



Rotoscoping and More Compositing

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In Chapter 17, “Titling and Simple Compositing,” we introduced the concept of compositing, and showed you how you can render part of an image transparent—using a key or an alpha channel matte—to reveal another image lying below. In this chapter, we’re going to show you how to create more complex mattes, as well as how to touch up your composites with painting tools, and how to layer your composites to create more sophisticated effects.

Why all this talk about compositing? Compositing features are the workhorse functions of any special effects process. Yes, you might have spent weeks creating maniacally detailed 3D models and animations of a thundering herd of gerbils, and the results might be incredibly detailed and realistic, but unless you can convincingly composite that animation onto your location footage of a plain in Montana, you won’t have a shot. No matter where your special effects content is created—painted by hand, shot with a film camera, generated by a computer—in most cases, it will need to be combined with live footage.



Even if your project doesn't require any such special effects, you will need to understand the basics of compositing if you want to perform more complicated color correction, or if you want to fix technical problems such as drop-outs and glitches.

For most of the tutorials in this chapter, we're assuming you own copies of Adobe Photoshop and Adobe After Effects. Although you might be able to achieve some of our compositing and rotoscoping goals using your editing program, if you're serious about any type of effects work, you really need a copy of After Effects. Demo copies of both applications can be downloaded from the Adobe web site.

Our advanced compositing discussion begins with a digital update of a technique that is as old as cinema.

Rotoscoping

Put simply, *rotoscoping* is the process of painting, drawing, or scratching on a piece of film. If you ever shot super-8 footage as a kid and scratched laser beams directly onto the film, then you were rotoscoping. A more impressive example, though, is the epic Disney rotoscopes that can be seen in such productions as *Cinderella*. To achieve some of the extraordinarily realistic, fluid movement, animators painted over footage of live actors dancing and moving.

The digital filmmaker has many applications for rotoscoping. At the simplest level, painting directly onto the frames of your video can be a brute-force solution for achieving certain types of effects. In fact, if you're patient and talented enough, you could simply paint in all the effects you wanted! More practical examples of rotoscoping include removing wires from models or actors, touching up the seams in a composite, adding optical effects such as lighting changes, smoke, fire, or lightning, and performing color correction. In addition, rotoscoping tools let you create complex alpha channels that can be used for fine compositing work.

In the next section, we'll lead you through a number of rotoscoping examples and tutorials and, whenever possible, we'll try to show you these techniques using applications that you already have. However, if your project will require a lot of rotoscoping effects, you'll want to invest in a feature with some dedicated rotoscoping tools, such as Discreet Combustion, or Apple's Shake.



As with the other effects topics that we cover in this book, rotoscoping can be a career in itself. Our goal here is to introduce you to some rudiments of the art, so that you can better understand how it might be useful to your production, and how you might personally use it to solve some problems. In addition, having an understanding of the basics will let you speak more intelligently, and interface better with the experts that you might hire for this type of work.

Painting on Frames

Just as Disney used to paint on celluloid, you can open up the frames of a movie and paint directly onto them using your familiar painting and image editing tools. Some programs such as Corel Painter allow you to directly open a QuickTime movie (Figure 17.1). These programs provide a simple interface for painting on a frame, and then moving to the next or previous frame to continue painting. They also offer special *onion-skinning* features that display a semi-opaque copy of one or more previous frames to help you position your paintings on the current frame.



fig 17.1

Figure 17.1 Corel's Painter lets you open a QuickTime movie as a navigable series of individual frames. You can then use Painter's full set of painting tools for your rotoscoping chores.



In addition, some programs provide special tools for painting over several frames at one time (for creating real-time, “painted on” effects) and for cloning from one frame to another—an ideal way to create certain types of effects.

If you don’t have an app that can open QuickTime files directly, you can always use your favorite image editor or paint program for rotoscoping, by first exporting video from your editing application using a format that your image editor can understand. Most editing and effects programs can export footage in a number of “still” formats. However, you’ll need to be careful about managing these images so that you can convert them back into video later.

As we discussed earlier, most effects shots are fairly short, usually just a few seconds, sometimes even just a few frames. Consequently, you usually won’t need to move huge amounts of data around. If you’ll be rotoscoping in a painting or editing program, you’ll need to do the following:

- Isolate the section of video that you want to manipulate.
- Export that section as a series of numbered still images. The file format you choose should be one that can support the full range of color in your video and should, obviously, be one that your painting or image editing app can work with. Most NLEs and effects programs can export PICT, TIFF, or Photoshop format (you don’t want to use JPEG, GIF, or any other lossy, compressed format). When exporting, create an empty folder on your drive and point the exported files into that folder. Your editing package will take care of sequentially numbering each image file. As long as you don’t change the name of any of these files, you’ll be able to easily re-import them later (Figure 17.2).



Figure 17.2 Adobe After Effects will let you save a movie as a numbered series of still images. You can open each image in a paint program or image editor for rotoscoping.

- Using your image editor, open, paint, and resave each file without changing its name.
- Import your numbered images back into your editing or effects application. Most apps have an option for importing a “numbered sequence.” This sequence will usually appear in your project window as a normal movie clip.

Notice that by following this procedure, you will preserve your full image quality since you’ll never expose the frames to any compression.

Filmstrip format

If you’re working with Adobe Photoshop and Adobe After Effects, you use the Filmstrip format to move your video from application to application. (Adobe Premiere also supports this format.) Filmstrip format works just like exporting a series of numbered images, but instead of saving them as separate files, After



Effects exports all the frames in one giant tiled image. (Figure 17.3) You can open this single image and edit the frames accordingly in Photoshop and then re-save the image. The edited filmstrip file can then be imported back into After Effects or Premiere and used to replace your original video.



Figure 17.3 – If you’re working with Adobe Photoshop and After Effects (or Premiere) you can use Adobe’s Filmstrip format for moving your video into Photoshop for rotoscoping.

The nice thing about the Filmstrip format is that it makes for easier file management. However, for long segments, it might tax your computer’s RAM more than a series of single frames will. In addition, you don’t get the onionskinning features that you get from an application that can open QuickTime movies, such as Corel Painter.

Rotoscoping a Simple Image

The easiest way to learn the workflow we just described is simply to try it. For this tutorial, we’re going to return to the “hand-gun” movie that we developed in the last chapter. When we left off, we had just added a camera shake to make the firing of the gun more dramatic. Now we’re going to use some simple rotoscoping techniques to paint some lighting effects onto the movie.

When the muzzle flashes, it should light up the hand, and possibly some of the shinier objects in the room. We could create a flash effect by applying a Levels filter to brighten the entire image, but this wouldn’t look quite right, as everything in the shot would be



brightened equally. We want to brighten just the objects that are near the flash; that is, the hand.

As with the *Camera Shake* tutorial, we will be using After Effects and Photoshop for this example.

Step 1: Open Your Project and Prepare Your Media

Open the Camera Shake project that you created at the end of Chapter 17. Our plan is to rotochrome each frame where there is a muzzle flash. We don't want to use the frame in our current composition, because it has been moved to create our shake effect. Instead, we want to manipulate the original image. Therefore, create a new composition and place the hand-gun.mov file into it.

Step 2: Export Your Single Frames

In your new composition, place the current time marker on the frame containing the first muzzle flash, and then select *Composition>Save Frame As>File*. Enter the name *muzzle flash 1.psd* and save the file. This will save the current image as a Photoshop file.

Step 3: Paint It

Open *muzzle flash 1.psd* in Photoshop. As we explained earlier, our goal is to add highlights to areas that would be flashed by the muzzle fire. Select the Dodge tool and paint the inside of the thumb, the front of the forefinger, and the tops of the other fingers that would be illuminated by the flash. You might also want to remove the shadow around the ring on the ring finger. You'll need a small brush, and you might need to use several strokes.

Now is also a good time to correct any weirdness in the muzzle flash itself. When we cropped the image, we ended up cropping a little too much off the left, resulting in a hard edge on the flash. Using the Smear and Clone tools, we can easily correct and reshape the flash.

There are some dull specular highlights on some of the objects in the background, particularly the molding on the doorway frame, and the bright white rolls of paper. Brighten these highlights using the Dodge tool. When you're done, save the image in Photoshop format (Figure 17.4).



fig 17.03 a,b

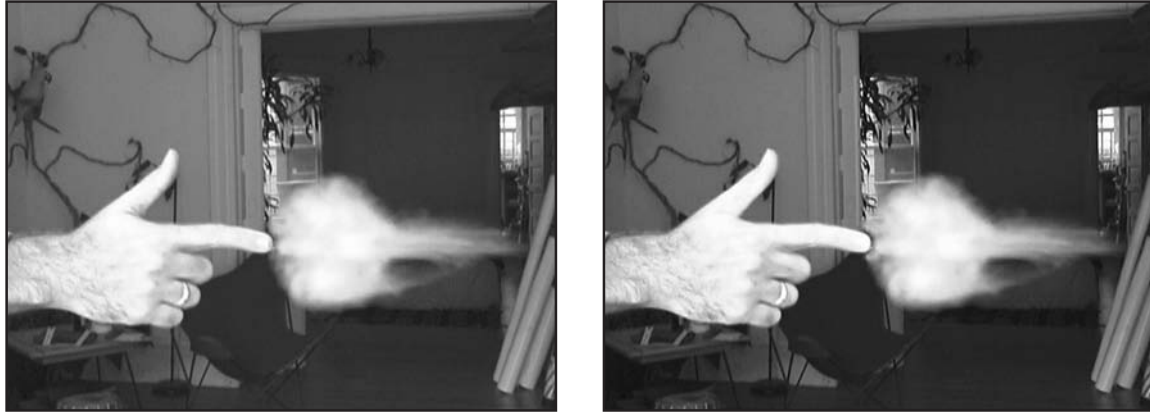


Figure 17.4a,b You can use Photoshop's Dodge and Burn tools to paint in a flash on the frame of video where the “gun” fires.

Step 4: Import the Modified Image

Back in After Effects, import your now-modified muzzle flash 1.psd image and place it into your camera shake composition. Place it in a layer above the hand-gun.mov layer, and position it so that it begins on the exact frame as the muzzle flash in the original movie. Shorten the layer's duration to one frame (Figure 17.5).

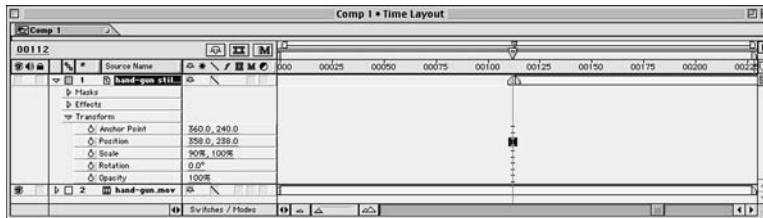


Figure 17.5 Position your still image in a layer above your video.

In the previous tutorial, you repositioned the movie to make the camera appear to shake. Set the muzzle flash 1.psd layer to the same position as the movie.

After Effects does not perform pixel aspect ratio compensation when it imports a Photoshop image. In other words, the imported image will be too wide because of the



difference in DV's rectangular pixels and the Mac's square pixels. You can compensate for this by specifying DV pixel ratio in the comp. settings dialog.

That's it! You've effectively replaced the original frame with the new, modified one. Now you can perform the same procedure with the other muzzle flashes, and then export your rendered shot to your editing program.

Whether working with single or still frames, the process just described is the basic workflow for rotoscoping. In the following tutorials, we'll be using these same techniques to move video between compositing, painting, and rotoscoping applications.

Rendering for DV Output

If you will ultimately be putting your project back out to DV tape, it's important to set the proper rendering settings when exporting clips from a compositing or effects package, especially if the clip you're rendering incorporates video captured from DV.

Because DV is interlaced, you should export your final renderings as interlaced output. DV is *lower field dominant*, so you'll need to specify this at render time.

Figure 17.6 shows the proper After Effects settings for DV rendering. These are the settings you should be using for the tutorials in this chapter. Note that if you ultimately plan on distributing via the Web, e-mail, or CD, you don't need to worry about interlacing.

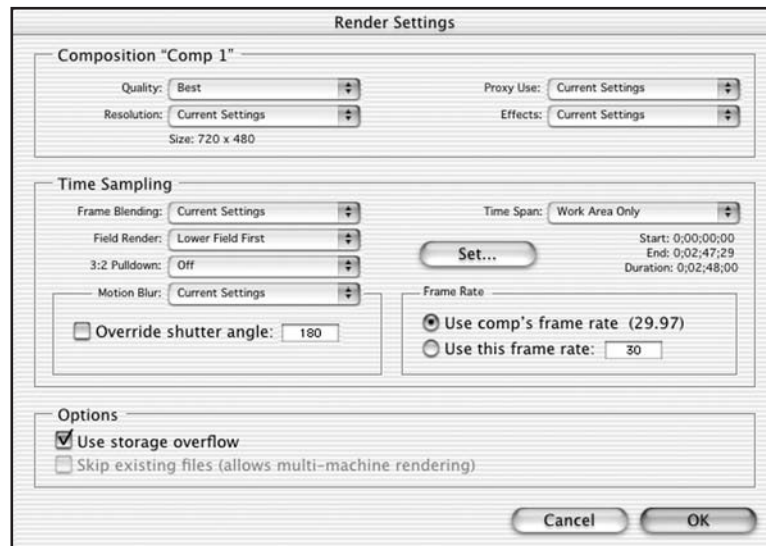


fig 17.5

Figure 17.6 Render settings in After Effects.

Better Rotoscoping through Filters

As we saw in Chapter 16, “Color Correction,” most editing programs provide special effects filters such as the Color Balance and Levels filters that we used for color correction. Adobe After Effects-compatible filters have become something of a standard for effects plug-ins, and if your app supports them (or if you’re using Adobe After Effects), you can buy filters that do a lot of special effects tasks that have traditionally fallen into the realm of the rotoscoping artist.

Often referred to as *opticals*, there are many effects that, until the advent of computers, were painstakingly rotoscoped by hand. Lightning bolts, sparks and flashes, laser blasts, and special color adjustments are all effects that can now be achieved automatically through filters. Although these filters don’t always provide exactly the effect you’re looking for, they often serve as an excellent starting point and can sometimes be combined with other filters and effects to get the desired look.



As a reference, here are some of the packages we recommend for creating a variety of “optical” effects:

- **DigiEffects’ Delirium** is probably the most useful single collection of plug-ins that we’ve seen. Providing excellent Fire and Smoke filters, along with very impressive Rain, Snow, and Fairy Dust filters, Delirium provides an excellent balance of practical effects with fun, “trippy” effects (Figure 18.7).



Figure 18.7 DigiEffects’ Delirium collection includes a number of excellent After Effects filters, including this very realistic Snowstorm filter.

- **Alien Skin Eye Candy** provides a number of improvements over After Effect’s built-in filters, including a Gaussian Blur filter that can extend beyond the boundaries of a layer, and an HSB Noise filter. Eyecandy also provides excellent filters for beveling, chiseling, and carving shapes out of a layer, as well as a nice filter for making a layer glow.
- **Red Giant Software’s Image Lounge** packs a variety of plug-ins. In addition to very stylized text, texture, and distortion filters, Image Lounge includes high-quality fire, clouds, and smoke effects, and unique to this package, special camera effects such as rack focus (Figure 18.8).



Figure 18.8 Red Giant Software's Image Lounge collection is one of many packages that includes a fire filter.

Stock Footage, or Filters?

In Chapter 17, you saw how a number of effects can be achieved by compositing stock film footage with your video. Fire, smoke, lightning, gun shots, weather, and many other effects can be achieved by purchasing high-quality stock footage from companies such as ArtBeats. Alternatively, if you're really resourceful, you can always create your own footage for compositing.

However, as you can see from the list of special effects filters, there are a number of plug-ins that will also create fire, smoke, lightning, and even rain and snow. Therefore, which is the better choice?

If realism is your primary concern, stock footage wins out over current plug-in technology. In addition, compositing stock footage with other video—even when using complex luma and chroma keys—will be faster than rendering effects with plug-in filters. On the other hand, special effects plug-ins offer a degree of control and scriptability that you'll never get from stock footage. If



you need flame, for example, that flickers and flares at precise moments, or lightning that travels between two very specific points, then plug-in effects will be the better choice. In addition, plug-ins don't take up additional storage on your drive the way stock footage can. Finally, filters can often interact automatically with other CG elements, such as the falling snow and logo shown in Figure 18.7.

Ideally, of course, you want both, frequently mixed together—for good fire effects, for example, several layers of composited fire for realism mixed with plug-in fire effects for more control.

Rotoscoping an Alpha Channel

As we saw in the last chapter, an alpha channel matte is essential for compositing elements and layers that don't have a background that can be easily cropped or keyed out. If your foreground element is computer generated—a 3D animation, for example—then your 3D animation package will probably render an alpha channel for you. However, if your foreground element was shot on video or film, then you'll need to create an alpha channel by hand.

Just as you can use rotoscoping techniques to paint into the image part of a piece of video, you can also use rotoscoping techniques to paint into the alpha channel of a piece of video to create complex, “hand-painted” mattes. As you'll see in the following tutorials, you'll often use a number of different tools and applications to rotoscope an alpha channel. (See Color Plate 15 for before and after shots of our intended effect.)

Painting an Alpha Channel by Hand

Painting an alpha channel by hand is often the only way to create a matte for a complex foreground. If your foreground plate contains a variably hued background that can't be keyed, or a complex foreground with more detail than you can easily crop, then hand-painting your alpha channel might be your only option. If this sounds tedious, don't worry, there are a number of tips and shortcuts that make hand-cutting an alpha channel matte much simpler.



Open the *Backyard Tutorial* folder on the companion DVD and look at the *Backyard raw.mov* file. You should see a 1.5-second establishing shot of a house (sorry, we'd love to have longer, more meaningful clips, but we felt it was more important to deliver a few full-res DV than lots of lower-res, smaller clips). Although the shot of the house is nice, we were originally envisioning a more dramatic sky. Our goal in this tutorial is to knock out the existing sky and replace it with something more dramatic. To do this, we'll need to create a custom alpha channel matte to define transparency in our *backyard raw* layer. This layer, along with a more dramatic sky layer, will be placed in After Effects to produce a final composite.

Step 1: Stabilize the Footage

Unfortunately, our backyard source plate has a tiny bit of movement to it. Therefore, our first step is to stabilize the image. If the image is perfectly still, then we can create a single frame of alpha channel that can be used throughout the entire movie. If the image jitters or moves, then our alpha channel has to move in the same way. In the end, it's easier to stabilize the shot than to create a jittery alpha channel.

As we discussed in Chapter 17, stabilizing an image by hand is possible, but very difficult. Consequently, we've chosen to use Adobe After Effects Professional Edition to stabilize the image. The After Effects Professional Edition has an a very good motion-tracking feature that can stabilize an image with the push of a button (well, two or three buttons, but it's still very easy) as you can see in Figure 18.9. Note that the Standard Edition of After Effects lacks the motion tracking feature that is required for image stabilization.

If you don't have a copy of the After Effects Pro edition (or another compositor with a motion tracker such as Discreet Combustion), don't worry, we've included a copy of the stabilized footage, called *backyard stabilized.mov*.

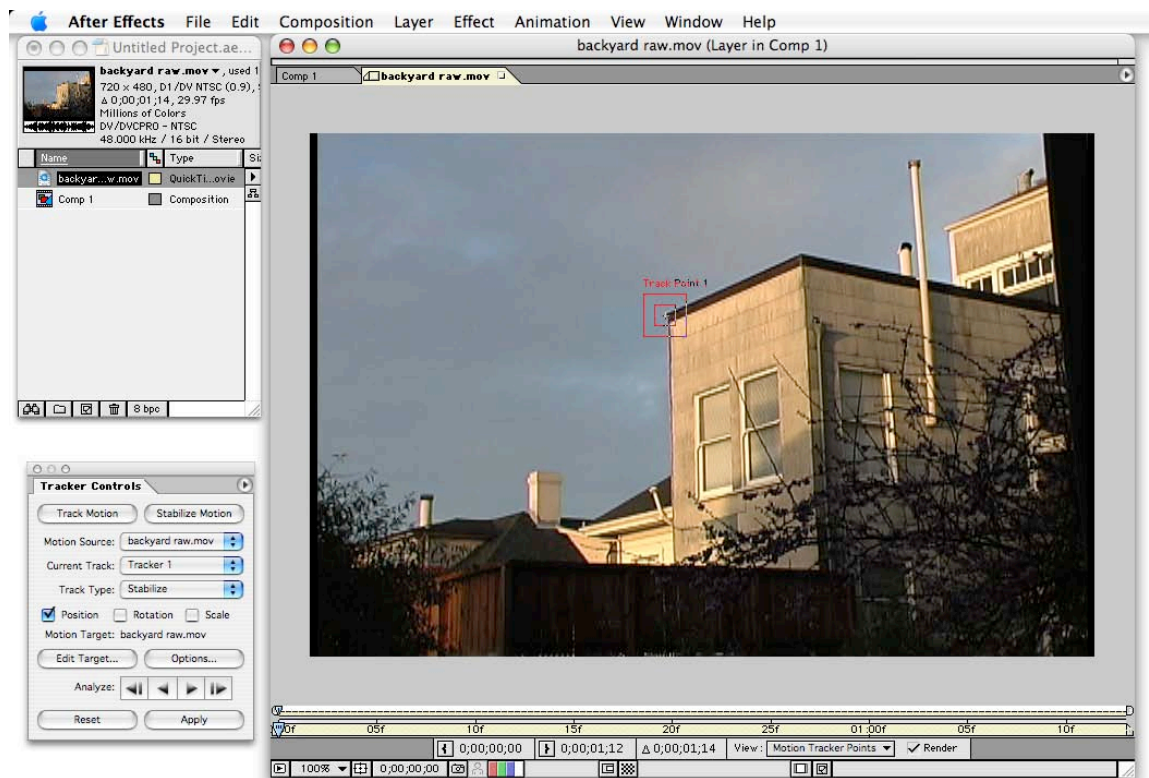


Figure 18.9 Stabilizing footage using Commotion's Motion Tracker and Stabilize feature.

Step 2: Create Your Project

Load the *backyard stabilized.mov* file into After Effects and place it in a new composition. Since this footage is a stabilized shot, we don't need to create an alpha channel for each frame in the movie. Remember, our goal is simply to eliminate the sky. The waving tree branches in front of the house don't cross into the sky, so we can simply create an alpha channel for the first frame and trust that it will work for the entire movie. Save the document as *backyard.ae*.

Step 3: Export the First Frame

We will be creating our alpha channel in Adobe Photoshop, so our first task is to get the first frame of our movie into a form that will be usable in Photoshop. With the current time marker on the first frame of the movie, select *Composition > Save Frame As > File* to export this frame as a Photoshop file (Figure 18.10).



Figure 18.10 We can export the first frame of this movie as a Photoshop file, and then hand-cut a matte in Photoshop.

Step 4: Open the Image in Photoshop and Start the Mask

Take a look at the image and consider what will be required to cut a good mask.

Fortunately, this image is pretty simple. The houses and chimneys all have a good, strong border. The only potentially troublesome area is the bush to the left side of the image. As we saw in Chapter 16, an alpha channel can be created in Photoshop by defining a selection, and Photoshop has a number of tools for creating selections.

You could try to use the Magic Wand tool to select the sky, but since the sky is slightly cloudy, the Magic Wand won't be able to zero in on a single color. Similarly, the sky is a little too mottled for Photoshop's Color Range tool. If you're using Photoshop 5.5 or later, you might be wondering why we aren't just using the Magic Erase or the Extract command, both of which were designed to eliminate backgrounds. The problem with these tools is that they simply erase the background; they don't define a selection or provide any way of translating the masking information that they generate into an alpha channel.



No, the easiest way out of this one is to paint the mask by hand. Fortunately, Photoshop is well equipped for this type of work. Click on the Photoshop QuickMask tool located at the bottom of the Tool palette. When in this mode, we can simply paint the areas that we want to mask. Masked areas will appear red. Grab a big brush and fill in the large, empty portions of the sky. Don't worry about getting in close around the houses or foliage; just mask out as much of the sky as you can using a large brush.

Change Your Cursor

The rest of this lesson will go much easier if you go to File>Preferences>Display and Cursors, and set Painting Cursors to Brush Size.

Step 5: Outline the Houses

Now, grab a smaller brush and zoom in to the right side of the image. Our goal here is to create a tight mask around the houses. Fortunately, the houses are mostly made of straight lines. Click at the right edge of the image where the doorway meets the top of the frame. Position the edge of your brush against the line of the roof, and click. Follow the roof line and you'll see that that edge goes for a short distance and then turns 90° to the left. The corner of that angle is the end of the first straight "segment." Hold down the Shift key and click once at this corner. Photoshop will automatically connect your first click to this second click and create a straight line between. Continue outlining the houses using this manner until you reach the shrub.

Step 6: Prepare for the Shrub

Obviously, trying to paint around the shrub will be a frustrating exercise. Instead of painting around the shrub, make a couple of broad strokes around it to close it off from the rest of the image. Your painted areas should now look like Figure 18.11. Click on the Selection button at the bottom of the Tool palette (the button to the left of the QuickMask button). This will convert your painted areas into a selection. Save the selection into an alpha channel. We won't be using this channel, but we're going to save it anyway, just in case something goes wrong in the next step.

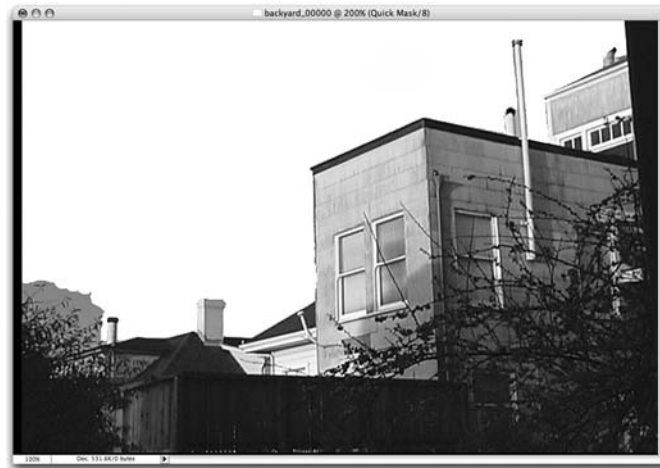


Figure 18.11 With the QuickMask tool, we painted around each house and up to, but not including, the complex shrub. We'll add that selection later using a different tool.

Step 7: Select the Shrub

With your selection still selected, pick the Magic Wand tool. Hold down the Shift key and click on the sky-filled areas in the bush. With the Shift key held down, each Magic Wand selection will be added to your hand-painted selection (although the alpha channel you saved earlier isn't being altered). Continue Magic-Wand-selecting the areas around the bush until you feel like you've selected all of the most conspicuous areas. Don't expect to get rid of all of the varying hues of sky visible in the bush; don't worry, we're going to correct for those problems later. If you make a mistake that you can't undo, press command-D to deselect, and then reload your selection from your alpha channel and start over with the Magic Wand.

Step 8: Save Your Alpha Channel

When you're satisfied with your Magic Wand work, save the selection. Now, open the Channels palette and you'll see you have two alpha channels. You can delete the first one, as it was our safety copy. Click on the second one to view it. The Magic Wand tool does not always create a smooth selection, so select the Blur tool and paint over the "bush" areas to smooth out, or feather, the Magic Wand selections that you made in Step 7. Remember, the blurry, gray areas of the mask will be semi-opaque when composited



and will serve to smooth and blur the fuzzy bush shape into the background (Figure 18.12).



Figure 18.12 Our completed matte for the backyard footage.

Save 9: Save Your Document

Now we want to do something new. We want to apply this single alpha channel to each frame in our movie, so we need to export the alpha channel from this document, and then attach it to our movie in After Effects.

From the Channels palette menu (the triangle thing in the upper right-hand corner of the Channels palette), select Duplicate Channel. For Destination, select New. Press OK, and a new document will be created that contains only our alpha channel. Before you save this document, however, you need to change its Mode to Grayscale. Select Image>Mode>Grayscale.

Save the document in Photoshop format as *backyard matte.psd*.

Step 10: Create Some Clouds

Before we leave Photoshop, we're going to create some clouds to place in the background. Although we could use stock footage of clouds, or render animated clouds in a 3D program, we're going to stick with a simple still of some wispy clouds. Create a new RGB document measuring 720 by 640 pixels at 72 dpi. Click the foreground color swatch and select a slightly undersaturated, reddish-orange. Make sure the background



color swatch is white. Choose Filter>Render>Clouds. Voilà! Instant clouds. Save this document as a Photoshop document and call it *clouds.psd*.

Step 11: Back to After Effects.

Open the *backyard.ae* file that you created earlier. Import the *backyard matte.psd* document and the *clouds.psd* document. Place the clouds in your composition *beneath* the *backyard stabilized.mov* layer. You won't see the clouds at all, since the backyard plate is obscuring them. Place the backyard matte document into your composition, and layer it *above* the *backyard stabilized* file. It should completely obscure the *backyard stabilized* layer. In the Timeline window, click the Eyeball icon in the backyard matte layer. This should make the matte layer invisible (Figure 18.13).



Figure 18.13 Our AE project before activating our alpha channel. Note that the backyard matte layer has its visibility turned off. We don't need to see it, we just need access to its luminance information.

Step 12: Define the Alpha Channel

Now we want to tell After Effects to use the backyard matte layer as the alpha channel of the *backyard stabilized* layer. Click on the *backyard stabilized* layer in the Time Layout window and choose Effect>Channels>Set Channels. Set Channels lets you redefine the



source of each channel in the current layer. We want to use our backyard matte document as the alpha channel for the *backyard stabilized* layer. In the Set Channels dialog, change the Set Alpha to Source pop-up menu to Luminance. In the field above that, set Source Layer 4 to backyard mask.psd. This tells After Effects to use the luminance information of the *backyard matte* layer as the alpha channel in the *backyard stabilized* layer. Because the backyard matte layer is all luminance (it's black and white, no chrominance), it will correctly interpret our alpha channel.

You should now see the clouds composited behind the houses!

If there is slight fringing or other artifacts between the foreground and background, you can always go back to Photoshop and try to correct them. Before you go to that much trouble, though, render the file out (using the Animation compressor, of course) and import it into your editing program. Then, look at the footage on your NTSC monitor. You might find that any slight fringes are invisible.

For a little extra drama, consider adding a slight movement to the clouds layer to make the clouds slowly drift behind the houses.