4

BEYOND BASIC IMAGE EDITING

As recently as the early 1990, artists could only have dreamed of the images that digital imaging now makes possible. With the growing popularity of digital imaging, features are being improved or added every year. This chapter will introduce several enhancements to the basic imaging procedures.
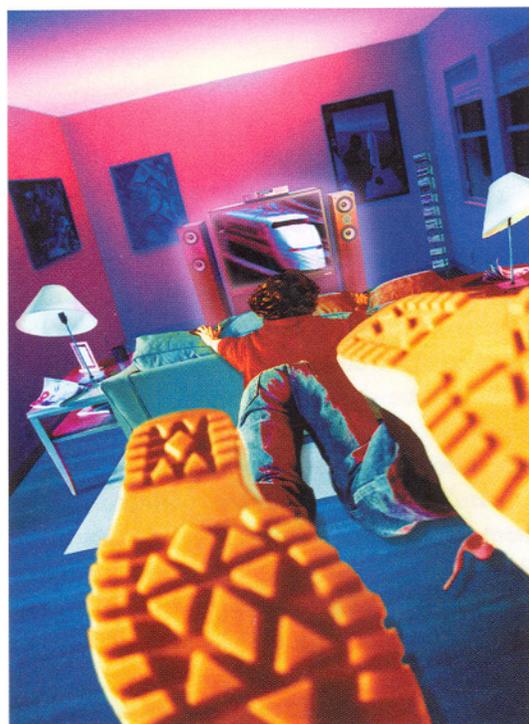
Curves control tones and colors. Curves are the most powerful tool for controlling brightness, contrast, and color balance. Using curves, almost any image can be made perfect.

Layers create composite images. Adobe Photoshop allows you to create images consisting of multiple layers. Layers are separate images that float above the background. You can make composite pictures by bringing together images from different sources.

Adjustment layers protect image data. A drawback to the early tools of digital imaging was that after many color corrections and contrast changes were performed on an image, data was lost and unwanted color artifacts would appear. Adjustment layers are a way to preserve all the color and tonal information in an image, no matter how much editing is done to it.

Masks are advanced tools for making selections. They make it easier to create, edit, and reuse selections. With masks, you can create and edit complex selections and save them for later use.

You can change the past. The history brush and the Fade command make it possible to modify editing steps that you have already taken.

JILL GREENBERG   Soles

In this advertisement for Toshiba consumer electronics, Jill Greenberg combined five separate images: the man, the TV and stereo speakers, the furniture, the picture on the TV, and a miniature model of the room.

The image was created in 1994 with an early version of Adobe® Photoshop®, one that did not have the layers feature (page 66). Without layers, each of the elements had to be positioned exactly, with no margin for error and no possibility of revision at a later time. Layers make creating composite images easier and less stressful.

(Opposite)   **ANNA ULLRICH**   Ticketholder

Contemporary photographers are creating composite images from the most unusual ingredients. Photographer Anna Ullrich says about this image, "The male figure is from a photograph I took of a taxidermist reaching into an embalmed orca whale's mouth. The landscape and faint image of a woman's face in the sky are appropriated photographs; the woman's face is incidentally from a photograph of my grandmother. The remaining imagery (the ticket, the tape measure, the cloth) are objects that I scanned on my flatbed scanner."

Layers

THE BEST WAY TO COMBINE IMAGES

Using layers is the most reliable and quickest way to combine images. Layers are images within the image. They appear stacked on top of each other, like layers in a cake or cards in a deck. Unlike cards, images in layers don't all have to be the same size.
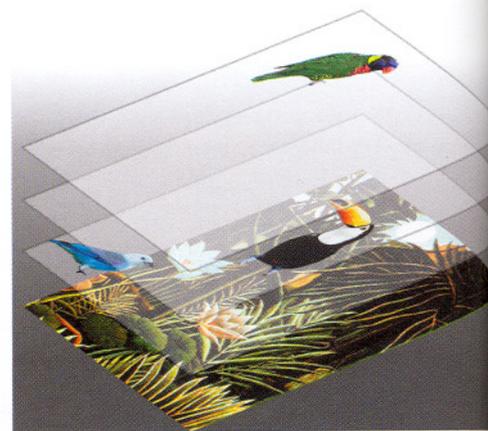
The image in a layer can be moved within the layer; you can reposition the image in each layer vertically and horizontally. In addition, the stacking order of layers can be changed; a layer can be shuffled up or down.

You can apply editing commands to just one layer. Each layer behaves like an independent image. Color balance, hue, saturation, levels, selections, and brush effects can be applied to a layer without affecting the other layers.
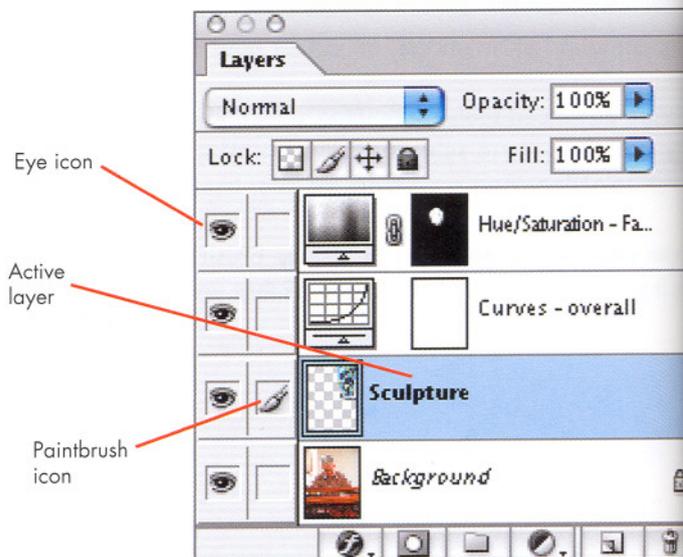
A layer can be made semitransparent so you can see through it. In addition, a layer mask (page 80) can be applied to a layer, letting you control the transparency more precisely— for example, a mask can make an image in a layer transparent or semitransparent in its center but opaque around its edges.

Adjustment layers are a different kind of layer. They don't contain images. Instead, they contain editing commands, such as levels or color balance, that are applied to some or all of the image layers below them (see page 76).

Text layers are a third kind of layer. Text layers contain numbers and letters. Text layers can be reopened and edited (for example, like word-processing documents).

An image composed of layers is like a stack of glass plates with a photogra[ph] glued to each plate. The transparent areas outside each photograph let yo[u] view photographs on the layers below. You can move the pictures from side [to] side or change the order of pictures in the stack. Left, an image composed o[f] layers. Right, how the layers would look if separated.
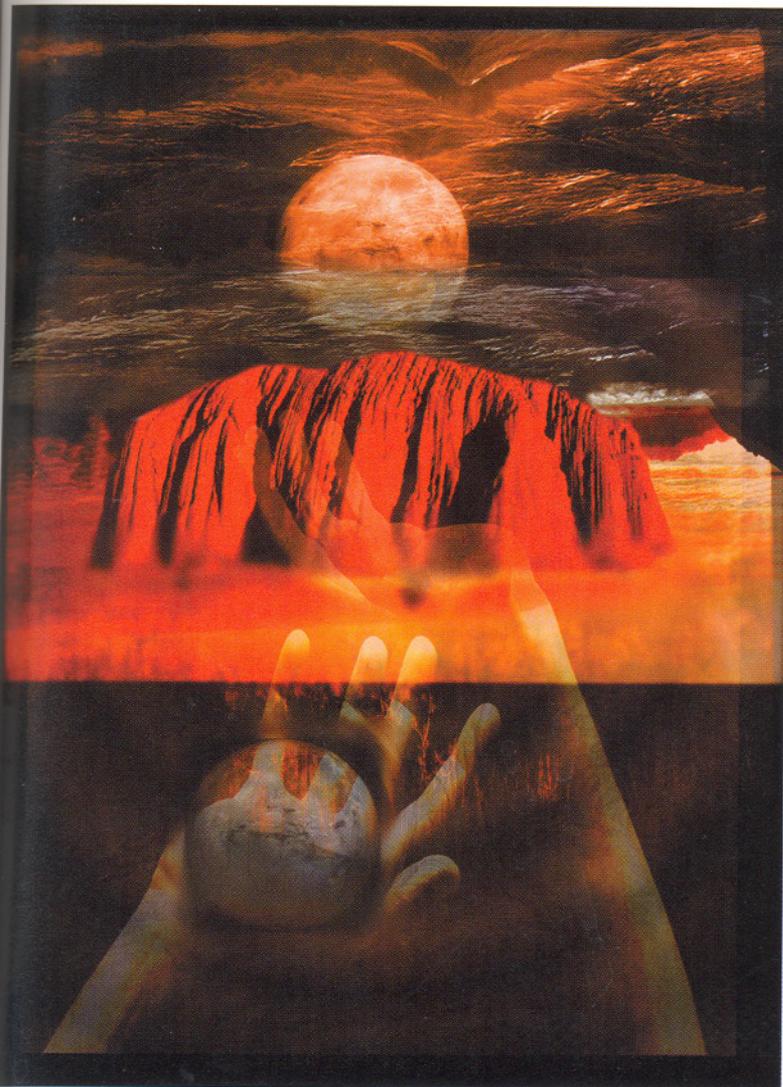

In Adobe Photoshop, layers are stored in the Layers palette. To see the Layers palette, choose Window > Show Layers. The order of the layers in the palette matches the top-to-bottom order of the layers in th[e] image. The **eye icon** is present when a layer is visible. Making layers temporarily invisible is helpful in editing other layers.

Many types of editing can be done to only one layer at a time. Yo[u] must click to **select the layer** you wish to edit; the selected layer is called the **active layer**. When a layer is active its name is in boldfac[e] and its bar is highlighted. When a layer that contains an image is ac[tive] it will also display a **paintbrush icon** beside its name bar. Adjustment layers and type layers don't contain images.
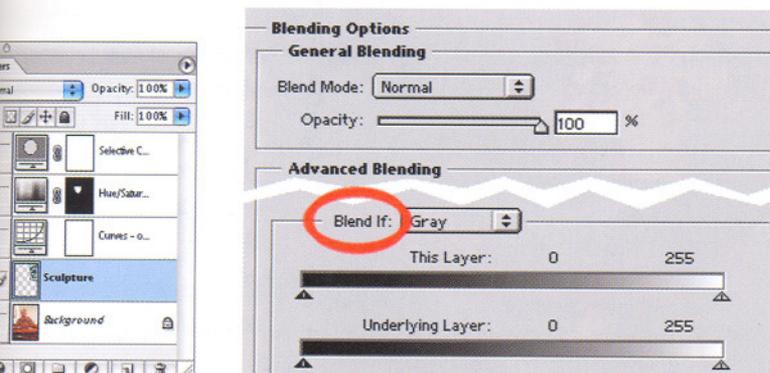
How are image layers created? You can create an *image* layer by choosing Layer > New Layer or by choosing New Layer from the Layers palette's options menu. Photoshop also automatically creates an image layer every time you paste one image into another. When you use the text tool to place text in the image, each text entry creates its own layer.

Naming layers. Whenever you create a layer from a menu or palette, you'll be asked to name it. However, if you paste a picture into an image, the layer will be named automatically. However, it's easier to keep track of layers when they have descriptive names ("Red Toyota"). You can rename a layer by clicking on its name in the Layers palette or by clicking the Layers palette's options button and clicking Layer Properties . . . (Photoshop 6).

LISA JOHNSTON uluru

Semitransparent layers can create strong visual effects. When you set the opacity of a layer to less than 100%, it becomes semitransparent and the layers beneath it can be seen. In Lisa Johnston's image "uluru" (left), the image is composed of five layers. Three of the layers are semi-opaque, but each has a different percentage of opacity. The topmost layer, a barely noticeable series of rings centered on the red mountain, is only 10% opaque.

Image layer options. Clicking an image layer's thumbnail image in the Layers palette (far left) opens a dialog box (left) in which you can specify many effects. The Blending Option **Opacity** is often the most important effect; it allows you to make the image in the layer opaque or semitransparent. Other Blending Options, like **Blend If**, permit you to make parts of the layer transparent while leaving the rest opaque. For example, Blend If lets you make only the lightest pixels of the layer opaque. Wherever its pixels are dark, they are transparent and the underlying image shows through the top image. Blend If also permits separate opacity effects for each primary color.
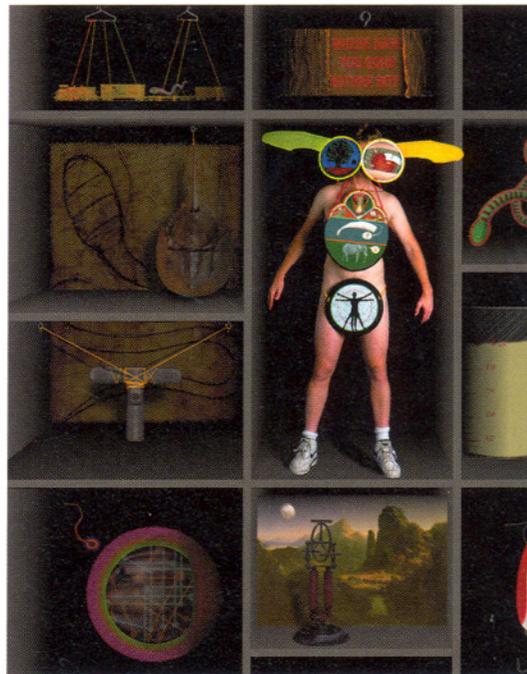
Layers
HARMONIZING THE ELEMENTS OF A COLLAGE

When images are pasted into other images, they often clash with their new surroundings. Something about them looks wrong. If realism is your goal, an image blended into a background must match the background in several ways.

Scale and resolution. An object's size must harmonize with its background. If an object is placed anywhere that gives clues as to its spatial relationship with the background, it is easy to see if it looks too large or too small. It's also easy to see a clash between an object and the background if they differ in sharpness or graininess.

A conflict of perspective can occur when two images taken by lenses of different focal length are combined. For example, imagine two people shown talking face to face. The result will look peculiar if one person was photographed with a wide-angle lens while the other was photographed with a telephoto lens.
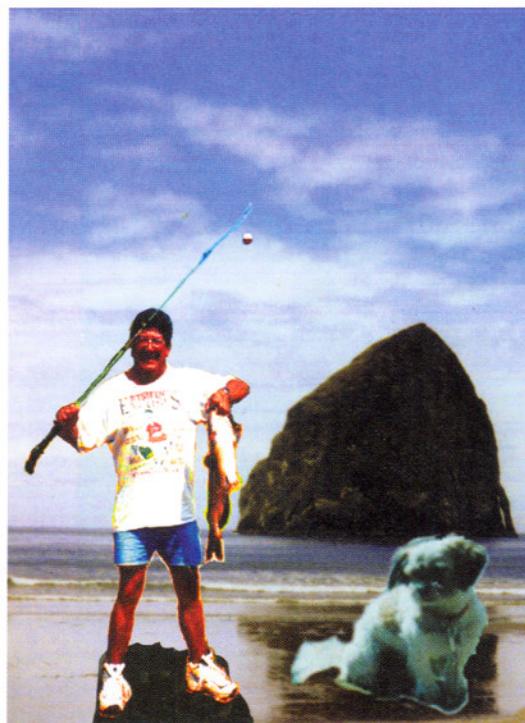
The quality of the light on an object can make it look like it doesn't belong with the rest of the picture. Sunlight casts shadows and creates sharp boundaries between the sunlit and shadowed parts of an object, while light from a cloudy sky is smooth and without shadows. The direction of light is important, too; if the background light appears to come from the right, it will be distracting when the light on a foreground object comes from the left. Contrast often needs to be adjusted if an object is to blend into the background; it's distracting when several shadows don't look equally dark. Indoor light often comes from several directions; each light source may have a different color tint.

STEVEN BLISS
Nature Boy (State II)

Attention to technical details can turn a seemingly incompatible mix of ingredients into a believable image. Creating Steven Bliss's allegories of boyhood in a "normal" American town requires attention to scale, lighting, contrast, and color saturation.

In addition to placing photographs and digital paintings in layers, he carefully paints shadows on the background layers to anchor the objects in the space.

Matching color balance and saturation are important to making realistic collages. At left two layers clash with their background.

One layer has a cyan-blue color cast which can be corrected with the Image > Adjust > Color Balance command (or with Levels or Curves).

The other layer is balanced, but it has too much color saturation. The saturation command in Image > Adjust > Hue/Saturation could remedy this situation.

JENNIFER ROBIN BUELL   Reflections of Humility

Faded layers.   After starting a documentary photography project about a resi-
dential neighborhood that would soon be destroyed to make way for
commercial development, Jennifer Buell realized that the thoughts and feelings
evoked by the hastily abandoned homes could be expressed by nonobjective
images. In this picture, the image layer containing the face is made semi-
transparent with a change of opacity (page 67) and is desaturated so that it
has no color, only tonality. The result is mysterious and haunting.

**Layers are very useful, but an image with many
layers can use up all your computer's RAM and
disk space.**   This will slow your computer
down and make it difficult to work productive-
ly. Images with fewer layers also print more
quickly; in some cases, an image with too many
layers may fail to print or cause the computer
to freeze.

**Speed up your computer by reducing the num-
ber of layers.**   You can *merge layers* together.
In Photoshop, the Layers menu contains the
merge commands.

Layer > Merge Down merges the active layer
into the layer shown below it in the Layers
palette.

Layer > Merge Visible merges all the visible
layers (those with their Eye icons visible in
the Layers palette). *The active layer must be
visible or this command will not work.*

Layer > Flatten Image merges all the layers into
one layer.

**Layers are saved only when the file is saved in
Photoshop format.**   Layers are not saved in
JPEG format. Save an archival copy of your
image in Photoshop format if you believe you
may work on it again in the future.

PROJECT

CREATING AN EXTENDED FAMILY

You will need   You'll need digitized versions of several pictures of your family
or friends. Your artistic goal is to combine people from the separate images so
they seem to belong together or else to make the image obviously artificial but
acceptably plausible. Before you begin, see Making a Composite Image Step by
Step on page 70.

Procedure   Using selection tools, copy images of people (with or without their
surroundings) from two or more sources and paste them into a third image. Con-
sider if you want realism or an artificial look. Realism requires much more work.
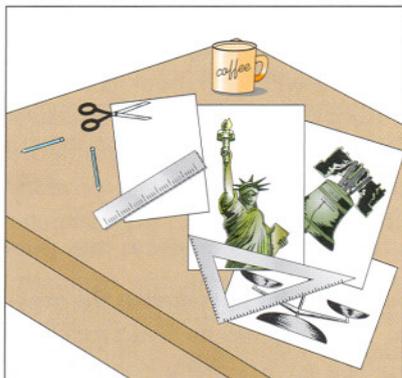
You'll be combining images from several sources, so you'll need to plan ahead to
ensure that the people's images are the right size in relation to each other.

Each image you paste creates a new layer, so you can apply color and tonal
corrections to it. You can also move the layer's image until you have a
satisfactory composition.

Since you will have more than one image open on the computer, be sure you
don't make such large files that your computer runs out of memory. If you do, use
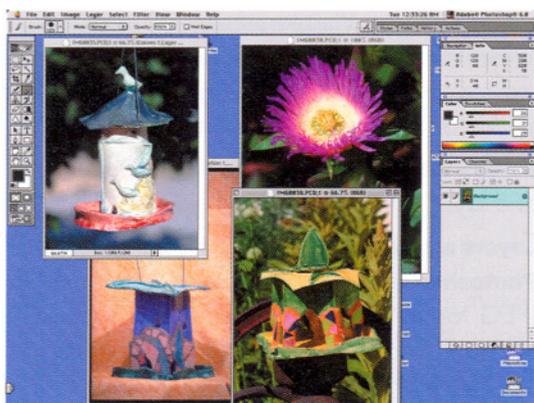one of the Layer > Merge . . . commands.

How did you do?   This is a free-form exercise, but it will help you discover if
you know how to change the size of images, crop and trim them, paste them into
an image, and adjust the tones and colors of each individual layer. If your composi-
tion works, you will create an artificial but interesting group portrait.
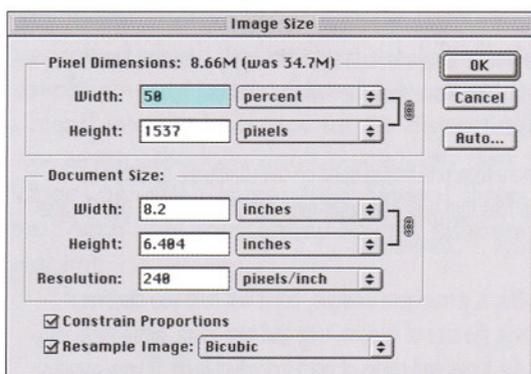
Making a Composite Image Step by Step

Plan your image. Before starting, visualize your final image and deci[de] which component images you will use. Don't plan an image that's too b[ig] for your computer or its memory. Remember that opening several imag[es] at the same time and having many layers in an image increase the d[e]mands on your computer.

1. Sketch what you visualized. Draw a picture of your backgrou[nd] image and place paper cutouts of each component layer over it. W[ill] the image components work together visually? Will they create an in[ter]esting image? Make changes in size and placement until you have a go[od] design. *Sketching on paper is faster than using a computer to sketch a [de]sign. Working on paper lets you try out ideas more quickly and multipl[y] your creativity.*

2. Inspect each component. Examine the component images toget[her] at the same magnification. Do the components and the background ha[ve] compatible contrast, color balance, and saturation? If you plan a rea[lis]tic image, do the components have similar lighting qualities (hard-edg[ed] light or soft light) and is the direction of the light the same? If the lig[ht is] incompatible, you may need to choose other components.

Examine each component to see how difficult it will be to remov[e] from its background. If the selection process will take too much time, y[ou] may wish to use another component image.

3. Adjust all the components. Compare your sketch with the com[po]nents on the screen. Will you need to resample any of the compon[ents] (page 30) so that they all have the right size? Components that are [too] large can be scaled down, but components that are too small may ne[ed] to be rescanned at a higher resolution. If you need to make scans for [a] missing components, be sure their pixel resolutions are compatible.

When reducing the size of the component, use the Image > Image S[ize] command. Checkmark the Resample Image box and select Bicubic fr[om] its pull-down menu. Bicubic resampling retains the highest image qu[ality] although it takes more time than other options.

Adjust the contrast, color balance, and saturation of all the com[po]nents. You will get a chance to fine-tune them later, so this adjustment [can] be approximate.

4. Select a component and copy it.   The right selection process will make component images blend into the background image more easily. Almost all selection procedures are easier and more precise if you zoom the monitor image to 200% to 400% magnification.

- If the background of the final image and the component image are absolutely identical, select the area you wish to copy with the lasso tool. Feather the selection and draw the selection away from the subject so that none of it is in the feathered area.

- If the background must be removed around the edges of the subject, try selecting the background with the magic wand or the Color Range command. Then use the Selection > Inverse command to deselect the background and select the subject.

- If the background must be removed, but the edges of the subject are out of focus or difficult to work with (such as hair), make selections with a pen tool (page 48) because pens are precise and allow selection boundaries to be changed later if they are not perfect. Many experienced users prefer to use layer masking (page 80), another process for creating editable selections.

- Dedicated masking software, like Extensis Mask Pro™, works in conjunction with Adobe Photoshop. These auxiliary programs offer sophisticated tools that simplify creating selections.

After making the selection, save the selection (page 83) in case you need to redo it.

5. Copy the selection and paste it into the background image.   Use the move tool (in the main toolbar) to position the new layer over the background. Examine how well the new layer blends into the picture. If too much of the old background remains around its fringes, you might try erasing the unwanted fringe with a tiny brush. If this doesn't work, you'll need to redo the selection process.

Evaluate the layer's overall quality. Is the image on the new layer the right size? If it's too large, you can scale it (Edit > Transform > Scale); if it's too small, you'll need a larger original. Are the contrast, color balance, and saturation correct? You can use a grouped adjustment layer (page 76) to correct the contrast and color imperfections of any one of your component images.

Repeat steps 4 and 5 for each of the images you add.

6. If you flatten the final image (Layer > Flatten Image) to make it print more quickly, keep a copy of the original with all its layers, in case you need to edit it again.
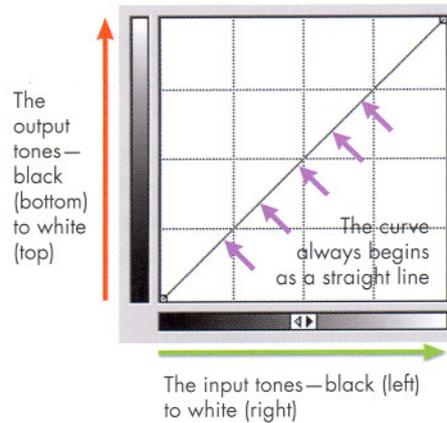
Curves

THE PROFESSIONAL WAY TO CONTROL TONES AND COLORS

A curve is a line on an interactive graph. When you move the line and change its shape (by clicking and dragging), the image's tones change interactively.

The Curves command changes brightness, contrast, and color balance more powerfully than the Levels and Color Balance commands. Levels lets you adjust only three points on the tonal scale: black, middle gray, and white; Curves lets you adjust as many as fourteen gray points, which are more than most images need. In addition to a curve for the combined colors, there is a curve for each primary color. Thus, curves will do what the Color Balance command does—and do it with more power and control.
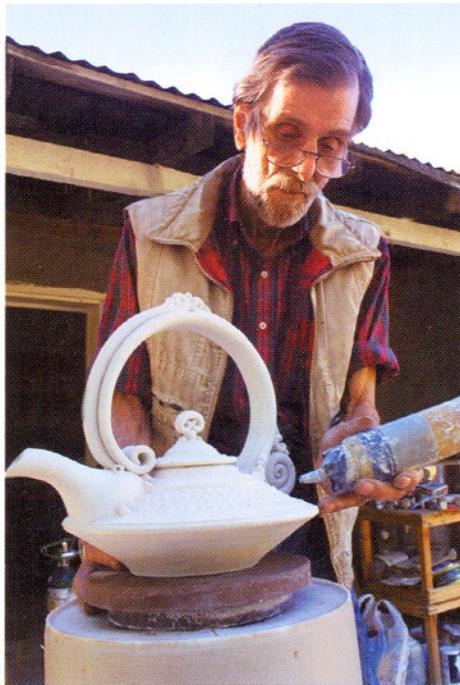
The output tones—black (bottom) to white (top)

The curve always begins as a straight line

The input tones—black (left) to white (right)

The curve as it appears before any editing. The curve is the straight line from the bottom left corner of the graph to the top right corner. Bending this line changes the tones of the image.
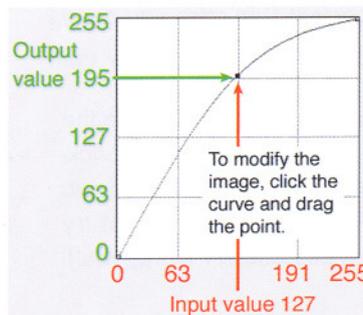
Understanding input and output is the key to using curves. When the curve is bent or moved, the brightness of the pixels changes. If the curve moves down, the image's pixels become darker. If the curve moves up, the image becomes lighter.
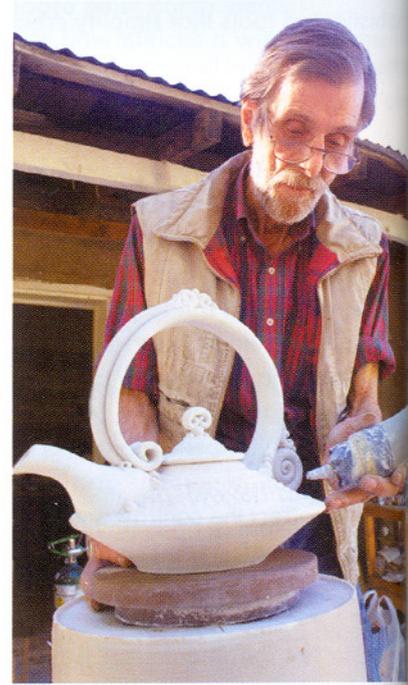
Using a curve to correct too-dark tones

Output value 195

To modify the image, click the curve and drag the point.

Input value 127

Correction with curves. Correcting this image with curves is easy. Since the problem is that the mid-tones are too dark, the middle of the curve is dragged upwards (the mid-tones are in the middle). Whenever the curve is moved upwards, the tones become lighter.
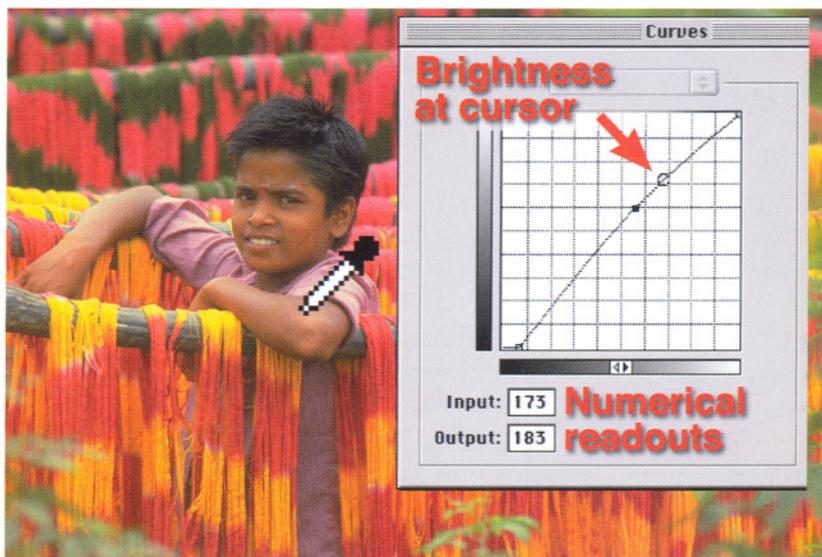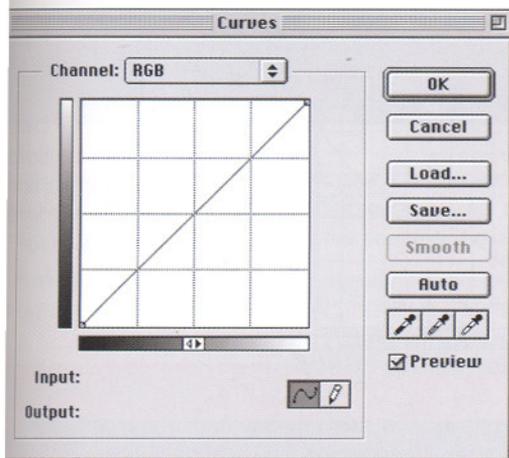
Instant feedback. Photoshop shows you the effects on the image as the curve is being dragged if the Preview box is checked.

Before editing. This image has good white tones and black tones, but the mid-tones are too dark.

After editing. The middle tones are now clear and visible.

The Curves dialog box (below). There are two ways to open curves. Image > Adjust > Curves opens the ordinary curves control. Layer > New Adjustment Layer > Curves opens curves in an Adjustment layer (see page 76 for adjustment layers). Both types have the same interface and change the image's appearance in the same way.

The illustration shows the appearance of the Curves dialog box before any changes have been made to the curve.

Brightness at cursor

Numerical readouts

Input: 173
Output: 183

Bonnie Kamin

Getting information about the image. When you place the cursor in the image and hold down the mouse button, information about brightness appears in the curve dialog box.

- A circle appears on the curve; it shows the brightness of the pixel under the cursor.

- The same information appears in numerical form below the curves graph. **Input** shows the brightness value (0 to 255) of the pixel before the curve was edited, and **Output** shows the pixel's brightness value after editing (the current value).

Moving the cursor with the mouse button held down lets you sample pixels from many places in the image. As the cursor glides around, the circle on the graph moves and the corresponding numbers change. The information you gain can help you decide how to place new points on the curve and which way to drag them to change their brightness.

The steepness of the curve controls the contrast of the image.
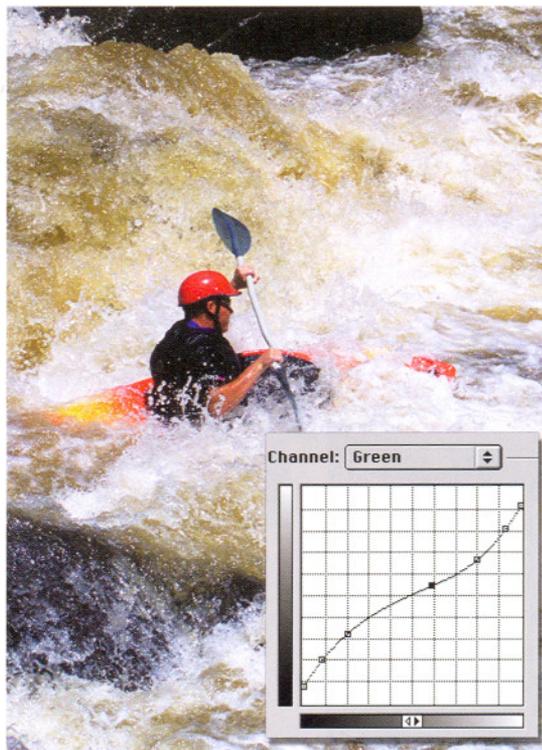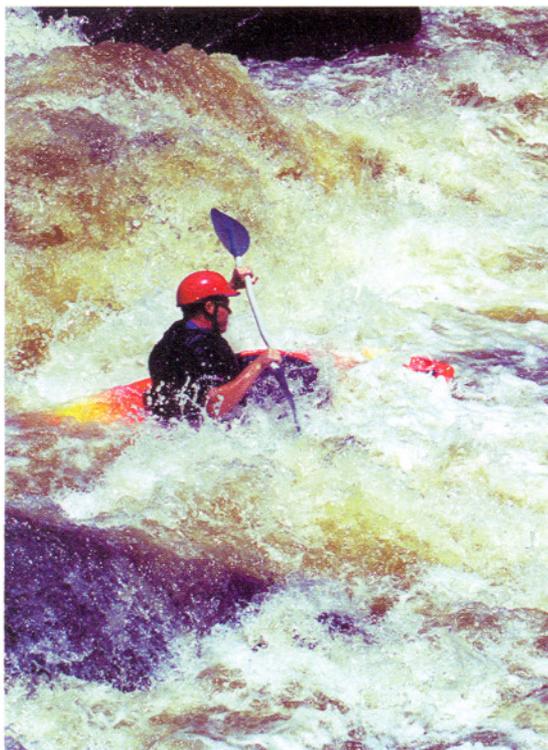
Left, a steep curve makes an image contrasty.

Center, a flat curve gives the image low contrast. Curves can be drawn with many different levels of contrast.

At right, the image has contrasty shadows and highlights, but the midtones are flat.

Curves

USING CURVES

Color corrections with curves. The Curves dialog box has a curve for the combined color plus individual curves for each color.

Here, the green curve used to correct a color problem. In the scanned image at left green was overexposed in the bright areas and underexposed in the shadows, causing magenta shadows and greenish highlights. At right, the green curve is raised in the shadows (which adds green) and lowered in the highlights (which subtracts green).
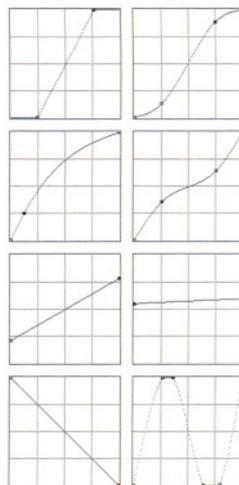

PROJECT

USING CURVES

The Curves command is the single most powerful correction tool available to digital image makers. This project will help you learn how curves can affect every aspect of an image.

You will need   A digitized color image with a full range of tones and colors. It should not be bigger than your screen at 100% magnification. You will be making many changes to see how the curves affect the image, so save a copy of the image in case you accidentally change the original permanently.

Procedure   Use an Adjustment layer to make your changes. Select Layer > New Adjustment Layer > Curves.

Be sure the Preview box is on (place an × in the box) so that the image will change as you edit the curves. Before you begin, click on different tones of the image. This makes a marker appear on the curve corresponding to the brightness of the pixel you clicked. Use this marker to learn about the relationship of the curve to the image.
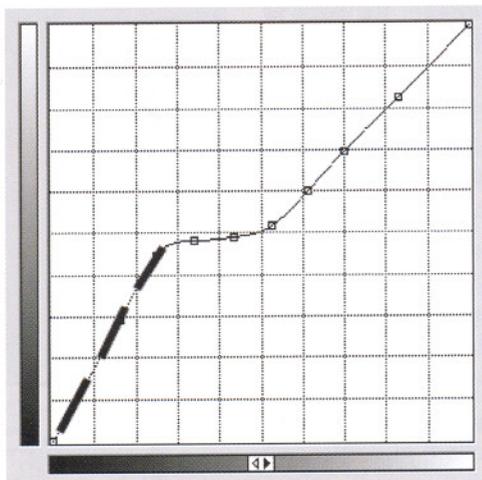

Click on the curve to create points and drag them until you have created curves shaped like those pictured here. Try all these curve shapes plus as many others as you can imagine.

Are places in the image where the contrast appears flat associated with steep or flat parts of the curve? Notice how the contrast and color saturation of the image changes with each type of curve. Notice how small changes in the curve shape affect the image.

Next, experiment with changing the curve of one color, leaving the others unchanged. Then try giving each color a different curve. See how many color effects you can create.

How did you do?   In this free-form project, you should have seen many radically different versions of the image. When the curve is steep, the image should have high contrast. When the curve is flat, the image should have low contrast. When the curve zigzags up and down, the image should show posterization, a special effect in which the tones of the image seem unpredictably jumbled.

Using curves to enhance the dark areas of the scene. At sunset, the bright sky silhouettes buildings on the horizon, and the rooms lit by fluorescent lights are barely visible, as seen at left. Using the curve shown at right, the dark areas of the scene are made lighter and given more contrast, below.

A masked adjustment layer. (page 81) could create the same appearance. The sky would be masked so that the brightening effect would be limited to the dark parts of the image.
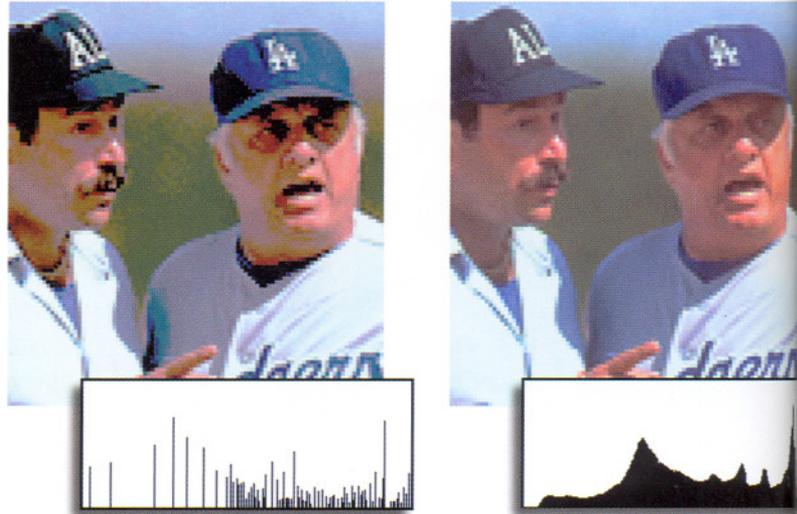
Adjustment Layers
PREVENTING COLOR BANDING AND DATA LOSS

Normally, as you edit an image, its data is altered forever. For example, if you change gray pixels into white ones, the changed pixels are given new values of red 255, green 255, and blue 255. After you finish work and turn off Photoshop, all records of the original values are lost forever. Often, after a series of edits, the original data can be so altered that only a small fraction of the original 16 million colors remain. The result can be that that banding becomes visible (see left).

Adjustment layers are permanently undoable and perpetually redoable. Adjustment layers (Layer > New Adjustment Layer) allow you to edit many aspects of the image without ever changing the original pixels. An adjustment layer contains no image, just commands that alter tones and colors in the layer(s) beneath it. *It is important to grasp the idea that the adjustments never alter the original pixels—the original data from the scan or camera is preserved.* As a result, an adjustment layer's effects are permanently "undoable," even if you reopen the image years later. *Note: the History palette lets you undo an almost unlimited number of changes, but the history is erased when you close the image. You cannot undo anything when you reopen the image.*

Professionals who edit digital images use adjustment layers as often as possible. Although adjustment layers greatly increase the size of an image's file, their flexibility makes them essential. For example, despite advances in color management technology (see page 98) an image will often appear different when printed on different models of inkjet printers. When printed on film (see page 107) or by offset printing press, the image's appearance will vary widely. So, for each situation, a professional must prepare an alternative version of the image—a considerable amount of work. It's easier if the image can simply be reopened and the necessary changes made to the settings of the adjustment layers. Best of all, the settings of the adjustment layer can be saved as files and thus old versions of the images can be recovered if needed again.
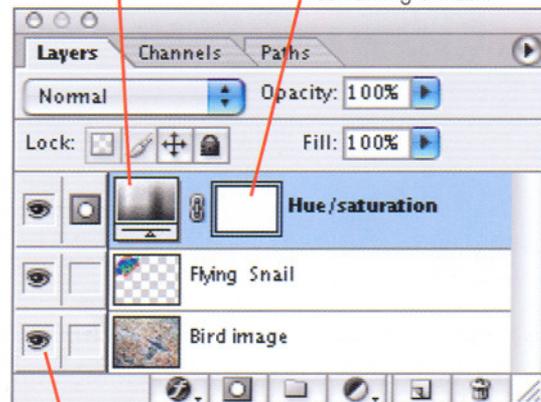
Without adjustment layers, colors can show bands. Left, an image and its histogram. This image was previously edited with Curves, Color Balance, Hue, Saturation commands. Banding is visible; the tonal gradation has an abrupt case appearance instead of a smooth, normal transition. A histogram can be used to diagnose banding. This one has gaps. It looks like the teeth of a comb. These gaps represent brightness levels where data was discarded during editing.

At right is the Levels histogram for an image layer that has had the same editing done with adjustment layers. The image has smooth gradations, and its original tones are present in the histogram.

This icon identifies it as a Hue/Saturation adjustment layer. The icon varies with each kind of adjustment.

This icon indicates that is a layer containing a mask.

Adjustment layers appear in the Layers palette. Instead of displaying a paintbrush icon to the left of its name, an adjustment layer displays an icon that indicates a "mask" (see masks, page XX). The layer's title bar shows an icon that identifies what kind of adjustment it is, such as Curves, Hue/Saturation, Levels, etc.

The eye icon is present in every kind of layer, so the effects of an adjustment layer can be clicked on or off.

Blending Options offer even more control over the image. Like image layers, the transparency of an adjustment layer is controlled by setting the Opacity with the command Layer > Layer Style > Blending Options. . . . In this illustration, a curves layer is applied to an image and its effects are scaled back with a decrease in opacity. Center, the image before adjustments are made. Bottom, the image adjusted with a curves adjustment layer. The amount of adjustment was excessive. Bottom right, the adjustment layer is set to 65% opacity. While decreasing opacity reduces the visibility of an image layer, in an adjustment layer, it decreases the power of the adjustment.

Jewelry, Sheena Cameron

Adjustment layers affect all the image layers below them in the Layers palette. However, you can *clip* (group) an adjustment layer with one designated image layer so that it affects only that one layer. The grouped layer must be the one below the adjustment layer. A grouped set of layers takes a distinctive appearance in the Layers Palette.
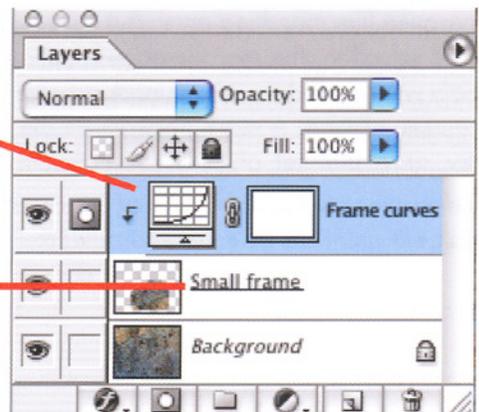
Use adjustment layers with special effects. Many of the special effects that can be applied to image layers can also be applied to adjustment layers. For example, the opacity settings embedded in the layer can be set from 0% to 100%. If an adjustment layer is set to 50% opacity, the power of the adjustment will be reduced by 50% (see illustration).

There are limits. Not all image-editing operations can be done in adjustment layers, but many important ones can: Levels, Curves, Color Balance, and Hue/Saturation. Certain special effects, like drop shadows and text effects, can also be applied in adjustment layers. Unfortunately, at this time, adjustment layers cannot be used to change image resolution or to apply filters like Unsharp Mask.

An adjustment layer normally affects all the layers beneath it. However, if you want to limit its effects, you can group it with the layer immediately below it in the Layers palette. First, select the adjustment layer; then use the command Layer > Group with Previous (Photoshop 7 and earlier) or Create clipping mask (Photoshop CS). Layers beneath the grouped (clipped) layers are not affected by the adjustment layer.

Indented thumbnail with downward arrow indicates that this layer is grouped with the one below it.

Underlined layer name indicates that this layer is grouped with the one above it.

Using Masks to Create Selections

Masks are the most professional way to create selections. Think of a mask as a sheet of plastic that lies on top of an image. Wherever you cut holes in the plastic you can edit the colors and tones of the image beneath; but wherever the plastic is solid nothing can change the image—the image is *masked*.

One advantage of masks is *variable density*. While ordinary selections have feathered or anti-aliased edges, a mask lets you make *any* part of a selection opaque, transparent, or in between. Wherever a mask is transparent, you can edit the image normally. Wherever a mask has partial density, the editing effects are partial. For example, if you increase contrast, the image under the transparent areas of the mask shows high contrast but the image under the semitransparent areas of the mask shows only a smaller increase in contrast.

Masks are not selections; additional commands are used to create selections from masks. For example, in the Channels palette, clicking the "Load channel as selection" icon turns the currently highlighted channel into a selection. *(A channel is the place where a mask is permanently stored. See page 83.)*

Seeing through a mask. A mask can be easier to use than an ordinary selection because of its visibility. Ordinary selections are visible because their edges are marked by a moving marquee (the marching ants). But if it's a feathered selection, the marquee doesn't show exactly where its edges are. A mask is better; you can see all of it. A mask appears on the monitor as a blanket of color over the image.

Masks are like coverings placed over an image. Masks restrict the editing done to the image beneath the mask. In some ways, a mask is like a stencil.

NOTE: before a mask can be used to edit an image, it must be converted into a selection (see example below.)

Problem: to remove the figure and paste it into another image. Top left, figure with a selection drawn around it. The hair is a problem, however, and is only roughly selected. More work must be done on the hair. Top right, the selection is turned into a mask with the command Select > Save Selection. . . . The mask is shown as a light red where is it opaque and is transparent over the former selection.

Below left, a close-up. To improve the hair, the mask is edited by painting on it. Delicate detail can be preserved with semitransparent brushstrokes. Below right, after painting on the mask, the mask was turned into a selection with the command Select > Load Selection. . . . The selected area was then copied and pasted into another image, which appears behind the figure.

1 and 2. A landscape
and a grayscale image
of a dancer. The
dancer's image will be
used to create a ghostly
image in the landscape.

3. A channel (see
page 83) is created in
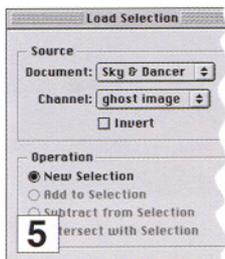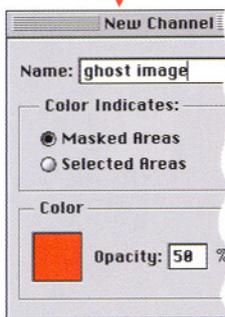the landscape. It is
named "ghost image."

The dancer's image is
selected by outlining,
then copied and pasted
into the landscape's
new channel. **(4)** This
creates a mask contain-
ing an image of the
dancer.

5. The "ghost image"
mask is loaded as a
selection in the
landscape.

6. Two adjustment
layers are created.
They affect only the
selection (the ghostly
image of the dancer).
See page 82 about
masks attached to
adjustment layers.
The adjustment layers
are Hue/Saturation
and Curves. The
adjustments create the
colorful, ghostly image
in the sky. Note: step
6 is performed twice,
once for each adjust-
ment layer. The
adjustment layers are
moved slightly away
from each other so their
effects are not exactly
superimposed.

Bonnie Kamin

The colored blanket is most thick where the mask is fully opaque and is transparent where the mask is transparent. You choose both the color of the mask and how opaque you want it to appear on the monitor. (Usually you don't want a mask to be so opaque that you can't see the image beneath it.) You can also temporarily make the mask invisible if it gets in the way of seeing what you're doing.

Adobe Photoshop treats masks as grayscale (8-bit) images. This has significant consequences. *Because the software treats masks like images, you can edit them like images.* This means you can use a brush to paint on a mask, making the mask either more opaque (blacker) or more transparent (whiter).

Because masks are treated as images, you can also paste shapes and other images into masks. For example, you can put text into a mask; the shapes of the letters can then be transformed into colors or effects. You can paste images into masks (but only 8-bit grayscale images, see left). In fact, because a mask is a grayscale image, you can apply any of the non-color editing techniques discussed in Chapters 3 and 4.

Selections can also be turned into masks. Clicking the "Save selection as channel" icon in the Channels palette turns the selection into a mask. *Why should you do this?* Most complex selections start with a simple selection, the kind you might make with the lasso tool or the magic wand; by turning them into masks, they can be edited more precisely. Then, they are turned back into selections. This may sound unnecessarily complex, but it is a powerful technique. It is helpful for making extremely complex selections, such as outlining the hair on someone's head.
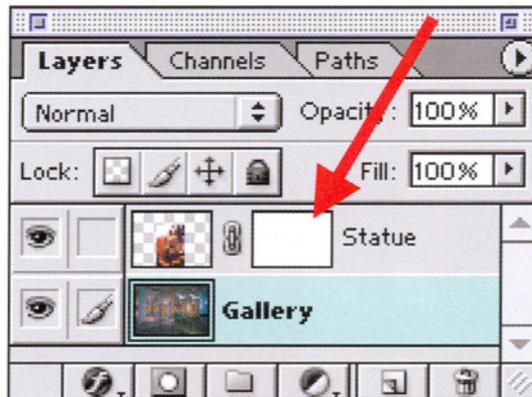
Layer Masks
Attaching a mask to a layer

A layer mask is a mask attached to a layer. They are useful because the mask only affects the layer; the rest of the layers are untouched. Three types of layer masks are useful to photographers.

Image layer masks. A layer mask can make part of an image on its layer invisible: wherever the layer mask has full density (black), the image is hidden; wherever the layer mask is transparent, the image is visible. A partially erased mask makes the layer's image partially visible.

Outlining an object is a common use for an image layer mask. By painting the mask black around the object, you'll make the layer around the object disappear. First, create a mask by choosing Layer > Add Layer Mask > Reveal All. As a result of choosing Reveal All, a transparent mask is created. When you paint black onto the mask, that part of the image becomes invisible. This is a forgiving procedure; if you make an error while painting, you can erase and repaint.

Text layer masks. Layer masks can be used to make parts of a text layer transparent or semi transparent. This extends the range of special effects that can be applied to text in images.

Editing an image la mask. Like all ma a layer mask can b edited with painting tools. In this exampl an image layer has mask that is transpo at first.

Here, the back ground image show museum and the lay floating on top of it statue.
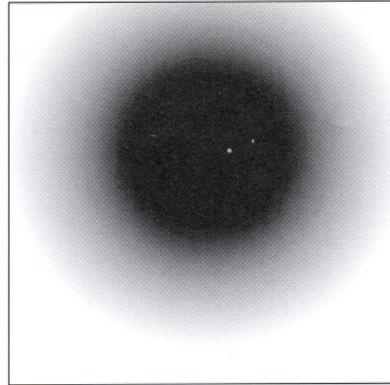
How the Layers pal appears after comp ing the command Layer > Add Layer Mask > Reveal All. thumbnail image of mask appears next the thumbnail imag the layer's image. B tween them is an ic depicting links in a chain, signifying th mask and image a linked together.

The effects of paint on the mask with b Painting adds dens the mask. This hide image in the layer lets the backgroun show through. If yo prefer to see the m while painting, yo make it appear by ing on the mask's icon in the Chann palette.

Masking an adjustment layer. A mask attached to an adjustment layer controls the intensity of the layer's effects. At left is an image in which an adjustment layer was used to decrease contrast until the image was a featureless gray. However, the mask, right, protected the central area of the image and preserved its normal contrast.

A graduated mask on an adjustment layer. Left, the aerial photograph has a correctable problem: atmospheric haze becomes thick and blue as the distance increases. The distant areas need more contrast and less blue. A curves adjustment layer that does this satisfactorily for the distant areas was created, but it spoils the nearby areas. The solution is to gradually mask the adjustment layer so that it is transparent in the distance and opaque in the foreground.
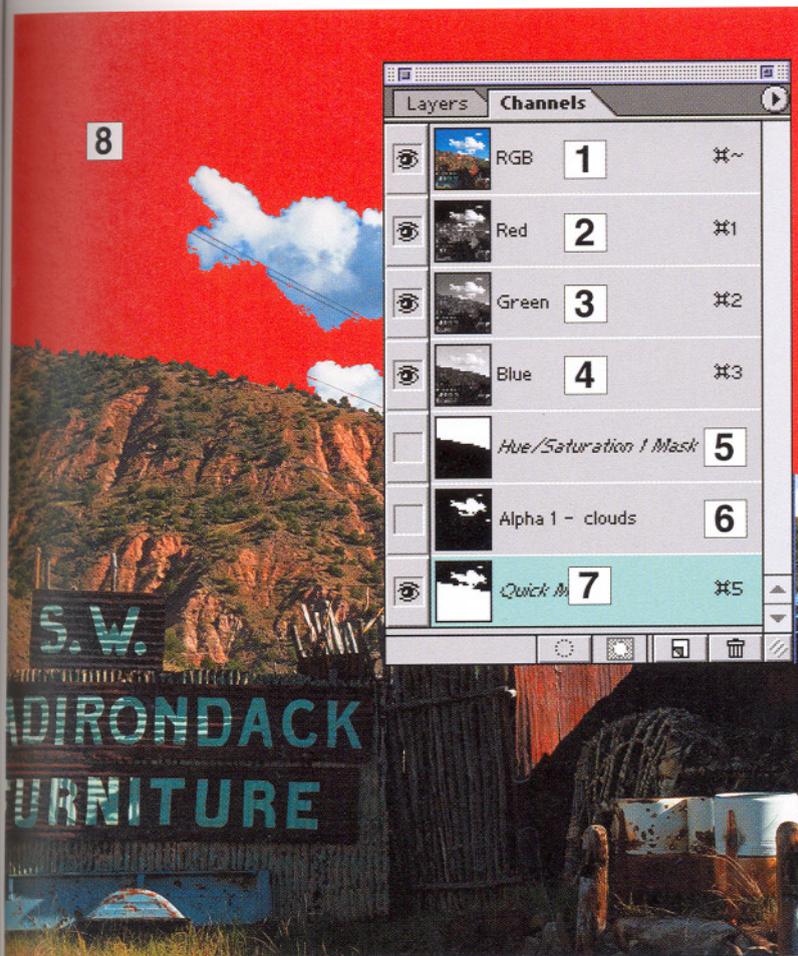
Adjustment layer masks. A mask attached to an adjustment layer can reduce the intensity of the adjustment layer's effects. On the previous page, you read that a black mask on an image layer makes the image invisible. By analogy, a black mask on an adjustment layer makes the adjustment invisible. For example, you already know that if you place a Hue/Saturation adjustment layer over an image layer, you can increase the color saturation of the image. But if you paint black on the mask, those parts of the image beneath the black mask will show no increase in saturation—they are masked from the effects of the adjustment.

The power of Photoshop is enormously enhanced by masked layers. When you master the use of masked layers, you move into the higher realms of digital editing. Masking an adjustment layer lets you "dodge and burn" tones and colors, changes you can easily modify or reverse at any time. Masking also lets you work quickly and experiment with ideas in rough draft form. Imagine having to try out several versions of an image. You can make drafts by using adjustment layer masks to control colors and tones. You don't have to spend a lot of time getting the edges of the masked areas to be perfect—you can do that later, after you have chosen the best image.

Storing layer masks. Creating an adjustment layer automatically creates a transparent mask in the Channels palette (see page 83 for how masks are stored). Whenever the adjustment layer is active in the Layers palette, its mask becomes visible in the Channels palette. Masks for image and text layers are not created automatically. You must use the command Layer > New layer mask to create a mask.

Adjustment lay[...]
let you dodge [...]
interactively. [...]
image, the sky [...]
ened selective[...]
curves adjustm[...]
is masked so i[...]
the upper left [...]
and a few brig[...]
that detract fro[...]
image. Below [...]
image before [...]
is darkened. T[...]
used on the ad[...]
layer is shown [...]
right. The phot[...]
was able to p[...]
the mask and [...]
ately see the re[...]
using different [...]
of paint. Errors [...]
corrected by re[...]

Masks are stored in the Channels palette where they are called *alpha channels*. Because color channels are also found in the Channels palette, it is important to know that the two have little in common. Color channels contain the color information about an image (see page 84). The information in color channels is part of the image; they are visible in the image. However, masks stored in alpha channels are not part of the image; they are never seen in the image. *Alpha channels are merely storage areas for masks—nothing more—and masks are just editing tools that help create selections. You never see the mask itself in the image.*

Alpha channels are a part of the image's file; they may remain when the image is saved. Their disadvantage is that they increase file size. For example, an RGB image file that is three megabytes can expand to four megabytes with one alpha channel.

When your image editing is complete, you may have no reason to keep them, so you can drag the alpha channels to the trash can in the Channels palette. *Don't discard them if you expect to rework the image later.* If you want to keep them, save your files in Adobe Photoshop format. Some formats, like JPEG, can't save alpha channels.

Note: while discarding alpha channels, be careful not to unintentionally discard masks attached to layers. Masks, whose names appear in *italics* in the Channels palette, are not alpha channels. It is also possible to discard the color channels. Normally, this will ruin the color balance.

Three types of channels

1-4. Color channels. The Red, Green, and Blue channels and the RGB (composite) channel are part of every RGB image (see page 84).

5. Adjustment layer masks (page 81) appear when its corresponding adjustment layer is selected in the Layers palette. Only one adjustment layer mask is displayed at any time, no matter how many adjustment layers the image contains.

6. Alpha channels. The channel "Alpha 1—clouds" (named by the photographer) is a mask that was created to lighten the dark tones in the clouds.

7. Quick Mask. There is a second type of alpha channel on this palette, a Quick Mask. Quick Masks are convenient but temporary alpha channels in Adobe Photoshop. They are created by clicking the Quick Mask Mode icon on the toolbar (not shown). You can convert a Quick Mask into an alpha channel by loading it and saving it, but you can have only one Quick Mask at a time.

8. The Quick Mask is the red-tinted area covering the image. It is visible in the image window because its eye icon is switched on. Note that the eye icons of the adjustment layer mask and the alpha channel are switched off. Masks whose eye icons are not visible cannot be seen in the image window.

Color Channels
WHERE COLOR INFORMATION IS STORED

Color channels store information about colors. An RGB image has three color channels: red, green, and blue. A CMYK image has four color channels. Each color channel is a grayscale image with 256 brightness levels. Each is an individual image, just as the three layers in color film are individual images. Like the three layers in film, color channels appear blended together when the image is viewed normally. However, editing software can also display each channel separately or in combination with one or more of the other channels.

What's the difference between a layer and a color channel? Because color channels add to the complexity of the software, it's important to know the difference between a layer and a color channel.

- A layer is an individual, full-color image. Layers can be stacked to create a composite image.

- Color channels are the color components of a layer. Each RGB layer has three color channels.

- When you edit color channels, you edit the color channels of one layer at a time. The active layer (the one selected in the Layers palette) is the only layer where the color channel editing is happening.
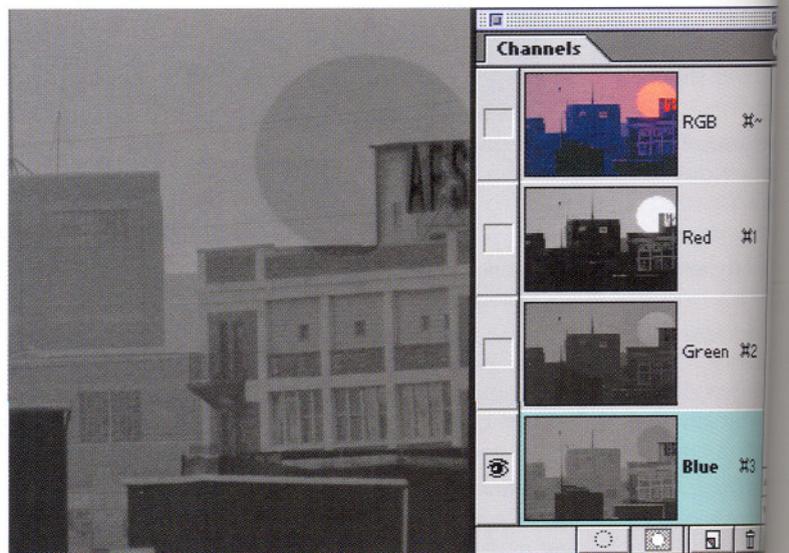
Sometimes it helps to edit only one color channel. On occasion, one channel is less sharp than the others, or it may appear too grainy. To fix this, you might remove grain in one color channel by blurring it with a filter, while you sharpen another color channel with a different filter (see Filters, page 89).
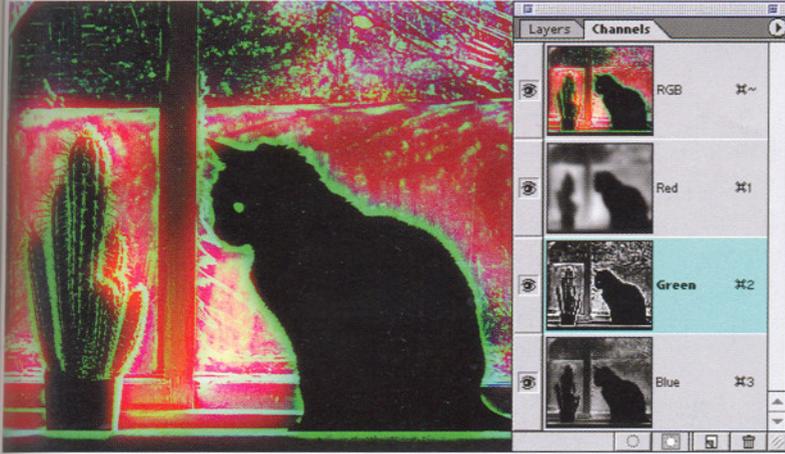

An RGB image has three color channels. Individual color channels are displayed as thumbnail images in the Channels palette, above. The composite of all channels is labeled RGB. When the eye icon is present beside the RGB channel's thumbnail, the image is displayed in full color in the main image window. It's best to view the individual color channel's thumbnail images in black-and-white (instead of color) because they are easier to compare with each other.

Color channels can be viewed individually in the main image window by making the other channels invisible. Channels are turned on or off by clicking their eye icons. Below, only the blue channel is visible (as a black-and-white image) in the main image window. The composite channel and the green or red channels have been turned off (their eye icons are not visible).

Special effects with color channels. To create a halo effect, a very strong Glow filter (Filter > Distort > Diffuse Glow) was applied to the red channel. Then, an Unsharp Mask (Filter > Sharpen > Unsharp Mask) was applied to the green channel (see Filters, page 89).

In order to edit only one channel, you must select it in the channel palette. Note that the Green channel's name is highlighted; highlighting indicates that the channel is active. Since it's normal for *all* color channels to be active at once, you must individually deselect the others.

KATRIN EISMANN
Self-portrait

Using color channels to create image features. Eismann's self-portrait was created with a flatbed scanner. The scanner made separate exposures for red, green, and blue, and the editing software converted the three exposures into color channels. During the three exposures, she kept her head very still while moving her hand to different positions to create an image of many hands.
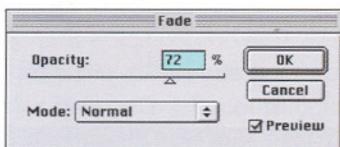

Katrin Eismann www.photoshopdiva.com

Modifying the Past
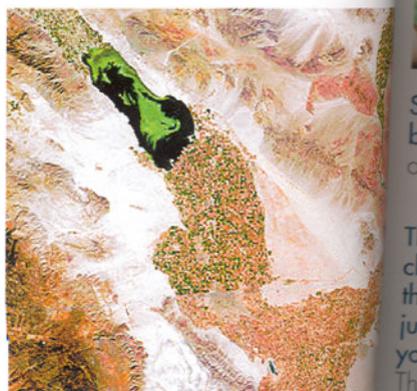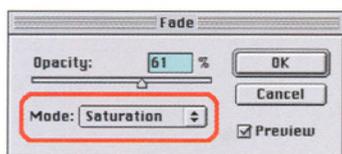## THE FADE COMMAND AND THE HISTORY BRUSH

The command Edit > Fade lets you modify the last editing command you completed. It allows you to partially undo a percentage of the command. For example, if you paint something orange, you could then fade the orange to 65% of its full opacity (in other words, the old color will show through the orange). Or, if you used a blurring filter to soften the image, the Fade command lets you restore some or all of the sharpness. You can preview the effects, so you can use Fade precisely. The Fade command is not available for all commands.

The History brush (in the main toolbar) is like a time machine. It allows you to restore part of an image to the way it looked earlier in your work session. Wherever you drag the History brush, the image reverts to the way it looked earlier. For example, if you use a sharpening filter to sharpen details, you can reverse the sharpening effect by brushing those spots you want to unsharpen. You might also use the brush to undo portions of a change in color balance.

The Fade command can be used to partially undo your previous command. Left, an image in which the Curves command increased contrast excessively. Above, the Fade dialog box, which appears after you choose Edit > Fade. . . . A fade of 0% will entirely undo the Curves command, and a fade of 100% will leave the image with no fade. You can preview the effects as you drag the slider between 0 and 100. Right, the image with the Curves command 50% faded.

The Fade command must be done immediately after the action. If you take another action, fade becomes unavailable.
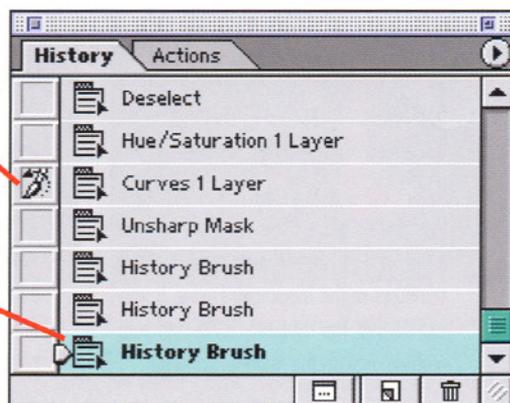

Fade can be used for some creative tonal and color effects. The Blending mode menu in the Fade dialog box permits you to fade only some aspects of a command. For example, after a large contrast increase to this satellite photo (left), the color saturation mode of Fade is selected (above). Right, the contrast is reduced to its original level (0%), but the color saturation effect that accompanied the increase in contrast remains in the faded image.
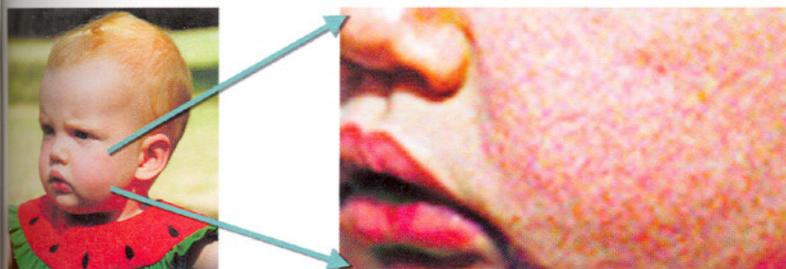
History brush icon

Current state in History palette

The History brush sometimes requires you to plan ahead. In order to work, the brush must paint from a saved copy of an earlier version (state) of the image. These earlier versions are called states (in the History palette) or snapshots, which are also stored in the History palette (see opposite). When you select one of these for the History brush, the brush will copy from it as it paints over the image. For an ingenious way to use the History brush with snapshots (one in which you go forward and backward in time to complete a task), see Removing Spots and Scratches on page 89.

History is made constantly as you edit an image, and it is recorded step-by-step as "states" in the History palette. By clicking in the box beside one of the states, you designate that particular state to be the source for the History brush. A History brush icon appears in the box beside that state's title. Now, you are ready to paint with the History brush.
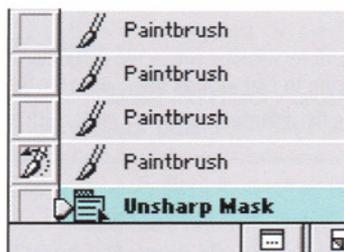
Be careful not to click the title of a History state accidentally. Clicking results in the entire image reverting back in time to the way it was when you created the state. This is a very good way to undo an error you made earlier, but it could also cause you to unintentionally lose a lot of work. If you do this by mistake, you can recover from it by clicking the title of the very last (bottom) state in the history palette. This returns you to the present.
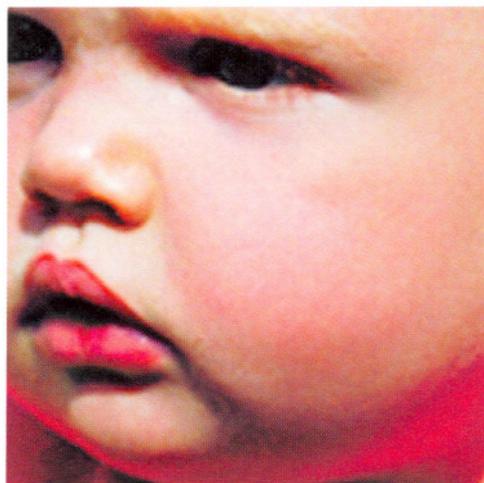

Sharpening with a filter improved this portrait, but areas of smooth skin became rough. The History brush can repair the skin by returning it to the appearance it had before sharpening.

The setup is done by clicking the box beside the state that took place just before the editing you want to modify. The brush icon appears in the box. Note that the sharpened state is still selected. Now you are ready to use the History brush.

The brush paints the sharpened image with a copy of the image as it existed before sharpening. Like all brushes, it can be set to be partially opaque; this lets you build up the changes gradually.
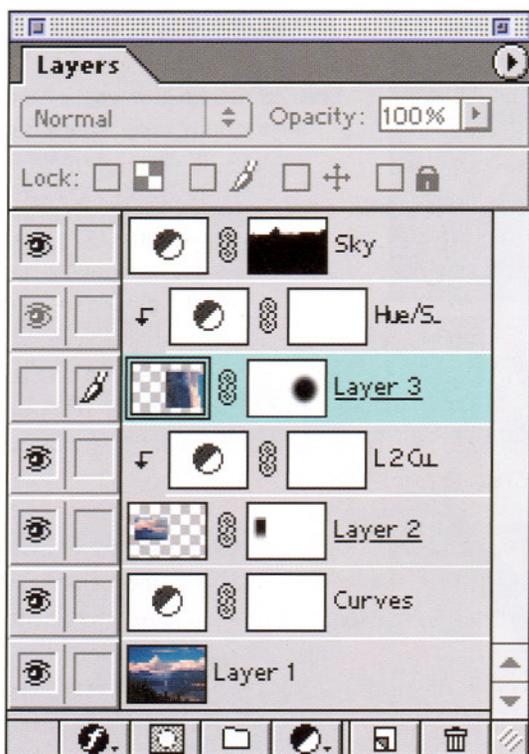
Troubleshooting

Power creates complexity. Selections, layers, channels, and masks make imaging software the tool of choice for thousands of artists. But such power comes with complexity and the potential for confusion. You can be stumped when the software does not do what you expect it to do. At right is a very basic list of steps to take when things go wrong. As your experience in digital imaging grows, develop a personal troubleshooting checklist by adding to this one.

Can you solve this puzzle?

If you try to edit Layer 3, the active layer, why will nothing appear to happen?

Answer: Layer 3 is invisible; its eye icon is switched off. *Your edits are occurring, but you just can't see them!*

When something goes wrong, stop and think.

Make sure that you are editing where you think you are editing—in the correct image, in the correct (and visible) layer, and in the correct (and visible) channel.

SOME BASIC TROUBLESHOOTING PROCEDUR[ES]

1. The editing software stops working.
Try closing a palette to see if the whole computer is frozen.

- If a palette won't close, try switching from the imaging software to Microsoft Windows or the Macintosh Finder. If you can do this, the computer is OK and your problem is with the imaging software.

- Is your image so large that the computer is still working on your last command? If not, you may need to exit and restart the imaging software.

- If the entire computer is frozen, restart the computer or get help from a lab technician.

2. If your last command did not work like you think it should have, stop and think.
Do not issue new commands, as you could accidentally edit the image. As a precaution, use the software's Undo command to undo your last known successful command. Does Undo work the way you expect? If it does, cancel the Undo command.

- If Undo does not work, then something unexpected happened *after* your last successful command. Don't cancel the Undo command, as it might have undone something you don't want. Either way, go to step 3.

3. If you still aren't getting the results you expect, consider some common reasons that this can happen.

- **Are you are trying to edit outside the selection?** See the discussion on

page 44. Also, if more than one i[mage] is open, are you confused about w[hich] image is active?

- **Are you trying to edit the wro[ng] layer?** Only the active layer ca[n be] edited, but it is possible for the ac[tive] layer to be invisible, so your edits [are hap]pening but you can't see them ha[ppen]ing! Be sure that you have the de[sired] layer active and that it is visible.

- **Are you trying to edit a chann[el or] mask that isn't visible or isn't [active?]** It is possible for the active channe[l to be] invisible, so your edits are happen[ing but] you can't see them happening. Be [sure] that the channel you want to edit [is active] and visible. Also, you may have th[e right] channel, but you may be working [on the] wrong layer.
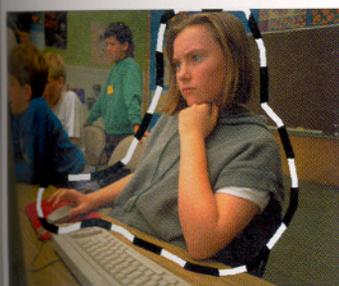
Sometimes a command you want t[o use] is grayed out or is missing from the [menu. Some commands are not avai[lable] at certain times. For example, when an *adjustment* layer is active, many menu [items] are grayed out. They become available [again] when an *image* layer is active. Problems [like] this are best solved by reading the softw[are] manual.

Are you trying to save a file but it w[on't] save? You may be trying to save the f[ile in] a format that won't accept the features i[n the] image. For example, you can't save a lay[ered] image in JPEG format. You may be trying [to] save the file to a disk that can't accept n[ew] files, such as a locked disk or a CD-ROM.

Digital Filters for Special Effects

Bonnie Kamin

Blurring the image around the subject. The subject is outlined with a feathered selection tool. Then Select > Inverse selects the area *around* the subject. The filter Motion Blur (Filter > Blur > Motion Blur) blurs the selection horizontally, creating an illusion of motion. The direction of the blur is chosen by the photographer, and the amount of blurring is set by numerical input.

Removing dust spots and scratches

Step 1. Apply the Dust and Scratches filter to the entire image with the command Filter > Noise > Dust and Scratches.

Step 2. (Top left) Take a "snapshot" of the dust-free image. A snapshot is a copy of the image. Snapshots are stored in the History palette. Open the History palette with the command Window > Show History. From the History palette's pop-up menu, select the command New Snapshot. Name the snapshot (for example, "Dust-free version").

Step 3. (Second from top) In the History palette, make the original (dusty) image active. You will see *two* snapshots in the History palette. Click the original, dusty image to make it active. *Active means that it is the version that is being edited. The image reverts to the way it was before you applied the dust and scratches filter.*

Step 4. (Third from top) In the History palette, click to the left of the dust-free version of the image to make its brush icon visible. *The brush icon means that when you paint on the image with the History brush (see below), the dust-free version will be copied by the brush, as though the brush was the rubber stamp tool.*

Step 5. Select the History brush tool from the main toolbar palette. The History brush is a special brush that paints from one version of an image (the source version) to another (the active version). It's like cloning from one image to another.

Step 6. (Bottom) Use the History brush to paint over dust spots in the original (dusty) version of the image. This will paint in the dust-free version.

Software filters are like camera filters—they create special effects. Hundreds of digital filters compatible with Adobe Photoshop are available from software companies. It is even possible for people with a limited knowledge of software programming to create their own filters.

Software filters, like camera filters, can be gimmicks that distract you from creative thinking. Most filters are useful primarily if you want to transform photographs into photo-illustrations.

A few filters are useful if you want the image to look purely photographic. Unsharp Mask (page 102) makes focus look sharper. Blur filters (Filter > Blur) reduce focus sharpness. Noise filters (Filter > Noise) increase or decrease the appearance of graininess in images. Digital graininess is the result of film grain or electronic noise in the scanner. Some filters and tools (such as blur filters or the smudge tool) eliminate the graininess, with the undesirable side effect that the blurred areas appear artificially smooth compared to the rest of the image. A noise filter corrects this by restoring a grainy appearance to the blurred areas. Select the blurred areas before filtering.

The Dust and Scratches filter will remove defects from an image, but it has the unwanted side effect of blurring the image. However, there is a way to apply it only to the scratched and dusty parts without blurring the image. See the illustration on the left for the details of this important technique.