examples of the Pathfinders in action, take a look at the Pathfinder palette chart on the following pages.

There are two effective ways to combine objects using the Pathfinders: 1) compound shapes, which remain "live" and editable; and 2) Pathfinder commands, which become "destructive" (permanent), and can't be returned to their original editable state except by using Undo.

See the "Add & Expand" lesson for a lesson that helps you to see compound shapes in action. The "Cutting & Joining" and "Divide & Color" lessons illustrate some uses of Pathfinder commands.

EXPANDING YOUR DRAWING & COLORING TOOLSET

This section provides more detail about compound shapes and related concepts, and explores some of the technical details involved with creating simple objects in Illustrator. If you're new to Illustrator you may want to experiment a bit with the lessons and Galleries later in this chapter to solidify what you've learned before continuing with this section. Consider "Expanding Your Drawing & Coloring Toolset" a reference section that is available when you're ready to delve deeper into the details of object creation in Illustrator. Topics covered include the Simplify command, color modification filters, and Illustrator's new "Liquify" set of tools.

Compound paths

A compound path consists of one or more simple paths that have been combined so that they behave as a single unit. One very useful aspect of compound paths is that a hole can be created where the original objects overlapped. These holes are empty areas cut out from others (think of the center of a donut, or the letter O), through which objects below can be seen.

To create a compound path, e.g., the letter O, draw an oval, then draw a smaller oval that will form the center hole of the O. Select the two paths, and then choose Object > Compound Path >Make. Select the completed letter and apply the fill color of your choice, and the hole

Pathfinder palette

T. NEAL/THOMAS•BRADLEY ILLUSTRATION & DESIGN
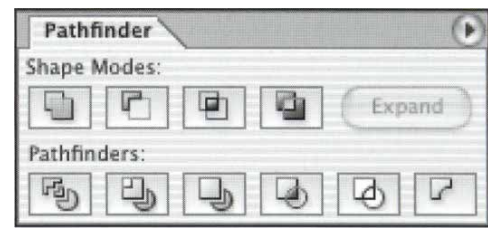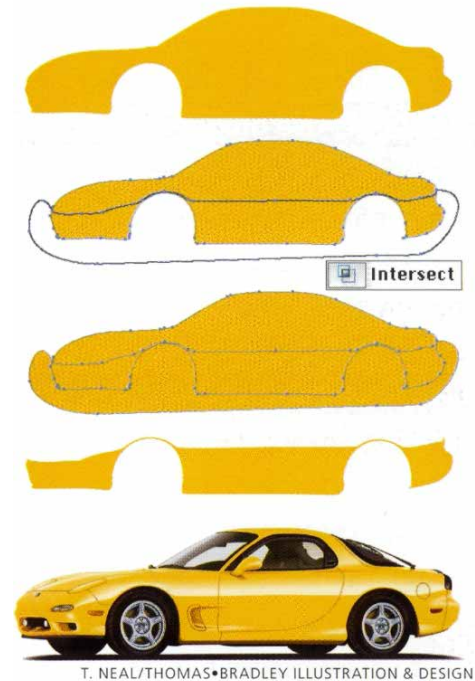
Using the Intersect Pathfinder to cut out the lower part of the car body. Bottom, the finished illustration

Tim Girvin used the Divide Pathfinder to create the logo for the film The Matrix. *See **his** Gallery in the* Type *chapter*

Left to right: two ovals (the inner oval has no fill, but appears black because of the black fill of the larger oval behind it); as part of a compound path the inner oval knocks a hole into the outer one where they overlap; the same compound path with inner oval, which was Direct-selected and moved to the right to show that the hole is only where the objects overlap

Compound shapes and compound paths don't have to overlap to be useful; apply a "compound" to multiple objects whenever you want them to operate as a unit, as if they were one object.

Example of a compound path used here to make the letters operate as a unit (see Tip above); from the Gary Newman Gallery in the Type *chapter*

Compound paths or shapes?

The quick answer to this question is to use compound paths on simple objects for simple combining or cutting holes. Use compound shapes on more complex objects (such as live type or effects) and to more fully control how your objects interact. See the section "The pros and cons of compound shapes and paths" (opposite) for details on when to use which.

Learn to use Compound Shapes

The **Minus Back** Pathfinder command is the reverse of the **Subtract** shape mode. You can create the same effect using the Subtract Shape mode by simply reversing the stacking order of the elements in your compound shape. See the *Layers* chapter for more about object stacking order.

will be left empty. To adjust one of the paths within a compound path, use the Direct Selection tool. To adjust the compound path as a unit, use the Group Selection or Selection tool.

In addition to creating holes in objects, you can use compound paths to force multiple objects to behave as if they were a single unit. An advanced application of this is to make separate objects behave as one unit to mask others. For an example of this using separate "outlined" type elements (see figures at left extracted from Gary Newman's "Careers" Gallery in the *Type* chapter).

Holes and fills with compound paths

For simple holes, the Compound Path >Make command will generally give the result you need. If your compound path has multiple overlapping shapes, or you're not getting the desired holes in the spaces, see "Fill Rules.pdf" on the *Wow! CD.* Or try using compound shapes (described in the next section), which give you complete control. Certain results can be obtained only by using compound shapes.

Compound shapes

As mentioned earlier, sometimes it's easier to create an object by combining simpler objects, rather than trying to draw the complex result directly. A *compound shape* is a live combination of shapes using the Add, Subtract, Intersect, and/or Exclude Pathfinder operations. See the first four rows of the Pathfinder Commands chart on the pages following for a look at the various command functions, as well as examples of how they can be used.

Compound shapes can be made from two or more paths, other compound shapes, text, envelopes, blends, groups, or any artwork that has vector effects applied to it. To create a compound shape, choose Window > Pathfinder to display the Pathfinder palette. Then select your objects, and choose Make Compound Shape from the Pathfinder palette menu. To assign a particular Shape Mode, select one of the components of your compound

shape and click on the corresponding Shape mode button on the top row of the Pathfinder palette.

Note: *Simply selecting your objects and pressing one of the Shape Mode buttons creates a compound shape and applies the shape mode you've chosen to the objects.*

c

The pros and cons of compound shapes and paths
Compound paths can be made only from simple objects. In order to make a compound path from more complex objects (such as live type or "envelopes") you have to first convert them into simpler objects (see the *Type* and *Live Effects & Graphic Styles* chapters for details on how to do this), and you'll only be able to edit them as paths. You can, however, combine complex objects using *compound shapes* and have them remain editable.

As you know by now, compound shapes allow you to combine objects in a variety of ways using Add, Subtract, Intersect, and Exclude. While keeping these Shape modes live, you can also continue to apply (or remove) Shape modes, or a wide variety of effects, to the compound shape as a unit. In later chapters, as you work with live effects such as envelopes, warps, and drop shadows, remember that you can integrate effects into your compound shapes while remaining able to edit your objects— even if your objects are editable type! Compound shapes can also help you bring objects into Photoshop (see the "Shape Shifting" lesson in the *Illustrator & Other Programs* chapter).

The power of compound shapes does come at a cost. Compound shapes require Illustrator to perform many calculations on your behalf, so as a result, too many compound shapes, or too many operations or effects applied to compound shapes, can slow down the screen redraw of your image. Although compound paths are much less powerful or flexible, they won't slow down your redraw. So if you're working with simple objects, it's best to use compound paths instead.

Starting objects: the word Sub is a compound shape ("Subtract" is subtracted from "Sub")
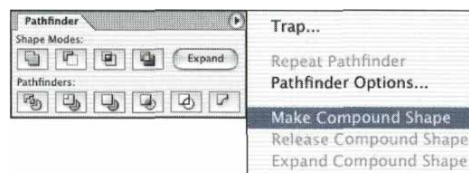
The starting objects from above, after Make Compound Shape and the corresponding shape modes have been applied, i.e., "intr" has the Intersect shape mode applied

In a compound shape all the original objects remain editable. Here the word "excl" was expanded to "Exclude," then a gradient and drop shadow were applied to the compound shape as a whole
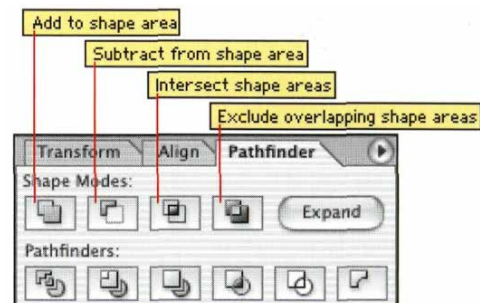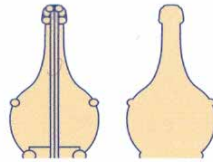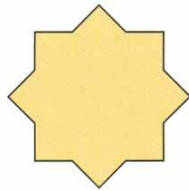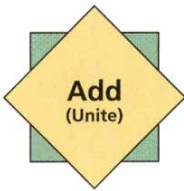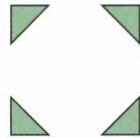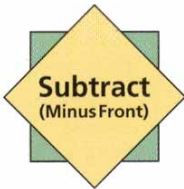

Shape Modes

The default settings for *were used unless otherwise noted. Artists' work may use custom settings.*
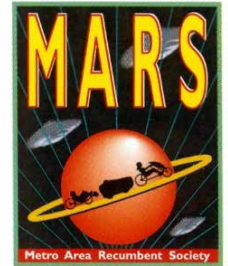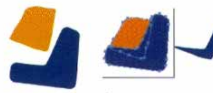
Add (Unite)
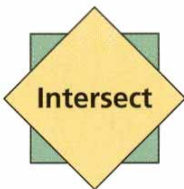
Before and after Unite

Subtract (Minus Front)
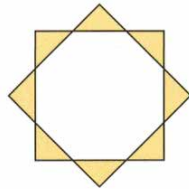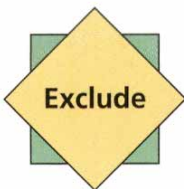
Before Minus Front

After Minus Front
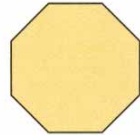
Intersect

Two objects, then overlapping and selected, then after choosing Intersect
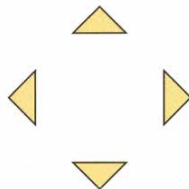
Copies of intersection

Exclude

Two objects

Both objects selected

Minus Back

Green objects selected and made compound paths

After Minus Back, objects can then be filled separately
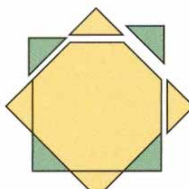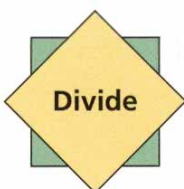
Divide

(Objects moved to show results)

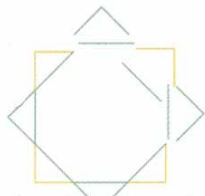Four objects

Objects divided

Each newly divided object filled

The default settings for ◆ were used unless otherwise noted. Artists' work may use custom settings.

Outline

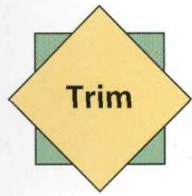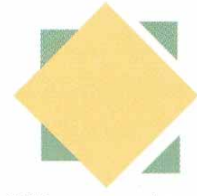(Objects moved and line weights increased to .5 pt to show results)

Before Outline

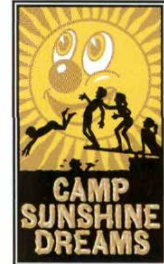After Outline, and resetting line weight

STEUER

Trim

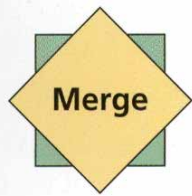(Objects moved to show results)

Before Trim; in Preview and Outline

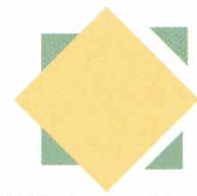After Trim; overlaps are reduced, BUT strokes are lost
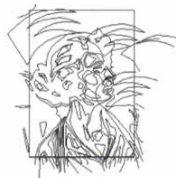
CAMP SUNSHINE DREAMS

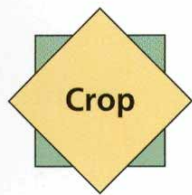SHIELDS DESIGN

Merge

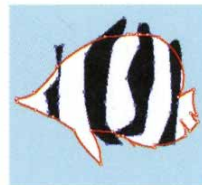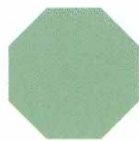(Objects moved to show results)

Before Merge in Outline

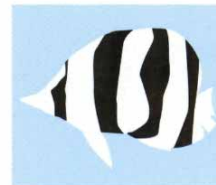After Merge; like fills are united, BUT strokes are lost

STAHL

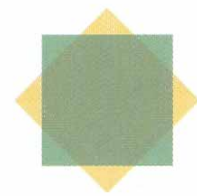**Crop**

A copy of the fish in front to use for Crop

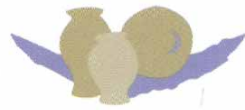After Crop; objects are now separated

DROBLAS GREENBERG

Hard Mix

Note: The Hard Mix filter is available in the Pathfinder Filters action set on the Wow! CD

Same color objects don't mix, so overlapping objects were colored differently

After Hard filter. Each overlap is now a separate object

After using the Eyedropper to switch the colors in the front objects

MARGOLIS PINEO (digitized by Steuer)

Soft Mix
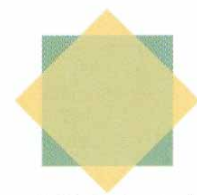
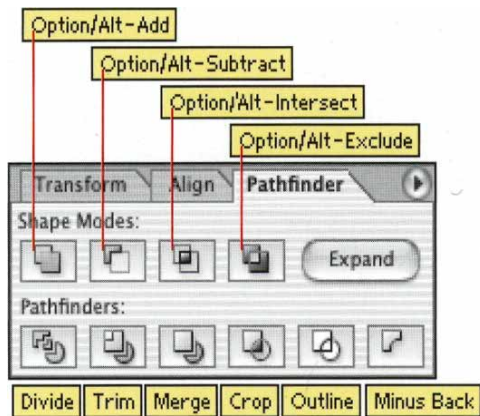Note: The Soft Mix filter is available in the Pathfinder Filters action set on the Wow! CD

Before Soft filter; the blue waves overlap and obscure the detail along the bottom of the rocks
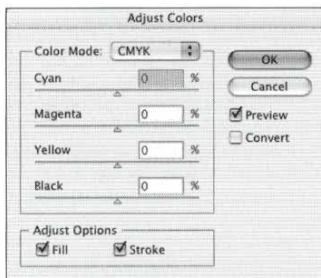
After Soft filter: see "SandeeCs Soft Mix Chart.ai" in SandeeCs WOW Actions folder on the Wow! CD

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Chapter 3 *Drawing & Coloring*   **73**

The Pathfinder Commands

The Adjust Colors filter (Filter >Colors)

Expand Compound Shapes?

When would you want to expand a compound shape?

- If a compound shape is so complex that interacting with it is noticeably slow, then expand it.
- Anything that relies on bounding boxes will behave differently on the expanded shape if that shape has a smaller bounding box than the editable compound shape. This affects all the Align commands and certain transformations.
- Finally, you must expand a compound shape before using it as an envelope. For more about envelopes, see the *Live Effects & Graphic Styles* chapter.

—Pierre Louveaux

Pathfinder commands

The Pathfinder commands consist of Option/Alt-Add, Option/Alt-Subtract, Option/Ait-Intersect, Option/Alt-Exclude, Divide, Trim, Merge, Crop, Outline, and Minus Back, all of which you can use to combine or separate shapes. See the preceding Pathfinder chart for a guide to what the various commands do and examples of how they can be used.

Unlike objects you create using compound shapes, the results you get when you apply the Pathfinder commands are destructive (they alter your artwork permanently). When working with complicated objects, it's best to use compound shapes instead of Pathfinders (see the Tip "Compound paths or shapes?" and the section "The Pros and Cons of Compound Shapes and Paths" earlier in this chapter).

The Divide, Trim, Merge, Crop, and Outline Pathfinder commands are used to separate (not combine) shapes—think of them as an advanced form of cookie cutters. The Trim and Merge commands require that your objects be filled before you use them.

Hard Mix and Soft Mix

You may notice that Hard Mix and Soft Mix are shown on the chart but no longer included on the Pathfinder palette. To restore these Pathfinders, install the WOW *Actions* "Pathfinder Filters.aia" from the *Wow! CD* (in "SandeeCs *Wow* Actions" folder in the *"WOW Actions"* folder), or apply them from Effect > Pathfinder, then choose Object >Expand Appearance (for more on Effects see the "Hard and Soft Mix" section in the *Live Effects & Graphic Styles* chapter introduction).

Color modification filters

Located in the Filter > Colors menu, the Adjust Colors filter lets you adjust the tint of Global colors in selections. Illustrator no longer allows multiple color spaces in a single document, so some color spaces will be unavailable. The Saturate filter (which integrates Saturate, Satu-