Full Color Management will save a profile fitting to the current color mode (these options are outlined in the following description for Full Color Management).

**Limited Color Management** Selecting this option will convert the image to sRGB when it is opened using whatever profile is included. The resulting image will use the sRGB color space. On Save, no profile will be embedded. The option to embed is available using Save As, and the sRGB profile will be embedded if you choose this option.

If you change color management settings while the image is open, changing to No Color Management will allow you the option of saving by manually embedding the monitor profile you created. Changing to Full Color Management will save the image with a profile fitting to the color mode (these options are outlined in the following description for Full Color Management).

**Full Color Management** This option retains a color profile if it is present in an opened image. On Save, the original profile will be retained with the image. The option to disable embedding the profile can be found in the Save As dialog box. Opening a new image or an image with no existing profile will cause Photoshop Elements to retain the profile with the image based on the color mode. These choices are the same when changing Color Settings while an image is open:

**RGB** will have the Adobe RGB (1998) profile.

**Indexed Color** will have the Adobe RGB (1998) profile.

**Grayscale** will have a Dot Gain 20 percent profile.

**Bitmap** will have no profile.

Notice that if you want to ignore, convert, retain, or embed a profile, you can do that by manipulating the Color Settings before and after an image is opened. Changing Color Settings in midstream will enforce different rules and create different results. This may be a pain, and it is something you probably won't do very often, but it can come in handy when you get a bad profile or when an opened file does not convert during opening the way you think it should. Attempting to open the image by using different settings might improve the initial result.

It is really a personal decision as to how to manage color. However, the level of complexity and unknowns in working with images seems to rise quite a bit if you choose to embed profiles and use working spaces outside of the more standard sRGB. It is likely that by using optimal techniques for correction (as defined by this book), there should be little difference in your results no matter which color space you use. This is why I suggest using No Color Management and simplifying the workflow. Personally, I work with color management off until I get an image that has a profile embedded. In that case, I might try to open the file by using different Color Settings to see if I get a better-looking conversion. Otherwise, I stick to the things I normally do because I can depend on my normal workflow to get consistent results. I almost never embed a profile unless it is specifically requested.

## Resolution

Put as simply as possible, *resolution* is a measure of potential detail in your images. High resolution suggests that there will be intricate detail; low resolution suggests that detail may be compromised. It would seem, if this description holds, that you would always want high resolution if you consider detail important. But that's not always the case. What you really want is the *correct* resolution, and this depends not only on what size you want the result to be but also on what medium you will be using. Output and display can use image resolution in different ways, so the result doesn't depend only on what the resolution of the image is; it depends on how much there is as well as how it is used.

In print, if you don't have enough resolution to meet the needs of the output, images won't look as sharp as they could; if you have too much, file sizes are unnecessarily large and processing will take longer than it needs to—and the results will not improve. On the Web, images without enough resolution will be too small; those with too much will be too large. This rule also carries over into other display-based technologies such as film recorders, which make high-resolution images on film from digital files. You can't just guess how much image information you need; you have to know the amount you really need and work within those parameters. Understanding what resolution is and how it is used is the only way to use it correctly.

While *dpi* is really an output term, it's often used casually as a universal term for resolution (*spi*, *ppi*, *dpi*, and even *lpi*). The various resolution-related terms can be tricky to use correctly and consistently, but you should know what they mean and use them properly when you mean something specific. To simplify with better accuracy, use *spi* when speaking of capture (scan sampling), *ppi* when discussing digital files, *dpi* when considering output resolution, and *lpi* in the context of halftone dot size.

**spi (samples per inch)** Capture resolution. The number of scanning and digital capture samples per inch.

**ppi (pixels per inch)** Digital file resolution. The assigned number of digital pixel elements to be used in printing or display of an image.

**dpi (dots per inch)** Printer resolution. The number of bitmap dots (smallest printing component) an output can create per inch.

**lpi (lines per inch)** A measure of halftone dot size. Halftone dots are made of multiple printer dots. The number of rows of halftone dots per inch.

## How Image Resolution Is Measured

Image resolution is usually measured in one of several ways: the number of total pixels (image dimension in pixels), the size of the file (number of bytes, kilobytes, or megabytes), or the amount of information per inch (*ppi*, or pixels per inch). One way of measuring the file size is not necessarily better or worse than another, as long as you can consistently achieve the desired result—without guesswork.

Measuring image resolution in total pixels or file size is not the most intuitive or useful approach for most people working in Elements. Both of these are usually used to measure source image size, such as with scans or images from digital cameras. While the measures tell the quantity of image information in a file, the parameters don't dictate how the information is used. A 2100×1500 image in total pixels could be a 7×5 inch image at 300 *ppi*, or a 21×15 inch image at 100 *ppi*—and it can be used that way simultaneously. The number of pixels used in an image measured as total pixels is essentially arbitrary. An image



measured with a file size of 12 MB might be about a third larger in RGB than CMYK. In black-and-white (grayscale), a 12 MB image would be much larger still—about four times the area of a 12 MB CMYK image. The lack of a controlling parameter to lock in the size of the image when using total pixels or file size keeps you from knowing exactly what you have and how the image will be applied if you look at file size alone. File size is probably the least-used measure of resolution, and it makes sense only in a workflow where color mode is static (for example, images are either only RGB or only CMYK).

Most Elements users will use ppi as a measure of image resolution because it is the most compatible in comparing to output resolutions. This type of measure tells how much of the image pixel information should be applied per inch. Because printer resolution is most often a finite measure (based on the printer’s dpi: how many printer dots can be made per inch), using ppi measurement makes it easy to determine the optimal match between digital image information and what the printer will need to produce the best results.

**What Image Resolution to Use**

Some people generalize and suggest using 300 ppi as a standard resolution for images going to print. For Web images is it usually accepted that images should be 72 ppi. While these are pretty good as general-purpose guidelines, they don’t tell the entire story. 300 ppi may be more than is necessary for all home printers, and may actually be too little for demanding output (such as film recorder output). Because monitor resolutions can vary, your 72 ppi image on a 96 dpi screen would actually be about 75 percent of the intended size. Neither choice is likely to ruin your output, in most cases.

Because output differs, there is no one universal magic formula to figure out what resolution to use. Each output type has a target range (minimum and maximum), based on its capability to process and use image information. Once you know the range you need as a result, you simply use that range as a target when working on an image. Know what your service company or printer manufacturer recommends for output on the devices you use. This may require reading the manuals or giving a call to the service company to find out. The optimal range is the range where the image will perform the best in application; it is possible to get acceptable results by going outside the range depending on how you implement the image and the results that you expect.

Table 1.2 shows the approximate resolutions you will want to use for your images, depending on how you want to use them. An image sent to a device that uses a specified output resolution should have a specific target ppi. The table shows some real-world examples of output resolution and workable ppi ranges. Calculations for the table were based on the formulas shown in the Calculation Used column; square brackets in the calculations indicate the range of values used to determine the lowest and highest resolution acceptable in that media.

MEDIA	OUTPUT RESOLUTION	APPROXIMATE IMAGE FILE RESOLUTION	CALCULATION USED
Web	72–96 dpi (monitor)	72–96 ppi	ppi = dpi
Inkjet (stochastic)	720 dpi	180–234 ppi	$[1 \text{ to } 1.3] \times (\text{dpi} / 4)$
Inkjet (stochastic)	1440 dpi	360–468 ppi	$[1 \text{ to } 1.3] \times (\text{dpi} / 4)$
Halftone, low resolution	75–100 lpi	116–200 ppi	$[1.55 \text{ to } 2] \times \text{lpi}$
Halftone, normal	133–150 lpi	233–350 ppi	$[1.55 \text{ to } 2] \times \text{lpi}$
Halftone, high resolution	175–200 lpi	271–400 ppi	$[1.55 \text{ to } 2] \times \text{lpi}$
Line art	600–3000 dpi	600–1342 ppi	$(\text{dpi}/600)^{1/2} \times 600$
Film recorder	4K (35mm)	2731×4096 pixels	Total pixels
Film recorder	8K (6×9cm)	5461×8192 pixels	Total pixels

Table 1.2  
Approximate  
Resolution for  
Various Media

Note that these resolutions are suggested and not absolute. Images will still print and display at other resolutions, but the results may not be predictable or efficient. Actual resolution needs may be somewhat flexible based on circumstances, such as paper and equipment used, original image quality, expected results, and so forth. Be sure to read manufacturer suggestions, and take most of the advice offered by service companies—they should know how to get the best results from their equipment.

### Resizing Images

Changing the size of an area that a group of pixels occupies can come in two forms: one causes you to resample an image (using Bicubic, Bilinear, or Nearest Neighbor interpolation), and the other changes the resolution to redistribute pixels over a smaller or larger area:

**Redistributing** pixels does nothing to actually change the content (mathematics) of the image information that is stored; it just suggests that the content will be applied over a different area.

**Resampling**, on the other hand, actually changes the content of your images, and changes it permanently.

The larger the amount of resizing (the greater the percentage increase or decrease), the more it affects the image content. One of these two things, redistributing or resampling, has to happen each time you either change the size of the whole image (using Image Size, not Canvas Size) or change the size of a selection by stretching or transforming.

When you *upsample* or *downsample* an image or image area and retain the resolution, Photoshop Elements has to interpret and redistribute tonal and color information, either creating (upsampling) or removing (downsampling) pixels. It does this through *interpolation* (adding image information) or *decimation* (removing image information), which are really fancy names for making an educated guess. Resampling an image to make it larger will never fill in information that is not already there, no matter what you do and which

plug-in you use. That trick you've seen on TV, where a pixelated image gets clearer and clearer as they zoom in, is reverse engineered. The only thing you can really do to reclaim image detail that you don't already have is reshoot an image or rescan (assuming that the detail is present in what you are scanning). What resampling will do is estimate and average differences between pixels to make a best guess. Details will tend to soften (upsample) or be lost (downsample).

Photoshop Elements has three methods of interpolation (methods of figuring out how to insert new pixels or remove existing ones as you change an image's size), and five interpolation options. Nearest Neighbor, Bilinear, and Bicubic are the methods. Bicubic Smoother and Bicubic Sharper are Bicubic interpolation options that have been added in Elements 3.

**Nearest Neighbor** When you resize using Nearest Neighbor interpolation, Photoshop Elements picks a representative color from those that already exist in the image. Whether upsampling or downsampling, there is no averaging to create new colors or tones. Nearest Neighbor is useful, for example, for controlled upsampling of screenshots without blurring.

**Bilinear** Bilinear interpolation behaves much like Bicubic and is supposed to be faster, but I've never clocked them. During the sampling, new tones and colors can be introduced between existing colors that are not in the original image. This can blur sampling of hard edges, but can provide a smooth transition for tones (Nearest Neighbor might provide a blockier, stepped result). One thing about Bilinear upsampling is that it remains more true to simple averaging between neighboring tones and adds fewer new qualities to an image than Bicubic. At times these properties prove to be an advantage in retaining look and feel, and in others they may result in softening. It is useful when you want a straightforward averaging, which may be useful when downsampling images.

**Bicubic** The resampling process creates new image information by averaging, like Bilinear, but goes one step further to provide a tiny bit of sharpening to the result. This is intended to counteract the blurring result of averaging. It changes a greater number of pixels with the same radius setting as Bilinear, but may generally give a better visible result in most cases than Bilinear. It is the real workhorse for sizing images. Bicubic Sharper is like Bicubic, but with enhanced sharpening; Bicubic Smoother is like Bicubic, but with less sharpening.

While making up information and decimating it sound like bad things, each has its purpose. Usually you should avoid upsampling—especially if the option exists for gaining more detail through a better-targeted source image. However, images can be upsampled with some success, depending on the desired quality—provided the change isn't huge.

Upsampling 10 percent or even 20 percent may not be noticeable if the source image is sharp. Usually you will upsample only to make up small gaps (if necessary) between the resolution you have in an image and what you really need, or to adjust borrowed image components (elements you are compositing from other images).

Downsampling, while certainly damaging and compromising to image content, should be less noticeable in your results. Image information indeed gets averaged or eliminated, but if downsizing is being done for the right reason, any details you lose would have been lost on output or display anyway. Detail loss is inherent in the process of downsizing or outputting images at a smaller size: even if the equipment used could reproduce detail at a smaller size, eventually details will pass the limit of the human eye's ability to discern them.

## Multipurpose Images

Making images that you'll use for more than one purpose (for example, print and Web) can cause a little problem. Optimally, you'd like to work with images so that you target the result. Doing so ensures that you retain all of the actual image detail rather than relying on interpolation or decimation and your choice for sampling type to produce the right results. It is a simple fact that an image going to print on a high-resolution printer should have more information than one at the same size used on the Web, or you will not optimize detail.

You have only two solutions in working with dual-purpose images:

- Create two images, each with a specific purpose.
- Create one image and resize.

Either of these choices poses a trade-off. In creating two images, you sacrifice valuable time in repeating processes. It is often self-defeating to work on two images to produce the same results (even using a detailed script) because the difference in size and volume of information in the image will produce different results with the same application of tools. In creating one image and resizing, you have to allow either interpolation of new image information or decimation, which may not be the optimal process. You can't work on small images and resize up, because detail will not be present.

The best way to go about working with multipurpose images is usually to work with them at the highest resolution and then resize them smaller. Working at the higher of two or more resolutions retains the details for the higher-resolution presentations, and decimates detail that will not be reproducible at lower resolutions. Softening or other ill-effects from severe resizing can be countered somewhat by sharpening. (See “(Un)Sharpening and Boosting Contrast” in Chapter 3 for more information on sharpening.)

## Knowing Your Equipment and Images

Part of working with images on your computer is learning the nuances of systems and software, and having some idea about what you expect to do with the images. You are responsible for knowing your equipment and the purpose of your images. This section cannot help if you are having trouble with your computer system, but it can tell you what to look for and where to get help. Similarly, it doesn't tell you what exactly to do with images but does present some general guidelines for how to proceed.

### Know Your Equipment

Because all computers and systems are not alike, it is impossible to cover every nuance of every system in every situation in one book. There are innumerable digital cameras on the market, a plethora of ways to get the images off the cameras, and hundreds of home printers to print the result to. Software configurations and utilities can cause fresh problems while solving others, and compatibilities can be an issue with both hardware and software.

If you have trouble getting the images off your camera, or have trouble with your printer or computer, the place to find answers is in the user manual for these devices and through technical support from manufacturers.

The following is a short checklist of maintenance tasks you should recognize, understand, and perform for your computer, peripherals, and software.

### Scanners (and Analog Film)

- Calibrate your scanner per manufacturer suggestions.
- Maintain a regimen for cleaning the scanner and scanned objects.
- Be sure to use proper connections and connection settings.
- Consider having important images scanned by scanning services, which may have better equipment and resolution than you may have at home (for example, scan negatives and slides to a Kodak Photo CD rather than on a home flatbed scanner).

### Digital Cameras

- Choose appropriate settings per manufacturer recommendations, and don't change settings if you don't know what they do.
- Learn about special features and settings by reading the manual.
- Understand image control and exposure.
- Understand how to format camera storage.
- Know how to properly connect a camera to your computer and download images from the camera.

## Printers

- Use appropriate paper and inks as suggested by the manufacturer.
- Read maintenance and cleaning suggestions and follow these practices rigorously.
- Don't expect RGB results from a CMYK printer. CMYK is a smaller color space, meaning there are simply fewer colors available.

## Computer Software and Hardware

- Maintain a firewall if using an open Internet connection.
- Use virus protection software to minimize problems with infected digital files, especially if you trade a lot of files. Never open a file from an outside source (even a known source) if it has not been scanned for viruses.
- Maintain a schedule of maintenance for data backup, disk error scanning, and associated digital maintenance (such as defragmenting).
- Check manufacturer websites regularly for software updates, bug fixes, and compatibility notices.
- Keep a log of program installations to help locate software conflicts.
- Don't jump to conclusions. Note multiple problems in the operation of your system. If you have problems with more than one program or device, there may be a common link to the real cause.
- Simplify your system whenever possible by detaching chronically unused peripherals and uninstalling unnecessary software.

## Know Your Image

Some matters involved in repairing and compositing images are not really judgment calls, and some are. One thing no book or manual can tell you is exactly what you want to do with an image. While I can suggest proven ways of getting good results, learning to evaluate an image's composition and deciding what to do to improve it will be a judgment call. Your judgment will improve over time and with practice.

Don't ever say it is good enough if it isn't good enough. Give up on an image only when it is not worth the effort to improve it. There is almost nothing you can't do with an image if you have the desire. You can also correct the same image from now until doomsday, improving it in increments all the time. Sometimes putting an image aside for a day or two can give you a new perspective: when you come back to it, you may see solutions you hadn't previously considered. Solutions won't always jump out at you, and sometimes

you'll have to manufacture them. In trying to stretch your limitations, no matter what you are attempting to do to an image, chances are you will learn from each solution you attempt.

The more you work with images, the easier and quicker the manipulations will become. Now let's push some pixels...

# Part II

## Wrestling with Image Tone and Contrast



Understanding the workings of a digital image starts with separating the image into its components of color and tone. But separating components isn't just an interesting exercise. In the long run, understanding separations empowers you to make image repairs beyond the obvious application of standard tools, ramping up the power of Photoshop Elements. Understanding the basics of separating images into components gives you the power to make other separations as well, including working with CMYK in Elements.

Getting confident with separation empowers you to make changes. If your image shows mottling, uneven color, or some other problem that is color- or tone-specific, taking apart the image elements can help you focus on the real problem. It's like treating a wound with plastic surgery instead of just putting a bunch of stitches and some gauze over it.

Chapter 2 **Separating Image Components**

Chapter 3 **Correcting Image Tone**





# Chapter 2

## Separating Image Components

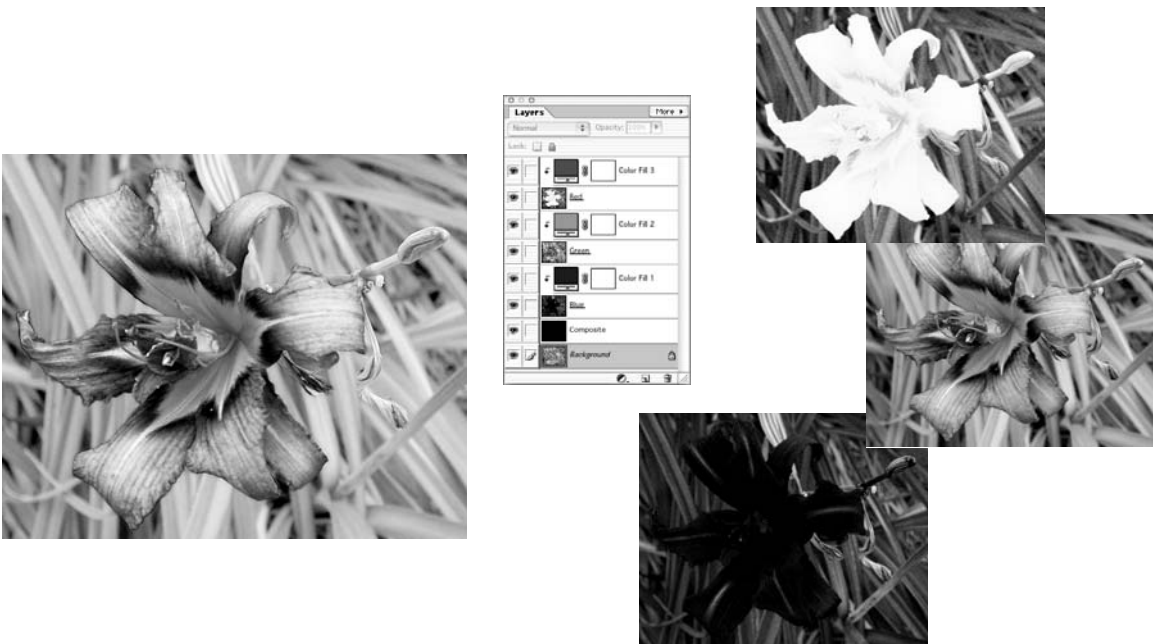
Splitting color images into components helps you leverage existing image information to make changes that would otherwise be either difficult or impossible in Photoshop Elements. For example, a simple use of separations gives you ultimate control over converting images from color to black-and-white. With a little ingenuity, you can use separations to mask specific colors or tones to help you target corrections and changes.

Before you master more complex color separation, you need to learn to handle simpler concepts, such as filtering RGB channels and separating luminosity (tone). Once you can make separations, it opens the door to creative image enhancement. We will start by looking at the importance of separation in getting the most out of black-and-white conversions, and we'll also look at how separation is integral to forming color in images.

### The Art of Turning Color to Black-and-White

#### Turning Black-and-White to Color Again

#### Applying Color: Separating the Color Component and Hand-Coloring



## The Art of Turning Color to Black-and-White

Black-and-white images hold a different kind of interest than color images. Sometimes you may want to turn a color image to grayscale to create black-and-white images or duotones (colorized grayscale, like sepia toning). Other times you may want to remove color from an image so you can then colorize it (hand-color, or reapply existing color to revised image tone).

There is more to making a good conversion to black-and-white than just choosing Grayscale from the Mode menu to convert your color to tone. Color images can present about 16 million variations for each pixel, whereas black-and-white is less robust in being able to display only 256 levels of tone in 8-bit. Color adds a layer of distinction between objects in an image: objects can be a similar tone, or darkness/lightness, but distinct in color. So, while objects may be easy to distinguish in a color image, they can merge or become less distinct when the image is converted to black-and-white. In other words, if you take a color image with clearly defined objects and then choose Grayscale to convert to black-and-white, some of the distinct differences might wash away with the color. Usually the result—considering how drastic the change is—is surprisingly not catastrophic. Except in extreme cases, you’ll still be able to see your subject. Different means of handling the conversion can produce better (or worse) results. The key here is that separating the components provides you options not only for making conversions, but for making your conversions better.

The simplest way to convert from color to tone is by either converting the image to Grayscale mode or desaturating the image. For example, instead of just changing to Grayscale mode, you can use Enhance → Color → Remove Color, or desaturate the image by using the Hue/Saturation function (move the Master Saturation slider to -100). These one-step processes, each produce the same result, based on combining tonal values in the red, green, and blue channels of an RGB image in specific percentages.

However, the result of the straightforward conversion to tone may not result in the black-and-white image you’d expect to see. The converted image can be rather blah, lacking definition and contrast between objects. Looking to other qualities that exist, hidden in the original color of the image, can help provide sources for improving the result.

There are various ways to separate out tones based on color, luminosity/brightness/tone (each of these three are essentially the same), and saturation. Once you learn to make separations, you can use the information to replace, supplement, and combine with other tones to produce improved results. Separating tone can also isolate image components for necessary repairs, and is often a handy technique to use during image restorations.

For our first trick, we'll be doing the impossible by separating a color image into RGB color components (known as *channels* in Photoshop). It is "impossible" because Photoshop Elements does not have channels, at least not as part of the interface. There is, however, more than one way to coax RGB components out of any image in Elements. In this case, you'll be separating the channel components in the Layers palette. In doing this, you can see how separations work and create at least three sources for working with tone in your image—all at the same time.

## Separating Color Components (Creating Channels)

Just because a tool is not in the Photoshop Elements program interface does not mean it can't be mimicked or invoked in another way. In the case of channels and separations, the interface for channels may be formally missing, but the light components of the image that make up the channel content are still there. The red, green, and blue color information exists in your color images or else you wouldn't have color. Just like Prokudin-Gorskii, who took an image and separated it into RGB components to capture on his glass plates (see Chapter 1), you will be able to take any color image and split out the components by filtering for red, green, and blue in the layers. This will enable you to mimic channels and take a better look at the tone information as separate color components.

First, you'll look at how to make RGB separations with a long, but rather simple, step-by-step process. The separation process mimics Prokudin-Gorskii's in that you will take an image and separate out the color components by applying filters, in this case using layer modes and a few simple color properties. There is an automated way to do the same thing using the Hidden Power tools included on the book's companion CD. These tools are provided so that you don't have to do the manual steps for the separation each time you need it. However, don't just skip the steps and go right for the automated tools, because you won't learn anything. What you learn here is imperative in preparing you for more difficult separation and image control challenges to come.

This set of steps was designed to work with a flattened image (one with only a Background layer). Your image can be flattened by choosing Layer → Flatten Image if it is not flattened already (if it is, the option will be grayed-out in the menu). Follow along using the sample image `1ily.psd` (an orange flower) provided on the Hidden Power CD.

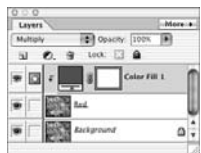


### Create the Red Component

First, create the red component:


1. Open the image you want to separate.
2. Duplicate the Background layer (Layer → Duplicate Layer). In the dialog box that appears, change the name of the layer to **Red**. Click OK.

You'll often need to return to the Background layer to extract different color information, so duplicating the Background layer at the start leaves you the original source to work from.



3. Make a fill layer by choosing Layer → New Fill Layer → Solid Color. Click OK. When the Color Picker dialog box appears, set the color to red (enter values: R = 255, G = 0, B = 0). Click OK. The image will be red; you'll fix that in the next few steps.
4. Set the fill layer mode to Multiply by selecting Multiply from the Blending Mode drop-down list in the upper left of the Layers palette. Multiply will effectively filter the color image for the red light information, isolating it (see the graphic pictured here).
5. Merge the layers by choosing Layer → Merge Down (Command/Ctrl+E) to commit the red filtering. You can turn this red light into a channel by adding equal parts of blue and green to the red in the following steps.
6. Duplicate the Red layer (Layer → Duplicate Layer). This creates a layer named Red Copy. You'll need it only temporarily, so there is no need to rename it. Click OK.
7. Make a Hue/Saturation adjustment layer by choosing Layer → New Adjustment Layer → Hue/Saturation. When the Hue/Saturation dialog box appears, use the sliders or type in the following settings: Hue: +120, Saturation: 0, Lightness: 0. This will change the color of the red component to green without affecting the tone. Click OK.
8. Merge the Hue/Saturation and Red Copy layers by choosing Layer → Merge Down (Command/Ctrl+E). This commits the change of color from red to green without affecting the tone.
9. Set the current layer mode to Screen by selecting Screen from the Blending Mode drop-down list in the upper left of the Layers palette. Screen mode acts by applying layer information as additive light.
10. Duplicate the Red Copy layer (Layer → Duplicate Layer). This creates a layer named Red Copy 2. Again, this is a temporary layer, so there is no need to rename it. Click OK.
11. Make a Hue/Saturation adjustment layer by choosing Layer → New Adjustment Layer → Hue/Saturation. In the Hue/Saturation dialog box, specify these settings: Hue: +120, Saturation: 0, Lightness: 0. This changes the color of the layer to blue. Click OK.
12. Merge the layers by choosing Layer → Merge Down (Command/Ctrl+E). This commits the change in color from green to blue—still not affecting the tone. The red filtered component is now in the Layers palette in equal parts of red, green, and blue (see the corresponding graphic). Combining them correctly (as you'll do in the next steps) will give you the red color channel as black-and-white tone.




13. Activate the Red layer; then link it to Red Copy and Red Copy 2 by clicking the linking box  for each copy layer.
14. Merge the linked layers by choosing Layer → Merge Linked. The result will be a single-layer grayscale representation of the red light component in the original image. This is the same thing as the red channel. Your layers should look like this graphic.

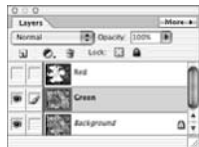


### Create the Green Component

Similar steps to creating the red component will help you extract the green component:

15. Hide the Red layer by clicking its layer visibility toggle (the eyeball icon) .
16. Activate the Background layer, duplicate it (Layer → Duplicate Layer), and rename the duplicate layer **Green**. Click OK.
17. Make a fill layer (Layer → New Fill Layer → Solid Color). The Color Picker dialog box appears. Set the color to green (R = 0, G = 255, B = 0). Click OK. The whole image will be green.
18. Set the layer mode of the Color Fill layer to Multiply to reveal the green light component of your image. Click OK. Your layers palette should look like the graphic that appears here.
19. Merge layers by choosing Layer → Merge Down (Command/Ctrl+E).
20. Duplicate the Green layer (Layer → Duplicate). The result will be a layer named Green Copy.
21. Make a Hue/Saturation adjustment layer (Layer → New Adjustment Layer → Hue/Saturation) with these settings: Hue: +120, Saturation: 0, Lightness: 0. This changes the color of the layer to blue.
22. Merge the layers by choosing Layer → Merge Down.
23. Set the layer mode to Screen by selecting Screen from the Blending Mode drop-down list in the upper left of the Layers palette.
24. Duplicate the Green Copy layer. This will result in a duplicate layer named Green Copy 2.
25. Make a Hue/Saturation adjustment layer with these settings: Hue: +120, Saturation: 0, Lightness: 0. This changes the color of the layer to red.
26. Merge the layers by choosing Layer → Merge Down. Your layer stack should look like this graphic.
27. Activate the Green layer, and then link it to Green Copy and Green Copy 2 by clicking the linking boxes of the copy layers.





28. Merge the linked layers (Layer → Merge Linked). This composites the layers into a single-layer grayscale representation of the green light component in the original image. Your layers should look like this graphic.

### Create the Blue Component



29. Hide the Green layer by clicking its visibility toggle.
30. Activate the Background layer, duplicate it, and name the new layer **Blue**.
31. Make a fill layer (Layer → New Fill Layer → Solid Color). The Color Picker dialog box appears. Set the color to blue (R = 0, G = 0, B = 255). Click OK. The whole image will be blue.
32. Set the layer mode to Multiply to reveal the blue light component. Click OK. The layers should look like the graphic pictured here.
33. Merge the layers (Layer → Merge Down).
34. Duplicate the Blue layer (Layer → Duplicate).
35. Make a Hue/Saturation adjustment layer with these settings: Hue: +120, Saturation 0, Lightness, 0. This changes the color of the layer to red.
36. Merge the layers by choosing Layer → Merge Down (Command/Ctrl+E).
37. Set the current layer mode to Screen.
38. Duplicate the Blue Copy layer.



39. Make a Hue/Saturation adjustment layer (Layer → New Adjustment Layer → Hue/Saturation) with these settings: Hue: +120, Saturation: 0, Lightness: 0. This changes the color of the layer to green.
40. Merge the layers by choosing Merge Down. The layers should look like this graphic.
41. Activate the Blue layer; then link the Blue, Blue Copy, and Blue Copy 2 layers.
42. Merge the layers by choosing Layer → Merge Linked. Your layers palette should look like the next graphic.



You have separated the image into three channels, one for each of the primary light components: red, green, and blue. These components can be looked at as a source for making conversion to black-and-white, as well as a source for learning about the nature of light and RGB theory. These are exactly the same components you would get using the Channels palette in Photoshop. Save this image by a different name so you can find it later.

Take a moment to examine the layers representing the separate light components by viewing them individually. Note the qualitative differences between the red, green, and blue channels. The representations reveal specific qualities about light in each spectrum.



Figure 2.1

These images were created using the separation steps in the previous procedure. Note that the green looks the most like what you might expect as a grayscale conversion.

Figure 2.1 shows an image of an orange flower against a green background separated into its components. (See the color representation of this flower in the color section.)

Now that you have seen the separation, you can accomplish the same set of 42 steps in a single click. Just go to the Hidden Power tools on the Styles and Effects palette, open any RGB image, and click the Split RGB in the PowerSeparations category of Effects. This will execute the steps for you. Splitting RGB should be done on a flattened RGB image—results with images that are not flattened may be somewhat unpredictable and can generate errors.



If you haven't installed the Hidden Power tools, you can find the tools on the CD and instructions for installing them in the Introduction to this book (see "The Hidden Power Tools" in the Introduction). Supplementary information on installing and troubleshooting can be found on the [hiddenelements.com](http://hiddenelements.com) website and the Hidden Power of Photoshop Elements forums at [retouchpro.com](http://retouchpro.com).

Separation is a key concept for grasping everything that follows in the book—it isn't just a neat parlor trick. It is a lossless process based on light theory—lossless in that it won't do any damage to your images. If you can navigate the steps but don't really understand what each is doing, deeper understanding will come, either as you proceed through the book or as you repeat the exercise and learn the process.

## Separating Luminosity

Separating luminosity from your images is another way to extract valuable tonal information and representation of black-and-white. *Luminosity* is a component of Lab color, which is a color model that distinguishes color components from tone (lightness). Because this color model considers tone separately from color, the luminosity component is often a good representation of what we would expect to see in black-and-white.

Photoshop Elements does not have Lab as one of the image color modes. However, as with RGB, luminosity and color components can be extracted from an image in more than one way, and can easily be represented using layers. As a purer measure of tone, the lightness



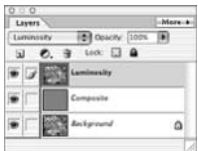
component is often useful when RGB separations may not provide an advantage. For example, and as you will see, luminosity and color separation is invaluable for color noise reduction, as often happens in images recorded by digital cameras using fast shutter speeds.

### Extracting Luminosity from Color



The following steps will enable you to extract luminosity from any RGB image. Use the flower image again (111y.psd) with these steps so you can compare the differences in the resulting grayscale components.


1. Open the 111y.psd image.
2. Duplicate the Background layer (Layer → Duplicate Layer). This will be a temporary layer, so it does not need to be named. Change the layer mode to Luminosity by choosing it from the Blending Mode drop-down list in the upper left of the Layers palette.
3. Activate the Background layer by clicking on it in the Layers palette.
4. Create a new layer (Layer → New → Layer). This creates a new layer between the background and the copy. Name the layer **Luminosity** and click OK.
5. Fill the new layer with gray by choosing Edit → Fill and then selecting 50 percent Gray from the drop-down menu.
6. Duplicate the Composite layer. Name the layer **Luminosity** and click OK. Your layers should look like this graphic.
7. Activate the Background Copy layer by clicking on it in the Layers palette.
8. Merge the Background Copy and the Luminosity layer (Layer → Merge Down).
9. Choose Luminosity from the Blending Mode drop-down list in the upper left of the Layers palette. Your layers palette should look like the next graphic.



With the layer mode changed to Luminosity, what will display is the lightness (or L channel from the Lab color model), which is a representation of image tone. Save the resulting file so that you can come back to it later. Comparing this result to the components of an RGB separation as well as the straight conversion to grayscale by desaturation (as shown in Figure 2.2) should show some distinct differences in quality. Depending on the source of the image (digital capture or analog), the content of the image, and the quality and quantity of light in the capture, these differences will be more—or less—pronounced.



The luminosity component information can be extracted from an image in a single step by using Hidden Power tools. Just click the Split Luminosity Hidden Power tool in the PowerSeparations category of Effects; the steps for separating luminosity will execute when the tool is clicked. The tool will create three elements: the Luminosity component, the Color component, and the Composite layer. The Color component is Luminosity's partner: the components work together to create image color and tone in a similar way

that RGB color components combine to create a color image. The Composite layer is just a canvas for the layer components to present against—as if the components are being projected to a screen. To view the image without the color, activate the Color layer and click its visibility toggle  on the Layers palette to shut off the view. To view the image without the luminosity (essentially this is color and saturation), activate the Luminosity layer and click its layer visibility toggle to off (the Color layer toggle should be on).

The Split Luminosity power tool should be used on flattened RGB images. We'll look more at the color component a little later when we look at how saturation information can help in CMYK separation.

## Making Black-and-White by Borrowing the Best Tone

Sometimes a simple conversion works just fine for changing a color image to black-and-white. The most straightforward conversion to black-and-white is accomplished by converting RGB to Grayscale or desaturating. You can also create black-and-white representations of an image by using components from the RGB or luminosity separations. Sometimes a component of one of these conversions will suffice, and other times you have to look around and be more creative by borrowing and combining the tones that you can find lurking in various components from different separations. This is where the art of converting to black-and-white comes in: you have to have the vision to see what will combine for an interesting result.

If you look at the components of an RGB separation, the most representative component of what you'd expect to see in black-and-white will often be the green channel. This is because green is more naturally in the center of the visual spectrum and more closely resembles how humans perceive tone. The red channel is toward the infrared spectra, and the blue channel is toward the ultraviolet. Therefore, the red channel more closely represents infrared capture, and blue is more like ultraviolet.



a



b

Figure 2.2

The luminosity, or lightness, separation for the image (a) shows a somewhat different and often better representation of image tone than simply desaturating the image (b).

Very often, luminosity will provide an easy source to extract a good black-and-white representation of any image. It is less prone to color noise and at times will look surprisingly smooth, even when RGB separations have strong color noise (again, this color noise can happen with images shot with a digital camera in low light).

All of the separation possibilities can show you tonal representations that are somewhat different—different from each other and different from straight desaturation. Sometimes a subtle adjustment in any of these three representations can yield greatly improved results in what otherwise would have been a straight conversion. These adjustments may be simple changes in tone using correction tools such as Curves (a Hidden Power tool that we'll look at in Chapter 3) or Levels. Or the changes may be made by using different areas of the image from different components and combining them with isolation, masking, or selection. We will look at methods for making these adjustments in later chapters.

Figure 2.3 shows five possibilities for a simple conversion to black-and-white from a single image, plus one result that combines three of the separations. For simple conversions, the blue and red can usually be discarded right away as sources because they are not often good representations of the way you will perceive image tone. However, red and blue can sometimes be used to make other adjustments (for example, to create selections, create masks, make calculations between components, mix components, or apply using histories—all of these techniques are presented in subsequent chapters). Comparison of the green, luminosity, and grayscale conversion from RGB may reveal different specific advantages. Adjustment of the available tones in more than one of the separated components may create the best result.

Figure 2.3

Looking at the five simple conversions of image tone can reveal distinct advantages in both representing the images and selecting objects or components.



Red



Green



Blue



Luminosity



Desaturate



Composite of three separations

The composite image in Figure 2.3 uses the luminosity, red, and green components. First, the luminosity component is used as a background: it is lightened to act as a canvas to set off the flower. The flower is isolated from the green component by using the red component as a mask. The flower is then just overlaid on the luminosity component by using layers. The techniques for masking and combining components is covered in later pages, so we won't look at those techniques here. We will look more at how to specifically make adjustments like this in topics that arise throughout the book.

## Turning Black-and-White to Color Again

While separations can be useful for creating black-and-white images, the components are useful for color only if you can recombine them to display color again. Prokudin-Gorskii had a similar problem after capturing his separations on the glass plates. He had to put his glass plates in a projector and simultaneously project them in near-perfect alignment with appropriate filtering (in the form of color cells) to re-create the color result on a screen.

In Photoshop Elements, you can use layer color and modes to “combine” the separated RGB components to re-create the image color. The result can be achieved without actually combining the separated components. Leaving the components as separate layers is a great benefit during color correction because you can then adjust each component and view how those changes affect the color as the changes are made. Layered components can be affected by other changes simultaneously, including selection, masking and adjustment layers.

## Compositing Separated Components into a Color Image

The following procedure should be used on an image that has been separated into red, green, and blue layer components by following the steps in the previous section, “Separating Color Components (Creating Channels).” The steps in the procedure that follows will partially reverse the process of creating the separations by enabling the components to display the color result. These steps are essential in letting you see the image as it should appear on-screen.

This procedure consists of two phases, preparing the RGB layers and then changing components to projected light.

## Prepare the RGB Layers

You should be starting with an image that has Red, Green, Blue, and Background layers as pictured in this graphic. You can either follow the earlier separation procedure to create the layers, or open any RGB image and click the Split RGB tool in the PowerSeparations category of Effects. To prepare the layers, follow these steps:



1. Activate the Background layer of the separated image.
2. Make a new layer (Layer → New → Layer). Name the layer **Composite**. Click OK. This layer will serve as a canvas for the composite—performing almost the same function as a projection screen.
3. Fill the layer with black by choosing Edit → Fill. Select Black from the Contents drop-down list and click OK to complete the fill.
4. Reorder the layers if necessary by clicking and dragging them up or down in the layers palette. The layers should be in the following order from top to bottom: Red, Green, Blue, Composite, and Background.
5. Hide the Red and Green layers by turning off their visibility toggles (click the eyeball icons) on the Layers palette. Your layers should look like the corresponding graphic shown here.



## Changing Tones to Projected Light

Now you need to convert each tonal representation of the image back to a colored light component so they can recombine for a full-color result:

6. Activate the Blue layer and set the color mode to Screen. Applying the layer as a screen will lighten the tone of the black composite layer.
7. Make a fill layer (Layer → New Fill Layer → Solid Color). Set the mode for the fill layer to Multiply. Click the Group With Previous check box (so it is checked) to group the fill layer with the Blue layer. Click OK.
8. The Color Picker dialog box appears. Set the color to blue (R = 0, G = 0, B = 255). Click OK. Steps 6 through 8 convert the appearance of the blue component layer from grayscale back to blue. The resulting effect is that the blue tone projects on the Composite layer as the blue light component would. The layers should look like the graphic shown here. In the following steps, you will do the same for the Green and Red layers.
9. Activate the Green layer and set the layer mode to Screen. This further lightens the composite because you have added information from the green light source.
10. Make a fill layer (Layer → New Fill Layer → Solid Color). Set the Mode for the fill layer to Multiply. Click the Group With Previous check box so that it is checked. Click OK.



11. The Color Picker dialog box appears. Set the color to green (R = 0, G = 255, B = 0). Click OK. Steps 9 through 11 convert the appearance of the green component layer from grayscale back to green, and apply the green to the Composite layer as green light.
12. Activate the Red layer and set the layer mode to Screen.
13. Make a fill layer (Layer → New Fill Layer → Solid Color). Set the Mode for the fill layer to Multiply. Click the Group with Previous check box so that it is checked. Click OK.
14. The Color Picker dialog box appears. Set the color to red (R = 255, G = 0, B = 0). Steps 12 through 14 convert the appearance of the red component layer from grayscale back to red, and apply the red tone to the Composite layer as red light.

At this point, the image will appear to be in RGB color in the image window, but the color components will still be available separately in the Layers palette (see Figure 2.4). To adjust an individual color component, you can create a new adjustment layer (as many as necessary) between the color layer and the fill layer. You can make any type of adjustment to the component, as long as it adjusts the individual component layers (Red, Green, and Blue) and not the fill layers. The result can be converted back to an RGB image, without components, by flattening.

Steps to change the separated RGB components to color layers, adding color fill to separations you created, can be accomplished by using a single click with Hidden Power tools. Clicking Preview RGB in the PowerSeparations category of Effects will perform steps 1 to 14 in this procedure. To perform both the separation and the preview of an image in one easy step, click Split RGB w-Preview in the same category of Effects. Split RGB w-Preview should be performed on a flattened RGB image. These Hidden Power tools will be invaluable to you in working through the book and making future image corrections by providing a useful, quick means of creating RGB separations.

## Applying Color: Separating the Color Component and Hand-Coloring

Separations represent the source components of an image in its original colors. Color can be introduced to your images and enhanced in other ways. Colorizing (or hand-coloring) images is an artistic approach to adding color. It differs from recombining RGB components into color or adding back the color element of a luminosity separation: it is a separate

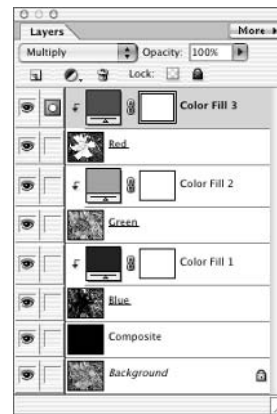


Figure 2.4

The separated colors in the image are successfully combined to re-create the color in layers while being kept separate. This enables you to work with layers as if they were Photoshop channels.



application of color. The color you apply may be a radical change from any original color. The tone, color, or components in the image can be used as a canvas to paint the color on.

Color can be applied to tone in an infinite number of ways, using various Photoshop Elements tools. The color application can be done with simple painting tools or with a more complex color application (for example, gradient mapping and/or blending). We'll take a brief look here at applying original color to tone and applying new color, to further delve into how color and tone work together to create the images you see.

## Looking at Color Distinctly from Tone

Earlier in this chapter, you extracted the tone from an image (see the exercise in “Extracting Luminosity from Color”), and the byproduct of completing that separation was a luminosity component. That component represented the tone as separate from the color in the image. The separation didn't address the color component, which can be isolated as well. The *color component* represents the hue and saturation of the image separate from the tone. You can think of *hue* as color (perhaps as picked from a color wheel) and *saturation* as the purity or vibrancy of that color.

Isolating and reapplying original color to tone is pretty simple in a luminosity and color separation—not nearly as complex as re-creating color from RGB separations. Starting with an image that you have extracted a luminosity component from in the earlier exercise, your image should have the following layers from the top down: Luminosity, Composite, and Background. (If you don't have the image with these layers, open 111y.psd and repeat the steps in “Extracting Luminosity from Color.”) Completing the separation to extract the color is done in a few easy steps:



1. Duplicate the Background layer. Name the duplicate layer **Color**.
2. Move the Color layer to the top of the stack.
3. Change the mode of the Color layer to Color (see the graphic pictured here).

In completing these few steps, you have added the color back to the image tone by using a separate color component layer. You can then work on the color and lightness (luminosity) components individually. That is, you can adjust the image tone separate from the color, and adjust the color independent of the tone. The color component can be extracted, changed, and applied to the original image, it can be applied to the extracted luminosity component, or it can be applied to other tone variations, such as the tone created by an RGB component. Figure 2.5 shows the result of a completed luminosity and color separation, with a sample of how adjustment layers could be placed for simple alterations to color and tone.

The way color is working here is more like how an artist might mix paint. Color mixes with tone to produce a result. If there is no color, the tone is applied in grayscale. If there



is no tone (white), the color is applied, but results in no color value: because there is no tone in pure white, there is no tone in the applied color. The darker the tone, the darker the applied color, until it turns black. When the image is black, the color layer again shows no effect on the visible result. The brightness/lightness is mixed with hue and saturation (a color) to make the result. This is much more straightforward and intuitive than RGB, encompassing different advantages.

When a color in an image seems wrong, you might need to make a change in the color or tone—or both—to get it right. One or the other won't always work to get you where you want to go. Separating the components gives you more freedom to work with color and tone independently to achieve the desired result.

We'll look much more in depth at adjusting image color in Chapter 5. In the following section, we'll continue exploring adding color to tone.

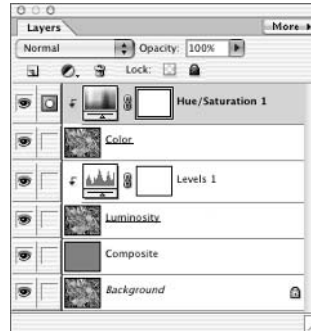


Figure 2.5

With tonality and color separated, you can effectively control one component without affecting the other. Here Levels are applied to tone, and Hue/Saturation to color

## Basic Hand-Coloring

*Hand-coloring* is the art of applying color by hand to images (usually black-and-white images). The effect can be anything from the addition of a simple color wash to garish additions of color, glitter, and other media. It can be lots of fun: either in attempting to recreate color in an image (in restoration or colorization), or in just replacing color for wild effects. In a way it can be a better coloring book (for adults or children). For our purposes, hand-coloring is another step in the study of applying color to tone.

### EXPLORING COLOR AND TONE THROUGH THE COMPOSITE LAYER

The Composite layer in Hidden Power separations is used as a canvas for applying and mixing separated components. If you fill the Composite layer with white, shut off the view for Luminosity and leave Color viewed. The image will turn white, even though the visibility for the color layer is still on. What many would expect is that the color for the image would be applied to the white composite. This is actually what is happening, and the result is very revealing about the relationship between color and tone. Because there is no tone in white, there is nothing for the color to display.

The point is, the display of color is directly dependent on tone: if you want color to display differently (lighter or darker), you'll have to manipulate the tone rather than the color. Making tone darker in an area of color will darken the color; lightening tone will lighten color. If you want another hue (for example, if you want to turn green to blue), you can change the color layer from the separation without affecting the tone.

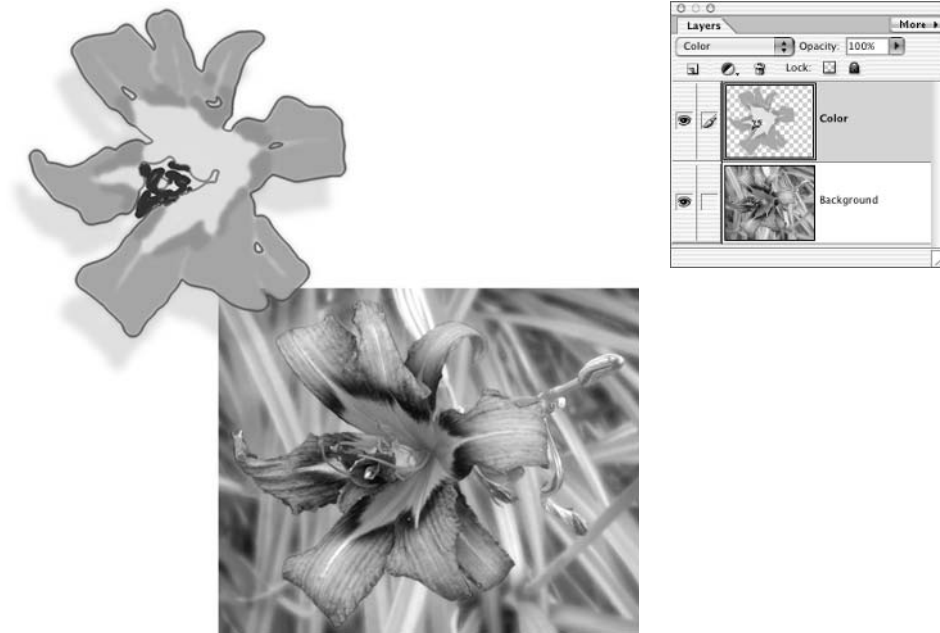


The simplest way to add color to a black-and-white image is a method similar to applying the color component in the luminosity and color separation. Try this out:

1. Open any one of the separations you have made for the lily, or create a black-and-white result for any image.
2. Copy the layer you want to color to a new image (on the Layers palette, choose More → Duplicate Layer, and then choose New from the Document drop-down list in the Duplicate Layer dialog box).
3. Flatten the New image (Layer → Flatten Image) and change to RGB mode (Image → Mode → RGB Color) if necessary.
4. Create a new layer above the black-and-white image background, and set the new layer mode to Color. Name the layer **Color** or something more appropriate to the color you will be applying (see the next step).
5. Change the Foreground color to the color you would like to paint in the image (click the foreground swatch on the toolbar to open the Color Picker, or use the Eyedropper to sample a color from another color image).
6. Choose the Brush tool (press B on the keyboard), and paint over the areas where you would like to apply the color in the new layer.
7. To paint in another color, repeat steps 5 to 6. Your layer setup should look like Figure 2.6.

Figure 2.6

In this technique color gets flatly painted over tone in its own layer.



The preceding steps let you paint with whatever colors you like. Colors could be added all in a single layer, as in this example, or directly to the tone, but these options offer less opportunity to adjust the colors later. For more flexibility, you can add additional colors to separate layers. To add additional colors on separate layers in the `111y.psd` image, continuing from the previous exercise, you could just do the following:

- Create a new layer (call it something appropriate to the second color you want to add).
- Drag the new layer to the top of the layer stack.
- Change its mode to Color.
- Repeat steps 5 to 11. A sample of a multi-layered approach appears in Figure 2.7.

The drawback to this hand-coloring method is that tone gets flatly covered with color. Although the color varies as you see it because of the underlying tone, it doesn't always map as you would expect—it can be weaker or stronger in areas because the tone below it varies. You can adjust the color with layer opacity, and other tools, like smudge, Gaussian Blur, and other filters.

If you try this in an image with people and attempt to replace the skin tones, the flatness of the resulting skin tones will be quite evident and unnatural. Though this result can be improved by adjusting the quality of the color you are applying (see “Managing Image Noise,” where skin tone is adjusted using noise), the color isn't as “smart” as you might expect. A Gradient Map can often be a better choice for hand-coloring.

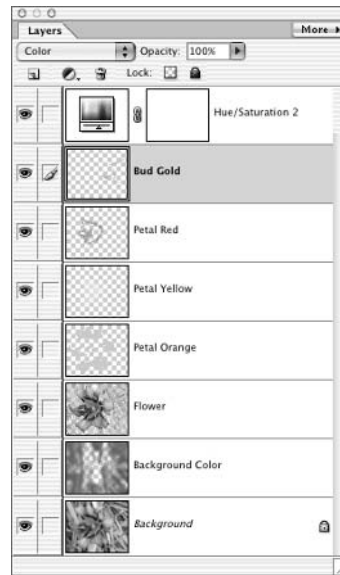


Figure 2.7

**Multiple layers are used in this example to separate colors on their own layers and the flower from the background to better isolate color application.**

## Hand-Coloring with Gradient Maps

Usually, applying flat color is not the best way to hand-color images. Instead, you can use *gradients*, which create a progressive change in color. Gradients can be applied using the Gradient tool or Gradient Map adjustment layers. The *Gradient tool* applies the gradient color according to the pattern selected in the options in the direction and distance that you apply the tool. This has somewhat limited application in hand-coloring and is more likely to be used in creating effects. Gradient Map *adjustment layers* replace colors and/or tones by using a customized color mapping. When a gradient map is applied, Elements replaces each level of gray with its corresponding gradient color as you've set it up in the gradient mapping.

So, say you have a grayscale image, and you apply a gradient map that has 100 percent red (R = 255, G = 0, B = 0) at the halfway point on the gradient (50 percent gray). All of the gray pixels at 50 percent brightness will display as red. If this gradient blends evenly to black at 0 percent and white at 100 percent, the red will fade to pink and then white where tones in the image get lighter; the red will darken to brick and then black where tones in the image get darker. Gradient application of color and tone can be infinitely more complex than this simple example by using more complicated gradients.

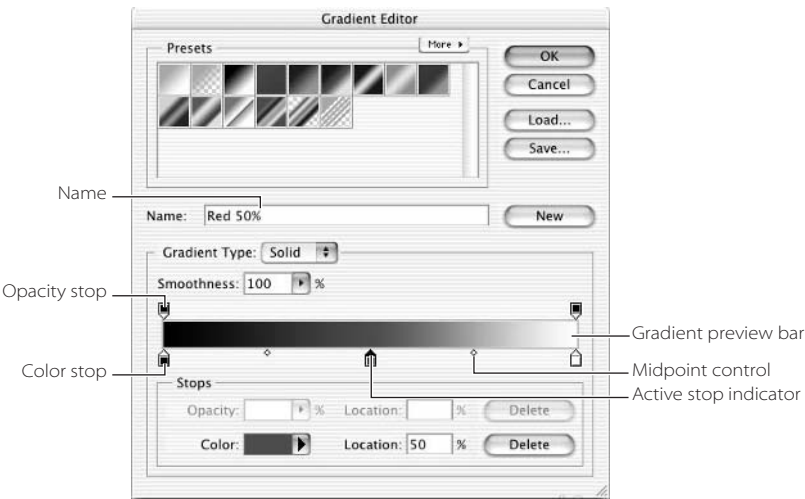
Remapping color and tone can work well in a limited area of an image. For example, you might use selection or masking to target a specific area of an image for recoloring skin tones. You can combine effects of two or more different gradient maps in a single image by using different maps with different selections or masks. Gradient Maps can also be used to create toning effects—for example, in sunset scenes or for duotone effects—so that the tone in an image can be associated almost exactly one-to-one with color.

To work with gradient maps, you need to be able to create and manipulate gradients. To work with gradients you will use the Gradient Editor, which can be opened from the Gradient Map dialog box. Open the Gradient Map dialog box by applying a gradient map as an adjustment layer (Layer → New Adjustment Layer → Gradient Map, click OK). When the Gradient Map dialog box is open, click the color bar under Gradient Used For Grayscale Mapping to open the editor.

Once the Gradient Editor is open, you can edit the current gradient, and create and save custom gradients for reuse. New gradients are created by adding and removing color and opacity stops, choosing a name, and clicking the New button. These new gradients are stored in the gradient library and are available whenever you choose gradient functions.

Figure 2.8 shows the Gradient Editor dialog box and a breakdown of the major features.

**Figure 2.8**  
The Gradient Editor allows the creation of custom color and tone alterations based on existing image tone.



Features in the Gradient Editor include buttons, the Name field, opacity and color stops, and Stops options.

## Buttons

- Click More to reveal Presets panel options. You can change the way the swatches are viewed in the Presets panel or change the gradient sets that are viewed.
- Click OK to accept the current values and close the dialog box.
- Click Cancel to close the editor without accepting changes.
- Click Load to load a gradient set.
- Click Save to save the current gradients as a set.
- Press the Alt/Option key to change the Cancel button to a Reset button. Click Reset to eliminate all changes made since the editor was opened and revert to the original values.
- Click New to create a new preset. This will save a swatch with the current settings and name.
- Click Delete to remove an active color or opacity stop. See “Opacity and Color Stops” below for more on stops.

## Name

- Enter a name for the current gradient, and then click New to save the gradient (in its current settings) to the Presets list.

## Opacity and Color Stops

- Add a stop by clicking above or below the preview bar. Opacity stops are added by clicking above the gradient preview bar; color stops are added by clicking below the gradient preview bar.
- Remove a stop by clicking it, holding the mouse button down, and dragging the stop off the preview bar. Alternately, you can click the Delete button with the desired stop active.
- Click a stop to activate it. The stop with its triangle colored black is the active stop (the stop whose settings appear in the Stops section of the dialog box).
- Double-click a color stop to open the Color Picker.

## Stops Options

- The Stops options on the top row of the Stops section show the values for the active opacity stop. To set Opacity for a stop, activate the desired stop and enter a number or click the arrow to drop down a slider.
- The Stops options on the bottom row apply to the active color stop. The Color swatch provides a preview of the stop's color; click it to open the Color Picker.
- Enter a Location value for either stop type to accurately position the stop (from 0 percent at the far left to 100 percent at the far right).
- Click the Delete button to remove the active stop.

## Editing Your Gradient

Setting up your gradient requires adding color stops to the bottom of the gradient bar to control the application of color to the tones in the image. To add a color stop, click just below the gradient bar and then drag the stop to the position on the gradient bar where you want to locate it. The color of the stop can be changed in several ways:

- Sample color directly from the image (moving your cursor over the image changes it to the sample tool).
- Double-click the color stop to open the Color Picker.
- Make a selection (Foreground, Background, or User Color) from the drop-down menu next to the Color swatch.

The opacity of the color application can be controlled by the opacity stops set on the top of the gradient bar. If you choose color carefully, the colors you apply should affect simply the color you want to see.

The image to which you will be applying the Gradient Map can be converted to grayscale if you like, but this isn't necessary; the map will work on the image tonality independently of current color. In some cases, it may actually be easiest to leave the color in the image so you can use the existing colors as sample color for the enhancement. Different images will require different handling depending on the color that exists and what you want to accomplish. You may want to adjust image tone or separate out image areas before applying gradient maps.

## Applying a Gradient Map

One of the simplest applications of a gradient is to use it to make tone adjustments in a grayscale image. In fact, the Gradient Editor can be used just like a Levels or Curves adjustment (we'll look at how to make Levels and Curves adjustments in the next chapter).

Try this simple Gradient Map application to adjust image tone:

1. Open any flattened black-and-white image (or open a color image, flatten the image, click the Split Luminosity Hidden Power tool in the PowerSeparations category of Effects, shut off the Color layer, and flatten again). If the image is in Grayscale mode, change it to RGB mode.
2. Press D on the keyboard to reset the Foreground and Background colors on the toolbox.
3. Open a Gradient Map by choosing Layer → New Adjustment Layer → Gradient Map. Click OK on the New Layer dialog box. This opens the Gradient Map dialog box with the Foreground-to-Background gradient default.
4. Click the Gradient Used For Grayscale Mapping swatch on the dialog box. This opens the Gradient Editor.
5. Click directly on the white color stop at the right of the gradient preview bar. This reveals a color midpoint (small gray diamond) in the center of the bar at the bottom.

When you click a stop to activate it, diamond-shaped markers appear to either side of the stop, between it and the next stop. These midpoints can be adjusted to affect the application of the gradient. Shifting the midpoint to the left increases the influence of the right stop; shifting the midpoint to the right increases the influence of the left stop. Adjust the color markers while viewing the image to get the best results.

6. Position the Gradient Editor so you can see your image, and move the slider right and then left of center while watching what happens to the image. (You may have to release the slider to see the result). Moving the slider left should lighten the image, and moving it right should darken it.

This simple application remaps the tone of the image based on the position of the slider. You can create far more complex tonal adjustments by adding color and opacity stops to the preview bar.

On the Hidden Power CD, you'll find an image titled oceansun.psd (Figure 2.9), taken at sunrise. This example is selected specifically to show how dramatic a Gradient Map change can be. Because the image is a sunrise, the colors are limited to mostly warm colors (reds and yellows). The stops and adjustments noted in the following exercise will work only on this image. Applying the color with gradients is an art more than a science. Results of this sort are steeped in trial and error. I created the result here by placing and adjusting markers, knowing only approximately where they would fall: brighter colors in the lighter half of the tone. You will need to experiment a little when placing stops to adjust other images—even when attempting the same effect—because tone in each exposure will be different.



Figure 2.9

The colors in the original sunrise are dulled yellows, oranges, and grays, but the results can be made more dramatic by using a Gradient Map.



In the following exercise, you will use Gradient Maps for tone and color adjustment in separate steps. First you'll want to darken up the image a little so that the image will accept some more saturated colors (remembering that tone and color work together). Once you've darkened the image, you can apply color to get a dramatic color result. You'll need to make sure existing stops in the gradient are the correct color and add some stops. When you get to the color, you'll make light areas of the image yellow, and deepen that color toward red to imitate the effect sunrise lighting produces. Darker areas of the image will reflect blues from the water.

### Adjust the Contrast and Darken the Image

1. Create a Gradient Map adjustment layer by choosing Layer → New Adjustment Layer → Gradient Map. Click OK on the New Layer dialog box. This opens the Gradient Map dialog box.
2. Open the Gradient Editor by clicking the gradient bar in the Gradient Used For Grayscale Mapping preview section.

3. Double-click the 0 percent color stop (at the bottom left) to open the Color Picker dialog box, and change the color to black (R = 0, G = 0, B = 0). (In this example image, it should already default to black.) Click OK to close the Color Picker.
4. Add a color stop to the gradient by clicking below the gradient preview bar. Set the position of the stop to 40 percent by typing **40** in the Location field.
5. Double-click the new color stop to open the Color Picker dialog box. Change the color of the stop to H = 0, S = 0, B = 33 (33 percent bright). (HSB is an alternative color scheme representing hue, saturation, and brightness.) Making this change will darken the tones at the 40 percent position from 40 percent to 33 percent bright. Click OK to accept the changes and close the Color Picker.
6. Add another color stop to the gradient by clicking below the gradient preview bar. Set the position of the stop to 60 percent by typing **60** in the Location field.
7. Double-click the new color stop to open the Color Picker. Change the color of the stop to H = 0, S = 0, B = 55 to change the tone 5 percent darker at this point, from 60 percent to 55 percent. Click OK to accept the changes and close the Color Picker.
8. Double-click the 100 percent color stop (at the bottom right) to activate it and open the Color Picker.
9. Change the color of the stop if necessary to white R = 255, G = 255, B = 255 or H = 0, S = 0, B = 100 (your stop may already be set to these settings). Click OK to close the Color Picker. At this point the Gradient Editor should look something like Figure 2.10.
10. Click OK on the Gradient Editor to close it and accept the changes to the gradient.
11. Click OK on the Gradient Map dialog box to close it and accept the changes for the new layer.

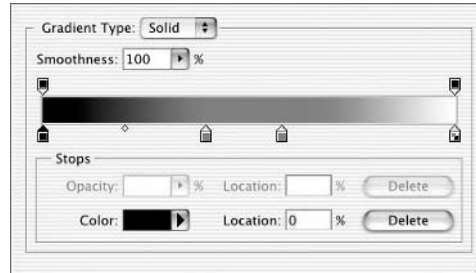


Figure 2.10  
The change in the gradient increases the influence of the darker tones.

At this point, the image should be notably darker, and it will change visibly from color to black-and-white. The result should resemble Figure 2.11. The selected settings will darken and convert any image to black-and-white, but they are used specifically in this image to change the tone. The goal here was specifically to darken the midtones. Toggle the visibility for the Gradient Map layer to see before and after.



Figure 2.11

The gradient mapping has adjusted the tones according to the stops placed in the gradient.



### Recolor the Altered Tone

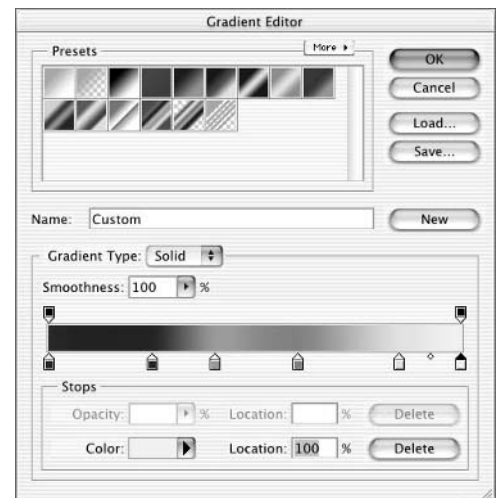
12. Create another Gradient Map adjustment layer (Layer → New Adjustment Layer → Gradient Map).
13. Click OK in the New Layer dialog box to open the Gradient Map dialog box.
14. Click OK in the Gradient Map dialog box to close it and create the new layer.
15. Change the layer opacity to 50 percent by using the Opacity slider on the Layers palette. This enables you to intentionally apply strong colors rather than muted ones to achieve your result. You can adjust the opacity again later to make the color stronger or weaker, as desired.
16. Change the layer mode to Color by using the Mode drop-down list. This will apply the color in the gradient rather than forcing adjustment of tone and color—which may be much harder to control.
17. Double-click the layer thumbnail for the active layer on the Layers palette. This opens the Gradient Map dialog box.
18. Open the Gradient Editor by clicking the gradient bar in the Gradient Used For Grayscale Mapping preview.
19. Double-click the 0 percent color stop (at bottom left) and change the color to dark gray (R = 40, G = 40, B = 40). Click OK to close the Color Picker. The color can be

changed in the Color Picker by typing the values into the RGB boxes after opening the picker by using any of the methods described earlier.

20. Add a color stop to the gradient by clicking below the gradient preview bar. Set the position of the stop to 25 percent by typing **25** in the Location field.
21. Double-click the stop and change its color to R = 25, G = 30, B = 90. This is a deep blue that will be used to keep a bluish tone in the water and in the darkest parts of the clouds. Click OK to close the Color Picker.
22. Add a color stop to the gradient by clicking below the gradient preview bar. Set the position of the stop to 40 percent by typing **40** in the Location field.
23. Double-click the stop and change its color to R = 145, G = 115, B = 120. This is a muted red that helps serve as a transition between blue and orange. Click OK to close the Color Picker.
24. Add a color stop to the gradient by clicking below the gradient preview bar. Set the position of the stop to 60 percent by typing **60** in the Location field.
25. Double-click the stop and change its color to R = 255, G = 90, B = 0. This color begins the more dramatic color highlighting by saturating the brighter portions of the image in orange. Click OK to close the Color Picker.
26. Add a color stop to the gradient by clicking below the gradient preview bar. Set the position of the stop to 85 percent by typing **85** in the Location field.
27. Double-click the stop and change its color to R = 250, G = 250, B = 20. Yellow will be used to add some spark to the somewhat drab highlights in the original. Click OK to close the Color Picker.
28. Double-click on the 100% (white) stop and change its color to R = 245, G = 245, B = 200. This is not quite white, and can stop the sun from looking too burned in and bright in the image. Click OK to close the Color Picker to activate it. At this point the Gradient Editor should look something like Figure 2.12.
29. Click OK on the Gradient Editor to accept the changes to the gradient.
30. Click OK on the Gradient Map dialog box to close it and accept the changes for the new layer.
31. Adjust the opacity for the Gradient Map 2 layer on the Layers palette to make the effect pleasing on-screen.

The result of the changes made in steps 12 through 31 can be seen in the color section. Your result should show a golden-orange

**Figure 2.12**  
Positioning of the stops should look like this after you have completed step 28.



sunrise, with quite a bit more color than the original. The changes you made here reflect the idea of making changes in separated components of the image: The first gradient map changes tone, affecting the luminosity of the image; the second gradient map targets the color. Although you haven't specifically made a luminosity and color separation, the function of the correction is the same as if you had.

One of the great advantages of using layered corrections is not only the ability to separate the components of the image that you are adjusting, but the ability to adjust after the fact. Setting color markers is obviously the most involved step in the process—and easily the most arbitrary. It will be useful to go back and experiment by adjusting the color and position of the gradient stops to see the effect each adjustment has on the image. You may want to use additional stops to create changes you may prefer and experiment with Gradient Map opacity. Leave this image open for now; you'll need it for the next procedure.

To add more control, you might want to experiment with separating control of the sky and sea. In the example, you can control the effects in the sky separately from the effects in the sea. A simple masking of image areas can enable you to adjust the colors in each with different gradients to improve the realism of the result. Because the horizon is flat, selecting one image area can be done quickly by using the Polygonal Lasso.

### Creating a Mask for Gradients

The selections outlined in this procedure are very much specific to this image. Your selections should be made on an image-to-image basis, according to the content you want to apply effects to. Begin this procedure by using the image from the previous procedure, with the contrast adjusted and tones altered. Then follow these steps:

1. Commit the grayscale changes by merging Gradient Map 1 with the Background layer.
2. Duplicate Gradient Map 2 and change the name of the duplicate layer to **Sky Gradient**.
3. Click and drag the lower-right corner of the image window to reveal the image matte, as shown in Figure 2.13. You may have to zoom out from the image if you are in close to make the image smaller before attempting to view the matte.

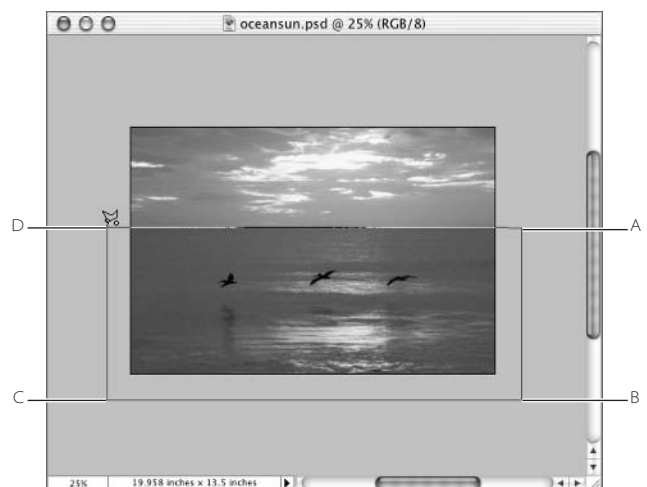
Figure 2.13  
Clicking and dragging the corner of the image window reveals the image matte.



4. Choose the Polygonal Lasso tool; then select the Anti-Aliased option and change the Feathering to 2 pixels on the options bar.
5. Click the Lasso tool to the left of and just outside the image, right at the horizon line on the image matte.
6. Move the cursor to the right of the image and click just outside the image on the image matte, right at the horizon line. This should make a selection line along the horizon.
7. Complete the selection by clicking three more times: outside the image at the bottom-right corner, at the bottom-left corner, and then back at the point of origin, as shown in Figure 2.14.
8. Change the foreground color to black.
9. Choose the Paint Bucket tool. Be sure the Sky Gradient layer is active, and click the Paint Bucket tool in the selected area on the image. The mask for the Gradient Map layer will fill with black in the selected area. This masks out (hides) the gradient effect on the sea for this layer; the layer effect applies only to the sky.
10. Select the inverse of the area that is currently selected (Select → Inverse).
11. Activate the Gradient Map 2 layer by clicking it. Change the name of the layer to **Sea Gradient**.
12. Fill the sky area of the mask by using the Paint Bucket tool. The fill will hide the gradient effect of this layer over the sky.

This will effectively mask the sky separately from the sea by using the same gradient map with two complementary masks, allowing a 2-pixel blend where the edges of the mask meet. After the masking has been completed, making adjustments to either of the gradient maps will affect the sky and sea separately. In the image used for this example, the masking provides an opportunity to use completely different gradient maps for the sky and sea, if desired. Changes can also be subtle, like removing any residual blue from the clouds in the sky without affecting the color of the sea. Try removing the dark blue stop (at the 25 percent location) from the Sky Gradient gradient map and raise the opacity of the layer to 65 percent. As the clouds would tend to be a warmer color (red to yellow), rather than a sea blue, this change will enhance the color of the clouds and intensify it.

Figure 2.14  
Click points A, B, C, and D to complete the selection.



By using masking and multiple gradient layers to apply gradients, and by working with layer modes and opacity, you can achieve complex results. Of course, this example is only the tip of the iceberg when it comes to applying color to tone. Combined with a variety of other tools you will use for enhancing and replacing color (which we will explore in later chapters), your ability to control the result is limitless.

A few points should be clear: The foundation for color application is tone. You must be able to control tone as a basis for image color. Targeting areas of change—with separation, layer properties, or masking—can help you confine your correction to specific areas or components of your images so you can achieve better results.

# Chapter 3

## Correcting Image Tone

Manipulating tone with confidence makes all the difference in getting the results you want in black-and-white and color. Adjusting tone starts with evaluating the image to define what you want to do, and moves through steps to make changes based on that evaluation. Two points to keep in mind:

- For every action, there is a reaction.
- You might have to break it to fix it.

The first point is an adaptation of one of Newton's laws of physics. Every general adjustment you make will affect what you are adjusting as well as other tones. The second is based on my experience with "fixing" appliances by disabling broken functions. In images, a fix doesn't always make everything in an image better, but it should improve the appearance of the image. Sometimes you must do something destructive to an image to enable a repair.

### Doing Minor Cleanup First

### Evaluating Image Tones

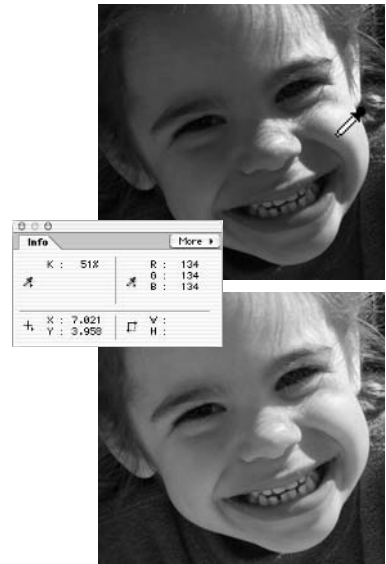
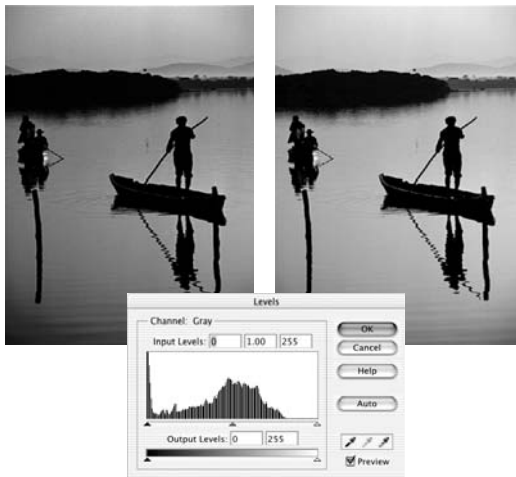
### Redistributing Tone with Levels

### Snapping and Fading Contrast with Curves

### (Un)Sharpening and Boosting Contrast

### Managing Image Noise

### Masking with Image Tone



## Doing Minor Cleanup First

Before adjusting an image, it is often good to do a quick once-over to evaluate image problems. This quick evaluation can involve first cropping the image and then removing, or touching up, other damage. Care in touch-up at this point permanently removes unwanted elements so they will not be present later no matter how you use the content of the image.

Two simple, direct methods of taking care of minor damage are cloning and duplicating image areas. With *cloning*, you sample information from one part of an image and then apply that information to another part of the image that might be damaged or missing. Cloning covers up the problem with other, problem-free image information. It can solve any type of minor damage, including dings, dirt, digital noise, and tears, as long as you have something to clone from that is a close match to the spot you are fixing. You can also use simple *duplication* to select an area of an image and copy it to another area to correct damage. Careful cloning or duplication can enable you to patch an image seamlessly without creating noticeable patterns or replacing damage with image flaws.

Image areas with tone and color complexities (such as skin tones) require careful selection of replacement areas in order to make unnoticeable repairs. Substitutions can come from within the same image or from another image with similar qualities. All cloning and duplication corrections follow the same basic steps:

1. Define the damaged area.
2. Locate a suitable replacement.
3. Obtain a sample of the replacement.
4. Apply the replacement to the damaged area.

### DO SOME DAMAGE CONTROL BY PLANNING AHEAD

You can avoid a lot of trouble with your digital images before you create them. Don't get into the habit of just thinking, "I'll clean it up later digitally!" A quick wipe with a clean, lint-free cloth can clear troublesome debris from an image you are scanning, or from the scanner glass, just as you might wipe crumbs from a chair before you sit down. The same idea applies to taking images with a digital camera; be sure your lens is clean before you point it at anything, wipe off dusty or dirty objects that will be in your images, and be sure you take the time to focus so your subject is as crisp and clear as possible. Taking these steps can save a lot of detail work later.

Obviously you can't expect anything to be pristine. Dust and finger smudges can appear at any point where the image makes a physical rather than electronic transfer (on the subject, on your lens, on the scanner glass, on the surface of a print or negative, and so forth). But once you've taken the image or scanned it, any minor nagging defects that worked their way into your image will remain until you remove them.

The more time you spend preparing to create an image, the cleaner the image will be and the fewer problems you will have to correct, which saves lots of time at the computer.

Images can be cropped to remove damage, but also to improve composition. Composition is discussed along with the tools in Chapter 7.

## Correcting By Using the Clone Stamp Tool

The Clone Stamp tool samples from a spot that you define in the image and copies image information in the shape of the brush you've chosen for the tool. This will help you take care of dust, flecked dirt, scratches, and many other minor image problems.

To select the area you will be cloning from, hold down the Option/Alt key with the cursor directly over what you will be cloning, and then click the mouse to set the area for the sample. The sample can be taken from the same image or another image, or from a different layer in the same image. Release the Option/Alt key and place the cursor over the target (the damaged area to be repaired). When you click the mouse again, the sample area will be applied to the target area. The distance and angle between the sample and brush will lock in with that relationship until you change the sample. To change the sample angle and distance, hold down the Option/Alt key and create a new sample. Both the clone-from and clone-to areas show on the image while you hold down the mouse button to apply the tool. This way, you can monitor accurately what area will be copied as well as the result. See Figure 3.1.

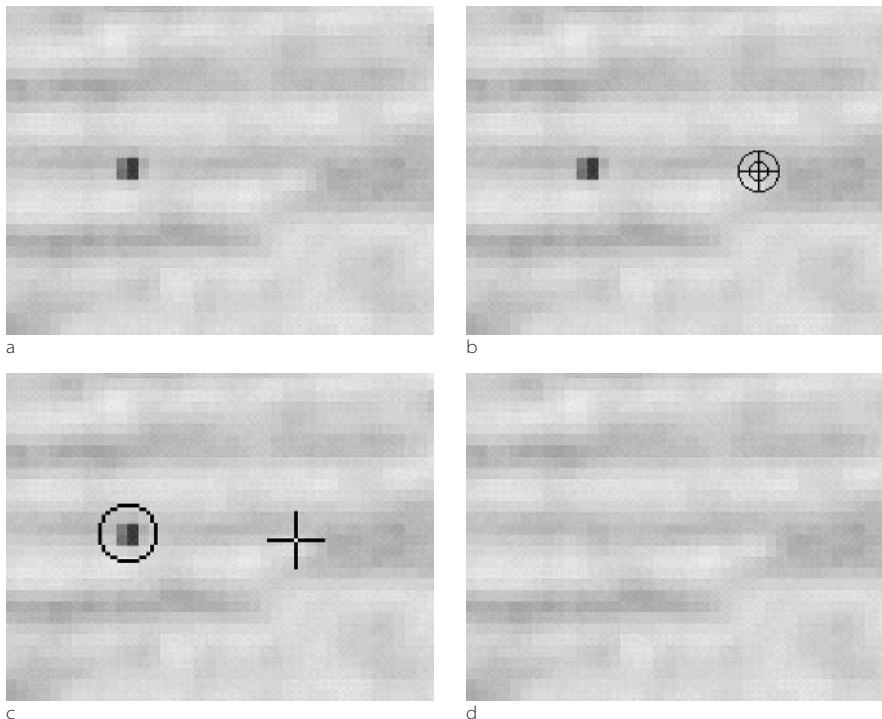


Figure 3.1

Identify a damaged area (a), sample the replacement (b), and apply it (c) to achieve a repaired image (d).









A practice image called `wavedirt.psd` is supplied on the CD. It is a scan of just the corner of an image that was apparently taken with a dirty lens. The changes you have to make may look simple, but correcting while paying close attention to the patterning and shading can prove to be tricky. The entire process of correction is as follows:

1. Choose the Clone Stamp tool (S).
2. Change the image view to 200 percent–300 percent. This size ensures that you are viewing all of the pixel information on-screen to make accurate applications.

The screen view percentage refers to the percentage of information in the image that you are viewing, not the print size or some other physical delineation. At 100 percent, each pixel is displayed on-screen.

3. Choose a brush. Brush size for dust correction should be somewhat larger than the width of the damage. In most cases, use a slightly soft brush (85 percent–95 percent hardness) so that corrections feather slightly into the surroundings as they are applied.
4. Choose a clone-from area, using the Option/Alt key to define your sample. The area you clone from should be clear of damage and dust, or you will copy that damage to the spot you are trying to fix.
5. Apply the Clone Stamp tool to the spot you would like to repair by releasing the Option/Alt key, positioning the cursor over the damage, and clicking the mouse. This sets the cloning angle and distance and applies the correction. Holding down the mouse button and dragging will apply the cloning over the area you drag across, maintaining the angle and distance between the sample and application points.

Your setting for Painting Cursors on the Display & Cursors preferences (Edit → Preferences → Display & Cursors) will determine the way the Clone Stamp tool appears on your screen. Standard shows the tool icon  during application, Precise shows a crosshair , and Brush Size shows the shape of the brush being applied . All three tool display options use the sample icon  when you hold down the Option/Alt key to sample the image.

For the best results, hold down the mouse button only as long as you have to; click over the damage and release. Click new sample points as often as necessary, but try to do so frequently. Changing the angle between the sample and application point can help reduce the possibility of creating undesirable patterns and obvious duplication of image areas.

For most corrections, choose the following options for the Clone Stamp tool:

- Aligned cloning (clones from sample point to application point by using a set distance and angle)
- Use All Layers
- A soft brush (85 percent–95 percent hard)

- Brush spacing set to 1 percent
- Normal mode
- 100 percent opacity

Brush options can be set only when using the Brush tool. To get the brush you want, choose the Brush tool, set the options (by clicking More Options on the Options bar), and then save the brush by clicking the brush preview and choosing New Brush from the pop-up menu. After the brush is saved, you can use it with other tools.

You will most often use the Clone Stamp tool in Normal mode, but in some instances other modes can serve a purpose. For example, to correct black specks, use Lighten mode and stamp from a slightly darker portion of the image. This will lighten the specks without darkening lighter areas. If you are stamping with the tool in Lighten mode to lighten dark spots in a light image area, clone from an area a little darker than the area you are cloning to. If you are trying to fix light specks, clone from an area a little lighter than the area you are cloning to using Darken mode. The corrections will tend to affect only the specks while keeping the general tone of the area unchanged.

Making corrections can be easier if you apply them to another layer. To use another layer to hold corrections, create a new layer above the one where you want to apply the correction, and then make your sample and apply it to the new layer. You can view before and after by toggling on and off the view for the layer. Making corrections on a separate layer also enables you to make other adjustments (such as applying filters or changing layer modes) while preserving your original image.


If your brush has a soft edge, the actual effects of the brush application extend outside the brush size shown on-screen.

## Correcting By Duplication (Patching)

It is sometimes advantageous to make corrections by copying and pasting larger areas of an image rather than painstakingly removing each speck of dust one at a time with the Clone Stamp tool.

Preselecting to define the shape and size of a large area of damage that you want to correct will enable you to find the best available replacement area and make quick work of repairs. The order of your approach and some basic techniques will remain the same when compared to cloning:


1. Identify the problem area in the image and the intended replacement.


2. Click on a selection tool. The Lasso tool is often a good choice because it will make irregular selections, and irregular patches tend to blend in less noticeably. Set the tool to feather the selection; this will soften the edge of the sample. Usually you have to feather only a few pixels (2–5), depending on the resolution of the image and the detail in the content of the patch.
3. Make a selection with the selection tool around the general area of the image you want to replace. Making this selection will ensure that you get a patch that is sized to cover the damage—like a template. Make the selection a bit larger than the damage so you can have some leeway in blending pasted areas.
4. Move the selection tool over the selection created in step 3, and the icon will change to the selection move icon . Click and drag the selection over to the area of the image to be used as a replacement. Choosing exactly where to place the selection can require rotating, flipping, or carefully sizing the selection. You may want to note any changes you make so you can reverse them after you paste the replacement. The options bar will show these changes.
5. Copy the selected area.
6. Paste. This creates a new layer containing the image area you are using as a patch. Because the patch is on its own layer, you can size and position it (by reversing the changes made in step 4), or use the Eraser tool and a slightly soft brush to blend the patch with the area being covered. Layer modes can also be employed (for example, Lighten and Darken).
7. Repeat steps 1 through 6 as needed to create more patches and repair the image.

If time permits and you have more than one option for making the correction, you might want to try several different solutions for the same problem area—especially if the area that you are patching is large or important to the image. Make the first patch and then turn off the visibility for its layer. After making the next patch, you can compare the two by turning the layer views on or off. Don't be afraid to mix patches, using more than one, if that works.

It is often best to work on an image area in stages, first removing smaller problems and then working up to larger ones. By first removing minor problems, you can then use those corrected areas to repair larger areas without duplicating old damage and problems.

## Using Healing Tools

Photoshop Elements 3 adds one of the functions from Photoshop most requested by Elements users: the Healing Brush tool . Adobe didn't stop with the Healing Brush; they

added the Spot Healing Brush tool  as well. These are “smarter” cloning tools that help users make changes by “intelligent” substitution between the sample and target areas. The key difference between the tools is that the Healing Brush enables the user to choose the sample area, and the Spot Healing Brush decides for the user where the sample will come from. Especially with smaller corrections, these tools can help you swiftly correct damage without a lot of fuss in matching tone and pattern.

While it is true these healing tools can help users make corrections, overreliance on them can damage images and create undesirable results. Don't always reach for the Healing Brush tool before the Clone Stamp or before considering manual patching—it isn't magic.

## The Healing Brush

The Healing Brush is a very close relative of the Clone Stamp tool. You have to define a sample area to clone from and then apply the tool to make the repair. The better your selection of the clone-from area, the better your result will be. The real difference between the Clone Stamp and Healing Brush is that when you release the mouse button, the healing function takes over after you release the mouse to compare the sample with the target, saving you many steps of blending, comparison, and blurring that achieve the final result.

The Healing Brush is great for some types of damage (such as dust) and for minor repairs (such as removing wrinkles from a forehead). Use this tool on isolated damage: areas of the image that are not too close to extreme changes in image tone or color. Using the tool too close to areas of transition in contrast and color can lead to unexpected blending: the color or tone from surrounding objects can bleed into the clone patch. In other words, you should use the tool on a stray eyelash on a cheek rather than a hair at the hairline.

To avoid any problems using the Healing Brush tool, use the following guidelines:

- Use a hard brush; the tool takes care of blending sample edges.
- Use a single application of the tool to cover the damage with a little to spare (use a brush that is 1.5 to 2 times the width of the damage).
- Avoid application of the tool near edges that contrast in tone or color.
- Be sure the source can replace the tone/texture of the target area—color isn't primarily important.

The application of the tool is almost identical to the Clone Stamp tool. Just choose a brush size, choose the clone-from (or sample) area, and apply the tool to cover the damage. Application of the tool can be made to a separate blank layer by creating the new layer and choosing Use All Layers in the Options bar. You will almost always use this tool in Normal mode with the Sampled option selected instead of the Pattern option. Pattern will

be used in repairs only if you have created a source to use for repair, or if you are doing more creative enhancement.

### The Spot Healing Brush

The Spot Healing Brush, a variation on the Healing Brush, attempts to make it easier to make spot corrections quickly. The tool decides for the user where the sample will be taken from (with the Proximity Match option selected for Type) or synthesizes the sample (with the Create Texture option selected for Type), automatically replacing the area of the image that you select by using the brush. It is meant to be used for spot correction—ergo the name—meaning that you should consider it for tasks such as picking dust out of scans rather than making larger damage corrections.

Because the Create Texture option synthesizes replacement information by some form of averaging, you will most likely get better results by using the Proximity Match option. However, unless the sample selection doesn't matter, even the Proximity Match option is somewhat suspect because the randomized behavior of the tool makes the result impossible to predict. Unless you are using the tool in an area of flat color and tone (a sky) or where patterns will blend in (grass), the Healing Brush, Clone Stamp, and manual patching techniques discussed earlier will almost always produce a better result than using Spot Healing.

## Evaluating Image Tones

Evaluating the tone, color (in its component tone), or other qualities of an image can help you make better corrections. At times you'll need to make precise measurements of image information, and at others you'll have to evaluate the general appearance of the image. The Eyedropper tool (used in conjunction with the Info palette) and the Histogram feature can provide just about all the image information you'll need to make adjustments.

### Using the Eyedropper for Evaluation

The Eyedropper, located in the toolbox, makes it easy to gather information about individual pixels or small pixel groupings. Simply click the Eyedropper tool and put the cursor over the image area you want to measure, and the Eyedropper will sample the composite of the visible layers and display the information in the Info palette (Figure 3.2). Such measurements can be helpful in evaluating an image periodically throughout the correction process. For example, comparing grayscale values for sample and target areas before cloning or duplicating can give you a good idea whether those areas are a good match before you make the clone or patch.

From the drop-down list on the Options bar, you can select a sample size: Point Sample (samples the pixel at the tip of the tool icon), 3 By 3 Average, and 5 By 5 Average. These options are also available by pointing the Eyedropper at an image and clicking the

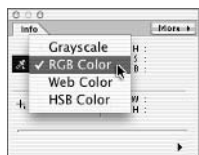


Figure 3.2

**The Palette Options pop-up menu on the Info palette enables you to choose color references: Grayscale (luminosity), RGB, Web Color, and HSB.**

right mouse button (PC), or holding down the Control key and left-clicking (Mac). The Average options look at a square of pixels (with the tip of the tool icon as the center pixel) and then average those to determine the result. If tone is noisy—for example, in skin tones—it is better to use a broader sample size to get a better average reading of the tones you are measuring. If you use a sample size that is too small when measuring a noisy area, it might make for confusing samples: values between one pixel and the next might change too rapidly to make sense or provide anything meaningful in the way of a reading.

To make a sample measurement:

1. Select the Eyedropper tool (I).
2. Choose the sample size from the drop-down list on the options bar.
3. Bring the Info palette to the front by selecting it from the Window menu or by clicking the tab in the palette well.
4. Spot-check with the Eyedropper by passing the cursor over various areas of the image while noting the values in the Info palette.

## Evaluating Images with Histograms

The Histogram feature (Window → Histogram) displays a graph of image information. The height of each column in the graph represents the number of pixels with a particular luminance throughout the entire tonal range of the image. If a specific channel is selected in the Channels drop list, the graph displays only information for that channel. A histogram is also available in the Levels dialog box (Enhance → Adjust Lighting → Levels). A histogram can help describe the tonality and integrity of an image, pointing out both image qualities and abnormalities that may need to be corrected.

For example, a histogram graph can tell you whether an image is naturally bright (high-key) or dark (low-key), whether the contrast is neutral or high. If the qualities are desirable, histograms can help you maintain those qualities by reevaluating the image later in the correction process. Although image qualities such as high- or low-key may be apparent to the naked eye, histograms also help you determine whether an image has been damaged in processing or whether it shows some other limitation, such as not taking full advantage of tonal range.

Aberrations in the image information can present themselves as uncharacteristic shifts, lack of balance, or gaps in the graph. A histogram that contains many peaks and valleys, gaps in information, and/or *clipping* (spikes in information that run off the chart) may represent some form of image damage, limitation, or loss of image information. If the damage appears extreme, the image might need correction or be essentially beyond repair: The graph can show insufficient tonal range for manipulation, correction, and use.

Evaluating a histogram is as easy as looking at it. Characteristics become obvious in a quick visual evaluation of the graph. The following examples show a basic blueprint for

specific image types, such as high-key, low-key, high contrast, low contrast, and images with damaged information.

You can evaluate a section of an image by selecting it with the selection tools and then looking at the histogram. The histogram charts results for only the active or selected portion of an image.

A histogram that is weighted toward the black or dark end of the graph—and that does not show gaps in tonality at the light end of the graph—represents a low-key (dark) image. These are often images taken in low light, such as around a campfire or birthday cake. Figure 3.3 shows an example of a low-key image and the histogram that represents it.

A histogram that is skewed to the light (right) end of the graph represents a high-key (light) image, such as the one in Figure 3.4. Beach shots with lots of light sand or snowy winter scenes are good examples of high-key images.

A histogram that peaks in the dark and light areas while having lower pixel density in the middle of the graph (like the one in Figure 3.5) represents a high-contrast image. Harsh lighting in direct sunlight can create a chasm between lights and darks, which is a typical example of high contrast—although not necessarily a desirable one. A silhouette, in which a figure is shown lit from behind, is another example.

Figure 3.3  
A low-key image

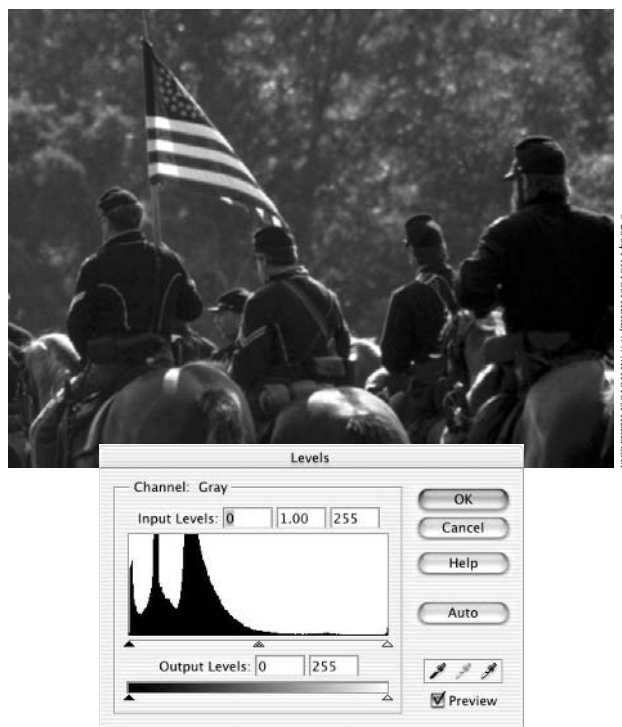


Figure 3.4  
A high-key image

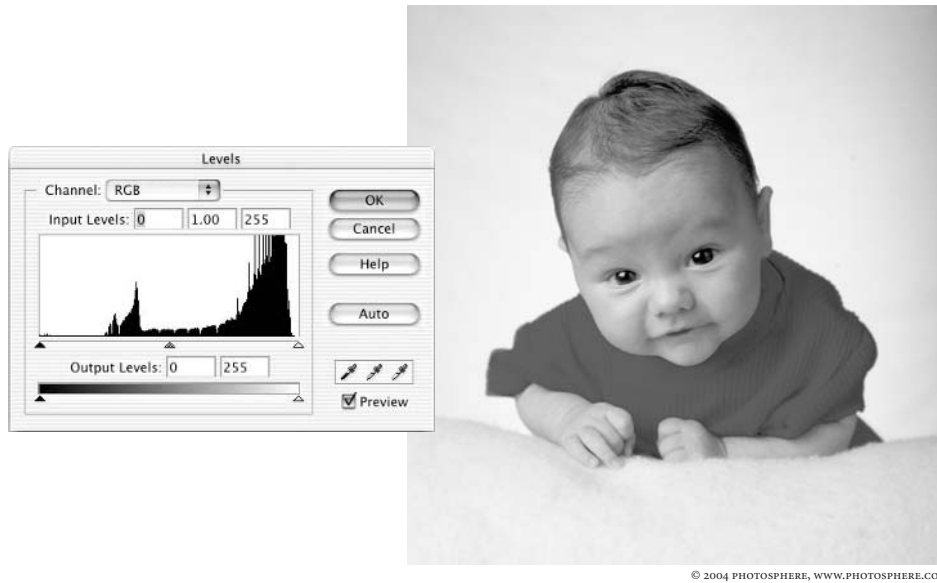
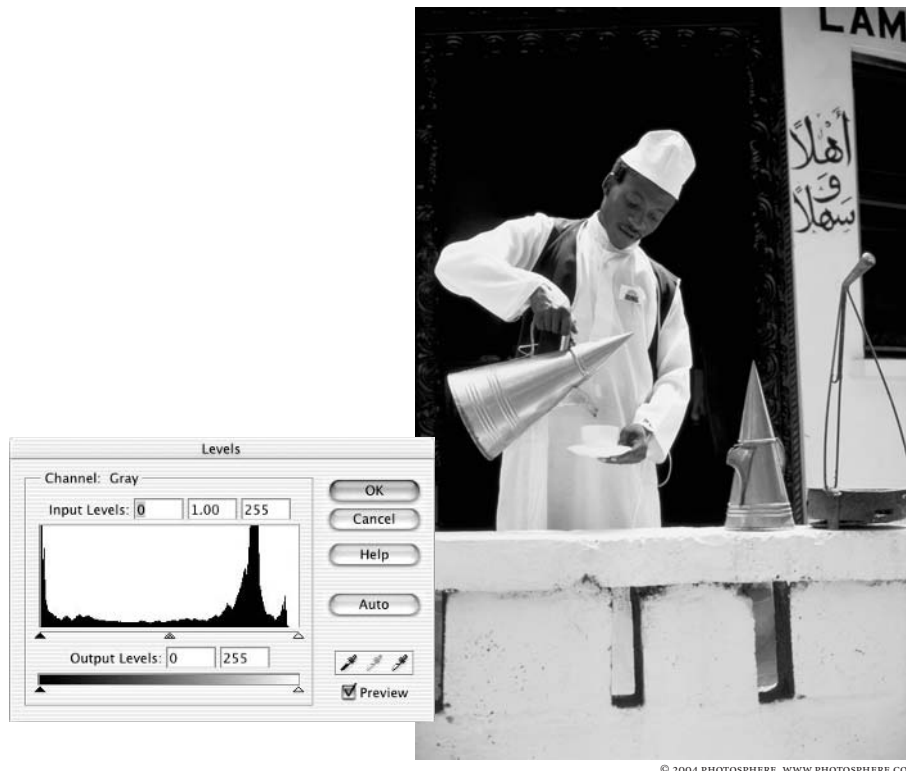


Figure 3.5  
A high-contrast image





A histogram that shows a peak in the center (Figure 3.6) is low contrast and medium-key. These images are dominated by midtones. Images shot on an overcast day can often have a low-contrast appearance.

An image with a mix of global and local contrast displays as a flattened graph in a histogram with few peaks and valleys; see Figure 3.7 for an example. Images with full tonal range can have quite a bit of local contrast as opposed to high total contrast.

The histograms in Figure 3.8 represent an image that has been altered by limiting the number of tones it contains (for example, by using the Indexed Color mode). Gaps between tones and a spikey appearance on the histogram suggest that the image has limitations. These types of gaps can be symptomatic of other damage, such as poor scanning.

Figure 3.6  
A low-contrast,  
medium-key image

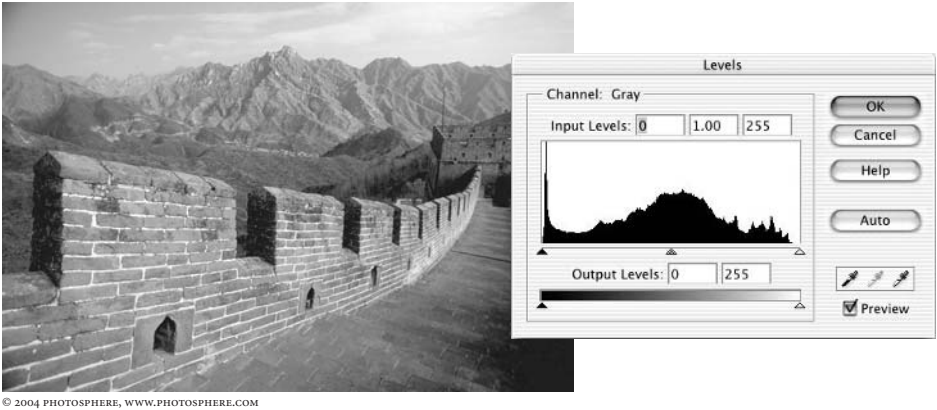
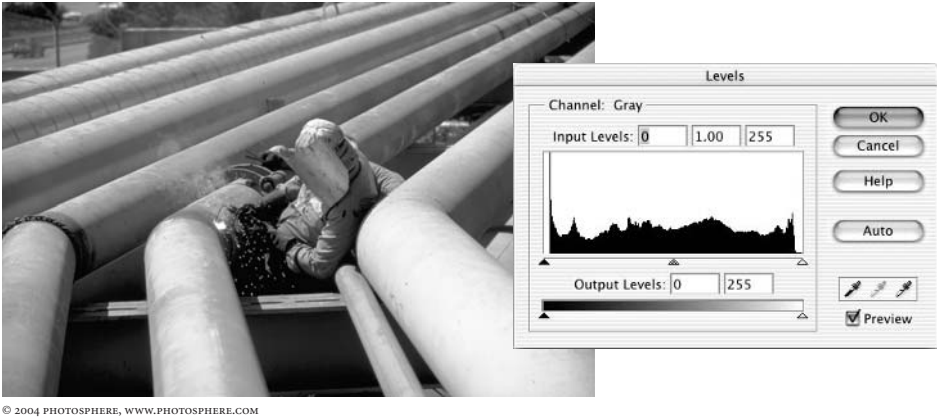


Figure 3.7  
A full toned image



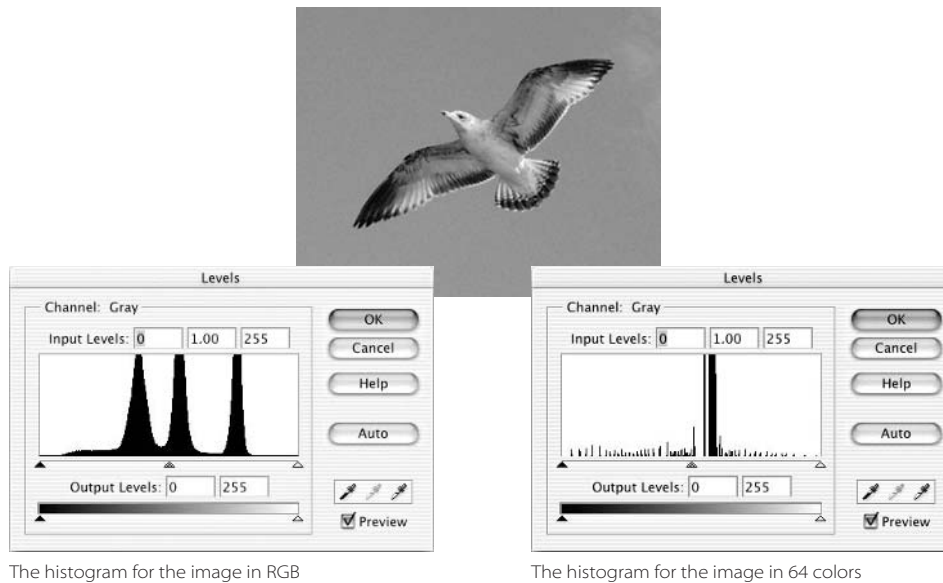


Figure 3.8  
These histograms represent the original tone and a conversion to 64 grays.

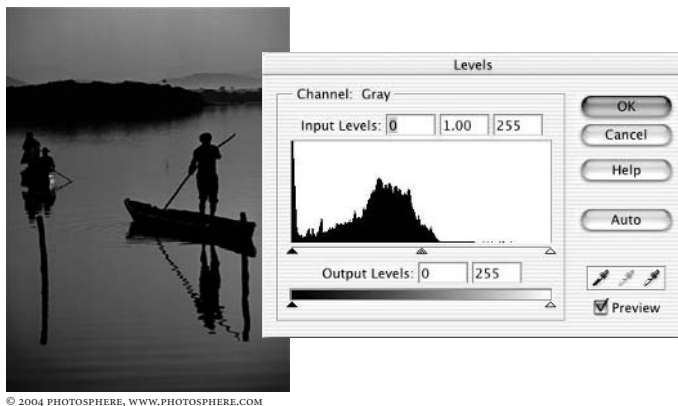
Histogram graphs should have some information for every level from the right to the left of the graphing, or else the tonality is not covering the potential dynamic range. Abnormalities might not always represent problems, but they are certainly good indications of unusual conditions and potential problems. If the histogram shows a gap, it suggests that image information is missing or damaged. Intermittent gaps (like those in the histogram created by reducing colors in Figure 3.9) can suggest a cause or origin of the image damage. Anomalies can result from capture problems, such as bad scanning (faulty techniques or equipment), incorrect image exposure, filter use, or unusual lighting conditions. Anomalies can also be the result of image processing: mode conversions, color management issues, corrections, poorly applied filters, and so forth. While it is possible for gaps in tone to be a natural state for the image, it is unlikely.

The most common tendencies in image histograms that help identify an image that can be improved are shortened tonal ranges and clipping.

*Shortened tonal range* is represented by a histogram that does not have information across the entire range of the graph, with a gap at either the light or dark end of the graph or both. A shortened tonal range indicates that the image is not taking full advantage of the shades of gray available (0 percent to 100 percent black) in individual color components or brightness (depending, again, on the information being displayed—which is based on channel selection).

Figure 3.9

Potential problems with this image are revealed through its histogram.



The image in Figure 3.9 is a good example of shortened tonal range. The image shows some potential for stronger contrast. The histogram displays a shortened tonal range, confirming the visual inspection. The tonality of the image could be adjusted to make the image more dynamic.

*Clipping* occurs when image detail gets combined. For example, this can happen when an image is overexposed and a range of highlight detail gets recorded in an image as pure white, or when an image is underexposed and a range of shadow details are recorded as pure black. Wedding images, for instance—in which the groom is in black and the bride in white—can easily be prone to over- or underexposure problems and a resulting loss of detail in either shadows or highlights. Some of the extreme highlights or shadow details may be lost, and this is reflected in the histogram by a spike at the extreme right or left of the graph. Clipping may be caused by any number of processes that occur in obtaining, opening, or resaving an image.

The key to using histograms is: when the histogram confirms image damage, it may point toward a course of correction. In the case of clipping, the histogram may suggest that you have to retake or rescan an image to capture the detail that was clipped.

You should never look at only the histogram, shout “Aha!” and make an image correction regardless of how the image appears on-screen. Be sure to visually assess the image as well, and use the two assessments in tandem. The visual assessment should override the digital one, especially if you get good results in tests and can trust the view of your monitor.

Even if you evaluate an image and feel you need to make corrections, that doesn’t tell you where to begin or how to make the corrections. The next task is to define what you want to do and how to accomplish your ends.

Although drastically altering tonal range is sometimes a mistake, shifting the range—even radically—can work to the benefit of the image by improving contrast and dynamic

range. While correction may temporarily skew an image's key and/or contrast, several corrections can be made in succession to achieve the desired result, or corrections can be blended between the original and corrected versions. In the following sections you'll look at making specific corrections to images by using Levels and Curves, and you'll evaluate how each of these tools affects tonal correction.

## Redistributing Tone with Levels

Tonal correction will often give black-and-white images broader tonal range and stronger overall contrast. After you correct minor flaws and evaluate the image both visually and with histograms, the next step in correction will often be to open the Levels dialog box to make a general tonal correction. Proper use of levels can quickly fix tonal range and the general brightness and contrast of an image. First we'll look at the steps and then how these steps might apply to a particular image:

1. Open a black-and-white image for corrections.
2. Complete dust corrections, cropping, and minor alterations.
3. Create an adjustment layer for adjusting levels (Layer → New Adjustment Layer → Levels).
4. Inspect the image both visually (on the monitor) and by using the histogram, noting the image qualities (the image key, contrast, and potential damage). If you have no concerns about the histogram and image damage, skip to step 6.
5. If the histogram seems out of character with the image or shows hints of damage, consider rescanning, replacing the image, or weeding out the source of the trouble.
6. Correct shortened tonal range by adjusting the Levels sliders.
7. Adjust the midtone slider on the Levels graph to manipulate the overall brightness of the image.

Of these steps, all but steps 6 and 7 have been covered previously. To understand the effects such changes have on an image, it will be best to look at an example. Look back at the image and histogram in Figure 3.10. The image was originally in color, and the warm tones in the color made the low-key appearance interesting. However, once converted to black-and-white, the image became dark and murky. This is confirmed by the histogram, which shows a decided skew toward the dark end of the graph and a gap between mid-tones and highlights.

Moving the Levels sliders to the left lightens the image; moving them to the right darkens the image. Where exactly to place each slider is a matter of what you want to accomplish. Changes can be conservative or quite radical. To correct a shortened tonal range, move the end slider on the outer side of the gap in toward the graph, and position it until the graph information becomes solid (see Figure 3.10). Open the `silhouette.psd` image on the CD and try this to see how it works on this image.



When you commit your changes by clicking OK, Photoshop Elements redistributes the tones over the total available range (0 to 255 levels of gray). Redistribution of the tonal information in an image from a thinner to a broader range will necessarily create some gaps in the presentation of the image information (see Figure 3.11).

This Levels change is one you can make strictly by looking at the appearance of the histogram and adjusting accordingly. The purpose is to take full advantage of the tonal range. The change will intensify overall contrast and broaden the dynamic range of the image. It may, however, affect the apparent key or contrast of the image.

One possible means of smoothing inconsistent tonality caused by redistribution is to apply a slight (less than 1-pixel radius) Blur or Sharpen filter to the image. This will, however, change fine detail and distort edges depending on the severity of the application of either filter. In most cases you will want to leave well enough alone and not blur the picture just to enhance the histogram graph.

Figure 3.10

The Levels sliders let you quickly redefine the white and black points in an image and redistribute tone.

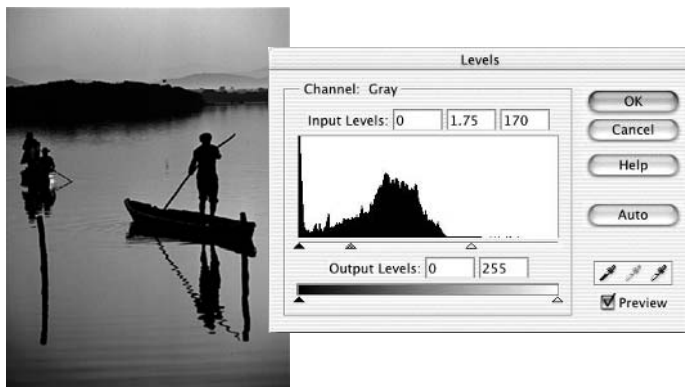
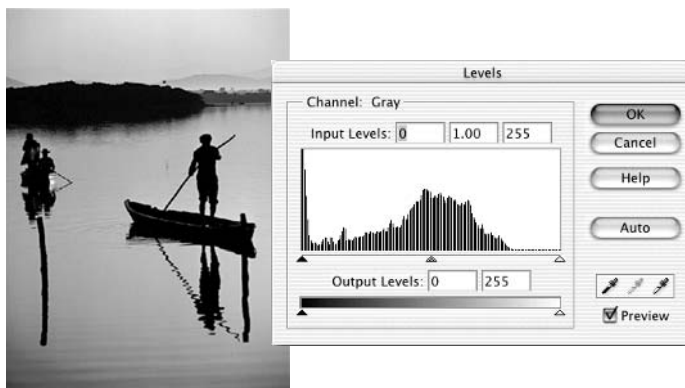


Figure 3.11

Gaps can suggest that image information is adjusted, but can also signify damage (or just that you have the Use Cache For Histograms preference selected in the Image Cache preferences).



It may be possible and desirable to go even further with this Levels correction. When a histogram presents a *tail* toward the shadows or highlights, it can often be clipped in part or whole. Tails on the histogram often represent scattered highlight or shadow information—generally attributable to image noise rather than image detail. Snipping the information turns it to absolute white for a highlight, or absolute black for a shadow. Generally, you will want to cut an entire tail when the graph represents scattered pixels; however, it is sometimes desirable to eliminate none, some, or all of a solid tail, depending on the image and the length of the tail.

As a general rule, the longer the tail, the less (proportionally) you should cut off. For example, whereas you may completely remove a tail that covers 15 levels, you might trim half or less of a tail that covers 50 levels, or 33 percent of one that covers 100 levels. Cutting proportionally in this way will help retain image integrity and character.

Don't feel that you have to crop a tail in an image just because it is there. If the results seem too drastic after cutting a tail, then they are. Put simply: do crop a tail that improves the image; don't crop a tail that compromises the image.

After adjusting tonal range, images can be adjusted for overall brightness as well by using Levels. A black-and-white image that appears too dark or light can be corrected by using the middle slider in the Levels dialog box. Moving the slider to the left lightens midtones, whereas moving it to the right darkens them. This may seem slightly counterintuitive, because you might think that moving the midtone slider toward the light range would lighten the image, and moving it toward the dark would darken it. However, the results actually make a lot of sense. The idea is that you are moving the median of the graph representation, and not the tone of the image. In moving the median of the graph, more levels of tone fall within the lighter or darker half of the tonal range, brightening or darkening the image.

Be careful not to abuse this tool—there are other, and perhaps better, ways of controlling the midtones (such as using Curves, as described in the next section). As a guide, try not to move the midtone slider more than 25 levels in any direction when making corrections. This keeps the redistribution small and more forgiving. You can always come back and lighten or darken an image later.

Although Levels adjustments can be made automatically, automated tools will not make your best corrections. Automated tools may get it right sometimes, but for many images personal judgment should prevail. Auto-corrections have no means to determine what “looks good.”

## Snapping and Fading Contrast with Curves

The Curves tool is the ideal tool to help fine-tune and reshape the tonal distribution of an image. Whereas Levels has only three slider points to change, Curves can have many, and those additional points allow you more control and the ability to control different tonal levels separately. Curves is both a more versatile correction tool and a more dangerous one than Levels because of its power. However, using Curves can help remove steps in corrections because you can make numerous corrections to various parts of image tone in one application.



Because the Curves tool is powerful, applying it requires a little savvy. It also requires installing the Hidden Power tools, because normally you can't get to Curves by using the Photoshop Elements interface. If you haven't installed the tools yet, do it now. After installing, apply Curves by using the following steps:

1. Open an image and determine through inspection and measurement what needs to be altered.
2. Click the uppermost layer on the image to highlight it. It is fine if this layer is the background.
3. Open the Styles and Effects palette.
4. Choose Effects from the drop-down list at the left, and then PowerTools1 from the drop-down list to the right.
5. Double-click Curves. This opens the New Layer dialog box.
6. Click OK. This opens the Curves dialog box and creates a new Curves adjustment layer in the Layers palette. See Figure 3.12.

If the gradient at the bottom of the graph runs from white on the left to black on the right, rather than black to white as shown in Figure 3.12, click the arrows in the center of the gradient. This will switch the mode from a percentage readout to levels of gray.

7. Set points on the curve to redistribute image information. (See the following sections, "Using the Curves Interface" and "Manipulating Curves," for more information.)
8. Click OK to accept changes and close the dialog box.

Steps 3 through 8 create a Curves layer for the image. You will be able to manipulate the curve until you accept the changes in step 8, at which point the curve will become uneditable. To make further changes, you can either add another Curves layer or delete the layer and replace it. Shutting off the view for the layer temporarily shuts off the curve and allows comparison of before and after.

Before learning how to make Curves corrections, you need to look briefly at the interface and how to manipulate the curve.

## Using the Curves Interface

Open a Curves dialog box by following steps 3 to 6 in the previous exercise with any image open. When opened, the Curves dialog box looks like a simple line graph. In essence it is, but the graph accepts your input so that you can make changes to the image. The line represents tonal response. On the initial screen there will be two points, one at black and one at white. When you alter the line (which you'll do in a moment), you alter the tonal response of the image.

If you move your cursor over the graph, you'll note that the Input and Output numbers below the graph change according to the position of the cursor. These numbers represent the vertical (Output) and horizontal (Input) positions on the graph. When you roll the cursor above the line, the Input number will be lower than the Output; if you roll the cursor below the line, the Input number will be higher than the Output. As you roll the cursor on the line, Input will equal Output.

The Curves graph can be in two modes, percentage and levels of gray. Percentage measures the percentage of black (0–100 percent), and levels of gray measures the number of levels of brightness (0–255). The percentage graph runs from light to dark: a higher percentage means more black. The levels graph runs from dark to light: more levels means brighter tone. You can switch between grayscale in levels and grayscale in percentages by clicking the arrow button in the center of the gradient bar below the graph. Photoshop Elements will remember this setting for the next time you use the Curves dialog.

Change to levels display and move the cursor around the graph until you are at an Input/Output reading of 128,128. This is the center of the graph. Clicking the mouse at that point will place a new point on the line, and will change the Input/Output readings to fields that represent the position of the current point. If you click on the same point and drag (holding the mouse button down), you can move the point. As you move the point, the curve moves with it. As you move the curve, the tonality of the image shifts according to the change in position of the curve. When viewing the dialog box in levels mode, the image will get lighter as you shift the arc of the curve upward and darker as you shift the arc of the curve down (see Figure 3.13). When viewing percentages, the relationship is reversed.

You can manipulate the position of points by typing numbers into the Input and Output fields. If you highlight the Input and type 63, and then press Tab and type 63, the response of the curve will flatten, and the point will move to the 75 percent black hash.

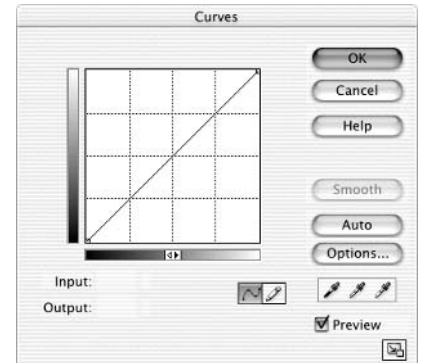


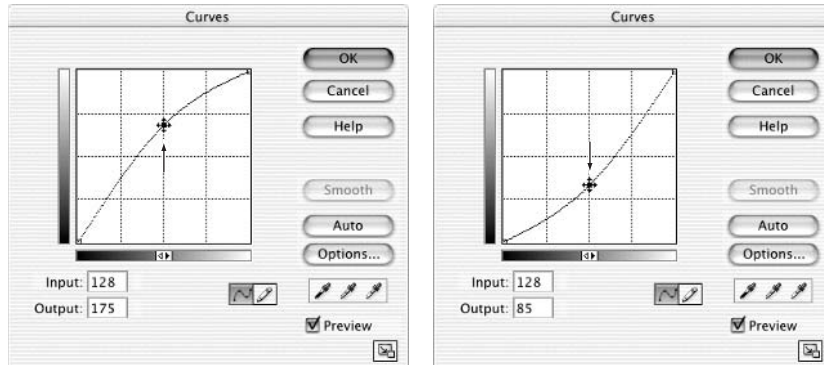
Figure 3.12

The Curves dialog box



Figure 3.13

When the curve is displayed in levels of gray (rather than percentages), reducing the volume under the curve darkens the image (left). This relationship reverses when the curve displays percentages (right).



You can toggle the number of hash marks on the graph display (four lines or ten) by Option/Alt+clicking anywhere on the graph.

Without closing the dialog box, move your cursor over the image. Your cursor will become the Eyedropper tool. Look for a place in the image that is close to 50 percent gray. When you have located the spot, hold down the Command/Ctrl key and click the mouse. A new point will be created on the curve, representing the tone sampled in the image.

To add a point:

- Hold Command/Ctrl and click to sample the image.
- Move the cursor over the curve and click.

To move a point:

- Click on the point and drag.
- Highlight the point (by clicking it) and change the Input/Output numbers.
- Highlight the point (by clicking it) and press the keyboard arrows in the direction you want to move the point. Hold the Shift key to move 10 levels in the arrow direction.

To remove a point:

- Position the cursor over the point, hold Command/Ctrl, and click.
- Highlight the point (by clicking it) and press Delete.
- Click and drag the point off the dialog box.

Although there are a few other features in the Curves dialog box, these are all you need to understand to make specific adjustments.

## Manipulating Curves

Specific tonal distribution changes that you make with Curves can be far more flexible than changes you can make with Levels. If Levels is considered as a tool to adjust the tonal range of the image, Curves can be considered the tool for adjusting image contrast.

A simple way to look at curves is that contrast increases in the tonal range between points where the curve is steeper, and contrast decreases in the tonal range where the curve flattens out. The curve in Figure 3.14 will increase contrast in the image midtones (between 25 percent to 75 percent black) and decrease contrast in the highlights (0 percent to 25 percent) and shadows (75 percent to 100 percent).

Figure 3.15 shows a curve that will decrease contrast in the midtones over the same range as the curve in Figure 3.14. Note that the increase in contrast over the midtones in Figure 3.14 decreases the contrast in the highlights and shadows; in Figure 3.15, decreasing the contrast in the midtones (25 percent to 75 percent) increases the contrast in the highlights (0 percent to 25 percent) and shadows (75 percent to 100 percent).

All points that you put on a curve will not necessarily be for moving the curve. At times it will be useful to place anchors on the curve to keep the tone in that area of the image from changing, or to act as a pivot for adjustments. For example, anchors set in the highlight and midtone can keep the tone in the highlight from changing while you adjust shadows (see Figure 3.16).

Corrections in contrast over shorter ranges should be evaluated with the Eyedropper to help target the correction to that range. For example, if shadows seem somewhat flat or highlights lack detail, there might be a reason to strengthen the contrast just in those ranges. To measure the range, measure the brightest and darkest areas of the tonal range you want to include by dragging the Eyedropper through the image area. Test samples in areas near the light and dark side of the range, and note what the values are. When you determine the

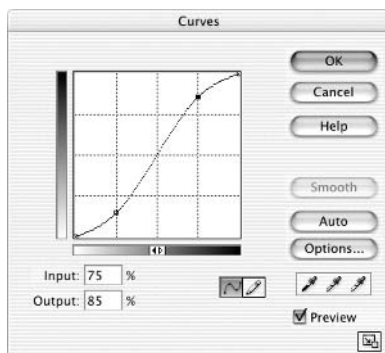


Figure 3.14

A steeper rise in the curve between Input values of 25 percent and 75 percent makes contrast sharper through the midtones.

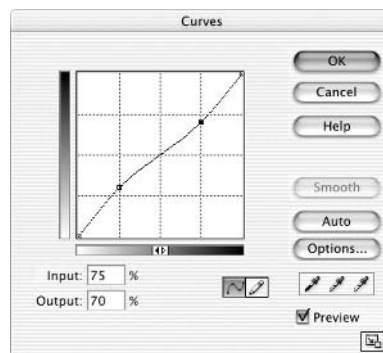


Figure 3.15

Decreasing midtone contrast increases contrast in shadows and highlights.

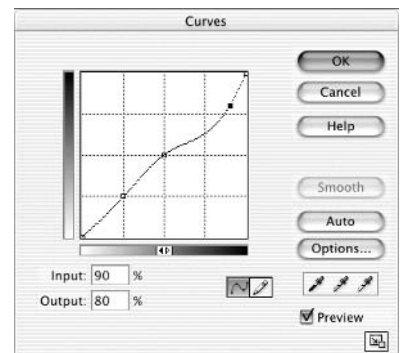


Figure 3.16

Anchoring the curve with extra points that just hold the curve in place can reduce the equal and opposite reaction of your changes.

range, set anchor points either by using samples directly from the image (Option/Alt+click to sample) or by clicking the curve and entering values you sampled as Input values. Sample values will be shown in grayscale percentages on the Info palette (K as percentage), so they will have to be converted to levels. To make the conversion from percentages to levels, you can multiply a percentage by 2.55. You can also set one of the readouts to RGB and take the levels reading from there, *if* the image is being viewed in black-and-white rather than color at the time of the measurement.

The Sample Size setting for the Eyedropper tool determines the size of samples used with curves. In most cases, you should use a sample of 3 or 5 pixels rather than a point sample. Control+click / right-click the image when using the Eyedropper tool to bring up the Sample Size menu.



The image used in the following procedure (see `contrastfix.psd` on the CD) was taken in direct sunlight, making for a high-contrast exposure. Your goal is to slow the transition from highlight to shadow, as well as lighten the image. Follow these steps:

1. Open the image you want to correct (see Figure 3.17).
2. Set the options for the Eyedropper tool and Info palette. For this example I chose a sample of 3 by 3 for the Eyedropper and changed one of the Info palette colors to K (Grayscale).
3. Open Curves by double-clicking Curves in the PowerTools1 category under Effects on the Styles and Effects palette.
4. Click OK when the New Layer dialog box appears.
5. Sample the bright end of the range you want to correct (see Figure 3.18) and create a curve point by whatever method you choose. See “Using the Curves Interface” earlier for more information on creating points.



Figure 3.17

This image was taken in direct sunlight and shows harsh shadows.

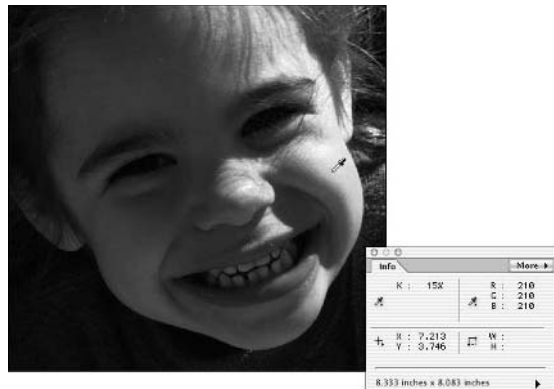
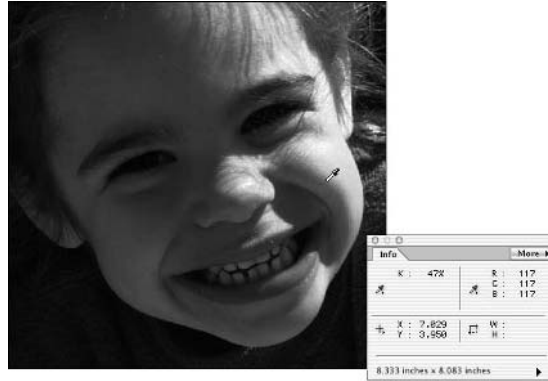


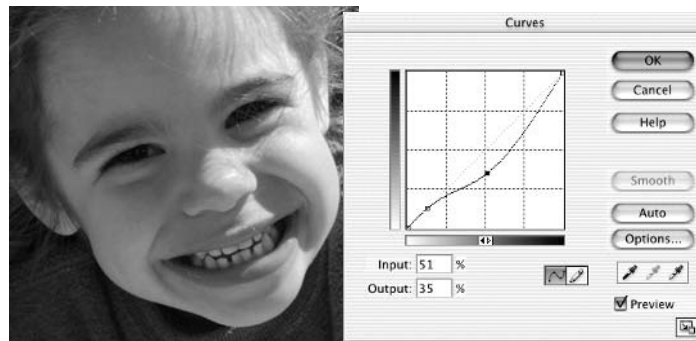
Figure 3.18

The highlight area of the cheek is the lightest portion of the area that will be changed.

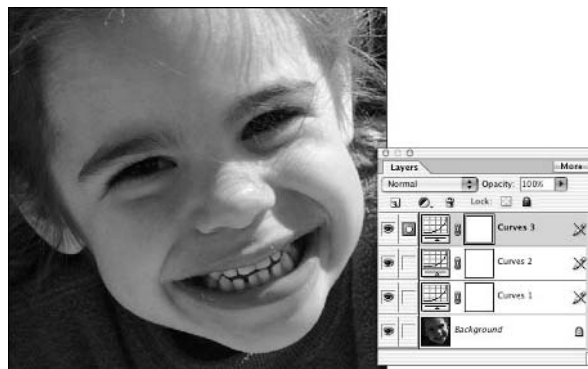
6. Sample the dark end of the range you want to correct (see Figure 3.19) and create a curve point.
7. Adjust the position of the curve points to create the desired change. In Figure 3.20, the 51 percent (134 levels) point was changed to an output of 33 percent (171 levels).
8. Repeat steps 5 through 7 to continue adding points and adjusting other tonal relationships.
9. Click OK to accept the changes in the curve.
10. Add additional curves by using steps 3 through 9 to make further modifications to the tone as necessary. See Figure 3.21.



**Figure 3.19**  
Measuring the shadow at the edge of the transition from highlight to shadow marks the darkest part of the range that will be changed.



**Figure 3.20**  
The changes in the curve lighten the image and reduce contrast in the mid-tones while improving contrast in the highlight and shadow detail.



**Figure 3.21**  
The result of several curve applications has improved the tonality of the image by lessening the harsh contrast between light and dark while enhancing contrast in selected areas.

Keeping a curve as a smooth cascade is more likely to create good results than using radical changes. Jagged curves tend to be unpredictable and will more likely produce special effects than corrections. If changes seem extreme or become difficult, make the changes over the course of several applications of Curves (adding Curve adjustment layers) rather than just in one shot. This will enable you to compare adjustments by toggling layer views, as well as enabling you to fine-tune.

## (Un)Sharpening and Boosting Contrast

The sharpening filters in Photoshop Elements are not magic. They will not take a wildly out-of-focus image and snap it back into focus or replace detail in an image that is lost by poor focus or camera/subject movement. This is not to say that it is impossible to use filters to improve the appearance of an image; however, you should not expect a miraculous recovery of any image—no matter what method you use or how intense the settings you choose.

Although sharpening tools can help the appearance of sharpness in the image, they actually have several uses aside from re-focusing an image. Sharpening filters—specifically the Unsharp Mask filter—enhance local contrast. The filters strengthen local contrast in an image based on the difference between adjacent tones and the filter settings you select (Amount, Radius, and Threshold). These filters are useful not only for improving the appearance of slightly blurry images, but also for adjusting images after resizing and for increasing contrast between image elements. Sharpening can also be used as an adjustment tool to enhance images that are going to print, in an attempt to offset dot gain and ink absorption, which can change the definition in an image. In other words, although the filter can help with sharpening, it can also be used as an “intelligent” tool for enhancing image contrast and improving the appearance of images.

Although other sharpening tools are included with Elements besides Unsharp Mask (the free-hand Sharpen tool, and the Sharpen, Sharpen Edges, and Sharpen More filters), I find them somewhat less valuable because they lack controls. They do nothing that you can't do using the Unsharp Mask filter.

### The Unsharp Mask Dialog Box

The Unsharp Mask dialog box (Filter → Sharpen → Unsharp Mask) has three sliders: Amount, Radius, and Threshold (see Figure 3.22):

**Amount** The Amount can be between 1 percent and 500 percent. It determines how much neighboring pixels will influence one another. The setting is affected by choices for Radius and Threshold: the higher the percentage entered as Amount, the greater the sharpening.

**Radius** The Radius can be from 0.1 to 250 pixels. Radius works similarly to a feather radius: the farther out from the center of the radius, the weaker the effect. The distance affected in the image is actually greater than the Radius (about 2.5 times), as the value is plugged into a calculation rather than limiting the range. The intensity decreases over the range.

**Threshold** The Threshold option controls the way pixels work against each other based on their relative difference. The threshold notes the number of levels by which neighboring pixels must differ to be included in the calculation. For example, a low threshold (0) would allow neighboring pixels to freely influence one another if there is a difference; a high threshold (255) keeps pixels from influencing one another.

The dialog box offers a preview option and zoom buttons in addition to the sliders.

The goal of sharpening is to improve, not reclaim, an image. The sharpening will be more or less effective depending on the content of the image.

Generally, you will want to choose a setting with a low threshold, which is measured in levels. This means Photoshop Elements will look at the number of levels of difference in the surrounding pixels, and if the number of levels is greater than the threshold, it will apply sharpening based on the settings for Radius and Amount.

The name *Unsharp Mask* comes from the traditional darkroom process in which an inverted, blurred (unsharp) duplicate of the original image was sandwiched to mask the exposure during printing. This helped target and adjust (sharpen) contrast differences.

You should usually keep the Threshold setting between 0 and 5—toward the lower end of this range. In fact, you will often want to use zero tolerance. Low tolerance levels (1 or 2) can keep Photoshop Elements from sharpening what is otherwise image noise. Sharpening noise will only make the image noisier. With that in mind, a good rule of thumb is to raise the threshold more for images with more image noise. This will keep you from enhancing image noise. The only time you will set the threshold higher than 5 is when you want to limit the filter's effect to high-contrast areas of the image to play up existing contrast and separation of image elements.

Radius and Amount might be set quite differently depending on what you are trying to achieve and the ppi and content of the image. In many cases, you might apply the filter twice: once with a low radius for general sharpening, and once with a higher radius for broader enhancement of image contrast.

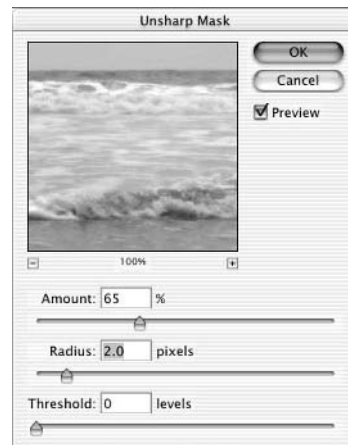


Figure 3.22  
The Unsharp Mask dialog box (Filter → Sharpen → Unsharp Mask)

## Affecting Sharpness with the Unsharp Mask Filter

Sharpening an image with the Unsharp Mask filter depends on Elements recognizing and enhancing existing edges in an image. In other words, if the image is too blurry to recognize, the filter can't tell where the edge is, so it can't tell what to enhance. This is why the filter works best on images that are already characteristically sharp.

Although settings can vary depending on the type of image and desired result, you will normally maintain the following settings in images that have average busyness and contrast:

**Radius:** 0.5 percent to 1.5 percent of the ppi

**Amount:** 50 percent to 100 percent

For example, a 300ppi image would have a target range for the Radius of about 1.5 to 4.5 pixels; a 72ppi image of the same size and similar content would have a Radius of about 0.35 pixel to 1 pixel. Note that these are rough guidelines, but they work for a variety of situations. If the content of the image is not busy, lacks focus, and/or is lower-contrast, you can tend toward the high end of the ranges; if the image is busier, is relatively sharp, and has high contrast, you would probably tend toward the low end.

Figure 3.23 shows an image before and after sharpening. Before sharpening, the image appears slightly soft and perhaps a bit lacking in contrast. A single application of the Unsharp Mask filter in the midpoint for the suggested range increases the contrast and boosts the sharpness (see Figure 3.23).

A *halo effect* occurs when the Unsharp Mask is applied too strongly over areas where flatly dark portions of an image meet flatly light portions, forming a high-contrast edge (see Figure 3.24). Often a halo effect is more apparent when the applied Radius is short—or not long enough to dissipate the edge of the sharpening effect without being obvious. Not only will the halo tend to blow out (or clip) areas of images, but the image will also distort and the effect will become unpleasant.

Figure 3.23

Sharpness and contrast in this image improve with an application of Unsharp Mask.







Figure 3.24

The original image and an over-sharpened counterpart: Although some sharpening may be desirable, a halo effect probably will not be.

You can reduce halo effects by first undoing the Unsharp treatment and then reapplying it with either a broader Radius, lower Amount, a combination of these, or by blending the result. Methods of blending are discussed throughout the rest of the book. One quick method is to flatten the image (Layer → Flatten Image), duplicate the Background (Layer → Duplicate Layer), apply the Unsharp Mask filter, and reduce the Opacity of the Background copy layer in the Layers palette.

Another option for blending the sharpening effect is to use the Fade tool in the Hidden Power tool set. You can find the Fade tool in the PowerBonus category under Effects on the Styles and Effects palette. Just undo the sharpening (press Command/Ctrl+Z) and double-click the Fade tool. Instructions will appear on-screen.

Staying within the guidelines helps you avoid oversharpening and creating halos in high-contrast areas of your images. Better to sharpen a little several times, sharpen a duplicated layer, or try other measures than to sharpen hastily and heavily and damage the image.

## Raising Local Contrast with Sharpening

Sharpening with the Unsharp Mask filter has a much different effect on an image than applying Curves or Levels, because the effect actually compares adjacent pixels, rather than adjusting based on a more predictable scheme. It does less to sharpen the details than it does to enhance differences that already exist in the image. This effect works well with low-contrast images, or images that seem to lack dynamics that increasing dynamic range (with Levels) or contrast (with Curves) doesn't fix.



When you are adjusting local contrast with the Unsharp Mask, the Radius might be much higher than suggested for normal sharpening (15 percent to 40 percent or more of the ppi), and the Amount much lower (between 10 percent and 35 percent). Again, these are just suggested ranges. The goal of the settings is to increase the radius beyond the distance where a halo is noticeable, and to keep the effect from causing damage (hence the low intensity, or Amount).

Figure 3.25 shows a somewhat low-contrast image of a ship (a) and corrections using the Unsharp Mask filter (b and c). Although it looks okay in color, the image lacks a little pop in black-and-white. By using Unsharp Mask to raise the local contrast, the image elements have more separation from one another. Two applications of Unsharp Mask—one to build local contrast (b), and one to sharpen (c)—make quick work of what would otherwise be an arduous task in masking to separate this boat from its surroundings, creating a result based on existing image differences.

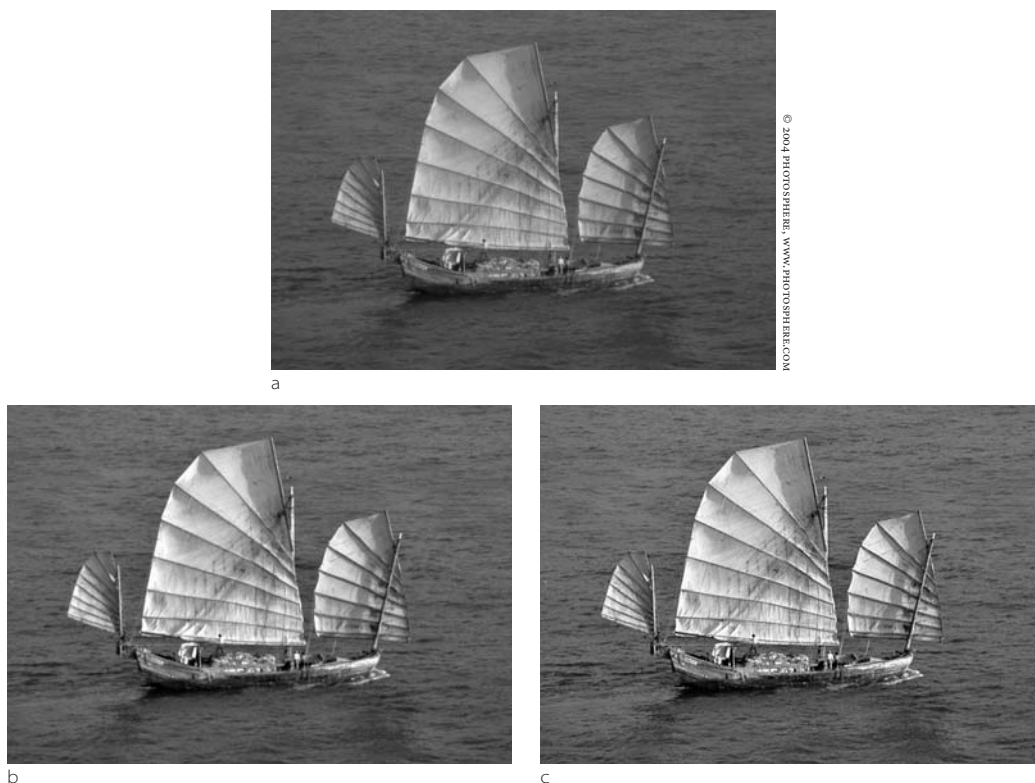


Figure 3.25

The original boat is a little dull (a). After raising the local contrast with the Unsharp Mask (using a broad radius and low percentage), the boat stands out better from the surroundings (b). The filter is then applied again (c), but this time to sharpen the image (using a short radius and higher percentage).

The third image (c) includes slight Levels and Curves adjustments. Curves was used to enhance the contrast that Unsharp Mask brought out, and Levels was used to adjust final brightness. Some tone was replaced quickly by duplicating the original, moving it to the top of the stack, setting it to darken, and lowering the Opacity to 10 percent; this filled in areas that sharpening had forced to clip (go to 0 percent gray). So you see that techniques of using Levels, Curves, and Unsharp Mask work together—rather than separately—to produce enhanced results.

## Managing Image Noise

Having noise in an image can mean a number of things, from having many objects in an image to something more akin to random digitized information—like you might get when turning your TV on without a cable connection or antenna. The concepts in this section will help you to reduce or eliminate undesirable patterning, digital image noise and texture in an image by increasing or decreasing random noise.

At times you may want to edit out, reduce, or even add image noise to achieve particular results in your images. To do this, you will use Blur and Add Noise filters, often in conjunction with other image editing functions, such as layer blending, selection, masking, and perhaps a few Hidden Power tools.

The Gaussian Blur filter (Filter → Blur → Gaussian Blur) can blur images or image areas. It does this by averaging the effects of pixels over a Radius, which you define by using a slider on the dialog box: the greater the radius, the more intense the blur. As a result of averaging pixels, blurring removes or lessens image noise by lowering the contrast of adjacent pixels. This averaging softens image edges, smoothing hard lines between areas of contrast, and can mitigate or obliterate image details. Essentially, this is the opposite of sharpening, which enhances existing contrast.

The Add Noise filter (Filter → Noise → Add Noise) generates image noise by randomizing color assignments for pixels. There are several choices in the Add Noise dialog box for controlling the filter. The Amount is related to Percentage, and defines the range of variation possible in creating the noise distribution. As the Amount goes up, the application of the noise is potentially more radical. Very strong applications of noise, like blur, can obliterate detail—in this case by wiping it out with random behavior rather than averaging. Noise applications can swiftly become something of a special effect, depending on the ppi of the image. An image with a higher ppi will be able to withstand stronger applications of the filter.

Generation of noise is affected by the Distribution Type. A *Uniform* distribution changes the values of individual pixels by selecting a random number within the range defined by the Amount. This number can be the original value plus or minus the amount for each channel of color. For example, applying an Amount of 25 to a 50 percent gray image (128 levels) in Grayscale will result in values between 103 and 153 levels of gray for any pixel, each value generated at random. You can see this effect by creating a new image, filling with a 50 percent gray background, and applying the Add Noise filter.

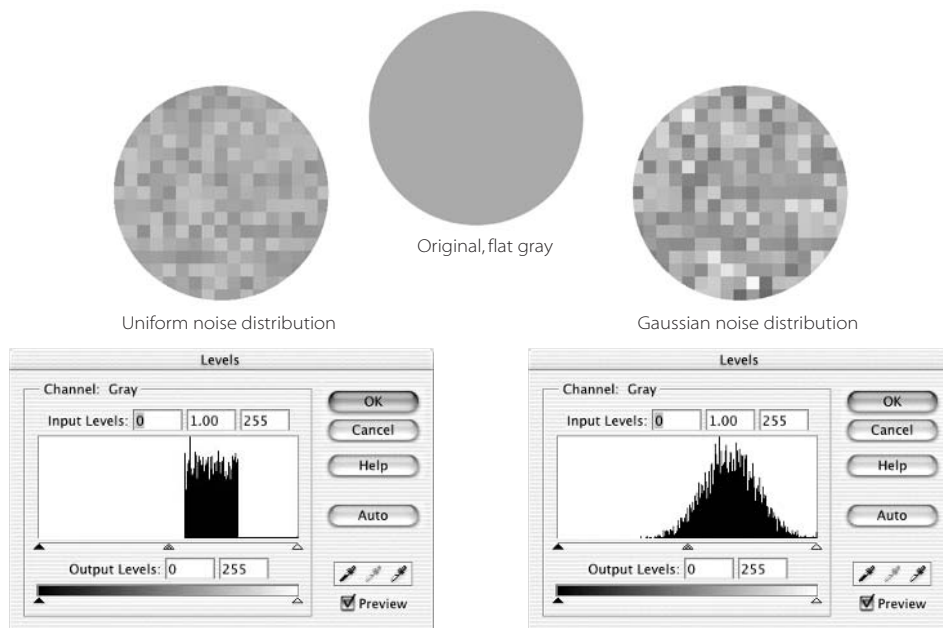
A *Gaussian* distribution changes the values of individual pixels by selecting a random number based on a Gaussian function. The function creates a tendency to select from the center of the range, but can also deviate more strongly from that norm. While the quantitative effects to each pixel can extend beyond what is dictated by Amount, the total effect is the same—just with greater peaks and valleys in the deviation. Because deviations can be broader, Gaussian noise can appear to be a stronger effect than the Uniform distribution with the same Amount setting, as shown in Figure 3.26. Compare this to the Uniform effect by creating another gray image of the same size, applying the Add Noise filter using the Gaussian setting, and comparing the images side by side.

The *Monochromatic* option applies the filter to only the tonal elements in the image without changing the color. For example, this would keep an RGB image that has been desaturated from generating color noise when the filter is run.

So far, neither adding noise nor blurring may sound desirable, because either could be damaging (or at least compromising) to an image. However, used in a controlled fashion, both can enhance an image and make results look more realistic. For example, an image or image area that is damaged by JPEG compression can be restored, somewhat, by selective blurring. In this case, blurring could potentially dissipate artifacts generated by compression. In a similar way, some types of digital noise can be lessened or removed, as might be effects of film grain, halftone printing, and paper texture. Selective blurring can also help in isolating image subjects by imitating effects of focus, such as depth of field.

Figure 3.26

A magnification of a 25 percent gray area shown with Uniform and Gaussian noise distributions of 10 percent. The histograms show the flat application of noise in the Uniform distribution and the bell-shaped application in Gaussian distribution.



On the other side of the coin, most image tones that look natural in an image are not completely flat when you look at them close up. When you attempt to add new elements to an image, such as by painting them in with flat tones or creating an area with blends (for example, to replace a sky), the elements can tend to look *too* perfect. The result is that the repair will look like a repair: skin tones will look more like a mannequin or caricature. Applying noise can mimic a more natural look by randomizing and effectively dithering image information. Additionally, you can use Add Noise to create texture or graininess (for example, to mimic film grain).

As strange as it may seem, sometimes when blurring won't solve a problem that you may have thought required noise reduction, applying noise can. Even more often, applying both blur and noise can do the job, adding variation while mediating extremes.

Blur and Add Noise filters can be used along with other functions to produce the best results. For example, you might make a selection of a particularly noisy area of an image to isolate it before applying a blur. After using Blur, you may need to use the Add Noise filter to fix the blurred areas so that they don't seem flat. You also might use a layer mode, mask, or other features to isolate the application so the fix is applied only to the areas where it is intended.

Both Add Noise and Blur are best if applied lightly and in combination. Figure 3.27 shows a repair in which noise was used to make an image correction blend better, after a blur was applied. The skin on the subject is not bad in the original, but it could appear much more youthful with gentler pores.

A selection was made of the subject's face (mostly using the red channel as a mask—a technique we will look at more later). With the selection loaded, the area of the subject's skin was copied and pasted to its own layer to isolate it. Once isolated, the copied skin was blurred. The results smoothed the skin, but left it too flat. Noise was added, using Uniform distribution with the Monochromatic check box selected. This returns some of the texture to the skin without leaving it looking too flat and fake. The appearance of the pores is softened first, using the Blur filter to remove noise. Next, the Add Noise filter is used to gently replace some of what was lost in the texture. The result is much smoother skin, and a somewhat more youthful smile.

Several techniques, including erasing information on the new layer or masking, could have been used to bring back the details that were getting covered. However, Blend Mask, a Hidden Power tool, was applied to the layer to enable the character of wrinkles to blend through based on tone. Again, combinations of tool applications and functions generally work best in achieving goals in an image because no one tool can do it all. You'll see more of Blend Mask in the following section.



b



c



d



a

Figure 3.27  
Original image (a)  
and the image  
blurred (b), then  
noise added (c), and  
Opacity adjusted (d).

## Masking with Image Tone

Masks are very much like selections, in that they can help you isolate image areas and work on them without changing other parts of the image. You saw how masking can help you target image changes by isolating the sky from the water in the gradient map example in Chapter 2. One frustration with using Photoshop Elements is that it allows you to use masks only in conjunction with adjustment layers, and does not freely allow you to mask any layer in an image. It also doesn't allow you to work fluidly with alpha channels, which are places the full-version of Photoshop can store masks and selections. Although you can save a selection in Elements 3, you still can't attach a mask to any old layer.

Hidden Power tools to the rescue!

The Hidden Power Blend Mask is a unique solution to this problem based on layer clipping and layer transparency. It enables you to make white areas of a layer transparent with a single click. It leaves black solid and turns levels of gray to semitransparent pixels—the darker the pixel, the less transparent it is. These semitransparent layers can then be grouped with other image content to be used as high-tech cookie cutters to reveal only what you want to see from the original image in a separate layer.

Because it is based on tone, the Blend Mask tool gives you the power to mask exact areas of an image based on any image quality that you can isolate as tone. Clever manipulation of tone by using Curves can enable you to target specific image areas based on particular qualities. These qualities can influence an image whether the image is color or black-and-white.

So what does Blend Mask do for you? Well, say you have a color image that looks a little flat in the shadows. You know there is image detail there, but you can't seem to coax it out no matter what you try: every time you make a change that helps one area, the other image areas go sour. Creating a mask for the shadows (75 percent–100 percent black) would allow you to isolate the dark portion of the image so you can make changes there without affecting anything else. Blend Mask helps you to make those masks. It would also help you make a mask to target other specific tone ranges, specific colors, or color ranges.

Figure 3.28 shows an image that could benefit from correction in just the shadow area. To mask just the shadow, you use the Blend Mask Hidden Power tools. Several power tools converge in this exercise to create your image editing advantage.

1. Open the sample image (horsehead.psd) from the CD.



Figure 3.28

**This image of a giant bronze horse was taken with the sun as a backlight, leaving the detail of the shadow flat and dark.**



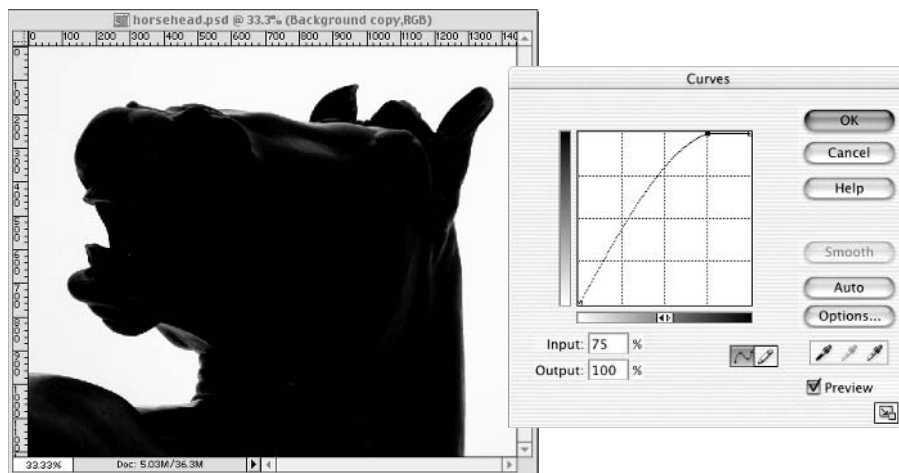
2. Create a luminosity layer: choose Effects in the Styles and Effects palette and then choose the PowerSeparations category. Double-click Add Luminosity in the PowerSeparations list. Change the name of the Luminosity layer to **Masking Tone**.
3. Create a new layer above the background and name it **Mask**.
4. Turn off the visibility for the Background layer.
5. Activate the Masking Tone layer and double-click Curves under the PowerTools1 category of Effects. Be sure to click the Group With Previous check box when the New Layer dialog box opens.
6. Click the center of the curve graph to create a new point on the curve. If the curve is displaying as levels (rather than percentages), click the arrow to change to percentage display.
7. Change the position of the current point to 75,100 (Input/Output) by typing these values in the appropriate fields, as shown in Figure 3.29.
8. Create another point on the curve by clicking near the center of the graph.
9. Change the position of the point to 73,0 by typing the values into the Input and Output fields, as shown in Figure 3.30.

The Curves dialog box will not allow the point in step 9 to be at 74,0, so 73,0 is selected as the next best position.

10. Accept the changes to the curve by clicking OK.

Figure 3.29

The image darkens as you begin to create your mask.





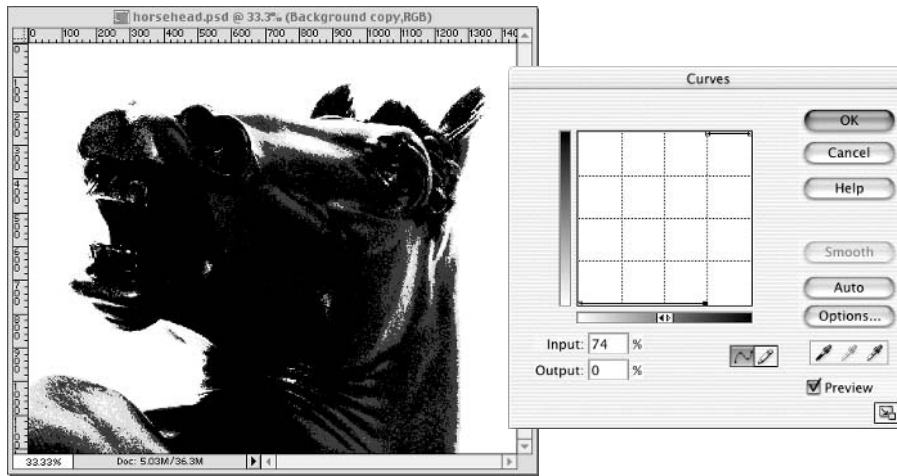


Figure 3.30

Shifting the position of this point will create stark contrast between the shadow (75 percent–100 percent black) and the rest of the image (0 percent–73 percent black).

11. Merge the curve with the Masking Tone layer (Layer → Merge Down) to commit the curve changes.
12. Double-click Clear Grayscale in the PowerTools1 category of Effects. This removes the white and grays from the Masking Tone layer to reveal the transparency grid. Only portions of the image that are 75 percent to 100 percent black based on the image luminosity will be opaque.
13. Merge the Masking Tone layer with the Mask layer. This commits the transparency of the layer.
14. Turn on the visibility for the Background layer.
15. Duplicate the Background layer and name it **Isolated Shadows**.
16. Move the Isolated Shadows layer to the top of the layer stack.
17. Group the Isolated Shadows layer with the Mask layer.  
Grouping the layers creates layer clipping; only the 75 percent to 100 percent area of the Isolated Shadows layer is visible. Confirm this by toggling the view for the Background layer off. This completes the masking. The layers should look as they do in Figure 3.31.

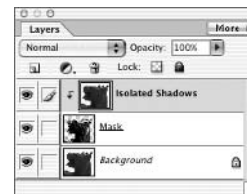


Figure 3.31

When steps 1 to 17 are complete, your masking should show the Isolated Shadows layer grouped with the Mask layer.

The Mask layer will be dark in the areas that are masked (if the relationship is inverted, you probably had the Curves dialog box in the wrong mode when working through the procedure). If you turn off the visibility for the Background layer at this point, the shadows will show without the nonshadow portions of the image. You can adjust the color or tone in the shadow area by applying changes—either grouped layer adjustments or



changes directly to the layer content—to the Isolated Shadows layer. Commit the changes by flattening the image. The Blend Mask Hidden Power tool will perform steps 2–17 for you, but you won’t always want to just run full speed through this masking process. Knowing how to do the technique manually will help the tool make more sense, and can offer other opportunities when making other types of corrections.

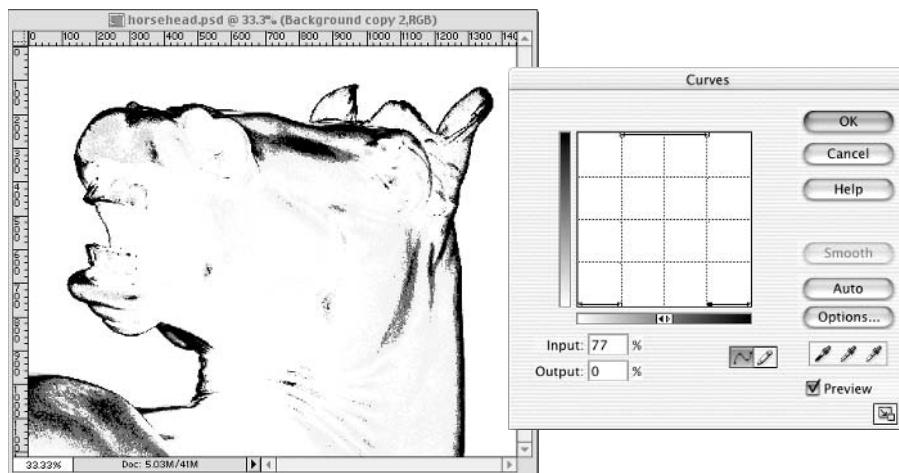
Masks and black-and-white representations can be created to target and exclude all sorts of image information. The key to targeting your masked information is the Blend Mask tool, which affects the layer transparency and the application of the curve. For more straightforward masks that are based on highlights or shadows, you can use the Transparent Grayscale Hidden Power tool. To base the mask on shadows, all you would do is create the luminosity layer and click Transparent Grayscale. To base the mask on highlights, create the luminosity layer, invert it (Filter → Adjustments → Invert), and click the Transparent Grayscale tool.

Curves can help you create complex masks based entirely on tonal components. For example, if you wanted to mask only the middle tones in an image, the curve would look like Figure 3.32.

Not only can you work with components separated from your original image, but you can also combine the results to target even more specific image areas. For example, say you want to adjust color in the midtones for a particular color component. Using a midtone mask alone, you could shift the color, but that would affect all other colors in the image that fall in the midtone range; you could use Hue/Saturation set to a component color, but that would limit you to using only Hue/Saturation for the correction.

Figure 3.32

This curve applied to luminosity will enable you to isolate midtones.



Using the midtone mask with a specific color component separated from your image could help you isolate the midtones in that specific component. First isolating the component and then applying the mask gives you more freedom to make corrections in a specific area of the image. All you have to do is create the mask, make the separation, and apply the mask to the component that you separated. In the following example, you will isolate the midtones on the blue component of the RGB separation.

1. Open the image you want to correct as a flattened RGB image.
2. Double-click Blend Mask in the Hidden Power tools and set the curve to look like Figure 3.33 when it appears. Allow the masking to complete. This creates the midtone mask.
3. Duplicate the background to a new image (using Duplicate Layer in the layers pop-up menu), and separate the image by double-clicking the Split RGB w-Preview tool in the PowerSeparations category of Effects. This gives you the separated color components for the original color.
4. Activate the original document and duplicate the Mask layer to the separated image two times. Name the duplicates **Layer 1** and **Blue Midtones**. These layers should be created at the top of the layer stack. They will be used to create distinct representations of the blue in the midtones and the blue in the highlight/shadows.
5. Activate the new document and create a new layer below Layer 1. You can create the layer anywhere and drag it to where it should be in the Layers palette. Fill it with white and name it **Blue Mask**.
6. Merge Layer 1 and the Blue Mask (this makes the Blue Mask a solid layer representing the midtones); then drag it between the Blue layer and its Fill layer. Change the mode to Multiply. This will blot out the influence of the Blue layer midtones. If you shut off the Blue Midtones layer, the midtones should appear to pitch toward yellow at this point.
7. Duplicate the Blue layer and change the duplicate layer's name to **Blue Highlight/Shadow**. The Blue Highlight/Shadow layer will remain grouped with the Blue Mask and Fill layers. This grouping represents the highlight and shadow areas of the Blue component.
8. Change the mode of the Blue layer to Normal and drag it above the Blue Midtones layer. Change the mode of Blue Midtones layer to Screen.
9. Duplicate the Fill layer grouped with the Blue Highlight/Shadow layer and drag the duplicate above the Blue layer.

10. Link the Blue Midtones, Blue, and Fill copy layers by clicking the link indicator on the Layers palette for the Blue Midtones and Blue layers. Group the layers by pressing Command/Ctrl+G. This grouping represents the blues in the midtones.

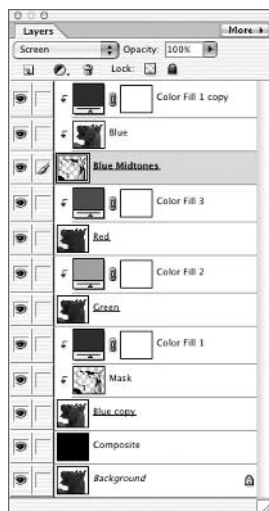
Once you have completed these steps, the masking will have been used to isolate the blue midtones. The layer stack will look like Figure 3.33, and the image will look exactly

the same as the original. However, if you add a Levels adjustment layer above the Blue layer, you'll be able to adjust the blue midtones in isolation from the rest of the image color—without changing the highlight and shadow. In other words, you are free, at this point to replace just that portion of the image with any tone or color that you want. In a similar way, you could create masking for highlights, shadows, and any combination of color and tone to accurately target an image area for change. All you need to do is create the masks and apply them by defining the desired tone and color ranges.

These changes and more are possible, and they become important when attempting more complicated color separations and application. We'll implement some interesting uses of this type of masking in the next few chapters.

Figure 3.33

Multiple mask applications enable you to accurately target changes in your images.



# Part III

## Serious Color Correction



The term *color correction* suggests that there is a correct color in your images to shoot for in the first place. You may consider “correct” to be what you saw with your eyes when capturing an image, but what you see isn’t a measure that you can duplicate. Your eyes can adjust to color and lighting conditions, so they are not good at judging the quality of color in a scene—it may actually have looked better to you than it was.

It would be nice if there were a quantitative measure of “correctness” that would guarantee the best color, because that would make correction easier. You can match color by measuring with sophisticated devices. However, what looks best won’t necessarily match the original color, and in some cases matching color will not be what you’ll want to do at all. In this section you’ll look at ways to apply color correction for both technical and artistic success by using techniques that expand on those you learned in Chapter 3.

### Chapter 4 **General Color Correction: Applying Levels and Curves**

### Chapter 5 **Specific Color Enhancement**



# Chapter 4

## General Color Correction: Applying Levels and Curves

If you look at RGB components as the basis for image color, color is just a slightly more complex version of black-and-white. The difference ends up being that three grayscale images are sandwiched together to make a color representation. If you consider the three black-and-white RGB components of your color image separately, and make basic correction to the tones, it is interesting to note that correction for color follows. The Levels and Curves manipulations and techniques from Chapter 3 can be applied to the RGB components of a color image in order to adjust image color. Correcting color this way will adjust many color saturation and brightness problems and can often balance color to compensate for color shifts caused by lighting. In this chapter, we'll look at the techniques for performing this type of correction as well as the reasons why the techniques work.

### Minor Cleanup for Color Images

#### Levels Correction for Color

#### Curves Correction for Color



## Minor Cleanup for Color Images

The place to start in doing minor cleanup of your color image is to get rid of what absolutely should not be in the image. Cleanup for color images is similar to the techniques already described for cleaning tone and black-and-white images. You use the Clone Stamp tool to clear out spots and minor debris by stamping over them with good replacements. Because you are trying to match red, green, and blue tones all at the same time, you have to be careful in selecting the source for replacement color. Making the corrections in a new layer can help by enabling you to fine-tune any changes. The Use All Layers option for the Clone Stamp tool should remain turned on. You may want to experiment with other modes for the Clone Stamp tool, such as using Color or Luminosity instead of Normal mode to adjust color or tone separately.



Other options for cleanup can present themselves in separated components, sometimes more readily than on a color composite. Looking at RGB tones or Luminosity and Color separations may reveal color-specific noise or other damage (such as stains on scanned prints). All you have to do is split the channels by using Hidden Power tools and then examine the separations individually to see whether there is any damage.

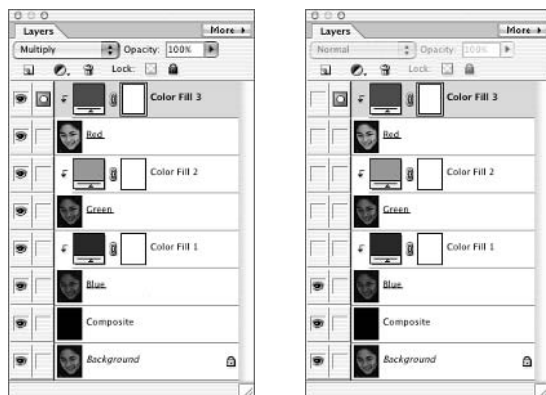
To view the grayscale for a specific component in a separation, make the separation and then turn off the visibility for the other components and the color fill associated with the component, if any (see Figure 4.1).



The Prokudin-Gorskii images from Chapter 1 (*Gorskii.psd*) are a great example of how correcting in separated tones may be useful. The glass plates in Gorskii's images have unique information because they were taken as distinct captures through different lenses to occupy distinct areas of the film. Because they are distinct captures, each color plate has unique damage from dust and scratches, as the red plate shows in Figure 4.2. In that case (certainly a rare one), it is better and easier to correct much of the damage in the separated tones as RGB because the damage will stand out more clearly than it will in the full-color preview.

Figure 4.1

To view the blue channel, turn off the visibility for the red and green channels as well as the blue color fill.





**Figure 4.2**  
A defect in the red plate shows up prominently in the original scan of the Gorskii image.

Splitting out the channels is often useful for removing color-related problems, such as stains on scanned prints or colored blemishes. We'll see more of the advantages when looking at more intensive color correction later in this chapter.

Once you have stamped out damage in the channels—and as long as you have made each correction carefully, so it is undetectable in each of the individual tones—the result should appear undetectable in the composite image as well. When the changes are complete, you can merge the separated components back to a single layer by flattening the image before moving on to other corrections. Although you can switch back and forth between working with the separations and the composite without harming the image, you should avoid making a lot of separation changes at this point because it wastes time. This stage of cleanup should usually be simple and quick before getting on to the main course of correcting color.

## Quelling Color Noise

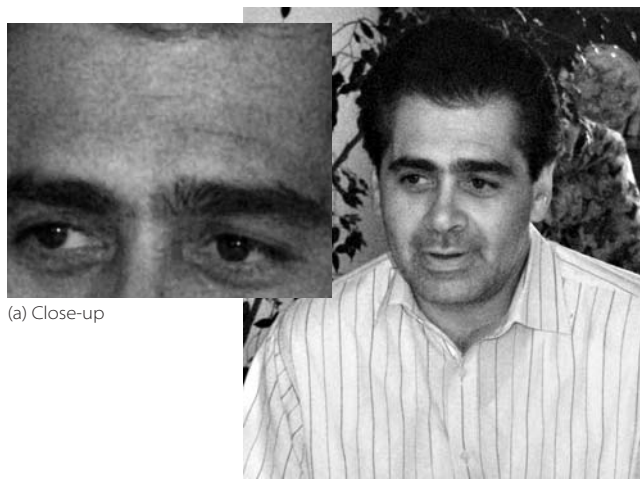
Digital noise can be a problem in images and is something else that you might want to clean up at this point, before moving on to other corrections.

Figure 4.3 shows a close-up of an image that was not taken in the best conditions. JPEG compression settings were not high, but they were high enough to accentuate the noise. Although the image isn't bad, it could be much better. The separation into RGB for this image clearly indicates that you have mostly color noise on your hands. (You can see the original image as `vince.psd` on the CD, as well as before and after corrections in the color section.)



Figure 4.3

This image shows digital noise even in black-and-white. Separating the channels of the image into RGB (by using the Split RGB Hidden Power tool) makes it apparent where the damage is. The worst of the channels is the discouraging blue channel (e).



(a) Close-up



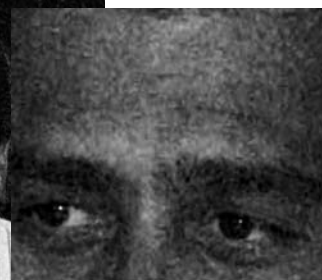
(b) Red



(c) Green



(d) Blue



(e) Blue Close-up

Although you might want to clean up or improve such obvious problems at this point, you might instead wait to do it after Levels correction. Doing too much before basic corrections can potentially cause even greater problems later.

There are many more things that you can do in addition to the few steps we will present here for correcting the color noise. For example, you might mask skin tone areas to apply smoothing to some of the tone or sharpen the image. But that type of complex correction is a good example of one that might be better accomplished later, after initial color

correction with Levels. You will be able to better judge when to flip-flop your basic correction steps as you gain additional experience with correction.

1. Open `vince.psd` from the CD.
2. Split luminosity and color by double-clicking the Split Luminosity Hidden Power tool in the PowerSeparations category of Effects.
3. Activate the Color layer by clicking it in the Layers palette.
4. Apply a Gaussian Blur (Filter → Blur → Gaussian Blur). This blurs the color information in the image while keeping the tone intact.



These steps have a dramatic impact on the RGB components of the test image. Figure 4.4 shows the result after flattening the image and reseparating the RGB components.

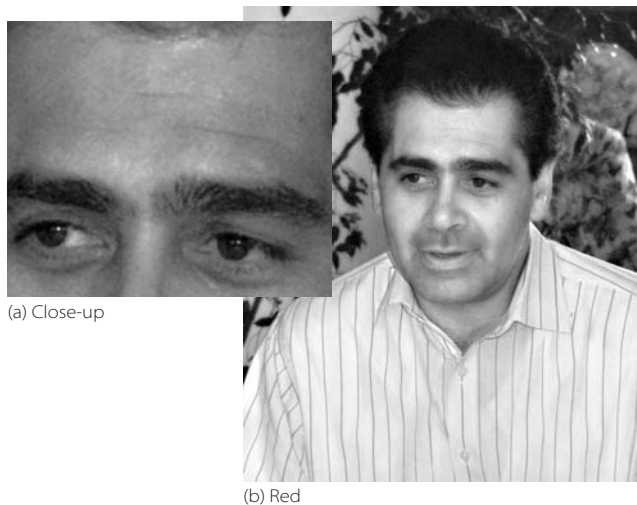


Figure 4.4

A great improvement can be seen in the color channels if you flatten the image again and separate the RGB. Note the dramatic change in the blue channel (e), and, surprisingly, you do not lose sharpness or detail.

Because the tone holds the detail in place, the color can be smoothed out without softening the appearance of the image. When you are finished, flatten the image and save it with a different name before continuing any other corrections. This will keep you from saving over the original if it turns out that you want to go back and see what happens if you don't correct the noise first.

You can use other filters to reduce the noise after the color is separated. You may want to experiment with the advantages of the Median filter and the Dust and Scratches filter applied to the Color layer. Each will handle the color adjustment in a somewhat different fashion.

There is a Hidden Power tool that will perform the noise reduction steps for you while enabling you to choose how much blur to apply. Just click Reduce Color Noise under the PowerTools1 category in Effects. This tool will automatically flatten and commit the changes in the image so that you will be ready for additional corrections.

## Levels Correction for Color

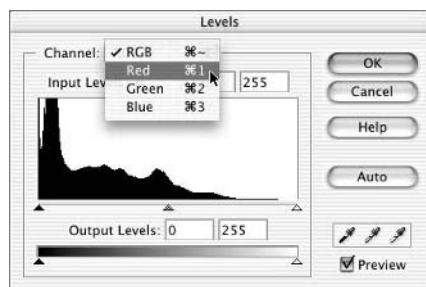
Object color is a result of light. Brightness of 100 percent indicates a 100 percent intensity of red, green, and blue light components. Brightness of 0 percent indicates a 0 percent intensity of red, green, and blue. If the color in a scene runs from white to black (a full dynamic range), all of the tones must have a full range as well. Levels corrections for each component of RGB will optimize the dynamic range of your image, and correcting with Curves can fine-tune the quality of color.

If you followed the discussion of correcting tonality with Levels in Chapter 3, making the leap to correcting color with Levels is a small step. It brings together the concept of components and separations from Chapter 2 with the corrective steps for Levels in Chapter 3. You want to apply Levels corrections to the separate red, green, and blue components, treating each component as you would a black-and-white image.

The Levels dialog box makes it easy to apply corrections to the separate components and saves you the step of separating the colors into tone. All you have to do is open the Levels dialog box and separately correct the red, green, and blue components—as

selected from the Channel drop-down list (see Figure 4.5). Select the channels one at a time from the drop-down list, make the correction according to the histogram, and then choose the next channel. Adjust each channel just as you would for a grayscale correction. Don't bother correcting the RGB composite; this will be taken care of by completing the Levels correction properly.

**Figure 4.5**  
Selecting a channel from the drop-down list in the Levels dialog box reveals the histogram specific to that channel and confines the effects of your adjustments to that component without making separations.



To apply corrections to separate color components:

1. Open the image you want to correct.
2. Complete minor cleanup.
3. Choose Enhance → Adjust Lighting → Levels. This opens the Levels dialog box.
4. Select Red from the Channel drop-down list. This reveals the histogram for the red component.
5. Make a Levels correction for the component by using the guidelines provided in Chapter 3 for making grayscale corrections with Levels. The correction should be done by evaluating the histogram.
6. Repeat steps 4 and 5 for the green and blue components. Do this by selecting Green and then Blue from the Channel drop-down list, instead of Red.
7. Accept the changes in the Levels dialog by clicking OK. This closes the dialog box.

When the correction is complete, the image should show increased dynamic range, stronger saturation, and a better likeness to realistic color (color balance)—as long as there was something to correct. Again, this correction may not get you entirely where you want to be. You'll probably have additional corrections to make.

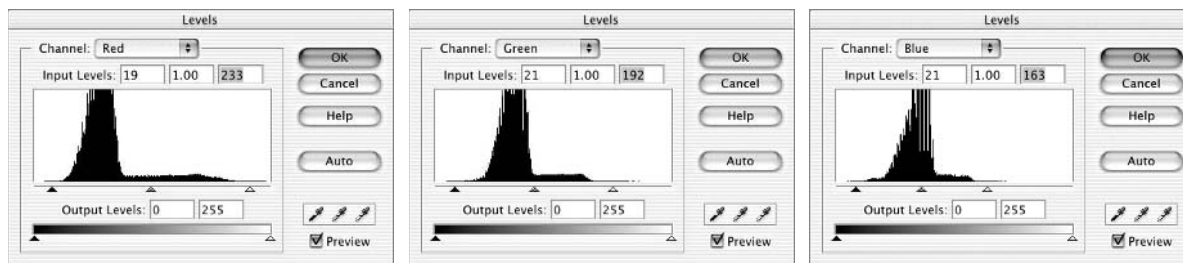
When making a Levels correction for color you must remember the following:

- Making a correction might remove a desired color shift.
- To retain existing color characteristics, make similar adjustments to histogram tails in the red, green, and blue components.

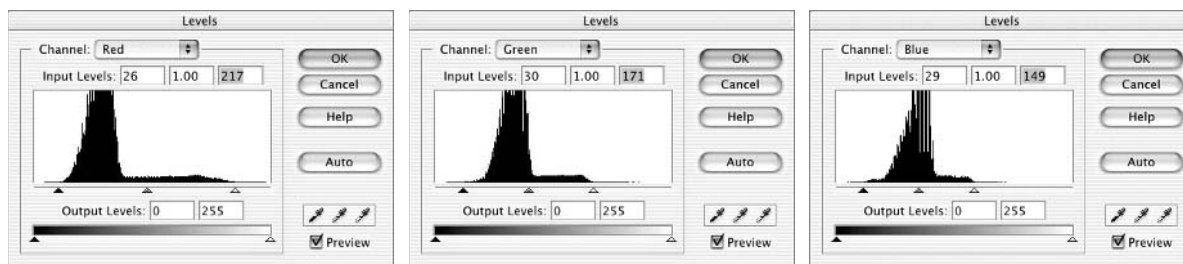
At times this type of Levels correction doesn't improve an image. Examples include extreme lighting conditions or adjustments that were made intentionally—such as in a sunset, or when an effect was achieved by color filtering (to purposely shift color in the image at the time it was taken).

Using a color version of the same image we worked with in the example for Levels correction of tone in Chapter 3, the Levels adjustment would probably look something like the sets of screens shown in Figure 4.6. (The result for the color image can be seen in the color section of this book.) The Levels correction in RGB will also improve the result when making conversions from color to black-and-white: increasing the dynamic range for color extends the dynamic range for the image, and the extended dynamic range enhances the image contrast. Make the corrections to the image yourself by using the `boat.psd` file included on the CD.





Half clipping



Full clipping



Original image



After full clipping

Figure 4.6

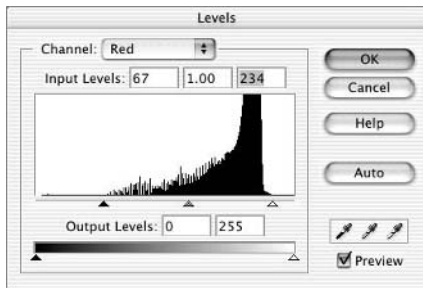
The corrections on the top row remove half the tail from each channel; the corrections below remove the entire tail. Color balance results from using a consistent approach to correcting image components.

If you make a Levels correction by using the guidelines for correcting tone in Chapter 3, the color in this image will spring back to life on your screen. In effect, all you are doing is redistributing the black-and-white tones in the red, green, and blue components to achieve a better dynamic range. Because light in the most dynamic image will run from white to black, your correction in Levels is just enabling the image to look its most dynamic. In the corrections for Figure 4.6 the rules are pretty clear-cut. Because the image doesn't have a decided skew, and there is a reasonable similarity in the quality of the histograms for red, green, and blue, the common rules hold.

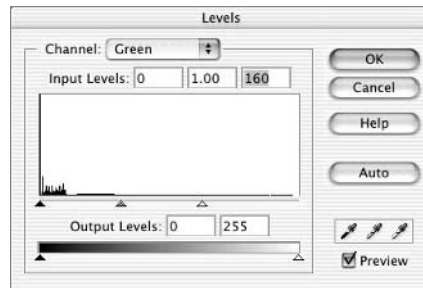


In Figure 4.7, however, the histograms for the RGB channels differ from one another and require some unusual treatment. The image, a close-up of a rose, is decidedly skewed toward reds. The first application of Levels is just a straight cut of the histogram tails, treating each channel as if it were a black-and-white image. However, a better result is achieved by doing an additional adjustment to the RGB. Because the first adjustment makes the shadows seem pale, the image requires a shift in the midtones to compensate—thereby pushing more image information toward the shadows. Once that's accomplished, the tone of the image seems more natural and balanced. See the result of these Levels applications in the color section. Use the image `rose.psd` on the CD to work the results for yourself.

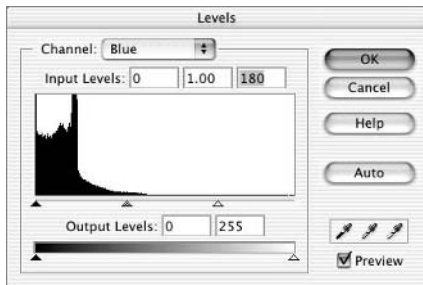
Figure 4.7  
Visual evaluation of the results suggests an additional change in the composite level.



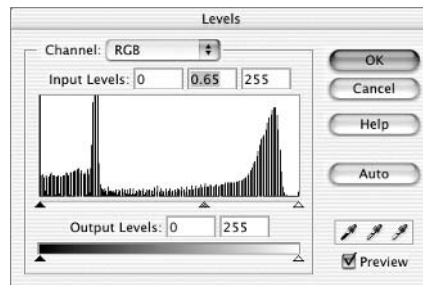
Clipping adjustment



Clipping adjustment



Clipping adjustment



Midtone adjustment



Original image



After adjustment



Levels adjustments can be used to manipulate tones in your images, as well as the balance of color and brightness. Coupled with other functions in Elements, Levels can be a powerful tool for correction and change. For example, if you mask areas of the image or components, you can target Levels redistributions to those areas and create specific changes, such as lightening midtones while leaving highlights and shadows unchanged. For more complicated alterations, you may want to consider using Curves, which we'll look at in the next section.

## Curves Correction for Color

Color casts in an image can result in flatness or unnatural color. A cast might be the result of poor image processing, varied lighting conditions (photos taken under fluorescent bulbs, for example), aging of the original medium (such as paper yellowing), or any number of other factors. Basic color correction with Levels often takes care of a lot of these problems. However, color casts and shifts between the lightest and darkest parts of an image are often a little more complex than looking at a histogram or doing a linear color correction in Levels. Curves have an added level of complexity that makes them perfect for fine-tuning color. In this section we will use the same monochromatic Curves Hidden Power tool we used in Chapter 3 and apply curve corrections to separated components of a color image to make complex color corrections.

The problem with using curves on color images lies in knowing exactly how to employ them to make effective corrective changes. It is difficult to look at an image and envision how a correction curve should look to fix problems in the image. While it may be easy to determine what looks wrong, correcting it can remain a puzzle.

For example, say you are looking at an image and the color of the subject's skin just looks wrong. If the skin tone looks wrong, the image will look wrong. If there were a reference that you could use to correct skin tone perfectly, everything else in the image would also fall in line. However, there is no absolute reference for skin tone. There are ways to estimate and approximate, but if approximations were good, you could just put your trust in the image you have on-screen and correct completely by eye. The difference in skin tones is vast. Not only does skin tone have many colors and shades in general, but the same person can have different skin tones at different times (for example, when the person has a tan, or when looking pale or flushed). This being the case, there is no value that can be used as an accurate reference for skin tone, no matter what chart you look at.

The best references to use in your image when you are considering correcting color are grays. Grays can act as references because they are easy to measure: they will always have even amounts of red, green, and blue. When you measure with the Eyedropper, the R, G, and B values displayed in the Info palette should all be the same—or very nearly so.

In a perfect world, you could find areas of your image that would be grays of exactly 25 percent (64,64,64), 50 percent (128,128,128), and 75 percent (192,192,192) black when corrected. You could then take measurements from these areas of your digital image to use as references for correction. All you'd have to do is set accurate white and black points and then correct the areas that should be gray by manipulating them. As a result, your images would color balance nicely. However, it usually isn't too easy to find gray references unless you place them in your image. Although you can do this using a reference card (a gray card, usually 18 percent gray, but anything of a standard flat tone will work), it is not something that everyone will take the time to do.

In many cases, grays that already exist in the image can be used as reasonable substitutes for a reference card. If you look closely, you may find something that should be a flat shade of gray, such as a steel flag pole, chrome on a car, asphalt...anything that should be flat gray can be useful for color evaluation. White and black objects (such as paper or car tires) can work, too, as long as they are not over- or underexposed, respectively. While objects can also vary in color to some degree and sometimes drastically (such as the mossy side of a tree), they will be easier to judge and correct for than skin tones.

Once you determine a target gray in your image, Curves can help you easily manipulate the targeted areas. All you have to do is measure the RGB values of the gray object, and then adjust the curves to flatten the color response. Flattening the color response can be done by shifting the curves to correct the sample toward gray while ignoring everything else in the image. When the changes are complete, the image color will be fixed as a by-product of normalizing the grays.



To determine the values for a gray object to use in correcting an image, do the following:

1. Examine the image to locate an object that should be closest to gray.
2. Be sure the Info palette is visible and that one of the sample types is set to RGB Color (RGB).
3. Select the Eyedropper from the toolbox. Select a sample option depending on the size and resolution of the image. Larger images with more resolution can usually stand broader sample areas.
4. Point the tip of the Eyedropper at the gray reference area in the image.
5. Note the grayscale and RGB values shown on the Info palette.
6. Make an RGB separation (using Split RGB w-Preview in the PowerSeparations category of Effects).
7. Adjust the Red, Green, and Blue layers with Curves so that the color tones reflect an average of the RGB values sampled at the reference area.



For example, say there is a flagpole in your image and you will be using it to make your color correction with Curves. You sample the tone and find that the area is 41 percent gray (looking at the Grayscale, or K value in the Info palette) and that RGB values in that area are 170,150,160. To get the gray to be flat (no color) in that zone, you'll want to make the RGB values equal. You do this by adjusting curves the same way you did when correcting tones—you'll use measured targets to correct your curve points. You can add points to the curve to make the corrections to separated components accurately according to the measurements.

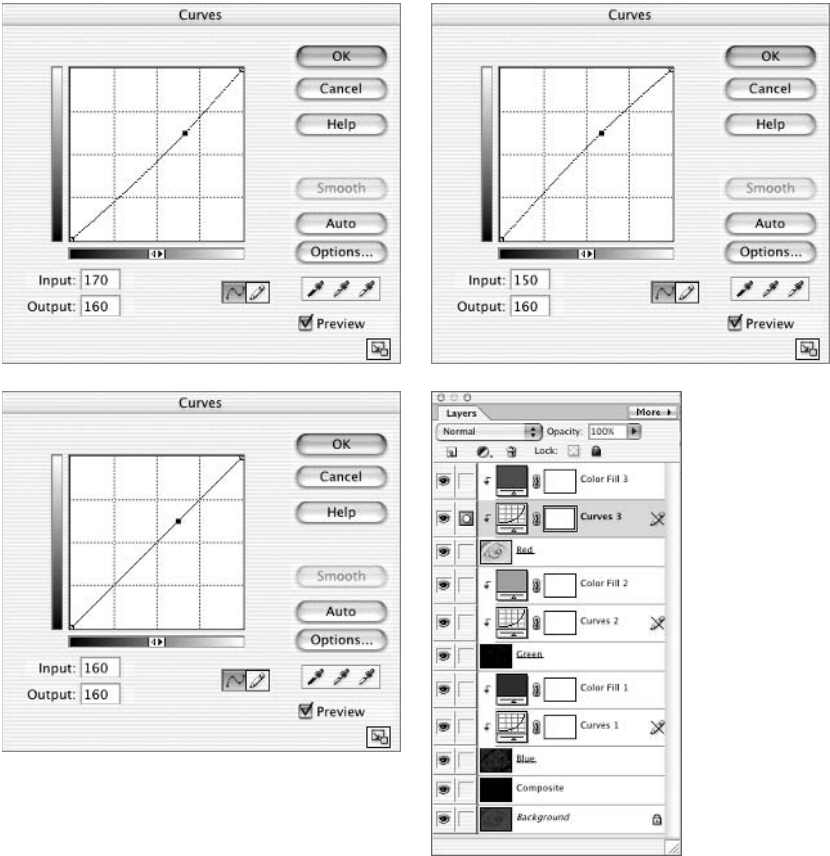


Because you want the gray to be flat, you can average the RGB values to find a target (170 + 160 + 150 = 480; 480 / 3 = 160). Once you have the average of the components, you change the values so that the components match the average. Figure 4.8 shows what the curves would look like. Here are the values for the curves:

Color	Input	Output
Red	170	160
Green	150	160
Blue	160	160

Figure 4.8

Adjustments would be made by changing the numbers in three Curves dialog boxes, one for each component of your separation.



To make the correction, you will add curves—one at a time, grouped to the split and layered RGB components—to change the value of the tones according to the numbers you have measured. Because of this level of control, your choice in the selection of a gray reference is important to the outcome of your color correction. For example, if you choose a gray that in reality is supposed to be slightly green and you don't allow for that in the correction, your final corrections will end up somewhat warm as a result. Again, visual inspection must work hand in hand with the numbers to achieve the best result.

Gray measures are given in percentages, and RGB measures are given in levels. The levels graph can work in either levels of gray or percentages. You can toggle between the two, and even use the curve to make the calculation for you (by placing a point on the curve and then clicking the percentage/level toggle on the bar below the curve graph). If you want to convert gray percentages (P) to levels (L) manually for your calculations, subtract the percent from 100 and multiply by 2.55:  $(100 - P) \times 2.55 = L$ . To convert levels to percentages, use  $100 - (L / 2.55) = P$ .

Because you are making an assumption about the gray (that it is indeed a flat gray rather than one with a slight tone), you may want to make an adjustment by using only a percentage of the change. Doing so may keep you from overadjusting. This concept is similar to not cropping off all of a large tail in Levels. If the difference in the colors is broad, or skewed to one of the channels, it may be preferable to average 50 or 75 percent of the difference. The more positive you are that the value you are measuring should be gray, the stronger the percentage of change you should apply. If you are positive the object is gray, make the change 100 percent of the difference. Scaling back to 50 or 75 percent respects some of the color measured in sampling the gray area of the image.

Using the previous example, take the difference between the measured and average value, multiply that figure by the percentage, and add it to the measured value:

$$\text{target value} = \text{measured value} + ([\text{average value} - \text{measured value}] \times \text{percentage})$$

In the case of the red channel, which measures 170, your equation would look like the following if using 75 percent of the difference (the average value is still 160):

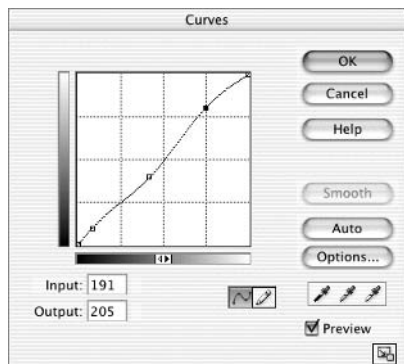
$$\text{target value} = 170 + ([160 - 170] \times 0.75), \text{ or } 170 - 7.5 = 163$$

Using an Output value of 163 makes the red change only 75 percent of the way, leaving some respect for the value you originally measured in the image. The following list shows the target values for making the change with 75 percent strength (respecting 25 percent of the original measurement):

Color	Input	Output
Red	170	163
Green	150	158
Blue	160	160

Figure 4.9

If using several sample grays, place them on the curve for each component in one step. This shows a Red correction for three measured values at 25, 101, and 205 levels.



instead of returning to the process several times, as shown on the curve in Figure 4.9. This ensures that you are changing the measured spots relative to one another; if you change the values sequentially on separate curves, the changes will occur independently and simply won't work right.

When measuring one level of gray, try to make it a midtone; if you are measuring two, use a lighter and darker gray; if you are measuring three, use quartertones (25 percent, 50 percent, and 75 percent, or 63, 128, and 191 levels). The

more evenly you divide the gray levels used for the correction, the better. The more levels of gray you correct for, the more accurate your correction will appear.



The following example uses the image from Figure 4.10 that was photographed by including a homemade 25 percent, 50 percent, 75 percent gray card in the image. The image was opened as a digital image and corrected for Levels. The gray card was then measured, and those measured results were applied as curves to make a correction. Use the `bleedingheart.psd` file on the CD to follow along.

Figure 4.10

The gray card (shown to the right) can help balance color at three levels of gray.



You can make your own gray card by making an image with scaled tones (for example, 25, 50, and 75 percent gray) and then printing that image with black ink only on your printer. This won't be entirely accurate, as black ink can have color and color can be influenced by the whiteness of the paper, but it can certainly work well in many situations—better than guessing what should be gray in your image. You could try experimenting with paint swatch samples from a hardware or paint store as well.

Use the following steps to adjust the curves according to your gray selection:



- 1. Measure the gray. Because there is a gray card in the example, there is an absolute reference. These are the original measurements:

Color	25%	50%	75%
Red	228	129	43
Green	210	151	91
Blue	209	143	78

- 2. Average the gray value for each tone (add the RGB values at each percentage and divide by 3). The results are 216 levels at 25 percent, 141 levels at 50 percent, and 71 levels at 75 percent. These averages are your target, or Output values.
- 3. Determine the target values for each component curve. Each curve will have three points, with the input reflecting the measured tone and the output reflecting the desired (averaged) result. Table 4.1 plots the points.

COMPONENT	INPUT	OUTPUT
Red	228	216
Red	129	141
Red	43	71
Green	210	216
Green	151	141
Green	91	71
Blue	209	216
Blue	143	141
Blue	78	71

Table 4.1  
Example Curves Settings for the Sample

- 4. Separate the image into its RGB components by using Split RGB from the Hidden Power tools located in the PowerSeparations category of Effects.
- 5. Activate and view only the Red component in the layers.
- 6. Double-click Curves from the Hidden Power tools located under the PowerTools1 category of Effects. Click the Group With Previous Layer check box in the New Layer dialog box and click OK.

7. In the Curves dialog box that appears, add three points to the curve: either hold Command/Ctrl and click once on each of the card swatches in the sample image, or click on the curve itself.
8. Ensure that the Curves dialog box is in levels mode, not percentages (you can change between levels and percentages by clicking the toggle switch on the bar below the curve graph). Click each of the points one at a time and change the Input and Output values to match those in the chart. Do this by entering the values from the chart in the Input and Output fields.
9. Repeat steps 6 through 8 for the Green and Blue layer components, viewing each layer individually by turning off the visibility for the other layers.



After all the corrections are performed using the card, you will have corrected for white and black, as well as 25 percent, 50 percent, and 75 percent gray. This gives you five reference points that should result in some pretty accurate color. This technique should be more accurate than using just one reference point, and can account for complex lighting. For example, if you take a picture in a royal blue room where there is incandescent lighting, ambient light (reflected) might tend to be blue, while direct light would be warm (or a little red). Highlights would tend toward red, while shadows would tend toward blue. Making multi-point corrections enables you to compensate for color difference and shifts at more points, leading to color that is more correct overall.

At this point, click Preview RGB from the Hidden Power tools in the PowerSeparations category under Effects to add color back to the image without flattening the layer channels. The preview should show improved color. Check it by toggling the visibility for the correction layers on and off.

When you are finished correcting the color, the image can be corrected for luminosity as well. You can correct tonal shift based on new black (K) measurements, or by using the RGB averages. If using measured percentages, you will take new samples of the gray card by using the K measurement in the Info palette; if you are using the averages (as in the following steps) you just use the RGB averages you already determined. Use the following steps:

1. Activate the Background layer for the RGB-separated image by clicking it.
2. Click Add Luminosity from the Hidden Power tools in the PowerSeparations category of Effects. This creates a Luminosity layer. Move this layer to the top of the stack.
3. With the Luminosity layer active, click Curves in the PowerTools1 category of Effects. Click the Group With Previous Layer check box in the New Layer dialog box and click OK.

4. Determine the values you will be using. You are adjusting to 25 percent, 50 percent, and 75 percent (191,128,63) for the card swatches based on the average RGB values (216, 141, and 71). So your value chart would look like this:

Color	Input	Output
Luminosity	216	191
Luminosity	141	128
Luminosity	71	63

5. Adjust the tone. Add three points to the curve by holding down Command/Ctrl and clicking on the three card swatches or by clicking on the curve. Then change the Input and Output values to the numbers determined in step 4.

The result of this correction will darken the image. Although it is based on measurement from the original, you may or may not want to keep that change. Click the view toggle for the Luminosity layer to compare before and after. To go somewhere in between, change the Opacity of the Luminosity layer by using the Opacity slider on the Layers palette.

You can split the RGB and Luminosity to make your corrections all in one separation by clicking Split RGBL (another Hidden Power tool) in the PowerSeparations category of Effects before making any adjustments. *RGBL* stands for red, green, blue, and luminosity. Making this separation will enable you to correct the luminosity separately from color while controlling both color and tone. It is a somewhat unique separation that cannot be provided even by Photoshop channels.



Although Levels and Curves are excellent correction tools, and making corrections absolutely by the numbers may seem pretty accurate, it may not produce the most pleasing color. If you have no idea where to start your correction, the techniques described here for basic color correction are definitely a fine start that will get you moving in the right direction. Because of other considerations (such as the limitations of the CMYK color space), you may get better color by replacing colors and tones, or by making corrections not so strictly tied to measurements, or in some cases by altering color completely. Making targeted and selective tone and color corrections can help with these additional changes, and we'll look at those approaches in the next chapter.



# Chapter 5

## Specific Color Enhancement

After making general color corrections with Levels and/or Curves, it is time to get specific about color. You can make changes with Levels and Curves in combination with later steps in corrections, but chances are that any additional changes you make will need to be targeted to a specific image area. Splitting image components out is helpful for general color correction and grayscale conversion, but there are other ways that separations can help you work with color and tone in images to get the best result. Separating components helps enable color adjustments, but components can also empower you to target even more specific areas of an image. This chapter looks into these possibilities in more depth by introducing tools, toning, calculations, and CMYK color.

### Using Hue/Saturation for Color Adjustments

#### Saturation Masking

#### Adjusting Color Balance

#### Painting in Color Changes: History Brush

#### Application

#### Making Duotones

#### Calculations and Channel Mixing

#### Separating CMYK Color

#### Using CMYK Color

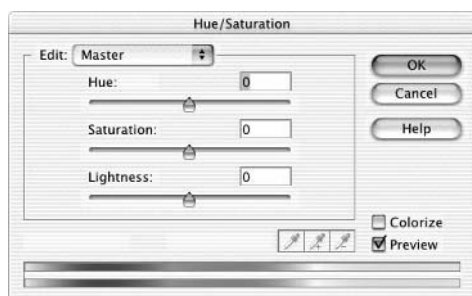




## Using Hue/Saturation for Color Adjustments

Hue/Saturation (Enhance → Adjust Color → Adjust Hue/Saturation, or Layer → New Adjustment Layer → Hue/Saturation, or press Command/Ctrl+U) is a powerful but easy-to-use color-correction tool. It enables you to adjust color based on hue, saturation, and brightness (HSB). HSB measurements are used on the Color Picker along with RGB, and are used to mix color—often in painting. *Hue* adjusts colors as if you were selecting color from a 360-degree color wheel. *Saturation* controls the density of the color; greater saturation means that the color in an image has the potential to be richer (the actual appearance of color is influenced by tone). *Brightness* (or lightness) affects the tone in the image. Hue/Saturation can affect all the color in the image or it can be confined to affecting only a specific range of color, using the Edit drop-down list in the Hue/Saturation dialog box (see Figure 5.1).

Figure 5.1  
The Hue/Saturation  
dialog box



✓ Master	⌘~
Reds	⌘1
Yellows	⌘2
Greens	⌘3
Cyans	⌘4
Blues	⌘5
Magentas	⌘6

The Hue/Saturation feature can help with color corrections by providing visual feedback and a relatively easy interface. When using the Hue/Saturation dialog box, all you have to do is adjust the sliders and use the image on-screen as a preview to watch what happens as a result of your adjustments. For the most part, as long as you have made proper Levels corrections, you won't have many additional color changes to bother with because Levels adjustments will have corrected for some issues of saturation, hue, and lightness (brightness).

Although it may not be the best use of the feature, you can open the Hue/Saturation dialog box and play with the sliders to see if you happen to stumble on an adjustment that improves the image. Testing adjustments by using Hue/Saturation can yield pleasant surprises. Unless you use selection or masking to target a color change, global adjustments to hue, saturation, and brightness will tend to require only a slight movement of any of the sliders—unless you are looking to achieve a special effect. You might be a little wilder with your experimentation if the subject in the image is something like a flower that may not have a specific color reference (unlike, for example, skin tone—skin has real-world limits and can't be, say, green or purple unless painted).

In making straightforward changes with Hue/Saturation, adjusting Hue will often throw the color out of balance swiftly, and adjusting Lightness may provide too drastic and primitive a change in tone for color correction (it has other uses as we will see). Lightness is the least attractive adjustment for most images when used by itself: far better to make these types of changes with Levels and/or Curves. However, you can occasionally get some pleasant results from increasing Saturation in some images.

To make a correction using Hue/Saturation:

1. Select the appropriate portion of the image to target your corrections. You can do one of the following:
  - Target the whole image.** Flatten your image (choose Layer→ Flatten Image) or select the top layer in the stack if adjusting the whole image (press Option+Shift+] / Alt+Shift+] to activate the top layer, or just click it).
  - Target a layer.** Activate the layer you want to correct by clicking it in the Layers palette, if making a selective change based on layer content.
  - Target a specific image area.** Create a selection or mask to define a specific area of the image. This targeting can be done by using selection tools or masking techniques, or by making a selection from the Edit drop-down list in the dialog box. Any active selection will become a layer mask for the Hue/Saturation layer, masking nonselected areas.
2. Open the Hue/Saturation dialog box by creating a Hue/Saturation adjustment layer. Choose Layer → New Adjustment Layer → Hue/Saturation. If targeting a specific layer for change, be sure the Group with the Previous box is checked in the New Layer dialog box.
3. When the Hue/Saturation dialog box is open, attempt to adjust the Saturation by moving the slider a few points to the right of the center position to see if greater saturation improves the color dynamic.

Admittedly, this procedure isn't terribly exciting. The result is that you will get more saturated color, and either prefer it, or not. One other option on Hue/Saturation is the Colorize option. The Colorize option is like applying a layer filled with a single color set to Overlay mode (at 50 percent Opacity). The difference is that you can adjust the Color, Saturation, and Lightness sliders on the Hue/Saturation dialog box to achieve the color effect you want rather than selecting a color from the Color Picker.

You needed this introduction to the Hue/Saturation function because the tool also offers some unique opportunities for selective correction when used in combination with other features and tools. Snapshots and Luminosity separations in the Hidden Power tools help make selective corrections, and selective correction is where the real power of Hue/Saturation lies. That's what we'll look at in the next section while making a saturation-based mask.

## Saturation Masking

If you want to make a selective color change (if you have a specific color or color range that you want to change or isolate from change in a shot), you may target those colors by using Hue/Saturation to help in creating a mask. You can make more drastic changes after

targeting than you could with general adjustments because the rest of the image won't change. Clever use of the Saturation slider in the Hue/Saturation dialog box can help you quickly create masks based on hue. These masks can help you target image areas based on color so you can make corrections and changes by using other features and tools.



The image in Figure 5.2 has several distinct colors that might be adjusted independently. (You'll have to take a look in the color section to see the color detail.) The image (*bottle.psd*) is provided on the CD for your experimentation and so you can follow along with the masking procedure. In the example, the color of the bottles is already a rich blue. If you want to keep it that way while making other changes, you can target other areas by freezing (masking out) the color of the bottles. This will enable you to alter color in the other parts of the image without changing the bottles. Just a warning: as we go along, this image will look quite awful before it begins to get better, because of what you are doing to build the mask.

Figure 5.2

This image offers several opportunities for hue-based color isolation.



The process of creating a mask based on color and saturation is basically the same for any image. You have three tasks to complete in order to make the saturation mask:

1. Prepare the image for making a color range choice by adding some key layers that help you create the mask.
2. Choose a color range. Select the color range you want to either change or keep from changing by using Hue/Saturation functions.
3. Use the color range selection and preparations to create a useful color mask.

The following three sections expand on the details for each step in the process.

## Preparing the Image

To prepare this image, you'll need to set up a few layers that will help you make the mask. You create these layers for the sole purpose of being able to commit changes you make when using layer blending options. Some of the layers depend on modes or calculations for the result that is displayed. Until you commit the changes by merging layers, the changes are only an appearance. You need to commit the changes to use them.

1. Open a flattened image, or flatten an open one. For this example, I used `bottle.psd`, found on the CD.
2. Duplicate the background. You'll use this layer to select the target colors for masking and to create the mask. Name the layer **Saturated Colors**.
3. Activate the background (press Option+Shift+[ / Alt+Shift+[).
4. Create a new layer. Name it **Mask**. This layer should remain transparent until the final steps of the exercise, and then it will become the mask.
5. Create another new layer and fill it with gray. To create the gray fill, choose Edit → Fill Layer. When the dialog box opens, set the Contents to 50 percent Gray, Blending Mode to Normal, and Opacity to 100 percent (Mode and Opacity are set to these by default, so you may not need to change them). Name this layer **Commit Mode 2**.
6. Duplicate the Commit Mode 2 layer created in step 5. Name this **Commit Mode 1**. There are two changes to commit using layer modes, and this upper layer will be the first in line, even though you created it second.



## Choosing a Color Range

Now that you have prepared the image, you can choose the colors to be excluded, or masked out, and made safe from change. You will temporarily desaturate the area of the image that you want to keep as it is, leaving only the color that you plan to change visible. The remaining saturated colors will be used to create your mask.

7. Activate the Saturated Colors layer by clicking it.

8. Choose Layer → New Adjustment Layer → Hue/Saturation. This initiates the creation of a Hue/Saturation adjustment layer at the top of the layer stack. Select the Group With Previous check box in the New Layer dialog box when it appears, and click OK to continue. The Hue/Saturation dialog box opens.
9. Select the Blues option from the Edit drop-down menu. The object of this step is to enable the color sliders at the bottom of the Hue/Saturation dialog box. You can do this by selecting any color other than Master from the drop-down list. I suggest Blues

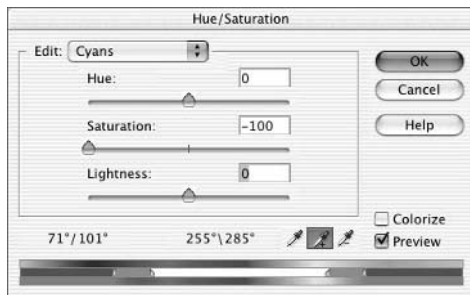



Figure 5.3

For the example, Blues was selected as the closest range for the current target for masking the blue bottles; the sliders automatically set to that range.

for this example, because it is closest to our target range for masking the bottles. We'll adjust the range in a moment. When making changes in other images, try to choose the color that best matches the color you want to mask. When you make the selection from the drop-down list, note that the eyedroppers become available in the dialog box and that the color bar at the bottom reveals sliders as in Figure 5.3. The sliders on the color bar represent the color range that will be affected by changes made to the Hue, Saturation, and Lightness.

10. Drag the Saturation slider in the Hue/Saturation dialog box all the way to the left. If you have selected a good representation of the color you want to work with, the color will desaturate. Don't let that worry you; it is starting to build your mask, which will be based on desaturated areas of the image.
11. Adjust the range of color that you want to keep from change—in other words, sample the color(s) that you want to add to the mask. In this image, use the Add To Sample eyedropper and click on anything left in the image that is blue. Most blue objects should have been included already, but there may be areas such as in the vase that you would like to include (see Figure 5.4). If you make a mistake, you can clean it up by: changing to the Subtract From Sample eyedropper, adjusting the sliders manually to contract the range by clicking and dragging them, or just starting over by holding down the Option/Alt key and clicking the Reset button. All color that you add to the color range will appear to desaturate in the image; any colors removed from the range will turn back to the original color. Color range adjustment can be accomplished in any of the following ways:

**Use the Add To Sample eyedropper.** Click the plus eyedropper icon  and use that to sample colors from the image that you want to add to the range, as shown in Figure 5.4.


**Use the Subtract From Sample eyedropper.** Click the minus eyedropper icon  and use that to sample colors from the image that you want to remove from the range.



Figure 5.4

There are blues in the vase that you may want to include as well. Dragging the Add To Sample eyedropper over the vase will include these blues (actually cyan) as well.

**Adjust the sliders manually.** Click directly on the slider at the bottom of the dialog box and drag it to move it. The close-up of the color range slider in Figure 5.5 shows some details of the slider. The color bar above the slider shows the range of color being affected, and the color bar below the slider shows the resulting color spectrum. The dark gray area between the absolute markers (the rectangular markers on the inside) shows the range that will be affected 100 percent by changes. The gray area between the absolute markers and the fade point markers (the triangular markers on the outside) shows where the color range will be affected in decreasing intensity (100 percent to 0 percent). Everything outside the range of the markers will not be affected.

Figure 5.5

**Close-up of the color range sliders**

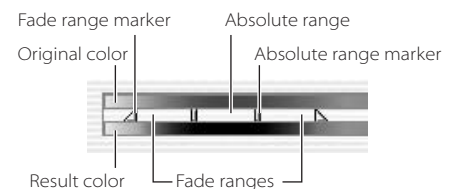
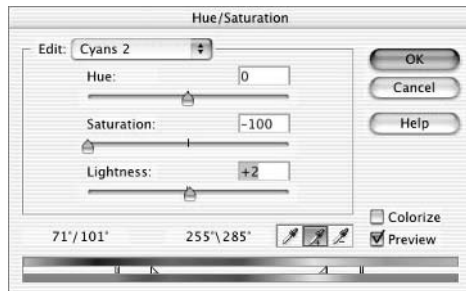




Figure 5.6

After adjusting the range by using the eyedroppers, the sliders will have shifted position to represent the range you have selected. The name of the color choice has automatically changed here to Cyan 2, to reflect a custom color range.



12. After the range is set (see Figure 5.6) and the colors you want to mask are desaturated, accept the changes for the dialog box by clicking OK.

You can imitate my result by changing the color range to match the settings shown in Figure 5.6 by moving them manually if your sample doesn't achieve the same effect. However, the point is to create the mask—not necessarily to match my results exactly. Depending on how you made the color selections, your range may be slightly different, and that's okay.

## Creating the Mask

With the color range you want to mask desaturated, you can use the image color saturation that is left to create the mask.

13. Merge the Hue/Saturation change with the Saturated Colors layer below by activating the Hue/Saturation layer (if it isn't already) and pressing Command/Ctrl+E. This commits the changes and shows the original image with the selected color range as desaturated.
14. Change the mode of the Saturated Colors layer to Color (select Color from the drop-down mode list at the top of the Layers palette). This shows image color saturation against a 50 percent gray background. The gray represents unsaturated image areas and image areas you want to mask, as well as other areas that previously were not saturated (white, gray, and black).
15. Merge the Saturated Colors and Commit Mode 1 layers by pressing Command/Ctrl+E. This commits the changes. The name of the layer should be Commit Mode 1.
16. Change the mode of the Commit Mode 1 layer to Difference. Difference mode compares the pixels in the current layer with the pixels below. If there is no difference, the result will be black. The greater the difference, the lighter the result will be. The desaturated areas of the image and blue bottles will appear as black; anything that is not completely black means there is some saturation in that area—the lighter and brighter the result, the greater the saturation.
17. Merge the Commit Mode 1 and Commit Mode 2 layers to commit the changes. To do this, activate Commit Mode 1 and press Command/Ctrl+E. The resulting layer should be named Commit Mode 2.
18. Open the Levels dialog box (Enhance → Adjust Lighting → Levels or Command/Ctrl+L) and make a Levels adjustment by pushing the white RGB Input slider to 128. This intensifies the brightness of the saturated areas (everything that isn't black).

19. Double-click Drop Black from the Hidden Power tools. Drop Black is found on the Styles and Effects palette. With Effects selected in the drop-down list to the left, choose the PowerTools1 category and double-click Drop Black. This function makes black in the current layer transparent, revealing the blue from the bottles and other unsaturated areas of the image below.

The Drop Black function makes pixels between 0 and 2 levels (or 100 percent to 99 percent black) completely transparent, and then fades the opacity of dark pixels between 3 and 31 levels (or 99 percent to 90 percent black). This helps blend the saturation masking.

20. Merge the Mask layer and the Commit Mode 2 layer by activating the Commit Mode 2 layer and pressing Command/Ctrl+E. This commits the Drop Black changes and leaves part of the mask layer transparent. The resulting layer should be named Mask.
21. Duplicate the Background layer. Change the name to **Unmasked Color**.
22. Move Unmasked Color layer to the top of the layer stack.
23. Group the Unmasked Color layer with the Mask layer by pressing Command/Ctrl+G.

In the end, the Layers palette should look like Figure 5.7. Steps 21 to 23 recolor the masked image area. It will look like the original image, but you have successfully masked your target area, as we'll see in a moment.

If you turn off the visibility for the background at this point, you will see the area that you have isolated in original color with a hole where the color portions of the bottles were. Chances are that the complexity of the area is nothing you would have wanted to select manually. You can make changes to the areas outside the bottles freely by grouping any new adjustment layers that appear above the Unmasked Color layer in the Layers palette. This targets change to everything but the bottles. You can make changes to the bottles isolated from the rest of the image by grouping changes with the Background layer.

For example, if you want to make a Hue/Saturation adjustment layer change to the blue bottles and a Color Balance change to the rest of the image (Unmasked Color), the placement for these adjustment layers is shown in Figure 5.8.

Saturation masking enables you to mask any color in any image so you can work on distinct colors separately—in this way using image color as a means of selection, masking, and targeting a specific area of the image for change. Saturation



Figure 5.7

Many changes result in just these few layers. The mask result is very powerful and useful.



Figure 5.8

This Layers palette shows how to set up Hue/Saturation adjustments made to the masked color range and Color Balance for the Unmasked Color.



masking is different from working with separated color as you do when separating RGB tones, because you are isolating colors that may have information in red, green, and blue components all at the same time. Not only can this method be used to isolate specific colors, but it can also be used to make selections of objects based on color—or lack of it. Masks you create can be loaded as selections by pressing the Command/Ctrl key and clicking the Mask layer. If the mask is loaded as a selection when you create an adjustment layer, changes in the layer will be reflected in the layer mask for the adjustment layer.

A function is provided in the Hidden Power tools to quickly work through the previous procedures and create a saturation mask. Just double-click Saturation Masking under PowerTools1 on the Effects palette and you will be walked through all the steps. Although this tool enables you to make saturation masks with the click of a button, you should practice this manual technique first, and work through it several times in different variations. For example, try isolating the red or yellow flowers in the image (the red is a challenge). Understanding how this works is invaluable when working on other images that need isolated corrections, or when working on complex separations such as creating the K (black) component in CMYK (which we'll be doing later in this chapter). You can do a lot more with the concepts that are being mined here than just make saturation masks.

## Adjusting Color Balance

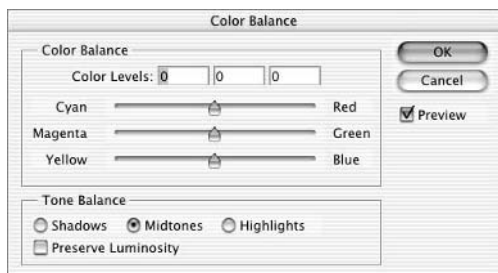


Figure 5.9

The Color Balance dialog box looks much like the Hue/Saturation dialog box, but the controls produce different results.

*Color balance* refers to the balance of color between opposites. For example, green and magenta are opposites; in order for image color to look right (not too magenta and not too green), these colors have to be in balance. Color balance tools enable you to shift the balance between these opposites to realign the color. Adjusting image color balance allows you to compensate for color shifts that may have occurred in capture or correction, or to add shifts that create a pleasing look.

The one problem with Color Balance is that, like Curves, it is apparently missing from the Photoshop Elements interface. The Hidden Power tools included on the CD allow you to access Color Balance by simply double-clicking Color Balance from the PowerTools1 category under Effects. This will open the Color Balance dialog box (see Figure 5.9) and will create an adjustment layer. When the changes are accepted and the dialog box is closed, the adjustment layer cannot be edited.



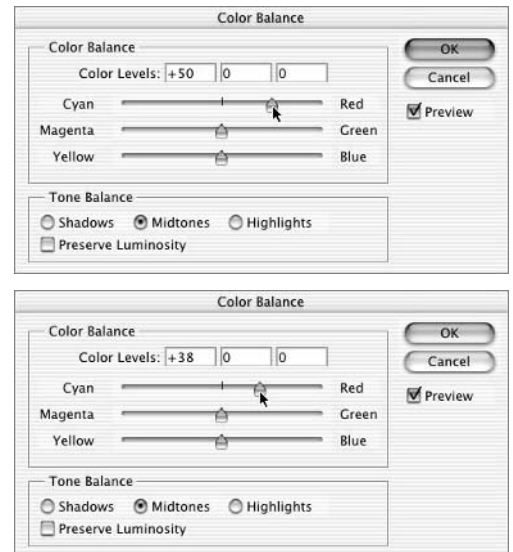
Color Balance is easier to work with when making color adjustments than Hue/Saturation. It is also often more effective at bringing out pleasing color by removing counter color—or colors that effectively work against one another in your images. It is great for finessing, rather than manhandling, color elements. Color Balance enables you to balance highlights, shadows, and midtones for cyan/red, magenta/green, and yellow/blue. This

provides an advantage when colors have gotten out of balance for whatever reason. For example, if yellowish highlights have been tainted by blue, they flatten and muddy toward green. Shifting the color back can make the color seem more vibrant. All you really have to do is open the Color Balance function and experiment with application to pick the most pleasing result.

To make adjustments, open your image, open the Color Balance dialog box (double-click Color Balance in the PowerTools1 category under Effects), and use the following steps. As you draw each slider back and forth, you will note the image tints to extremes; your goal in these changes is to find the point where these extremes balance and leave the slider at that juncture.

1. Starting with the Midtones radio button selected, make a radical shift in the top slider (Cyan/Red). Slide from approximately  $-50$  to  $+50$  (more if you find it helpful) and watch the effect on the image. This gives you an idea as to whether a move with the slider makes a change that seems visually pleasing in the color of the image overall, and should give you a hint as to what the balance looks like for that slider in the extreme positions. It is unlikely that an extreme will look balanced.
2. Pick either  $-50$  or  $+50$  as the more pleasing. Compare as many times as you need to make the decision.
3. When you have selected the more pleasing slider position, compare it to the midpoint between the two original selections. In this case, that would be a comparison between the center ( $0$ ) and the point you found more pleasing ( $-50$  to  $0$ , or  $0$  to  $+50$ ).
4. Make a few such comparisons, picking the best of your two choices, each time dividing the field in half until you arrive at a final result. See Figure 5.10.

Figure 5.10  
If the better choice was  $+50$ , your next comparison would be between  $+25$  and  $+50$ . The winner of that decision goes against  $+38$ .



Feel free to experiment with the Preserve Luminosity check box. When it is checked, Elements will attempt to keep luminosity from changing. If you are trying to keep luminosity intact, apply the Color Balance layer in Color mode—it will prove more predictable.

5. Repeat steps 2 through 4 for the Magenta/Green and Yellow/Blue sliders.
6. Repeat steps 1 through 5 for Highlights and then for the Shadows.

7. To be reasonably sure you've made the best choices (you won't be able to open the dialog box again after you have closed it), run through steps 1 through 6 a second time. This will help you to adjust for balance changes you made.
8. Click OK to accept the changes.
9. Compare the image before and after the correction by toggling the view for the Color Balance layer.

While the application here may seem conceptually simplistic, as long as your monitor can be reasonably trusted, you will find that this trial-and-error method can greatly improve your images—in tone, contrast, and color. You'll also get good rather quickly in determining the best slider positions, and will spend little time doing comparisons and cutting down your options. Once you gain confidence, you'll pay very little attention to the dialog box, and just watch the image as you move the sliders. This adjustment can be used in conjunction with other tools to achieve targeted results as well. For example, you might use it in combination with a hue-based color mask created with Hue/Saturation. These types of combinations of tools and masking give you infinite control over targeting image color results.

## Painting in Color Changes: History Brush Application

Sometimes it is easiest to get the color you want in different portions of an image by using different corrections. You may find that making one part of an image look good comes at the expense of absolutely ruining the color in the rest of your image. This little dilemma might make it seem that there is no way to make a compromise between the two without compromising the image color or making complicated selections.

As it turns out, you don't have to settle for a compromise. There is a way to make changes to your image—even drastic ones—and store those changes so you can use them later. Using some Hidden Power tools, you can then paint only a portion of the color back in.

Photoshop allows you to do this with something called the History Brush. The History Brush lets you select a *snapshot* (a stored state of your image) as the source for painting so you can apply that version of the image back into your present image by using a brush. It enables you to do all sorts of things such as color changes or spot application of filters (apply the filter, take a snapshot to use as a source, and then jump back to the original image and paint changes in as desired).



Photoshop Elements doesn't have a History Brush tool and has no way to take snapshots. But why should that stop you? Using Hidden Power tools, you can store a version of your image in a way similar to taking snapshots by double-clicking the Snapshot tool. The stored versions (or snapshots) are saved in layers, and the visibility is turned off so that you can return to them as needed. Using layer masking will allow you to easily imitate the History Brush: you can group the snapshot to an empty layer, turn on the visibility for the

snapshot layer, and use brushes to fill in the mask. As the mask layer becomes solid, it will look like you are painting back changes stored in the snapshot.

To take a snapshot of your image, be sure it looks like you want it to, and then double-click Snapshot in the PowerTools1 category under Effects. When you take a snapshot, several things will happen in the image. Whatever you see on-screen will be merged (retaining transparency, if any), and a copy of that will be stored in a new layer. The snapshot layer will be stored at the top of the layer stack, above and grouped with a Snapshot Mask layer. The snapshot content will be hidden because it is grouped to the mask and the mask is empty. Leave the snapshots in storage until you want to apply them. The rest of the image will be left exactly as it was when you made the snapshot. See Figure 5.11.



**Figure 5.11**  
After taking a snapshot of the background, the layers look like this. You can have multiple snapshots.

Between making different snapshots, you have several options for continuing to work and make changes and corrections:

- Leave everything as it is and just keep making changes.
- Throw out the changes you made to achieve the snapshot by deleting those layers (leaving the snapshot, of course) and then make new changes.
- Retain the changes and start with the original background.
- Retain the changes and start from the snapshot.

Your choice depends on how much information you really want to keep and how you like to work. If you just keep going from where you are, you can retain information in layers you might want to use later. On the other hand, if you are sure there is nothing you want to retain, tossing out the changes will keep the important information in the snapshot and make your image a little more lean.

You may want to retain some or all of the layers used in making the changes that lead up to creating the snapshot so that you can make adjustments (for instance, if you want to reshoot Snapshot 1 with additional changes or in a different style). You might also want to retain the layers if you just aren't done with the image yet (for example, if you have to go to work and can't complete what you are working on right then). To retain the layers used in making the changes, just leave them there. Use a duplicate of the Background or Snapshot layer and drag it just under the Snapshot layer at the top of the layer stack. Duplicate the Background layer so you will be able to return to the original image, or duplicate the Snapshot layer to continue working from where you were. If the plan is to keep the layered changes and return to working on the original, the layers will look like Figure 5.12.



**Figure 5.12**  
With Background Copy 2 blotting out the changes made earlier, you can step back to the original image without losing previous corrections.

Technically, you can save the image with all the layers and changes by using this snapshot method—saving snapshots is something even Photoshop doesn't allow. You may want to thin the layers out as you go along to keep the file size small. Although retaining snapshots and layers can be an important time-saver, it can also fatten your image heartily. Be sure you need what you save.

The purpose and application of this type of change may be best looked at in an example. We can run through an application of the tools in context, and you can see how they work.

Figure 5.13 shows a butterfly. In the color section you can see that this butterfly landed on an object that was nearly the same color as itself. While the color is interesting, you may prefer a little more variety to make the butterfly stand out. Because the color of the background is similar to the butterfly, Hue/Saturation masking wouldn't accomplish the change, because it would select both the color in the butterfly and the background. And while you could make some sort of complicated selection, there are much easier ways.

Start by making a general correction to the image to be sure you are starting with the best representation of tone and color. With that complete, it is time to start exploring opportunities to change the image. In this case we'll change the color of the butterfly; you could change the background by using the same technique.

Figure 5.13

A blue butterfly rests on a blue background, but you might want some more interesting color distinction.



The process of making the change occurs in two stages, preparation and application.

**Preparation** First, do some exploring and experimenting. Instead of working with complicated selections, you can simply adjust different versions of your image to create sources for the color you'd rather see in specific areas of the image. Taking snapshots will store the changes; then you can later use the snapshots to recall and apply the changes to your original image.

**Application** Once the source color is all set up in the original image, you just paint the color back into the original image by using brushes.

We'll explore the preparation and application in more detail in the following sections.

## Preparation

To prepare for changes to the butterfly, you will make some corrections to separate areas of color and freeze those changes by taking snapshots. Each snapshot can focus on a different color or element that you will want to work back in later.

1. Open the butterfly image (`butterfly.psd` on the accompanying CD) and duplicate the Background layer. You should work on this duplicate. Leaving the Background layer alone will allow you to return to the original content later to adjust for different colors.
2. Adjust the color of the image so that the dark portion of the butterfly looks how you want it to look. Don't worry at all about what you do to the blue—or any other color, for that matter. Don't bother to use selection or other masking; just change the color/ tone. You can use any tools or filters that you want, but for this example use the Color Balance Hidden Power tool (find Color Balance on the Styles and Effects palette under Effects in the PowerTools1 category). I added yellows and reds to the shadow to warm up the black.
3. Once the dark portion of the butterfly looks how you want it to look, take a snapshot by double-clicking Snapshot from Hidden Power tools (also found under the PowerTools1 category in Effects). This will be your source for the dark portion of the butterfly. Name the snapshot **Dark Portion**. It will appear at the top of the layer stack.
4. Make changes to adjust the butterfly's wing color to however you would like to see it. This may require deleting and enhancing other changes that you made to create the Dark Portion snapshot—and that is okay because you have achieved the objective of those changes and stored them as the snapshot. Duplicate the Background layer and drag it below the Snapshot Mask layer to give you a fresh starting point. This is a good time to use Hue/Saturation to make the change, editing the default Master color set. Again, adjust the color on the wings and ignore everything else. I chose to make the wings look a vibrant lime-green.



5. Make a snapshot of the image when you have completed the change for the wing color. Name the snapshot layer **Wings**.
6. Make changes to the image to target just the color of the spots on the bottom of the wings. Again you can duplicate the Background layer and remove other color changes. I used Hue/Saturation, selected Red from the Edit menu, and fiddled with the sliders to get a brighter, more saturated red.
7. Make a snapshot of the image when you have completed the change for the spots on the wing. Name the snapshot layer **Spots**.

You could continue to make changes for other elements in the image, but these three changes are enough to give you an idea of what you can do.

## Application

Now that the snapshots are created, you are ready to apply them to make your changes to the butterfly.

8. View the original image Background layer. This may require turning off visibility for other layers you have created. As an option, you can duplicate the Background layer and bring it up below the snapshots.
9. Click the Snapshot Mask layer for the snapshot source you want to apply. This activates the visibility for the Snapshot Mask. Start with the Wings snapshot, because the resulting change will be the most dramatic.
10. Choose a painting tool (the Airbrush is a personal favorite) and a brush for the application. I chose a brush size of 200 pixels that is fairly soft (30 percent hardness).

Brush selection and dynamics in step 10 matter, and should make sense for your application. If you are going to be painting back image areas that are large and mostly open, select a large brush; if you are painting back smaller areas, choose a smaller brush. Solidity also matters: an opaque brush will create an opaque mask, and a brush that is soft and/or applied with less than 100 percent opacity will only partially apply the snapshot content.

11. Although it doesn't really matter, choose white for the foreground color. Any color will work, but the idea of masking is usually based on black-and-white, where white represents unmasked areas.
12. Paint over the wing area in the Snapshot Mask layer you selected by clicking and dragging the paintbrush. The content from your snapshot source will fill in as you go. To compare the change before and after, toggle the visibility of the Snapshot Mask layer for the snapshot you are working with.



13. Choose the next source by clicking the Snapshot Mask for that snapshot. Repeat steps 10 through 12, choosing an appropriate brush size for the changes you want to make and painting in turn on the Snapshot Mask layer for the Dark Portion and Spots snapshots.

After you have painted in information from the Dark Portion, Wings, and Spots snapshots, your butterfly should look significantly different. By the time you are finished, you should have painted in some interesting color that you have from each snapshot source. This is eons easier than making complex color selections and often a lot more fun.

You can adjust the results of applying any of the snapshots at any time by using the Eraser tool to touch up the mask, and changing layer modes and opacity. When you do, make the changes on the *Snapshot Mask* layer, not the snapshot itself. If you change the snapshot, it permanently changes the content of the snapshot and/or reveals the content of the mask (which would be white, if you took the suggestion I made previously). If you really botch the application of a snapshot and want to start over, just activate the Snapshot Mask layer for the snapshot you want to do over, Select All (press Command/Ctrl+A), and press Delete on the keyboard. This will clear any painting you have done in the layer so you can start with a clean slate.

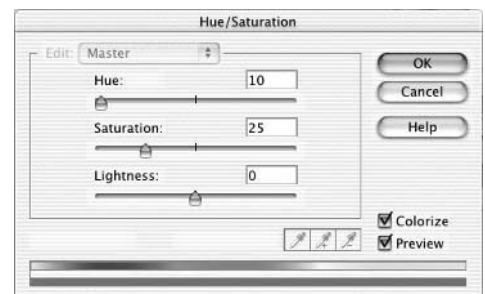
Snapshots are simple in concept: all they do is store an image state and enable you to apply that information later by using layer masking properties. Although they are simple, they can enable you to paint in filter applications, and make other color corrections and changes with the flexibility of a changeable layer mask. A snapshot can be used to spot-apply any change and is a versatile tool for spot corrections.

## Making Duotones

A *duotone* is an image in which two colors are applied as tone to create a colored effect. The idea behind duotones is often to create a richer feel for black-and-white images, perhaps to add a little color and maybe even increase the dynamic range of a printed image. Duotone effects for photographic images have traditionally been achieved by chemical processes for toning prints (sepia toning as well as other special processes). On the printing press, true duotones are created by applying two or more inks based on image tone. We'll look at how to control duotone results digitally and in print. Although there is some information on printing and halftones here, you may want to take a look at Chapter 9 for more options on getting true duotone prints from a home inkjet.

Creating a duotone effect digitally in Photoshop Elements can be done a number of ways. For example, you can rather quickly emulate a sepia tone by opening Hue/Saturation, clicking the Colorize option, and shifting the slider to achieve a duotone effect (see the Hue/Saturation palette in Figure 5.14). When you print to an inkjet printer, the result will often be satisfactory—though not optimal.

Figure 5.14  
Clicking Colorize and setting the Hue to about 10 will give a decent sepia tone to any black-and-white image.





You could apply a color in a fill layer that is set to Color mode, or you could also experiment with colorizing by using gradient maps. Each of these methods may achieve the effect of duotone color, and the image might print out just fine on your home inkjet, but the methods do not produce a true duotone and may not be the best solution. Certainly duotones can simply be pleasing to the eye, but true duotones pose specific advantages in printing. Using more than one ink to print halftone images on a press can take advantage of multiple screening angles, and can produce a better richness and depth in the intended result. Other advantages to using duotone over black ink alone in prints include lessening the appearance of printer dots and increasing ink coverage on the page. Duotone effects can also help to correct and emphasize subtle tonal detail.

When printing halftones with two or more inks, using two black inks can improve a printed image because the two sets of dots will be screened differently (the rows of dots applied at different angles). The increased number of halftone dots can result in better application of inks. (You'll learn more about halftone dots in Chapter 9.)

When duotone images are used in spot-color print jobs, the purpose is often to limit color due to budget constraints. To create effective duotones for this purpose, you have to be able to control the color separation for two inks (such as black and a spot color). If not, you will have to pay a technician to do the separation for you, or worse, pay for four-color work (CMYK printing) on a two-color job. Because there is no built-in duotone handling in Photoshop Elements, there is really no direct way to save the separate plates for duotone colors. Add to the difficulty the fact that there really isn't a means to handle spot color in Elements in the first place, and you have a problem. Luckily it is another problem that you can solve with Hidden Power tools.

Solving the problem and understanding the application requires a little knowledge of duotoning as well as working with separations and spot color. We'll take a look at the whole process, from how to break down and apply spot-color inks in preview to how to get actual duotone print effects on your inkjet printer and on a press by using Photoshop Elements alone.

## Understanding Duotones

When you create a duotone, you replace the existing tone of an image with two tones. A key to the difference between duotone color and four-color printing (CMYK) is that CMYK color printing attempts to imitate color that already exists in the image or a scene. Duotoning is different because it is often a means of adding color and richness to black-and-white images to enhance the tone. Inks in a duotone are applied variations of existing

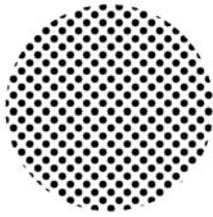
image tonality. The original tone is duplicated and altered to represent the density of ink color components—something like using red, green and blue components to represent color in RGB. The mix of the inks is controlled in Photoshop using Curves. The effect of duotoning a black-and-white image is more like colorization in that the tone of the image is influenced by color rather than attempting to represent realistic color.

The duotone effect is controlled by selecting and mixing color successfully. Interplay between the colors is often a subtle shift rather than a radical application. While other tools can be used for creating the interplay between colors, Curves will give you the most control. Setting curves without some sort of technique, method or understanding of what you are trying to achieve might prove quite fruitless and frustrating. Likewise, problems can result if you pick color you like rather than color that will be effective. Your plan should be as follows:

1. Select inks that are compatible and that can accomplish your goal in duotoning.
2. Set up the image and apply curves to make the most of the inks you have chosen with consideration for the tonal qualities of the image.

Although there is a little art to experimenting with color selection and application, there is some pretty straightforward science as well. A 25 percent gray ink at 100 percent strength will be 25 percent gray when printed; it just covers 100 percent of the paper (see Figure 5.15). It can never get darker than 25 percent gray unless mixed with another color. With this in mind, any color affects an image mostly in tonal areas that are lighter than the 100 percent strength of the color. That is, a 25 percent gray ink will be able to more effectively influence tonality in 1 percent–25 percent grays—although it will affect darker colors that it mixes with, it will be less effective in manipulating the image over that tonal range. A dark color can represent lighter tones, but the opposite can never happen. A rule of thumb should be to use at least one color that is dark or black for your duotone so you can maintain the dynamic range in the image.

When choosing color, work with color that is harmonious and sensible. Select color that can blend effectively to produce a smooth white-to-black gradient (see Figure 5.16). You will most often want to use colors with distinct tone rather than all dark or all medium-toned inks. In a simplistic view, the lighter colors you use will emphasize the contrast and tone in the brighter or highlight/midtone range of the image, and the darker colors will emphasize the shadow details. If you select a light color and a dark color for a duotone, the light color can be run with a greater density in the lighter image areas and the dark in the shadows. This will help you to most effectively work with (rather than against) image tone. For example, for a straightforward duotone you might choose black and light orange, or black and sky blue.



**Figure 5.15**  
Magnification shows black ink—100 percent black—printed at 25 percent gray (left), and gray ink—25 percent black—printed at 25 percent gray in halftone printing (right)

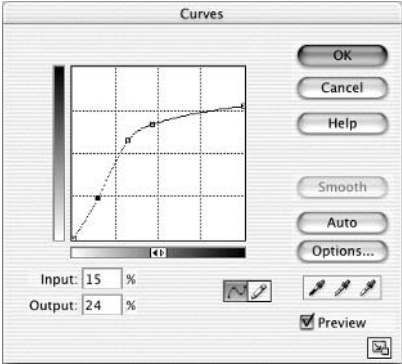


**Figure 5.16**  
Unrealistic expectations can yield bad results in your duotones. You want blended tones to be able to flow evenly from light to dark (a). Bad choices can limit tonal range (b) or lead to color being applied inappropriately (c).

Whatever colors you choose, the emphasis of the colors in the duotone should be in their tonal range where the ink is most effective. Harmony between colors will make it easier to set up blends that work with the image tones. If you choose difficult color combinations or have unrealistic expectations, you can make much more work than necessary in getting the blends to work—or you may simply make it impossible.

The colors used in duotones are often called *spot colors*, although commercial color book names are also used (such as PANTONE, TRUMATCH, Focoltone, and so on). These colors are standards and can be matched by your printing service. To use specific colors for duotones that we will create in Elements, you'll have to get an RGB equivalent from a color book or a printing service.

**Figure 5.17**  
Depending on the color, desired effect, and image, the curve can be even steeper than shown here.



Curves serve as translators for how ink is to be applied. The curves are used to influence the tone of an image to increase or decrease the strength of an ink in a specific range. Throughout the tonal range, the inks blend to form shades and tones, which are finessed to the advantage of the image. A rule of thumb is that if you want to apply a 25 percent gray ink, curves should show high intensity at 25 percent on the curve graphing for that ink (as shown in Figure 5.17).

Deciding how to set the curves is part art and part science. Darker inks are often steeply graded in the shadow tones, whereas lighter inks are more steeply graded in the lighter tones. This will use the ink in its most effective area and help it to render the tone dynamically. If you remember back in Chapter 3, the steepness of the curve affects image contrast over the range where the curve is steep. This same theory works here: by making the curve steep over the effective range of the color, you are enhancing the potential contrast.

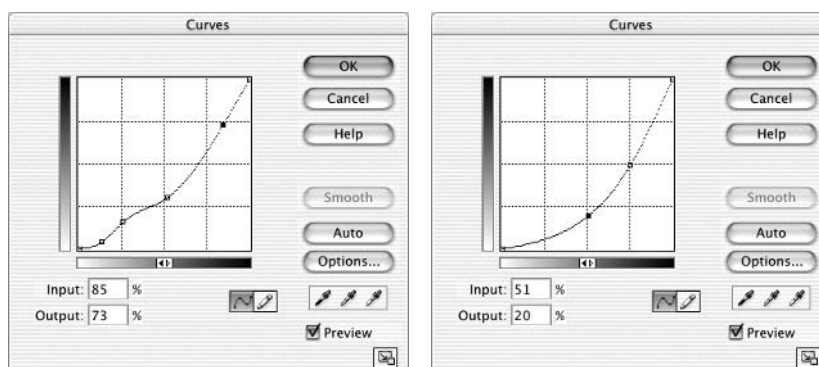


Figure 5.18

The curve with the hump (left) is used to emphasize contrast in a small portion of the highlight area so those tones don't flatten out.

If you use two shades of black or two dark inks, you should de-emphasize the density of the inks or you will darken the image; however, when using two dark inks, setting both curves the same way may not take advantage of potential dynamics in the image. Figure 5.18 shows a sample of curve settings used in a scenario with two dark inks.

Experimenting with curves for application of color can yield some pleasant and subtle toning effects. Using some of the ideas here can help you apply the colors in a way that makes sense. Now let's look at creating a duotone effect in Elements.

## Applying Duotone Effects

To build a separation-ready duotone in Photoshop Elements, you have to use an image's tonality along with some tricks that we've seen hints of both in using curves and in making RGB separations. Curves are used to enhance the tone for the separate inks, and preview techniques like those used for RGB separations are used to look at the results of how inks will combine. When the preview looks the way you want it to look, separations can be provided to your printing service as grayscale images or you can print actual duotones on your home printer.

Follow these steps to create a duotone in Elements:

1. Open an image that is black-and-white, or convert a color image to black-and-white by the methods described in Chapter 2. Be sure the image tone is corrected—you won't want to do this afterward because it will change the look of the duotone. See the sample image shown in Figure 5.19. This image is available on the CD (duotoning.psd).
2. Copy the flattened image content by duplicating the Background layer two times. If you were creating a tritone (three inks) or quadtone (four inks), you would duplicate as many times as there are inks you want to apply.



Figure 5.19

People are often good subjects for duotones.



3. Rename the layers to identify the colors/tones you expect to apply. I simply called them **Black** and **Spot 1**.
4. Change the mode of the layer at the top of the layer stack (Spot 1) to Multiply. This will ensure that the application of the upper color makes the result darker, as it would when printing.
5. Create a new layer and fill it with the color you want to apply. Name the layer according to the color you are applying. This way if you come back to it several years later, you'll know what you did without a lot of analysis. In the example, to create something of a sepia tone I used an RGB close to Pantone 472 (R = 255, G = 155, B = 125). This layer will be used to apply a color to the Spot 1 layer.
6. Change the mode of the color layer to Screen and group it with the Spot 1 layer. Using the Screen mode will lighten the Spot 1 layer in accord with the color you have selected. Because you have started with a grayscale image, the color of Spot 1 will technically be black. Because any color you pick will be lighter than black, using Screen mode will lighten the result.

When stacking colors, arrange them from darkest at the bottom to lightest at the top. This will help your organization and the application of color as well.

7. Activate the Black layer by clicking it.
8. Double-click Curves in the PowerTool1 category of Effects to initiate the creation of a Curve adjustment layer. Be sure the Group With the Previous box is checked in the New Layer dialog box before continuing.
9. Apply a curve to adjust the results. See Figure 5.20 for the curve used in the example. The idea here is to lower the influence of the black overall, while using it to emphasize contrast in the darker half of the image.
10. Activate the Spot 1 layer.
11. Double-click Curves in the PowerTool1 category of Effects to initiate the creation of another Curve adjustment layer. The Group With Previous box should be checked already.
12. Apply a curve to adjust the results. The lighter ink should have stronger influence and contrast in the lighter tones, and this is reflected in the use of the curve pictured in Figure 5.21.

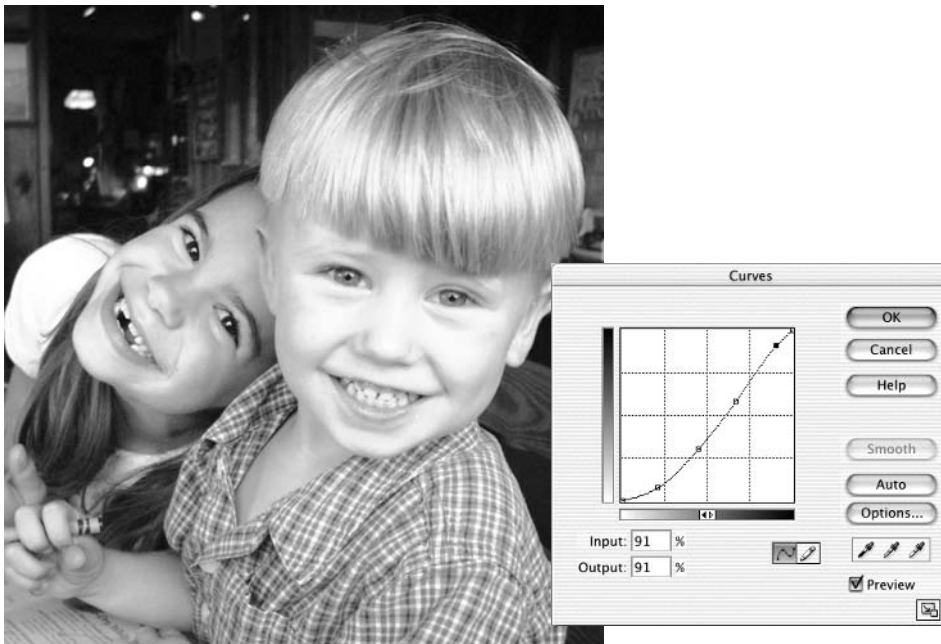
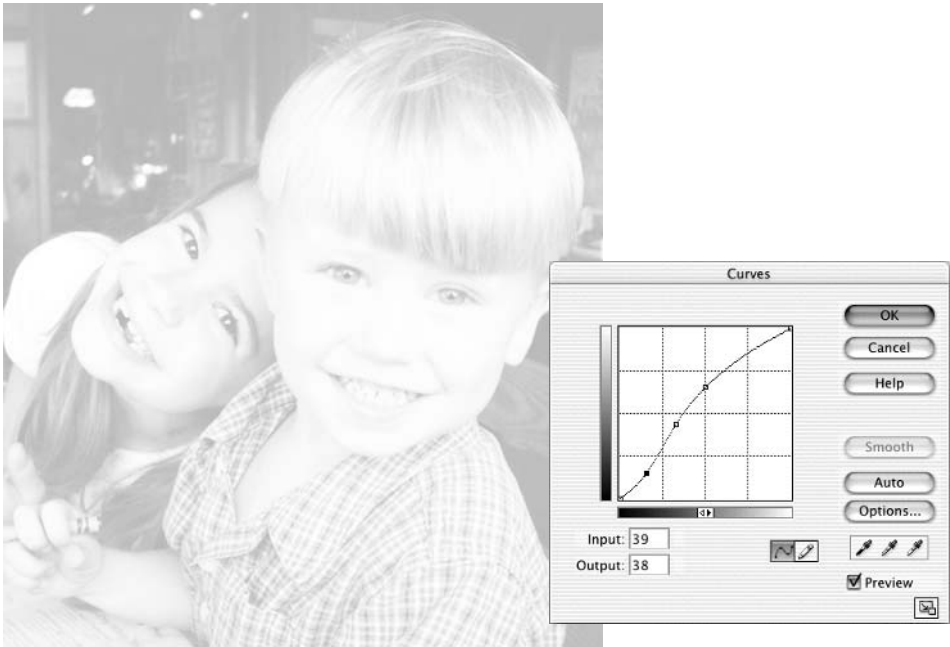


Figure 5.20  
The curve for the dark ink lightens the influence so that later ink adjustments will interplay.

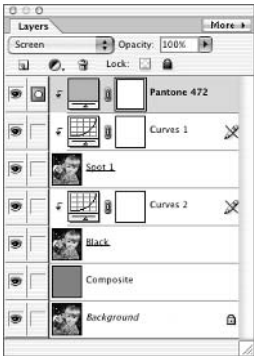
Figure 5.21

The curve for the light ink strengthens the influence in the lighter tones.



The final result of this procedure can be seen in the color section. Your Layers palette should look like Figure 5.22 when you are finished. As far as layer order, the curves should be immediately above the tone they are adjusting and between the tone and color. Should you need more adjustments, add another curve layer or replace it (delete and create a new one). You can add as many adjustments as you want and test different combinations by

Figure 5.22  
The result of the example should look like this in layers.



toggling the visibility for any of the Curve adjustment layers. If you want more spot colors (to create a tritone or quadtone), duplicate the setup for Spot 1. If you want the black to be a spot color, add a color layer above the curve for the Black layer (you may want to change the name for the Black layer as well). The adjustments may require some fiddling before they look just right.

Again, this type of work on individual color separations can serve many purposes: achieving the effect of adding color to a black-and-white image, working within the limitations of a



two-color print job, enhancing printed results by using two inks and screens rather than one, and gaining the opportunity to enhance image tone by influencing ink coverage and ink contrasts. If you are just colorizing an image to get a duotone effect, you probably won't have to go through the trouble; if you want a true duotone that can be separated into specific inks, this is the way to go.

Hidden Power tools provide functions for creating duotone images. Just start with a flattened RGB image that has been converted to black-and-white (use any of the methods discussed in earlier chapters), and double-click the Duotone Setup (in the Separations category of Effects). The power tool will lead you through the process of setting up the layer stack. Be sure the black-and-white image is in RGB color mode, not Grayscale, or you will not be able to apply color.

Be sure to try to blend inks so that the influence of one ink can pick up where the next leaves off. As part of the process, you may want to use a gradient bar to judge the quality of the gradient you are creating when combining the colors. I have provided a sample gradient bar (*Duotone\_Preview\_Bar.psd*) on the CD. You can use this to check how smooth your mixing is or to develop curves for application in duotones. To test your duotone curves, just open the preview image and drag the curves and colors to it from the duotone you are working on. You will have to arrange and group the layers to match what you created. To use it to develop curves, create the curves right in the preview file and then drag them to the duotone you are creating. The gradient should appear relatively smooth and even—unless you are using the duotone for some type of image correction or special effect. The bar is more useful for seeing where the curves may be failing (and need adjustment) than in generating effective duotones. To test the duotone directly in the image you are working on, double-click Duotone Bar tool in the PowerSeparations category of Effects. This will create a duotone preview bar right in your image.



Even when applying the same duotone color scheme to different images, you can't always apply it with the same curves. The result really depends on the image. What works fine for normal and low-key images may not work as well for high-key images, which would probably suffer from the attention to shadow detail. Curves need to be created dependent on the overall tonality of the image on an individual image basis—otherwise it could just be a push-button effect. Generally, high-key images should be set to emphasize detail in the highlight areas, and low-key images should be set to emphasize detail in the shadows. Experimentation and experience with setting the curves will make creating duotones easier and more intuitive.



## Printing Duotones

To print your duotones, you could just flatten them and send to the printer, but you'd have done all the extra work in the previous section for nothing. What you have in the layers by the time you are done with the duotone procedure is a *bona fide* separation. You should treat it that way. This means using the inks separately and applying them to the paper as separate inks.

A great home experiment is to print the separated colors one at a time to see the duotone results. To do this, leave one of the duotone color layer sets on (see Figure 5.23), flatten the image, and save it as an RGB image (you can use Grayscale mode for black ink) with the name of the color. Save a separate flattened image for each color in your duotone. When you are finished, print these to your printer one at a time *on the same sheet!* Print light colors first, and follow with darker. You should use photo-quality paper and allow sufficient drying time between printing each ink. If you use lower-quality paper, the paper will likely not handle the ink well and the result might be murky and oversaturated. In putting down the colors one at a time, you will build your print similar to the way it would be created on a printing press. As long as your printer has reasonably accurate paper gripping, you'll get a pretty refined result.

Blacks will probably be richer and darker when printed in this multiple-pass style because the inks will go on heavier than they would if printed in a single pass. The printed effect of multiple passes is a greater tonal range, because the blacks will be darker—even though you are using the same number of grays in the image and same number of inks in the printer. This works somewhat like putting on multiple coats of paint.

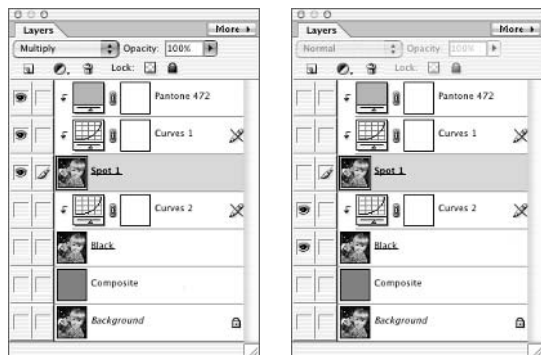
For use with an imagesetter and for making film or creating printing plates, you'll want to make grayscale images from your duotone layers. Leave one duotone component visible in the layers, shut off any coloring for it, flatten the image, and save it as a grayscale with the name of the color. Do this for each component in the duotone. You'll note that the “light” layers become dark when you do this (see Figure 5.24), and that's what is supposed

to happen. What you are seeing is how the application of the color ink will look in grayscale—as density of the ink, rather than color. The tonal representation is a percentage of ink (0–100 percent).

As long as you tell your printing service which file is which, they can create film for printing or impose the image without a lot of trouble. There is one other way to put these files together to avoid problems when submitting them: by turning them into EPS DCS files. We'll take a closer look at that technique in the “Using CMYK Color” section later in this chapter.

Figure 5.23

View only one color result at a time before flattening and saving.



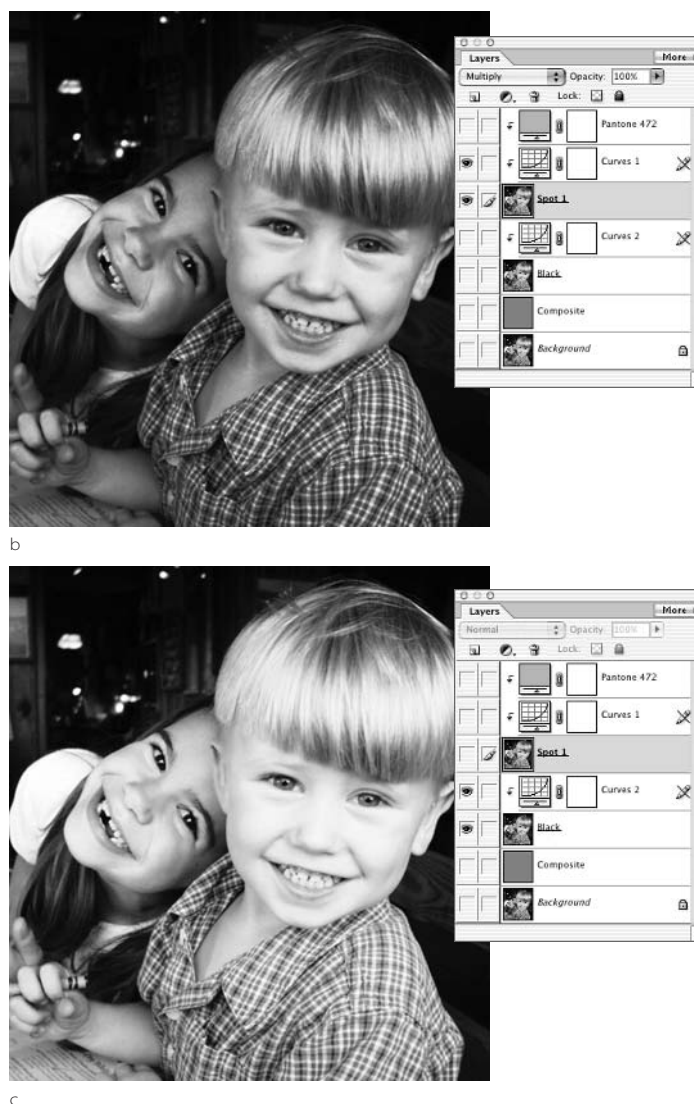


Figure 5.24

Shutting off the color (a) and other layers (c), and then flattening gives you grayscale depictions of the Spot 1 color plate. (b) is the Spot 1 plate and (c) is the black.

## Using Duotones for Tonal Corrections

Duotone curves can be used to make subtle changes and corrections in difficult black-and-white images. Although the images will not retain the richness of duotoning or the effect of multiple inks, creating duotone effects to correct grayscale images can help strengthen subtle detail, and some of this may be retained in the grayscale result. Consider the duotone curves to be an important part of your grayscale correction arsenal.

For example, if you have an image with subtle highlight detail (such as a wedding picture in which dress detail has become somewhat washed out or faded due to harsh flash lighting), you can create a duotone to change the image emphasis in different tones. Just open the image in black-and-white and then create a duotone. For the wedding picture example, you'd pick a black and light-gray ink for your colors. Use the light gray to emphasize the highlight area of the image. This can work in images where tones seem to flatten too much, as in Figure 5.25.

## Calculations and Channel Mixing

In Photoshop, calculations and channel mixing are ways to adjust color or tone based on image components. What the two features have in common is that they play components against one another to create a result.

*Calculations* create a result by using components as parts of an equation, much like adding, subtracting, multiplying, and so forth. The simplest calculations can be a way of combining selections to create a different result. For example, say you see a situation where you can easily make two selections separately, but you want to somehow combine the selections by subtracting one from the other. Calculations would let you make the separate selections, save them as channels, and then combine them by using layer functions. See Figure 5.26.

Figure 5.25

This image had flat medium tones (left), but applying a duotone helped make an adjustment that better defined the contrast and lightened the result (right).



Figure 5.26

Calculations let you add selections together or subtract them (as shown here), but far more complex calculations can occur.



*Channel mixing* is an adjustment in which you change one component based on combining it in percentages with other components. For example, say you have an image of a bright red flower appearing over a lush green background. The problem with the image is that in real life, the flower is purple. Assuming this is a problem with the image, if you separate and look at the RGB channels, you'll find that the red channel is white (saturated) where the flower is and the blue channel is dark or black (unsaturated). You could mix some of the red channel into the blue to lighten the blue channel, increasing the blue saturation in the flower. The result will, of course, shade the color of the flower toward purple—although you may have to exercise other control (such as masking) to get the result you want.

Calculations are usually a means of producing masks based on image color or content. Therefore, you'll handle them a little differently than you would normally handle channel mixing. Channel mixing is often more suited to color correction and adjustments. The functions allow you to render simple changes, complex image results, and fine adjustments. The real advantage is that you use tone that already exists in the image; the tone can act as a complex, natural selection to enhance your image in ways that would be much more difficult if attempting selections manually.

What is the most frightening about calculations and mixing are the names and the descriptions. If you have followed the concepts behind separations to this point, you have applied some simple calculations. However, how to use calculations and mixing in layers may not be entirely obvious. Once you've taken a look at how to do calculations and mixing, they are really easier to control and they offer more options the Hidden Power way in Photoshop Elements than if you were working with Photoshop. Because you work in layers, the results are more visual, and they simply make more sense to use because you can see exactly what is happening as you make the changes. You are also not limited to using just the few components available in the current color mode: you can mix and match components in any way you find convenient to get your result. The key is the setup in layers.

We'll look at calculations first, and channel mixing will fall right in line. When we're finished, we'll look at an example of how calculations work by building an unsharp mask using traditional darkroom techniques that you can use on any image—in combination with or as a substitute for the Unsharp Mask filter.

## Calculations Setup and Application

Practically the whole problem in making calculations is the setup and deciding what to do, and what you'll want to do at any time depends on your image and purpose. Setting up calculations requires that you have image components (or grayscale representations) that you want to use in creating a result. Your source can be selections, masks, and/or separations. All you do is duplicate the parts you want to use for the calculations and use layer

properties to create the calculated result. You'll want the gray tone for each color component you use in the calculation rather than the color version.

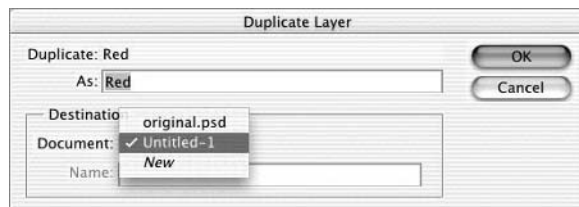
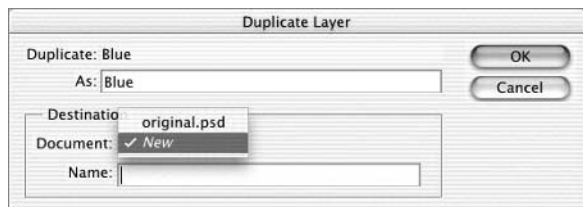
Layer blending modes and their functions become important to calculations and channel mixing. Knowing what each layer mode does can help you get the results you want in calculations. There is a listing of the modes and descriptions of what they do in the appendix for your reference.

Use the following steps to set up your calculations:

1. Decide what you want to do to the image and which image components, selections, and masks the calculation will use. The source layers should be converted to black-and-white components.
2. Duplicate the components you will be using to a new image (choose New for the document in the Document drop-down list in the Duplicate Layer dialog box). Duplicating the first channel to a new image (see Figure 5.27) creates the image you will use to collect the other components for the calculation. In the Destination panel of the Duplicate Layer dialog box, name the new document something obvious, such as **Calculation 1**. If you don't name the image in the dialog, the new image will be named **Untitled-#** (where the octothorpe represents a version number).
3. Duplicate the additional components to the Calculation 1 image by selecting the document named in the previous step by name from the Document drop-down list in the Duplicate Layer dialog box. Source components for the calculation can be from other images (or other calculations), but they may need to be resized.
4. Arrange the component layers in order to create the calculated effect. For example, if you want to darken one layer based on the other, put the layer that will be doing the darkening on top, and change the mode to Darken. If you are looking to create other effects, you would choose the appropriate layer mode. Most often you will use Darken or Multiply to darken the result, and Lighten or Screen to brighten the result.
5. Change the mode of the upper layers to create the desired calculation. Adjust opacity of the layers to moderate the effect. For example, if you want one layer to brighten the lower layer by only 50 percent, change the opacity of the layer to 50 percent.
6. Flatten or merge the result.

Figure 5.27

The target for the first channel is a new image (left). The target for the second channel can be the image created in the first duplication (right).



This simple set of steps opens numerous possibilities for using layer properties and other tools in your calculations. Calculations can be corrected with curves or you can exercise other correction options while the calculation is being created—all at the same time. You can add masks to the layers, invert content, or make selective changes or other tonal adjustments. Because of the staggering number of variations this procedure opens up, you might see how this could quickly amount to a book of its own. This calculation method can be used for masking and selection techniques as well as for making complicated blends for spot colors and other separations (as we'll see in the next section on CMYK separation). You can use the result by loading it as a selection or by using it to create masks.

When you have achieved the results you want, you'll have to copy the layer back to your image. To create masks from calculations, you can use various Hidden Power tools to convert the content into layer clipping masks, or to create selections as a source for filling layer masks. For example, if you create a grayscale calculation and want to use the result to mask your image, you can apply it like so:

1. Duplicate the calculated result to the image you want to apply it in. This requires first making a composite layer in the Calculation 1 image. To do this, create a new layer at the top of the layer stack, name it **Layer Mask**, and then press Command+Option+Shift+E / Ctrl+Alt+Shift+E to copy flattened content to the new layer.
2. Double-click the Transparent Grayscale tool in the PowerTools1 category of Effects. This drops out the white area of the Layer Mask layer so that it becomes transparent. You can see the effect if you shut off the view for all layers except the Layer Mask layer. To reverse the effect, you have to Invert the layer content (Command/Ctrl+I; see Figure 5.28) before using the Transparent Grayscale tool.
3. Copy the Layer Mask layer to the original image (or the image where you want to apply it as a mask) by using the Duplicate Layer function.
4. Apply your mask by putting the Layer Mask below the layer you want to mask; then group the two layers.

The Layer Mask layer can be loaded as a selection by holding down the Command/Ctrl key and clicking the Layer Mask layer in the Layers palette. Layer Mask layers can also be combined as part of further calculations.

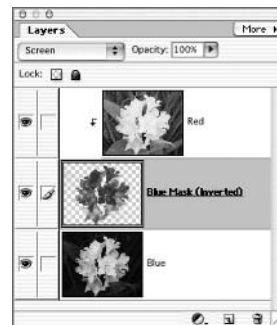


Figure 5.28

This layer setup shows how you can use reversed masking in layers.



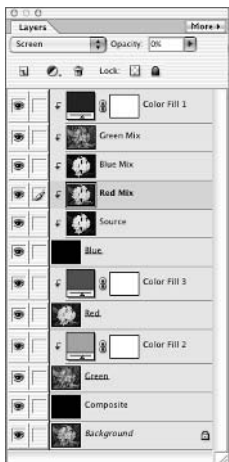
Figure 5.29

The order of the layers should look like this after step 4.



Figure 5.30

The Layers palette shows mixing using the Blue component as the source.



## Channel Mixing Setup and Application

Channel mixing may be a little more concrete than calculations, and offers more opportunity for straightforward color correction and color modification. The setup is similar to calculations, but content will mostly likely be from separated components. The idea is that there is no better means to adjust select areas of an image than by using the image itself. In this case the image components act as masking and content at the same time.

You can mix channels directly in the current image with a full-color preview, or in grayscale. The color preview lets you see how the change affects the current image; the grayscale enables you to look at the mixing result separate from the current image. The latter is helpful if you are making a mask or other grayscale representation from the mixing.

To mix channels with a full image preview:

1. Separate your image into RGB by using Split RGB w-Preview in the PowerSeparations category of Effects.
2. Choose a component that you want to target for the adjustment (either the Red, Green, or Blue component) and activate it.
3. Move the target component to the top of the stack (press Command+Shift+] / Ctrl+Shift+]). This moves the target component and the grouped color to the top of the layer stack.
4. Duplicate the target component. Name the duplicate layer **Source** and move it between the target component and its associated fill layer. Change the layer mode to Linear Dodge. See Figure 5.29.
5. Duplicate the Green layer. Change the name of the Green layer to **Green Mix** and rename the Green Copy layer **Green**. Move the Green Mix between the Source layer and the associated fill layer. Change the layer mode to Linear Dodge.

When a layer is duplicated in Elements, the original loses its association with any grouped layers, and the copy retains them. It is easier to rename both layers than to juggle groupings.

6. Duplicate the Red layer. Change the name of the Red layer to **Red Mix**, and then change the name of the Red Copy layer to **Red**. Stack the Red Mix layer directly above and grouped with the Green Mix layer. Change the layer mode to Linear Dodge.
7. Duplicate the Blue layer. Name the Blue layer **Blue Mix** and then rename the Blue Copy layer **Blue**. Stack the Blue Mix layer directly above and grouped with the Red Mix layer. Change the layer mode to Linear Dodge. See Figure 5.30.
8. Adjust the Mix layers to reflect the desired mix of components/channels.

When making adjustments, add influence from a component by increasing the Opacity for the component layer (Red Mix, Green Mix, or Blue Mix layers). The Source layer acts as a placemark for the preview and should probably not be adjusted—though you may choose to shut it off if using less than 100 percent of the original component. To subtract a component, move the component to the top of the grouping (drag it in the Layers palette to move the position), invert it (press Command/Ctrl+I) and then change the mode to Linear Burn. Components set to Linear Burn need to be above the layers set to Linear Dodge while remaining grouped, or they will not influence the result.

These steps for setting up a channel mixer in a color image can be accomplished by using the Channel Mix effect provided in the Hidden Power tools. First you have to run Split RGB w-Preview in the PowerSeparations category and then run Channel Mix, in the PowerTools1 category.

What this type of channel mixing can do that Photoshop's native tool can't, is allow you to change the blend modes of components and allow simultaneous application of a component in more than one blend mode. The result is that you have a far more flexible tool to work with.

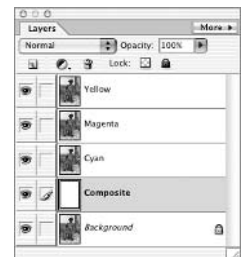
To mix channels for a grayscale result, you should not use the color fill layers. While you could just delete the color fill layers and juggle layers around, let's start the setup from the beginning:

1. Open and flatten a color RGB image.
2. Run the Split RGB tool in the PowerSeparations category of Effects.
3. Add a Composite layer filled with black above the Background layer.
4. Attach the word *Add* to the names of each of the component layers (Red Add, Green Add, Blue Add), change the Mode to Linear Dodge, and lower the Opacity to 0 percent.
5. Duplicate each of the Add layers, change the layer copy names from Add Copy to Subtract (Red Subtract, Green Subtract, Blue Subtract). Change the layer Mode to Linear Burn and drag to the top of the layer stack (Opacity will already be 0 percent). Invert the Subtract layers (press Command/Ctrl+I)
6. Activate the Red Add layer and change the Opacity to 100 percent.

The layers should now look like they do in Figure 5.31. The Red component will be showing at 100 percent. Mix the components by changing the opacity of the various layers to add or subtract influence.

The mode and opacity you use depends on what you are trying to accomplish. You will often just use Linear Dodge and Linear Burn as the setup indicates, but other modes can be used, such as Screen or Lighten to brighten the mixed result, and Multiply or Darken to darken it. This flexibility is something that Photoshop's Channel Mixer tool doesn't allow.

Figure 5.31  
These layers set up black-and-white component mixing that will yield the same results as Photoshop's Channel Mixer.





Steps 3 to 6 can be accomplished using the Channel Mix Grayscale tool provided with the Hidden Power tools in the PowerTools1 category of Effects. First run the Split RGB tool and then the Channel Mix Grayscale tool.

Mixing can be used to make many kinds of color corrections, but it is often most useful in replacing image tone or qualities in image areas that have been ravaged by saturation or by exposure extremes that distorted or clipped image information. Channel mixing can also help make complex conversions to black-and-white (with everything from an infrared to ultraviolet flavor). A very practical application of calculations and mixing can be seen in making custom CMYK separations, as we'll do later in this chapter. A great example of the power of components used in calculations and channel mixing is creating a manual unsharp mask, as we'll do in the next section.

## Manual Unsharp Masking: Calculations in Action

There are many adjustments you can make with calculations and channel mixing, and not all of them will be obvious immediately. One of my favorites is manually creating unsharp masking effects. Unsharp masking, as mentioned earlier, was a darkroom process before it was a filter. The photographer doing the developing would sandwich a blurred film negative copy of the image with the original to burn in (increase exposure of) the image shadows. The blur would target the contrasty edges, and the result after the application would be increased shadow detail and a sharper look to the image. This application of unsharp is a little different, but builds on the same concept.

You can imitate this modified darkroom sharpening effect by using the following steps:

1. Open a flattened image that you'd like to apply an unsharp mask calculation to.
2. Duplicate the Background layer.
3. Invert the Background Copy layer (press Command/Ctrl+I or choose Filter → Adjustments → Invert) and rename the layer **Unsharp Mask**.
4. Blur the layer. The size of the blur will depend on the resolution of the image and the amount of detail. The more detailed the image, the less blur; the higher the resolution, the greater the blur. Start with 5 pixels for a 3×5 image at 300 ppi.
5. Change the Layer mode to Overlay.
6. Reduce the opacity of the duplicate layer to 50 percent; adjust the opacity as desired.

The Unsharp Mask layer you have created ends up working much like the sandwiched negative in the darkroom process. It enhances edge contrast, albeit in a different way than using the Unsharp Mask filter. You may want to apply a curve to adjust for contrast changes or apply the Unsharp Mask filter after using the manual technique to enhance the results.

Unlike the Unsharp Mask filter provided with Photoshop Elements, this sharpening filter has less of a tendency to produce halos. It also has the interesting side effect of decreasing contrast, whereas the Unsharp Mask filter increases contrast. Because the effect is the opposite of the Unsharp Mask filter, the two sharpening effects can often be used together to greatly intensify image sharpness. The result you get is brought about by a masked calculation: the inverted “negative” acts to mask the highlights and applies the Overlay calculation more intensely over the dark portion of the image, resulting in contrast edge enhancement.

The best results for the unsharp masking calculation will often be had by applying the change to the image luminosity. If you use the Split RGBL or Split Luminosity Hidden Power tools in the PowerSeparations category of Effects, you can separate the luminosity component and then apply the sharpening to the Luminosity layer. Color won’t be altered, and you may achieve better results than applying sharpening to tone and color at the same time.

Two tools called Sharpen and Sharpen Plus are provided with the Hidden Power tools. Sharpen will run through the basic process described in the preceding steps, enabling you to select the intensity of the blur. Sharpen Plus will enable you to run through the sharpening process and adds an Unsharp Mask filter application as well that you can control. To use these tools, click the layer you want to sharpen to activate it (this may be the image background or any layer, but using a luminosity layer is suggested) and double-click the Hidden Power tool. You will be able to adjust the intensity of the sharpening application by using layer opacity after the tool runs you through the process.

## Separating CMYK Color

One Image mode that Photoshop Elements supposedly does not handle at all is CMYK color. CMYK stands for cyan, magenta, yellow, and black, the four colors that are the traditional standard for ink printing. Even though Elements doesn’t have a CMYK image mode, there are ways to extract CMYK components, just as there are ways to extract RGB components, or luminosity and color. CMYK is just a little more complicated. The procedure for separating CMYK color is probably not something you will need to use every day. You will use this only in situations where CMYK is a must, or when you want control over the separations you make on a printer that will not allow you to make your own separations.

Even with the ability to create a CMYK image, many home printers would take an image you created in CMYK and print it without directly using the CMYK data. These printers would look at the CMYK file, interpret it as RGB, and then use that information to print by using its CMYK inks. In effect, what happens is that you don’t really get from the printer output the CMYK that you put in. We’ll take a look at how to get around that potential problem later in this section.

To fully understand what's going on here, you need to have a decent understanding of just about everything that we've discussed up to this point in the book. Because CMYK separation can be a complicated topic, we'll first look at the process of how to separate, and then discuss some additional theory. This topic could fill a book on its own, so we'll just give you enough to get started with here. You can learn more from experimentation and discussions on the Hidden Power website and in the Hidden Power newsletter (find information about the newsletter on the website: [www.hiddenelements.com](http://www.hiddenelements.com)).

With the following techniques, you can create your own separations and not only use them in four-color print jobs, but force your printer to make a CMYK print to your specifications.

## Making the Basic CMY Separation

The easy part of this separation is filtering out the CMY. Although it isn't as straightforward and easy as making an RGB separation, the process for separating is similar.

In the RGB additive color scheme, cyan is a combination of pure blue and pure green; magenta is a combination of pure red and pure blue; and yellow is a combination of pure red and pure green. Screening an image for blue and green will reveal cyan, screening for red and blue will reveal magenta, and screening for red and green reveals yellow. If you look at a color wheel, the relationship between these colors may become more evident. The target CMY color falls between the two RGB components. In other words, the cross product of mixing equal amounts of blue and green light is the RGB equivalent of cyan. Combining red and blue lights creates magenta. You can see this result by opening the `RGB.psd` file on the CD.

What we will be doing with the CMY separation is using the understanding of these combinations to apply the same type of color filtering we applied when extracting RGB. Completing the separation will give you basic CMY image information. This separation information works to represent your image on-screen, and in a perfect world. When we're finished with the CMY separation, we'll look at why it doesn't work in real-world printing and what we have to do to offset that shortcoming. We'll work through the CMY separation in three parts:

**Preparation** Set up the colors for separation by duplicating the original image. Once the image is duplicated, you are ready to start making the real separations based on existing color.

**CMY Separation** Screen each layer by the RGB color components to reveal the CMY color separation and simultaneously create the preview for the color. This state is temporary, because to make this a really useful separation you'll have to convert each channel to grayscale—just as you did with the RGB components.

**Conversion of Colors to Tone** Adjust each color to display tone. There is no way to represent the intensity of component color other than by using its tone. The leap here is that you have to remove the color that it seems you have already separated, and then re-create it to get a usable result.

## Preparation

All you will be doing here is creating some source layers to use in helping to make the separation:

1. Open `gorskii.psd` (found on the CD), duplicate the Background layer, and name the new layer **Cyan**.
2. Change the Mode of the duplicate layer to Multiply.
3. Duplicate the Cyan layer and name the new layer **Magenta**.
4. Duplicate the Magenta layer and name the new layer **Yellow**.
5. Activate the Background layer.
6. Create a new layer and name it **Composite**.
7. Fill the Composite layer with white.

The image will look awful at this point, but that doesn't matter. These are only the initial steps, and you'll be taking quite a few more to complete the separation. The layers should look as they do in Figure 5.32. Steps 1 through 7 can be completed by double-clicking CMY Setup in the PowerSeparations category of Effects loaded with the Hidden Power tools.

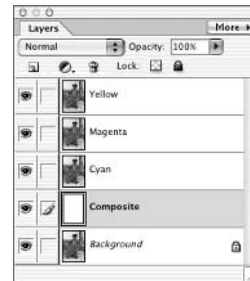
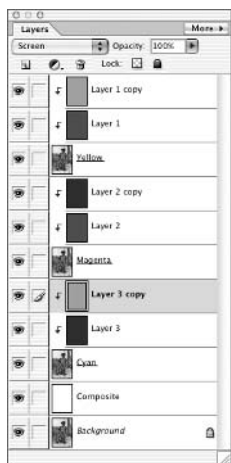


Figure 5.32  
With this layer setup, you are all ready to separate the CMY colors.

## CMY Separation

Just like separating the RGB components, we'll add some screening layers to filter out CMY color from the image:

8. Activate the Yellow layer by clicking it or by pressing Option+Shift+] / Alt+Shift+].
9. Create a new layer, being sure that Group With Previous is checked. You can name the layer **Red Screen** if you want, but it is only a temporary layer, so naming is unnecessary.
10. Fill the layer with pure red ( $R = 255, G = 0, B = 0$ ) and change the mode of the layer to Screen.
11. Duplicate the Red Screen layer. Fill the layer with pure green ( $R = 0, G = 255, B = 0$ ). Again, this is a temporary layer, but you can name it **Green Screen**. The red and green combine to filter out the yellow component from the image. This completes separation of the yellow component from the image.



**Figure 5.33**  
The basic RGB-CMY  
separation setup in  
layers.

12. Select the Magenta layer.
13. Create a new layer, checking Group With Previous.
14. Fill the layer with pure red ( $R = 255, G = 0, B = 0$ ) and change the mode of the layer to Screen. Rename the layer **Red Screen** if desired.
15. Duplicate the Red Screen layer from the previous step. Name the layer **Blue Screen** if desired.
16. Fill the layer with pure blue ( $R = 0, G = 0, B = 255$ ). The red and blue combine to filter out the magenta component from the image. This completes separation of the magenta component from the image.
17. Select the Cyan layer.
18. Create a new layer, checking Group With Previous.
19. Fill the layer with pure green ( $R = 0, G = 255, B = 0$ ) and change the mode of the layer to Screen. Rename the layer **Green Screen** if desired.
20. Duplicate the Green Screen layer created in the previous step.
21. Fill the layer with pure blue ( $R = 0, G = 0, B = 255$ ). Change the layer name to **Blue Screen** if desired. The green and blue combine to filter out the cyan component from the image. This completes separation of the cyan component from the image.

If you have completed these 21 short steps without a hitch, you'll be looking at the same image you started with and the layers will look like Figure 5.33. If you turn off the visibility for any two of the three component layers, you'll see the separation named in the remaining layer. Hidden Power tools will take care of steps 8 through 21 if you double-click the CMY Color tool in the PowerSeparation category of Effects.

### Converting Color to Tone

Although you could work with this image to some extent at this stage of the separation, it is still a color representation rather than a real separation of component color. You really have to have grayscale representations of a color as tone for it to be useful as a separation. In this segment we'll convert the color to tone.

22. Activate the Cyan layer by clicking it in the Layers palette.
23. Link the screen layers (blue and green) to the Cyan layer by clicking and dragging your cursor over the link boxes.
24. Merge the linked layers by pressing Command/Ctrl+E. This merges the three layers into a single layer named Cyan. It is a color representation of the cyan component for the image.
25. Activate the Magenta layer by clicking it in the Layers palette.

26. Link the screen layers (blue and red) to the Magenta layer by clicking and dragging your cursor over the link boxes.
27. Merge the linked layers by pressing Command/Ctrl+E. This merges the three layers into a single layer named Magenta. It is a color representation of the magenta component for the image.
28. Activate the Yellow layer by clicking it in the Layers palette.
29. Link the screen layers (red and green) to the Yellow layer by clicking and dragging your cursor over the link boxes.
30. Merge the linked layers by pressing Command/Ctrl+E. This merges the three layers into a single layer named Yellow. It is a color representation of the yellow component for the image.
31. Create a new Hue/Saturation adjustment layer by choosing Layer → New Adjustment Layer → Hue/Saturation. When the New Layer dialog box opens, be sure the Group With Previous box is checked.
32. Change the Edit selection from Master to Yellows.
33. Move the Lightness slider all the way to the left (see Figure 5.34). This removes the color from the Yellow and enhances the tonality to make tonal representation of the density of the yellow component.
34. Click OK to close the Hue/Saturation dialog box.
35. Shut off the view for the Yellow layer and activate the Magenta layer by clicking it in the Layers palette.
36. Create a new Hue/Saturation adjustment layer by choosing Hue/Saturation from the New Adjustment Layer submenu under Layers. Be sure to check Group With Previous to target the adjustment to the Magenta layer.
37. Change the Edit selection from Master to Magentas.
38. Move the Lightness slider all the way to the left. This removes the color from the Magenta and enhances the tonality to make a tonal representation of the density of the magenta component.
39. Click OK to close the Hue/Saturation dialog box.
40. Shut off the view for the Magenta layer and activate the Cyan layer by clicking it in the Layers palette.
41. Create a new Hue/Saturation adjustment layer by choosing Hue/Saturation from the New Adjustment Layer submenu under Layers. Be sure to check Group With Previous to target the adjustment to the Cyan layer.

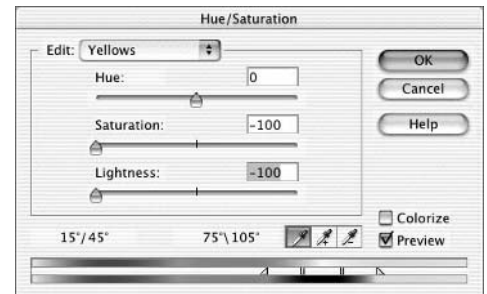


Figure 5.34  
The Hue/Saturation settings for changing the yellow component to a grayscale yellow plate

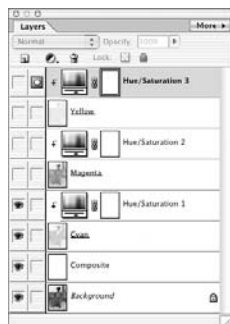
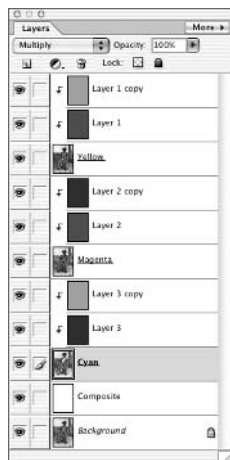


Figure 5.35

The Hue/Saturation layer for each component should be positioned directly above and grouped with the color component.

Figure 5.36

A complete CMY color separation should look like this with all the layers.



42. Change the Edit selection from Master to Cyans.

43. Move the Lightness slider all the way to the left. This removes the color from the Cyan and enhances the tonality to make a tonal representation of the cyan component. See Figure 5.35 for the result of the steps to this point.

The result of these steps has the desired effect in creating the color components as tone, but it also removes the color so that there is no preview. The preview can be added back by repeating the steps for CMY separation. The only difference in those steps is that instead of choosing the color component to add the screens to, you select its grouped Hue/Saturation adjustment layer instead. You can merge the Hue/Saturation layers back into the plates, and you'll end up with layers that look like Figure 5.36.

Hidden Power tools will perform all of the steps in this section (22 through 43) as well as merging the Hue/Saturation adjustment layers and adding back the color if you double-click the CMY Separation tool in the PowerSeparations category of Effects.

Though you have the separate CMY components, this is only part of the CMYK separation. The next part is adding black. Black is added to the CMYK separation to make up for the fact that in the real-world process inks (and ink mediums) are not as efficient as light. Combinations of printed CMY inks can't absorb all the light that strikes them, so black is added to boost potential light absorption. We'll look at one way to define the black component in the next section.

## Handling Black Separation

CMYK separation from RGB requires separation into CMY, and then generation of elements and masks to implement black (K). Black implementation can vary depending on preferences. We'll look at one style, and that should give you the information you need to make variations that you find pleasing. You have the basic CMY components, and you will use the information from these to determine saturation and luminosity. You'll use the saturation and luminosity to determine where the black is most useful. Like the duotone use of inks, black will be most effective in the darkest portions of the image, and usually where there is less saturation (that is, grays).

We'll be continuing the separation into CMYK by using the CMY separation and preview you have created from the `gorski.i.psd` image in the previous sections. You'll have to know how to create saturation and luminosity masks to create the black component. The following steps give you the basics for completing the black separation:

1. Make the saturation mask.
2. Make the luminosity mask.

3. Apply the Black in the separation.
4. Remove color under the black.

We'll step through each part in the following sections.

### Making the Saturation Mask

Making a saturation mask similar to the one used in the earlier saturation masking example will enable you to target gray (and nearly gray) areas of the image. You will then be able to substitute black in those areas. This will help make sure ink does not oversaturate or shift color, which can cause problems in printing.

1. Duplicate the Background layer by activating it and choosing Duplicate Layer from the Layers palette pop-up menu. Choose New as the Destination Document in the Duplicate Layer dialog box. This opens the duplicate in a new image.
2. Split the Luminosity and Color components in the image by using the Split Luminosity tool in the PowerSeparations category of Effects.
3. Turn off the visibility for the Luminosity layer and move it to the top of the layer stack.
4. Duplicate the Composite layer.
5. Merge the Composite Copy and Color layers. This commits the color layer information.
6. Set the result to Difference mode. This shows a comparison between the image color saturation and unsaturated areas. Lighter areas are more saturated.
7. Merge the layer result from steps 5 and 6 with the Composite. This commits the saturation comparison.
8. Create a Hue/Saturation adjustment layer (Layer → New Adjustment Layer → Hue/Saturation). Move the Saturation slider all the way to the left to set the Saturation to -100 percent. Click OK.
9. Create a Levels adjustment layer (Layer → New Adjustment Layer → Levels). Set the sliders to adjust tonality by moving the white slider to 128. This adjustment can vary depending on the image and what you want to accomplish, as well as how you want to control the separation. Making a stronger change will confine black generation to areas with less color saturation.
10. Merge the Composite, Hue/Saturation, and Levels layers. This will give you your saturation mask, and it should look something like Figure 5.37. It represents a mapping of color in the image from the most saturated (lightest) area to the least saturated (darkest) area. Rename this layer **Saturation**.



### Making the Luminosity Mask

A luminosity mask will help you target the darkest areas of your image, where the black can best influence the color range. This will enable you to make the most of black's effective range while reducing ink saturation.

11. Add a new layer above the Saturation layer. Name the new layer **Black** and fill it with 50 percent gray (R = 128, G = 128, B = 128).
12. Activate the Luminosity layer.
13. Make a levels correction by opening Levels (press Command/Ctrl+L) and moving the white input slider to 128. This changes the mask so only 50 percent grays or darker appear as gray. It is your luminosity mask and should look like Figure 5.38. Making less of a correction will cause your black component to influence more of the image.
14. Activate the Saturation layer, change its mode to Lighten, and move it above the Black layer. This helps reduce the black influence in dark but highly saturated areas of the image.
15. Merge the Saturation layer with the Black layer. This commits the calculation in step 4. The result will be your black component.



Figure 5.37

The saturation mask shows lighter in areas where the color is most pure (has the least gray).



Figure 5.38

The dark portion represents the darkest half of the image (50 percent–100 percent black).

## Applying the Black in the Separation

Once the black component separation is complete, you have to move the black component back to the original image with the CMY separation and then apply the black to adjust the other color components. Where black is used to influence the image, you reduce the influence of other colors—again, to avoid oversaturating the areas.

16. Duplicate the Black layer completed in “Making the Luminosity Mask” back to the original CMY separated image (use the Duplicate Layer function by activating the Black layer and then selecting the original image as the target). The layer name should remain Black.
17. Move the Black layer to the top of the layer stack in the original image. Change its mode to Multiply.

The steps of the black separation covered in the preceding three sections (“Making the Saturation Mask,” “Making the Luminosity Mask,” and “Applying the Black in the Separation”) can be taken care of by using the CMYK Black Hidden Power tool located in the PowerSeparations category under Effects. That tool will make the saturation mask and the luminosity mask and apply the separation to the original image. The result will look a little dark. The next step is the adjustment to the other color components: removing color under the black to balance the addition of the black component.

## Removing Color under Black

To keep ink use lower, to get better results on a press and in your printer, and to balance the effect of adding the black component, you will want to reduce the amount of color in the CMY components where the black ink was added. This reduction can keep the ink from oversaturating, streaking, and drying poorly in print, as well as improving the look of the image on-screen. This procedure continues on from the point where you added the Black layer back to the CMY-separated image in the previous section.

18. Duplicate the Black layer and Invert it (Filters → Adjustments → Invert). You can name the layer **Gray Color Adjustment**
19. Open Levels and change the white Output slider to somewhere between 128 and 191 levels. This change will determine how much of the color below the black you will be taking out. The layer will look like Figure 5.39. I used 128 for the example. The less the change, the less color will get removed, and the greater the final ink outlay at the printer.

Figure 5.39

**This is really a mask that you will use to screen other colors.**



Using 128 for the white levels input slider position will remove 50 percent of the color under the black ink, and 191 will remove 25 percent of the color. At 25 percent removal, your maximum ink outlay in blacks will be 325 percent (C75 + M75 + Y75 + K100), which is a little higher than what is usually suggested for press work. At 50 percent removal, the maximum ink outlay is 250 percent (C50 + M50 + Y50 + K100). We are just making a flat change here, because this can get really intricate. For example, you may choose to use Curves for creating the adjustment, and you could adjust those curves separately for each ink.

20. Select the Gray Color Adjustment layer and move it to just above the Yellow layer.
21. Change the Gray Color Adjustment layer's mode to Screen. This reduces the gray values in the Yellow layer by the intensity/density of the black component.
22. Duplicate the Gray Color Adjustment layer and drag the copy to just above the Magenta plate. This reduces the gray values in the Magenta layer by the intensity/density of the black component.
23. Duplicate the Gray Color Adjustment layer grouped with the Magenta plate and drag the copy to just above the Cyan plate. This reduces the gray values in the Cyan layer by the intensity/density of the black component. Your layers should look like Figure 5.40.

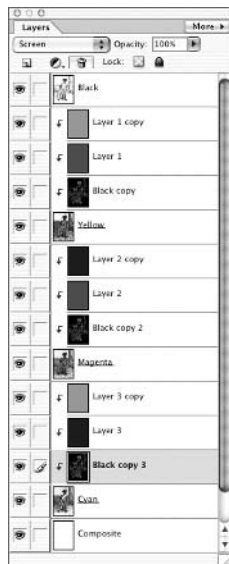
That's it. What you have now is a complete separation that shows the cyan, magenta, yellow, and black with color removed under the black to reduce the density of inks so there won't be over-inking on press. The results appear in Figure 5.41 as gray components,

and the printed result is shown in the color section. The steps in "Removing Color under Black" can be taken care of by double-clicking Remove Black Color in the PowerSeparations category of Effects.

The entire process from setup through applying color removal can be completed by using the CMYK Process Effect in the Hidden Elements tools (under the PowerSeparations category of Effects). You will be required to make adjustments to levels and/or curves to complete the processing. You may see the potential here for manually adjusting the performance of your images, in that there are many other variations you can consider. For example, cyan (traditionally a weaker, less efficient ink) is left stronger than yellow and magenta during under-color removal. The under-color removal is also often processed using Curves. An option for using curves is included as part of the automated CMYK Process tool included with the Hidden Power tool set. Use either the Curves or

Figure 5.40

With the Black copy layers in place, you've essentially completed the look of the separation.



the Levels tool for adjustments, not both. You will need to make separate reduction layers for each of the colors if you want the removal to be different for each component color. All of this will require a little testing to get the best output. There are an infinite number of variations.

With the separation in place, you can make changes to the image in CMYK, just as you would adjust an RGB image. In other words, if you feel that there is a little too much or too little of any color, you can reduce this imbalance by inserting a Curve or Levels layer just above the component layer and then making adjustments. The changes will be previewed directly in the image as you make them, so you can see the result on-screen.

Once you determine settings that work, you can reuse that method over and over again to create your custom separations. For example, if you note your prints are all a little magenta heavy, you can add a curve to the Magenta layer as part of your process to reduce the magenta influence. At the same time, you are not subject to automatic conversions. You have the advantage of making corrections to your CMYK content that you simply can't control otherwise in Elements—or Photoshop.

## Using CMYK Color

Once you have a viable separation, you'll want to be able to use it, right? You can merge the Gray Color Adjustment layers with the plates to accept the changes. This will leave you with the components and their color preview (screening) layers. To print any of the plates, you follow the same procedure you used for printing duotones. That is, you can flatten the layers individually to get C, Y, M, and K components in color, and then run the sheet through your printer four times, once for each color. Your other option is to throw out the color screening layers and save the component layers as separate files, and provide these to be used to output film. While these are viable options, the best option may be to build a real CMYK file with them.



C



M



Y



K

**Figure 5.41**  
Your completed CMYK separation should look something like this in order: C, M, Y, and K.

The only problem with making a CMYK file is there is no direct way to save the file as CMYK, since Photoshop Elements won't handle CMYK channels. However, using a DCS file template, it is possible to save your custom separations for use in a PostScript environment and create a viable CMYK file from Elements—even though there is no CMYK mode.

## Printing with DCS EPS Files

The method of creating your CMYK file may be a little bit of a horse-and-buggy approach in our modern digital image world, but it is the only method that Photoshop Elements seems to allow, and it does let you at least complete the process and apply the image.

What we'll do is hijack the components of a DCS EPS file. You will take your CMYK layers and split out the individual components, and then insinuate your content into the DCS file. You'll have to know a little about DCS files and what to do with the template, but that part is relatively easy—and we'll look at how to do it all in this section.

DCS files can come in several types, but the one we'll be using here is a five-part file. The file has a preview (a low-resolution image that you can use for placement in layout programs that handle PostScript information), and separate grayscale files for each of the components (cyan, magenta, yellow, and black). The placement file is essentially a resource fork that points to the other files. When the file is encountered by a PostScript device, it will reference the high-resolution information in the separately saved component files. As long as you don't change the name of the file that is being referenced, a PostScript device can be fooled into thinking that the content in those files will be what it needs to print...and there it can reference your cleverly substituted component separations.



All you will be doing to create the file is opening the DCS EPS template parts included on the CD with the book, and then replacing the content:

1. Copy the CMYK template folder from the DCS folder on the CD to a new directory/folder. The directory should have a name that describes the image. Be sure to copy the entire folder—all five parts of the template should be retained.
2. Open an image that is color-separated into CMYK components or open an image and create the separation by double-clicking CMYK Process in Hidden Power tools in the PowerSeparations category in Effects.
3. Change the format of the file to Grayscale and do not flatten the layers. Be sure that you have merged the color components with their Gray Color Adjustment layers.
4. Open the Image Size dialog box to check the size of the CMYK separated image. Record the number of pixels. If the image is not already 300 ppi, change the ppi of the CMYK image to 300 ppi. As you are adjusting the ppi, the content of the image

should not change. Be sure Resample is *not* checked (see Figure 5.42). Close the dialog box and accept the changes if you have adjusted the ppi.

5. Select All (Command/Ctrl+A), activate one of the component layers, and choose Edit → Copy.
6. Open the corresponding template file (for example, for the Cyan component, open `[template].C`).
7. Resize the file to the size noted in step 4. Check the Resample option. Don't worry about image distortion of the template, as the template information is unimportant.
8. Choose Edit → Paste. The image of your plate should get pasted to a new layer.
9. Flatten the file or merge down (Command/Ctrl+E).
10. Save the file (Command/Ctrl+S). *Don't use Save As*, because it may change your file and make it invalid.
11. Close the template file.
12. Repeat steps 5 through 11 for each of the color components, selecting the appropriate template file for each: `[template].M` for magenta, `[template].Y` for yellow, and `[template].K` for black.
13. Go into the folder/directory where you saved the components, and rename the placement file (it will have an .eps extension) to whatever you want. *Do not* rename the component files. Renaming components will cause the image to fail.

When you have completed these steps, you will have saved the CMYK components of your image so that they can be placed in layout programs such as QuarkXPress or Adobe InDesign. These programs will recognize the DCS file, and will reference the high-resolution components when it is time to print. The placement file will look like Figure 5.43 as a preview. The preview is meant to help with placement of the image. Be aware that the preview will not resize automatically to the new size of your components; it shows a set 1000-pixel square for a 300 ppi image, no matter what you do in resizing the component files.

Be sure not to save more than one image (the five parts are one image) to a folder or you will save over other image information. Using separate folders for each image will keep your files from overwriting one another. If you have a lot of DCS files to work

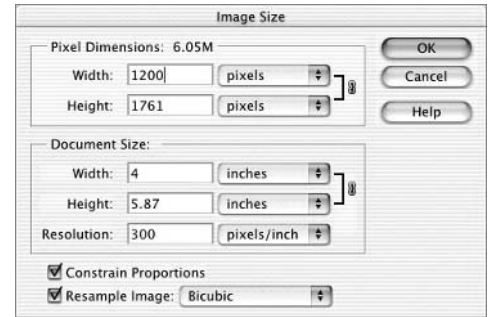


Figure 5.42  
The 1200×1761 dimension is what you'll want to note in this image. Each image can be different.

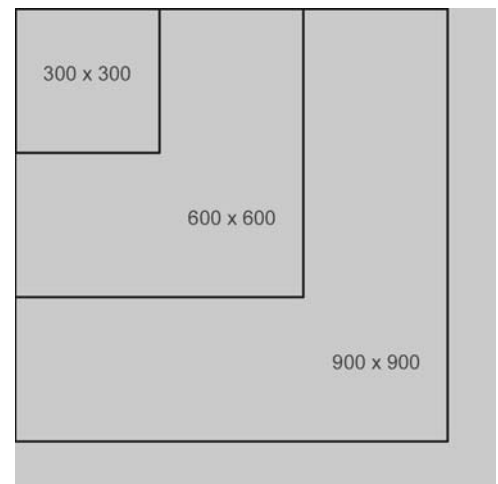


Figure 5.43  
The preview in the placement file is meant to help place the image in an image box—you will not be able to preview the image. The box for a 3×3 inch 300 ppi image (900×900 pixels) should be aligned to the 900 pixel hash marks. If using a 2×3 image (600×900 pixels), it would be aligned to the 600 pixel hash in width and the 900 in height.



with, place the separate folders for each image in a main folder (such as My CMYK Images, as shown in Figure 5.44).

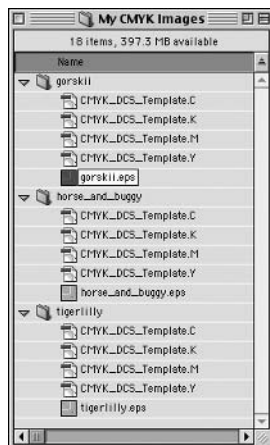
Templates are also provided on the CD for duotone, tritone, and quadtone images so

that you can use your duotone, tritone, and quadtone images as DCS EPS files. These files use a generic name for the additional colors (that is, Spot Color 1, Spot Color 2, and Spot Color 3). The generic colors can cause some mismatching when processing components, but it is possible to find solutions for output. Alert your printing technician to the generic names in the spot color files before processing.

If you have digested even most of what has happened in this chapter, you are pretty much a color guru at this point—well beyond the scope of what most Photoshop users know. There is almost nothing you can't do with a color image coming out of Photoshop Elements. Now we can move on to working on the composition.

Figure 5.44

The folder for your CMYK file can use generic names, but naming the folder by using filenames that describe the images can help sort them and make the DCS images easy to find.



# Part IV

## Rebuilding Images



The previous parts of this book have roughly tackled the broad topic of manipulating color and tone. The next area of attack is the objects and shapes in your images. While the title of this part may sound like we're going to discuss image overhauls and sweeping changes, that isn't quite the point. The idea is to work with what exists in an image, and improve it as possible. Examples of concrete changes will give you the tools to make all the wild changes you want. Understanding a little about composition can give you a good idea (or at least a hint) as to how you might improve an image by placement of the objects. Knowing how to extract and work with objects gives you more freedom to place them however you want to in the composition. Once you're able to separate color and separate objects in a scene, you have more or less ultimate control over how an image looks. This part looks at image objects in two sections:

Chapter 6 **Altering Composition**

Chapter 7 **Reshaping Image Elements**





# Chapter 6

## Altering Composition

Before just changing parts of your images around, you need a plan. An image can become infected with a lot of simple composition problems. If you treat the infection, the image will improve. Composition problems come in three types:

- Problems inherent in an image
- Problems born of careless composition
- Personal vendettas

Problems inherent in the image are those that just couldn't be fixed when taking the image. Careless composition results when something sneaks into the frame unnoticed, or when you haven't paid enough attention to what is there. The "vendetta" category is full of making certain changes you simply like or dislike; you might want to change a perfectly good image. There's no accounting for taste. There are guidelines to better composition, but the rules aren't rock-solid. Understanding composition can help you achieve better images both with your camera and by making better corrections.

### Problems in Composition (Ten Tips for Better Images)

#### Cropping as a Tool for Composition

#### Isolating Image Elements

#### Compositing Image Elements



## Problems in Composition (Ten Tips for Better Images)

All good images have at least one thing in common: they usually flatter and enhance the subject. Chances are when you look at a good image, the subject stands out in a pleasing way. Good images also always start in the camera (or in your scanner), but you do have the opportunity to fix problems and make compositional alterations later in Photoshop Elements. The changes you make can be simplified by the understanding of color and masking that you've gained thus far, and mastered by fixing what is "broken" in the image.

You've probably seen some of the most ridiculous composition faux pas in images you shoot—regretfully this will usually happen after you've taken them and you are looking at the image result. The problems in composition will almost always have to do with placement of objects in an image, image clutter, lighting, and the perspective on the subject.

For example, say you are at an awards ceremony where the governor comes to make an award presentation at a local Moose lodge. You try to get a picture at the climax of the evening, just as the award is handed off to the recipient. You've never stopped to look at the background, and never considered another perspective but standing and shooting flat-footed from wherever you happened to get placed in the seating lottery. Later when you look at the image, you see the massive horns in the background. The mounted moose head on the wall in the background makes the person getting the award look more like Bullwinkle than a hero.

You could have saved the need for correction by doing a little more to anticipate the image. Such planning ahead could have included trying to position yourself for a better angle. By doing so, you could probably have avoided the moose head, and maybe you'd have found a slightly more interesting angle on the subject as well.

- Look at every object in the viewfinder when framing your images, and eliminate what you don't need or want whenever possible.
- Take advantage of different angles that may reveal interesting perspectives on your subject if it is appropriate, as shown in Figure 6.1.

Another common problem with composition is that it is often just boring. When you take a portrait of friends who have come to visit from overseas, you line them up like cattle and take pictures slightly more interesting than mug shots. And the only reason they are slightly more interesting is that you've again forgotten the moose head on the wall—which they probably don't happen to have in the police station's booking room.



Figure 6.1

This chair can be framed to fill the entire image, or moved to another position in the frame so the image includes more of the setting and potential interest.

If you take an image with an on-camera flash of three static people standing and smiling—perhaps even at the ultimate moment as they chorus the smiley phrase “cheese”—no matter what you do, you are going to have three static people smiling flatly lit smiles. They may be washed out in the exposure and in various stages of blinking, sneezing, scratching, and so forth. For the next shot you could move them to the shade of a leafless tree, where the branches cast a pattern of shadows that weave a complexity on their faces that you’ll never remove (see Figure 6.2). It won’t matter if you change the backdrop to something interesting—Egyptian tombs, the Eiffel tower, or a moose head—the result will be about the same: an unflattering image of the main subject.

- Pay attention to sources of light and shadow—both artificial and natural. Use light to your advantage.
- Avoid the temptation to stagnate shots with posing and to always shoot with the subject at the center of the frame.
- Consider taking multiple shots from one position even if you think you got a good one; this can give you more image data to mine.

Many times composition problems—like bird droppings on a statue—are just part of the “ambiance” of an image. Images can have clutter and debris that is no more attractive than minor dust and dirt that you’d get in a scan, and there is no way to anticipate or avoid it without missing the shot. Taking an image of a play on a ball field with a \$2000 lens will still capture the garbage caught in the swirling wind behind as the play unfolds—it just might get a better picture of it.

Figure 6.2

The natural shadows in this image are complicated by unnatural shade. The result will be nearly impossible to save without editing heroics.



Figure 6.3

Lack of a more extreme depth of field effect in this image fails to completely isolate the subject from the background.



Zoom lenses, aperture, shutter speed...who needs that stuff? Just about any camera on the shelf can be set to an auto mode that will correct the exposure. The catch phrase is “point and shoot”: all you have to do is follow orders, right? The gizmo does something, and the thingamajig does something else, and what the heck—you get a picture when it’s all done.

- No equipment will always take a better picture just because it costs more.
- Don’t depend on auto mode to know what you want. Know how to use shutter speed, lens length, aperture, and exposure to control movement and depth of field when you need it. See Figure 6.3.

Certain things can’t happen when you edit an image. You won’t ever take a picture of the back of someone’s head and flip it horizontally and see their face. That may sound ridiculous, but in a similar way select objects can’t often just be flipped right to left: you may be somewhat frozen in orientations because of lighting, perspective, and content. A stop sign flipped will not say *POTS*, it will say *STOP*, backward—that is, with all the letters reversed in reverse order. In a similar way, an object captured with the light falling from

the left will look odd if flipped the other way because it will be the only object in the scene where the light is striking from a different direction.

- Consider the image you are taking as the final product, even if you know you'll be editing it later.
- Be realistic in the results you expect from editing your images, and always start with the best images you can.
- When flipping the orientation of objects, be sure that the lighting, shadows, and content all make sense.

So if you take all of these steps to make good images, why is it that you need Photoshop Elements to fix your photos at all?

If you do advanced work with Photoshop Elements, you probably aren't taking images intending to spend a lot of time in front of the computer fixing them. Although there are certain things you can do to your images in the computer that you can't in the heat of a flashbulb, you want to be going to the computer to enhance and flatter the images, just as good composition flatters a subject. Unless you are doing restoration, you will generally want to start with good images to make them even better, rather than spending a lot of time editing bad images to make them okay.

Whether you are taking an image by looking through the camera's viewfinder or evaluating it for corrections, the same questions of composition can come to mind. Even with your best effort on every image, there will often be compositional elements to adjust. The trick to correcting problems is not always so much finessing the image as recognizing what you consider a problem—then calmly stalking the problem like a hunter.

## Cropping as a Tool for Composition

Cropping entails cutting away the edges of your image; you choose what to keep or eliminate in the image while adjusting the orientation. You can crop to snip away image areas that don't matter or are distracting, to get the viewer's attention back to whatever it is that you want them to see. You can also use cropping to reorient images so the horizon is straight, or so the composition is more interesting. Cropping is usually the first adjustment you will make in a digital edit when it comes to composition: it reduces the image area that you have to work on and helps focus the rest of your changes. Reshaping an image by cropping can result in a significant change in composition and the feel of an image.


The Crop tool can be accessed by pressing C on the keyboard or by clicking its icon  in the toolbox. To use it, all you have to do is click on the image and drag a cropping box. Once the box is on the image, you can resize and rotate it by using the handles. Figure 6.4 shows two examples of how cropping can improve composition.

Figure 6.4

Cropping can correct perspective, remove unwanted image area, and help the viewer focus on the image.



Figure 6.5

Set the color of the cropped area to contrast your image, or as a gray (or black) so it behaves as an image matte. Use the Opacity to block out any image area that you will crop, to give a good view of the result.



Color and Opacity options for the Crop tool found on the Options bar (see Figure 6.5) can help you visualize the result of your crops before you commit them. You can change the color of the area outside the crop area to give you an idea of what the image looks like cropped. I often use a 50 percent gray background at 90 percent opacity so I can barely see the image area I am removing and can get a good idea of the result. Too little opacity gives you very little idea of the final result as a preview; too much, and you can't really see what you are cropping out. Changing the color to white rather than the black default can help you see what the crop will look like on white paper. You can change to other colors as a preference or to preview how a crop will look with colored matting.



The crop can be committed by clicking the OK button on the tool options bar or by pressing Enter. Once the crop is accepted, you can undo it by clicking Undo, pressing Command/Ctrl+Z, or stepping back in the Undo history.

You can practice cropping these examples by using the Crop1.psd and Crop2.psd files included on the companion CD. These are simple examples of images that could use some cropping. At times you may want to crop an image more than once: the first time to change the orientation on the object, the next to restore the framing. Cropping outside the image boundary (see Figure 6.6) will leave you with image areas filled with the background color.



## Isolating Image Elements

Flattering the subject can mean complementing or isolating it in some way so the object is clear in the image. Isolation is really a three-step process. First, you isolate an image area by using selection or masking. This can be an involved process in which you use many of the techniques that have been discussed prior to this point in the book (separations, masking, calculations, mixing, and so forth). Once your elements are selected, you can cut and paste them to a new layer to isolate them from other image areas. With the area isolated, you can apply effects focused on just that isolated area of the image. The digital isolation of the image element is technical, and the image alteration that completes the visible separation is more artistic. We'll look at a few different solutions as we jump into an example.

The orchid.psd file (included on the CD) looks like Figure 6.7. When you first open the image in Photoshop Elements, the background and foreground will show some difference, but there could be more separation between this object and the background. We'll strengthen that separation by using a drop-shadow effect on the orchids and a blurring effect on the background. Blurring will further obscure detail in the background, and the drop shadow will serve to burn in (or darken) the area around whatever selection you make.



Figure 6.6

**The cropping boundary has crossed outside of the image frame. It will take some concentrated effort to fix the missing corners of the image.**



Figure 6.7

These unusual flowers can be made even more distinct from the background.



The three basic steps below will be expanded on over the next few sections as we go through the exercise.

**Select the Object** You have a lot of options for making selections of the orchids, from making a manual outline of them, to selecting by calculation, to making a selection with the Hidden Power Blend Mask tool. We'll look at more than one way to do this and save the selection.

**Use the Selection to Isolate the Object** Once the selection is made, you have the run of the house. You can manipulate the elements separately—including color, tone, and any other adjustment you can think of. All you have to do is get the image objects on their own layers, which we'll do in short order by using the selection in conjunction with Copy and Paste commands.

**Make Separation Changes** We'll blur the background to reduce the detail there and then create a drop shadow from the isolated orchids to add some separation from the background.

## Making a Selection of the Object (Manual)

One way to make your selection is by manually defining the selection area. There are many ways that you can do this, including using the Lasso or Magnetic Lasso tool, or converting a stencil that you make by painting on a new layer. Here we'll use the Selection Brush tool. The section that follows, "Making a Selection of the Object (Calculations)," presents an alternative set of steps for accomplishing a similar selection with far less manual intervention.

1. Open the `orchid.psd` file included on the CD if you haven't already.
2. Choose the Selection Brush tool (press A). Set the Options for the tool as follows:  
Size = 15 Pixels, Mode = Mask, Hardness = 95 percent, Overlay Opacity = 60 percent, Overlay Color = red (R = 255, G = 0, B = 0).

The Selection Brush can be used in either Mask or Selection mode. Mask mode is used for this example. You can switch back and forth between modes by changing the Mode while using the tool.

3. Change the colors on the toolbar to the default colors by pressing D on the keyboard.
4. Zoom in to 200 percent–300 percent (this will make sure you can see all the pixels in the image).
5. Using the Selection Brush, trace the outline of the orchids (outside), staying as close as possible to the edge of the petals and stems. If you hold down the Shift key and click, you can create short line segments; using a series of these when navigating around petals will work on all but the toughest curves. After outlining with a larger brush, you can change the brush size to get into tight areas, and hold down the Option/Alt key to erase. Complete the circuit of the selection, making an edge all the way around the orchids. Be sure to get the areas between the flowers. The completed outline will look something like Figure 6.8 but will be in red on your screen. You could continue to use the Selection Brush here to fill in all the areas of the image that you don't want to select, but we'll speed this up and make it more accurate by combining a stenciling technique using layers.
6. When the outline is complete, choose the Magic Wand tool. The mask you have created will turn into a selection. Invert the selection by pressing Command+Shift+I / Ctrl+Shift+I. Set the Magic Wand to 0 Tolerance, Contiguous, and uncheck the Use All Layers option.
7. Create a new layer (Command+Shift+N/Ctrl+Shift+N) and fill the selection with black (Edit → Fill Selection; use the Foreground Color, Normal Mode, and 100 percent Opacity). Name the layer **Orchid Selection**.



Figure 6.8

The outline is made dark here for emphasis; your outline will look red in the same shape.



Figure 6.9

The black area of this figure shows the area that should be filled when you have completed step 8.

8. Deselect (Command/Ctrl+D).
9. Using the Magic Wand, click in each of the areas outside the orchids while holding down the Shift key to add to the selection.
10. Expand the selection (Select → Modify → Expand) by half the diameter of the brush used in step 5 to compensate for any softness at the edge of the area you filled previously (step 7). This should make the selection fall across the center of the outline created in steps 5–7.
11. Fill with the foreground color. At this point you have completed the basic shape for the selection of the flowers. Figure 6.9 shows the result.
12. Change the opacity of the layer to 0 percent or shut off the view. No kidding. This will hide the layer whether the visibility is on or off and will essentially store the selection. It is one of two ways we'll use to hide selections in your images.

The black fill in the Orchid Selection layer should not cover any of the flowers, and should have a slightly soft edge. Later we will use this content to load a selection and make short work of the image adjustment.

## Making a Selection of the Object (Calculations)



This is a second way to make the selection of the orchids—this section does not follow from the previous one but substitutes for it. You may find a number of ways to do something similar to what is suggested here in using calculations. The idea is to take whatever advantages you see in the image and successfully enhance them to get the result you need.

The orchids are the brightest elements in the image, and that makes them a pretty easy target for this kind of selection. In a similar way, the darkest, most saturated, least saturated, or most color-defined image areas can all provide the information you need to make a calculated selection—depending on the separations you choose to make, the image you are working on, and what you want to achieve.

1. Starting with the `orchid.psd` image, make an RGB separation by using the Split RGB tool under the PowerSeparations category in Effects.
2. View, and then delete, the Blue component layer. You won't need it for this calculation, because it offers very little practical distinction in the object you are trying to separate. However, take a look at it to see why it isn't helpful.
3. Duplicate the Green component layer and set the duplicate to Screen mode. Doing this will take advantage of the information in the green channel and emphasize the brightness that already exists there. Light areas will get much lighter, while dark areas remain dark.
4. Change the Red component layer to Color Burn mode. The red is more consistently dark around the flower, and setting it to Color Burn will darken the perimeter. This should help darken the area around the flowers to black. This will result in a pretty good outline of the orchids in black-and-white. See Figure 6.10.
5. Merge the layers used in the calculation (Green, Green Copy, and Red), and rename the result **Orchid Selection**. It is not yet a selection, but you will use this layer just like the Orchid Selection layer in the manual technique.

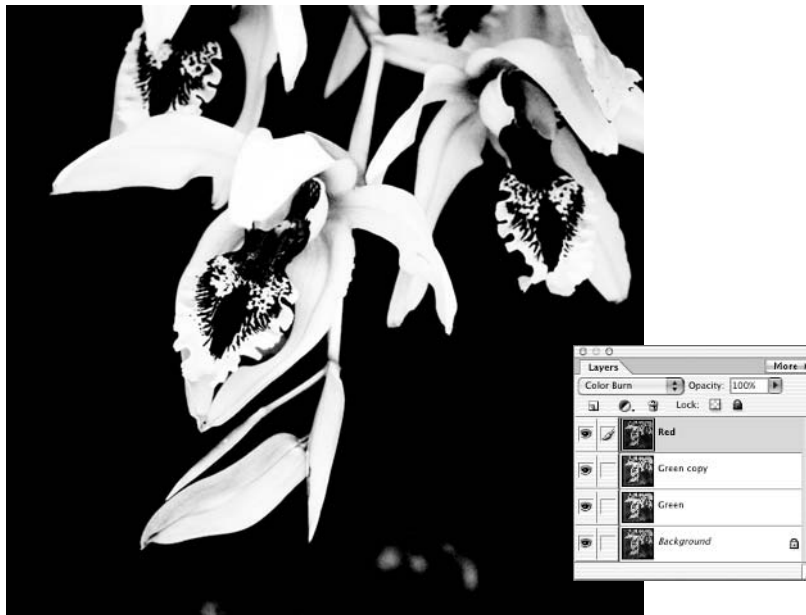


Figure 6.10

While this selection is not perfect, it uses existing image information and is much quicker than manual selection.

6. Get a brush and touch up the rough outline of the flowers made with the calculation. To touch up, fill in any areas you don't need to select by filling in those areas with black. Use white to remove black areas to add to the selected part of the mask. The center part of the petals will have left the most for you to clean up.
7. When you are done with the touch-up, double-click Clear Grayscale and then double-click Commit Transparency in the PowerTools1 category of Effects in the Hidden Power tools. This will first create the appearance of the mask and then commit the transparency. It creates a mask based on the black-and-white content of the Orchid Selection layer. The white areas will be transparent.
8. Change the opacity of the mask layer to 0 percent, or turn off the visibility.

This series of steps should create a layer filled with black that is nearly identical to the manual selection made in the previous set of steps. You can use the result from either method and continue with the process in the next section.

## Using the Selection to Isolate the Object

Whether you made your selection manually or through calculations, you can now use the Orchid Selection layer to load a selection that will enable you to manipulate elements in the image.

1. Load the Orchid Selection layer as a selection by holding down the Command/Ctrl button and clicking the Orchid Selection layer in the Layers palette.
2. Activate the Background layer.
3. Copy and paste. This will paste the orchids into a new layer. Change the layer name to **Orchids**.
4. Load the orchid selection again by Command/Ctrl+clicking the Orchids layer. Choose Select → Invert (Shift+Command+I / Shift+Ctrl+I) to invert the selection.
5. Activate the Background layer.
6. Copy and Paste the background to create a new layer. Name the layer **Orchid Background**. Figure 6.11 shows a breakdown of the layers in detail and in the Layers palette.

Figure 6.11

The layers you have left will be the original Background, the Orchid Background, and the Orchids neatly stacked from the bottom up in the Layers palette.



Your layers should be in the exact order shown in the figure. Isolating the background might have taken you one step further than you expected to go. However, you'll need the Orchid Background on its own layer. The reason for this is that the color from the orchids would bleed into the background when you blur if the objects aren't separate. Treating them as separate objects keeps the reactions separate. You might try the blur on a copy of the Background layer when we get to that point just to see the difference.

## Making the Isolated Changes

Now that the image elements have been isolated into their own layers, you can edit them individually by blurring the background and creating a manual drop shadow:

1. Activate the Orchid Background layer.
2. Apply a Gaussian Blur (Filter → Blur → Gaussian Blur). The radius should be broad enough to significantly blur the background, but the setting is your choice. If you click the Lock Transparent Pixels option for the layer before the blur, solid pixels on the layer will remain solid.
3. Load the Orchids layer as a selection by Command/Ctrl+clicking it in the Layers palette. Create a new layer and drag it below the Orchids layer. Name the layer **Drop Shadow**. The selection will be used to create a drop shadow on the new layer.
4. Adjust the selection. You may want to both Expand and Feather the selection (find these on the Select menu). Expanding will give you a broader base, and Feathering will blend in the effect of the shadow at the edges. The stronger you want the effect to be, the broader you should make both. Try Expand and Feather settings of 10 pixels. These can be redone later by throwing out and replacing the Drop Shadow layer.
5. Fill the selection with black. Set the layer mode to Multiply to ensure that areas of the image below the shadow darken. You can control the intensity of the effect by using layer opacity. Figure 6.12 shows the original, the drop shadow, and the result.

**Figure 6.12**  
While this shows shadowing to enhance separation, using white for the shadow could add separation between a dark object and its dark background.



### SELECTING FLY-AWAY HAIR?

A common request in user forums on the Internet is the ability to quickly select a subject's fly-away hair. This can usually be challenging: there is no guaranteed way to make that kind of selection, and no one-size-fits-all methodology. If the hair is photographed against a distinct color (such as a blue or green screen), it may be a better idea to apply the advantage posed by the background color to create a mask rather than attempting to make an absolutely nutty selection based on the thin wisps of hair. Similar to the techniques used in "Making a Selection of the Object (Calculations)" you might build a color range mask either using Hue/Saturation or Blend Mask. If you target the mask correctly to the color range of the background, you can use it to drop in whatever background replacement you wanted, or use it to create a selection that enables you to isolate the wisps to their own layer.

Placing the drop shadow increases the local contrast around the orchids and enhances the separation from the background. At this point, you may want to try painting in some highlights or working with other effects and correction, but the basic purpose of isolating these image objects has been accomplished.

## Compositing Image Elements

In times of image trouble one of the greatest options to have is the availability of more than one source image to work with. If you take several shots of the same scene, you are really safeguarding yourself for any corrections you might have to make. For example, if you are taking one of those artificially posed group shots (we all do it at some time or another) and you take one shot, you may find that Bessy blinked, and Billy had a finger up his nose. If you pause a moment and take the same shot, Billy and Bessy might be fine while Uncle Dom is fending off a bee, and one of the twins ran off. Neither of the shots is good by itself, but since they were taken at the same time, you can use elements from each to create one good image. It is probably more time-efficient to go find the twin and try one more shot, but in a pinch, you have the information you need for the completed image. Just copy Bessy without the blink and the more flattering pose for Billy from the second shot to fix the first.

This same philosophy works to help you fix any number of other problems. Say you go out and shoot a great picture of a balloon race starting off in the early morning as they float up the hillside at the peak of fall foliage. The image is perfect, except for that one ugly balloon, or the billboard ad you can't crop out, or the electrical wires, or a water tower... If you wait a moment and snap another image, the balloons will have moved and you'll have a whole new set of autumn leaves to make any necessary patches with, or you can mix and



match the positions of the balloons as you'd prefer. If you wait till the balloons are above the hillside, you can take a clean shot of the hill by itself and then place the balloons wherever you want. More source material in the same light, from the same angle, can be far better than just repeating information in the image. As long as the images are good, you'll have more freedom to use different parts of different images to create the image you were looking for in the first place.

This type of multi-image thinking can be turned right on its head to help you make better shots and solve creative problems. You may set up shots that you take in parts *on purpose* to get a better result.

For example, say you are taking a product shot of the teapot in Figure 6.13 to sell on a website. There is a little more than meets the eye because there are several internal parts, and you'd like to show them all in one image. Lighting multiple objects in a scene can get tricky: objects in close proximity can block lighting and cast shadows over one another. One way to rid yourself of the lighting problem is to shoot each part that you want to include and then assemble the shots into one final image. This enables you to make the best of each part and simplifies the process: you make one lighting setup, shoot each of the parts so you can easily extract it from the background—perhaps even take a picture of just the background—and then make a composite of the parts.

If you take pictures of the parts of the pot separately, all you have to do is compile them in a single image. Simple, right? You may have to create a background, unless you take an image to use for that separately. You can spend a lot of time with this one depending on how meticulous you are.

**Take the Image Parts** I've already shot the image parts for you, and the files are included on the CD in a folder called Teapot. There are five: the glass, the harness, the insert holder, the top, and the basket.



**Extract the Image Parts** Isolate each image part, and copy/paste the element into a new image that will be large enough to hold all of the objects. Use whatever method you want to use to isolate the parts—you may even want to mix techniques. The previous section with the orchids may provide some guidelines for accomplishing selection and isolation. In some instances, calculations can prove to be pretty easy because the blue parts of the pot will provide an easy target. However, the glass and basket have highlights and a lack of color, which may be a bit more challenging. To make this a little more interesting, I didn't color-correct, so you might want to do that. You can match the color across the pieces either by making an adjustment to each image according to the background, or by correcting the background to gray. I'm not sure how it happened, but one of these darned objects got shot in slightly different light. See how even the best-planned images can easily go awry?

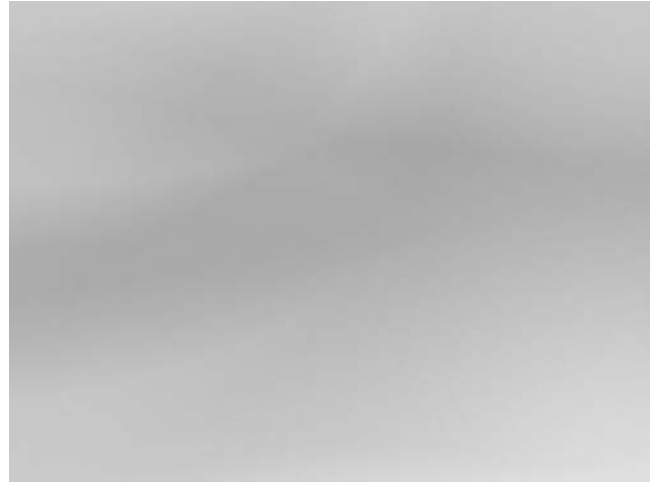


Figure 6.13

This teapot opens  
up into several dif-  
ferent pieces.



**Create the Background** You can use a totally flat background, or you can add a little interest and make it seem more realistic with a slight gradient—perhaps multiple gradients—and a touch of noise. The background you create is up to you, but it should be at least twice as wide as the widest object, and twice as tall as the tallest, with the same ppi. The background I used is pictured in Figure 6.14. You'll have to remember one additional challenge: that glass stuff on the pot is supposed to be transparent, so whatever you end up with as a background has to somehow make sense with what you can see through the glass. You might want to take care of that with color masking.



**Figure 6.14**  
This background was made entirely from simple gradients and should serve as a fine place to insert my objects.

**Arrange the Image Parts and Create Effects** You can arrange the objects however you want to within the image and then apply effects to add realism or separation. A few steps to take:

- Create drop shadows for each of the objects. Often just a simple, soft, semi-opaque shadow outlining the base of the object will do. This helps to blend the elements and make them interact—rather than seeming like disparate pieces of a puzzle that were pasted into an image. You may want to create these shadows manually by using black, a feathered brush, and a layer with the mode set to Multiply just below the object (similar to what we did with the orchids).
- Be conscious of areas where elements cross. For example, if you overlap the glass onto the harness, part of that harness should probably show through the glass. Your adjustments will have to reflect that.

When you are all finished, the image should look something like Figure 6.15.

## Alpha Channels in Elements Images

Because making the selection to isolate the objects is the least important part of the compositing exercise, I left alpha channels in each image. You can use the alphas to make selections of the objects. An *alpha channel* is just a means of storing a selection; it is stored in the same way color is stored (as a component), but the alphas don't affect image color. When they are loaded, they re-create the selection that was stored... exactly.

One of the improvements made to Photoshop Elements in version 2 was the ability to save, load, and delete alpha channels by choosing Save Selection, Load Selection, and Delete Selection functions, respectively. (For those on Photoshop Elements 1, the Hidden Power tools included a way to work with alphas.) The only problem with that is you can't

Figure 6.15

The composite of the parts will show a clear rendering of each component without the trouble you'd otherwise have with shadows.



see alpha channels in Photoshop Elements, so you have to work a little blind. If you store a lot of selections in any one image, there isn't a quick way to purge them from your images. (If you're still on either version 1 or 2, see my website, [www.hiddenelements.com](http://www.hiddenelements.com), for the appropriate Hidden Power tools.)



For version 3 of Elements, I've provided two Hidden Power tools to help you work with selections: Delete Selections and Alphas, and Preview Selection. Delete Selections and Alphas will help you purge selections from your image without having to delete them one at a time. Removing the alphas will help keep your images trim in file size. Preview Selection will provide a brief preview of any of the saved selections you choose. You'll need to be able to work with alphas to save your selections, so we'll look at doing that briefly first.

To practice loading a selection, you can use one of the sample images from the teapot example:

1. Open one of the images from the example set for the teapot.
2. Choose Load Selection on the Select menu. When the dialog box appears, select Alpha 1 from the Selection drop-down list (it should be selected for you because it is the only alpha).

This will load the Alpha 1 channel from the image as a selection. The subject of the image will be selected; that's all there is to it. The only reason this works is because the alpha channel was saved with the image. You can use the Save Selection function for storing your own selections as alpha channels. All you have to do is the following:

1. Open an image.
2. Create a selection by using whatever tools you like.
3. Choose Save Selection from the Select menu.
4. Type a name for your selection/alpha channel.
5. Click OK to accept the changes and save the selection by the name you entered.

To Delete a selection, just choose Delete Selection from the Select menu. When the dialog box appears, choose the selection you want to delete and click OK to accept the change.

If you have an image where you've saved a bunch of selections and you want to purge them all, the Delete Selections and Alphas tool in the PowerTools2 category in Effects can help you out. All you have to do is double-click Delete Selections and Alphas, and the Hidden Power tool will separate all the channels and then ask you which you want to combine to re-create your image. If the image was RGB, choose RGB to tell Elements what type of file it should make; then choose the color channels. In an RGB image, the RGB channels will be separated into *filename.red*, *filename.green*, and *filename.blue* (where *filename* stands for the name of the image before you split it; if you are splitting a file you hadn't saved, the filename will be *Untitled* with a number: *Untitled-#*). The image will be reassembled from the sources you choose.

A selection is represented on-screen by the selection outline. This selection outline tells only part of the story about what is actually selected. The outline shows only where the selection is at least 50 percent effective. If there is grayscale in your selection, or feathering, the only way you'll know exactly what total area will be affected is by previewing the selection.

Hidden Power tools provide a preview for any saved selection. Be sure you've saved the selection you want to preview and then double-click Preview Selection in the PowerTools2 category of the Hidden Power tools on the Effects palette. This tool will prompt you to select a saved alpha. When you have made the choice, the selection will preview automatically and then fade. When the preview disappears, a message will appear telling you the preview is complete. Do not interrupt the process.

These few tools should add powerful selection storage and selection management features to your repertoire.



# Chapter 7

## Reshaping Image Elements

There is a whole lot to pay attention to when you are looking to “fit” an object into a new image. You must consider light, shadow, detail, perspective, tone, and color. It becomes a balancing act as you have to make objects fit not only as part of the composition, but also as part of the color and texture of the image. In other words, at this point you need to pull together all that you have in your toolbox and everything you’ve learned so far.

There are simple transformations, and then there are those that radically reshape an image element, in essence re-creating it in a form that didn’t exist before. This kind of transformation may require isolating elements based on color or tone, and then altering the shape of the element itself. We’ll look at both reshaping and creating image elements in this chapter.

### Transformations and Distortions

#### Shaping Image Elements with Light and Shadow

#### Creating Image Elements



## Transformations and Distortions

Transformations and distortions are usually looked at as a means of bending an image or making something look, well, demented. People tend to have fun with tools such as Transform or Liquify, and that is all well and good, but distortion tools can be used for repair as well. You might want to distort things to make them look more natural, or simply better.

Images taken with a wide-angle lens may exaggerate the size of objects at the center of the image; tall objects can sometimes show an exaggerated perspective because of the way light comes through a lens. Sometimes you will want to enhance this effect, and at other times you may want to minimize it. You may simply want to display some creativity and change the appearance of an object or reshape it to make it fit where you want to see it in an image.

Take a look at the example image in Figure 7.1. There's nothing really wrong with this image; however, there are some things you might want to improve or change. For example, the window seems a bit skewed, and the wall does, too. The horizon (where the wall meets the floor) isn't flat. The image looks as though the picture was taken with a lens that distorted the whole scene.

Figure 7.1

An interesting image as is, it can also be a good study for perspective.



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Say you are a perfectionist and just need to have that window square. You can use the Transform command (Image → Transform) to bend and stretch the image until the window looks right—or has the perspective that you'd prefer. All you do is either make a selection around what you want to reshape and transform that selection, or have a layer active and then transform the whole layer. Click and drag the handles on the bounding box to reshape the image. The image information inside the box changes to fit the new shape of the box. Pressing the Enter key or clicking the OK button on the options bar commits the changes. Pressing the Escape key will undo the transformation before it is committed. The modes for Transform are described in Table 7.1 and are demonstrated in Figure 7.2.

MODE	DESCRIPTION
Free Transform	Enables you to rotate, scale, skew, distort, or change perspective without having to switch tool modes via the menu. Move the cursor outside the bounding box to rotate. Click any handle and move to scale the box; hold down the Shift key to scale proportionally; hold down Option/Alt+Shift to scale proportionally on center. Hold down Command/Ctrl+Shift to skew; hold down Command/Ctrl to distort; hold down Command+Option+Shift / Ctrl+Alt+Shift to change perspective.
Skew	Enables you to reshape the bounding box by moving any handle along a current axis (side). Hold down the Shift key to switch the tool to Perspective; hold Option/Alt to skew opposite handles (corners or sides) on center.
Distort	Enables you to reshape the bounding box by moving any point freely. Hold down the Shift key to restrict movement to a current axis (side).
Perspective	Enables you to skew or reshape the bounding box by moving handles. Moving the center handle skews the box along any axis (side). Moving a corner handle resizes the box in sync with the opposite corner: corners on the same axis (side) move in the opposite direction from one another.

Table 7.1  
Transform Modes

Figure 7.3 shows just how much of a transformation you have to make to change the perspective of the image so that the window is square. And this change is fine—but only if you want to ignore the rest of the image. The only area of the image that the change fixes is the outside of the window frame, not the windowpanes—and the transformation throws everything else in the image out of whack at the same time.

Transformations that you make should often be slight. Larger changes will compromise sharpness in a way similar to resampling.

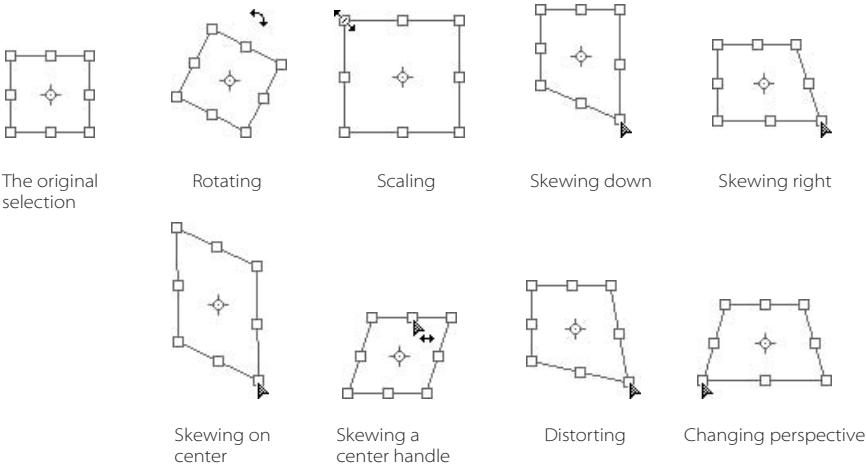


Figure 7.2  
The Transform options can skew, rotate, scale, distort, and change perspective of your selection. Note that the cursor changes for different actions.



What you want to do to fix objects when using Transform is to isolate the problems. Make selections of specific image areas or objects, move those image areas or objects to their own layer, and then work on them in isolation from the rest of the image. In fact, you can take the separate parts of the image and rebuild the whole image to make it look the way you want it to. That's what we'll be doing with the image from Figure 7.1.



The image is available on the CD (*perspectives.psd*). In the following exercise you'll see how to use what's in the image to separate out objects using selection, and fix the perspective problems. The key parts of the image are the tree, the window, and the background (sidewalk and wall). You'll want to separate each object and move it to its own layer, and then do adjustments as necessary.

On your way through the corrections you'll be working with two more Hidden Power tools: Make Guide and Clear Guides. These will enable you to place nonprinting lines called *guides* on your image to help with alignment. Split RGB will be used in helping to create a complex masking and selection. The process of adjusting this image is involved; be sure to allot a good chunk of time at the computer when you are ready to test it out, or save the image for the exercise in stages as you go.

The main parts of the exercise are divided as follows:

Figure 7.3

To transform a flattened image, you have to first convert the background to a layer by double-clicking it in the Layers palette.



**Prepare the Image** There is some minor cleanup to do to the image. Note the spotting and inconsistent color in some of the paint. You can remove the bleaching effect on the windowpanes as well. What you decide to fix will depend on how picky you are. Once you've done minor touch-ups, you'll want to do general color correction. I'll be leaving all of this to your discretion as per instructions in previous chapters and won't be includ-

ing it in the steps because it is covered elsewhere in the book. I hope it is enough warning to say: if you jump right into the manipulation without prepping, you might make more work for yourself rather than less. Failing to clean up may leave you spreading existing problems around the image. For more information, see "Doing Minor Cleanup First" in Chapter 3 and "Minor Cleanup for Color Images" in Chapter 4.

**Re-create the Background** By using the existing background and some patching, you will create a fresh, new background to build the rest of the image on, using information that already exists in the image.

**Add in the Sidewalk** This will be a simple application of Transform on whatever part of the existing sidewalk you can salvage.

**Isolate, Fix, and Position the Window** The window can be selected using a variety of techniques that we've already discussed, from

color and tonal techniques to manual selection. Another option is making a rough selection that you can blend in later. This simpler technique is what we'll be using. Once the window is selected and copied to its own layer, the perspective can be adjusted with the Transform command. The transformation will require two separate adjustments: one to the whole window to straighten the outside of the frame, and one to adjust the windowpane. Using Guides will help keep the window in position. We'll look at another possibility later in the chapter: replacing the window entirely with an object made from scratch.

**Isolate, Fix, and Position the Tree** Adjusting the tree will require some fancy image editing footwork. The tree will have to be selected a lot more accurately than the window because the selection will be used to re-create the tree's shadow. All those tiny branches can be difficult. Although the selection can be done in several ways, this solution uses a variety of tools, including channel calculations, Levels, Threshold, Paintbrush, and Lasso in a new image.

You won't have much to do with the tree itself. The pot will need some reshaping and adjustment. The original image seems to have a shadow that was generated by something off to the right of the frame, so the shadow will need to be replaced entirely.

## Re-creating the Background

We'll start by creating the background to rebuild the image on.

1. Open the image (`perspectives.psd`).
2. Make a large selection of the wall, including as much of it as you can, but excluding the window, tree, sidewalk, and any shadows. This is probably easiest to do with the Lasso tool. You are looking to encompass the largest patch of unadulterated wall that you can find.
3. Copy and paste the selection to a new layer and name the layer **Wall**.
4. Activate the Background layer layer; then create a new layer and fill it with white. Name it **Canvas**. You'll be using the Canvas layer to block out the background; you'll need the Background layer as a source for the elements you'll be isolating during the process of making the changes. The canvas will also let you see how development is progressing without constantly turning the visibility of layers on and off.
5. Use the Wall layer as a source for making patches to fill the rest of the image. This is probably easiest to do by using layers. Duplicate the Wall source layer to create more source material for the wall. Name the layers that you add **Patch 1**, **Patch 2**, and so forth, so you know what you used them for. With the Canvas layer on, transform (move, rotate, stretch, and so forth) the duplicates to patch the wall. All you really want to do is fill any white areas that you see. Consider the following options:
  - Duplicate the Wall layer. You can use the Duplicate Layer command.



- Create feathered patches of the full layer. To create a patch, activate the Wall layer by clicking it in the Layers palette, Command/Ctrl+click the Wall layer (to load it as a selection), and then feather the resulting selection 10–20 pixels (Select → Feather). Copy and paste to make a new layer, and then rename it **Patch#**.
  - Create patches to fill specific image areas. To do this, make a selection over a white area as a template, move the selection to a donor area that fits the selection, and copy and paste the selection from the Background layer. Pasting will create a new layer (that you can rename). Once the patch is created, reposition the new Patch layer to fill the area where you defined the template selection. You can expand the template selection (Select → Expand) and feather it (Select → Feather) to help blend in your patches.
  - Create patch selection shapes at random. Using a feathered selection tool, make selection shapes, and copy and then paste these patches to create multiple, random patch sources.
6. Once the wall is mostly patched, create a new layer above the Patch layers and make spot corrections with the Clone Stamp tool to smooth any obvious seams, holes, or other obvious inconsistencies. When you are finished, the result should be a solid wall with no other objects, as in Figure 7.4.
  7. Link all the Patch layers, click the Wall layer to activate it, and then merge them using Layer → Merge Linked. The resulting layer should be named Wall and will be the composite of all the patches you created.

## Adding in the Sidewalk

With the wall as a background, it is time to start building in other objects.

8. Turn off the visibility for the Wall and Canvas layers and then activate the Background layer.
9. Make a selection of the open part of the sidewalk by using the Polygonal Lasso tool. Copy and paste the selection to a new layer. Name the layer **Sidewalk**.
10. Drag the Sidewalk layer above the Wall layer. Turn on the visibility for the Wall layer.
11. Use the Transform tool (for example, Distort) and multiple copies of the cement to shape the Sidewalk layer as desired. The goal is to create a flat horizon, and to fill the bottom of the image from left to right as in the original. You may want to re-create the sidewalk with a single copy of the cement, or with patches, similar to what you did with the wall. The result should look something like Figure 7.5.



Figure 7.4

The new wall should have no other objects, and no obvious rifts and/or duplications.

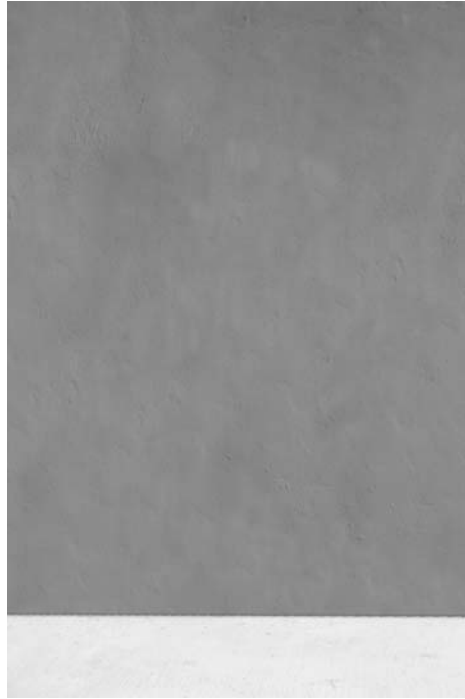


Figure 7.5

The wall and sidewalk form a new background, where you'll place the other image elements as you build the new image.

## Isolating, Fixing, and Positioning the Window

The next step is to adjust the window's shape to fit the new perspective of the image.

12. Turn off the visibility for the Wall layer (the sidewalk can remain).
13. Choose the Marquee selection tool (square) and make a selection around the window, leaving a fairly generous amount of wall around the edges; then copy and paste the window to a new layer and name the layer **Window**.
14. Drag the Window layer to the top of the layer stack.
15. The next two steps will help you create a guide for aligning the window. Place your cursor halfway up the left side of the window and note the cursor position in pixels on the ruler or Info palette. Turn on the ruler by pressing Command/Ctrl+R. To change the ruler units, see Units & Rulers in the Preferences (press Command/Ctrl+K and then Command/Ctrl+5). The vertical position on the Info palette is the X value.
16. Place a vertical guide at the position you noted in the previous step by clicking Make Guide, a Hidden Power tool in the PowerTools2 category of Effects. Choose Vertical

for orientation of the guide, and then enter the value noted in the previous step in the Position field.

17. Make measurements and place guides for the right, top, and bottom edges of the window by following steps 15 and 16, noting the center position for each side. Top and bottom guides will use horizontal rather than vertical orientations, and are represented by the Y value on the Info palette.
18. When the guides are all in place, adjust the window by using Free Transform to fit the window as closely as possible to the guides you created. See an example in Figure 7.6. Accept the changes when you are satisfied.
19. Using a large, soft brush and the Eraser tool, erase the edge of the wall included with your window selection to blend it in with the Wall layer.
20. The next few steps will help you reshape the window glass. Place new guides for the right, left, top, and bottom of the window for the inside part of the frame.
21. Make a Rectangular Marquee selection somewhat larger than the window glass, about midway between the inner and outer guides. With the selection in place, be sure the Window layer is active and copy and paste the selection to a new layer.
22. Use Image → Transform → Free Transform (Command/Ctrl+T) to reshape the new layer so that the inner frame of the window aligns with the guides you created. Your results should look like Figure 7.7.



Figure 7.6

Your transformation of the original should look something like this. The actual change depends on the shape of the selection you made of the window.

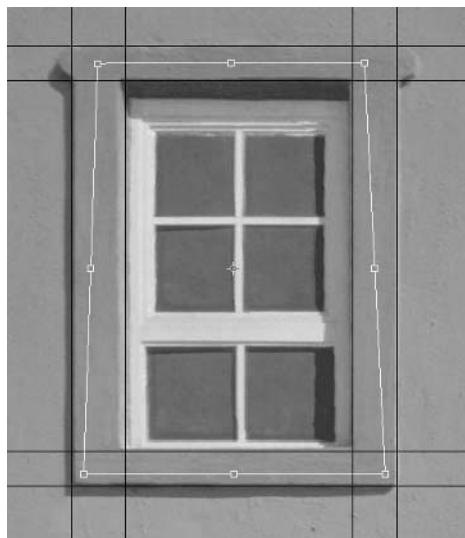


Figure 7.7

With the frame realigned, the unnatural effects of the original perspective should be all but eliminated.

## Isolating, Fixing, and Positioning the Tree

23. Activate the Background layer and copy it to a new image by selecting Duplicate Layer on the Layers palette pop-up menu. When the dialog box appears, choose New in the Document drop-down list in the Destination panel.
24. Split the color into RGB by double-clicking the Split RGB Hidden Power tool in the PowerSeparations category of Effects.
25. Create a new layer above the RGB layers and name it **Tree Selection**. Fill it with black and drag the layer below the RGB layers (just above the Background layer).
26. Delete the Blue layer.
27. Set the Red layer to Difference mode in the Layers palette. You'll note that the tree becomes a bit darker than the shadow behind it. Choosing Difference is specific to the content of this image—other images may work better using other modes (or color separation techniques) to create masks and separation.
28. Apply a Levels correction to draw out the difference by making a Levels adjustment layer. I used Input levels with sliders set to black: 0, midtone: 1.00, and white: 115 to get the result shown in Figure 7.8. Once the difference between the tree and the surrounding area is apparent, it can be enhanced in a number of ways.
29. Make another adjustment to turn the wall (excepting the shadow) white around the tree. Use Threshold to measure the darkest point on the wall, by moving the slider until just one pixel appears where there are no branches. Use the value from the Threshold as the white slider position for a Levels correction (see Figure 7.9), and the background will mostly vanish.



Figure 7.8

Increase the appearance of separation between the tree and the wall by making a straight Levels correction to increase the dynamic range of the tone.

30. Merge the visible layers by choosing Layer → Merge Visible (Shift+Command+E / Shift+Ctrl+E).
31. With the area around the tree mostly clear, clean up the rest of the area around the tree manually. See Figure 7.10.
32. Copy the selection made in Figure 7.10 and paste it as a new layer into the original image. Name the new layer **Tree Selection**.
33. Activate the Tree Selection layer, set the Magic Wand Tolerance to 1, Anti-aliased, and Contiguous, and then click in the white area of the selection layer. Reverse the selection (Command+Shift+I / Ctrl+Shift+I), activate the Background, and then copy and paste the selection. This puts the tree on its own layer. Name the layer **Tree** and drag it to the top of the layer stack.

Figure 7.9

Use Threshold to measure the darkest point on the wall, and use that value as the white slider position for a Levels correction.

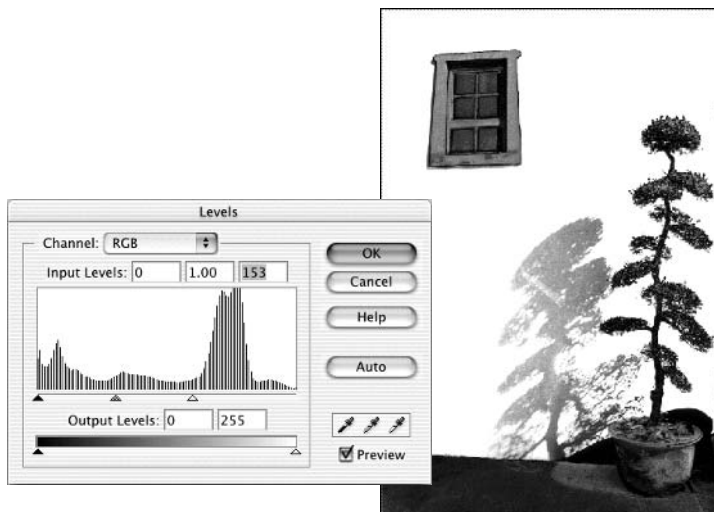


Figure 7.10

Use a paintbrush and white to make a clean area around the tree and pot (a); then use the Polygonal Lasso to clear the rest of the image by making a selection (b); then fill the selected area with white (c) after the selection is made.





34. Turn off the visibility of the Tree Selection layer. Don't delete the Tree Selection layer; you'll need it later.
35. Touch up the tree. You may want to reshape the pot (copy it to its own layer and use Transform), remove the shadow from the rim on the right (use selection and color and tone adjustments), and adjust some of the branches. At this point the image should look something like Figure 7.11.
36. Save the file and name it **new\_perspectives.psd**.

Everything has been replaced, but something still looks a little wrong. The missing piece is the shadow for the tree. You'll put that back in, in the next section, after taking a better look at light and shadow. Because you've done quite a bit of work to this point and don't want to lose it (or you may need a break), the last step suggests saving the image as a PSD to retain all the work you've completed. Do that now if you haven't. We'll get back to rebuilding that image in a moment.



Figure 7.11

**When you've separated the tree and window, they'll look like this over the Wall and Sidewalk layers.**

## Shaping Image Elements with Light and Shadow

Light and shadow affect the shape of objects and how they appear relative to one another. Shading and highlighting can provide separation between objects as well, as we saw in the orchid exercise in Chapter 6. It is light and shadow that affect depth and texture in an image, and light that gives shape and color to everything in your images.

Making a raised button provides a good, simple example of how light and shadow can create shape. The following steps will turn a flat gray square into a shaped button that appears to be elevated from the background:

1. Create a new Grayscale image (File → New) that is 500×500 pixels.
2. Make a marquee by using the Fixed Size option for the Marquee tool on the options bar. Set the size to 300×300 pixels and click the tool at 100,100 (x,y). If you click exactly on that point (use the rulers; if the rulers are set to inches, change the preferences to pixels), the selection will be centered exactly on the image. In this case it doesn't matter if you are off by a few pixels.



3. Create a new layer named **Button** and fill the selection made in the previous step with 50 percent gray.
4. Select the Background layer. Create a new layer named **Drop Shadow** and set the mode to Multiply. Creating the new layer just above the Background in the layer stack will keep the drop shadow behind/below the button.
5. Feather the current selection 20 pixels and fill the selection with black. Change the layer Opacity to 75 percent.
6. Deselect by pressing Command/Ctrl+D.
7. Offset the shadow layer down 20 pixels and right 20 pixels. To do this, choose the Move tool, hold down the Shift key, and press the right arrow and down arrow keys on your keyboard two times each.
8. Activate the Button layer by clicking it in the Layers palette.
9. Create a new layer and name it **Highlight**. Check the Group With Previous check box, set the layer mode to Screen, and change the Opacity to 50 percent.
10. Reload the previous selection by pressing Shift+Command+D / Shift+Ctrl+D. Invert the selection (Shift+Command+I / Shift+Ctrl+I) and fill it with white.
11. Create a new layer and name it **Shadow**. Check the Group With Previous check box, set the layer mode to Multiply, fill the layer with black, and change the Opacity to 50 percent.
12. Choose Select → Deselect.
13. Activate the Highlight layer, choose the Move tool, and offset the layer down 20 pixels and right 20 pixels. To do this, hold down the Shift key and press the right arrow and down arrow keys two times each.
14. Activate the Shadow layer and offset it up 20 pixels and left 20 pixels. To do this, hold down the Shift key and press the left arrow and up arrow keys two times each.

This leaves you with a square button that appears to be slightly raised and is separate from the background. Figure 7.12 shows the results: the flat square is transformed into a shaped button with apparent contour. The drop shadow between the button and the background creates distance between those objects; the Highlight and Shadow layers create object shape by mimicking how a raised button might look if a light were coming from the upper-left corner of the image. The more extreme the effects, the greater the depth or distance appears.

Simple highlight and shadow creation of this sort happens when using layer effects. The way you choose to handle shadows controls the shape of the object, but the final image has to show some consistency with the scene to portray the desired result and the direction of

the light. If you now move the Highlight up and left 40 pixels, and the Shadow down and right 40 pixels, it inverts the highlight and shadow on the button. The button appears to be concave—like a dish rather than raised. In this case you might also remove the shadow.

All this is to say you can create some cool effects with light and shadow, but you can't just drop a shadow into an image willy-nilly and have it look correct. You have to take existing lighting into account and adjust for angle and direction. You also have to adjust the landscape to make the shadow fall correctly.

When placing the shadow back in the image we were rebuilding in the previous section, you'll have to compensate for light direction and the interplay between objects in the scene. Depending on how you handle the shadow, you can also adjust the distance between the pot and the wall. These considerations affect realism in the result. Although Elements has some very basic means of creating a drop shadow, knowing how to create your own shadow enables you to have far more control in applying a realistic one.

## Making the Tree's Shadow

Let's look at a flat application and then a more realistic one and compare the results.

**The Quick Way** The quick way to make a shadow for the tree is to make minimal adjustments for how the shadow might fall. It ignores all the possible nuances of light angle and direction and just gets the job done. The results may not be optimal.

**The Better Way** A better way to make the shadow takes into account some distortion that will occur because of the angle of the light and the position of objects where the shadows fall. The result should appear more realistic.

## The Quick Way to Make a Shadow

The first of two ways to create the shadow relies on techniques for creating a custom drop shadow.

1. Open the `new_perspectives.psd` file saved in step 36 at the end of the earlier section "Transformations and Distortions."
2. Duplicate the Tree Selection layer two times. Set both of the new layers to 50 percent Opacity and Multiply mode. Drag both layers up below the Tree layer. The Layers palette should look like Figure 7.13.
3. Change the name of the copied layers to **Sidewalk Shadow** and **Wall Shadow**.

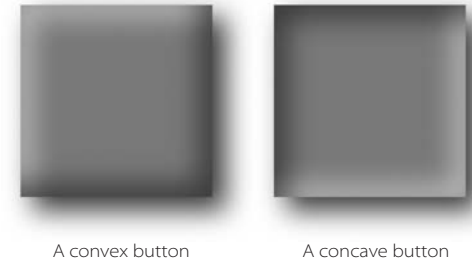


Figure 7.12

A flat area of color can be both raised from the background and shaped with simple application for highlights and shadows.



Figure 7.13

Two shadows will be used to create one complete one.

4. Activate the Wall Shadow layer. Use the Move tool to drag the Wall Shadow layer so that it looks like the shadow is falling on the wall from the tree. Just look at the shadow on the wall, ignoring the portion of the shadow that falls on the sidewalk; we'll clean that up later.
5. Activate the Sidewalk Shadow layer. Choose Image → Transform → Distort, grab the top-center handle on the bounding box, and pull the handle left and down until the tree trunk matches up at the base of the wall. You may have to zoom in and out of the image (Out: Command/Ctrl+hyphen, In: Command/Ctrl+plus sign) to view the changes and adjust the handle. The result of the adjustment will look something like Figure 7.14.
6. Load the Sidewalk layer as a selection by Command/Ctrl+clicking the Sidewalk layer in the Layers palette. Feather the loaded selection 1 pixel.
7. Activate the Wall Shadow layer and press the Delete key. This deletes the area of this layer that falls over the sidewalk.
8. Invert the selection, activate the Sidewalk Shadow layer, and press the Delete key. This deletes the area of this layer that does not fall on the sidewalk.
9. Make manual adjustments to the shadow layers by using a painting tool (with a slightly soft brush). Using black will add shadow; using white will remove it. This touch-up might include making the trunk match up at the base of the wall and/or completing and adjusting the shadow around the base of the pot. When you are finished, the result should look something like Figure 7.15.

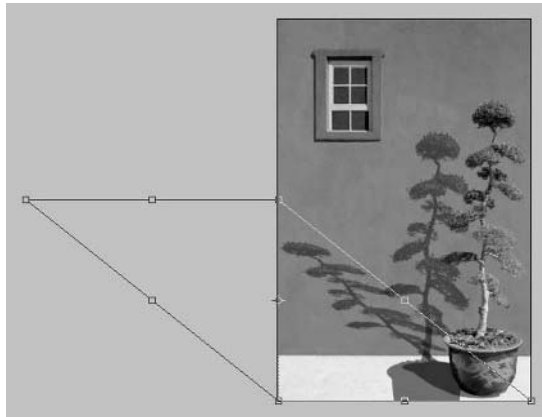


Figure 7.14

With both shadows visible, get the trunk of the tree to meet at the juncture of the sidewalk and wall.



Figure 7.15

This isn't bad for a few minutes of work, but it may not be the most accurate shadow you can make.

## The Better Way to Make a Shadow

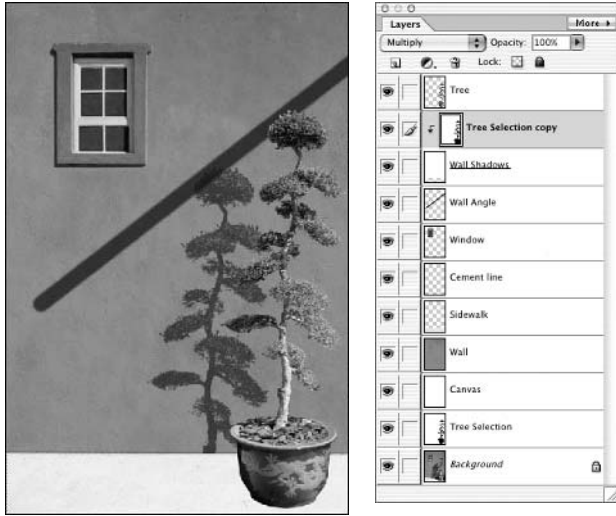
A problem with the quick way that you might have noticed is that the shadow looks nothing at all like the original shadow. There is no angle to the way the shadow falls on the wall, and the shadow on the sidewalk represents a front view of the pot. In either case it is not very accurate.

The sad fact is that it is impossible to render an accurate drop shadow by using a single image. The shadow that you see is accurate only from the perspective of the light source. In other words, you have to take another image from the position of the light source or shoot from the position of the shadow toward the light source to have a representation of your object that matches what the shadow looks like. We don't have that luxury here, because we don't have an image shot from those angles, and considering the proximity of the tree to the wall and the angle of the sun, we may not have been able to anyway.

The next best thing we can do is to be a little more creative with what we *do* have to work with in the image. Natural shadows will distort somewhat because of angles—how the light strikes the object and how the shadow then drapes on the wall. You can use distortions and transformations to your advantage in re-creating a more realistic shadow than the “Quick Way” method. Here are the steps:

1. Jump back in the Undo History palette to where you opened the `new_perspectives.psd` image, or open the image again if you have closed it.
2. Make a selection of the Sidewalk layer and invert it.
3. Create a new layer named **Wall Shadows** below the Tree layer. Set the Opacity to 50 percent and the layer mode to Multiply.
4. Fill the Wall Shadows layer with white. Every shadow component you create in this exercise for the wall will be grouped with this layer. All of these component layers will be set to Darken and 100 percent Opacity.
5. Duplicate the Tree Selection layer and arrange it in the Layers palette so that it is above and grouped with the Wall Shadows layer created in step 3.
6. Move the shadow into position, where you would like to see the top of the shadow fall.
7. Create a new layer and name it **Light Angle**. Set the Opacity to 60 percent and the mode to Multiply.
8. Draw a straight line between the top of the tree and the top of the shadow. To do this, choose any painting tool, and a hard brush with a diameter of 5–10 pixels. Click on the tree. Then hold the Shift key and click the exact same spot in the shadow that corresponds to the spot you clicked on the tree.
9. Transform the layer by choosing the Transform function and scale it to five times its size (500 percent) by using the numbers on the options bar. This will make the line you drew thicker, longer, and more useful as a guide. At this point, the image and the layers should look like they do in Figure 7.16.

10. Choose the Lasso tool and make a selection of the top segment of the tree's shadow. This can be a rough selection. Copy and paste to create a new layer in the grouping with the Wall Shadow layer. Set the layer mode to Darken and the Opacity to 100 percent.



**Figure 7.16**  
The angled line will act as a guide to help make some changes in the steps that follow.

11. Choose Image → Transform → Free Transform. Change the Skew to match the Light Angle layer by pressing Command+Option+Shift / Ctrl+Alt+Shift and moving one of the side handles on the bounding box.
12. Release the Skew On Center modifier keys and press Shift; then stretch the box by moving the top center handle and bottom center handle until the box is 150 percent–200 percent of the original size (watch the percentage in the H field on the options bar, and it will show you the result). The Transform box should look something like Figure 7.17 as a result of the changes in steps 11 and 12.

13. Accept the changes when the distortion seems acceptable and interesting.
14. Repeat steps 11 through 13, selecting segments of the tree from the top down. I used nine distinct sections of the tree shadow. When you are finished, the result should look something like Figure 7.18.
15. Duplicate the Tree Selection layer, name it **Pot Top**, and move it above the Tree layer. Reduce the Opacity to 50 percent and use the Eraser tool to trim away everything but the rim of the pot (as shown in Figure 7.19).
16. Duplicate the Pot Top layer and place the copy in the layer group with the Wall Shadow layer; then follow steps 11 to 13 again to create the shadow that the pot top might cast.
17. Load the Sidewalk layer as a selection again by pressing Command/Ctrl and clicking the Sidewalk layer in the Layers palette.

**Figure 7.17**  
Skew using the angled line as a guide, and then stretch the result.



18. Create a new, ungrouped layer named **Sidewalk Shadow** and fill it with white in the selected area. Set the Opacity to 50 percent and the layer mode to Multiply. This layer should be created above the Sidewalk layer and should not be grouped.
19. Move the copy of the Pot Top layer above the Sidewalk Shadow layer and group them.
20. Stretch and position the pot top as desired. Be sure the edge of the shadow in this layer aligns with the pot top shadow where it appears to come off the wall.
21. Shape and fill in shadows for the pot by painting on the Sidewalk Shadow layer manually with black. The results should look something like Figure 7.20.

A comparison in the color section of the book shows the original image, the quick way of making a shadow, and the better way. The idea is that creating drop shadows is not necessarily as simple as choosing a layer effect. Realistic work often requires custom attention, which means being able to apply custom shadows and highlights. With a little creative adjustment, it is possible to produce more realistic fixes.

With everything separate, you also have more freedom to explore different composition options. Figure 7.21 looks at two other quick ways to rearrange the objects in your image. Similar techniques can be used in other images to separate objects from their backgrounds, re-create or fill in background areas, and adjust the composition.



Figure 7.18

This shows more of a cascade of shadow and better imitates what the sun might produce as the shadow falls on the wall.



Figure 7.19

The dark area is the shape you want; use the Eraser to trim away everything else.



Figure 7.20

The completed shadow should look fairly natural, and perhaps a whole lot neater than the original.

Figure 7.21

Being able to separate elements can give you ultimate freedom over image composition.



## Creating Image Elements

At the far end of working with images is the option of creating absolutely new elements. Consider how complex the shadow for the tree was, and then multiply that complexity by all you've learned about color and tone. That's not a very concrete equation, but it is relevant in that creating something new requires creativity—and a few basic bits of understanding.

In the previous section, we looked briefly at how highlights and shadows could shape an image. In a similar way, highlights and shadows can help you make far more complex adjustments, such as creating the appearance of texture. They can give shape to an environment.

Making new elements doesn't mean you'll usually create an image from scratch. More often, you'll have something specific in your image that you want to replace. Or perhaps you'll need to patch what is in your image but won't have sufficient sampling area to create a patch, or you'll be feeling a little creative and want to add an element to an image. It is much more rare that you'll absolutely create an image from scratch, unless you are doing an original illustration. We'll take a look at illustration in Chapter 9.



In this section, we'll take a look at some of the nuts and bolts of what you'll need to create image elements, and leave some of the rest to your creativity. You'll need to know how to work with patterns and texture, and how to create shapes by using tone. We'll bring together lots of techniques used throughout the book to create the result.

## Creating Texture and Patterns

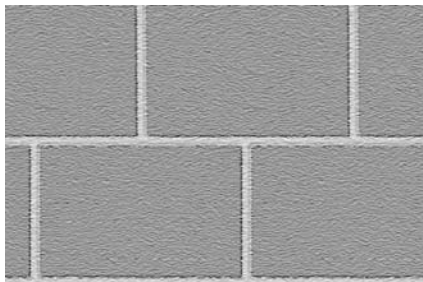
Say you have an image with a background wall painted a sort of pastel pink color, a weird window, and a funky-looking tree that was casting an awful shadow. You take a look at the image and decide you want to replace the wall rather than try to patch it together. Silly example, right?

Although it would be easy enough to fill in color, the texture of the wall would probably be the most difficult image elements to deal with. We'll look at two solutions. One is a better solution for this example, but it is important to know how to do both. First we'll work with a little bit of what we *do* have to create a seamless pattern; then we'll create texture by generating it completely from scratch.

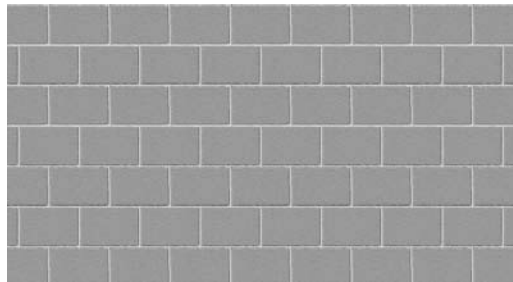
### Creating Seamless Patterns

A *seamless pattern* can be used to fill an image area of any size. Usually this type of pattern is something that you want to replicate and repeat, rather than something you want to seem random. For example, a wallpaper pattern, plaid, or bricks might be a fine pattern to repeat (see Figure 7.22). Taking bricks as an example, all you'd have to do is create or copy a small portion of the brick pattern, be sure it can be repeated without obvious seams, and then use that pattern to fill an area.

With a little touch-up, you could remove any repeating patterns by changing the color or tone of a few bricks. Just make a rough selection of four or five at random, and then create a new layer and fill it with white or black. Set the layer mode to Screen (white) or Multiply (black) and lower the opacity (see Figure 7.23). Depending on how you use and manipulate other patterns, you can make them seem random as well, or use them as a basis for creating less obviously contrived objects.



Sample area



Sample used as a pattern

Figure 7.22

**Using a sample as a pattern is much easier than creating a whole wall brick by brick.**



To create a seamless pattern you need only a small swatch of an image area that you'd like to replicate. All you do is offset that swatch (using the Offset filter), and then patch whatever seam there is. We'll use the old wall from the tree and window picture as an example.



1. Open `perspectives.psd`. Make a rectangular selection of a representative area of the wall that is clear of shadows or distinct characteristics that would show in a pattern, such as the area shown selected in Figure 7.24.
2. Copy the selection to a new image: choose `Edit → Copy`, and then create a new image (`File → New`) and choose `Edit → Paste`. After you create the new image, Elements automatically sizes it to the area that you copied.
3. Flatten the image (`Layer → Flatten Image`).
4. Adjust the sample in the new image by removing notable characteristics that might be pronounced in a repeated pattern. For example, if there were a nail protruding from the wall or a distinct marking of some sort, you would remove it. This should help reduce obvious pattern repetition.
5. Now to make sure the pattern is seamless. Check the image height and width by using the Image Size palette, and remember those numbers. Choose `Filter → Other → Offset` (Figure 7.25). The offset amount you specify should be about half the height and width of the image. Be sure that the `Wrap Around` option is selected in the Offset dialog box before accepting the changes. This adjustment moves any seams from the image into view.

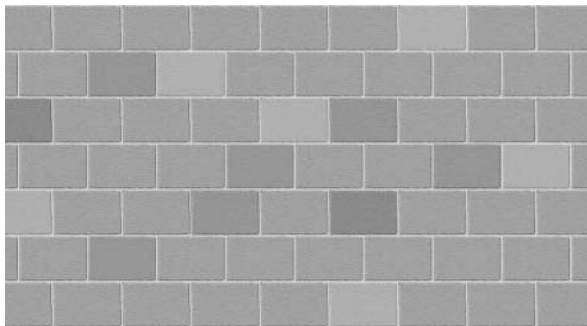


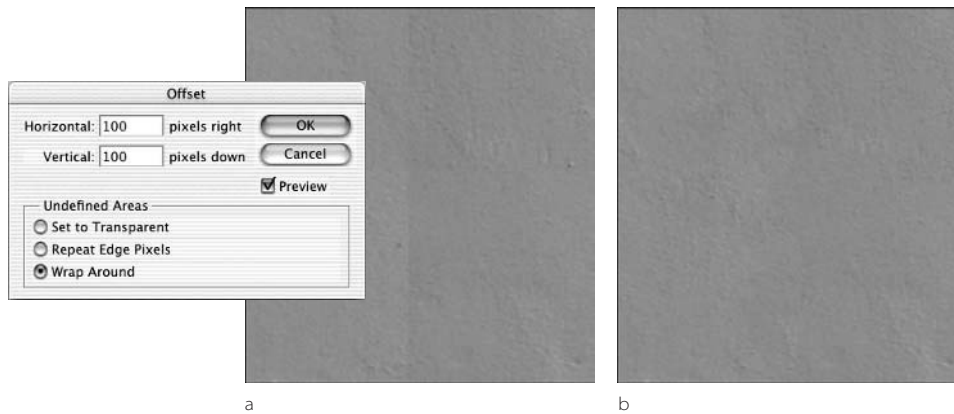
Figure 7.23

By randomly selecting a few bricks and changing the tone by a few levels, the pattern can appear to be random.



Figure 7.24

The selected area of the image has very few characteristics that would be a problem in a pattern.



**Figure 7.25**  
Offsetting shifts what would be the seam of the pattern into the center of the image (a). You can then clean up the transitions to make it seamless (b).

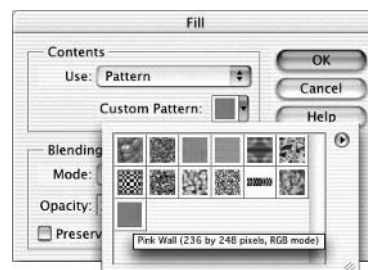
6. Blend the seams of the image. You will probably want to use the Clone Stamp tool and a soft brush. The goal is not to wipe out all the characteristics of the wall, but to smooth out the transitions so that the seams are not apparent. You may need to repeat the offset and seam blending a second time to be sure the sample is seamless.
7. Create a pattern by choosing Edit → Define Pattern. Call the pattern **Pink Wall**.

Once you have completed these steps, you will have stored the portion of the wall as a seamless pattern. Go back to the original image, deselect the sample area, and apply the pattern by creating a new layer and using the Fill function. Choose Edit → Fill, and in the Fill dialog box, choose Pattern from the Contents drop-down list. Choose Pink Wall from the Custom Pattern drop-down list. (See Figure 7.26.)

The pattern will fill the whole layer. It will look much like the wall, but it will be...a pattern. And you can pretty much see that it is (see Figure 7.27). It's a good start, but you can do better. Because the wall seems more like cement or stucco that should have more of a random nature, you will have to do a bit more work to get this to look right.

## Creating Texture from Scratch

The limitation of making seamless patterns is obviously that the patterns represent only a small area of what you are trying to depict. Because of that, filling with a pattern can often look like a pattern. It isn't really a surprise. It might work if you are imitating a brick wall, but something less defined or random, such as the surface of concrete or stucco, would seem to repeat when you really don't want it to.



**Figure 7.26**  
When the pattern was saved, it was stored in the pattern library. It can be selected wherever patterns are available and stays stored until deleted.

Figure 7.27

You might get away with this, but the repetition in the pattern is obvious and can detract from the image.



This is where you can be creative with layer and filter application to make the filled background look unique—not at all like a pattern—or create the background entirely from scratch. In fact, every time you make the application, you can get a different (yet similar) result, if you use filters that help generate random image information. Once you have generated the information, you can apply highlights and shadows to make the area seem textured. You can use the texture to either enhance the existing texture created by the filters you applied, or create new texture where there was none.

Working with filters is almost always a process of experimentation, unless you use a filter that has a specific behavior. You rarely can just reach into the pile of filters and pull out one that will do exactly what you want without making adjustments—or without using filters in combination. Filters are usually best used to enhance an image rather than change it, which is why it may often be wisest to use what exists in your image and adjust it.

Take a sample of the existing pink color of the wall. Then create layers pictured in Figure 7.28 and described in the following list, marked A through E.

- A. A gradient, black to white (using the Gradient tool, draw a line from the upper-right corner to the lower-left corner)
- B. A Clouds filter application (Filter → Render → Clouds) on a 50 percent gray layer

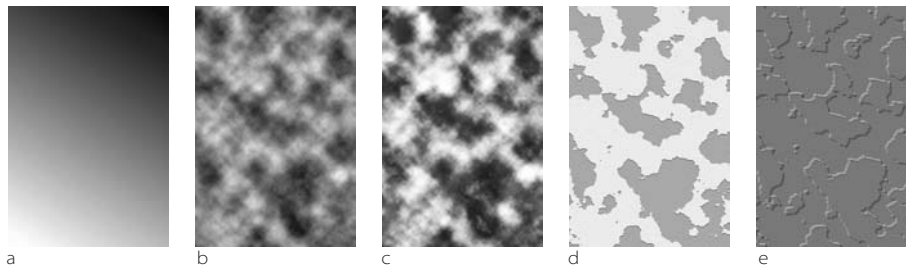


Figure 7.28

The grayscale versions of these filter applications look too extreme to help this image, but they will.

- C. A Difference Clouds filter application (Filter → Render → Difference Clouds) on a duplicate of the Clouds filter layer, adjusted by choosing Equalize (Image → Adjustments → Equalize)
- D. A Note Paper filter application (Filter → Sketch → Note Paper) on a duplicate of the Difference Clouds layer
- E. An Emboss filter application (Filter → Stylize → Emboss) on a duplicate of the Note Paper filtered layer

While this may look like a hodgepodge, the results are not entirely an accident. The simple gradient can be used to darken the image slightly in the upper right. Next a series of filter changes is made in steps—each step based on the previous one—to try to unify the effects of the layers to be applied.

The trick to applying these layer results effectively is to give them each very *little* influence in the image. They are going to enhance, not take over, what is already there. The layers were applied to the background of the image by simply stacking them above it using the following settings:

Layer	Mode	Opacity
A	Luminosity	10%
B	Luminosity	5%
C	Color	3%
D	Normal	0%
E	Luminosity	5%

If you look at the layer settings, these changes affect the luminosity much more than the color—and not all that much. The idea is to randomize some information and use it to influence the tone to create texture. *Influence* is not an overhaul. The goal here is to create two things: general shading, and larger, unpredictable changes in tone and color to affect the apparent flatness of the wall.

I chose several of the filters for specific reasons. The Clouds filters introduce randomized behaviors. Emboss creates highlight and shadow depth based on existing image content that change the randomized tone areas into shapes. The highlighting and shadow

created by the Emboss filter acts much like the highlights and shadows in the raised button example earlier in this chapter.

You would probably think I was joking if I were to say it almost doesn't matter what filters you run in between generating the random information and converting that to texture by adding the highlights and shadows. You could spend hours exploring different combinations and results. Part of the fun of filters is guessing which filter might give you an interesting result. The effect of the Difference Clouds filter is to apply the Clouds filter as if to a layer above and grouped to the current layer, set to Difference mode. This filter kept my original clouds information and added some random color behaviors. Note Paper makes a threshold-based gray and white texture effect that is often good for chipped paint, rust, and similar effects. Here it is used as a source to create a patchy look to the cement/stucco.

The effect of the different layers is subtle, but a whole new wall was created by mixing the results. If you open up the image on the CD (wallpattern.psd) and zoom in, it looks pretty real. In a sense, the wall is: you retain some of the real part of the image and texture by basing the color and texture of the wall on the pattern sample, and then enhance the sample. Neither the real portion of the image (the seamless pattern) or the filter applications do it all on their own.



If you're feeling adventurous, you might want to make a break from reality entirely and create the whole wall from scratch. The only element you are missing is the sort of granular cement texture. Instead of creating big random information, you'll want to create flecks and then shape those by embossing. The Noise filter can provide the source for those flecks by creating some random noise. Try the following on the wallpattern.psd:

1. Turn off the visibility for the added layers (A through E).
2. Duplicate the Wall Pink Pattern fill layer to a new image.
3. Resize the new image by using Bilinear resampling to 10×10 pixels (deselect Constrain Proportions). This gives you an average tone and color for the wall.
4. Make a sample of the color by using the Eyedropper and then close the image. That's all you wanted the new image for—to get the color sample.
5. Create a new layer above the Wall Pink Pattern fill layer and fill it with the foreground that you sampled. Call it **Wall Pink**.
6. Duplicate the Wall Pink layer and name the new layer **Cement Texture**.
7. Remove the color by using Remove Color (Command+Shift+U / Ctrl+Shift+U). Then apply Noise (Filter → Noise → Add Noise; 10 percent, Gaussian, Monochrome).
8. Apply Threshold (Image → Adjustments → Threshold) to limit the noise. I didn't change the slider from the default (128). Changing the slider will influence the density of bumps in the cement.

9. Apply Emboss (Filter → Stylize → Emboss). I chose a 1-pixel radius, Amount 75 percent, and Angle 45 degrees (about the angle of the original light source). When using Emboss, you generally should use a radius that fits with the detail you are trying to enhance: small details, small radius.
10. Apply Gaussian Blur (Filter → Blur → Gaussian Blur) to soften the embossing. Choose a smaller than 1-pixel radius, again to retain the smaller details. At this point you'll have a somewhat bumpy-looking gray layer. You may want to zoom in to 100% or more to have a good look.
11. Change the Opacity to about 15 percent and the mode to Luminosity, and look what happens. The Pink Wall layer becomes textured with little bumps.

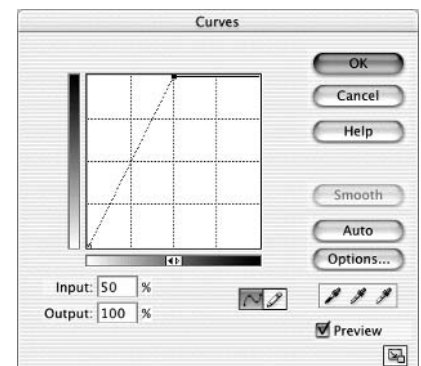
Add back the Clouds, Difference Clouds, and Emboss layers by turning the visibility for those layers back on. If you compare the original to the result that you have created entirely from filters, you'll see that the texture is not the same but has a similar feel. To make that comparison, drag the Wall Pink Pattern fill layer to the top of the layer stack and toggle the visibility on and off.

You can make further improvements by adjusting the intensity of the bumps in the Cement Texture layer so that they appear more random. Do this by adding a mask to the Cement Texture layer as in the following steps.

12. Duplicate the Wall Pink layer to a new image and flatten the image.
13. Run the Clouds filter.
14. Double-click the Blend Mask Hidden Power tool in the PowerTools1 category of Effects. When you get to the Curves dialog box, set the curve as shown in Figure 7.29.
15. Duplicate the Mask layer back to the original image.
16. Duplicate the Cement Texture layer. You can leave the name as Cement Texture Copy.
17. Drag the Mask layer below the Cement Texture Copy layer and group the layers. To group, you can link the two layers by clicking the link box on the Layers palette for the Cement Texture Copy layer, and then press Command/Ctrl+G.
18. Change the Cement Texture Copy layer to Normal mode and 100 percent Opacity. This enables the texture to influence the mask at 100 percent.
19. Change the Mask layer to 20 percent Opacity and Luminosity mode. You want to use the mask to apply the effect. Here again you are influencing the result, not trying to overpower it. This adds 20 percent more intense bumps over 50 percent of the image. Experiment with the settings by adjusting the Mask layer Opacity only.



**Figure 7.29**  
This setting will make sure the cloud layer has no tone brighter than 50 percent gray (128 levels).



This series of steps (12–19) masks the texture with some randomized behavior, again using the Clouds filter. As a result, some of the texture is softer and some more pronounced: the filters acting together create a more randomized effect.

You can do still more with this, but you can also play with filters forever, refining and adjusting. Combinations of filters enable you to create innumerable textures that can be helpful in patching missing image areas or creating entirely new objects.

## Making an Object

Creating an object from scratch is the extreme test of everything we’ve been through thus far. You would have to make the basic shape of the object using tone and color, and then give it depth and fit it into an image. The exercise is tricky and challenging, with varying levels of difficulty. If you created those little cement bumps in the last part of the preceding section, then you created a simple, photo-realistic element. There should be nothing to stop you from going further.

Say you took a look at that picture of the tree and window and decided that the window was the wrong one for your wall. You wanted something a little cuter...a double-hung window, and maybe some blue curtains rather than that black empty space. You could take a picture of another window and manipulate it so it fits in the space in the image. This might require hours, hunting down something similar to what you were looking for, so that you could take a picture of it. Or you could make a window from scratch.

It may sound easy to make a window. It’s just a rectangle, maybe with a few little criss-crossed doodads (muntins, they’re called). To some extent, it is simple. But to do it you will have to use just about every darned process you’ve gone through thus far in the book, and learn a few more little tricks.



Making the window will require a couple of Hidden Power tools and a lot of small adjustments, from shaping the molded look of the muntins to dropping the muntin shadows on the wavy curtains. We’ll look at those changes in detail here, using a lot of images to keep you in step. There are a lot of steps to this exercise—so allow yourself plenty of time to complete it. Be patient and save in intervals so you can retrace steps if they seem to go wrong. We’ll take the project on in four parts:

**Make the Window** Creating the box shape for the window sash is just the beginning. We’ll add detail to the woodwork of the sash and muntins, using curves to alter gradients. When the first sash is done, it can be duplicated to save some work and then shaded to create depth.

**Make the Curtain** Curves can be employed again to create wavy curtain pleats; then employing a little transformation can make the way they fall seem unique. After the curtain is created and colored, it will be placed behind the window.



**Make Shadows for the Window and Curtain** Once the curtain is where it belongs, the image will look a little flat. Adding a shadow from the window falling on the curtain will give it some depth. The angle of the shadow will have to approximate the source in the destination image. The real kick is trying to weave that shadow in and out of the pleats. We'll do that by using an application of the Displacement filter.

**Place and Fit the Window with the Wall** With the double-hung window complete, it will have to be fit into place where the current window is. This will require more transformation, some feathering, and the incorporation of still more shadows.

## Making the Window

1. Open a new RGB image at 10×10 pixels with a white background. The resolution doesn't matter, so 72 ppi will work fine.
2. Press D to restore the default color for foreground and background, and then press X to switch black to the background.
3. Change the canvas size to 12×12 pixels (Image → Resize → Canvas Size). This creates a black frame around the image.
4. Resize the image to 400×400 pixels (Image → Resize → Image Size) by using Bilinear resampling. This increases the size of the image and adds an evenly stepped gradient to the edge of the frame.
5. Open a Curves dialog box by double-clicking the Curves Hidden Power tool in the PowerTools1 category of Effects. Shape the tone of the gradient area by adjusting the curve as shown in Figure 7.30. Choose Layer → Merge Down (Command/Ctrl+E).
6. Copy/paste or duplicate the Background layer and name it **Frame**.

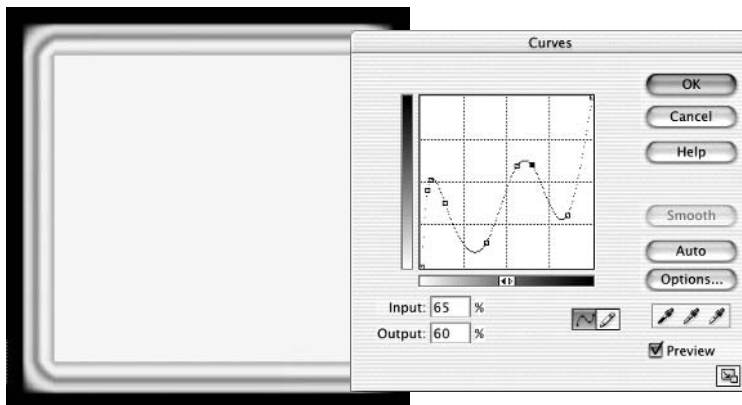
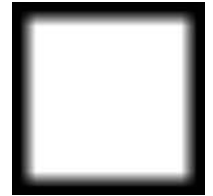
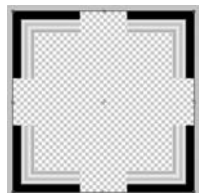
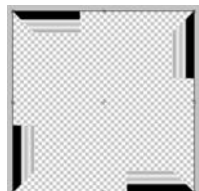
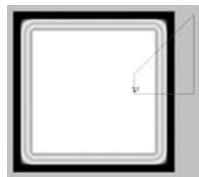


Figure 7.30

The frame is going to give you a rough look at the final bevel. We'll reshape this in the coming steps to sharpen the corners.

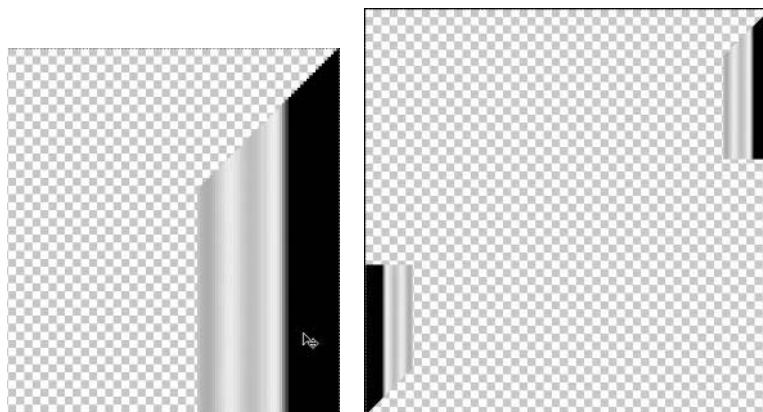





7. Turn off visibility for the Background layer, and then clear the center of the image (click the center with the Magic Wand tool and press the Delete key).
8. Deselect (press Command/CTRL+D), then make a selection of a segment on one of the sides of the frame by using the Polygonal Lasso. Miter one of the ends to a 45-degree angle (hold the Shift key while making the angle).
9. Copy and paste the segment to a new layer and name the new layer **Miter**.
10. Turn off the visibility for the Frame layer.
11. Using the Move tool, position the segment in the Miter layer so that the point of the shape falls exactly in the upper-right corner.
12. Duplicate the Miter layer. Rotate the duplicate layer (not the canvas) 180 degrees, use the Move tool to position the new segment in the lower-left corner, and use Merge Down. The result should look like Figure 7.31.
13. Duplicate the Miter layer, rotate the duplicate 90 degrees in either direction, and use Merge Down.
14. Duplicate the Miter layer, Flip Horizontal, Merge Down. At this point, you see just the corners of the frame. Turn on the visibility for the Frame layer to see the whole frame.
15. Make a new layer, check the Group With Previous box, and fill the layer with yellow (R = 255, G = 255, B = 0).
16. Make a new layer (not grouped) and then make a selection of the black part of the frame (use the Magic Wand with Use All Layers and Contiguous checked). Expand the selection by 2 or 3 pixels, and fill the selection with yellow. Name the layer **Sash Frame**.
17. Duplicate the Sash Frame layer three times and call the layers **Drop Shadow**, **Bevel 1**, and **Bevel 2**, bottom to top in the layer stack.

Figure 7.31

The identical segments should be 180 degrees different and in opposite corners, tucked neatly so the point is right in the corner.



We'll need to add some effects to the frame to give it some shape. For more control you can create the effects manually, but we'll do it using Layer Styles. There are not a lot of controls for Layer Styles, so we'll use them a little creatively by using layer modes and opacity to mix the effects.

You'll need to change some effect settings after applying the Layer Styles. To open the Styles Settings dialog box, you have to apply the Layer Style and then double-click the layer styles indicator  in the Layers palette. Steps 18 to 20 demonstrate some of what you might do in applying styles.

18. Add a Soft Edge drop shadow to the Drop Shadow layer by using Layer Styles. To apply the style, open the Styles and Effects palette, choose Layer Styles in the drop-down box on the upper left; then choose Drop Shadows in the categories. Click the Soft Edge thumbnail. When the style is applied, the effects indicator appears on the target layer in the layers palette dialog; double-click the indicator to open the Style Settings dialog. Be sure the Global Angle check box is checked, and adjust the style to a 45-degree angle and 5 pixels. Adjust the strength of the effect by changing the Opacity of the layer. I used 30 percent.

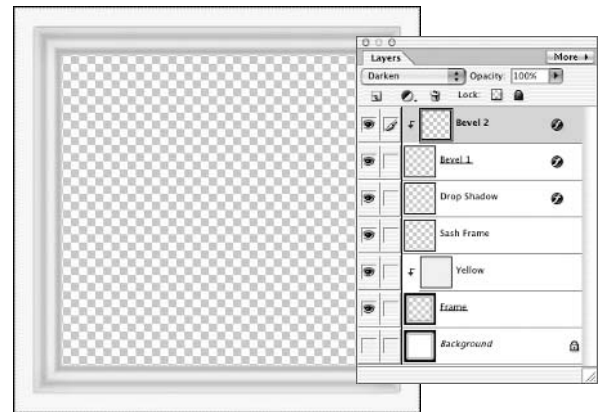


**Figure 7.32**  
Limited controls in styles leave most manipulations to layer properties.

19. Add a Simple Inner Bevel to the Bevel 1 layer. Bevels will be found by selecting the Bevels category for Layer Styles. Once the style is applied, open the Style Settings dialog by double-clicking the effects indicator for the layer in the Layers palette. Reduce the Bevel Size to 2 or 3 pixels by using the Style Settings dialog box (see Figure 7.32). Select the Use Global Light check box on the Style Settings dialog box, and then change the layer Opacity to 30 percent on the Layers palette to reduce the intensity of the effect.

20. Add a Simple Inner Bevel to the Bevel 2 layer by using Layer Styles. Reduce the Bevel Size to 2 or 3 pixels, uncheck the Use Global Light check box, change the Angle to 135 degrees, group the layer with Bevel 1, and change the mode to Darken. This puts the bevel edge all around the frame. At this point the result should look like Figure 7.33 in the image and in the Layers palette.

There are a lot of other adjustments you can make if you'd like, such as add effects to the frame to give it texture. We will not be concentrating on those details here, but feel free to add them in. The next series of steps moves on to creating the muntins.



**Figure 7.33**  
By unchecking the Use Global Light check box, the user can choose a new angle. Using an angle that is 180 degrees different completes a 360-degree effect.

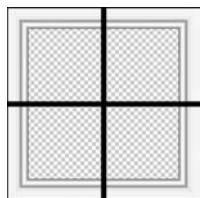
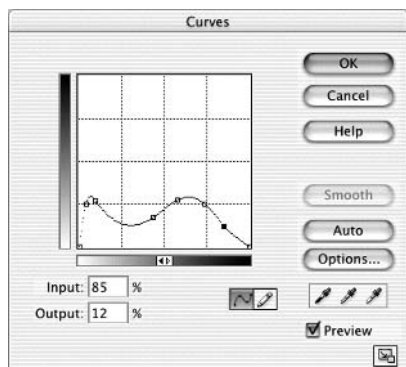


Figure 7.34

You can create far more subtle effects with a little patience and a few more curve points.

21. Make a selection down the center of the image, create a new layer, and fill it with black. Duplicate the layer.
22. Rotate the duplicate layer 90 degrees and then Merge Down. You'll end up with a cross over the image. Name the layer **Muntin Source**.
23. Duplicate the Muntin Source layer and then blur the new layer (I used 3 pixels).
24. Create a new layer below the Muntin Source Copy layer and name it **Muntins**. Fill it with white and merge the layers.
25. Use Curves to shape the beveling on the Muntins layer. I used the curve shown in Figure 7.34. Merge the curve with the Muntins layer when you have it as you want it.
26. Load the Muntin Source layer as a selection by Command/Ctrl+clicking it in the Layers palette; then expand the selection by 3 to 5 pixels. Invert the selection, activate the Muntins layer, and press Delete to trim the muntins. When you are finished, delete the Muntin Source layer.
27. Create a new Hue/Saturation adjustment layer and group it above the Muntins layer. Check the Colorize check box and make adjustments to Hue and Saturation sliders to match the color of the bevel on the frame.
28. Place guides at 200 px horizontally and 200 px vertically by using the Make Guide Hidden Power tool in the PowerTools2 category of Effects (you will have to switch the selector in the Styles and Effects palette from Layer Styles to Effects).
29. Choose the Rectangular Marquee and make a square selection from the exact center of the image (use the rulers to locate the exact center; hold down Shift+Option+Alt when dragging the cursor to make a square). Then select Transform and rotate 45 degrees by using the options bar. Figure 7.35 shows the selection and the rotation.
30. Hold down the Shift key and use the keyboard arrows to move the selection about 80 pixels to the left (press the left arrow key eight times).
31. Activate the Muntins layer, and then copy and paste three times. You'll use these segments to fix the bevel where the muntins cross.



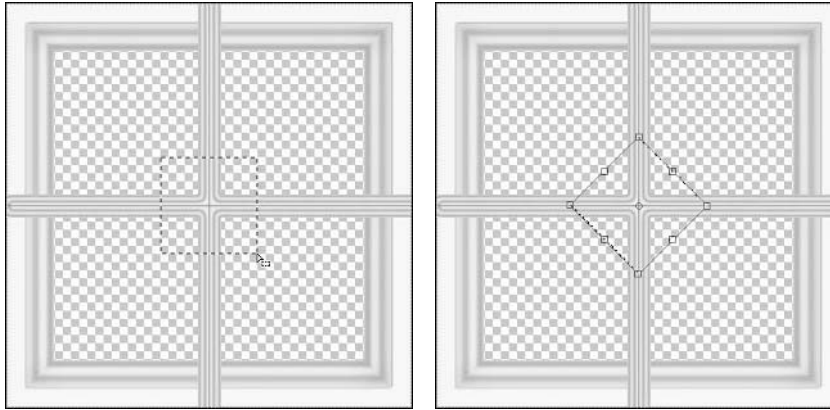


Figure 7.35

When making this change, the Hue/Saturation layer should be activated. It will keep you from making unexpected changes in any of the image layers.

32. Activate the bottom copy layer, rotate it 90 degrees, and center the segment in the image by using the guides and the Move tool (press V). This segment should align perfectly with the vertical muntin and should overlay the intersection.
33. Use the other two copies to adjust the bevel to the right and left of the vertical. The bevel may not look exact, but a little imperfection might look more realistic.
34. Remove the guides by using the Clear Guides Hidden Power tool in the PowerTools2 category of Effects.
35. Merge the Muntins, Muntins Copy, and Hue/Saturation layers. To do this, link the layers, activate the Muntins layer, and press Command/Ctrl+E.
36. Select the Eraser tool and use a hard, round brush to miter the muntins to the frame. See Figure 7.36.
37. Activate the Sash Frame layer and then choose Merge Visible.

You now have a complete sash. You could run through those steps a second

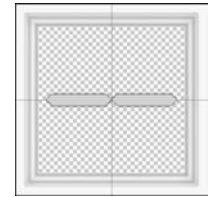
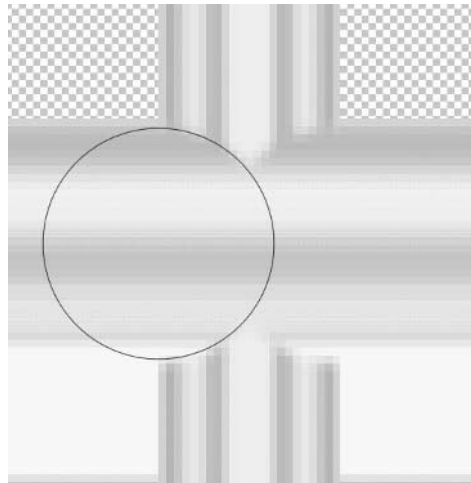


Figure 7.36

A round brush at the right size for the Eraser tool can create a miter that follows the curve of the frame quickly and convincingly.



time to create a second sash, but duplicating the sash you have already created will be easier. In the following steps you will duplicate it in a new layer above the other sash in the layer stack. The upper portion of a double-hung window runs on the outside, and such a detail is important to remember in imitating real objects.

38. Change the height of the canvas from 400 to 800, anchoring the bottom of the image by clicking the appropriate anchor box, as shown in Figure 7.37.
39. Duplicate the Sash Frame layer and name the new layer **Upper Sash**. Change the name of the Sash Frame layer to **Lower Sash**.
40. Choose the Move tool, hold the Shift key, click in the image, and slide the upper sash into place. It should snap to the image frame. If not, turn on the Snap To Grid feature (View → Snap To Grid; it should be checked in the menu).
41. Duplicate the Upper Sash layer and group the duplicate layer above the LowerSash.
42. Create a Soft Edge drop shadow for the Upper Sash Copy layer, using layer styles at 90 degrees and 20 pixels. Change the layer Opacity to lighten the effect.
43. Trim the image down to just the window (use the Marquee tool to select the whole window, and then choose Crop from the Image menu). Your result should look like Figure 7.38.

Although you might want to do more at this point, you can consider yourself finished with the window framing. If nothing else, this procedure may have given you a better appreciation for

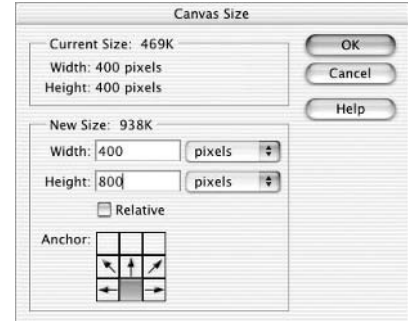


Figure 7.37

**Anchor the canvas at the bottom.**

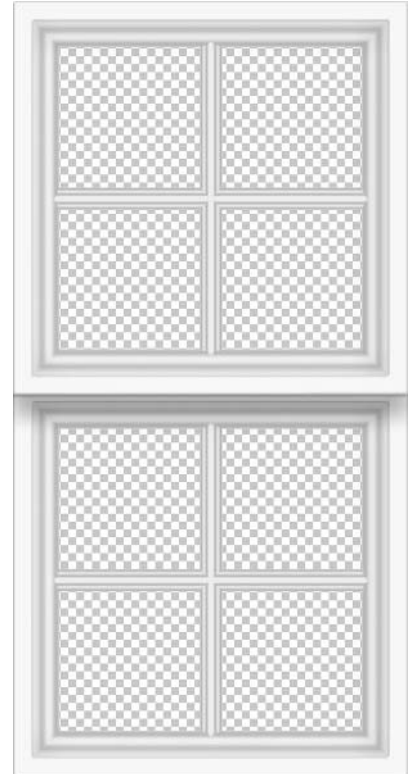


Figure 7.38

**The complete double-hung window as seen from the outside of the house.**

carpentry. You can still make a number of adjustments to this image, but the techniques you have seen here should give you a pretty good idea of how to shape objects and details. Additional details are up to you. Now let's move on to the curtains.

## Making the Curtain

1. Duplicate the Background layer of the Window image to a new image by using Duplicate Layer.
2. In the new image, create a new layer and name it **Curtain**. Fill the layer with a black-to-white gradient from right to left.
3. Shape the gradient by using a wavy curve that looks something like the curve in Figure 7.39.
4. Commit the changes made by the curve by choosing Layer → Merge Down, and then resize the layer to 50 percent width.
5. Move the resized layer to the left. If you have Snap To Grid on, the content should snap to (align with) the edge of the image.
6. Duplicate the resized layer, and then flip the new layer horizontally and move the content to the right until it snaps to the right edge of the image. Use Merge Down to get the two halves of the curtain on the same layer. The result of steps 5 and 6 should look like Figure 7.40. The resulting layer should be named Curtain.

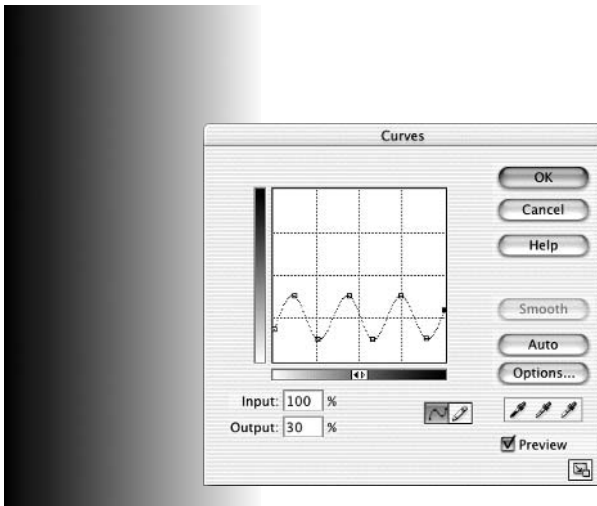


Figure 7.39

The shape of the curve will be similar to the shape that you could trace with a pencil on the floor where the pleats fall—an even, wavy line.

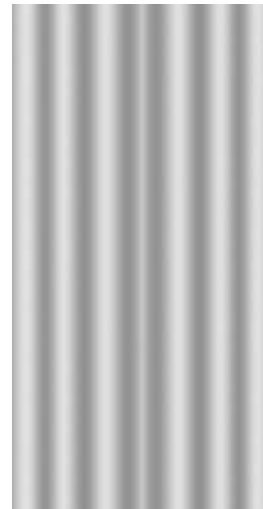


Figure 7.40

The basic cascade of the curtain takes shape.



7. Activate the Curtain layer and choose the Perspective Transform tool. Use it to alter the fall of the curtain somewhat by expanding the curtains at the bottom, as in Figure 7.41.

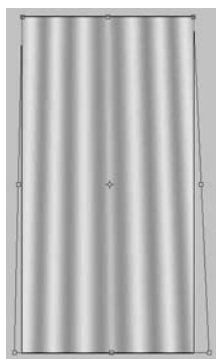
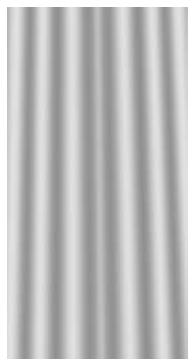


Figure 7.41

This is a simple distortion. Other filters and more complex behaviors (as we'll see with Displace in a moment) can add other touches of realism.

8. Add a Hue/Saturation adjustment layer above the Curtain layer. In the Hue/Saturation dialog box, check the Colorize check box, and adjust the curtain to an interesting color. I chose blue, but you can use whatever you like (remember, it will be combined with a yellow window sash, a pink wall, and a green window frame).
9. Turn off the visibility for the Hue/Saturation layer, flatten the image, and save it somewhere that you can locate easily as **curtainmap.psd**. (We'll get back to the curtainmap.psd file in the next section to help shape a drop shadow for the curtains). Don't close the current document.

10. Step back in the history by clicking Hue/Saturation 1 Layer on the Undo History palette (Figure 7.42). This will bring you back to just before the save so you can keep working.
11. Merge the Hue/Saturation 1 layer with the Curtain layer and then duplicate the Curtain layer back to the Window image.
12. Position the Curtain layer below the Sash layers if necessary. The result should look like the image and layers stacked in the Layers palette in Figure 7.43.



Figure 7.42

Stepping back in the history restores the layers that you flattened.

## Making Shadows for the Window and Curtain

A lot of the reality of the object will depend on the reality of the details. Creating the drop shadow for the curtain is critical to the realism of the result.

1. Turn off the visibility of all layers but the Sash layers, and use Merge Visible. Change the name of the merged layer to **Window**.
2. Load the Window layer as a selection by Command/Ctrl+clicking the layer in the Layers palette, and then invert the selection.
3. Create a new layer and name it **Inner Shadow**. Group this layer above the Window layer, set the mode to Multiply, and fill the selection with black.
4. Deselect, blur the layer a little (5-pixel radius using Gaussian Blur), and offset it up and right (5 pixels up, 5 pixels right).
5. Change the opacity until it looks pleasing. The idea is to give a little depth to the inner portion of the window. You may want to turn on the visibility for the Curtain layer while making this adjustment. Your Opacity will probably be between 30 and 50 percent.

6. Load the Window layer as a selection again.
7. Create a new layer between the Curtain and the Window and name it **Curtain Shadow**. Fill this layer with black.
8. Offset the Curtain Shadow layer 35 pixels down and left. Your result will look something like Figure 7.44.
9. Turn off the visibility for the Window layer and fill the area outside the window shadow frame with black by using the Paint Bucket tool. See Figure 7.45.
10. Choose the Displace filter (Filter → Distort → Displace). Set the Offset to 0 percent Horizontal and 30 percent Vertical; select Stretch To Fit and Repeat Edge Pixels. When the Open dialog box appears, choose the curtainmap.psd file you created in the previous procedure. Your result should look like Figure 7.46.

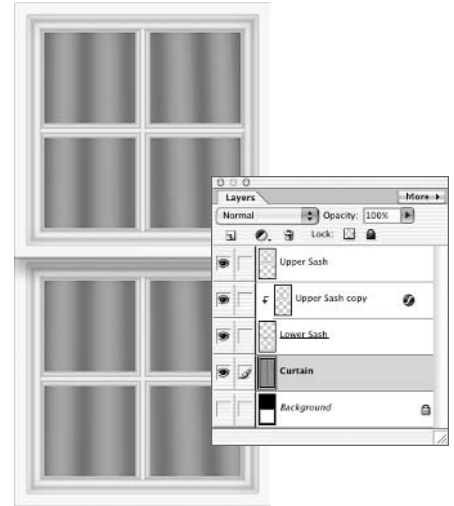


Figure 7.43

This looks a little flat, but we'll add some depth with shadows in the next section.

When using Displace, the Vertical setting tells Elements you want the effect to be adjusted up and down only. Stretch To Fit resizes the map you use—because it was created from the same size file, you could choose Tile in this instance and get the same result. Repeat Edge Pixels will use the black border you have if the shadow stretches too far; setting to Wrap Around could send pixels that go off the bottom of the screen to the top.

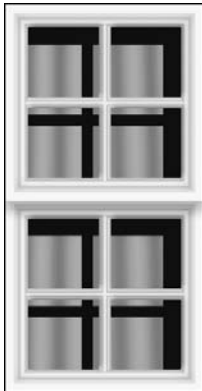


Figure 7.44

This is just quick positioning for the shadow; we'll soften and shape it in the coming steps.

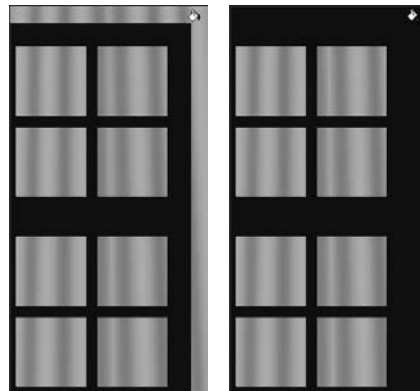


Figure 7.45

Touching up behind the scenes here makes sure that you can reshape the shadow dramatically without having to fill in later.



11. Blur the Curtain Shadow layer by about 3 pixels, set the Opacity to between 30 percent and 50 percent, and adjust the position of the layer (vertically) as desired.
12. Create one more new layer at the top of the stack. Choose a small (5 pixel), soft brush (0 percent Hardness), and draw a line across the bottom of the upper sash in black. Adjust the Opacity setting. This should appear to add some beveling or rounding to the bottom of the sash. When you are finished, the window should look like Figure 7.47.

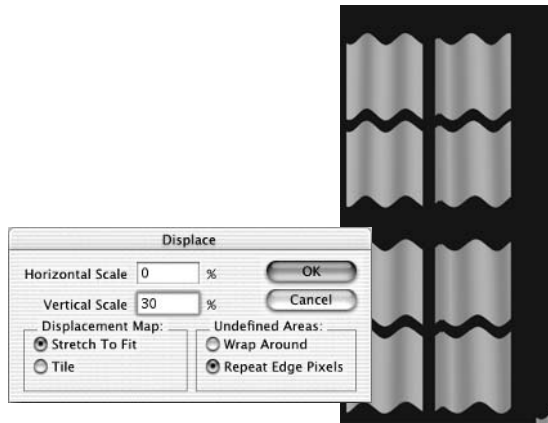


Figure 7.46

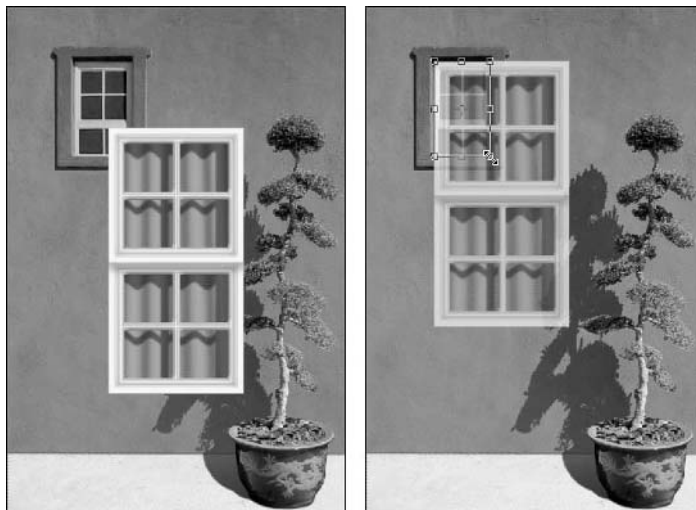
The **Displace** filter will use the tonality of the selected file as a map to offset the content of the layer.



Figure 7.47

With the shadow in place on the curtain, the window has some more realistic depth.

Figure 7.48  
Lower the opacity temporarily to make the initial fit, and then transform to shape the space.



### Placing and Fitting the Window On the Wall

At this point, you need to flatten the window, copy it to the image with the wall and the tree, and shimmy it into place (see Figure 7.48). It will be the wrong size, and you will have to shape it, trim it, create a shadow for the window frame, and perhaps alter some color, sharpness, and texture.

Since you already know how to do all that stuff, I will leave the details of fitting the window up to you. My result (complete with generated wall) can be seen in the color section and in Figure 7.49.

What I've probably been most successful in showing here is that you can spend the good part of a weekend on what is already an interesting image. But hopefully the techniques presented for shaping and adjusting have given you tools you can use to make many creative changes and additions to other images.



**Figure 7.49**  
A new wall, a new shadow, and a new window make a new, less distorted image.



# Part V

## Images in Print



Once you've spent a whole bunch of time making an image look just how you want it, selecting Print and sending the image to your home printer may not always achieve the results you want. Printing images to get the most out of them may require just a little bit more fancy dancing.

You may need to consider using some special tools such as vectors to control the shape of your output. Understanding your printing options (for hardware, software, and images) and how those options control output can help you achieve better results.

Chapter 8 **Vectors**

Chapter 9 **Options for Printing**



# Chapter 8

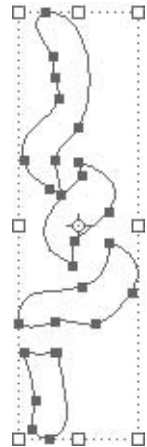
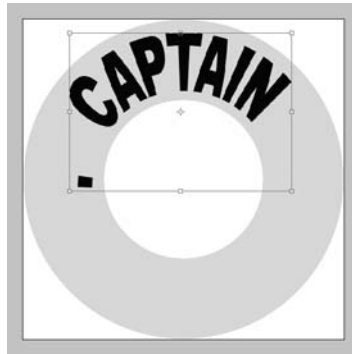
## Vectors

For the most part, Photoshop Elements is a pixel-based image editor. However, vectors are another means of controlling image content. You may have seen vectors in action if you've used Shape tools in Elements. *Vectors* define image areas as mathematical outlines, independently of the pixels and resolution of the image. They have a number of different (shall we say hidden?) uses. Vectors can be used to make shapes, sure, but they can also be used as clipping paths that redefine the actual boundaries of an image. They can be used to store hard-edged selections. They can be used as clipping layers in order to shape image layer content. They can be used to create artwork (such as logos) that can be scaled infinitely. We'll look at all these possibilities in this chapter.



### Making Vectors

#### Creating Scalable Vector Art

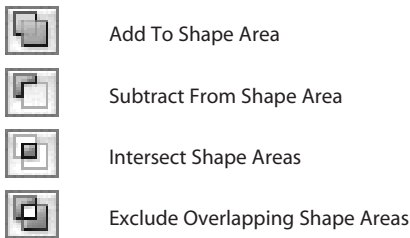
#### Applying a Clipping Path



# Making Vectors

The basic way to make vectors in Photoshop Elements is to select any one of the Shape tools, select a shape, and apply it to your image. Shape tools include the Rectangle tool, Rounded Rectangle tool, Ellipse tool, Polygon tool, Line tool, Custom Shape tool, and Shape Selection tool. The Shape tool can be accessed by clicking the shape tool icon in the toolbox; this icon will vary depending on which of the Shape tools you used last. After the tool is selected, there are numerous options for selecting shapes on the Options bar (see Figure 8.1), including custom shapes . You apply the shape by clicking and dragging the shape tool cursor  on the image. When applying the tool, Elements responds by creating a new layer for your shape. That's that. Custom shapes are somewhat limited by the sets you have available in the Presets/Custom Shapes folder in Elements.

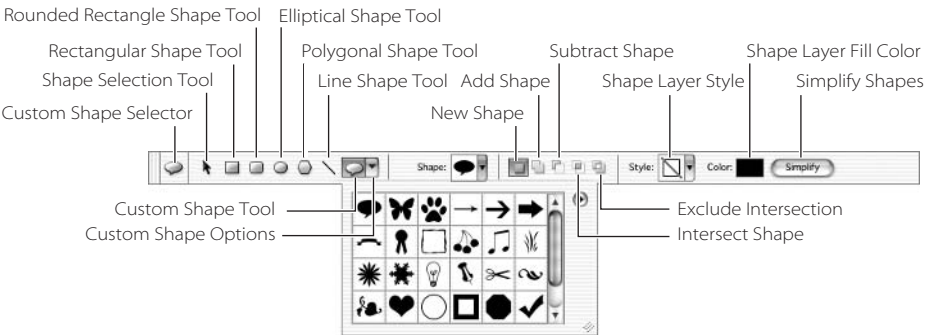
Slightly more complex shapes can be created by using shape modes to combine shapes. These shape modes are Add To Shape Area, Subtract From Shape Area, Intersect Shape Areas, and Exclude Overlapping Shape Areas. They are used like calculations between different shapes that occupy the same layer.



Using just these standard shape modes, you can make some interesting and complex shapes. Try the following:

- 1. Create a new image (File → New) with a white background that is 1000×1000 pixels.

**Figure 8.1**  
The Options bar offers possibilities for selecting different shapes and controlling how they combine.



2. Make a new shape layer. To do this, choose the Shape tool, select the custom shape option on the options bar, choose a custom shape from the drop-down list on the options bar, choose any color other than white, and begin drawing the shape by clicking and dragging on the image.

Press the spacebar as you draw to move the position of the shape you are drawing.

3. Choose a shape mode from the Options bar (Add, Subtract, Intersect, Exclude). This mode choice will determine how the next shape that you draw interacts in the image.
4. Change the custom shape you have selected (if desired), and draw the next shape.

The vector component that you add in step 4 is added to the layer that you created in step 2. The shapes combine to display a result based on the mode(s) you have selected for *each* component. That result is displayed in the color selected in step 2.

To take a look at the effect shape modes have on the result, highlight the second shape that you drew using the Shape Selection tool, and change the mode on the Options bar. The result should change in the image based on the mode you select. You can add more shapes to the layer by repeating steps 3 and 4.

You can combine the shape components that you have drawn in your layer into a single, complex vector shape:

- To combine shapes into a single vector component, create the shape components and then double-click the Combine Hidden Power tool in the PowerTools2 category of Effects.

After you combine or simplify your shapes, you will no longer be able to adjust their positions individually. You may want to duplicate the shape layer and hide it (shut off the view for the duplicate) before combining components so the components will be available separately without having to re-draw them.

- To combine shapes into a single non-vector shape in its own layer, create the shape components and then double-click the Simplify button on the Options bar. This option will lose vector advantages.
- To combine shapes that you have created on separate layers, you will have to move them to a single shape layer. Use the Shape Selection tool to highlight the component you want, and then cut and paste shapes you have created to the shape layer, where they will be combined.
- To highlight a component, just click it with the Shape Selection tool (click right on the vector line).



- To highlight more than one component on the same layer, you can click and drag the Shape Selection tool over multiple shapes, or hold the Shift key while clicking individual shapes.

Say for some reason you want to make a custom shape—for example, a fishhook—that you can't find in the shape libraries and can't imagine how to construct by combining shapes from these libraries. One task you can't do with standard Photoshop Elements Shape tools is to make freehand shapes. You could spend most of the day using the existing shapes that are supplied—adding, subtracting, and combining—but creating a custom shape this way will probably prove a little tough.

Hidden Power tools add some functionality that can help you change any selection to a shape, and this gives you the power to make any custom shape you need.



All you have to do is make a selection (any shape or size, using tools you have), and then double-click Shape From Selection in the PowerTools2 category of the Hidden Power tools on the Effects palette. This will turn the selection you made into a custom shape on its own shape layer. Once the selection is a shape, you can use it just like any other shape created with the Shape tool: copy and paste the shape to other shape layers, and size and combine the shape with others. The difference is that the shape you make can be your own.

Tolerance settings on the Make Work Path dialog that appears after you click the tool allow you to choose how closely you want the vector to conform to the pixels. Higher numbers simplify and smooth the vector while sacrificing accuracy; lower numbers add vector anchors and may make for a blockier result. Shooting for a balance between the two extremes will get the best results. It is sometimes best to increase the image size to create the vector if you want to retain smooth vector results.

One of my favorite ways to create shapes is by making a rough sketch with a painting tool and then creating a refined selection by using the Polygonal Lasso. Figure 8.2 shows how a very rough sketch of a hook is turned into the final hook illustration.



Once a shape is created, you can store it in an image and use it as you might use one of the shapes from the shape libraries. The process is a little more manual in that you have to copy and paste the shape, but this gives you much greater flexibility with vectors than using shape libraries alone. For an example of how to store shapes in a library image, see `hiddenLibrary.psd` on the CD.

If you have shapes that you want to store, follow these steps:

1. Create a blank image. It can be any size, but 500×500 pixels at 72 ppi will cover most of what you will ever need the file for.
2. Save the file with a name that reflects the shape types you expect to save there.

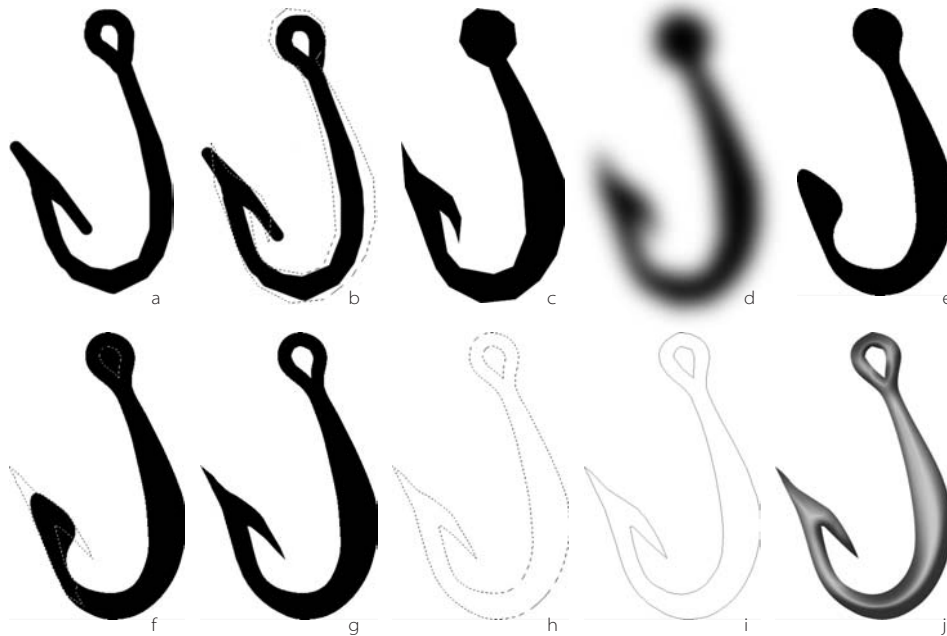


Figure 8.2

A very rough sketch (a) is used as a simple guide for creating a more refined selection (b) made with the Polygonal Lasso tool. The polygon selection is refined and smoothed by filling with black (c) and using Gaussian Blur (d) and then Threshold (e). Additional selections (f) are used to make alterations (g), and the final selection (h) is converted to a shape (i). Once the shape is in a layer, layer effects can be applied (j).

3. Choose the Shape Selection tool.
4. Click on (highlight) the shape you want to store to activate it. The shape can be from any open image.
5. Copy the shape.
6. Activate the library image.
7. Create a new shape layer.
8. Paste in the shape.
9. Name the layer something meaningful so you will know what it is in the description. When you need to use it, you can just locate it and copy it to the image you want to use it in.

Another way to store shapes in a library is to save all the shapes as separate files in a directory (for example, named *MyShapes*) and then use Photoshop Elements' Create Web Photo Gallery function (discussed in Chapter 10) to create a preview of all the shapes in the folder. This will be easy to update and will enable you to scan previews of many shapes quickly in your web browser or in the Elements File Browser.

Shapes can be another means of storing selections—as long as you want to store the selection without anti-aliasing, feathering, or other grayscale manipulations. Such hard selections can be converted to shapes by using the Hidden Power tools, and the visibility can be turned off. To create a selection from the stored shape, Command/Ctrl+click the layer where the shape is stored.

Another handy tool provided with the Hidden Power tools is one that will make a shape from any text you’ve created. The Shape From Text tool is located in the Power-Tools2 category of the Hidden Power tools on the Effects palette.

Converting text to vectors may not seem to be much of an advantage when I tell you that you won’t be able to edit the type anymore. However, converting type to vectors can save you from having to worry about transferring fonts with your Elements images; vectorized fonts will show up correctly even on computers that don’t have the same fonts installed. Changing the fonts to vectors locks the shape of the font and makes it a graphical part of the image, while still allowing you to scale the image and not have a fuzzy font result. Vectors will produce sharper type results than rasterized type when used correctly. Converting to vectors also puts to rest some potentially annoying font errors.

The application of these Hidden Power vector conversion tools should become clearer in the following example, where we’ll use shapes to create scalable vector art.

## Creating Scalable Vector Art


Pixel images are normally trapped by their content in that pixel content is inflexible, and must be interpolated to be resized. Using vectors can help you create art that can be scaled to any size while retaining sharpness in the shape of objects. Although you can’t turn all elements of a standard photograph into vectors, you can create artwork as vectors so it can be scaled to suit your needs.

Captain Hook’s Bait & Tackle is the name of an imaginary tackle shop. Let’s say the owner wants a logo and asks you to make it. He wants to use the logo on his letterhead, business card, and website, and on promotional items such as caps and T-shirts. One other thing the logo will be used for is a little 10×16 foot billboard next to the Fishingtown exit from the I-1000 freeway. The only answer you get when you ask how big the logo will be on the billboard is: “Big.” So it’s safe to assume that the logo will run about 9 feet tall.

A 9-foot-tall image in Photoshop Elements at 100 ppi would be almost 11,000 pixels square. That’s about 333 MB. It isn’t a file that you’ll want to transfer over the Internet even if you have a fast connection. Interestingly, if you are careful, you can probably create the file you need and do it in less than 1000 pixels square (technically, even smaller than that!).



Follow these steps to create the logo:

1. Open a new, blank 1000-pixel-square image. Set the resolution to 72 ppi.
2. Click the Shape tool on the toolbar. Then on the Options bar choose the Ellipse Shape tool. Create a new shape layer by drawing a circle to fill the square image. Start drawing at the center. You can find this center of the image by opening the Info palette, setting the measure to pixels, and then watching the coordinates change as you move your cursor in the image window. The center will be at 500,500. When you have located the center, hold down the Shift and Option/Alt keys and drag your shape; the shape will constrain to a circle and draw from the center point, where you first clicked. Leave 100 pixels or more at the edge of the image all the way around—you may need some space to maneuver your shapes and artwork.
3. Click the Subtract From Shape Area button on the options bar, locate the center of the image again, and then draw a second circle from the center, about half the diameter of the first. This will give you a torus—a donut shape—as a result of the two shapes you created that inhabit the same layer. You should not have to adjust this, but if you do, use the Shape Selection tool to click on the shape component you want to move. When the component is highlighted, you can move it freehand by using the Shape Selection tool or change to the Move tool and use the keyboard arrows to position the shape.
4. Create a hook by sketching it and then converting it to a shape—the technique described earlier in “Making Vectors.” Alternatively, you can copy in the hook you made during that exercise, if you’d like.
5. Create the type to be placed in the donut. This is the toughest part of the exercise, because Elements does not offer a lot of type controls. All you really have to work with are the Create Warped Text function , point size, and Transform. It might be easiest to set one word or phrase at a time.

I used the Arc setting on warped text at 100 percent for the top text (and –100 percent for the bottom text) with about 30 percent Vertical Distortion. I added spaces before and after the text evenly to shorten the arc and control horizontal distortion caused by the arc. To add spaces at the beginning of the text, you have to add an extra junk character (I use a period) before the spaces, or the spaces will just move the text to the right—but don’t forget later that the junk character is there, or it will show up in your final image. Once the type is close using Arc and spaces, use Transform to fit it in place if it still needs adjustment. See Figure 8.3 for a quick approximation of these steps.

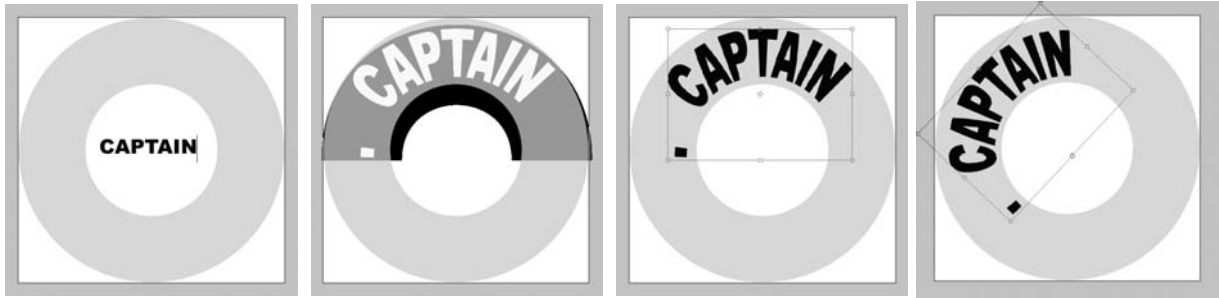


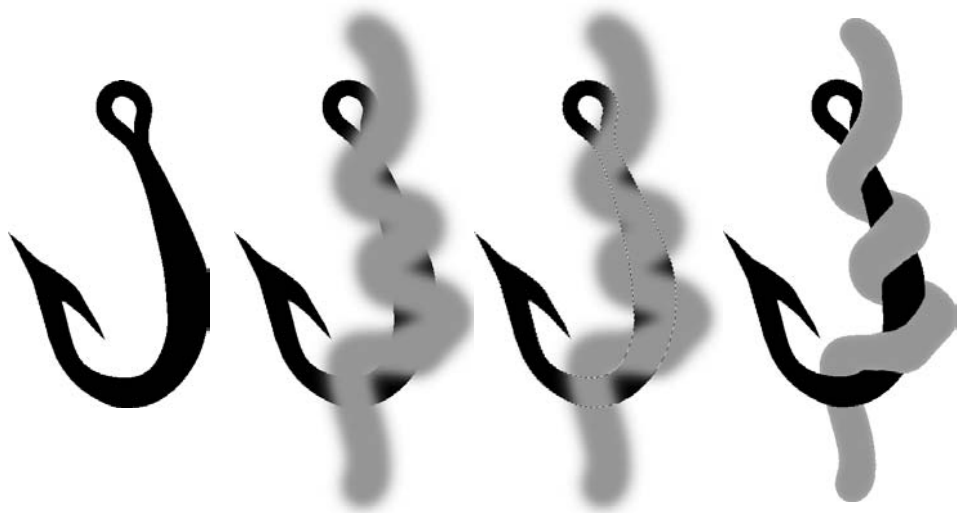
Figure 8.3

Make the arc on the bottom of the text match the hole of the donut, and then rotate the type into place. You may have to make other tweaks to the position.

6. Convert the type to shape layers by using Shape From Text on the Hidden Power tools, found in the PowerTools2 category of Effects. You may want to duplicate these text layers and hide them before the conversion, in case you need to come back and make changes.
7. Create the worm. Roughly sketch in its shape as it would appear wrapped around the hook, using a soft brush (0 percent hardness) on a new layer. Merge with a new white layer (created below the worm), and use Threshold to tighten up the edge. Load the hook as a selection by Command/Ctrl+clicking the Hook layer (created in step 4). Use the selection to erase areas of the worm that would wrap around the hook by using a hard brush (100 percent). You can't just hit Delete because you would remove the parts of the worm that appear in front of the hook as well. See Figure 8.4.

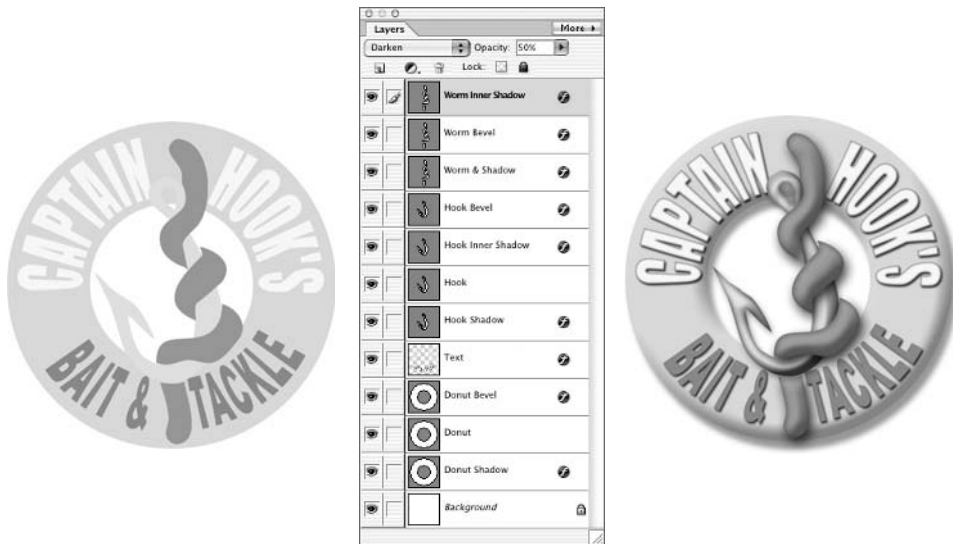
Figure 8.4

Sketch the worm roughly and remove parts you don't need by using the hook as a selection and guide.



8. Convert the worm to a shape layer. To do this, make a selection from the worm you drew (Command/Ctrl+click the Worm layer), and then double-click the Shape From Selection tool in the Hidden Power tools under the PowerTools2 category of Effects.
9. With all the elements in place, apply layer effects and color to achieve desired depth and effects. You can apply manual effects as long as you want the edges blurred in the result. If you need a tight edge on any effect (such as a hard drop shadow), you can duplicate a shape layer and adjust the color or effects. I used strong bevels on the worm, hook, and donut, along with inner shadows and drop shadows.

At the end of this exercise, you should have something that looks like Figure 8.5. Keep the layered version of the image and store it safely. It is possible to change the size of the image as necessary and correctly target the file for different types of output. Because your image is essentially composed of all vectors, you can retain sharpness in your image at any size. You can also temporarily shrink the image for moving it from one place to another; as long as the person receiving the file has Photoshop Elements (or Photoshop), they can expand the image again. The important edges remain defined by vectors. Any blends and/or effects you used for coloring and shading will simply blur more without damaging the result so long as you resize by using Bicubic or Bilinear interpolation. There will be some difference between these two interpolation types depending on the content of the image.)



**Figure 8.5**  
Separate layers were used for each effect by duplicating the shape to which the effect was to be applied. See captainhook.psd on the CD and in the color section.

If you wanted to add other details (for example, to define the worm segments), you would have to do so by using an additional shape layer so that the effects would not blur during resizing. When you resize, you will probably need to adjust layer effects to re-create what you had. This is far easier than re-creating the entire image. And far better than just resizing an image by upsampling dramatically.

“Oh, what’s the difference in using vectors!” you say? The difference is a quality image rather than a soft one. Look at the comparison in Figure 8.6; these are depictions of the same image. Image A was created at 1000×1000 pixels, flattened, and then resized to fit our billboard. Image B was created at 1000×1000 pixels and then resized to fit the billboard by using the advantage of vectors: the image was resized with layers and vectors intact, and then flattened.

It should be apparent from the comparison that the vector image can be resized without losing image quality, whereas pixel images will lose some definition. You can now take your vector logo and happily resize the image for use on a billboard or business card with equal success.

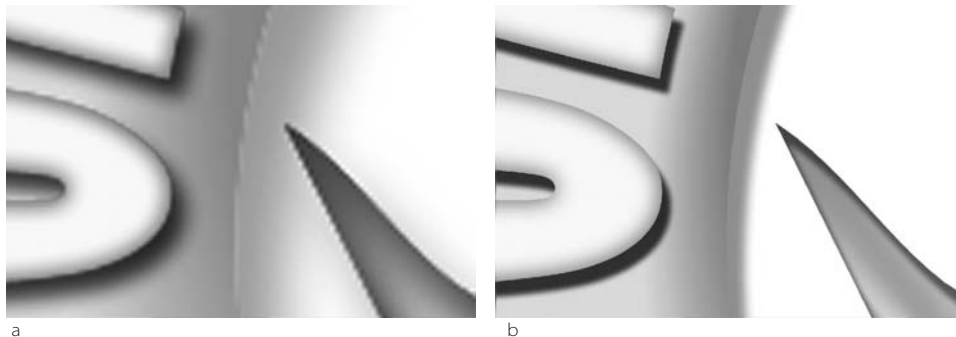
Vectors don’t only shape the content of layers; they can actually harness the shape of your entire image. Read on about applying clipping paths that you create from vector shapes.

## Applying a Clipping Path

Say you want to create an image that isn’t constricted to the rectangular shape of your standard digital image. Suppose you want the image itself, and not just a layer, to be star-shaped, or circular. An easy way to do this is to make a selection of what you want to keep, and then invert the selection and delete the area of the image that you don’t want. As long as the background color is set to white, the image shape will appear to be a shape other than a rectangle when printed. White areas of images don’t print with color (unless you are printing with a spot white ink, and you’d know if you were doing that).

Figure 8.6

This small segment of the billboard was magnified. Note the softness, pixelation, and lack of definition in the upsampled image (a) compared to the vectors (b).



This easy solution is okay if you don't have anything in the background below the image. If you are printing your easy-shaped image over another image or other content in the background of the digital file, using white won't work. One thing a white background will do in your rectangular image is whitewash anything behind it. If your image is like our Captain Hook logo, and you want to bring it into a layout program to print over a background image, you might want to import just the shape of the logo rather than the whole image. What you really want to do to the image is clip it out of the background and paste it into the layout—as though you were making a collage.

*Clipping paths* do exactly what you want. These are vector shapes that redefine the boundary of your images. They enable you to “float” an image over a background in layout programs and clip the edge of the image with vector accuracy, just as if you'd used scissors. This technique can work best with images that you create with shapes in mind (like the Captain Hook logo) and type. All you have to do is save a vector in the image as a path, and then assign that path as the image-clipping path.

Again, the problem with clipping paths in Photoshop Elements is that the program doesn't let you work with them. You can't save a path, and you can't assign a clipping path.

At least, you can't without the help of Hidden Power tools.

To use a clipping path with our Captain Hook logo, follow these steps:

1. Prepare the image by creating the shape that you want to use for the clipping path. This requires combining the separate paths for the hook, the worm, and the donut. Use *one* of these two ways to do this:
  - Make a combined selection by holding down Command/Ctrl+Shift while clicking each shape layer in turn on the Layers palette (Figure 8.7). This will combine the selections of each shape as you go.
  - Use the Shape Selection tool to highlight the shapes, copy them all to a single shape layer, change the shape modes of each component to Add, and then double-click Combine Vectors in the PowerBonus category of Effects, or the Simplify button on the options bar (Figure 8.8).

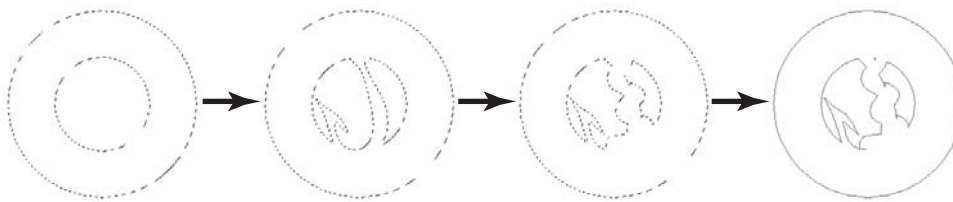
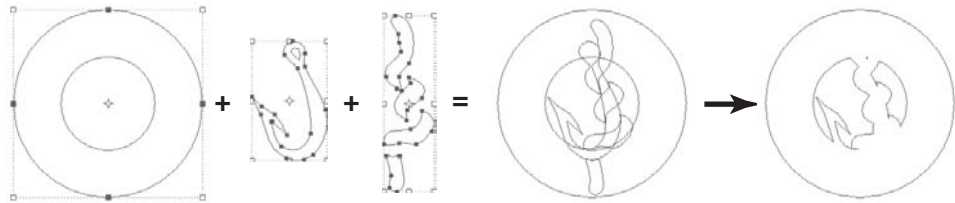



Figure 8.7  
You can multiple-select your shape layers...



Figure 8.8

...or you can copy them all to a single shape layer and combine them.



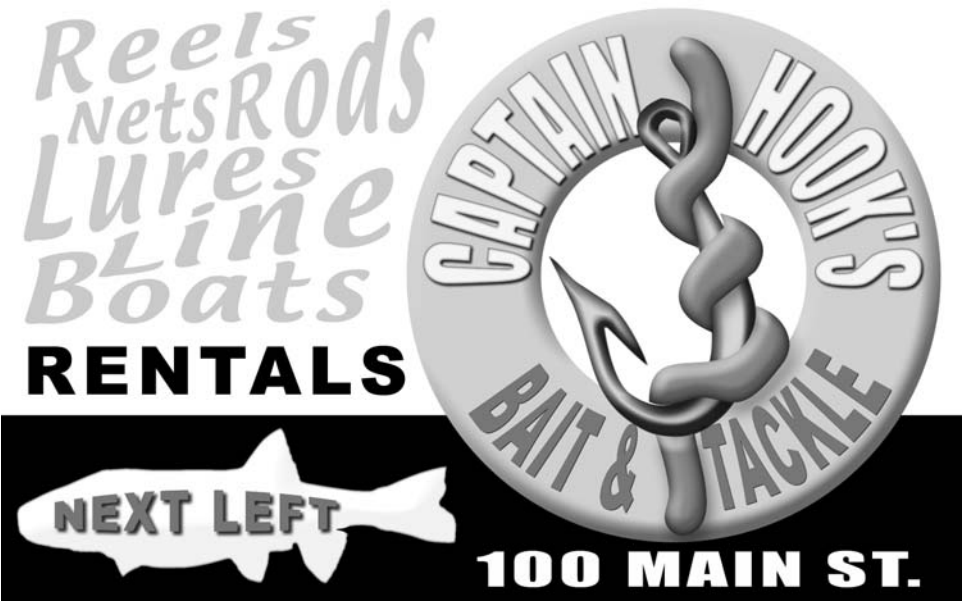
To combine the shapes, you'll need to duplicate one of the shape layers, choose the Shape Selection tool  (part of the Shape tool set), and then click the components you want to copy. When the shapes are highlighted (you can click and drag a box to highlight the parts of the worm), you can copy, paste, and then set the component to Add by clicking that option on the options bar.

2. Assign the clipping path by double-clicking Make Clipping Path from the Power-Tools2 category of Effects in the Hidden Power tools.

At this point you'll be ready to place your Elements image in the layout program. Figure 8.9 shows what your Captain Hook billboard might look like. Be sure to save your file in a format that is compatible with clipping paths, such as EPS or TIFF.

Figure 8.9

The clipping path cuts away the white portion of the logo when the image goes to print by considering the clipping path as the absolute boundary of the image.



You may have noticed that this will remove your drop shadow in the printed result because the shadow lies outside the boundary of the clipping path; even though you can still see it in the image, it won't show up in the result. If you want the shadow, you can create it by using a little trick that will also enable you to place the shadow manually in the layout.

1. Copy the clipping path to a new grayscale image that is the same size and resolution as the final print file.
2. Make it a fill layer—filled with 75 percent black. (You may need to increase or decrease the percentage of black to get the results you desire. The greater the percentage, the darker the shadow result.)
3. Change the image to a bitmap by selecting Bitmap from the Color Mode menu. When prompted, change the resolution to the output/printer dpi. Use the maximum capability of the printer.
4. Save the file as a bitmap (BMP) file by using Save As.

This file can be placed in your layout program below the clipped image (how you do this depends on the layout program you use). You will be able to manually move it separately from the clipped image. It may not look very pretty in the layout preview, but the result should look just fine on a high-resolution imagesetter or PostScript printer.

The success of printing images that have clipping paths depends on two other factors: you have to save the file in a format that will respect the clipping path, and you have to print in PostScript. The leap here is that most home printers are not PostScript. We'll look at a solution for testing PostScript output without a PostScript printer in Chapter 9.



# Chapter 9

## Options for Printing

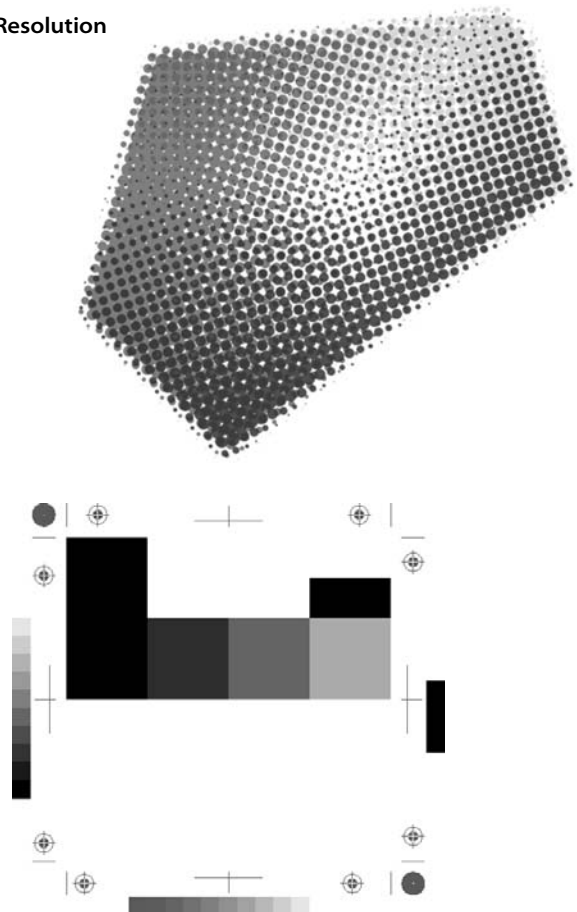
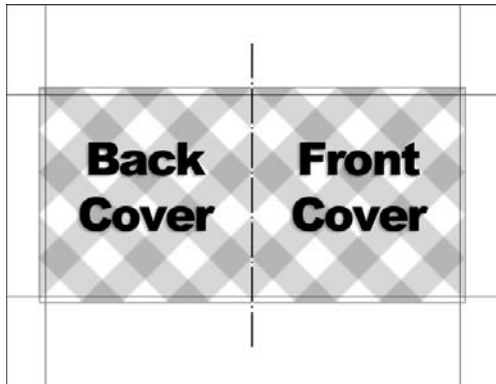
You shouldn't just buy a printer and a ream of paper and assume you have every weapon you will ever need for your printing arsenal. First, you have to know what to expect from your printer's capabilities and the type of paper you buy. Knowing about the process can help you make better decisions that lead to better results. While there are ways to get better results at home, at times you might need to print an image with a different process to get the best output. There is a reason why some printers cost thousands of dollars while standard home inkjets are much less expensive. Some of your best options for printing are just not practical for home use, but that doesn't mean you can't use them. In this chapter, we'll look at getting better color results in print.

### Understanding Printers and Printer Resolution

#### Making Prints at Home

#### Printing to the Edge

#### Using Other Printing Options



## Understanding Printers and Printer Resolution

There are really only a few practical options when buying a printer for your home. Though not the only options, generally you are limited to a photo-quality inkjet printer—which is inexpensive and not a bad choice at all—or a laser printer. The latter is often quite a bit more expensive and doesn't necessarily deliver superior results. The main advantage of a laser printer is genuine PostScript printing, which you may or may not have a use for, depending on what you are printing and what your workflow is.

Different printer types handle the same image information in somewhat different ways. Understanding how each works can give clues as to how to prepare an image for printed output.

Both inkjet and laser printers put tiny dots (of ink or toner) on paper that represent the absolute resolution of the printer. These dots have fixed measurements for each printer. The shape and intensity of each of the printer dots cannot be altered: they are either 100 percent on or off. The dots per inch (dpi) rating of a printer represents the number of these tiny dots that the printer can make in one linear inch on a page. It is essentially measured the same way whether the printer is a laser or an inkjet. The dpi of a printer can be considered its maximum resolution—the finest building block of the printer's ability to represent an image. The maximum resolution of a printer is the *lower* of any two numbers reported as the resolution by the manufacturer. A 1200×600 dpi rating, for example, is really 600 dpi with a half-step for the rows (the half-step allows the dots to overprint). The dpi rating for a printer never changes—though there are other options you can use to control the output and how those dots are used.

The different dot patterns used by laser and inkjet printers accounts for the difference in their printed result. The dots used on a laser printer form larger dots in halftone screens; dots on an inkjet form an array or tonal density (as used in stochastic printing). By definition, *halftone screening* uses dot shapes (diamonds, circles, and so forth) of different sizes in rows to create tone and color in halftone screens (the arrangement of halftone dots and angles); *stochastic printing* uses randomized printer dots (not shaped dots in halftone rows) to create arrays of tone and color. A stochastic printer can print with a lower resolution (dpi) than a laser printer and appear to create finer results because of the randomized behavior of the dots.

If you can understand halftone screening, it isn't a big leap to understand stochastic printing. We'll look at halftone printing first, in a little more detail. If you know some printing theory, it can help you understand how your images are represented in print, and you'll better understand how to achieve the best results. Different image content (vectors and pixels) controls printer information in different ways. Controlling that content starts with understanding print theory.

## Halftone Printing

*Halftones* are printed images that are composed of halftone screens. Halftone screens are composed of two types of printer resolution simultaneously: printer dots (also known as printer elements and dpi) and halftone dots (known as screening frequency and lpi, or lines per inch). *Printer dots* are the smallest unit of ink the printer can print (the *dot* in *dots per inch*). *Halftone dots* are the screening dots (the size of the halftone dot or the *line* in *lines per inch*). The halftone dot is made up of the smaller printer dots, which then create the halftone dot shape. See Figure 9.1.

A set number of printer dots is assigned to each halftone dot based on the halftone dot size. The printer dots are turned on or off in patterns on a PostScript printer to represent the shape of the halftone dots. In fact, halftone dots, unlike printer dots, can vary in size from one dot to the next. The greater the tone, the larger the halftone dot, and the more printer dots are turned on inside the halftone dot grid. For example, if a halftone dot has 256 printer dots in it, 50 percent gray will use half the black printer dots in the halftone grid, or 128 out of the 256 printer dots.

During the process of describing the image to the printer, the shape, color, and tone of the image is converted into rows of halftone dots based on the lpi and screening angles selected in the printing options (if nothing is selected, the printer will use a default). These dots are arranged in screens similar to the appearance of a window screen, one screen for each ink. The goal of applying the screen is to minimize the visibility of the individual dots and maximize ink coverage on the page so that images appear as continuous tones to the naked eye—whether you are using one ink (black) or more (usually CMYK or some variation of that). The printer is then told which printer dots to print and which to keep off in order to create the halftone pattern and represent the image.

You can specify the size of the dot by choosing a *line screen* in the printer settings when going to print (using a PostScript or PostScript-compatible printer). The line screen setting tells the printer the number of halftone dots that will be put down in an inch. The size and orientation of the halftone dots can be controlled by the halftone screen size and screening angle that you choose. The *screening angle* tells the printer how to offset the rows of halftone dots so they don't all land on one another, which results in less obvious patterning of the dots. We looked at these concepts briefly when discussing duotone printing in Chapter 5. Knowing what the trade-offs are in selecting line screens and screening angles can help you optimize the use of the printer resolution to get the best printed result.

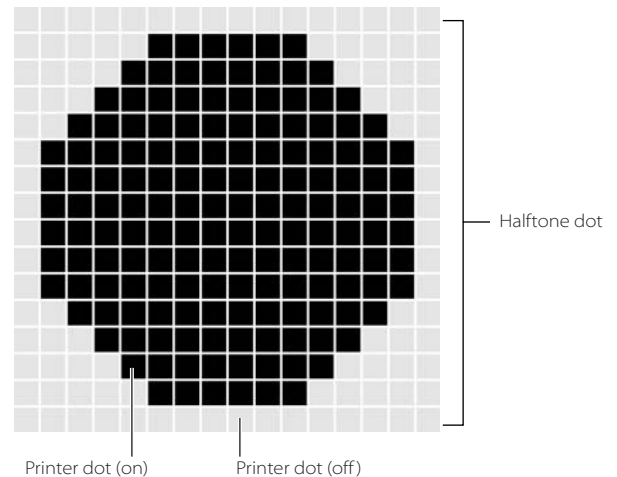


Figure 9.1

**This shows a complete printer dot grid for a 16×16 halftone dot. The black printer dots are on; the gray printer dots are off. This halftone dot uses 60 percent of the printer dots in the grid, so it represents a 60 percent tone.**

Printers have a set maximum resolution (printer dots). The more printer dots that are used to print a halftone dot, the larger the halftone dot will be, and the lower the frequency of the lpi. The lower the lpi, the greater the number of printer dots that are in a halftone dot, and the more tones the halftone dot can represent. Because a greater number of printer dots in a halftone dot leads to a greater number of possible variations, the trade-off to more shades in each dot is that dots have to be larger. The opposite is also true: if you use fewer printer dots in a halftone dot, it will have fewer potential variations, but smaller halftone dots. The larger the dot, the easier it is to see and the more likely the halftone dots are to cause visible dot patterning (*moiré* patterns). The trick of halftone printing is to keep halftone dots large enough so that the printer can represent many image tones (by being composed of enough printer dots), but not so large that the halftone dots are easy to see.

Keeping the halftone dot small while having enough printer dots to represent full image tone requires maintaining a delicate balance. Dot size should be as small as possible while representing the maximal number of tones. In other words, you want to increase the lpi as much as possible to make the halftone dots small, yet you want to keep the dots large enough so they contain enough printer dots to represent all of the tone stored in the image.

However, just as with other types of resolution, if you have more information in the halftone dots than you can use, you waste it. There is no need to make a halftone dot with more information than you can extract from the image source. So, there are better and worse ways to use up the printer resolution by selecting the right lpi. You have to balance the halftone screen frequency and size of the dot to get the best result.

Screening can be optimized for printing images that you have created depending on the maximum resolution of the printer you are using. Say your printer has a resolution of 600 dpi. This means it can print a maximum of 600 printer dots of information in a linear inch. At the same time, Photoshop Elements is an 8-bit program, meaning it can store 256 tones for any pixel color. To be maximally efficient, any halftone dot would have to be able to represent 256 possible variations to present the information correctly (or at least potentially).

A 16×16 element halftone dot can have 256 variations ( $16 \times 16 = 256$ ), and can therefore represent 256 shades of tone. A 20×20 element halftone dot could represent 400 shades of gray—but it would be 25 percent larger, and an 8-bit source image would still provide only 256 potential variations. You would be printing halftone dots that can potentially represent a lot more information (156 percent) than you have in your image. A 10×10 element halftone dot will be smaller and less easy to discern, but it can have only 100 variations ( $10 \times 10 = 100$ ), and will less likely be able to show the full potential of your image. The 256 variations in a

16×16 dot will allow you to fully represent all of the 256 levels of tone possible with 8-bit color. Table 9.1 shows the size of various halftone dots and the number of shades of gray they can represent.

So, if the printer has a 600 dpi resolution and you want to run a halftone dot with 256 potential tones, then your lpi will have to be set to 38 ( $600 / 16 = 37.5$ ). This is a low linescreen fre-

quency and a rather large halftone dot. If you step down to a lesser-size halftone dot with fewer elements—say a 10×10—you can have smaller halftone dots and a higher lpi frequency, and the printed result might end up looking better. A 10×10 halftone dot on a 600 dpi printer would enable you to run a 60 lpi screen ( $600 / 10 = 60$ ).

Regrettably, a halftone dot that can represent all 256 possibilities is not always the best bet with a lower-resolution printer. Although a smaller number of elements per halftone dot means that fewer potential colors/tones can be accurately represented by a single halftone dot, this also means that there will be a less smooth transition between tones. When you step down from a 16×16 element halftone dot to a 10×10, you go from 256 levels of tone representation down to 100. If you further decrease the number of elements, the potential number of tones continues to lower. Each time you lower the number of tones you can create, you increase the potential for color and tonal banding. You have to decide which trade-off gives you the most pleasant result.

If you have followed the discussion up to this point, you may now understand why you get noticeably better results printing to an imagesetter (with 2540+ dpi) than you do with even good home laser printers. With at least 2540 printer dots at your disposal, you can use linescreen values of up to 150 (158, really) and still get 256 levels of gray. Compare this result to using 38 lpi to get 256 levels of gray on a 600 dpi printer, as discussed above. Running a higher lpi will limit the gray levels in output. The only way to get the full number of gray levels and shrink the screening dots is to have higher resolution in the printer (higher printer dpi). This is why printer dpi makes a difference in the image result. Printers with greater dpi (resolution) can show a greater number of tones than a lower resolution printer, while using the same size halftone dot.

With the halftone rows defined by the line screen, all that is left to do is convert the image to dots that fit neatly in rows. If everything is set up correctly, colors are separated into the CMYK components and converted to halftone dots. If there is only one color (usually black), screening is fairly simple. The screen is converted to rows of dots at a specific angle. Often this angle is 45 degrees for black in an attempt to better fool the eye into seeing tone rather than rows of dots (but it can be another angle of your choice).

ELEMENTS IN HALFTONE	SHADES OF GRAY
20×20	400
16×16	256
10×10	100
7×7	49
5×5	25
3×3	9

Table 9.1  
Conversions of  
Halftone Dimen-  
sions to Gray Levels



Color generation is a bit more complicated because the angles of screening for each color are offset, so the result doesn't cause the inks to run in parallel. Default settings for the screen angles might be something like C 108 degrees, M 162 degrees, Y 90 degrees, and K 45 degrees. The colors in an area of the image are broken down into their CMYK components and then individually rendered into dot screens at the different angle settings. These screens are then printed over one another to create color and tone.

If you are printing with multiple passes, you may have to adjust screening manually.

A most interesting fact about halftone dots and printer dots is that they can be controlled by the presence of vectors. Clipping paths and clipping layers, as described in Chapter 8, can be used to control and reshape halftone dots in a way that pixels cannot. Vectors can essentially cut through halftone dot shapes and define how printer dots are assigned. Vector shapes and type can retain sharp edges in halftone screening, but might lose sharpness if converted to pixels.

Figure 9.2 shows how a shape printed with four colors (CMYK) would print when using straight halftones and when using vectors to define the edge.

## Stochastic Printing

If you can fathom all that is going on in printing a halftone in the previous section, stochastic (inkjet) printing is comparably simple. Instead of being trapped into halftone dot shapes, stochastic printing randomizes the use of printer dots so the printing seems smoother and there is little possibility of creating moiré patterning and other potential halftone-dot-related trouble. This is also why lower-resolution stochastic printing can seem finer than much higher resolution halftone printing.

Figure 9.2

The non-vector halftone edge is softer and far less defined than the vector-edged shape, though both may look almost identical as digital images.

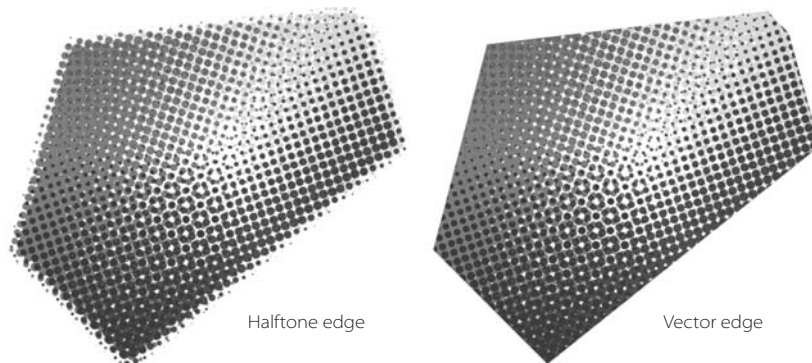
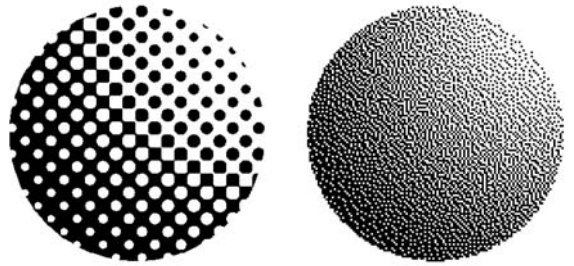


Figure 9.3 shows a rough approximation of how halftone and stochastic printing of the same area may compare.

While you won't have to deal with lpi settings and the trouble that halftone dots can bring, you forgo some of the refined edge sharpness you can get with PostScript vector printing. Your images printed with an inkjet printer will look decidedly more like a photograph than anything you print on a laser printer. Both printing types have their advantages, and neither are truly continuous tone.



**Figure 9.3**  
A halftone representation of an area (left) can be compared with finer printer elements in stochastic printing (right) when printers are capable of the same resolution.

## Making Prints at Home

After you've made corrections to an image, you might look at it on the screen and it will look just fine. But when you print it, the color might not seem as vivid as you remember from the screen. This kind of outcome isn't unusual, as the process of printing can sap some of the strength from the color. It is a result of the necessary conversion from RGB (the light you see on-screen) to CMYK (the ink you see on paper).

Image files created by a camera are recorded in RGB color. This is a fine way to record visible color that will be projected as light—that is, just about any color that can readily be reproduced on your camera LCD, your TV, your computer monitor, in digital projection (using a digital projector), and in creating digital film (film recording). All of these RGB processes play together fairly nicely.

Most printers you will use, on the other hand, use a straight CMYK process. By *straight* I mean plain ol' cyan, magenta, yellow, and black, with no additional inks. CMYK and RGB are not very friendly with each other—CMYK can often make RGB look bad...or much worse than it has to look. Specifically, vivid red, green, and blue areas of an image can suffer in the conversion to CMYK because there are areas of RGB color that the CMYK process just can't imitate. Getting better results starts with that awareness. Adjusting an image specifically for CMYK results—working with an image that you've converted to CMYK or previewing the image as CMYK—can make a difference. We'll look at both of these options in this section.

What goes wrong between your image on-screen and the result in print can be hard to track down. Problems can start with your monitor not being calibrated and can range to it being improperly profiled, to having problems with color management in the image, to needing adjustment to your separations, to having trouble with your printer, and even printing on the wrong medium. We've covered all of these areas but the last one. Before we get deeper into printing, we need to determine who is controlling your output.

## Who Controls Your Output?

You can make a conversion to CMYK by using techniques from this book, but you can't always be sure that your separation setup is going to be used for the printing—unless you test it. The reason for this is that many inkjet printers (printer drivers) like to make their own separations. Instead of taking what you put together as a CMYK image, they might convert the information from CMYK and then back to CMYK again. It's a problem similar to what can happen behind the scenes with renegade image profiles.

Recall that in Chapter 1 I dismissed profiles. I don't use them, I don't need them, and neither does anyone else. They can't possibly tell a printing device what I can't, and they can't see and correct to what I want as the result. Only I can do that.

You might guess that this double conversion—CMYK to RGB (or Lab) and back to CMYK—is not desirable if you've already gone out of your way to make a CMYK separation. Printers and drivers don't do this to be naughty; they are trying to help you get the best results. The printer will not realize that you are a sophisticated user and have created your own separation with a purpose in mind.

The first thing you want to do is find out what your printer is doing so you'll know better how to handle your images—at least with that printer. You'll need to run a quick test to see how your printer is handling color. All you have to do is run a rich black (a black that combines black ink with cyan, magenta, and/or yellow ink rather than just using black) to the printer. Once you evaluate the results, you'll have to look at your possible options. Unfortunately, you can't print a CMYK image directly from Photoshop Elements. So that everyone can perform this test, I've provided another route using Adobe's Acrobat Reader (which is available on the companion CD).

### Running the Test

Use the following steps to test your CMYK output.



1. Open **CMYK.pdf** from the CD by using Acrobat Reader.

This test will not work if you open the image by using Photoshop Elements, because Elements will have to convert the file to RGB. You need to print the image as CMYK.

2. Print using your usual printer and the print settings you usually use.
3. Evaluate the results in a well-lit room.

To evaluate the output, you have to know what you are looking for and what this test print is supposed to be testing. The file is set up with a rich black bar (more than just black

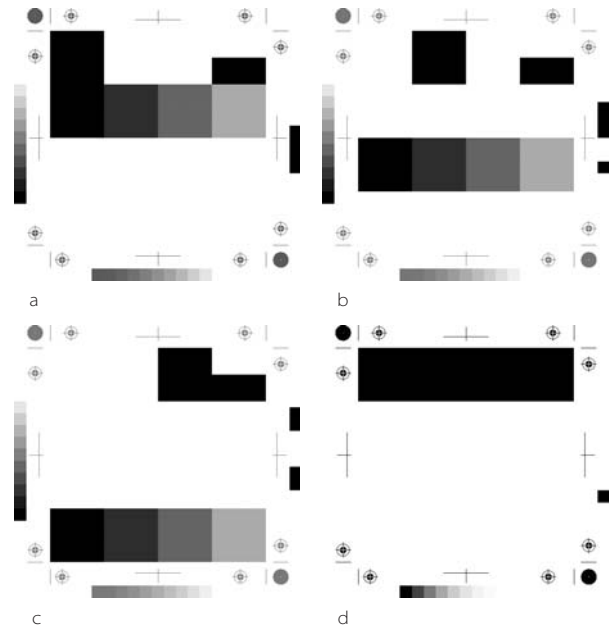
ink) across the top. The “black” bar should actually be five colors—if your printer and driver are printing it as intended. The first three boxes are a rich black with cyan, a rich black with magenta, and a rich black with yellow, respectively. The top half of the last box will be black ink only, and the bottom half a rich black using 100 percent of all four inks. The next three bars in the image will be cyan, magenta, and yellow at 100 percent, 75 percent, 50 percent, and 25 percent. The separation of how that looks in color plates when separated right from the file I provided is shown in Figure 9.4.

Examining the output in the light should make apparent any differences between what you should have gotten and what you did get. If the black looks like a solid bar rather than several different blacks, your printer (or the driver) is taking liberty with your CMYK separation. Therefore, you may not be able to use the printer as a reliable proofing device to see what you will get when using another printing device or service—unless you can find a solution.

If you want to get the CMYK out that you created, you will want to get the test image to print by using the original color in the image. It isn’t so much that you want to be a control freak and never have image information change; you just don’t want it to change without you knowing about it so that you can make proper adjustments and not waste your time.

There is more than one solution to the problem, but you have to be able to live with the result. Your solution could be as extreme as replacing your printer, but other options don’t require making a decisive change in your current home setup. Your options include:

- Changing the output settings for printing
- Replacing your driver or using another method to get the right output
- Using a printing service when pre-separated output is critical
- Working in RGB and accepting whatever the printer and driver give you in the conversion to CMYK
- Using a combination of the previous options



**Figure 9.4**  
The color in your print should use cyan (a), magenta (b), yellow (c), and black (d) in exactly the patterns shown, or your printer or driver is getting in the way of your results.

## Changing Your Output Settings for Printing

Several settings that control how the printer will handle color can be hidden somewhere on the various tabs of your printer driver settings (and sometimes in the program you are using to do the output). These settings include the more conspicuous Convert CMYK Before Printing type to the type that vaguely mention something about color management (or profiles). There may be other options more cleverly disguised. There also may be no options at all. Unfortunately, there are few standards.

If you look through all of your printer dialog box options when you are ready to print and there are no color options, then you will have to look at another potential solution. Don't give up until you get out the printer manual or online documentation of the driver interface and see what settings the driver has and what the settings affect. The documentation can point you in the direction of any settings that you might need to experiment with when the settings are not obvious.

There is no profile in the `CMYK.pdf`, and the result of your printing should be that the color is not manipulated by the color settings of your printer. However, some printers/drivers may either insist that you have a profile or assume a generic profile, and this can result in a conversion. Again, that will show up as a change in the black bar, and/or as influence to the pure CMYK color bars. Alternatively, you may choose to use a workaround and/or replace your driver.

## Replacing Your Driver

Most printer companies have a website for their products where you can download upgrades to system software and sometimes hardware as well (firmware). Obtaining new printer software from the website for your specific printer model can help give you functionality that was added after the printer was manufactured—or that enough people complained about to warrant an enhancement. When visiting such a website, don't pass up the option to complain, if necessary.

There may be third-party drivers that can do what you need. These will usually come at an additional expense. Sometimes you can use other drivers, but this can require a lot of trial and error, and is probably impractical for the most part.

One exception where you can find a free third-party driver is on the Adobe website. Adobe makes drivers that are pretty much universal in helping create PDF files, and these can be downloaded for free. There is also functionality on the site that will help you convert files to PDF. Creating PDFs to print from is often a good solution for varied applications (you'll note that I used it for the test file). Using PDFs, you can often get the equivalent of PostScript output from a non-PostScript printer (for example, clipping paths won't be ignored). All you do is use the driver option to Print To File. This

will make a PRN (printer) or PS (PostScript) file, depending on your settings and the driver used. This file can then be turned into a PDF and you can use that to print. PDF files are also often small (depending on compression settings) and service friendly; they can be lossless, and they can embed fonts.

Although it is not specifically changing your printer driver, exploring other options for programs to print from can be another solution. For example, layout programs often have capabilities that can help you get the output you want. For example, if you have QuarkXPress, Adobe PageMaker, or Adobe InDesign, printing from these programs can sometimes add options for output, or you can convert files to other formats such as EPS (Encapsulated PostScript).

Another clever workaround is to print your CMYK process images one color at a time by using multiple passes on the printer—as was outlined for making duotone prints in Chapter 5. While this may improve the result, it will probably not work perfectly if your driver is ignoring your separations. In other words, this only masks the problem rather than fixing it. If you can't control the settings, you still are not really controlling the result.

## CREATING PDF FILES

Adobe Acrobat (Professional, Standard, and Elements) and Adobe Acrobat Distiller will enable you to create PDF files from PRN (print) and PS (PostScript) files. These programs are usually licensed by purchase, but may be included with other software packages or new computer purchases.

As another option, Adobe will allow you to use their online tools at their site to create a limited number of PDF files over a trial period. You can find the PDF creator here: <https://createpdf.adobe.com/> (look for the Try it for Free! link). Other free and inexpensive resources are available as well, such as these:

- Ghostscript  
<http://www.ghostscript.com>
- Pdf995  
<http://www.pdf995.com>
- PS2PDF  
<http://www.ps2pdf.com/convert/convert.htm>
- Docudesk (deskPDF)  
<http://www.docudesk.com>

Information here is likely to change; please feel free to post questions to the Hidden Power forum or search the Web for *Create a PDF online*.

### Using a Printing Service for Output

There are two ways to look at a printing service: 1) an expensive place that can be intimidating, inconvenient, and smells like chemicals, or 2) a resource for equipment you don't want or can't afford to keep at home. Services enable you to use sophisticated printers that you would probably never buy. Different services may have different equipment, and getting to know what is available—both locally in your area and through the Internet—may give you some good options for other means of output. Options can include color laser, LED (light-emitting diode), film recorders, offset printing, print-on-demand, and other processes (both high- and low-tech). For the most part, you'll know if you need a special service. Several of these options will be looked at in more detail later, in the section “Using Other Printing Options.”

### Working in RGB

You may notice that the CMYK test gives you different results than you should get if the printer is using the information you send, but another question you need to answer is whether the results are good enough. In many cases they might be, and if they are, it saves the problem of having to make and correct CMYK separations. There is nothing wrong with sending an RGB image to your printer to be separated to CMYK *if* the results are satisfactory. At other critical times (when you are making a specific separation, as I did to create the CMYK test), you may need to explore more thoroughly how you can influence CMYK output.

### Using a Combination of Solutions

What the last few sections were obviously leading to is that not every image will warrant or require the same process to get the result you need. I might use all of the discussed solutions in a single day, depending on what I need to accomplish. Being aware of the options is half the battle; the other half is realizing that using the right one at the right time saves work, time, frustration, and possibly money as well. Be sensible about your choices; be honest in your image evaluations; and be ready to change the processes you use most of the time in order to get the right result in the end. The right result will vary, sometimes from image to image.

### Selecting and Testing Printer Paper

When eating soup, most sophisticated soup eaters use soup spoons. In a pinch, a teaspoon or tablespoon could do; if you are the chef, a ladle may be used for tasting. However, there is usually a reason why items we use every day have taken on slightly different shapes to perform their jobs. The same is true of printer paper. In this section, we'll discuss how to select and then test printer paper to ensure the best results.

## Selecting Paper

Most people would tend not to run tissue paper through their printer in hopes of getting a good print. The same goes for toilet paper, paper towels, wax paper, litmus paper, tracing paper, shelving paper, aluminum foil, bubble wrap, plastic wrap, and so forth. What many people never consider is that different papers that look essentially the same have different qualities—and some of these qualities aren't a lot different from some of the sillier suggestions that you would quickly dismiss. Plain ol' typing paper may be too absorbent, acting more like a paper towel in absorbing the ink. It might have a texture or coating (such as an easy-to-erase surface) that impedes ink absorption. It might not be white. It may not necessarily be made for accepting ink from a color inkjet printer. Different inks in different printers can be ... different. Because they can be different, paper that works well in one printer (such as a printer with an ink that dries quickly) may work less well on a different printer (such as a printer with ink that is slower to set).

Although differences in paper can create different results when using a laser printer, it is usually much less of an issue because absorption is not part of the equation.

Manufacturers did not put expensive photo-quality paper on the market just because they thought they could sucker in unsophisticated buyers to pay 10 to 20 times more for paper they really didn't need. Photo-quality paper was made specifically to do the job of making the best-quality images from your inkjet printer. It is worth the extra money to use it when printing your best-quality, final images.

You don't have to use special photo-quality paper for every print, but you may need to change printer settings to adjust for the paper type. When using plain paper, it should be white. If not, the whites and lighter colors in your image will be influenced by the paper color (usually decreasing the dynamic range of the image). You will find that some brands of paper (even brands of the fancier photo-quality paper) will work better with your printer. Sometimes this will have little or nothing to do with price.

## Testing Papers

If you are going to use a plain paper to proof images before printing on better photo-quality papers, or if you will be using different quality papers, be sure to “waste” a few sheets testing your output. Read the manufacturer's suggestions for the settings to choose for photo-quality and plain paper, and make prints of the same image on each. Make a few prints with somewhat different settings; for example, if there are settings for different grades of photo-quality paper, you might try more than one (especially if the paper you are using is not noted specifically by the manufacturer). Try several prints with the plain



paper as well. As you make the prints, note the settings used for each by writing those settings directly on each print you make.

Compare the results of the photo-quality prints to the image on-screen first. Choose the result that most closely resembles what you see on-screen. (It may not be the best print!) Next, compare the print that looks the most like what is on-screen with the prints on plain paper side by side. Make note of the settings that produced the best matches, and use those settings when you print to those paper types. Retest whenever you switch papers. If you like the quality of the prints you get with a certain brand of paper, you should stick with it unless there is a good reason to change—and “because another brand costs slightly less on sale” is not a good reason. Using the same paper simplifies your process and ensures optimal results without having to retest.

Testing your paper and noting the settings that produce the best results can assure you that what you see on-screen will most closely resemble what you will finally get in print. Once you make this test, it should be unnecessary to make plain-paper proofs for every image you print. With this test made, you have essentially completed the easier process of color management that I suggested at the beginning of the book. If you do not change the monitor settings or the paper you use, you can be assured every time of getting similar matching to what you see on-screen.

## Printing with a Profile

A second use for color management and profiling arises when you print your files. Working-space color management is handled by your selection of a preference for Color Settings (see “Color Preferences” in Chapter 1). What that selection does not handle is the output profiling. Output profiling attempts to adjust for your printer, and hopefully the paper used as well. The output profile can be used whether you have your preferences for the working space set to limited color management, full color management, or none.

Printing with your printer profile can be accomplished through Elements via the Print Preview dialog box. Just choose Print from the File menu to open the dialog. Select the Show More Options check box at the bottom left of the dialog. Under Color Management, the screen displays the current Source Space (the profile embedded with your image per your color management settings), Print Space, and Intent. Print Space is where you can select your profile. Profiles should be printer or printer/paper profiles that you have saved to the same place as your monitor profile (generally the `Colorsync/Profiles` folder on Mac or the `System32/Spool/Drivers/Color` folder on Windows).

Intent is set to Relative Colorimetric by default; other settings include Perceptual, Saturation, and Absolute Colorimetric. These options are described in Table 9.2.

INTENT	EFFECT
Perceptual	Attempts to maintain a view based on how we perceive color; actual color may change.
Saturation	Attempts to render saturated color in the new space, potentially at the expense of color accuracy.
Relative Colorimetric	Attempts to preserve as much of the original color as possible, while adjusting color outside the target space to the closest possible match.
Absolute Colorimetric	Does not attempt to preserve or adjust color that is out of gamut for the target color space.

Table 9.2  
Intent Settings for  
Print Preview

Profiles that you will usually want to use for this will either be printer profiles provided by your printer manufacturer (sometimes supplied with the unit, sometimes available from the company website), or printer/paper profiles most likely provided by paper manufacturers (in some cases, the printer and paper manufacturers may be the same). You can also have custom profiles made, or try third-party profiles (often the latter are created for specific combinations and purpose). Don't just assign any old printer profile because you have the opportunity to assign one.

CMYK Previews

It is not possible to preview CMYK printing in Photoshop Elements, so they say, because there is no CMYK to work with in the first place. If one can't create CMYK, there is, of course, no way to preview it—and no reason to. There is also no Preview option. Why should that stop you?

It is exactly because there is no CMYK that it is pretty easy to preview CMYK. That may sound contradictory. But what a preview has to do is take your CMYK information and convert it to RGB again. Because Elements won't open a CMYK image as CMYK, the preview is really automated (read: forced). As fate would have it, it is exactly the conversion from CMYK to RGB that will show you what you should be getting in print and will let you know—without printing—approximately what results you will see when you do print.

As I demonstrated in Chapter 5, you can build a CMYK image by making a custom separation and saving to a DCS EPS template. To complete the process of previewing your CMYK images on-screen, all you have to do is split out the CMYK channels from your custom separation and merge them. You can do this manually by copying each channel out of the file, creating the EPS, and then going back to open that file so it converts to RGB. Hidden Power tools provide an easier way without having to save the image first. All that is required is that you can complete a CMYK separation and get a reasonable preview using output to plain and/or photo-quality paper. If you have accomplished this, you can preview your result before even sending the image to print by proofing on-screen. This can save paper, ink, and cost.



The preview that you will create is just a preview file and nothing more. You should never save the preview. Just look at it, see if there is something you want to adjust, and then throw it out. You can experiment with creating a curve set that makes the preview look accurate, and you can then apply that to any image you are previewing. This will take some trial and error (or testing), but once you have achieved an accurate preview adjustment, you can use it over and over to preview the result of your separations.

1. Create a CMYK separation by using Hidden Power tools functionality. Double-clicking CMYK Process in the PowerSeparations category of Effects will lead you through the separation.
2. Double-click Make CMYK Split in the PowerSeparations category of Effects in the Hidden Power tools. This will separate the C, M, Y, and K channels from the separation you created in step 1, leaving the original channels in the layers of the first image.
3. Double-click Preview CMYK in the PowerSeparations category of Effects in the Hidden Power tools. This will attempt to combine the separated channels created by the split. Because Elements is an RGB program, it will stop you from viewing the image as CMYK, and prompt you for a conversion to RGB (choose to convert by clicking the Convert Mode button). This CMYK to RGB conversion is exactly what you need to preview the CMYK result on-screen.

After you have completed this simple process, the image on-screen should represent the CMYK you will probably get by printing the original CMYK separation (if your printer respects your separation). I say “probably” because there can be some variation specific to the printer, the inks, and the paper, as well as your setup for color management. The solution to getting a more accurate preview is to make some adjustments to the preview image on-screen. To adjust the preview, do the following:

1. Create a CMYK EPS separation by using CMYK Process in the PowerSeparations category of Effects and then the CMYK template to create and save your DCS EPS. If you aren’t sure what to do, follow the instructions for “Separating CMYK Color” in Chapter 5.
2. Open and print the EPS file by using a layout program or create a PDF; any process that you have tested (using CMYK.pdf) that respects the separation you make is fine.
3. Open the CMYK EPS file in Photoshop Elements, and allow the conversion to RGB.
4. Compare the print to the screen and make changes to the preview image on-screen by using adjustment layers (such as Curves, Levels, and so forth). Your goal is to make the screen match the print as closely as possible. This may take some time. Look back to Chapters 4 and 5 for color correction techniques.

5. Create a preview file to store the adjustments you made. Name the adjustment layers according to their purpose and/or placement. It may be a good idea to save a screen shot of the Layers palette so you can duplicate the results.
6. Use the correction layers to correct the preview of other images. All you have to do is drag the correction layers from the sample to the new preview.

You can make your adjustments by using separations to fine-tune the preview. RGBL, explored in Chapter 2, may be a good choice.

## Creating Custom Picture Packages

Picture packages are an easy way to fit images onto a printed sheet when you go to create image prints. Packages can lay out one image in different sizes and combinations to fill a printing sheet, or allow you to print more than one image. Photoshop Elements provides a bunch of presets, and you might find one that meets your needs. I don't know about you, but most of my sheets of paper are standard 8.5×11 inches, and there are no presets for that size. A good thing to know is that you aren't stuck with the presets Adobe assigned.

Picture Package can be accessed directly by choosing Picture Package from the File menu (File → Picture Package), or it can be accessed by clicking the Print Layouts button on the upper right of the Print Preview dialog box (Print Preview is accessed by choosing Print from the File menu, or by pressing Command/Ctrl+P).

Say you want to print seven images on an 8.5×11 sheet—three images that are 4×5 and four smaller wallet shots at 2×2.5. To create the Picture Package by using the measurements from the example, all you have to do are the following simple steps:

1. Open Picture Package by choosing File → Picture Package or by clicking the Print Layouts button on the upper right of the Print Preview dialog box.
2. Click the Edit Layout button in the Picture Package dialog box. This opens the Picture Package Edit Layout screen (see Figure 9.5).
3. Enter the name you would like the layout to appear under in the drop-down list on the Picture Package screen under Layout. I named the layout (7): (3) 4×5, (4) 2×2.5. This stands for the number of images on the sheet, and then the breakdown of the number and size of the individual images.
4. Select the desired Page Size from the drop-down list. If the size does not already appear on the list, add it by choosing Custom and entering the numbers in the Height and Width fields. As an alternative, just entering a Width and Height will change the Page Size setting to Custom automatically.
5. Click the Delete All button to clear the image boxes (called Zones).

Figure 9.5

This handy screen enables you to configure a new layout and save it.



6. Click the Add Zone button, and change the Size and Position to the following:  
Width 4 in, Height 5 in, X 0.25 in, Y 0.25 in.
7. Duplicate the zone created in step 6 and reposition. To do this, Option/Alt+Click on the zone, then choose Duplicate from the pop-up menu. Change the position to X 0.25 in, Y 5.5 in.
8. Duplicate the zone again, and change the position to X 4.25 in, Y 0.25 in.
9. Add a new zone that is 2×2.5 inches and position it at X 4.25 in and Y 5.5 in.
10. Duplicate the zone created in step 9 and change the position to X 4.25 in and Y 8 in.
11. Create another duplicate of the zone created in step 9 and change the position to X 6.25 in and Y 5.5 in.
12. Create another duplicate of the zone created in step 9 and change the position to X 6.25 in and Y 8 in.
13. Click the Save button to save your layout and return to the Picture Package screen.  
You will need to select a name for the file you are saving.

Your layout will use your currently open image (if there are any). The example layout will look like Figure 9.6. You can reuse the layout after it is created to print other files, a folder of files, images from the Assets bin, or images in the File Browser. If you are not automating printing of a folder or image group, you can change individual images in the layout by clicking them in the Picture Package dialog box after the layout is set up (see Figure 9.7). If you are automating a folder or other image group, each image will be incorporated into a new package. Compiling the image for print may take Elements a few moments

to complete, as it will assemble the image(s) in a new document on-screen. Images will be rotated automatically to take best advantage of the layout size. You can then save and/or print the packages when the image(s) have been completed.

In Windows, these layout files are stored in \Adobe\Photoshop Elements 2\Presets\Layouts. On a Macintosh, they're in \Adobe Photoshop Elements 2\Presets\Layouts.



Figure 9.6

As long as you measure correctly, you can create a Picture Package template that will arrange images on a single sheet for you so you don't have to do it manually every time.



Figure 9.7

Select the image you want to replace by clicking it and choosing an alternative in the Select An Image browser.

## Printing to the Edge

Another layout problem that may confound a user is making images print to the edge of the paper. On most printers, there is an edge area of the sheets you are printing that the printer will not print on—if you use the right paper settings. It is commonly called the *grip edge*. It is often a quarter to a half an inch broad, and may vary from edge to edge depending on how paper was designed to go through the printer. In most cases, you really don't want to print right to the edge of the paper if the printer was not designed for edge-to-edge printing—and maybe you don't even want to do it then. If the ink misses the page, you could end up getting ink on the printer, rollers, or something else, and the edges of the print could be smudged by handling.

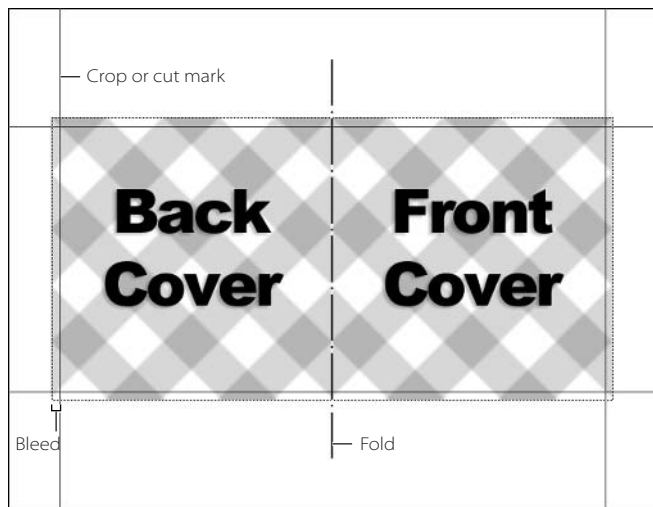
There are two solutions to the problem of printing to the edge, which are really the same thing: buy perforated paper that you print on and then tear away in the shape of the print, or just do it the old-fashioned way and crop the paper.

For example, say you are creating a CD booklet and you want to make your image on the front and back go right to the edge of the booklet. You wouldn't start with paper that was exactly the right size and then use your printer to print the image exactly to the edge; you'd start with a larger sheet, print the cover, and then cut the paper down. Figure 9.8 shows a sample layout.

The image prints a bit beyond the crop edge—say, by an eighth of an inch. This provides a margin of error for the cropping. If the cut doesn't fall precisely on the crop mark, the image will still come all the way to the edge of the cropped area. Extending the image beyond the boundaries of the area you want it to occupy and then cropping the edges of the image is called *bleeding* in printing terms. One eighth of an inch is a standard margin of error.

Figure 9.8

All areas outside the crop hash are cut off and discarded.



## Using Other Printing Options

There are several other printing options for your images, and in this section we will focus on higher-end possibilities. You can turn your images into negatives or slides for use in photo printing or projection, and you can use other printing processes such as offset printing and LED. You will have many more options than those mentioned here, but in dealing with digital images and photography, these will be common and useful. Check with your local services and on the Internet for more ideas.

### Film Recorders

A *film recorder* is a means of generating film exposure from a digital image. Film recorders can be used to create slides and negatives, which can then be used for slide presentations and print exposures.

Within the film recorder, a CRT (cathode ray tube) is employed to project a thin beam of light through a filter and onto film to expose it. Film is then processed and developed by using conventional photo processing, resulting in an image on traditional analog film.

Film recorders come in varying resolution and quality based both on the number of lines of resolution possible and the quality (and size) of the CRT. Cost for processing can vary based on the quality of the film recorder and the available resolution. Usually it is not cheap, but when you need slides or film and have an image with enough resolution, the quality can be unsurpassed. Resolution of your images may have to be 650–1000 ppi at the final size.

35 mm film is generally used with 2000- and 4000-line recorders. 8000-line recorders can be used with 35 mm film, but this resolution begins to surpass the limitation of the film grain. 8000-line recorders are usually used with larger film stocks (2.25 inch), and 16000-line recorders with 4×5 inches and larger.

A list of exactly what resolution to use would be meaningless, because the quality of these various devices may require different sources. You'll have to contact services both to see if they have film recorders available and what they require for output.

### Offset Printing

*Offset printing* is usually standard CMYK printing on printing presses, though it can also be duotone printing or other processes such as six-color. Printing on a press may come in handy for producing greeting cards, business cards, books (and covers), CD inserts, calendars, posters, and the like—printed materials that you will want to produce thousands of in quantity. While shorter runs may be available, this type of printing is almost exclusively effective in volume. The result is top quality in both black-and-white and color printing. Presses can be of varying quality. The better-quality presses will run upward of 133 lpi and 2540 dpi. All will use PostScript and halftone approaches.



## Light-Emitting Diode (LED) Printing

*Light-emitting diode (LED)* printers generate photographic results from RGB digital files. Somewhat like film recorders, these printers enable your files to be printed without the conversion to CMYK because the process used is light-based. Exposure is created on photographic paper in sizes up to poster size, directly from digital files. Exposures are then processed as you would photographic paper, often right in the same machine.

While LED prints may be somewhat more expensive than traditional photo prints, the gap isn't very wide. The advantage is that you can use this process selectively with images that you have had the opportunity to correct and improve digitally and still get photographic results. Unlike using a film recorder, which would take two steps (record to film, then print) to get results, LED printing takes the digital file directly to print in a single step. Because it cuts out having to pay for film and photo developing, it can end up being much less expensive to process.

Again, quality can vary, but the color results will often be superior to home printing. Files often require only about 250 ppi at final size. Check with your service to be sure, and ask to see samples of prints to check the quality of resolution and papers before you buy.

# Part VI

## Images on the Web



The only real difference between a web graphic and any other graphic is that a web graphic is intended for display on a monitor. This reduces some of what you need to know. For one thing, you really don't have to worry about CMYK separations or color mode conversions—unless you will be using images across print and web media and want to match business colors as closely as possible. But web image work opens up some new challenges as well as whole new arenas of image possibilities.

### Chapter 10 **Creating and Using Web Graphics**



# Chapter 10

## Creating and Using Web Graphics

Images you create can be used on the Web as well as in print. Although these can be the same or similar graphics, there are some differences in how they are applied on the Web as compared to in print. You use a different set of specifications as far as file type, color, and resolution are concerned. We'll look at how to apply those concepts to web images in Photoshop Elements, as well as how to insert images into web pages and how to perform image compression. A stark and challenging distinction between web graphics and the static images you use in print is the ability to make web graphics interactive and animated. We'll take a look at creating rollovers and how to go about planning, creating, and implementing animation.

### Image File Types for the Web

#### Basic Guidelines for Web Design

#### Inserting Images in HTML

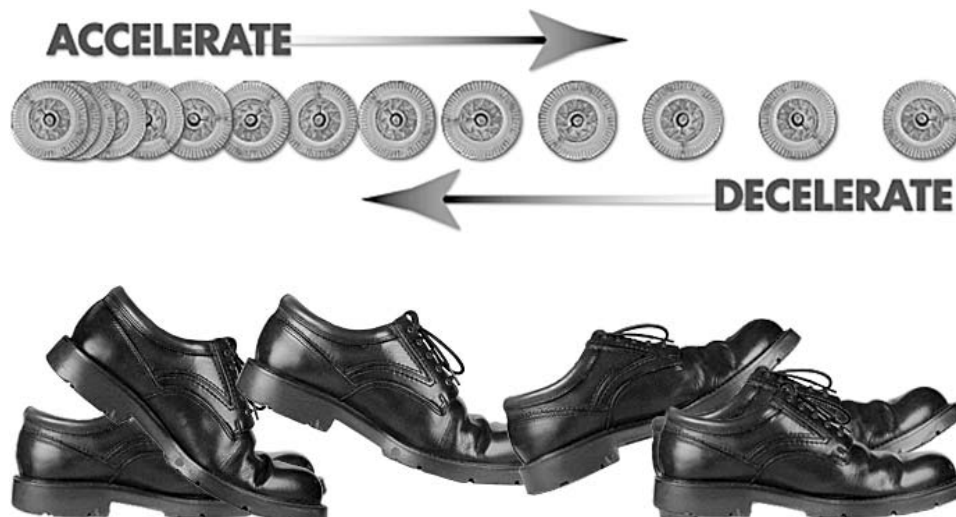
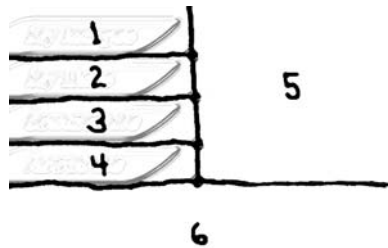
#### Making a Web Gallery

#### Creating Slices from a Whole Image

#### Creating Rollovers

#### Creating Animations

#### Looking beyond the Book



## Image File Types for the Web

Although you can transfer any file type through the Internet (as an e-mail attachment or by downloading), your file type choices for web images that will be displayed on web pages is limited to those that are supported by web browsers. If the file type is not one that the browser will display, the image will not show up (with various errors or display anomalies). Although Elements supports many file types (see Table A.6 in the Appendix), and although you'll find many more still on the Web, generally you will want to stick with GIF and JPEG images. PNG, TIFF, EPS, PDF, and SVG images are sometimes supported in various browsers, or can be viewed with plug-ins.

You can check whether an image you have saved is browser compatible by loading it directly into your browser. Simply open your browser, choose Open (this option may be called something slightly different, such as Open File or Open Page, depending on which browser you are using), and then select the file. Be aware that a plug-in you may have installed can affect the functionality of a browser: if visitors to your images or website do not have that plug-in, they may not be able to view the images. When you are unsure, view the images (and the web pages they will be included in) in different browsers to be positive they show up as you expect them to.

Be aware of the advantages each file type offers, and don't just dismiss the use of one over the other in all cases. There will be times when using each format is both sensible and desirable. The choice of which format to use is determined by the image contents of the file being saved.

Generally, use the JPEG format with full-color graphics and use GIF for images with limited color, such as type over a flat color background without a drop shadow. The following guidelines should give you a better idea of which format to use when saving. Choose the GIF file format for saving if the image meets *any* of the following criteria; choose JPEG if the image meets *none* of these criteria:

- The image must have transparent properties.
- The image is a simple RGB containing 256 colors or fewer.
- The image is currently in Grayscale or Indexed Color mode.
- The image is intended to be an animation.

Either of these image types can be used in rollovers, tables, backgrounds, or any standard image placement on a web page. Often, you will want to use them in combination on a single page, and it might be advantageous to combine them in many circumstances. For example, you might want to use GIF shims (blank images used as spacers) in a table to take

advantage of transparency, whereas the table area itself is made up of JPEG slices to make the most of a color image you are using as a button. In a more complicated scenario, you might want to animate part of a rollover button that is a JPEG in the normal state (when it's not being rolled over or clicked). You would have to use a GIF to support the animated image of the button and a JPEG to maintain the best color quality in the static image.

## JPEG

Named for its developers, the *Joint Photographic Experts Group* (JPEG) format is the easier of the two web images to implement, because the file type can retain full RGB color. Although there is an advantage to JPEG in its ability to retain image color, the image that results from the save can be distorted by the format's built-in compression. Compression in a JPEG file simplifies image information by making estimates as to what is important—based on a visual algorithm. The result of the compression can sometimes be harmless (at lower levels), but more often shows up in the image as distortion known as *artifacts*—which can often be devastating to image integrity. The compression may show up only upon magnification of the image, but the potential for artifacts makes saving to JPEG an option to use only when necessary for Web display, or when space (file size) is at a premium.

Be sure to save as few times as possible—the more often you save to JPEG, the more the compression distorts your images. JPEG compression gets reapplied each time the file is saved. If you will be working on an image, save to a lossless file format (such as TIFF or PSD) whenever possible; use JPEG for final images only.

JPEG compression runs on a scale of 0 to 12; 0 is the most compressed with the greatest loss of image quality, and 12 is the least compressed retaining the most original image information. The higher the compression in a JPEG file, the smaller the image files, but the more the compression will damage the image information. This means that as the quality of the image goes up (and compression is lowered), the size of the resulting file increases.

## GIF

CompuServe's *Graphics Interchange Format* (GIF), often used for web graphics, is an image compression format designed (specifically for the Web) to speed the transfer of images. GIF conversions might require finessing the color because GIF files can display only 256 colors. Mixing the 256-color palette with dithering can make it appear that there are more colors than there really are.

Compression for GIF images is technically lossless, but conversion to Indexed Color is not lossless: there are a maximum of only 256 colors in a GIF color table, so the 16 million

potential colors in an 8-bit RGB image will be limited to fit in the palette. Conscious web design that plans to incorporate GIF images will generally keep colors simple, as this fits well with the idea of the GIF compression scheme from the side of image creation. If you are creating a graphic image from scratch (such as a logo), it is more likely that you will be able to make the color fit a GIF color table. For example, if you are running yellow text over a blue background, there will be a limited number of colors in the image. The result will probably be smaller as a GIF and may actually be represented better that way (there is no generation of artifacts that would happen with a JPEG). However, color photographs will be less likely to present well as GIF images. GIF cannot represent most of the colors in a common color photograph, so it may prove to be a bad choice for normal photographic images.

## Web Image Resolution

In general, the resolution of all images saved for on-screen viewing should be set to between 72 and 96 ppi, regardless of file type. This is true for web images as well as those that are to be used in video applications. The reason for this is that 72–96 ppi matches the common range for projection on a monitor. There may be exceptions (such as HDTV, high-definition television), but the 72–96 ppi range will cover most computer applications and will give you a good representation of the size that graphics will appear on most other computers.

On screens with higher definition, web images appear smaller; the image information is used up over a smaller area, rather than projecting the existing information at a higher resolution. The result is that images fit the resolution of the display automatically, rather than being used at a fixed size as in print.

## Saving for the Web

With the Save For Web command, Photoshop Elements gives you the option to compare two versions of the image, each using a different optimization method for compression and dithering. This option enables you to make a visual comparison between the original and the saved result before saving. In this way, you can select the smallest image file that still maintains the image quality you need. You can use the Save or Save As commands to create your web images, but you will have to do it without previews.

The Save For Web dialog box offers several combinations for comparing and optimizing images to be saved for Web use. Options include the following:

- File type
- Compression
- Resizing

- Animation controls
- Browser preview
- View size
- Download rates

This is a very powerful feature for making the most of your web images by making the least out of their file size.

The Preview panel of the dialog box enables you to make comparisons to the original uncompressed version of the file. This will display the name and size of the original file, and the current file type, saved size, compression and approximate load time of the file that would be saved if changes were accepted. Neither image view can be edited or altered directly, but you can zoom in and move the canvas to look at different areas by using Zoom and the Hand tool. The previews for the saved image will alter with changes you make in the options.

The Preset panel of the dialog box enables you to select a preset optimization type from the Preset drop-down list or enter your own settings (Custom). Once the file format is selected, options appropriate to that file type will display.

The Image Size panel offers options for resizing the image being saved. The options are much like those in the Image Size dialog box (Image → Resize → Image Size), but the options are more limited, although more apropos for web-image size changes. Dimensions are changed in pixels only, and can be changed by percentage or dimension.

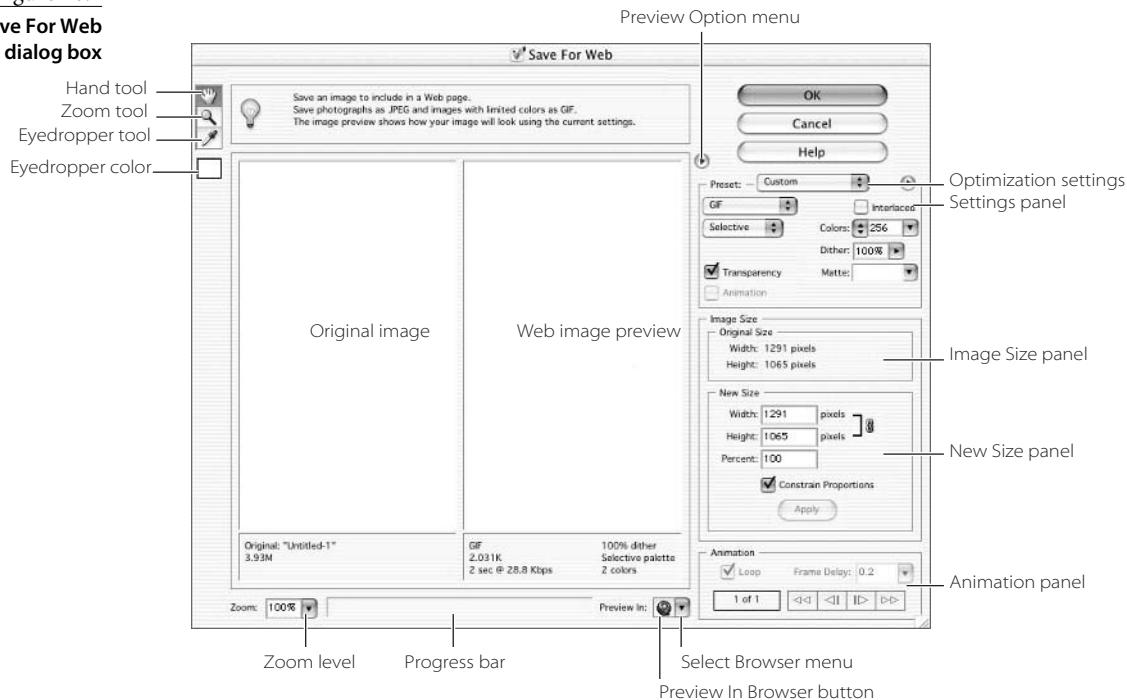
You can view the image directly in different browsers by clicking the Preview In Browser button. The image is opened in the selected browser, and image statistics are included in the preview. This enables you to see exactly how a specific browser displays an image.

Use the following steps to save your images for the Web by using the Save For Web command:

1. Choose File → Save For Web. The Save For Web dialog box is displayed with a preview of the current image and the most recently used save options (see Figure 10.1).
2. Select optimization settings for the image, and then consider options for file type and compression. Each time you change any of the settings for optimization, look at the preview to be sure the change produces an acceptable result.
3. When the optimized version is acceptable, click the OK button. This accepts the settings and opens the Save Optimized As dialog box.
4. Choose a name for the file to be saved—be sure to use a different name than the original to avoid overwriting. Choose a location and click OK to save.



Figure 10.1  
The Save For Web dialog box



## Basic Guidelines for Web Design

Although there is no right or wrong, there is better or worse in web page design. Better is effective, and worse turns the visitor away. A few simple precautions can help limit the potential for design problems. Use these guidelines as a checklist to keep within a safety zone for your design. Of course, you can bend and break these guidelines, but they should help steer you in the right direction.

### Minimize Image Size

You should strive to create the smallest possible files when creating images for the Web while still maintaining image quality. Smaller files load more quickly into a browser, and therefore allow faster browsing of your web pages. Regrettably, there is a trade-off in consideration of quality when shrinking file size.

The size of your image file is a matter of numbers. The more information an image file has to carry, the larger the file will have to be. By reducing the pixel dimension to the minimum size (reducing the physical dimension), the image will be at its minimum effective size. By reducing the size further using compression (in the case of JPEG images), or

reducing the number of colors (in the case of GIF images), images will be as small as possible and will transfer more quickly.

Following these guidelines will help keep your pages lithe and effective in design, and they will be better apt to effectively transmit your content.

- Crop images as tightly as possible to keep file sizes small. If you need extra space around the image, it is better to accomplish that with HTML code.
- Make images the exact pixel size that you want them to appear.
- Use 72 dpi for the final resolution. This will show you the effective maximum size of the image (viewed at 100 percent).
- In GIF images, reduce the number of colors as much as possible without distorting the image.
- Use JPEG format for images with more than 256 colors.
- Crop animation tightly to the area of motion. Keep the number of animation frames (layers) to a minimum, and use animation sparingly—or eliminate it.
- Keep rollover states to a minimum by using only the states you really need—every image state you use needs to preload, and that takes more time.
- Use repeating images on your pages to lower the number of elements that have to load.

## Minimize Web Page Downloads

Having some general targets for code on your web pages can improve the look and speed of the pages. While you won't do this directly in Photoshop Elements, the following list is good to keep in mind while implementing your images:

**Remove comments and other empty, unnecessary code from HTML.** Any unnecessary code, including blank spaces, adds time to loading pages—even if it seems harmless.

**Use short filenames and simple directory structures.** A bulky directory structure, with extra layers and long names, can add unnecessary code because nested files must be renamed for each link. Use relative links, where possible.

**Keep the total size of your entire page below 150 KB—including images.** Keep it much lower if possible. Lots of people have improved their connectivity these days, but designing for the high end leaves much of the market behind.

**Use a limited number of colors.** Three to five colors will usually do. This helps maintain a unified look and can keep the design from becoming too busy. Another good reason to limit colors in graphics is to keep their file size tiny.

**Sketch out the page before you make it.** Knowing what you want will help you cut corners in creating the elements that go with it. This can keep the pages small in file size (KB) and speed the creation process.

**Design pages that can be viewed with little scrolling.** You may have a lot to say or even a very interesting article to represent, but dividing it into parts will work better on the Web and may be more intriguing for those with shorter attention spans.

**Use simple HTML and GIF or JPEG images.** Don't depend on browser plug-ins to deliver effects. Standard practice should *not* be to design with the newest standard browsers as a target. There are many cool tools available for creating amazing websites, but the simple fact is that when someone has to download a plug-in to see your page, you risk that they will miss the effect—and if so it is wasted.

**Create sites offline and test your pages before and after they are live.** You might get everything working fine offline and then when you set it up you might forget something or a link might be valid only within your directory structure. Always test your pages with as many browser programs as possible, at least the two most popular ones. If possible, test your pages on different computers and different operating systems.

**Create page designs at a browser-friendly size.** Designing for a 21" monitor makes assumptions that are probably unfounded about your visitors. If a page can't be viewed easily on a 17" monitor, chances are that many visitors will have problems. Some people still use 15" monitors and low resolution.

**Break up pages at logical points.** Don't cram so much on a page that it takes forever to scroll through. Keep pages small so loading is quick, and add links to navigate to organized information.

**Make navigation simple and obvious.** There is nothing worse than sitting on a page and not knowing how to get to the next step or where to go—or if there is more to get to. Good design should play a part in simplifying both the information and access to it.

**Choose common fonts for the page itself and be aware of potential for reflow.** Fonts used in page code (not in images) should be common, or you risk substitution. Fancy type should be set as images in Elements rather than hoping your visitors have your fonts.

## Inserting Images in HTML

The following is a terribly short primer covering just the basics for those who have never tried to implement images on the Web. If you have already used the Web to display your images, you might want to hop over this section and move on to "Creating Rollovers."

To place your images into web pages, you have to complete several tasks beyond simply creating the right images. Online services exist that will help you display your images, but they have simplified the way you display your images by automating the process and doing the behind-the-scenes work for you. You may want better control of what appears on your site, and for that you'll have to delve into doing it yourself—unless you have a budget for design.

If you are going to be a do-it-yourselfer, you have to do the following:

1. Secure a web host (server) or hosting service.
2. Get a URL.
3. Create web pages to display your images.
4. Upload the web pages to the server.
5. Tell people the website is there.

The web host keeps your files at the ready so that when a visitor puts your address in their browser, the files can be accessed. You can buy your own web server (the most serious and expensive option), rent hosting, or engage in a free hosting service (free service usually comes at the expense of forced advertising in the form of banners or pop-up ads). Free services are excellent to practice with, and often can be all you need if you are just out to display your images casually. The more serious you get about the Web, the more serious you'll become about services.

Your URL is the web address, the widely recognized `http://etc.com`. Hosting services sometimes offer a web address along with the services (for example, popular services such as AOL and EarthLink offer free website space as part of their packages). This URL will be the address you “advertise” by telling people where to go. Web addresses don't necessarily have to be `.com` (for example, `.net` and `.org` are well used), and many of the less expensive (and free) options won't be a dedicated dot-com but a subdomain (such as `myname.exampleservice.com`). Whatever the web address, they all pretty much work the same.

To display an image in a browser, you could just send people links to images (`http://www.mywebaddress.com/myimage.jpg`), but this won't allow you to put any text or description with it. To add text (and other links and descriptions), you have to create at least one web page, and a website if there is to be more than a single page. To create a web page, you have to either write the code or use a program that will help write it for you (such as Microsoft FrontPage, Adobe GoLive, or Macromedia Dreamweaver). The code will be in *Hypertext Markup Language (HTML)*, which is a series of tags that describe some parameters so the browser knows what it is supposed to do to display the page.

One feature in Elements will take a folder of images and create a website for you to display those images. We'll look at the Web Photo Gallery feature in a moment.

An image is inserted into a page by using code that identifies the image and its location so the browser knows where to look. The simplest code for inserting an image on a web page is an image tag. Here is a sample of a simple web page with an image tag:

```
<html>
  <head>
    <title>My Image</title>
  </head>
  <body>
    
  </body>
</html>
```

To create this page, you would type it in exactly as you see here by using a text editor (such as WordPad, SimpleText, or Notepad), and save the file as text-only with an .html extension. The file would then be uploaded to the server, along with the image file. When the URL is entered in a browser anywhere in the world, the image will display (as long as the Internet connection is good and there are no limitations or restrictions to display).

The `html` tag shows where the code for the page starts and stops. The `head` tag usually contains some information about the page that mostly doesn't display—except for the information in the title tag, which appears in the title bar of the browser window. The information that appears between the body tags is what displays in the browser window. The key to displaying the image is the `img` tag, which tells the browser to go look for an image source in the directory called `myimage.jpg`. If you were to type “Here's a picture of me on summer vacation” above the `img` tag line, the text would appear in the browser window along with the image.

While there is a lot more to explore as far as web controls and controlling page layout, this is not a book on web design or HTML code. If the idea of using images on the Web is new to you, you may need a beginning book on web design—or feel free to ask questions on the Hidden Power of Photoshop Elements website and in the forum. Another great way to explore code is to view the page source by selecting the Source or View Source option in the web browser (often on the View menu). This option will show the page code, and reading the code can give you hints as to how effects were achieved in design.

The following sections jump to more advanced implementations of images. The easiest of these to implement directly from Elements is creating a web gallery.

## Making a Web Gallery

The Photoshop Elements Web Photo Gallery feature helps the user create a website to display images. The site will display all of the images initially as *thumbnails*—smaller versions of larger images. When you click a thumbnail, the larger version of that image will display.

In this way, visitors to your site can “walk through” your gallery and look at the images they want. Because the thumbnails are smaller versions of the original files, the thumbnails load more quickly than full versions would and speed your visitor through loading your pages.

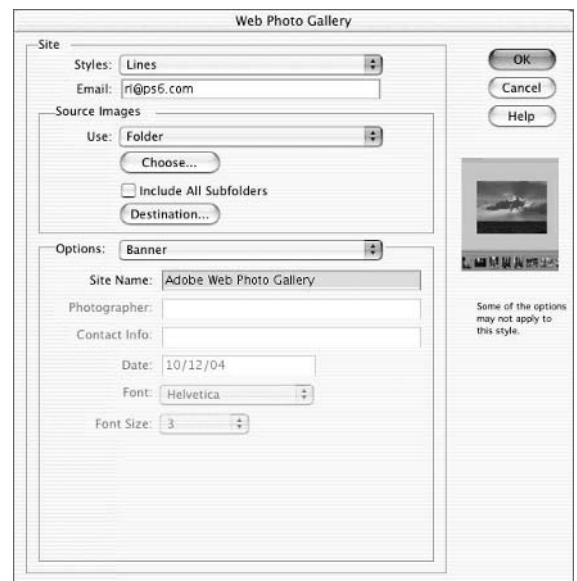
Elements will let you choose one of 15 predefined templates and will automatically create web pages to help you display selected images. The result is a reasonably sophisticated website—and the finished product can make you look like you know what you are doing, even if you have no idea.

All you do is set up the images you want to include, choose File → Create Web Photo Gallery (see Figure 10.2), select your options, and click OK. Elements takes care of the rest, automatically resizing and resaving the images from any Elements-friendly format into thumbnails and display JPEGs. When you are finished, you don’t have to look at a snippet of code or even know what happened; just post the content of the directory of files Elements created to your web host, and the images will be ready for everyone to see. To view the site after you upload to your web host, just enter the URL for the host in your web browser. As long as you copy all the files correctly and use the proper URL, you’ll see the result. When you do, you can send the same link to anyone you want to share the images with.

You may need some details on setup and selection of options in the Web Photo Gallery feature, so here is a step-by-step procedure to follow when creating your web gallery. You’ll start with some preparation outside of Elements before you jump in and make the gallery.

1. Gather the images you want to use on your photo gallery website by copying them into a single directory. Use a new directory, name the directory something distinct, and note the location. These files can be any file type that Elements will open. It may be best to use uncompressed RGB images in most cases.
2. Create a destination directory where Elements can save the processed website files. This should have a different name than the image directory. It is probably best to give this directory a name having something to do with the purpose of the thumbnail site.
3. In Elements, open the Adobe Web Photo Gallery. To do this on a Mac, choose Create Web Photo Gallery from the File menu. In Windows, from the Photo Editor or Organizer, click the Create button on the

Figure 10.2  
**The Create Web Photo Gallery dialog box**



menu bar to open the Creation Setup dialog box; then double-click Web Photo Gallery. You don't need to have any images open to kick off the process.

4. Choose a Style from the drop-down list. The dialog box shows a preview of what the site will look like, including a sample image.
5. On the Banner tab, enter your Title for the site (this appears on the browser window bar and on the top of the web page), Subtitle, and Email Address. Choose the Font and font Size. This information will be used to create the site and include an e-mail link so that visitors can send e-mail to you. There are only four font choices available because websites should use common fonts—your fonts won't necessarily display on someone else's machine. You are essentially choosing to display serif, sans serif, or monospaced type. Font size is not in points. These represent relative sizes. The larger the number, the larger the size of the display font.
6. Click the Browse button in the Destination panel, and locate the destination directory you created in step 2.
7. Click the Thumbnails tab. On this tab you will set up the display of the smaller images used as previews for the large images. Thumbnail Size assigns the size that thumbnail images will display. Font and font Size specifications are applied to the thumbnail captions. Check boxes for Filename, Caption, and Date note what you want included in the thumbnail display captions.

The caption is taken from the Description that was previously entered for each file, which is stored using the File Info dialog box (File → File Info). If no file information was entered, nothing will show for the caption.

8. Click the Large Photos tab. Here you will define the parameters for resizing your large photos, quality of the resizing, and captions. Check the Resize check box if you have images of varying size that you want Elements to adjust for you, and then specify the size that you want them all to be. Note that resampling will occur for images that are not the size you select.
9. Click the Custom Colors tab. This enables you to select colors for the web page background (Background), the banner text (Banner), body text (Text), and links (Link, Active Link, and Visited Link). Change the colors by clicking the swatch to open the Color Picker. Active Link specifies the color for the frame and the name of the thumbnail that is currently displayed (for templates that show thumbnails and large images at the same time). Link shows the frame and text color for any link that has not been visited (clicked); this includes the e-mail address. Visited Link will be the frame and text color for links that have been used by the visitor.

10. In the Photos panel, click the Add button to add images to the gallery. These can be added by using the Photo Browser, by using the Entire Catalog, the Photo Bin (open images), by Collection or by Tag. See Adobe instructions for working with the Organizer for more on how to manage your photos. Click the check boxes for images you want to include; then click OK to accept the changes and close the Add Photos dialog box. The photos you selected will appear in the Photos panel of the Adobe Web Gallery dialog box.
11. Click Save to create your gallery.

When you have completed the process of creating your web gallery, you can preview your site by opening the `index.htm` or `index.html` file with your favorite web browser. To properly upload the files to a web host, upload all the files from the directory (do not include the directory, or you will have to adjust the URL linking).

The resizing process is automated, so resizing can cause blurring and damage to images because of resampling and compression. Be sure the target directory does not contain your original images, or you risk saving the resized images on top of the originals.

## Creating Slices from a Whole Image

If you have traveled the Web at all, you have probably seen examples of images that load in parts. These images are made from the original image cut up into smaller sections known as *slices*. The sliced sections of the image are held together like pieces of a very simple puzzle by the HTML code. When the web page is displayed, the code tells the web browser how to display the image parts, and they are arranged so that they show up in the right order. When handled correctly, the image displays just as if it were whole.

There are some good reasons to divide an image into parts by using slices. First, if an image is extremely large and takes a long time to load, the delay might cause a browser to look like it has lost a connection. The person visiting the page might wait a long time before anything starts happening and may get the idea that the page is missing, broken, or corrupted. Using the image as arranged slices enables portions of the image to begin appearing on the screen so the visitor at least has the sense that something is happening on the page.

A better reason to cut up a graphic is so that you can make parts of the image into links and rollovers (we'll look at rollovers in the next section). Cutting an image into portions lets you work with the pieces of the web image as separate parts. You can then define any behavior each part might have separately—similar to what happens when you isolate image areas by selection, masking, or layering. You can use slices to help save load time by deploying your images intelligently.





## Cutting the Slices

Slices must be rectangular, and they have to be pretty accurately cut to make it easier to fit them back together. To make accurately sized cuts, you could use grids or the Marquee tool, but one of the most flexible and easy-to-use tools for measuring are Guides. Guides enable you to set custom markers in your image to help define the shape of your slices.

Guides aren't provided with Elements, and a slice tool isn't either. However, Hidden Power tools can help you along by giving you access to guides and automating the process of cutting out and saving slices.

1. Open the image you want to slice. See Figure 10.3 for the image used in this example.
2. Decide how you want to cut up the image. Sketch a diagram of the slices (see Figure 10.4) so that reassembling the image will be easier. No slices should overlap, and all should be rectangles. Number the slices in the order that you will cut them up, from left to

Figure 10.3

This image shows a simple list of web page button links that might be used on your website.



right and from top to bottom. The simpler you keep the pattern, the easier your job will be later. This sketch can be done in Elements on another layer if you'd like. If you create the sketch in Elements, be sure to shut off the view for the sketch layer when cutting your image into slices to keep sketch lines from being included in the slices.

3. Place guides on the image to reflect the grid created by your sketch. To place a guide, double-click the Make Guide Hidden Power tool in the PowerTools2 category of Effects. Enter the pixel position for placement of the guide; you can move the guides with the Move tool. Keep placing guides until the slices you need to make are all outlined with the grid. Do not place any guides that you will not be using (delete any unused guides), but be sure that a guide aligns with every side of every slice. Some guides will overlay other slices, and that's okay (see Figure 10.5). Save your image with the slice guides by using a different name.

If you choose the Move tool (press M on the keyboard), you can click on a guide and drag it to change its position. Guides can be deleted by double-clicking them, again, with the Move tool selected. They can also be dragged off the image by pulling them over the rulers. Manual positioning may come in handy for fine-tuning the position of the guides on your image before you start slicing.

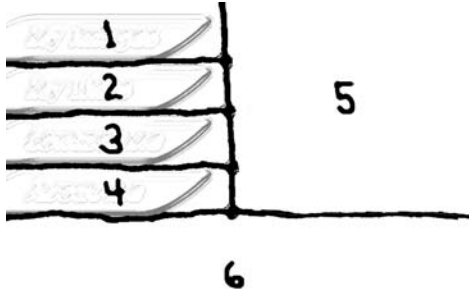


Figure 10.4

This rough sketch shows six slices.

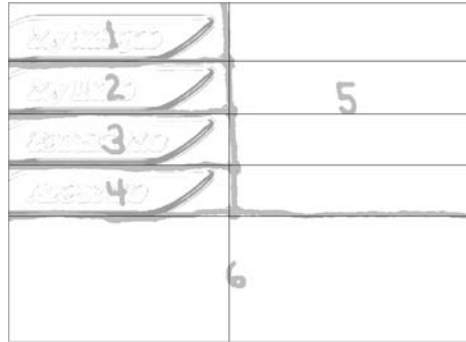


Figure 10.5

Guides placed over your image will create a grid that you will use to cut up the slices.

4. Choose the Marquee tool and drag a selection from one corner of your first slice (for example, the upper left) to the diagonally opposite corner (for example, the lower right), making sure the selection snaps to (automatically aligns with) the guides. The Snap To option for the guides is on by default; to shut it off temporarily, press the Control key on Mac, or right-click on Windows.
5. Crop the image (Image → Crop). This cuts away all of the image except the slice you are currently creating (don't worry, we'll bring the rest back in a moment).
6. Save the slice by using File → Save For Web. You will be able to choose different settings for each slice, if desired (including animation and rollover states as described in the sections that follow). Save each slice with a distinct name according to the slice number (such as slice1, slice2, and so forth, according to your sketch) and save them to a directory you'll use just for that set of slices. Be sure to name the files correctly, or you'll have trouble putting them together later. You may want to enter the filenames for the slices on the diagram.
7. Jump back two steps in the file history by clicking the appropriate step in the Undo History palette. The step you click will be just *before* Rectangular Marquee, near the bottom of the history. If you have followed these steps exactly, the step will be called New Guide, or Drag Guide if you moved it into position. This will return the image to how it was after step 3.
8. Repeat steps 4, 5, 6, and 7 until all the slices are created according to the sketch you made in step 2.

The Save Slice Hidden Power tool will do steps 5, 6, and 7 for you. Once you've used the Marquee tool to select an area, just double-click Save Slice in the PowerTools2 category of Effects to crop and save it as its own image. (You will still have to name the files appropriately.) The guides in the image will help keep your selections accurate so that the slices you create will all fit together when they are reassembled in a web browser.

## Positioning the Slices

Once you finish the previous steps, you will have all the slices you need, but they will be a hodgepodge of separate files and you will have to create the HTML to reassemble them properly.

Before you turn to creating the HTML, count the number of image rows (horizontal) and columns (vertical) you have created by using the guides in the image. This information will be important in helping you create the HTML easily.

The first step in assembling your images is creating an image table to place them in using HTML code. A table can create an array of rectangles to fit your images into, so you can arrange the way they appear for your visitor. To create your image table, you can open up a text processor (such as Notepad or TextEdit) and then use the sketch you made as a reference for creating the code. This table will tell the browser how to reconstruct the image in the original order and layout. The table is created by placing table tags in the HTML to define where the code for the table starts and ends. You insert td (table data) tags that represent slice columns and tr (table row) tags to represent slice rows.



Use the following steps to complete the code for the preceding example. At each stage, the code you will type is bold-faced so you can pick it out from what you've already done.

1. Type in the following code exactly as you see it. This is the basic code to use to create your table. (The `slicetext.html` file on the CD contains this starting code if you don't feel like typing it.) This sample HTML contains a table with one row and one column (one set of tr and td tags):

```
<html>
<head>
  <title>My Sliced Image</title>
</head>
<body>
  <table border=0 cellspacing=0 cellpadding=0>
    <tr><td></td></tr>
  </table>
</body>
</html>
```

- Count the columns in your image and add a set of tags for each column to that line in the code (see Figure 10.6). Just count the slice columns (vertical image columns) made by the guides, and ignore the images. To add the code, highlight the column tags (`<td></td>`), copy them, and paste them so that there are as many tag sets as you have image columns. The following sample code shows what this would look like if you had two columns, as in the example image:

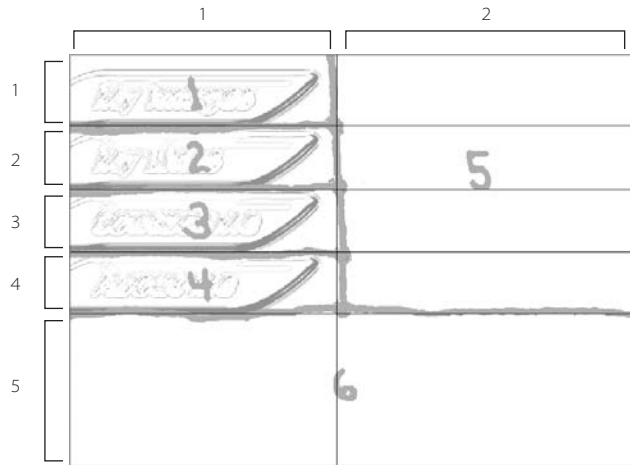
```
<html>
  <head>
    <title>My Sliced Image</title>
  </head>
  <body>
    <table border=0 cellspacing=0 cellpadding=0>
      <tr><td></td><td></td></tr>
    </table>
  </body>
</html>
```

- Count the number of rows in your image and add lines to the table code to reflect that number. Just count the horizontal image rows made by the guides (see the example in Figure 10.6), and ignore the images. To add the code, highlight the row code (from `<tr>` to `</tr>`, the tags and everything inside them), copy, and then paste that code until there are as many sets of row tags as you have counted image rows. Here's what the code would look like if you had five rows (and two columns), as in the sample image:

```
<html>
  <head>
    <title>My Sliced Image</title>
  </head>
  <body>
    <table border=0 cellspacing=0 cellpadding=0>
      <tr><td></td><td></td></tr>
      <tr><td></td><td></td></tr>
      <tr><td></td><td></td></tr>
      <tr><td></td><td></td></tr>
      <tr><td></td><td></td></tr>
    </table>
  </body>
</html>
```

Figure 10.6

Count the rows and columns according to the number of guides you place.

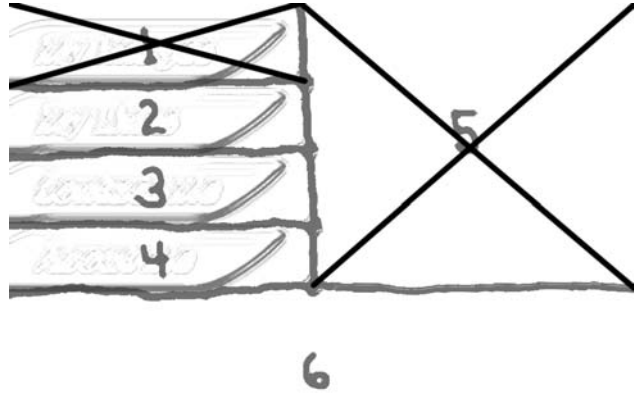


4. Look at the first row on your diagram, and note all the images that are partially or entirely in that row. Note the filenames. Enter the image reference for the first slice (counted left to right) in the code between the sets of `td` tags. This is done with a single `img` (image) tag, with the `src` (source) attribute providing the filename of the image. Enter the second image in the second set of tags. Continue doing this until all the images in the row are used. In the example, there are two images: `slice1.jpg` and `slice5.jpg`. The result would look like the code here:

```
<html>
<head>
  <title>My Sliced Image</title>
</head>
<body>
  <table border=0 cellspacing=0 cellpadding=0>
    <tr><td></td>
      <td></td></tr>
    <tr><td></td><td></td></tr>
    <tr><td></td><td></td></tr>
    <tr><td></td><td></td></tr>
    <tr><td></td><td></td></tr>
  </table>
</body>
</html>
```

5. On your diagram, cross out the slice images that were used in the previous step (see Figure 10.7). You need to reference each image only once in the table, and this will serve as your reference that an image has been used.

6. If there are leftover `td` tags in the line of code that represents the slice row (`<td></td>` sets with nothing in them), delete the extra tags.
7. For each image in the current row, count the number of image rows and columns that the slice covers. If there is more than one row and/or column, go to step 8; otherwise, go to step 9.
8. Enter the number of rows and columns for each image by adding code that tells how many rows and columns the image belongs to. This will be done using span attributes (`colspan` for spanning columns, `rowspan` for spanning rows). You have to add this value to the tags only if the image covers more than one column or row:



- a. For columns, add `colspan=y` to the `td` tag, where `y` equals the number of columns that the image covers.
- b. For rows, add `rowspan=x` to the `td` tag, where `x` equals the number of rows that the image covers. Delete `y <td></td>` pairs in each line of code below the current line for `x - 1` number of rows. You subtract one because the current row you are on counts as one, and you don't want to count it twice.

For example, slice 1 from the example covers only the first row and first column, so no tags are added. Slice 5 covers the second column only, but is part of four rows (rows 1–4). For the `slice5.jpg`, you would have to add a tag for the columns it spans: `colspan=4`. The resulting code would look like this:

```
<html>
  <head>
    <title>My Sliced Image</title>
  </head>
  <body>
    <table border=0 cellspacing=0 cellpadding=0>
      <tr><td></td>
        <td rowspan=4></td></tr>
      <tr><td></td></tr>
      <tr><td></td></tr>
      <tr><td></td><td></td></tr>
    </table>
  </body>
</html>
```

Figure 10.7

**Crossing out the slices you have used will help you keep count in the rows and will make sure you use images only once in each table.**

9. Repeat steps 4 to 8 for all your slices. In step 4, when counting the images in the row, don't include any images that you crossed out. An image should be included in the row count only if the upper-left corner of the slice is in the row.
10. When you have completed the code, save the file with a distinct filename (for example, `myslicedimage.html`) in the same directory where you saved the image slices. Your code will vary as you cut up images in different configurations, but for this example it should look like the following:

```
<html>
<head>
  <title>My Sliced Image</title>
</head>
<body>
  <table border=0 cellspacing=0 cellpadding=0>
    <tr><td></td>
      <td rowspan=4></td>
    </tr>
    <tr><td></td></tr>
    <tr><td></td></tr>
    <tr><td></td></tr>
    <tr><td colspan=2></td></tr>
  </table>
</body>
</html>
```

If you open your web browser and load the HTML file, your image should appear whole. If it doesn't, something has gone wrong, and you'll need to locate the problem—it will most likely be caused by a code error or by saving the file in the wrong folder. Images must be saved in the same folder as the HTML file in this example (not in a subfolder).

If you wanted to place the images in a subfolder, the folder has to be named in the `src` reference. For example, if you placed your slices in a folder named `Images`, the `src` reference would look like this for `slice1.jpg` in the code: `src="Images/slice1.jpg"`. A forward slash separates the files and folders.

If your image loads successfully, you can use this image table in other web pages where you want to use this sliced image. All you have to do is copy everything between and including the `table` tags and paste it into another web page. Be sure you copy the images to the same directory/folder as the new HTML file.

You can probably see that keeping the slices simple can help ease putting the image back together and can simplify tracking the parts as well.

## Creating Rollovers

*Rollovers* are often used as buttons on a web page to help the visitor realize that a section of an image is a web page link. Rollovers appear to change depending on the action of the visitor and where they place their cursor when they view your web page. The term *rollover* comes from the concept that when you roll the mouse to move the cursor over the image, the position of the cursor prompts the browser to change images, interactively. For example, when a cursor is rolled over a button image, the image can appear to highlight in some way, suggesting that the area of the page is live; if you click the button, something else will happen (so long as the right references are made in the code). Creating a rollover requires some JavaScript, which tells the browser what to do. Rollover sections of an image are often used in combination with slices so that you can create buttons or simple highlighting, or reveal additional information.

You can do more than simple highlighting with rollovers, such as creating complex interactive events that can be used for games or for more complex control in display of page information. Six potential actions, known as *states*, exist for any rollover: Normal, Over, Click, Down, Up, and Out. They describe actions that the visitor can take with the mouse (or other input device) to affect the rollover; these states are defined in Table 10.1 and illustrated in Figure 10.8.

When creating a rollover, you don't need to use all the states. In fact, a rollover could technically have only one state—although that isn't much of a rollover if it does. Usually, you will want to have at least one state in addition to Normal. Only one image state of each kind can exist in the rollover, and the fewer states you use, the better. Fewer states require less loading time because each state generates more code and uses more images. If you are trying to create a mouse-click event, it is best to use either the Down and Up combination or Click, not all three or other combinations thereof.

There are more complex behaviors that you can accomplish with rollovers. For example, you can use rollovers creatively to change page contents, and you can even develop simple puzzles and games by hiding and showing areas of the screen depending on where the visitor's cursor is. These more-complicated rollovers are put together by using different slices to trigger different views. Perhaps we can talk about those on the website and in the newsletter, where there is more opportunity for demonstration. For now it should suffice to show you a basic rollover.



Figure 10.8

This series shows the states as they were created in order from top to bottom. Normal and Out are the same because you usually will want to return to the original state upon moving out of the image area so that everything is as it was.



To create a rollover, you have to create the separate image states that you want to use and then insert the JavaScript code that will exchange the two images.

Table 10.1  
Rollover States

STATE	DESCRIPTION	JAVA COMMAND
Normal	The initial state of the image when the page loads.	
Over	The state of the image when the mouse cursor is hovering over the image area.	onMouseOver
Click	The state of the image when the mouse button is clicked while the cursor is hovering over the image area. Used instead of a Down and Up combination.	onClick
Down	The state of the image when the mouse button is clicked and held down while the cursor is hovering over the image area. Used in combination with Up as one of two components in an option, instead of Click.	onMouseDown
Up	The state of the image when the mouse button is released while the cursor is hovering over the image area. Used in combination with Down as one of two components in an option, instead of Click.	onMouseUp
Out	The state of the image when the mouse exits the image area.	onMouseOut

In a simple rollover, all you need is a snippet of Javascript to define the rollover function, and a few basic Javascript commands, as in the following example:

1. Open a new text file and type the following to start the page:

```
<html>
  <head>
    <title>Roll Over</title>
  </head>
  <body>
  </body>
</html>
```

2. Add the JavaScript code to define the swap function and use a different type of image reference. The script goes within the head tag. It defines parameters so your browser knows what to do later when it encounters the onMouse and swap commands. To enter the script, type the following:

```
<html>
  <head>
    <title>Roll Over</title>
    <script language="JavaScript1.2">
      <!--
        function swap(img, changeto)
        {document.images[img].src = changeto;}
      <!-->
    </script>
  </head>
  <body>
  </body>
</html>
```

3. Add a `onMouseOver` and `onMouseOut` swap commands, and a named image reference. When the browser encounters the swap command attached to an action (for example, `onMouse`), it knows to change an image. It can change the current image or another one on the page, as long as they are named. Adding both commands will change the images when the cursor rolls over, and then again back to the original a when the cursor rolls off the area. The image will start out as `1.gif` and change to `2.gif` when the mouse cursor rolls over. It will change back to `1.gif` when the mouse cursor rolls out.

```
<html>
  <head>
    <title>Roll Over</title>
    <script language="JavaScript1.2">
      <!--
        function swap(img, changeto)
          {document.images[img].src = changeto;}
      //-->
    </script>
  </head>
  <body>
    <a href="#" onMouseOver="swap('imagenam', '2.gif');"
      onMouseOut="swap('imagenam', '1.gif');">
      
    </a>
  </body>
</html>
```

4. To add other images to other rollovers, add unique image names. This shows a page with two images, `1.gif` and `3.gif`. When you roll over `1.gif`, it will change to `2.gif`, and when you roll out, it will switch back again to `1.gif`. Roll over `3.gif`, and it will change to `4.gif`, and back to `3.gif` again when you roll out.

```
<html>
  <head>
    <title>Roll Over</title>
    <script language="JavaScript1.2">
      <!--
        function swap(img, changeto)
          {document.images[img].src = changeto;}
      //-->
    </script>
  </head>
  <body>
    <a href="#" onMouseOver="swap('imagenam', '2.gif');"
      onMouseOut="swap('imagenam', '1.gif');">
      
    </a>
  </body>
</html>
```

```

</a>
<a href="#" onMouseOver="swap('imagenam2','4.gif');"
    onMouseOut="swap('imagenam2','3.gif');">
    
</a>
</body>
</html>

```

5. To make the rollover image into a link, just change the octothorp (#) in the hyper-reference (href) to the URL you want to link to:

```

<html>
<head>
<title>Roll Over</title>
<script language="JavaScript1.2">
<!--
    function swap(img, changeto)
    {document.images[img].src = changeto;}
//-->
</script>
</head>
<body>
<a href="page1.htm" onMouseOver="swap('imagenam','2.gif');"
    onMouseOut="swap('imagenam','1.gif');">
    
</a>
<a href="page2.htm" onMouseOver="swap('imagenam2','4.gif');"
    onMouseOut="swap('imagenam2','3.gif');">
    
</a>
</body>
</html>

```

6. You can improve the performance of rollovers by preloading the images. This will place the images in the browser memory so that it doesn't have to go out and look for them during the behavior. If it has to go search, there can be a delay in the image change and it'll look clunky or perhaps be missed entirely if the visitor rolls away quickly before the image loads. You'll need to add a `preload` function in the script, and reference that `preload` in the body tag so the browser knows to execute it. It looks like this:

```

<html>
<head>
<title>Roll Over</title>

```

```

<script language="JavaScript1.2">
<!--
    function swap(img, changeto)
    {document.images[img].src = changeto;}

    function preload()
    {image1 = new Image();
     image1.src = "1.gif";
     image2 = new Image();
     image2.src = "2.gif";
     image3 = new Image();
     image3.src = "3.gif";
     image4 = new Image();
     image4.src = "4.gif";}

    //-->
</script>
</head>
<body onLoad="preload('image1','image2','image3','image4')">
  <a href="page1.htm" onMouseOver="swap('imagenam', '2.gif');"
    onMouseOut="swap('imagenam', '1.gif');">
    
  </a>
  <a href="page2.htm" onMouseOver="swap('imagenam2', '4.gif');"
    onMouseOut="swap('imagenam2', '3.gif');">
    
  </a>
</body>
</html>

```

To add more images to the preload, insert additional images in the JavaScript in the header and name them in the preload. You can substitute any name for the image variable names, but they have to match in the JavaScript and the preload or the reference won't work. There are more complicated ways to do this.

Many websites offer free code and further instructions on this type of JavaScripting.

This is just the beginning when it comes to using HTML and JavaScript with your images on the Web. These tips on using slices and rollovers are meant to start you on your way. If you have questions, feel free to bring them up in the forum (<http://hiddenelements.com/forum>).

## Creating Animations

Movement is an advantage unique to the web medium for most graphic artists not working in video or TV applications. Creating effects requires timing and consideration of space and motion that offers different challenges than still art. Animations can be created in Photoshop Elements by using the GIF format, image layers, and the animation export check box in the Save For Web dialog box.

Animations work in an image by displaying a series of changes that appear one after the other to make objects seem to be moving. If you've ever seen a flip book—where you flip through the pages and an object seems to move—that is really the same idea. The same theory is used in movies. Changes in position are recorded as steps in sequences that are then displayed in frames—separate images captured on film. Usually many frames are captured per second (for animation, 12 to 16 or more). The purpose is to show the images so quickly that people can't distinguish between the separate frames, so the objects give the appearance of fluid motion. In capturing images for movies, many images are captured of objects that are already moving and the images are simply played back in a timed sequence to re-create the motion. In creating animation, images are planned to create the illusion of motion.

A specific number of frames is used to plan movement and timing. For example, if it takes a cartoon character 3 seconds to walk across the screen at 16 frames per second, 48 separate drawings would have to be created to complete the movement. These drawings would represent the sequential movement of the character in 16ths of a second. The more frames played back per second, the tighter and smoother the resulting motion appears in the sequences.

GIF animation works in a similar way to cartoon animation, movies, or flip books. In creating GIF animations, you need to create a series of sequential movements that accomplish the illusion of movement. You can control the timing of the frames, the series of events, and the speed of the movement. The trick is to plan a smooth motion and to balance that against the number of frames you use.

Planning the motion requires deciding how long you want the motion to last, how smooth you want it to be, and what distance or space you want the movement to cover. It can also require planning for the limitations of your medium. As with most other web concerns, you need to make your images as small as possible while still getting the results you want. The more frames you use, the larger the resulting file will be, and the longer the animation will take to download. So you will want to create your animation simply and effectively. This usually means reducing the number of frames to only the frames that are essential.

Color is another limitation. Since animation is supported only in GIF files exported from Elements, you will have to export files with a maximum of 256 colors. This may lead you toward using subjects with limited color to obtain the best results, or planning that includes using a limited color scheme.

Although animations are cool, and can be fun and challenging to create, use animations with purpose on a web page. If you just include animations in your pages willy-nilly because you can or because they're "neat," you may not be doing it for the best reasons. Some animations can be distracting instead of useful and might encumber and defeat the purpose of your site.

## Planning Your Animation

To create an animation, it is best to approach the whole process tactically. To save time and effort, knowing what your goal is from the outset will help save steps.

Use the following steps to plan your animation and develop parts of the motion. Very simple animations such as blinking eyes or flashing lights that appear to travel around a sign (often called a marquee) will go through these same steps, but the considerations will be simple, and may not require in-depth planning.

1. Decide what you want your animation to look like. It might require making sketches or taking notes to define exactly what you want the animation to do. Say you want a man to simply walk left to right on-screen. You can do this many ways, and with different perspectives, such as full body, or just shoes and ankles—or shoes alone. You could build your walking man with stiffly swinging legs, but a more complicated and accurate motion will show the knee bending, the heel of the shoe lifting to bend the toe, and then the toe straightening as the leg swings forward and straightens out again. The amount of detail you want to include is important to later planning steps.
2. Roughly break down the animation into separate movements, so that each change in direction or motion constitutes the end of one action and the beginning of the next. Itemize cyclical or repetitive motions that you can repeat. For example, a walking figure will take a step first with the right foot, then the left, and then repeat. You may be able to save "steps" by making the right-left cycle one time, and then repeat it as needed. See Figure 10.9.
3. Decide how many seconds you want each of the movements in the animation to last. For example, you might decide that each step should take 1 second. This calculation helps you determine the number of frames you will be able to include for all of the details you are interested in.
4. Determine the number of cycles required to complete your motion. Make a close approximation of the distances you plan to cover by using a linear or pixel measure for each movement. If the walking figure covers 100 pixels with each step, the animation is to cover your screen from left to right, and the animation is 800 pixels wide. You'll need to cover those 800 pixels. If each step takes 1 second, eight steps (four right-left cycles), will cover the distance in 8 seconds total.

Figure 10.9

This series of motions can be used to repeat multiple steps by simply repeating the series.



- 5. Decide how many frames you want to use—either for each movement or for the whole animation. This should not be an arbitrary selection, but should be based on the distance of the movement, how smooth you need it to be, and the detail you need to include.

Although using a high number of frames per second makes the motion smoother, it also increases the file size. More than 32 frames per second (fps) is overkill—especially for the Web. Fewer than 16 fps might make the action a little blocky and rough, depending on the action. You’ll want your web animation to fall in the 8 fps to 12 fps range at the very least if you are looking for smooth motion. You can use fewer frames and slower frame speeds (depending on what is happening), but doing so can make the animation chunky or hard to follow. Regretfully, you sometimes have to accept clunky as a trade-off to file size. Table 10.2 lists some frame rates and suggested uses. These rates consider continuous motion as the desired result.

While it may make for a clunky result, using 5 frames per second for the eight-step walking animation requires 40 frames to complete. Even that will lead to a large animation. You can see how higher frame rates become unwieldy—and pretty much become a burden to deal with.

You should be able to see from the complexity of this that it is beneficial to keep animation movements simple unless you are interested in spending a lot of time animating. The other side of this is that the more frames you use and the more time you spend, the less likely that the result will be a usable GIF animation. It might end up more suited for video or other applications, but that kind of application is not supported by Photoshop Elements—at least not directly.

FRAME RATE (FRAMES PER SECOND)	FRAME DELAY (SECONDS PER FRAME)	USE
1 or fewer	1 or more	Deliberate differentiation between frames; slide shows
2	0.5	Stop-action effects
5	0.2	Very chunky web animation
8	0.13	Chunky web animation
12	0.08	Minimum smooth web animation
16	0.06	Quality web animation; TV cartoon frame rate
24	0.04	Top-quality TV/cinema cartoon animation
32	0.03	Maximum move export rate; TV/cinema film quality

Table 10.2  
Typical Animation  
Frame Speeds



## Building Your Animation

Now that you've planned your animation, you can begin creating it. First you should create the animated parts or repetitive movements that will be part of the larger movements in the frames. Depending on the complexity of the scene you are animating, you might have to build many parts, and you might have to do it in separate images and combine them. You should animate constants or repetitive actions first, or smaller movements within larger ones; this will make it easier to combine elements into a larger movement. You might find it easiest to build a few common or frequently used elements first and then duplicate those as needed.

Once you have the image elements built, move them all into a single Photoshop Elements document and follow these steps:

1. Compile the animated image parts into corresponding frames, with each frame represented as a separate layer.
2. Stack the completed frames from the background to the front in the Layers palette. The Background layer will be the first frame of the animation; Elements will generate each frame in succession from the bottom of the stack on up.
3. Save the layered file in Photoshop native format (PSD). This will be your backup in case you need to come back to the animation and adjust elements that are not flattened.
4. With the image still open, choose Save For Web.
5. Choose GIF as the File Type under Settings, and set the GIF options as desired.
6. Click the Animation box under Settings. This will make the Animation panel available.
7. Preview the animation by clicking the Play button to move through the successive frames. This will help you to be sure you've layered the movement correctly. If necessary, cancel out of the save and rearrange the layers.
8. Set the frame speed and looping according to the speed of motion you had planned.
9. Save the animation by clicking OK.

The animated GIF can be viewed by loading the file into a browser, or the file can be viewed as part of a web page by using HTML code for placing a GIF, just as you would place any other GIF image. The animation will be a single file.

There are numerous options for working with animation to adjust the results. You can selectively apply changes to single frames, add and delete frames by adjusting the PSD that you saved, and then regenerate the GIF.

To edit a frame individually, select the frame by clicking it in the Layers palette. If you add or delete layers to edit, be aware that these will be added to or deleted from the frames if you export the animation again. You have to merge all changes to the frame you want to include them in so that they are not exported separately.

## Animating Image Elements

Animating elements requires attention to detail and an understanding of how motion is handled. For example, objects can accelerate, decelerate, move at constant speeds, turn, and so on, while you handle all the planning and execution of every movement. Here we'll look at how to make motion do what you want it to do.

### Acceleration, Deceleration, and Constant Speed

When an image element appears to move faster as it goes, that is called *acceleration*. It is the same thing that happens when you press down the gas pedal in your car to go faster. *Deceleration* is exactly the opposite—like putting on the brakes. A spinning top that is slowing down is an example of deceleration. *Constant speed* describes something moving that is not accelerating or decelerating but continues to move at the same pace.

Acceleration is created during an animation by increasing the movement or distance steadily between a series of frames. Decreasing movement steadily causes deceleration. Even movements between frames in a series will represent constant speed.

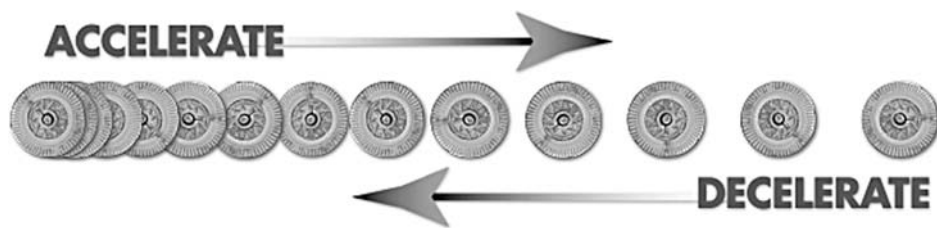
The effects can be calculated by using some plain old good sense. Say you want to give a stationary car an acceleration of 6 pixels per frame over 1 second of movement using 12 frames per second. By the 12th frame, that car would have to be moving at 72 pixels per frame ( $6 \times 12 = 72$ ). All you need to do is move the car 6 additional pixels with each movement: these movements would be 6, 12, 18, 24, 30, 36, 42, 48, 54, 60, 66, and 72 pixels for each successive frame. Figure 10.10 illustrates accelerating and decelerating movement. By the end of the 12th frame, the car will be moving at 864 pixels per second ( $72 \times 12$ , or the number of pixels per frame times the frames per second). To maintain that movement at that point, you would keep the incremental movement at 72 pixels per frame.

You can certainly get more complicated and more accurate than this by applying an acceleration rate according to a bell curve if you have a target. That is, acceleration will gradually become 6 pixels per frame (say, 0.5, 1.5, 3, 4.5, 5.5, and 6, rather than immediately hitting 6). However, we are looking for only a reasonable approximation at this point. The main thing to remember is that to make something move more quickly, the distance between where it is and where it was will be less than the distance between where it is and where it is going to be, and vice versa for deceleration. If you want a constant speed, you are maintaining the current movement: move in even increments. If you want to stop, duplicate the frame without moving any of the elements.

To elongate a pause in any action, simply duplicate a layer for the number of frames that you want the pause to occur. As long as the layers are not altered in any way, this layer addition will not contribute significantly to increasing the file size.

Figure 10.10

The figure shows an acceleration toward the right and a deceleration to the left. The tire steadily accelerates or decelerates by moving the object more or fewer pixels between layer frames.



### Compiling Animated Parts

As suggested in the steps earlier, you will have simple and complex movements in your animations. In addition, some motions that seem simple are actually complex. For example, a tire rolling is a simple form of a complex movement. Not only is the tire rotating, but it is also moving forward. To animate the tire correctly, you will have to show the rotation of the tire as it covers a distance, as well as moving the position of the tire. To get the right effects from complex movements, you should attack the parts separately. This is best illustrated by an example. We will build an animated banner for a web page, including walking shoes as an example of simple motion applied in a typical animation. We'll do the animation of the shoes only, and then discuss a few possibilities at the end.

The first task that you would normally do is create constants. *Constants* are any image elements—foreground or background—that will not change. For example, a constant might be a floor for the shoes to walk on. Once the constants are created, they can be duplicated to appear in every frame of the animation. We won't be starting with any constants in this example; there will be enough to keep track of with just the shoes, as simple as they may seem initially.

For the example, the animation will have to fit within the banner. I'm going to assume that 8 inches is a pretty safe width for display. The plan will be to use 5 frames per second, and to make each step last 1 second. Each frame has a duration of 0.2 seconds, and the total movement is 576 pixels (an 8-inch banner at 72 ppi). Each step will cover slightly less than 2 inches, or about 120 pixels.



The motion of the shoes is somewhat complex: one shoe goes from being at rest to full acceleration, then decelerates and stops again, and then the next shoe takes over and goes through the same cycle. The full cycle for steps including the right and left shoes will cover 10 frames. You could take these images yourself with a digital camera, but to save you some time and trouble, I have included the individual shoe images on the CD. To mimic the desired motion, the images of the shoe are provided in five stages for each shoe: pushing off, swinging up, swinging down, landing, and at rest. The motion will look like the shoes shown back in Figure 10.9, but it will be complicated by having both right and left

shoes. While the right shoe is moving, the left remains still; while the left moves, the right remains still. Because of their proximity, the shoes cross in front of (right) or behind (left) one another. You'll see how this can lead to a pretty complex series of image layers.

The easiest way to attack this animation is to build the right step motion and then the left step motion, and then combine them in alternating sequences. Once you have created the simple right and left steps and combined them, the rest of the motion is pretty simple: the shoes travel along in a straight line horizontally, repeating the same motion three more times. The set of steps that you create can easily be duplicated (we'll see how in a minute) and then repositioned for each repetition, saving an absolute ton of work.

Although I provided original images for each change in position for the shoes, there may be times when you will create motion by altering an original. When animation requires a transformation or resizing rather than a straight copy, you should not create subsequent steps from the previous one in order, as may seem natural. Always go back to the original, copy it, and then apply the change. If you don't, distortion will increase with each step. For example, if you have something rotating at 45 degrees per frame, Elements will have to distort the image at each step in the turn; each subsequent rotation will distort it even more. By the time the object is rotated the seventh time, distortion in detail of the rotating object may become apparent—just in time to cycle back to the original. This close comparison may make it evident that the images were not handled as well as they might have been. The best plan is to have originals for each position; but when that isn't possible, go with the best you can get and always rotate from the original.

To apply this plan to creation of the animation, use these suggested steps:

1. Make a new RGB image that is the size and resolution of the animation you will be creating. In this case, the image will be 576 pixels wide and 72 ppi. Make it 2 inches (144 pixels) tall and crop it down later. Name the image **Animation** in the New Image dialog box.
2. Open all 10 of the shoe images (provided on the Hidden Power CD) and duplicate them into the image created in step 1. When duplicating the shoe images, it is probably best to use Duplicate Layer so you can name the target layer. You can also duplicate the shoe images by dragging them with the Move tool from the source image to the image created in step 1. Name the layers according to the letter and number of the filename
3. Arrange the layers so that they are in order, right series and then left series, from the bottom up (see Figure 10.11). You will position the shoes in the layer after ordering the layers, so don't worry about where the shoes are positioned on the layer, yet.
4. Shut off the views for the left shoe and be sure all the views for the right shoe are on.

Figure 10.11

**The layers should simply be stacked in the Layers palette at this point, grouped by shoe (right or left).**

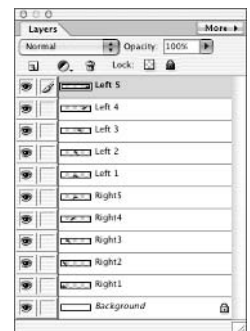


Figure 10.12

When all the layered images are set in place for one of the shoes, the result will look something like this when all the layers are showing.



5. Duplicate the Right 5 shoe layer and call it Right 0. Move the Right 0 layer to the bottom of the stack, just below Right 1. You want the movement to end with the shoe at rest, but you need to start the series considering the initial position of the shoe.
6. Position the shoes so they look somewhat like Figure 10.12. You may want to place a guide near the bottom to help you with the alignment of the shoes. You'll want Right 0 and Right 1 to be in just about the same horizontal position (match at the toe) and aligned on the bottom. Right 4 and Right 5 will be in the same position as each other horizontally (match at the heel) and aligned on the bottom, but about 120 pixels to the right of Right 0 and Right 1 (measured toe to toe). Right 2 will be closer to Right 1 than Right 3, suggesting acceleration between Right 2 and Right 3. Right 3 will be closer to Right 4 and 5 than Right 3, suggesting deceleration between Right 4 and Right 5.
7. Turn on views for the left layers and duplicate Left 5. Rename the duplicate **Left 0** and place it below the Left 1 layer.
8. Duplicate Left 5, name the copy **Left 0**, and then position the left shoes. You can either repeat the steps used for positioning the right shoes or use the Right shoes as a guide. The latter is probably easiest if you turn on the view for the same number of layers and align them. Alignment does not have to be perfect, but you'll want it to be pretty close. When you are satisfied that the layers are positioned, link them.
9. Choose the Move tool, click the image, hold down the Shift key, and slide the Left shoes to the right (they should all move in unison) until Left 0 is centered between Right 0 and Right 5. You can turn on the view for Right 0 and Right 5 and Left 0 to make the image less distracting. Be sure the Left 0 image remains linked to all the other Left images—they will move even though you can't see them. This will be the basic position for the alternation of the right and left steps.

With the basic movement created for each shoe, you have to create pairings of right and left shoes and combine them in layers. If you created the animation now, you'd see the right shoe move with no left on the screen, and then the left move with no right. The shoes will have to be in pairs at all times. We'll start with the shoes in a stationary position and then take a step with the right shoe. You should save the image at this point using a

name that will not be the same as the final one (such as *SeparateShoes.psd*). You may need to come back to this image for adjustments.

10. Duplicate the Left 0 layer, call the layer **Right-Left 0**, and then shut off the view for all layers except Right 0 and Right-Left 0.
11. Drag the Right-Left 0 layer directly below Right 0, activate Right 0, and then Merge Down. Shut off the view for Right-Left 0.
12. Repeat steps 10 and 11 five more times, naming the duplicate of Left 0 in sequence (**Right-Left 1**, **Right-Left 2**, **Right-Left 3**, **Right-Left 4**, and **Right-Left 5**) and dragging the duplicated layer each time just below the number pairing for the Right shoe. You should end up with 6 Right-Left layers numbered 0–6 (see Figure 10.13). When you get to Right 5, duplicate it before merging with Right-Left 5. You'll need the extra copy of the Right 5 layer for the Left-Right shoe series. Name the Right 5 copy **Right 0** and shut off the view.

These steps complete the right step, moving the shoe through the motion while the left shoe is stationary in the scene. Next, the left shoe needs to be animated. The position of the final frame for the right and left shoes is the position the shoes are in at the start of the left shoe movement.

13. Be sure that all the Left layers are linked. Then turn on the view for Left 0 and drag the left shoes so the Left 0 shoe is aligned with the left shoe on the Right-Left 5 layer. Then shut off the view for Right-Left 5.
14. Duplicate the Right 0 layer. The duplicate shoe should fall where the Right 0 layer is, directly between Left 0 and Left 5.
15. Throw out the Left 0 layer, and shut off the views for all layers except Right 0 Copy and Left 1.
16. Drag the Right 0 Copy layer to just above Left 1 in the layer stack. This places the right shoe visibly in front of the left.
17. Merge the Right 0 Copy with Left 1 and rename the layer **Left-Right 1**. Shut off the view for Left-Right 1.
18. Turn on the view for Left 2; then duplicate Right 0 and drag the Right 0 Copy above Left 2.
19. Merge the Right 0 Copy with Left 2 and rename the layer **Left-Right 2**. Shut off the view for Left-Right 2.
20. Repeat steps 18 and 19 by turning on the next layer in the series (Left 3, Left 4, and Left 5), duplicating Right 0, and dragging the Right 0 Copy layer above the next Left shoe in the series. Then merge and rename the resulting layer Left-Right and numbered according to the sequence (**Left-Right 3**, **Left-Right 4**, and **Left-Right 5**).

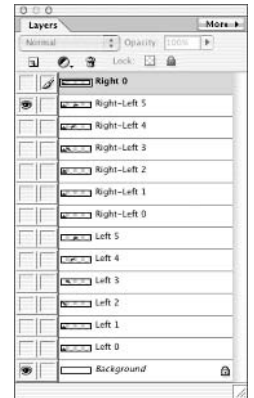
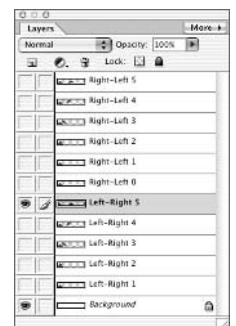


Figure 10.13  
After combining the Right layers with the Right-Left layers, your Layers palette should look like this.

Figure 10.14  
After combining the Right 0 copy layers with the Left layers, your Layers palette should look like this.



21. Throw out the Right 0 layer. At this point the layer stack should look like Figure 10.14.

The initial right-left left-right series is complete. You need to duplicate it three times and then align the duplicates to complete the step series. You could spend a long time duplicating those layers and realigning, but there is a little trick that lets you duplicate multiple layers to speed the process:

22. Create a new RGB image. Make it the same size as your animation image. Name it **Duplicator** in the New Image dialog box.
23. Activate the original image and position it so that you can see part of the Duplicator image window.
24. Link all of the Right-Left and Left-Right layers, choose the Move tool, click the Animation image, and hold the Shift key. Drag the cursor over the Duplicator image window and then release the mouse button. All the layers will copy to the Duplicator image—they will have the same layer names, and they will be linked. The shoes will be centered on the image.

Trying to drag from the Layers palette will not work. You need to drag from the image window to successfully copy multiple layers.

At this point, you have the step sets in the Duplicator and the Animation images. You will use the sets in the Duplicator to duplicate the sets of layers into the Animation as needed. This process saves you from having to duplicate the sets of layers one layer at a time.

25. Activate the topmost layer in the Duplicator image, and then switch to the Animation image and activate the topmost layer there. In both images this should be Left-Right 5. Activating the top layer ensures that the copies you make will stack on top of the other layers in the image.
26. Activate the Duplicator image and position the window so that you can see the Animation window below.
27. Click the image, hold the Shift key, and then drag the cursor from the Duplicator image to the Animation window.
28. Repeat steps 26 and 27 two more times.

You'll now have 44 layers in the Animation image. These will be four complete sets of the 11-step series.

29. Close the Duplicator window and don't bother saving it.
30. Turn off the visibility for all the layers.



31. Hold down the Shift key and click the Right-Left 3 layer in the Layers palette closest to the bottom of the stack. This displays the linkages in the Layers palette and you will see only Right-Left 3 in the Animation image window.
32. Using the Move tool, drag the shoes so that the left shoe just exits the left side of the screen.
33. In the Layers palette, turn on the view for the linked Left-Right 5 layer and shut off the view for Right-Left 3.
34. Hold the Shift key and click the next Right-Left 0 layer up in the layer stack. This shows all the layers linked to it in the Layers palette, and turns on the view for the layer you clicked.
35. Drag the Right-Left 0 shoes and align them with the Left-Right 5 shoes.
36. Delete the active Right-Left 0 layer from the Layers palette.
37. Repeat steps 34 to 36 two more times.

When you are finished, you will have four full right-left series, and they should be perfectly aligned. The shoes will start off the screen at the left, and then traverse the image heading toward the right. At this point, save the image (using a new name) and then run through the steps for creating an animation by using the Save For Web option. This may take a few minutes to generate, but you will end up with a 41-step animated GIF. This image can be opened in a web browser, and you will see the shoes appear to walk across the screen.

There is more that you can do with this. You could, of course, keep going with the animation and just walk the shoes off the other side of the screen, or you could add other elements to the image. For example, if you were creating a website banner for shoe deodorant pads, you might have the shoes walk across and stop, have the pads fly into them, and then have flowers bloom out of the shoes. A slogan might pop up saying something like, “Leave ’em smelling like a rose.” Using the same shoes, you might create a banner for a health insurance company by having the shoes walk into an open manhole and then displaying the words, “Don’t get caught in a hole uncovered,” and then roll in a manhole cover displaying the insurance company insignia and name. You could use it for a graphic website that has tutorials by showing the shoes walking in and then displaying the slogan, “Short steps to better images”; the shoes could stop their walk in front of an image that could fill with color. You could also use them as shoes for a man walking to a barber-shop... In other words, these same shoes can be reused for different purposes. You will, of course, need to adjust the animation to make the shoes fall in a hole or stop.

The point is that the only limitation to animating objects is your creativity and ability to envision the steps of the animation. By creating a series of controlled movements frame by frame, you develop the elements necessary to make objects appear to be animated.



Careful attention to image placement, movement, and timing in frames per second can help you decide where image elements need to be placed and how to control them. Photoshop Elements can help do some complicated work in the compilation and creation of frames, and can save a completed animation as a single unit in one file.

## Looking beyond the Book

Throughout the course of this book, we have looked at a simple set of image tools and how they have the power to do everything you need:

- You've looked at image color: how to take apart an image by using several color models, and how to correct image color.
- You've extracted image elements from a scene, created new image elements, and taken static image elements and made them appear to move.
- You've taken images and implemented them on the Web and in print after adjusting them.
- You've gained control over Curves, snapshots, the History Brush, blend masks, channels, clipping paths, CMYK, and other Hidden Power tools.

Doing all of this in the relatively short expanse of this book might have seemed, at the outset, impossible. Hopefully you now consider yourself able to do the impossible. If you do, that means I've done what I set out to do by writing this book.

While that is an achievement, there is also more to talk about, more to learn, and more image problems to tackle. In other words, this book does not end here. You can creatively combine the information, tools, and techniques described and indulged in here in a myriad of ways to make image solutions. You might occasionally need a helping hand from another program, but the entire point is that Photoshop Elements is an enormously powerful tool that can help you do anything you need to do with an image. Perhaps much more powerful than you'd dreamed.

Please feel free to visit me at the book's website, [www.hiddenelements.com](http://www.hiddenelements.com), and sign up for the book's newsletter. The site has additional information to specifically help readers of this book. You'll be able to ask questions, get answers, and communicate with other serious Elements users. The information provided on the site is also my way of making sure the book does not end with the last page, so that you can get help when you need it, and it also ensures that this book is a jump-off point for your creativity rather than a static tome that leaves you with no place to go. Please feel free to send me your comments and questions ([thebookdoc@aol.com](mailto:thebookdoc@aol.com)), and I'll do my best to get to as many as I can. I look forward to hearing from you and helping you grow your abilities with Photoshop Elements.

# Appendix

## Other Concepts and References

This appendix provides some background information that doesn't fit a particular topic in the book, but that might be handy to know when working with images. It is stuff I know I struggled to find at one time or another. Topics such as these are sometimes buried in obscure places if they are even documented. They may be presented incorrectly on the Web, or they can be just plain too difficult to find when you really need them. Hopefully you'll find these topics come in handy.

### **The Toolbox**

#### **Resolution**

#### **File Types**

#### **Bit Depth**

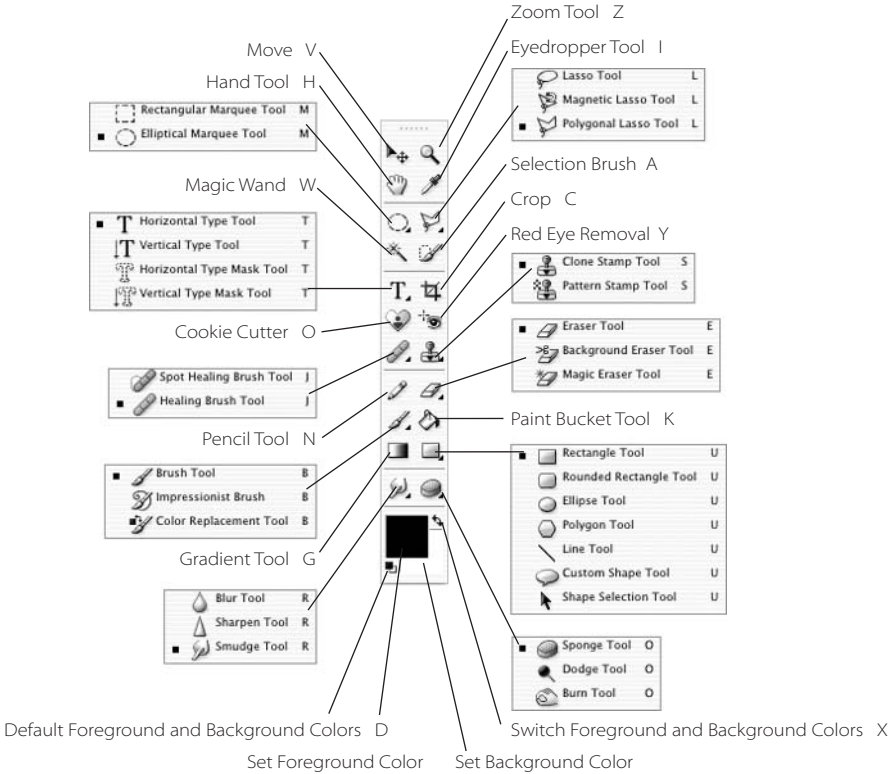
#### **Blending Modes**

# The Toolbox

Table A.1 describes the toolbox tools and shortcuts for selecting them. Figure A.1 maps the tools as they appear on-screen. If you learn to use the shortcuts (from the map or the table), you don't have to waste time hunting for tools on the toolbar, and you can actually hide the toolbar to give yourself some more workspace.

To remove the toolbox from your display, choose Windows → Tools to uncheck the option. To cycle through tools that have the same shortcut, press Shift and the shortcut letter.

Figure A.1  
An exploded view of  
the toolbar



TOOL NAME	SHORTCUT	DESCRIPTION
Rectangular Marquee	M	Makes a rectangular or square selection.
Elliptical Marquee	M	Makes a circular or oval selection.
Lasso	L	Makes a freeform selection formed by dragging the cursor with the mouse.
Polygonal Lasso	L	Makes a polygon-shaped selection formed by clicking the mouse to mark the endpoints of the polygon sides.
Magnetic Lasso	L	Makes a freeform selection formed by the selection lasso snapping to the edges of contrasting tones or colors.
Selection Brush	A	Paints a freeform masked area based on brush size and dynamics. The unpainted area is converted to a selection when the user selects another tool.
Move	V	Moves active (and linked) image areas.
Magic Wand	W	Selects similar colors or tones based on a specified sample area and tolerance range.
Crop	C	Resizes canvas (can result in a larger or smaller image than current canvas).
Rectangle	U	Creates a vector rectangle shape. Creates a new shape layer if a non-shape layer is currently active.
Rounded Rectangle	U	Creates a vector rectangle shape with rounded corners. Creates a new shape layer if a non-shape layer is currently active.
Ellipse	U	Creates a vector ellipse (circle or oval) shape. Creates a new shape layer if a non-shape layer is currently active.
Polygon	U	Creates a vector polygon shape with an even number of sides, based on the number of sides specified on the options bar. Creates a new shape layer if a non-shape layer is currently active.
Line	U	Creates a vector line with a width in pixels specified by the Weight field on the Options bar. Creates a new shape layer if a non-shape layer is currently active.
Custom Shape	U	Creates a custom vector shape by using the custom shape selected on the Options bar. Creates a new shape layer if a non-shape layer is currently active.
Shape Selection	U	Activates or moves shape layer components.
Paint Bucket	K	Based on the tolerance and selections specified on the Options bar, fills an area with the foreground color or a pattern. Colors the image matte if used over the matte area while the Shift key is pressed.
Brush	B	Paints with the selected brush using the foreground color and brush dynamics (click More Options on the Options bar).
Impressionist Brush	B	Paints with the selected stylized brush using sampled color and brush dynamics (click More Options on the options bar).
Eraser	E	Changes the erased area to the background color (when used on the background) or to transparent (when used on a layer).
Background Eraser	E	Changes the erased area to transparent based on the settings specified on the Options bar. Changes the background to a layer if applied to the background (using color modes that support layers).

Table A.1

**Photoshop Elements Tools***Continues*

*Continued*

TOOL NAME	SHORTCUT	DESCRIPTION
Magic Eraser	E	Changes the erased area to transparent based on sample point and tolerance. Changes the background to a layer if applied to the background (using color modes that support layers).
Horizontal Type	T	Places entered text horizontally using the font selection, point size, and other dynamics selected on the Options bar.
Vertical Type	T	Places entered text vertically using the font selection, point size, and other dynamics selected on the Options bar.
Horizontal Type Mask	T	Creates a selection based on horizontally entered text, font, point size, and other dynamics selected on the Options bar.
Vertical Type Mask	T	Creates a selection based on vertically entered text, font, point size, and other dynamics selected on the Options bar.
Gradient	G	Fills an area with a blend of one or more colors based on the gradient, applied direction, and gradient type (Linear, Radial, Angle, Reflect, or Diamond), selected on the Options bar.
Pencil	N	Creates a hard-edged freehand line based on the selected brush.
Red Eye Brush	Y	Replaces the color of the brushed area with the replacement color defined on the Options bar, according to a sample area (the tool samples the initial click point).
Blur	R	Softens hard edges or areas in an image to reduce detail, based on the brush size and dynamics selected on the Options bar.
Sponge	Q	Changes the color saturation or vividness of an area defined by the brush selected on the Options bar. In Grayscale mode, the Sponge tool increases or decreases contrast by moving gray levels away from or toward neutral gray.
Dodge	O	Lightens areas where you drag the cursor based on the range (Highlight, Midtones, or Shadows), brush size, and dynamics specified on the Options bar.
Sharpen	P	Applies a sharpening calculation to the area where you drag the cursor based on the brush size and dynamics specified on the Options bar.
Smudge	F	Either smudges the existing colors in your image or smears new color through your image based on the direction you drag the cursor, the brush size, and the dynamics specified on the Options bar.
Burn	J	Darkens areas where you drag the cursor based on the range (Highlight, Midtones, or Shadows), brush size, and dynamics specified on the Options bar.
Clone Stamp	S	Copies sampled pixels from one part of an image to another based on the brush size and dynamics specified on the Options bar.
Pattern Stamp	S	Paints with a selected pattern based on the brush size and dynamics specified on the Options bar.
Healing Brush	J	Copies sampled pixels from one part of an image to another based on brush size and dynamics (like Clone Stamp), then attempts to fit the correction into the target area by making “smart” comparisons between the sample and target areas.

*Continues*

*Continued*

TOOL NAME	SHORTCUT	DESCRIPTION
Spot Healing Brush	J	Clones like Healing Brush but selects clone source automatically. Best used for correcting minor damage such as dust.
Hand	H	Enables the user to grab the canvas and scroll to navigate a magnified image when all of the image cannot be viewed at one time.
Eyedropper	I	Samples color from the image based on a single pixel or pixel area (according to selected options). Places the color in the foreground or background (when the Shift key is pressed). Often used with the Info palette.
Zoom	Z	Increases (zooms in) and decreases (zooms out) the magnification of image display on-screen.
Switch Foreground and Background Colors	X	Exchanges the colors in the Foreground Color and Background Color boxes.
Set Foreground Color		Opens the Color Picker dialog box to allow the specification of a color to fill the Foreground Color box.
Set Background Color		Opens the Color Picker dialog box to allow the specification of a color to fill the Background Color box.
Default Foreground and Background Colors	D	Restores the Foreground Color and Background Color boxes to their default colors.

## Resolution

Several resolution factors can affect your results in Photoshop Elements. These factors include input resolution, monitor resolution, and output resolution. Understanding resolution is imperative to getting the best results from your digital images.

### Input Resolution

*Input resolution* is the resolution of images coming off of the device you are using for capture. Most commonly this will be a scanner (whether you scan your own images or have them scanned for you) or a digital camera.

### Scanners and Resolution

Scanner resolution is measured in dpi (dots per inch), based on the number of scanned samples that occur during scanning, and how that is converted to image information. Scanners are most often rated in optical and/or interpolated resolution—the latter sometimes disguised by other terms. You should pay attention to optical resolution only. Interpolated resolutions lead to the scanner creating interpolated (assumed) information, so the results will usually not be much better than using interpolation to resize images in Elements.

All scanner types are not alike, and for best results you should use them for the purpose that they were made. You will generally not want to use a flatbed for scanning negatives—even if they have a transparency adapter or other means of scanning slides. Flatbeds start at an optical resolution of about 600×600 and can go much higher. They are generally best for making reflective scans such as those you might make from prints. Negative scanners will start with at least 1800×1800 and are better suited to making accurate high-resolution scans from your negatives and slides. They are, however, usually fairly expensive. Services, such as Kodak Photo CD scanning (this is different from Kodak CD, which is a lower-end product), can provide high-resolution scans of your images inexpensively.

So long as you have the option when scanning, you should make a scan that fits your targeted need. In other words, know the purpose of your scans before you make them, and don't just blindly scan to the maximum capability of the scanner. Scan to exactly the size you need to cut down on the need for interpolation, unless you have a good reason to do otherwise. The size you need can be determined by the print resolution and the target range for image output that we looked at in Chapter 1, in the section “What Image Resolution to Use.” Making your scans to the target size will require selecting options for resolution, and perhaps other settings such as scaling, in your scanner software before making the scan. These settings vary from scanner to scanner, so be sure to familiarize yourself with the settings by reading the manual and exploring the scanner's software.

Digital Cameras and Resolution

Digital camera resolution is weighted in pixel dimension, total pixels (megapixels), or both. While that is useful as a comparison between cameras, it doesn't tell you how big the resulting images will be. Table A.2 offers a brief overview using common camera abilities and maximum output size (in inches).

Table A.2  
Common Camera  
Resolutions

CAMERA RESOLUTION	TOTAL PIXELS	MAX. FINAL SIZE FOR WEB/ MONITOR (96 DPI)	MAX. FINAL SIZE FOR PHOTO-QUALITY (200 DPI)	MAX. NEGATIVE/ CHROME OUTPUT (650 DPI)
640×480	307,200	6.7×5	3.2×2.4	1×0.75
1024×768	786,432	10.7×8	5×3.75	1.5×1.1
1280×960	1,228,800	13.3×10	6×4.75	1.8×1.5
1600×1200	1,920,000	16.7×12.5	8×6	2.5×1.8
2048×1536	3,145,728	21.3×16	10×7.5	3.1×2.3
2400×1800	4,320,000	25×18.75	12×9	3.7×2.8
2500×2000	5,000,000	26×20.8	12.5×10	3.9×3.1
3072×2048	6,291,456	32×21.3	15.4×10.3	4.7×3.1
4536×3024	13,716,864	47.3×31.5	22.7×15.1	7×4.7

When using your digital camera, pay attention to the resolution rather than the number of images you can get onto your memory card. Some people make the mistake of sacrificing image resolution to get more pictures on their card. It's better to buy more cards. Unlike using a scanner, your capture of a scene with a digital camera may be your only opportunity to make the capture; unless there is a specific reason to use a lower resolution, leave the camera set to the maximum pixel dimension or highest resolution.

## Monitor Resolution and Settings

*Monitor resolution* affects how images appear on-screen. Most people will set monitor resolution to the highest setting suggested by the manufacturer and assume that it is correct—or assume that it doesn't matter. If you set your monitor resolution too high (greater than the monitor was built to handle), you can lose detail rather than improve it, and images can appear too small. If you set the resolution too low, objects on screen will appear larger than they should, and you won't take advantage of the viewing landscape on your monitor.

The maximum monitor resolution setting is dictated by the monitor's viewing size and dot pitch. *Viewing size* is simply the monitor area; *dot pitch* is, essentially, the resolution—the number of image dots that can be represented. The greater the viewing size or the lower the dot pitch, the more information the monitor can show. A larger monitor will tend to have a higher dot pitch than a smaller one. Monitors with lower-dot-pitch will tend to look sharper.

There are more complicated means of selecting a monitor display resolution, but in my estimation choosing the “right” resolution is choosing the resolution that makes the image appear correctly sized on-screen. This choice also pretty much eliminates the possibility that your monitor doesn't have enough resolution. Any monitor with a dot pitch of less than .28 (about .22 horizontally) should be able to handle the range that I suggest while viewing sharply. This does not mean that having a higher-resolution monitor is wasted; finer dot pitch almost always translates into finer image display. Using a higher resolution can also have the advantage of making palettes and menus smaller, leaving more space on the screen to work.

Table A.3 is a guideline to help you create an accurately sized image on-screen, and will give you a target to shoot for. It may not be exact, because there are variables in displays, but it should take you closer than just guessing at a size or choosing the maximum suggested resolution willy-nilly (or based on what you think might look good when you have the monitor control panel open). The point is that when you choose View → Print Size, your image will be close to displaying on-screen at the size you intend to use it.



Table A.3	DIAGONAL VIEW SIZE	72 PPI RESOLUTION	96 PPI RESOLUTION
Common Monitor Sizes and Resolutions	23"	1600×1200	1920×1200
	21"	1280×1024	1600×1200
	19"	1152×870	1280×1024
	17"	1024×768	1152×870
	15"	870×640	1024×768
	13"	800×600	870×640

Monitor screen size is measured from corner to corner diagonally rather than as height or width. If you are unsure of your monitor size, a quick measure of the diagonal surface area of the screen will tell you approximately what the view size is for your monitor. Choose an available display resolution in the monitor control panel that falls between the range shown in the table (between 72 and 96 ppi) to get the most accurate sizing.

If you prefer to have a very accurate view of print size on-screen, you can choose your resolution roughly and make adjustments in the horizontal and vertical projection of the monitor to make the display dimensions nearly exact. To do this, you can match a display ruler (show rulers on an open image displaying at 100 percent) to a household one by using horizontal and vertical screen controls.

**Number of Colors**

You may be able to change your color settings to anything between monochrome and 32-bit color in your control panel, and as with resolution, it might be tempting to always pick the maximum. These settings may be presented as bits or number of colors (depending on the operating system and the utility or control panel you are using for the setting). The more bits or colors, the more true-to-life color can be; at the same time, the more taxing the color processing can be, so this may result in fewer options for refresh rates (see the following section for more information on refresh rates). Optimally you will want to choose to display the most bits you can, but if you have a less powerful video card and a large monitor, or if your refresh rate options are limited, it may be best to choose fewer bits or colors as a trade-off. Your images store 24-bit information (3×8 bits) in Photoshop Elements at maximum, so displaying at 32-bit is not necessarily better for viewing image color.

**Refresh Rate**

*Refresh rate* is the frequency at which an image on the screen is updated or refreshed. The rate is measured in Hertz (Hz). The higher the frequency (the more Hz), the faster the screen refreshes. The faster it refreshes, the less likely you are to detect flicker, and the more likely that your view of changes and movement on the screen (such as the cursor)

will seem smooth. Quick refresh rates can also reduce eyestrain. This can be important if, like some of us, you spend a lot of time staring at your monitor.

Use only suggested refresh rates for your monitor and video card or you can run the risk of damaging your equipment. Refresh rates should be as fast as you can make them within the manufacturer’s suggested range without cutting into other display properties that reduce performance in other ways (see the previous section).

Output Resolution

Table A.4 shows some real-world examples of output resolution and workable ppi ranges. Calculations for the table were based on the formulas shown in the Calculation Used column; square brackets in the calculations indicate the range of values used to determine the lowest and highest resolution acceptable in that media. This table can be handy for choosing a rough estimate of file size, and you can use the equations for calculating more specific results. The table also assumes you will be printing the image at 100 percent of the image size; resizing the image in layout or another program will affect the calculations. Check with your printing service for their recommendations before blindly assigning these estimates.

MEDIA	MEDIA RESOLUTION BASE	APPROXIMATE FILE RESOLUTION (PPI)	CALCULATION USED
Web page	Mac/PC monitor	72–96 ppi	ppi = dpi
Poster plotter	300 dpi printer resolution	100–150 ppi	$[0.33 \text{ to } 0.5] \times \text{dpi}$
Inkjet (stochastic) prints	720 dpi	180–234 ppi	$[1 \text{ to } 1.3] \times (\text{dpi} / 4)$
Inkjet (stochastic) prints	1440 dpi	360–468 ppi	$[1 \text{ to } 1.3] \times (\text{dpi} / 4)$
Newsprint	75–120 lpi	117–240 ppi	$[1.55 \text{ to } 2] \times \text{dpi}$
Coated paper (books, magazines, etc.)	133–175 lpi	207–350 dpi	$[1.55 \text{ to } 2] \times \text{lpi}$
Art publications	175–200 lpi	271–400 ppi	$[1.55 \text{ to } 2] \times \text{lpi}$
Line art	Printer output resolution	600–1342 ppi	$(\text{dpi} / 600)$ $1/2 \times 600$
Film recorder	4K lines, 35 mm	2731×4096 pixels	Total pixels
Film recorder	8K lines, 2.5+ in.	5461×8192 pixels	Total pixels

Table A.4  
Approximate  
Resolutions for  
Various Media

Interpolation

Say you have a pixel-based image at 5×7 inches and it has 300 ppi. That will print well to a variety of outputs at the original size (although there may be too little or too much resolution for some options). If you want to resize the image or apply it at a different size by changing the dimension, the ppi, or both, there are many possible results. Table A.5 looks at these possibilities (all based on an original image that is 5×7 at 300 ppi).

Table A.5  
Potential Resize Options

DESIRED CHANGE	INTERPOLATION METHOD	APPLIED IMAGE SIZE (INCHES)	EFFECTIVE IMAGE PPI	RESULT	COMMENT
Increase file dimension with same ppi	Bicubic	8×10	300	Increasing the number of pixels causes image information to be added or faked.	The result will probably not be much better than applying the original image without interpolation. It will likely be a bit soft. Image content may affect the results. Bicubic interpolation works best with blended tones (photographs).
Increase file dimension with same ppi	Nearest Neighbor	8×10	300	Increasing the number of pixels causes image information to be added or faked.	The result will be almost exactly like applying the original image without interpolation. It will likely be a bit soft, and may be blockier than Bicubic interpolated results. Image content may affect the results. Nearest Neighbor interpolation works best with solid color and lines (screenshots).
Increase file dimension with lower ppi	Bicubic	8×10	72	Disproportional changes in ppi and dimension (in this case, decreasing the ppi dramatically while increasing the dimension) cause image information to be changed (in this case, lost).	Even though the size of the file increases in this case, the result is less information in the file because of the lower ppi. While this 8×10 may display fine on-screen and on the Web, the result in print will most likely be soft and undesirable.
Increase file dimension without interpolation	None	8×10	210	Proportional changes in ppi and dimension result in the same image information being distributed over a new area. There is no change in file information (or file size).	This will provide a very similar result to applying the image at increased ppi. The resolution could probably be better targeted to the desired output.
Increase (double) the ppi	Bicubic	5×7	600	Increasing the number of pixels causes image information to be added or faked.	This file will have too much resolution for just about any type of output. It can slow processing and increase file sizes unnecessarily, without improving output quality.
No change	None	5×7	300	Applied at file dimensions.	This is the targeted application of this pixel-based image.

*Continues*

*Continued*

DESIRED CHANGE	INTERPOLATION METHOD	APPLIED IMAGE SIZE (INCHES)	EFFECTIVE IMAGE PPI	RESULT	COMMENT
Decrease ppi	Bicubic	5×7	72	Decreasing ppi and keeping the dimensions the same removes information from the image.	While this can be fine for the Web, this file will have too little resolution for most types of printed output. It may look fine on-screen, but that shouldn't be the determining factor.
Decrease file dimension without interpolation	None	3.5×5	429	Proportional changes in ppi and dimension result in the same image information being distributed over a new area. There is no change in file information (or file size).	By decreasing the file dimension without interpolating, this file will have too much resolution for just about any type of output. It can slow processing and increase file sizes unnecessarily.
Decrease file dimension with lower ppi	Bicubic	3.5×5	72	Decreasing file dimension and ppi at the same time removes information from the image.	This image takes a double whammy in decreasing both dimension and ppi. While it will be suited to screen display (and may not look too different on-screen than the display of the two options that follow), results in print will probably not be satisfactory.
Decrease file dimension with higher ppi	Nearest Neighbor	3.5×5	300	Disproportional changes in ppi and dimension (in this case, decreasing the dimension while retaining ppi) cause image information to be changed (in this case, discarded or lost).	Resizing an image smaller is usually less damaging to the result than attempting to add information to the image. While making images smaller shrinks the pixel base and merges and loses information, it tends to matter less than increasing image size. Nearest Neighbor interpolation, unless used with great care, is not usually your best choice in decreasing image size. Results will probably be better in most cases with Bicubic (or perhaps Bilinear) interpolation.
Decrease file dimension with higher ppi	Bicubic	3.5×5	300	Disproportional changes in ppi and dimension (in this case, decreasing the dimension while retaining ppi) cause image information to be changed (in this case, lost).	Generally it is fine to repurpose an image by decreasing its size. Because the result will merge and blur somewhat, sharpening is recommended. Using Bicubic resizing actually invests a little sharpening for you, so that additional sharpening may not be necessary. If possible, work with images at the intended size for best results.

## File Types

When saving an image, you have to select a file type. To choose the right one, it is handy to know what the available file types are and generally what they are used for. Table A.6 gives a brief overview of file types supported when saving from Photoshop Elements. Other file types are supported as “open only,” meaning that you can open the files, but you will have to save them as something else.

Table A.6  
File Types to Save In

FILE TYPE	SAVE AS COLOR MODES	PURPOSE / USE
Photoshop document (PSD)	All	Native Photoshop Elements format. Store working/in-progress Photo-shop images.
Bitmap (BMP)	All	Traditionally a Windows-based file format. PC screenshot format. Loss-less compression.
CompuServe Graphics Inter-change Format (GIF)	All	Web graphics. Uses an indexed-color palette (256 colors max) to achieve compression—colors are converted during save if not already indexed. Conversion to GIF from images with more than 256 colors will cause image information loss.
Encapsulated PostScript (EPS)	All	Mostly used in PostScript printing to retain vector, pixel, and separation information. Does not support alphas. Can use JPEG compression.
Joint Photographic Experts Group (JPEG)	Grayscale, RGB	Often used for full-color web graph-ics, and digital camera image storage. Uses variable, lossy compression in storage, which can damage images over repeated saves. Better color retention than GIF.
PC Exchange (PCX)	All	Another bitmap format like PCT and BMP. Uses lossless compression.
Portable Document Format (PDF)	All	Designed by Adobe Systems to allow viewing of PostScript-encoded docu-ments (using Acrobat products such as Reader). Uses compression includ-ing lossless ZIP encoding and lossy JPEG. Compression can be controlled separately for color, grayscale, and monochrome (bitmap) images. Highly portable between platforms and used broadly in print applications.
Photoshop 2.0	All	Native Photoshop format with back-ward compatibility to earlier versions.
PICT file (PCT)	All	The Mac equivalent of Windows BMP.

*Continues*

*Continued*

FILE TYPE	SAVE AS COLOR MODES	PURPOSE / USE
PICT resource (RSR)	All	Files used in resource forks (such as icon graphics).
Pixar Computer Image (PXR)	Grayscale, RGB	Specially designed for Pixar Image workstations, for editing rendered graphics to return to a Pixar format.
Portable Network Graphics (PNG)	All	Developed as a royalty-free replacement for GIF. Supports transparency and animation (but not via Elements). Supports both lossless and lossy compression (but not via Elements).
Photoshop RAW (RAW)	Grayscale, Indexed Color, RGB	Undefined or raw image data. No compression. Can be used for custom deciphering or encoding of file formats that are otherwise unsupported by Photoshop. Similar to but not the same as Camera RAW.
Scitex Continuous Tone (SCT)	Grayscale, RGB	Developed by Scitex for proprietary image-processing systems. Used with high-end scanning devices. No compression.
Targa (TGA)	Grayscale, Indexed Color, RGB	Most common in the video industry; also used by high-end paint and ray-tracing programs because of expanded bit depth. For specific application in video output. No compression via Elements.
Tagged Image File Format (TIFF)	All	A broadly used, general-purpose file type for printed output. Supports most native Photoshop Elements file features. Supports lossless compression.
Wireless BMP	BMP	For application on wireless networks.

## Compression

*Compression* is a means of making image files smaller. It occurs when saving files as part of the file type, or it can be applied after saving by using a file compression utility.

Some file compression encoding is known as *lossy* in that it loses original image information during processing. In some instances, it's okay to sacrifice some image quality for file size. For example, JPEG is a lossy format used on the Web to speed image transfer. However, in most cases you should stick to lossless compression to retain the quality of your images. Beware of lossy compression that gets reapplied each time you save. JPEG compression, for example, is reapplied each time you open and then save the file, so image quality will steadily degrade over time if you continue to use JPEG format.

Compression that is applied as part of the file format (JPEG, LZW, GIF, and so on) is different from file compression. File compression is done with utilities (ZIP, SIT, SEA,

MIME, and so on). Utility compression is always lossless as it acts on the file information independent of it being an image. Image-type compressions may act on image information directly to achieve compression.

## Bit Depth

Bits and bit depth have been known to cause confusion, and understanding them may be important to freeing those ghosts from the closets in your mind. A big deal is made of 16-bit image editing, or how many bits a scanner or camera can capture. If you don't have the foggiest idea what bits are, that can lead right to the bus stop of confusion. If you know, you can make intelligent decisions about how important specifications really are to your image editing.

*Bits* represent how exactly color can be measured. They are the little encoded 1s and 0s used in computer language to describe an image. Each pixel color in your image is described by the bits. The more bits, the greater the potential accuracy of the color in each pixel.

Bits themselves are just tiny chunks of information—sometimes described by the term *binary*. All that term means is that each bit used in your files can have one of two values: either on (1) or off (0). If an image is 1-bit, each pixel in the image can be on or off: black or white. The more bits per pixel, the more complex the relationship gets, and the more color variations can be represented.

If your image is a 2-bit image, each bit has two potential values, and these values can be paired in any of these four combinations: 00, 01, 10, or 11 to define the pixel. Each additional bit per pixel adds a multiple of two combinations, one additional set of combinations for each additional bit. Just to show how quickly this can add up, if a third bit were added to your two-bit image, this would result in the following set of possibilities for each pixel: 000, 001, 010, 011, 100, 101, 110, 111—a total of eight possible combinations. So each time another bit is added, there are twice as many possible combinations—one additional full set of possibilities for each of the two possible values of the bit.

To determine the total number of bit combinations, all you have to do is multiply by two for each bit. Eight bits per channel would be  $2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$  (or  $2^8$ ), totaling 256 combinations. However, this can get a little murky. Following that logic you would think that a 24-bit image would be  $2^{24}$ , representing 16 million colors. That is correct. But when describing an RGB image, 24-bit images can be described as 8-bits per channel. That is, each of the three channels is allotted 8 bits. These three groups of 8 bits describe the 256 tonal possibilities for each channel: red, green, and blue. Each of the colors has 256 possibilities that can be combined in any fashion. Whether you multiply  $2^{24}$ , or  $256 \times 256 \times 256$ , you get the same number of bit combinations: 16,777,216. That is how many colors each pixel can represent in 24-bit color.

Bit terminology can be confusing because *bit depth* can be referred to as bits per channel or total bits. If used with care, this shouldn't pose a problem, but it can be confounding

when you discover a 16-bit image actually has more image information than a 24-bit color scan. Be sure you are comparing either total bits per pixel or bits per channel when looking at specifications or comparing images. Comparing bits per channel to total bits is like comparing grayscale and color images...different representations of the same thing, but they are not equivalent.

If you add bits, you add potential colors: if you have an image with 30 bits, there would be 10 bits per channel, or 1024 bit combinations per pixel per color, or 1,073,741,824 potential combinations. That is 64 times as many color combinations as 24-bit, with only a few more bits per pixel.

In other words, increased pixel depth exponentially increases the color possibilities, which is why increased color depth is considered potentially so valuable in color work. The negative effect of increased bit depth (for example, to 16-bits per channel from 8-bit) is increased image size. There is also some question as to the value of increased bit depth. In fact, it seems almost useless for anything but initial corrections for two reasons:

- If you have 16 million colors, it is not incredibly likely that having even more is going to have a lot of effect on the way you see an image.
- Output in most cases can't reproduce more than 24-bit color.

Increased bit depth can improve the capture of detail in poorly exposed images and may be desirable for archiving. However, 8-bit is more than most people actually need. (For more about 16-bit images, see the “16-bit Images” sidebar in Chapter 1.)

## Blending Modes

*Blending modes* are a means of calculating a result between source and target information in your image. Blending modes can be applied with brushes or layers. A blending mode controls how the content (a layer or brush) is applied, based on the image content. When a mode is used with a painting tool, Photoshop Elements uses the brush content as the source (foreground color) as if the color were being applied in a layer, using the selected brush dynamics. Brush applications change the content of the layer you are painting on to achieve the result; layer modes cause a visual (rather than actual) change based on calculated interaction with all image information below the layer.

Modes can create effects by using calculations based on select color components. For example, the result might be a calculation involving red, green, and blue components (tone and color together), or a calculation based on luminosity, color, or other components. Table A.7 describes the blending modes available in Elements.

Adobe is pretty stingy with the exact calculations involved in blending modes. The descriptions are actually obfuscated by the language used to describe them. To simplify: the more obscure and difficult to calculate, the less useful the mode will tend to be in normal use.



Table A.7	BLEND MODE	QUICK KEY	EFFECT
Photoshop Elements Blending Modes	Normal	Shift+Option+N / Shift+Alt+N	Plain overlay of content. The result takes on the color/tone of the pixels in the upper layer.
	Dissolve	Shift+Option+I / Shift+Alt+I	The result takes on the color/tone of the pixels in the upper layer, but the result is dithered (randomized) according to the opacity of the application. The greater the opacity, the more the selection is weighted to the upper layer. 100% opacity will produce a 0% Dissolve effect; 50% opacity indicates 50% of the result has the applied color.
	Darken	Shift+Option+K / Shift+Alt+K	Chooses the darker color value set for each pixel in comparing the two layers. Uses either the applied color or the original. No portion of the image gets lighter.
	Multiply	Shift+Option+M / Shift+Alt+M	Darkens the result by darkening the lower layer based on the darkness of the upper layer. Any applied tone darker than white darkens the result. No portion of the image can get lighter.
	Color Burn	Shift+Option+B / Shift+Alt+B	Burns in (darkens) the color of the underlying layer with the upper layer, darkening the result. No portion of the image gets lighter. The greater the difference between pixel colors, the greater the change.
	Linear Burn	Shift+Option+A / Shift+Alt+A	Similar to Multiply but somewhat more extreme.
	Lighten	Shift+Option+G / Shift+Alt+G	Chooses the lighter color value set for each pixel in comparing the two layers. Uses either the applied color or the original. No portion of the image gets darker.
	Screen	Shift+Option+S / Shift+Alt+S	Brightens the result by lightening the lower layer based on the lightness of the upper layer. Any color lighter than black lightens the result. No portion of the image can get darker.
	Color Dodge	Shift+Option+D / Shift+Alt+D	Dodges (lightens) the color of the underlying layer with the upper layer, lightening the result. No portion of the image gets darker. The greater the difference between pixel colors, the greater the change.
	Linear Dodge	Shift+Option+W / Shift+Alt+W	Similar to Screen but the result is more extreme.
	Overlay	Shift+Option+O / Shift+Alt+O	Multiplies (darkens) the light colors and screens (lightens) the dark ones. Colors at light and dark extremes are affected less than midtones.
	Soft Light	Shift+Option+F / Shift+Alt+F	Multiplies (darkens) the dark colors and screens (lightens) the light ones depending on the applied color. If the applied color is light, the pixel lightens; if dark, it darkens. Soft, or 50% application of the upper layer.
	Hard Light	Shift+Option+H / Shift+Alt+H	Multiplies (darkens) the dark colors and screens (lightens) the light ones. 100% application of the upper layer.
	Vivid Light	Shift+Option+V / Shift+Alt+V	Similar to Color Burn when the applied color is darker than 50% gray; similar to Color Dodge when the applied color is lighter than 50% gray.

*Continues*

*Continued*

BLEND MODE	QUICK KEY	EFFECT
Linear Light	Shift+Option+J / Shift+Alt+J	Similar to Linear Burn when the applied color is darker than 50% gray; similar to Linear Dodge when the applied color is lighter than 50% gray.
Pin Light	Shift+Option+Z / Shift+Alt+Z	Similar to Multiply when the applied color is darker than 50% gray; similar to Screen when the applied color is lighter than 50% gray.
Difference	Shift+Option+E / Shift+Alt+E	Reacts to the difference between pixel values. A large difference yields a bright result; a small difference yields a dark result (no difference yields black).
Exclusion	Shift+Option+X / Shift+Alt+X	Uses the darkness of the original layer to mask the Difference effect (described previously). If the original value is dark, there is little change as the result; if the original color is black, there is no change. The lighter the original color, the more intense the Difference effect.
Hue	Shift+Option+U / Shift+Alt+U	Changes the Hue of the original to the applied while leaving the Saturation and Luminosity unchanged.
Saturation	Shift+Option+T / Shift+Alt+T	Changes the Saturation of the original to the applied while leaving the Hue and Luminosity unchanged.
Color	Shift+Option+C / Shift+Alt+C	Changes the Hue and Saturation of the original to the applied while leaving the Luminosity unchanged.
Luminosity	Shift+Option+Y / Shift+Alt+Y	Changes the Luminosity of the original to the applied while leaving the Saturation and Hue unchanged.

## Camera RAW Files

RAW is not an acronym; it simply stands for *raw*, as in raw image data. RAW files have been around for a long time. In fact, you could open and save to a type of RAW file (Photoshop RAW) in Photoshop Elements 1. When you open one of these RAW files you get a dialog that allows you to put in parameters to decipher the image data (see Figure A.2).

The RAW (or Photoshop RAW) file format was meant to provide the user a means of opening and saving nonstandard image files—possibly created before there were digital image standards, or developed with nonstandard processing (for example, in scientific imaging). If you only had the file and did not know how to open it up and what parameters to use, you would have a very difficult time opening the image because you'd have to guess at what was stored in the files and how that translated into the Photoshop RAW parameters—if it did at all.

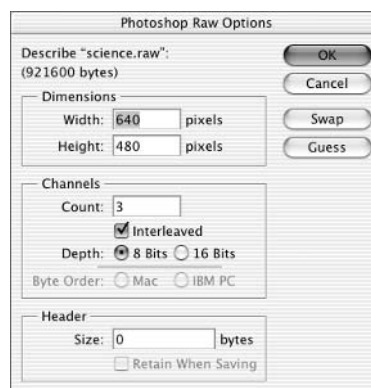


Figure A.2

The Photoshop RAW options allow the user to decipher image structure by choosing bit dimension, channel count and bit depth, and header length information.

RAW files that you get off your camera are really just another type of RAW file, though they are handled in a much different (and friendlier way) by Elements 3, using the Camera RAW plugin. These RAW camera files are assembled from the raw data captured by your digital camera into proprietary image formats. You might think that is the same as any image your camera spits out, but that isn't exactly true. Before you download images from your camera as JPEG or TIFF images, they start out as raw data; they are encoded, processed, and turned into one of the more familiar digital file formats so that they can be used with popular image editing programs. RAW files will be raw data, and all will be called RAW files, but all RAW files will not all be constructed the same way. In fact, the file types that come off different cameras as RAW can have unique file extensions depending on the manufacturer. The Camera RAW plugin in Elements has the ability to recognize many of these RAW file types, and it will automatically decipher the files and present them in the Camera RAW dialog, which you can then use to do some initial adjustment to the raw data from the image.

The processing that occurs in the Camera RAW plugin includes interpreting and merging captured information. Similar to the way Prokudin-Gorskii's captured images, the camera will capture image information in a grid of tiny sensors that are filtered for red, green, or blue light. The camera then takes the information from smaller groups of sensors and interpolates a result, because red, green, and blue are not usually captured in exactly the same sensor area (there are exceptions, such as tri-sensor cameras, or X3 technology). While this composite will likely be an adequate representation (better at higher resolutions), it may or may not be the ultimate representation of the original image data. After all, the camera does not have the slightest idea of image key, and it can't read your mind to interpret your artistic intent for the image. On top of that, standard TIFF or JPEG images may be stored in 8-bit file formats rather than at the bit depth in which they were captured. The process of interpolation and compression necessarily compromises image data; as with interpolated results from resizing, you are left with the calculated result, whether that's good or bad.

Adobe's new DNG (Digital Negative) file format is an attempt by Adobe to standardize (or create an open standard for) RAW camera images. Their hope would be that this file type would be used widely as a standard by manufacturers to remove the possibility of increasing the already large number of proprietary RAW file types. Adobe offers a DNG converter for free that works with many file types. You can download it here: <http://www.adobe.com/products/dng/>.

The Camera RAW plugin lets you control how the raw data gets combined. Making adjustments in the dialog is an opportunity to get the most out of information captured by the camera, plain and simple. If your camera shoots in 12-bit and produces an 8-bit JPEG that is stored on your camera's media, many calculations happen along the way to compile the image from the RAW data and shrink the file size. This can be stated another way: the process of storing the file compromised original capture data with a loss in

potential for the ultimate image quality. This loss may not be huge, and in some shots you may not notice it at all (in comparing RAW and JPEG). The images where you will not see a big difference are those that are properly exposed. However, the latitude that you have in working on an image and coming up with what you need from the RAW data (and later in 16-bit) is worth the extra processing time for those who are serious about their images. If you already know about exposure, aperture, and composition, and have some experience in digital image processing, you might shoot RAW images to give yourself more to work with in achieving the goals of your images in post-processing—and perhaps to give yourself better data to store as the source of your image captures in your archives.

In other words, just as a user might appreciate the speed of automated processing when using Auto Levels or Auto Contrast, setting your camera to store JPEG images might be a godsend because the process is completed for you. However, if you don't shoot only statues outside on an overcast day at noon or so...then you may have more creative vision as to what makes an interesting image. If you shoot scenes with a lot of potential for manipulating shadow detail or highlights (low-key or high-key images), you would certainly like the advantage you have in manipulating the images from your RAW originals. If you shoot a rock concert, for example, the latitude you gain in manipulating the highlights, shadows, and light color would certainly favor storing RAW files. You would more likely be able to make drastic manipulations to the RAW, high-bit image without causing or enhancing damage that could be introduced by overworking the image in 8-bit or by enhancing the JPEG compression damage.

You can look at the RAW format as the ultimate archive version of an image, because there is no compression, artifact, or other adjustment made by the camera before delivering the image—all you have is the raw capture data. This can enable you to make adjustments and compensation to the capture, rather than the standard conversion enforced by on-camera processing.

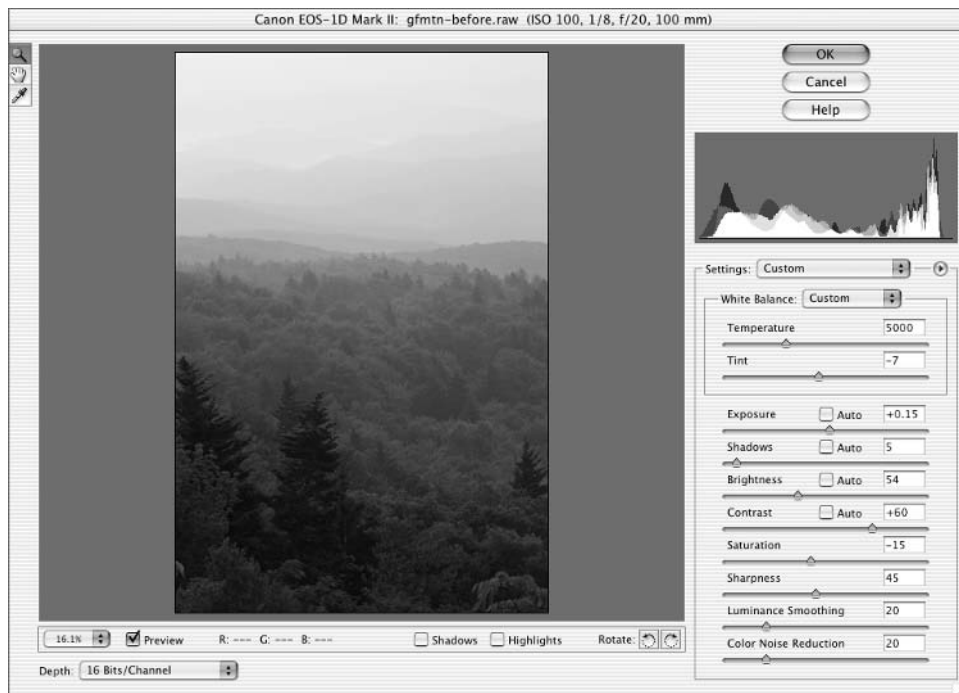
## Working with RAW Images from Your Camera

Even though you can open a RAW file in Photoshop Elements, getting the camera to store RAW files is a distinct matter. Not all cameras will allow you to save files in RAW formats. To process the RAW data, your camera will have to offer a RAW save option and you will have to change the camera settings to store the data in the camera's RAW format. See your owner's manual for these instructions.

To handle your camera's RAW images, you will most likely be able to use either proprietary software provided with the camera, or Photoshop Elements 3. Elements 1 and 2 do not handle RAW files that come from your camera without the Camera Raw plug-in. The Camera Raw plug-in is standard in Elements 3, and it enables you to open many types of camera RAW files from the native data. The plug-in will open automatically when you attempt to open a recognized RAW image file (see Figure A.3).

Figure A.3

When you open an image saved in a RAW file format, this dialog appears, allowing you the opportunity to convert the image data.



When you open the image by using Elements, you will be presented with the dialog box and can make adjustments that you prefer by using the on-screen preview as a visual guide. Settings that you choose can be saved and used in actions and batch processes so that you can process your RAW images in bulk. More interesting, you can store and archive the camera's RAW files, and at a later date process them differently if a different interface or process becomes available.

The Camera Raw dialog includes sliders that help you adjust color Temperature, Tint, Exposure, Shadows, Brightness, Contrast, Saturation, Sharpness, Luminance Smoothing, and Color Noise Reduction. Other settings that effect the output are bit depth selection (you can choose 8- or 16-bit) and rotation. Controls that only affect what you see on screen include preview size (as a percentage of pixels viewed) and clipping previews (Highlight and Shadows). You can do all this while looking at a preview and a color histogram that provide clues as to the best mixture of these elements in the image. Some of the adjustments may be better deployed during correction stages, so do not feel obligated to use every slider, and don't attempt to make the image look perfect in the preview. In some cases you will not even want to make an adjustment at this stage.

## CURRENTLY SUPPORTED CAMERAS

As of this writing, the Camera RAW plugin supports the following camera types. The list of supported cameras may be enhanced by Adobe over time as new cameras come on to the market and upgrades to the plugin are made available. Check Adobe's site (<http://www.adobe.com>) or the Hidden Power of Elements site (<http://www.hiddenElements.com>) for updates and information.

### *Canon*

- EOS-10D
- EOS-1Ds
- EOS-1D
- EOS-1D Mark II
- EOS-D30
- EOS-D60
- EOS-300D
- (Digital Rebel/Kiss Digital)
- PowerShot 600
- PowerShot A5
- PowerShot A50
- PowerShot Pro 1
- PowerShot S30
- PowerShot S40
- PowerShot S45
- PowerShot S50
- PowerShot G1
- PowerShot G2
- PowerShot G3
- PowerShot G5
- PowerShot Pro70
- PowerShot Pro90 IS

### *Contax*

- N Digital

### *Fuji•Im*

- FinePix F700
- FinePix S5000 Z
- FinePix S7000 Z
- FinePix S2 Pro

### *Kodak*

- DCS 14n
- DCS Pro 14x
- DCS720x
- DCS760
- DCS Pro SLR/n

### *Konica Minolta*

- DiIMAGE A1
- DiIMAGE A2
- DiIMAGE 5
- DiIMAGE 7
- DiIMAGE 7i
- DiIMAGE 7Hi

### *Leaf*

- Valeo 6
- Valeo 11
- Valeo 22

### *Leica*

- Digilux 2

### *Nikon*

- D1
- D1H
- D1X
- D100
- Coolpix 5700
- Coolpix 5000 (with
- rmware v.1.7)
- Coolpix 8700

### *Olympus*

- E-10
- E-1
- E-20
- C-5050 Zoom
- C-5060 Zoom
- C-8080 Wide Zoom

### *Panasonic*

- DMC-LC1

### *Pentax*

- \*1st D

### *Sigma*

- SD9
- SD10

### *Sony*

- DSC-F828

Adjustments that you do make will often be to retain the best image information possible. This means you will want to balance the histogram while getting a preview that looks good. Balancing the histogram in this case means expanding the dynamic range of the white area of the graph, while maintaining the balance of colors and keeping the individual color components from clipping (not shifting one of the three component colors too far into the highlights or shadows so that you lose captured detail). Each of the controls will help balance image qualities differently—but usually intuitively (see Table A.8).

Table A.8

Camera RAW Controls

CONTROL	USE/DESCRIPTION
Settings	Enables the user to select preset, custom, or previous settings used with the plugin. Selected Image uses the settings from the previous conversion; Camera Default uses default settings that you created for the camera or from the image as shot (if no default is stored); Previous Conversion uses the last settings used to process images from this camera. To store a default, adjust the sliders as desired and choose Set Camera Default from the pop-up menu to the right of the Settings.
White Balance	Adjusts Temperature and Tint based on selection from the drop list. Drop list selections include: As Shot (from image data), Auto (automatically balanced), Daylight (normal daylight, 5500 degrees Kelvin), Cloudy (cool, overcast lighting 6500 degrees Kelvin), Shade (cool light full shade, 7500 degrees Kelvin), Tungsten (balanced light, 2850 degrees Kelvin), Florescent (greenish light, 3800 degrees Kelvin), Flash (balanced light, 5500 degrees kelvin), Custom (manual slider settings). White balance can be sampled from the image using the eyedropper tool from the upper left of the palette; just click on what should be a gray area of the image.
Temperature	Enables correction for the ambient color temperature (white balance). The plugin will counter the correction by warming or cooling the image color. Moving the slider to the right increases the ambient color temperature and warms as a result (compensates for images taken on an overcast day). Moving the slider left decreases the ambient color temperature and cools the image as a result (compensates for warm images such as those taken with unbalanced incandescent light).
Tint	Allows the user to balance the magenta/green tint of the image and counter balance the changes made by using the Temperature slider. Moving the slider right increases the influence of magenta; moving the slider left increases influence of green.
Exposure	Exposure simply lightens or darkens an image by increasing (right) or decreasing (left) exposure. Checking the Auto box will automatically select a balanced exposure based on other existing settings.
Shadows	Enhances the influence of shadows in the image. Moving the slider to the right darkens the image; moving it to the left lightens image. Checking the Auto box will automatically select a shadow presence based on other existing settings.
Brightness	Enhances the influence of highlights in the image. Moving the slider to the right lightens the image; moving it to the left darkens the image. Checking the Auto box will automatically select a highlight intensity based on other existing settings.
Contrast	Enhances image contrast. Moving the slider to the right increases global image contrast; moving the slider left decreases image contrast. Checking the Auto box will automatically select a contrast based on other existing settings.
Saturation	Much like the Saturation slider on the Hue/Saturation dialog. This is used for adjusting color saturation in the image globally. Moving the slider to the right increases saturation; moving the slider left decreases saturation.

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*Continued*

CONTROL	USE/DESCRIPTION
Sharpness	Enhances local contrast in the image much like the Unsharp Mask filter. Moving the slider to the right increases the local contrast, sharpening the image; moving the slider to the left decreases the intensity of the sharpening.
Luminance Smoothing	Helps to attenuate tonal noise somewhat like blurring. Moving the slider to the right increases the softening, moving the slider to the left reduces the intensity of the blur.
Color Noise Reduction	Mediates color noise. Moving the slider to the right increases mediation; moving the slider left decreases mediation.
Bit Depth	Enables the user to open the image at standard 8-bit depth or use the RAW file bit depth to render a 16-bit image. If selecting 16-bit, RAW camera images with less than 16-bit will be converted to 16-bit so no image information is lost. Select the desired result from the drop list.
Rotation	Rotates the image for the preview and opened image. Clicking the rotate button at left rotates 90 degrees counterclockwise; clicking the rotate button at right rotates the image 90 degrees clockwise.
Auto	These check boxes appear above adjustment sliders for Exposure, Shadows, Brightness and Contrast. When they are checked, the corresponding slider will adjust automatically whenever you change any of the other settings.

## Advantages and Disadvantages of 16-bit?

Once your images are processed and you are ready to go to print, you will be printing to an 8-bit color device (I don’t know any printers that claim to handle 16-bit images). This is a current technological impasse, which may be changed in the future, as 16-bit images haven’t been around all that long in common practice. However, whether printing to 8-bit with 16-bit information is a “loss” at this point is questionable. Technically you will be changing from trillions of colors to millions, but the difference might be beyond human perception.

The real thing that you are trying to do with RAW files is not to print them; it is to get the best darned image information you can off your camera. One of the maxims for ending with the best result is starting with the best image—not one that you will use digital image editing to enhance later merely for fixing mistakes. That means trying to capture what you imagine you see in the viewfinder and in your imagination by using the equipment you have. If you are a creative shooter, your images (and correction possibilities) could gain from using RAW files, but it is not critical, and not everyone needs it for image editing. Using RAW format offers the opportunity to fine-tune images coming from the camera. For many who are critical of their work, this can provide advantages.

The biggest drawback to using RAW format is that the files stored in RAW format tend to be much larger than those stored as JPEG. This means that you will either need to get more storage for image capture (more media cards, or cards that have greater capacity), or be prepared to fill up your media many times faster. In short, it can cost you more space



when shooting, more processing time when correcting, and more archival space when storing. However, the potential gain in quality and possibilities when processing may be worth the drawback.

Whether the ability to work with RAW files is a benefit depends on your camera, its processing, and your workflow. An honest evaluation of images you open from RAW against those processed by the camera should give you a good idea of whether it is worth the additional space—and the cost of additional storage. In most cases it is likely that it will be, at least for manipulation.

## Reader Requests

If you think of anything you'd like to see in a chart or table that would simplify what you do, please make a request on the website or newsletter for the book, or send the request to me by e-mail. If you need it, it can probably prove useful to a lot of people. I'll make requested information available as I can (possibly as part of the Hidden Power tools). Your input is invaluable! I can't guarantee I'll get to everything, but I may have a quick answer to help out.

E-mail: [thebookdoc@aol.com](mailto:thebookdoc@aol.com)

Website: <http://www.hiddenelements.com/>

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**Note to the Reader:** Throughout this index **boldfaced** page numbers indicate primary discussions of a topic. *Italicized* page numbers indicate illustrations.

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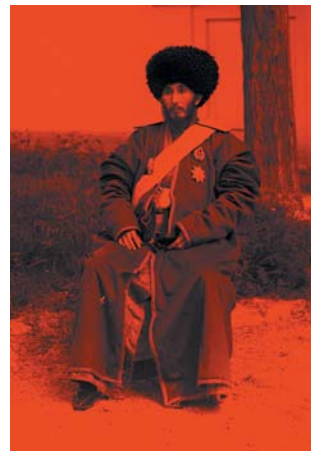
Original scene



Blue light (using a blue lens filter)

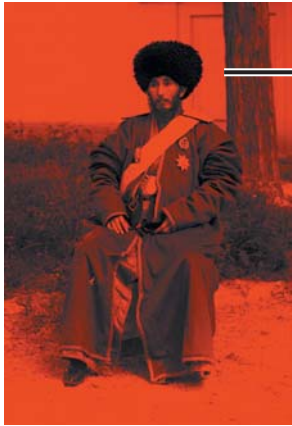


Green light (using a green lens filter)



Red light (using a red lens filter)

This image by Prokudin-Gorskii, titled *Man in Uniform, Seated on Chair, Outside*, was taken around 1910 by using color filters on the lenses to separate color into red, green, and blue components.  
[Chapter 1]



Red light



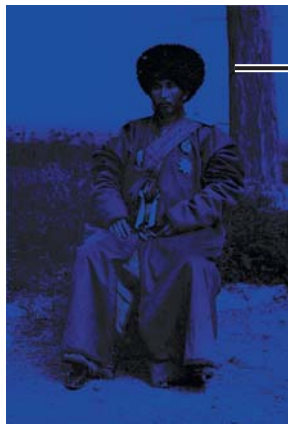
Red Tone



Green light



Green Tone



Blue light



Blue Tone

The filtered light was captured on black-and-white glass plates, encoding the color information before there was ever color film, but as three separate color plates representing the red, green, and blue components as tone. [Chapter 1]



Red Tone



Red light



Green Tone



Green light



Blue Tone



Blue light



Restored original

With Photoshop Elements and Hidden Power tools, you can use color properties and layer modes to reverse the process and re-create color in the scene that Prokudin-Gorskii shot almost 100 years ago. [Chapter 1]





Original



Red



Green

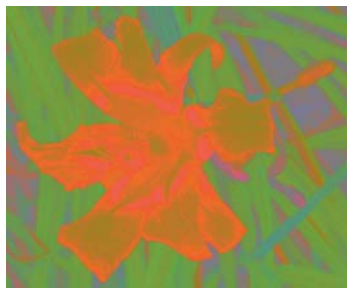


Blue

Any color image breaks down into the red, green, and blue components when you use the RGB separation process enabled by the Hidden Power tools. [Chapter 2]



Original



Color



Luminosity

Any image will also break down into the color and luminosity components when you use Hidden Power color and luminosity separation tools. [Chapter 2]

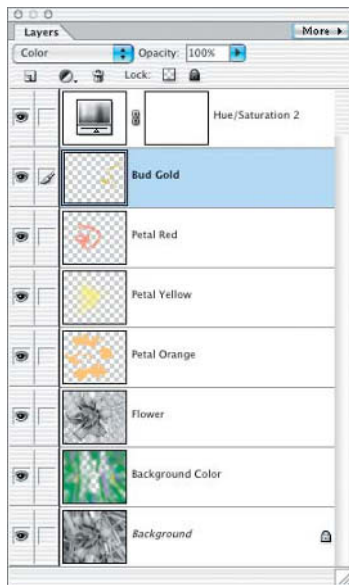




Original



Original converted to tone



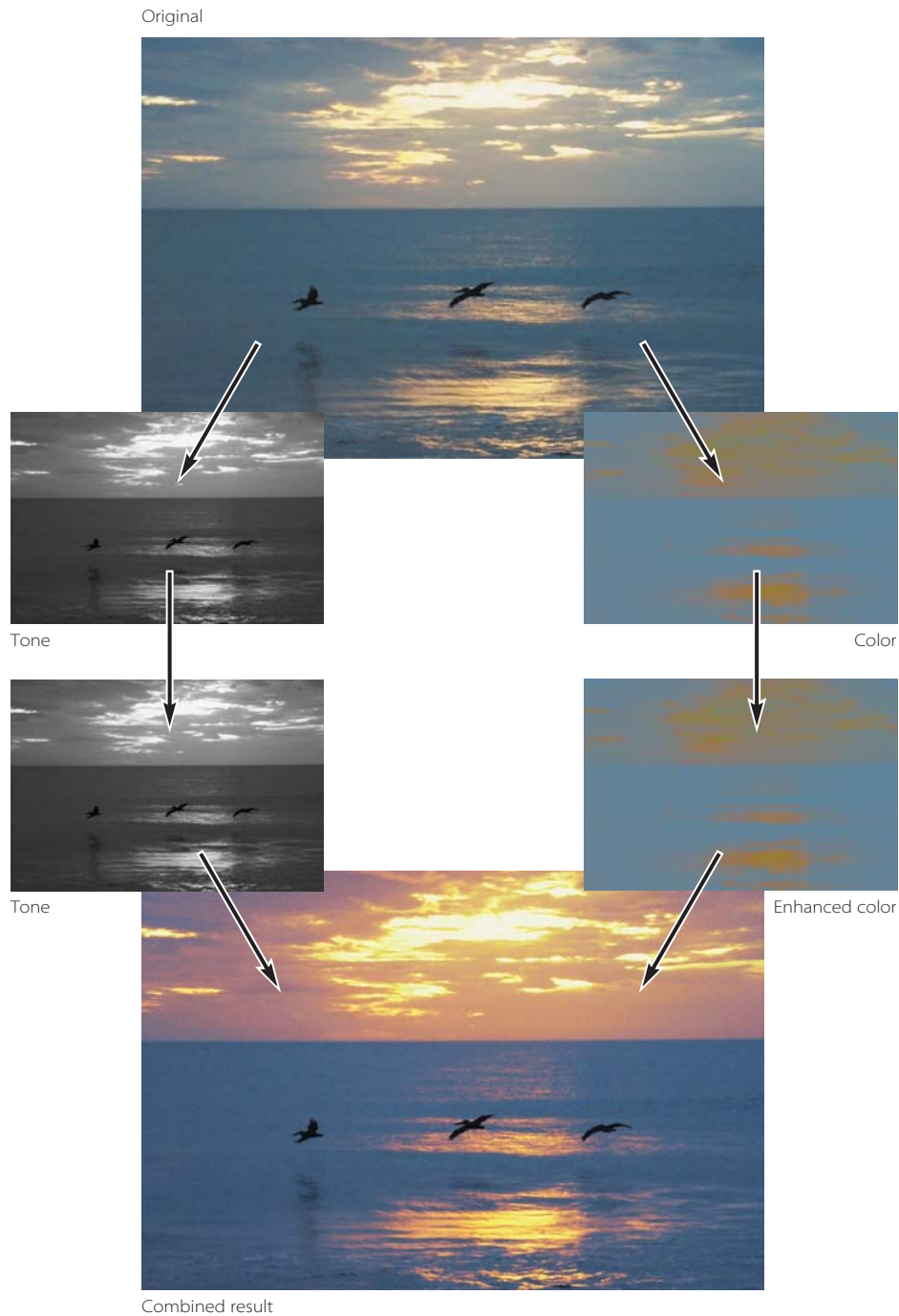
Layered result



Hand-colored lily

Tone and color work together to create what you see in an image. Hidden Power tools show how layer properties can be used to help you hand-color tone, creating new art from any image. [Chapter 2]





By separating color and tone with Hidden Power tools, either or both can be optimized and enhanced to produce better image results. At the top of this diagram, color is separated from tone; when the color is adjusted (bottom), color and tone are reassembled for improved final results. [Chapter 2]



Original

Learning to control noise and blur can eliminate image problems while retaining the realistic look of objects. Hidden Power techniques for applying blurring and noise are used here to improve skin tone. [Chapter 3]



Close-up of original



Close-up of blur only



Close-up of mixed blur and noise



Before



After

Applying Hidden Power tonal manipulations and masking adjustments can help you take images on the brink of being useless and bring them back to life. [Chapter 3]

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Before

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After

Simple adjustments with Levels can correct color imbalances, brighten tone, and make images more dynamic in seconds. [Chapter 4]



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Before

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After

Level adjustments can enhance tone and detail without changing image color.  
[Chapter 4]



Before



After

Applying Curves with Hidden Power tools and techniques on image color components can fine-tune color adjustments. [Chapter 4]



Before

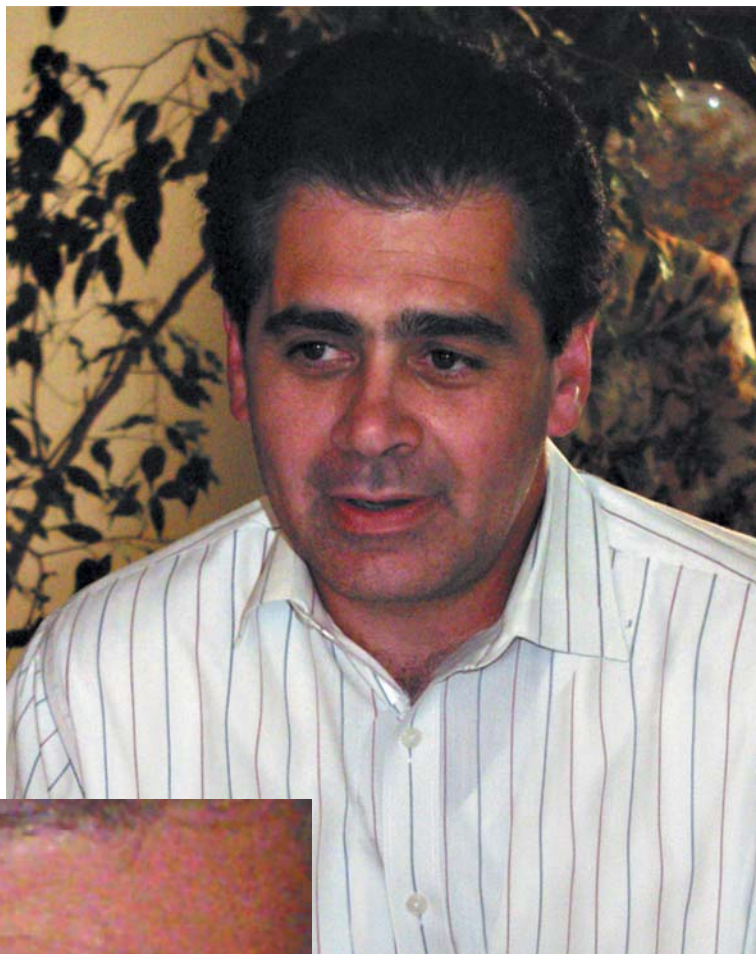


After

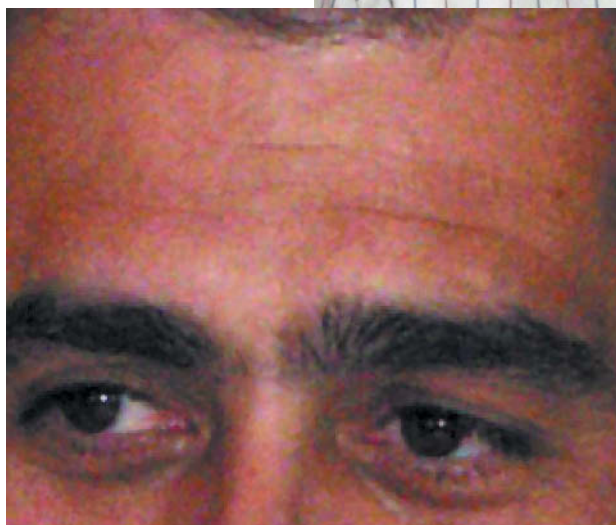
Enhance existing color, target color correction to color ranges, and selectively make color adjustments by using advanced Hidden Power masking techniques. [Chapter 5]



Reduce color noise in  
your digital camera  
shots easily by using  
Hidden Power tools  
that isolate color from  
tone in your images.  
[Chapter 5]

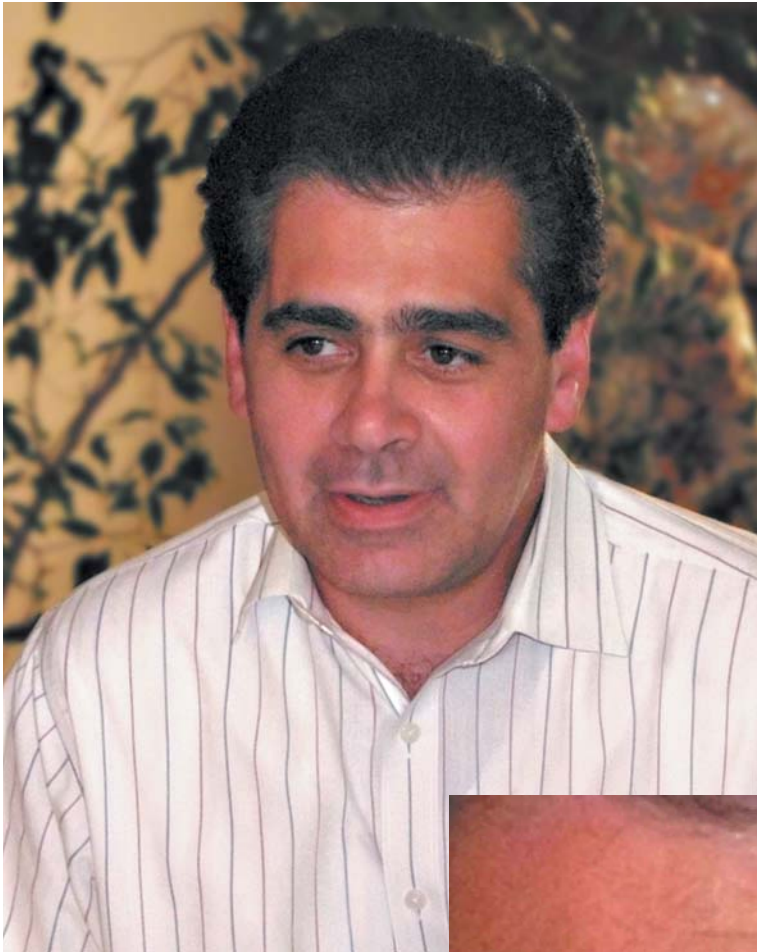


Before

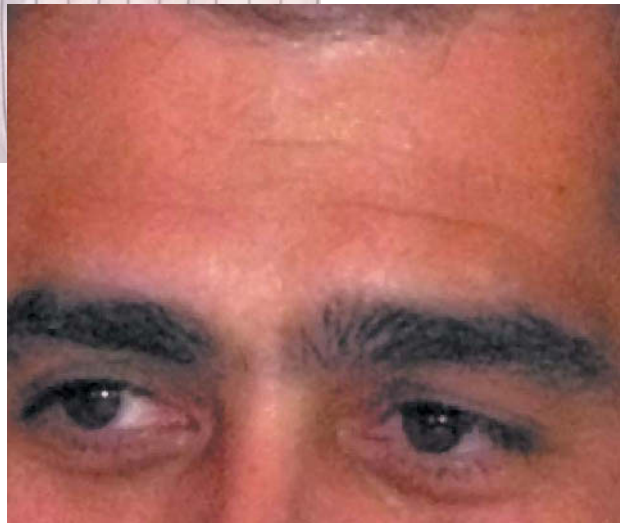


Close-up





After



Close-up



Before



After

Recolor image objects or apply filter effects to select areas of your images with brushes. Hidden Power tools use layer properties and masking to imitate Photoshop's exclusive History Brush. [Chapter 5]

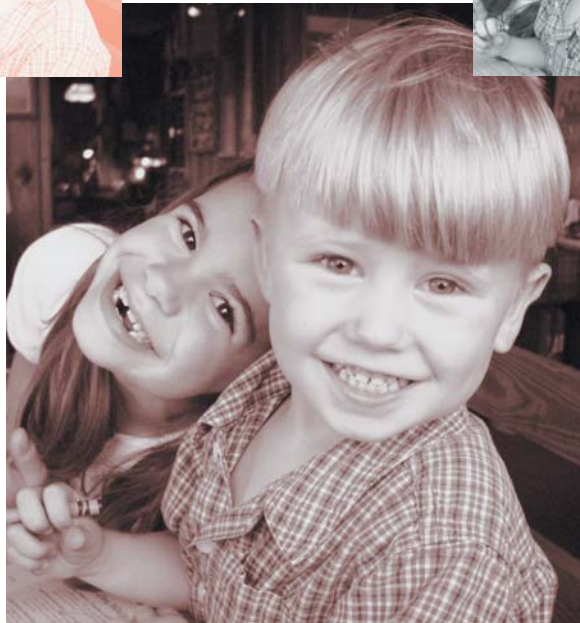
Original tone



Spot color



Black



Duotone color result

Learn several duotoning techniques to impart some color and artistic vision into black-and-white images. Make true duotone effects and print them by using Hidden Power tools and techniques for image results with greater dynamic range. [Chapter 5]



Original



Duotone component (black)



Duotone component (spot color)



Duotone result



Final tone

Color your images with duotone effects, or use properties of duotoning to correct and enhance black-and-white results. [Chapter 5]



Purple flowers



Original pink flowers



Blue flowers

Hidden Power's masking, calculations, and color mixing techniques can help you gain unique control over colors in your image. [Chapter 6]



Original



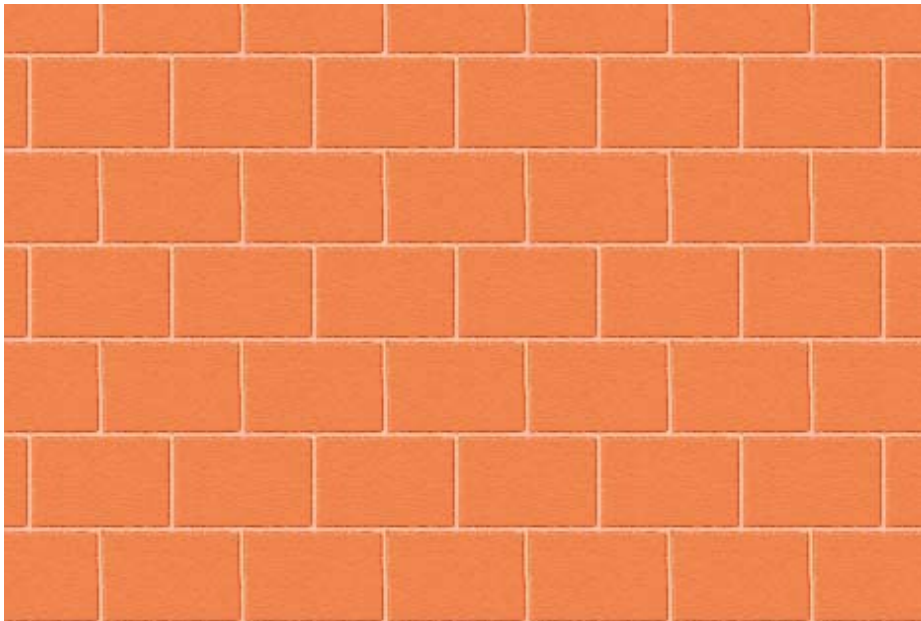
Darkened, blurred background



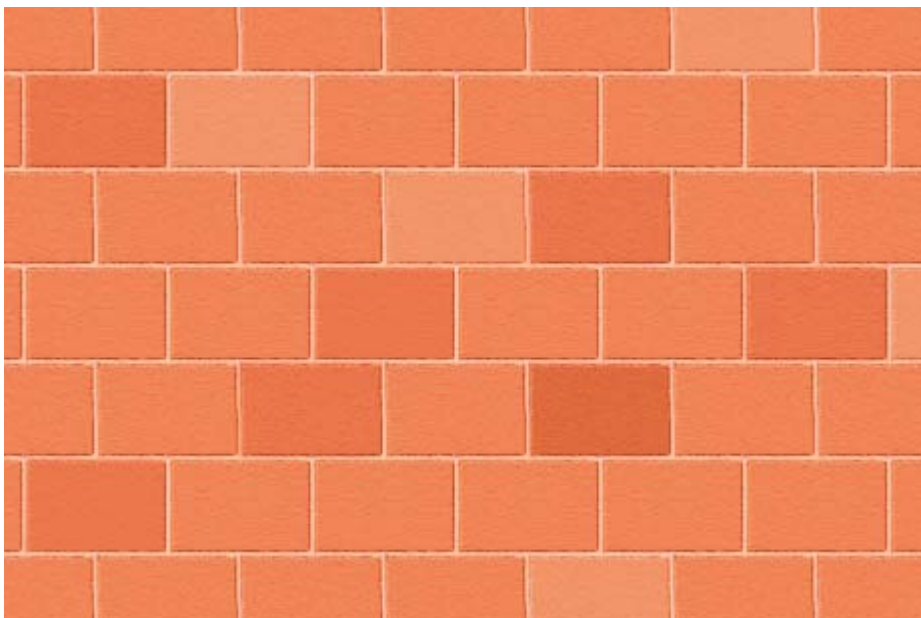
Recolored

Controlling the blur and brightness around a subject by using selection and masking can help it stand out in the image or enable you to recolor any way you want. [Chapter 6]





A simple fill pattern



An adjusted fill pattern

Understand how to create and use image patterns to rebuild image areas. Some selective work and randomizing patterns you create can make a patterned fill more realistic and all but undetectable. [Chapter 7]

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The original image



A simple replacement drop-shadow



A more accurate shadow replacement

Composition changes may require adjusting or re-creating shadows for realistic results. These images show the original image (with a shadow distorted by the camera lens), a simple replacement drop shadow, and a more accurate replacement shadow created by using objects from the image. [Chapter 7]



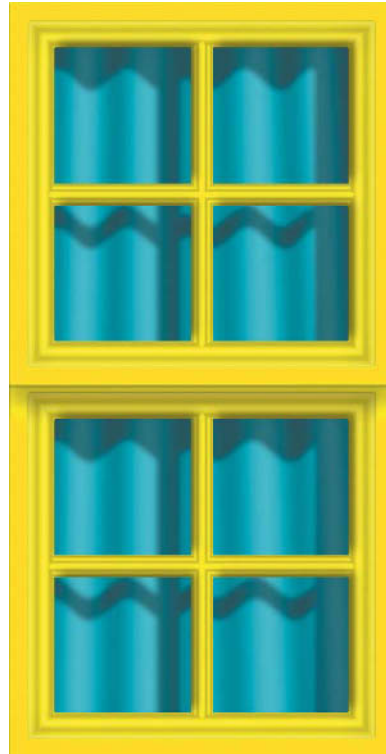
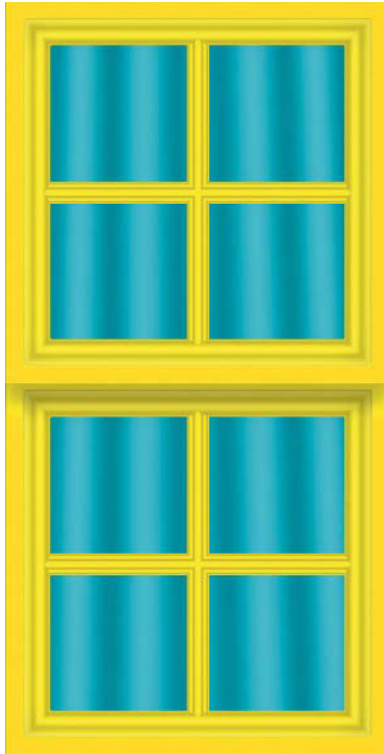


Image objects such as this window can be created from scratch and given realistic dimension by using shapes, shadows, noise, and a few Hidden Power tricks. [Chapter 7]



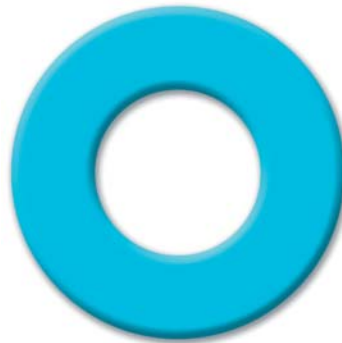
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Original

In a similar way that you can take apart color and rearrange or rebuild it by using Hidden Power tools, you can dissect and rebuild this image entirely to improve the composition. [Chapter 7]



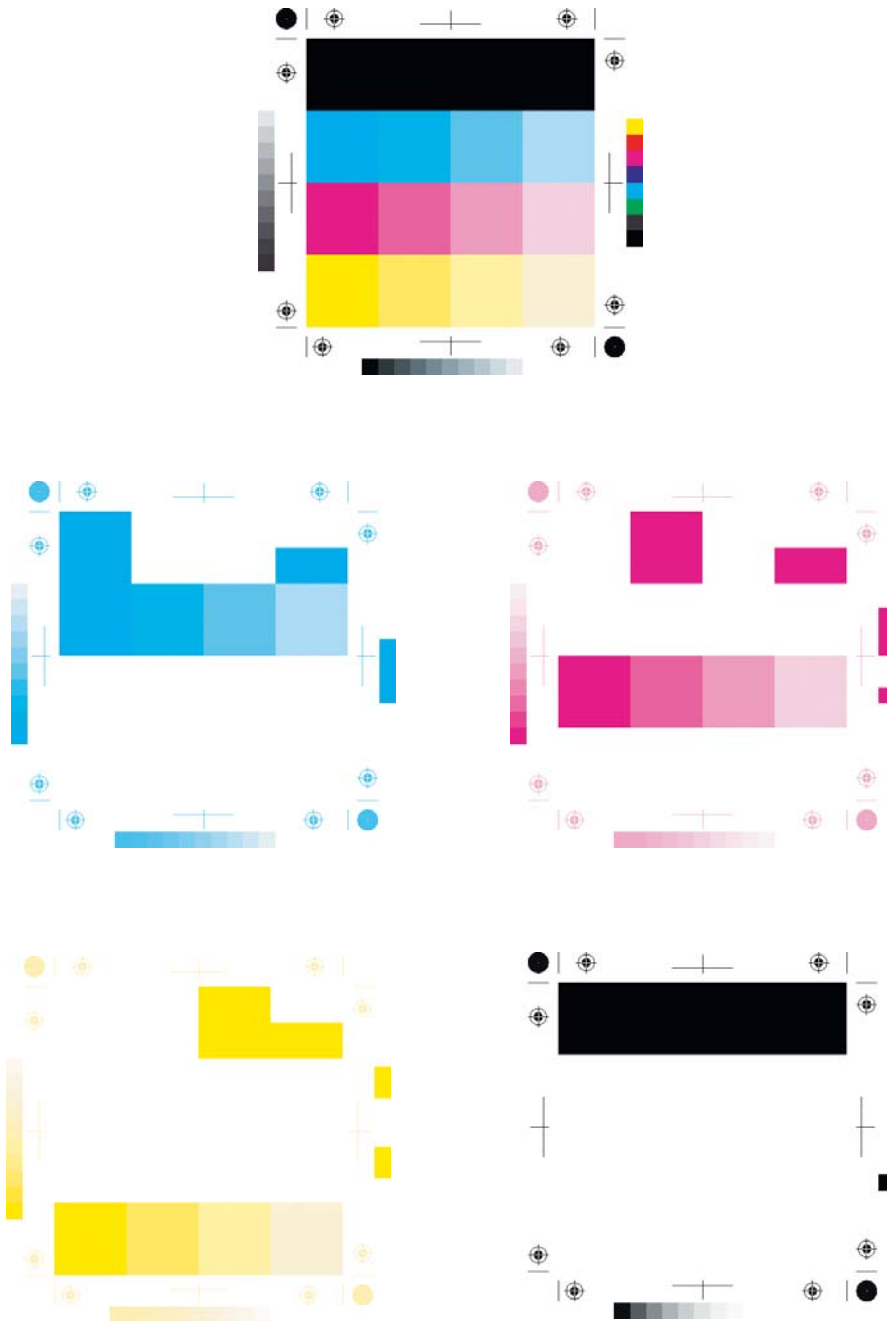
The adjusted composite



It is possible to make custom illustrations, logos, and other high-quality vector art with Photoshop Elements and Hidden Power tools. This figure shows a breakdown of the parts of an image created entirely with customized vectors. The composite result appears on the facing page. [Chapter 8]



Captain Hook's logo can be scaled infinitely and reapplied to any project, from a business card to a billboard and beyond. [Chapter 8]



In CMYK color, all color is represented by cyan, magenta, yellow, and black. This figure shows a breakdown of the test image into pure CMYK colors. Being able to control your CMYK output can be the key to getting better color in print. [Chapter 9]





Normal



Click



Over



Out



Down



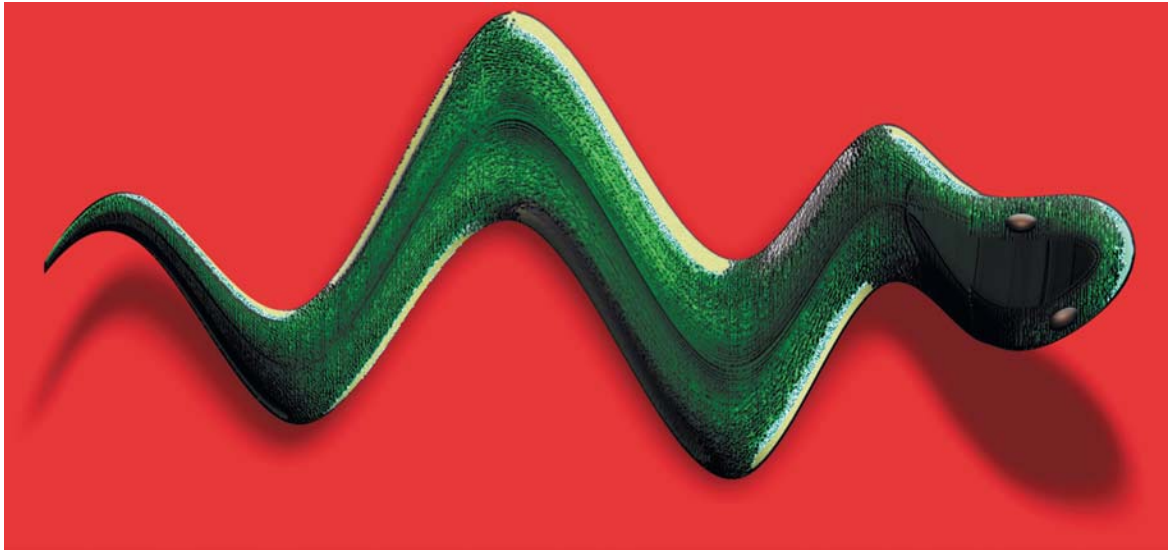
Up

In web design, you can use up to six rollover states to control how the page looks and what happens as the visitor navigates your website. [Chapter 10]

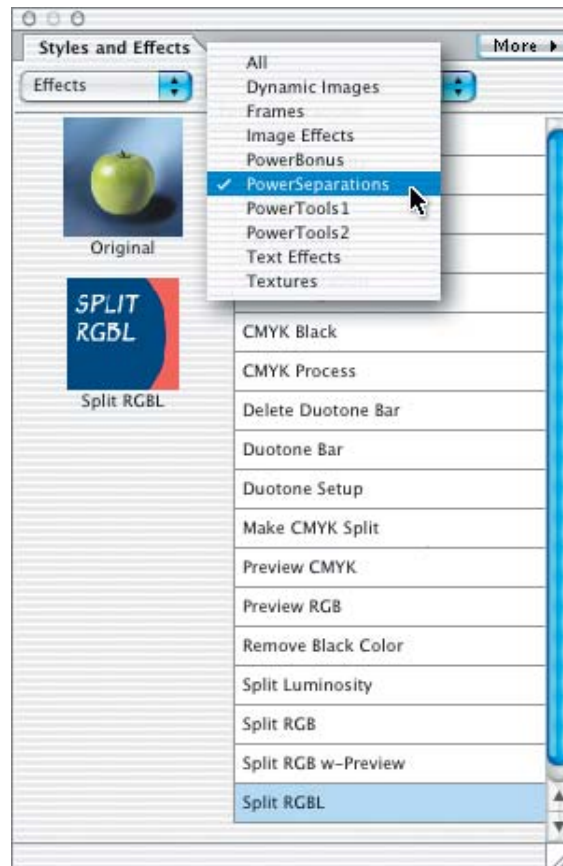


Employing several Hidden Power tools, you can perform “impossible” stunts such as creating custom CMYK color separations from your RGB images without leaving Photoshop Elements and creating CMYK files for print. [Chapter 5]





Images can be built almost entirely by using filters and effects such as these snake and fire effects. Special effects can be discussed on the Hidden Power website and list server. [<http://www.hiddenElements.com>]



A lot of your work will be simplified or made possible by using the Hidden Power tools found on the CD. Access the Hidden Power tools by installing them from the CD (please follow the instructions in the Introduction carefully). After installing the tools, open them from the Styles and Effects palette (Windows → Styles and Effects). Choose Effects in the drop-down list at the left, choose one of the Power categories from the category drop-down list at the right, and then double-click the Hidden Power tool of choice.