



Displacement Maps and Distortion

As you might have gathered from the title this tutorial is all about distortion. We'll have a look at a couple of filters and then we'll go on to use displacement maps to create some amazing effects. So, let's start with the filters.

All the filters distort images in one way or another but here I'm just going to show you a couple from the Distort section of the Filters menu. You can experiment with the others on your own.

To start with I've created a simple background by brushing on some horizontal blobs of colour and applying the maximum amount of motion blur (Filter > Blur > Motion Blur) so that I get fine, irregular stripes that show the effects of filters and displacement maps very well.

Filters

The first filter to show you is **Liquify**:

Filter > Distort > Liquify

This filter has a toolbox of its own on the left of the dialogue box and a couple of settings on the right. If you hover the mouse over the individual tools then it will tell you what they are. I'll just show you the first couple.

It's useful to note that there is a Revert button on the right. So if you are playing around with the tools you can use this to get back to the original image instead of having to use Ctrl-Z or Undo History.

The other one I want to show you is **Spherize**

Filter > Distort > Spherize

This filter distorts an image, a layer or part of an image so that it looks as though it's wrapped around or inside a sphere.

There's one main setting to consider. The Amount setting determines if the image is wrapped around or inside the sphere – a positive figure giving a wrapped sphere and a negative figure shows the image inside a sphere.

Remember that filters can be applied to a layer or a selection. So, by using the elliptical marquee selection tool you can create an elliptical 3D illusion anywhere on your image.

Displacement maps

We looked in an earlier tutorial at combining the colours of one image with the colours of another image by using blending modes. Now we're going to look at how to combine one image with the texture or shape of another using a displacement map.

It's a two stage process –

1. First you create your displacement map, that is the texture that you want to use or the surface you want to wrap an image around.
2. Then you apply it to an image.

I'm going to start with a simple version, wrapping the painted image we created in the last section, around two different maps, one made from some simple brush strokes and the second created from a photograph of some water.

So, to start, we'll create our first map:

- Create a new, blank document.
- Draw some lines with a hard edged brush
- Save as a psd (photoshop format) file. This is the only format that will be recognised as a displacement map so this stage is important.

Now if we go back to our painted background, we can apply the displacement map by selecting Filter > Distort > Displace. There are four settings to consider:

- **The horizontal and vertical scales** – here is where you set the amount of distortion you want to apply. This is generally a small number, typically between 5 and 20 but you can experiment with larger/smaller numbers and see what happens.
- **What to do if the displacement map isn't the same size as the image you are applying it to.** You can either elect to have the displacement map **Stretch to Fit** the image or to have it **Tile** ie repeat across and/or down the image. The default is Stretch to Fit.
- Lastly you need to decide **what you want the filter to do if applying the filter creates voids or Undefined Areas in the image.** The default is Repeat Edge Pixels and I've always left it on that.
- Click on OK.

Now you need to select the displacement map that you created earlier. This is then applied to your image which is distorted to the pattern of the map.

Sharp edged maps like this one are ok but softer edged ones seem to give a more interesting result. So, I'm going back to my map and I'm going to apply a small amount of blur (Filter > Blur > Gaussian blur) with a setting of 3 pixels.

Now I'm going to re-apply this map to the painted background and you'll see that the result is quite different.

The pattern of lines can be anything you like, such as a spiral or a scanned image of some kozo.

Next I'm going to create a different map, this time from a photograph.

- Open your background/texture image. Here I'm using a waterscape.
- Remove the colour using Enhance > Convert to Black & White. This isn't strictly essential but it's very difficult to judge the contrast on a coloured image.
- Increase the contrast either by using the slider in the Convert to Black & White dialog box or by using levels.
- Add a small Gaussian blur of somewhere between 3-20 pixels – this helps to smooth out the transitions on the combined image and avoids jagged areas. It will also often make a more interesting combined image.
- If the image still has layers present then you may want to flatten the image before you save it. Layer > Flatten Image.
- Save as a psd (photoshop format) file. This is the only format that will be recognised as a displacement map so this stage is important.

Now for the fun bit:

First I'm going to apply the waterscape map to the painted image Filter > Distort > Displace with settings of 20 for the Horizontal and Vertical scales. Stretch to Fit should be selected for the Displacement Map and Repeat Edge Pixels for the Undefined Areas. Click on OK and then double click on the waterscape map file you prepared earlier. See your image distort to the texture of your map file.

Then undo that and reapply the map using 40 for the Horizontal and Vertical scales. You should be able to see a difference.

Waterscape with bark map

Usually you have a good idea of the result you are going to get from a particular displacement map but you can get some surprising results. I was playing about with some lovely textured bark and created a map from it. On a whim I applied it to the waterscape I used earlier and, well, I wasn't expecting what happened – it looked like it's raining on the water. Who'd have thought.

Leaf on crumpled paper

For the next map I photographed some crumpled paper and then created a new map from the photograph. I then applied the map to a scanned image of the veins of a leaf. This gives a distorted leaf but it lacks the 3D look that I'm after for this version.

So, a common next step is to superimpose the original map on to the image and integrate it with a blending mode. In this case I end up with two layers.

The bottom layer is the leaf with the displacement map applied and above that is a copy of the displacement map on its own layer. I then applied the multiply blending mode to the top layer and reduced the opacity a little.

Wooden wheelie bin

The last example is a bit odd (odd is good ☺) – I'm going to wrap an image of bark around a wheelie bin.

- So, I'm going to start with two photographs, one of the wheelie bin and one of the tree bark. It will make life much easier if you make sure your images are the same size and orientation before you begin! Of course you can change the size of layers as you go along but I think there's enough new stuff going on here without having to re-size on the fly.
- Next I cut the bin out of its background using the quick selection tool and made a displacement map using the usual technique but with a little more blur than usual.
- I then applied the wheelie bin map to the bark and there is very little to see.
- So, I copied the original bin photograph over the bark and applied the Overlay blending mode which is much better but I don't really want the bark to be all over the image I only want it on the bin itself so I need to cut the bark away in the shape of the bin.
- At this stage I ran through the various ways to select the area around the bin and decided that the easiest way was to use the bin map again so I copied it on to the image and switched off all the other layers so I could see what I was doing.
- The background is uniform so I could select it easily using the magic wand. I then switched the bark layer back on, unlocked it, and deleted the area that represented the background.
- To finish off I reduced the opacity on the bark layer and you have your wooden wheelie bin.

I think that's enough for one tutorial – have a play and see how you get on.