

# STEVE CAPLIN'S **A** TO **Z** OF DESIGN

## D: Distortion

Steve Caplin walks us alphabetically through the concepts essential to success for any jobbing or aspiring designer.



### ABOUT THE AUTHOR

**Steve Caplin** is a designer and illustrator working for a range of national newspapers. His best-selling *How to Cheat in Photoshop*, now in its fourth edition, is published by Focal Press.  
<http://books.macuser.co.uk/caplin>

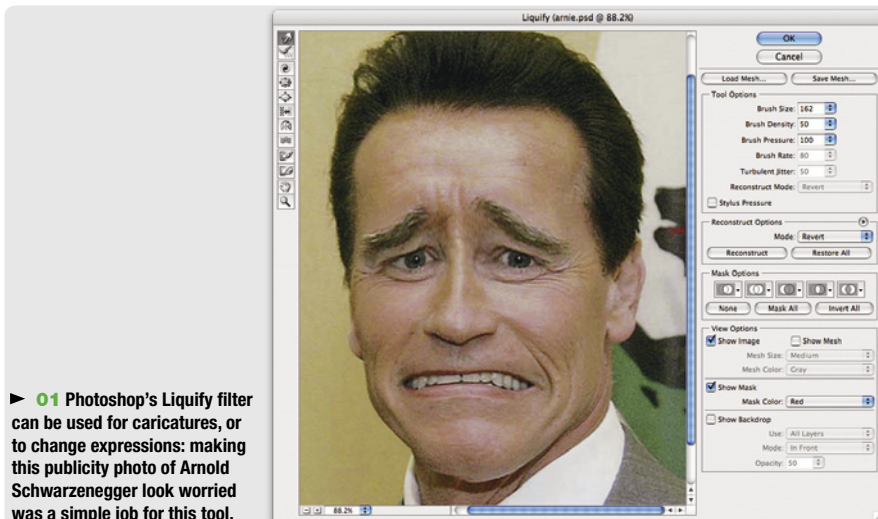
**Whatever illustration program you're** working in, the ability to distort elements to fit within a space is essential. Sometimes it's simply a matter of scaling and rotating an object or layer; frequently, more radical distortions are required in order to make the picture element look as though it belongs in the space.

Photoshop provides a variety of ways to distort images. Free Transform is most commonly used to scale and rotate, but if you hold down the command key as you drag a corner handle, you'll distort just that handle; hold down command and shift to distort a single handle along a vertical or horizontal axis. More useful still is perspective distortion: command-alt-shift-drag a corner handle to mirror the distortion with the opposite handle on the same side as the one you're dragging. This technique is very useful for making a flat texture appear to be receding in three dimensions, giving the ability to create instant walls and floors.

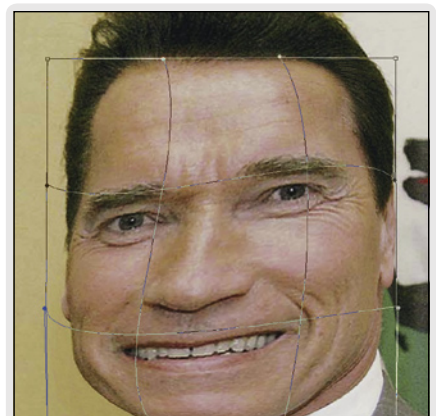
If you distort a flat texture using this perspective process, there's a danger that

the foreground will look artificial, as the pixels are enlarged to fill the space. A simple workaround is to move the texture layer half off the canvas to one side, and then to duplicate it, drag it to the other side of the canvas and merge the two layers together. This produces a texture that's twice as wide as the canvas, so when it's distorted you'll retain the integrity of the pixels.

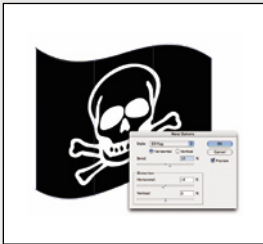
The Image Warp feature introduced in Photoshop CS2 is a powerful tool that combines envelope distortion (which uses Bézier curves to control the shape of the outside of the bounding 'envelope') with mesh distortion (which allows the interior grid points to be moved independently). Image Warp enables complex distortions, such as wrapping a label around a curved surface. It can be tricky to manipulate so many anchor points, especially as dragging a corner will also affect the interior grid points, so it's frequently best to begin with one of the built-in preset distortions to get the basic shape, then modify that by changing the method to Custom using



► **01** Photoshop's Liquify filter can be used for caricatures, or to change expressions: making this publicity photo of Arnold Schwarzenegger look worried was a simple job for this tool.



▲ **02** By manipulating only the inner points on a Mesh Warp, we can be sure that the outside of the selection will still line up with the unselected area. Good to know there won't be a join in Arnie's hair line.



◀ **04** Illustrator's Warp distortion allows shapes to be distorted using a variety of preset shapes, with a small number of controls to affect their strength.



◀ **05** The Mesh distortion gives us as many anchor points as we want both around the periphery and within an object, providing many control vertices – but at the expense of ease of use.



◀ **06** ▲ **07**: The flag (top left) is selected at the same time as the outline (bottom), ensuring that the outline is the topmost object in the selection. Choosing envelope distortion with the top object produces the perfect fit that slots the flat flag neatly into its distorted shape (above).

the pop-up menu, which will allow the individual points to be edited freely.

Like any pixel-based editing system, Image Warp is destructive: once the layer has been distorted, there's no easy way to return it to its original state, and further editing is tricky. A good solution is to convert the layer into a Smart Object first, which can still be distorted using Image Warp. The difference is that when you select it later, the previous Image Warp controls will appear, just as if you'd never committed to the operation: you can manipulate the control points further, or even remove the distortion. Best of all, Smart Objects can be created from multiple layers, which means you can distort a group of objects as one, while retaining full editing control over its content.

For more freeform distortion, Photoshop's Liquify filter provides a brush-based approach. Like a far more powerful version of the Smudge tool, Liquify allows you to push and pull great clumps of pixels exactly where you want them. It's perfect for minor adjustments, such as changing the expression on a face (a lot can be done by lifting eyebrows!), slimming thighs and stomachs, and creating caricatures. It's also a powerful tool for creating whirling designs from basic photographs. This tool is best used with a graphics tablet, rather than a mouse, for more precise control.

There are three ways of distorting objects in Illustrator. The first is to use a Warp, which is a shape chosen from a menu of preset shapes. The direction and strength of each warp can be set, as can the amount of horizontal or vertical distortion, but you can't then edit the anchor points to produce a custom envelope as you can in Photoshop.

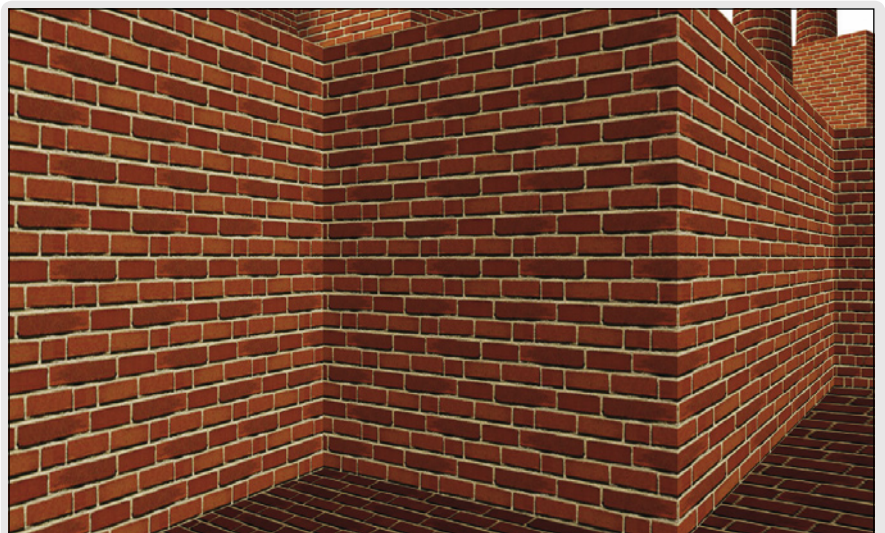
The second method is a Mesh distortion, in which you begin by choosing the number of horizontal and vertical grid points within the mesh (again, unlike in Photoshop, where

these values are set). It's a powerful tool, as it allows you to customise the mesh precisely to the requirements of the object on which you're working. Each point within the mesh can be moved independently, and each is linked to those around it by Bézier-controlled curves that determine the shape of the object being distorted. The more mesh points, the more control you have, but the harder it is to manage all the vertices.

The third method is ingenious and requires no editing of anchor points or slider controls. This, the 'top object' method, automatically warps a selection to fit the shape of the uppermost selected object. It's useful in that it's easily replicable, so can be used to make a series of objects conform to a single shape. You might, for instance, draw a rippled flag outline; any flat EPS flag that's combined with this will take on the shape of that outline. If you add shading as separate objects, it's easy to apply both the distortion and the shading to a folder full of flat flags with no effort.

Both Photoshop and Illustrator also include a range of distortions that operate within the object or layer: these include a set of filters in Photoshop, such as Ripple, Spherize, Twirl and ZigZag, which move a layer's pixels around according to parameters set by one or more sliders. (The ZigZag filter, curiously, is the one to choose if you want to make ripples.)

Illustrator includes a smaller set of filters for randomising the line drawn between pairs of anchor points: these include Bloat, Roughen, Tweak and so on. They can be applied from the Filter menu, in which case the line segments will be moved, with anchor points added, in line with the filter's appearance. Better, though, to apply the same filters through the Effects menu: in this way, they remain live and editable – in a similar way to Photoshop's Smart Objects – and can be tweaked or even completely removed at a later point. ☒



▲ **03** This scene has been built entirely from a single photograph of a flat brick wall. The perspective mode of Photoshop's Free Transform creates convincing 3D effects with ease.