

Build a Well in Carrara and UVMapper Pro - Carrara Tutorial

Carl E. Schou

February 28, 2003



Wendigo Well

For this month's foray into the digital domain, we are going to use UVMapper Pro and Carrara Studio 2 to build a 3D model of a stone well using displacement mapping and Boolean subtraction techniques. If you don't have UVMapper Pro, you can also do the displacement mapping using the Anything Grooves plug-in for Carrara, though this tutorial will focus on using UVMapper Pro. Links for both of these utilities are provided at the end of this tutorial.

Some Background on Displacement Mapping

At a distance, the results of displacement mapping look very similar to the effects of a bump map. Bump mapping causes the light reaching an object to behave as though the smooth surface was really irregular, creating shadows and the illusion of surface depth. Displacement mapping actually transforms the smooth surface of the mapped object, creating real depth and shadows.

Displacement mapping is the process of changing the shape of a mesh by applying an image to the mesh and using the image as a height map. The dark areas of the image cause the mesh to sink in towards the center of the object. The light areas cause the mesh to expand out away from its center.

Strategy for Building a Well

- (1) Produce a tiled image of a stone wall.
- (2) Apply the image as a displacement map to a cylinder using UVMapper Pro.
- (3) Use Carrara to duplicate the cylinder, making the duplicate a little smaller, and set slightly inside the original cylinder.
- (4) Boolean subtract the smaller cylinder from the larger one to generate a new mesh.

Make the Tiled Source Image

For source material, a simple image of a stone wall will do, though a seam will occur in your model at the place where the two side edges of your texture join when wrapped around the cylinder. To avoid this problem, we will make a seamless tile of the image.

For source material, I used the image of the stone wall of the museum in the park where I frequently go hiking.

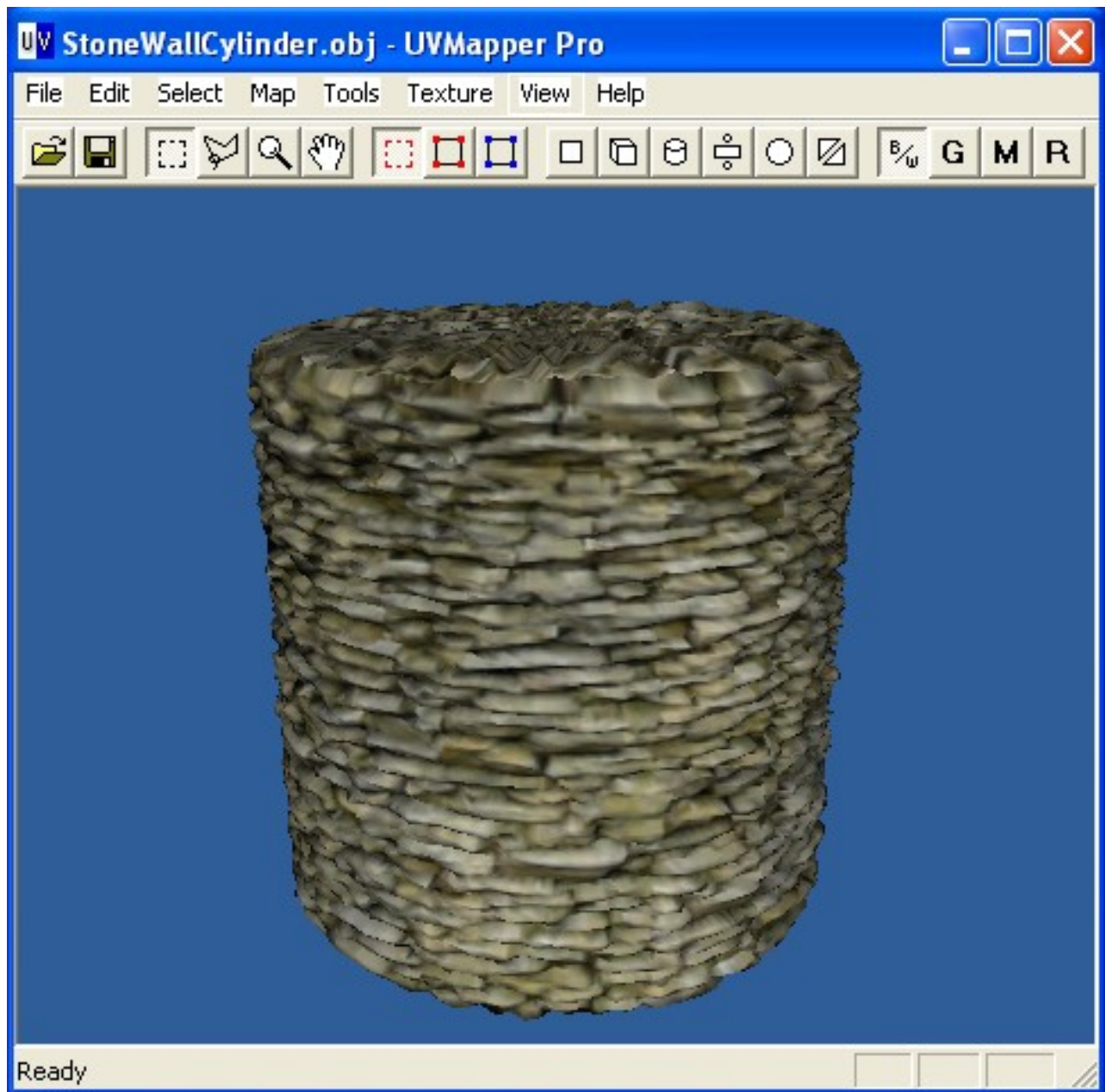
The image was tiled using the Texture Resynthesis module that is included in the Texture Maker program. Texture Maker is a program specifically designed for seamless texture generation. The Texture Resynthesis module works by analyzing the structure of a small sample of an image and synthesizing a tiled version of that image. A link for the Texture Maker program is given at the end of this tutorial. The original image of the wall is shown below left and the tiled image is shown below right.



Build a Stone Cylinder in UVMapper Pro

Now we are going to create a cylinder in UVMapper Pro and use our image as a height displacement map.

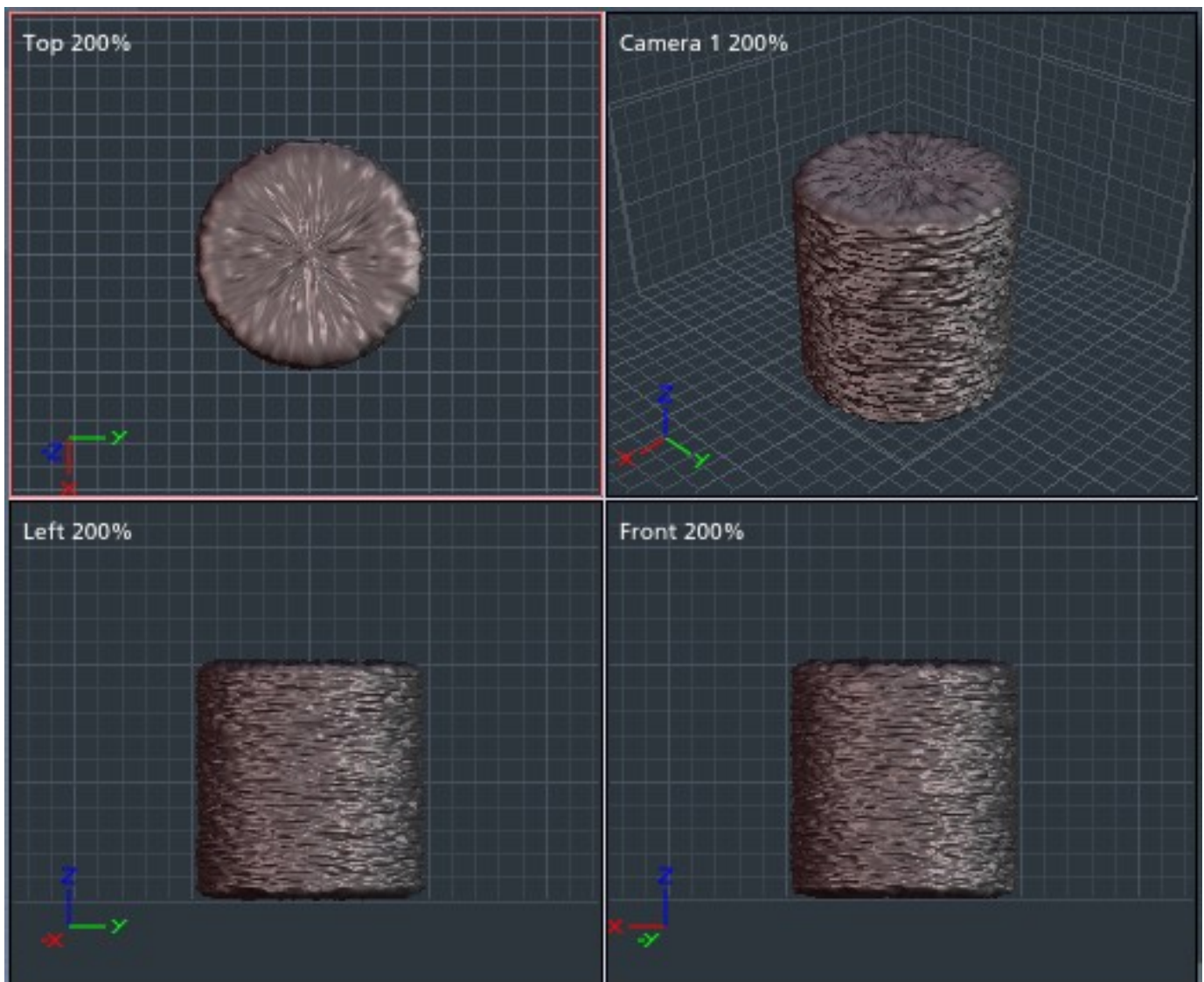
Start up UVMapper Pro and click on File>NewModel>Cylinder. Set the number of sides and the height divisions to 128 to get a medium resolution cylinder. Click on View>ShowModel to see the cylinder. Next, click on Texture>Load and select the BMP file that will be used for the displacement map. Click on Tools>Vertices>Displace. Use a MinOffset of 0.0 and MaxOffset of 0.25 to set the height displacement. You should see something like the image below. Try experimenting with different settings for cylinder resolution and height displacement to see the effects on the cylinder. When you are satisfied with the results, save the model as an OBJ file.



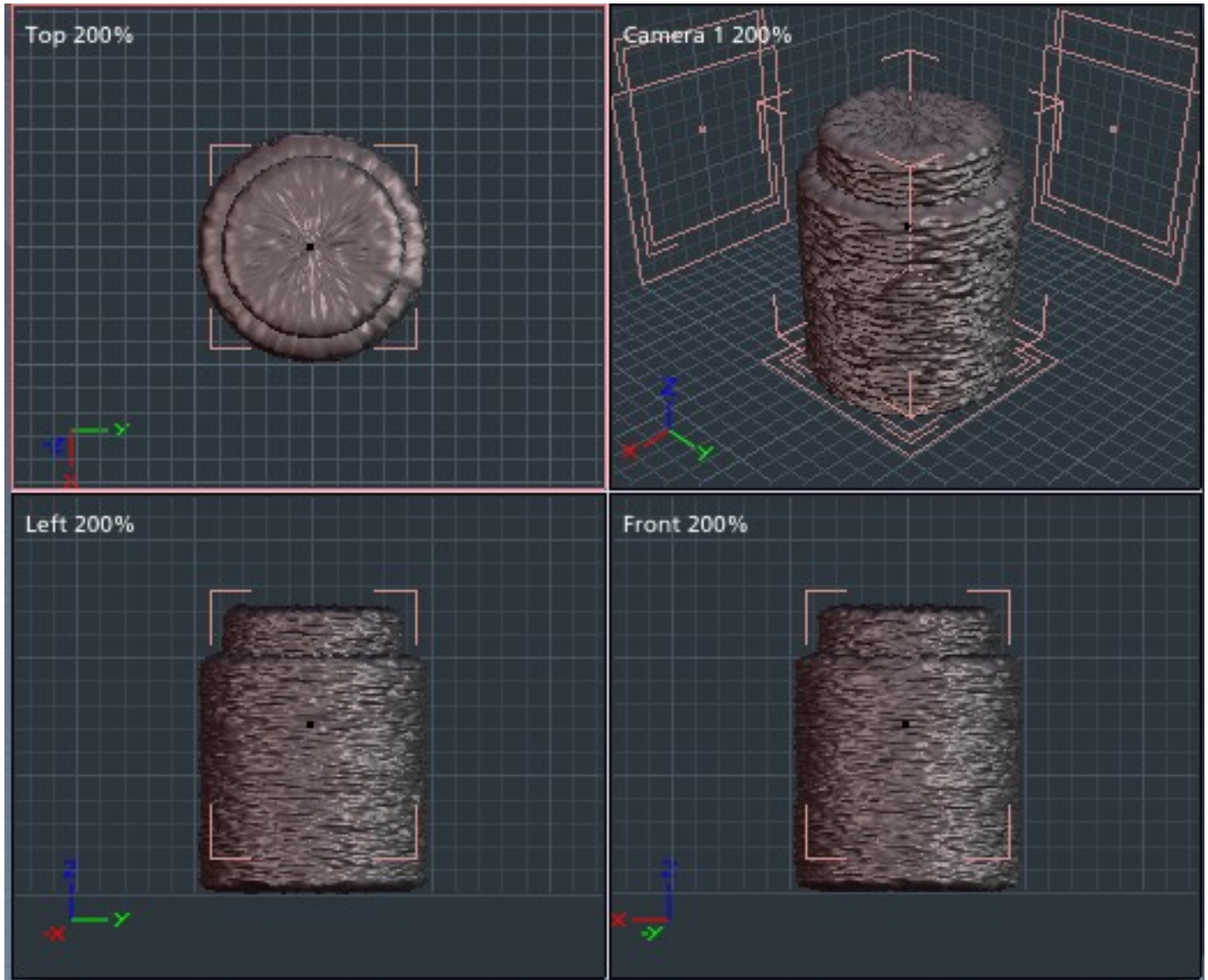
Ready

Make the Stone Cylinder into a Well in Carrara

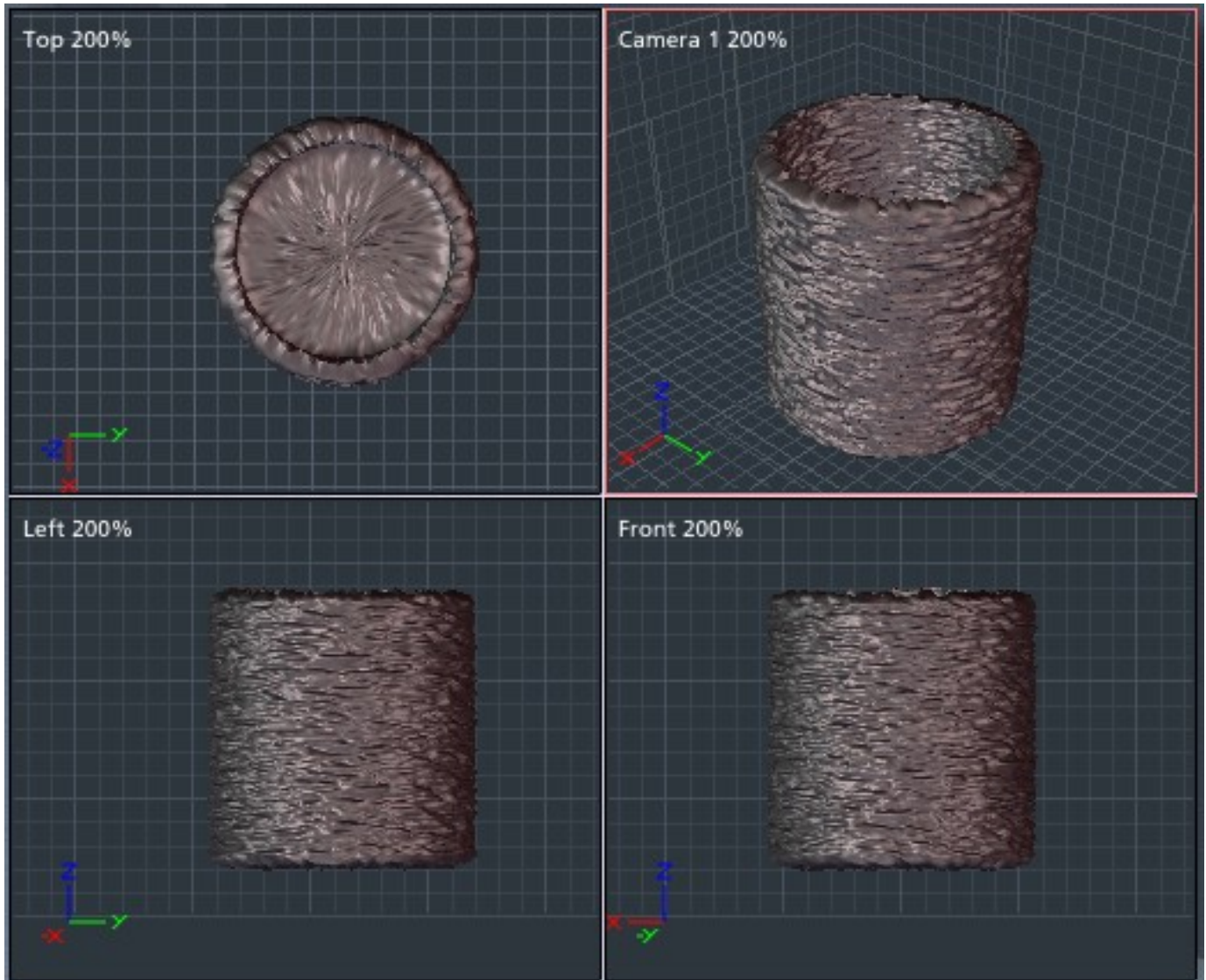
Start up Carrara and import the stone cylinder you just produced in UVMapper. You should see something like the image below.



Duplicate the cylinder, then resize it to 80% along the X and Y axes. Move the new cylinder up by 2 units in the Z direction as shown in the image below.



Now we're going to hollow out the well using Boolean operations. Select both objects, then click Edit>3D Boolean and subtract the smaller cylinder from the larger one. This process will take a while because it is very computationally intense. Depending on your machine, you may just want to let this part run overnight. The good thing is that Carrara actually generates a new mesh out of the Boolean operation. Most other 3D apps would not produce a new mesh, so you would be in trouble if you wanted to export your model into another program. When the process is complete, you should see something like the image below.



Texturing the Well

The beauty of this type of modeling is that the model is already UV mapped to accept the texture that was used to generate it. Simply apply the original tiled image to the well using parametric mapping. Add a small amount of high frequency noise to the bump channel and you should get some very realistic results.

The Rest of the Picture

The bones were built using Organica and the toadstools were done in Amorphium Pro. The ground was a Bryce terrain built using a tiled image of pine needles for a height map. The Hemlock trees were made using the Bryce 5 TreeLab. The final image was rendered in Bryce using the Soft Shadows option.

The Wendigo is a creature out of Native American folklore that few people would like to meet. Fortunately, he was not at home when this rendering was made.

Related Links

[Eovia, home of Carrara](#)

[Digital Carver's Guild, home of Anything Grooves](#)

[UVMapper](#)

[Texture Maker](#)

[RETURN TO TUTORIALS]