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I n t r o d u c t i o n

Purpose : quickly model complex outdoor landscapes within Blender, without messing with specific tools like Bryce or Terragen. We'll work on the basis of Height Maps, exactly as do these two softwares.

Level : intermediate. C–Key needed for the fourth part.



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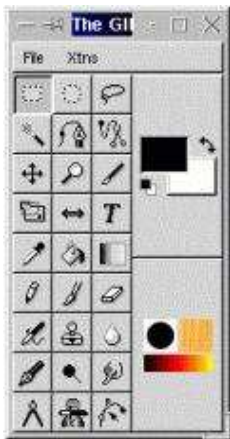
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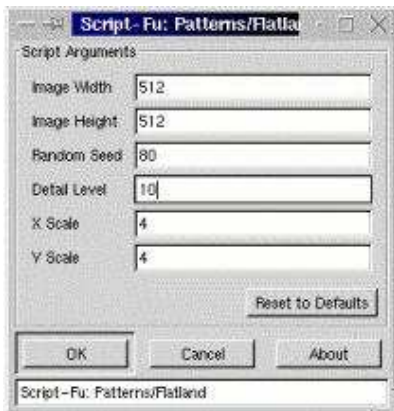
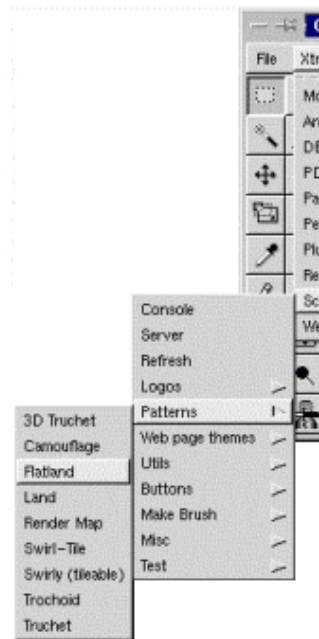
Step 1: Height Map

First of all, we will use The GIMP software in order to generate a Height Map for our landscape. This tutorial assumes that you are already familiar with The GIMP and Blender.

Upon starting of The GIMP, we'll get the following window :

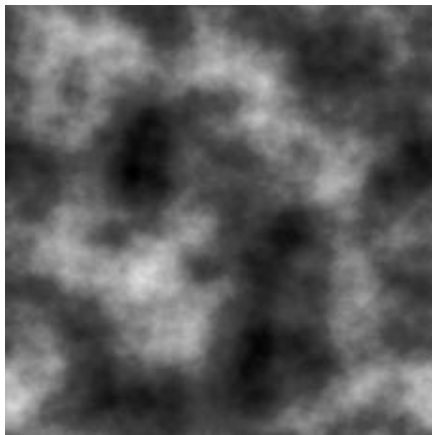
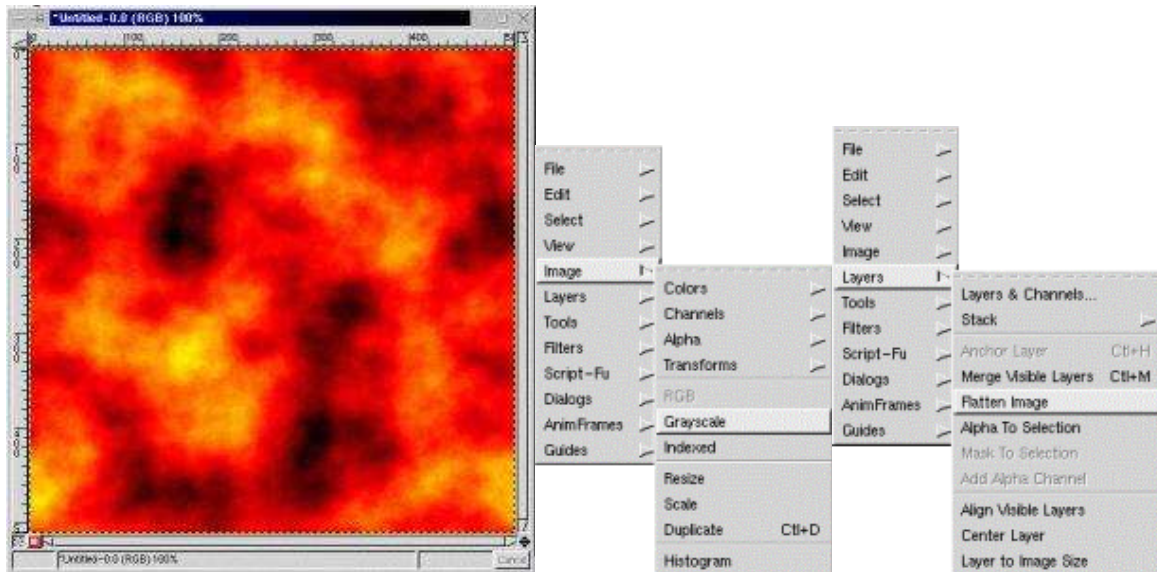


Click on the Xtns menu title, select Script-Fu, then Patterns and Flatland, which is the special effect we are looking for.



You obtain the hereafter dialog box. For your first try, use the following parameters : Image Width : 512, Image Height : 512, Detail Level : 10. Feel free to try other values as needed. Pay a special attention to the values of Random Seed and Detail Level.

You should obtain a color Height Map like the one below. To have Blender working with it without trouble, you should also transform it in grayscale, and then flatten it.



And here is a full Height Map, ready for use, obtained with a few clicks only with The GIMP ! You just have to save it with the name and in the directory of your choice.

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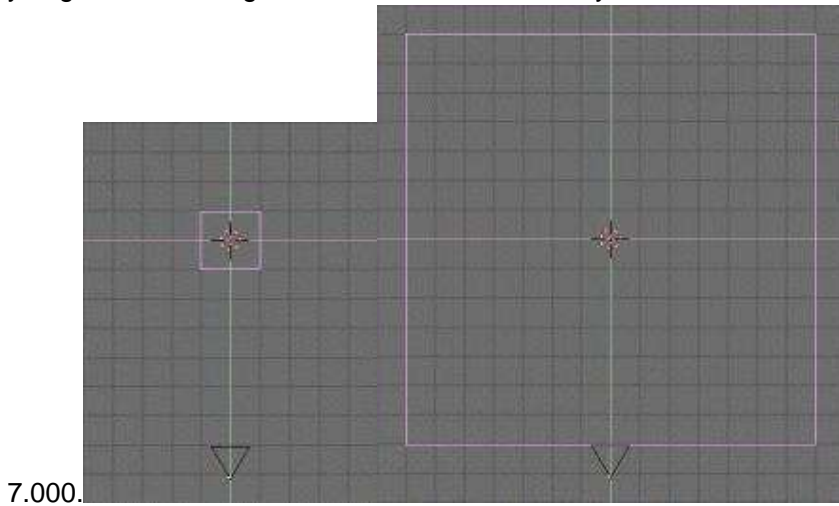
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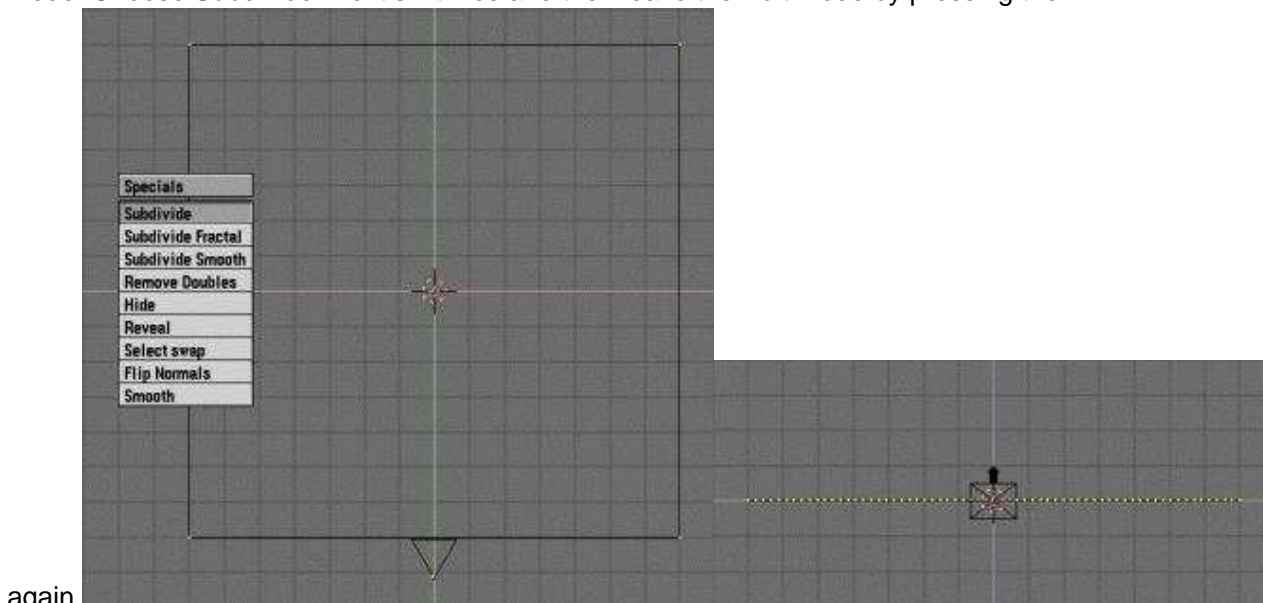


Step 2: Modelling the Ground

And now, for the Blender part of the tutorial Start a new scene using CTRL+X. Confirm ERASE ALL to get rid of all previous scene. The plane should appear in pink, telling that it's already selected. If not, RIGHT-BUTTON of the mouse on one of its border should select it. Use the S-KEY. While holding the CTRL-KEY pressed, move the mouse outward of the plane until you get the following values : Size x : 7.000, Size y : 7.000 and Size z :



With the plane still selected, enter the Edit Mode by pressing the TAB-KEY of your keyboard. The four control vertices of your plane should appear in a pink color. Press the A-KEY to select them all. Now press the W-KEY to call the subdivide mode. Choose Subdivide. Do it six times and then leave the Edit Mode by pressing the TAB-KEY



again.

The plane comes with a standard material that you can edit with the F5-KEY (Material Buttons). Choose a Specularity

(Spec) of 0.05, a light Hardness (Hard) of 80 and a Reflection (Ref) of 0.7. You can change these parameters as you wish later.



Enter the texture editor by pressing the F6-KEY (Texture Buttons). Choose Image. Click on the Load Image Button and select the picture you created sooner with The GIMP.



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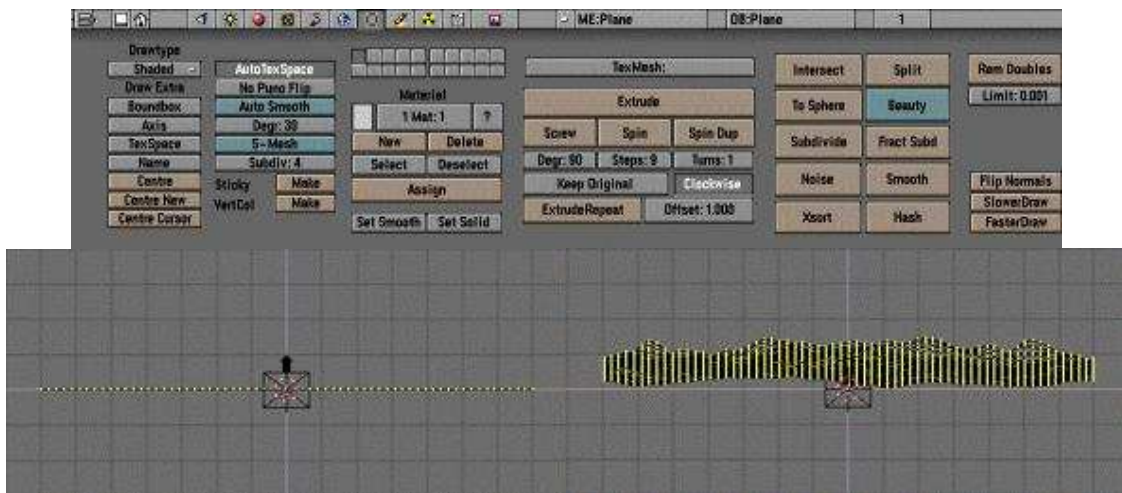
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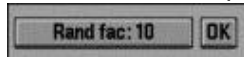
Step 3:

Enter the Edit Buttons with the F9-KEY. With the plane still selected, press the TAB-KEY to edit all the vertices. Select all of them with the A-KEY. Go to Front View with the NUM-1 key. Click one time on the Noise Button. Look at the changes on the screen : Blender assigns a higher height to the vertices corresponding to a bright color of the Height Map than the ones with a dark color. Repeat this action 5 times. You can smooth your landscape by pressing one or two times on the Smooth Button.

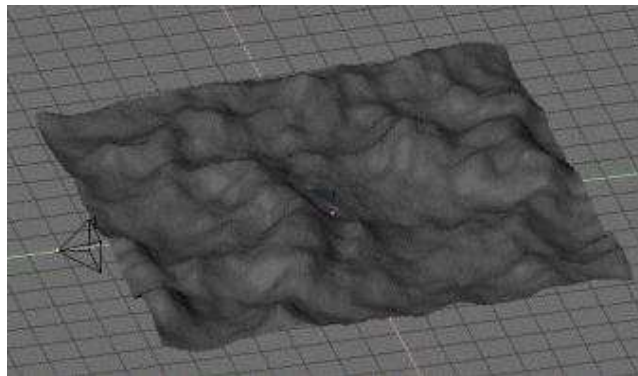


Here we are ! We can add some realism to our landscape by pressing one more time on the W-KEY and by choosing Subdivide Fractal, this time. Just answer OK to the pop-up query that will appear. A last click on the Smooth Button could

also be needed if you feel it right.



Go in Shaded View with the Z-KEY in order to see your hard work. Give the result a better look with a click on the Set Smooth Button.





Step 4:

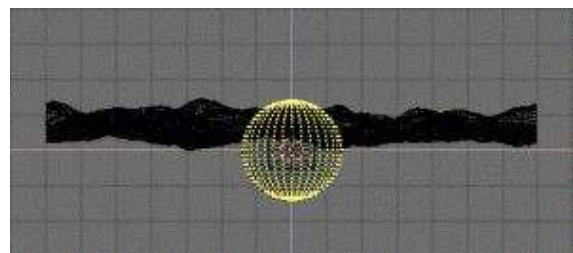
Completing the Scene

First of all, don't forget that the texture that maps our landscape is still the Height Map. Select the landscape with a RIGHT-CLICK of the mouse, and press the F6-KEY in order to access the Texture Buttons. As we did before, click on Load Image and replace the Height Map by another nice texture of your choice.

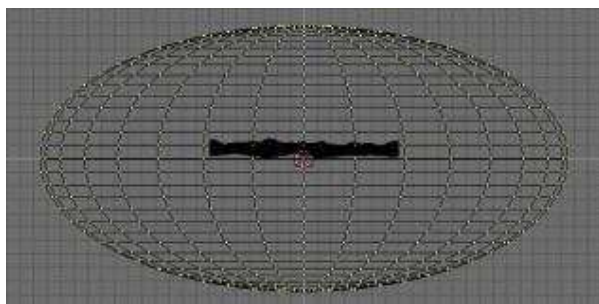
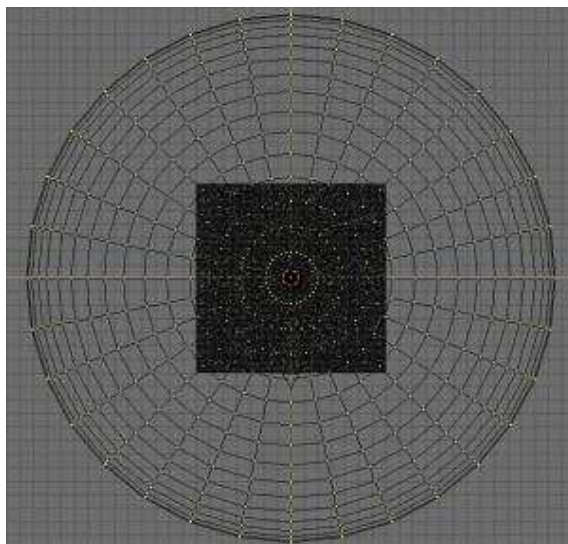
If all has been done correctly, since the start of this tutorial, the cursor is still at the centre of the scene. If this isn't true, go to top view with the NUM-7 key and use LEFT-CLICK of the Mouse at the center of our grid. Go then to front view with the NUM-1 key and do the same. Voilà ! Your cursor is almost at the centre ! If you want, you can do SHIFT+S in order to activate the Snap Menu. Then, choose Curs->Grid in both views.

Pay attention to the fact that you are not in Edit Mode anymore, and that no item is selected. Then press the SPACE-KEY, to see a menu window popping-up. Choose MESH>UVSphere. Say OK to the number of Segments and Rings without changing anything about them. There are quite fine this way ! With the A-KEY, select all the vertices of the brand new sphere.

MESH	>Plane	A
VIEW	>Cube	A
EDIT	>Circle	A
OBJECT	>UVsphere	A
OBJECT	>Icosphere	A
MESH	>Cylinder	A
CURVE	>Tube	A
KEY	>Cone	A
RENDER	>	
FILE	>Grid	A
	>	
	>Duplicate	D



Go to top view with the NUM-7 key. As we already did at the start of this tutorial, resize the sphere using the S-KEY and keeping the CTRL-KEY held. Move the mouse outward the sphere until it has a diametre about four-five times the diagonal of your landscape.



Go to front view or side view using the NUM-1 or NUM-3 keys. Repeat the last action (S-KEY and CTRL-KEY), but this time, click on the MIDDLE-BUTTON of the mouse all the way (in order to constrain the action to an unique direction) and moving the mouse from to bottom only. Unhold the mouse button when you have values close to these ones : Sizex : 1.000, Sizey : 1.000, Sizez : 0.800.

Now leave the Edit Mode by pressing the TAB-KEY. Giving you sphere a new material should be obvious, now : F5-KEY, push the - BUTTON, and select ADD NEW. Change the name of the material (for example, put Sky here). The same way, give it a texture using the F6-KEY. As we have seen it many times, now, click on Image, then Load Image and select a nice sky texture ! Et voilà ! We are close to the end !

Tips : give to the material of the sphere some Emit (try 0.4). You'll get a luminous bright sky ! Moreover, you don't want it to be lit by other light beams, such as the spot, so move the sphere on a different layer than the rest of the scene. If you do, you'll have activate the Layer Button of the Spot, hereafter.

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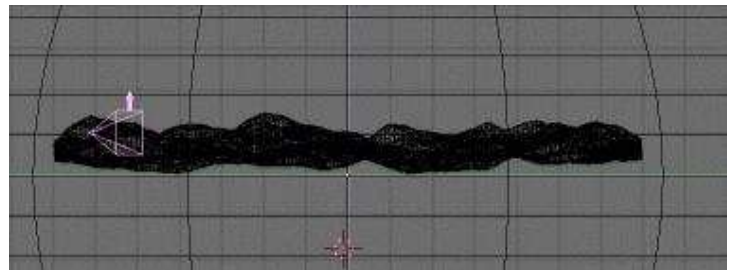
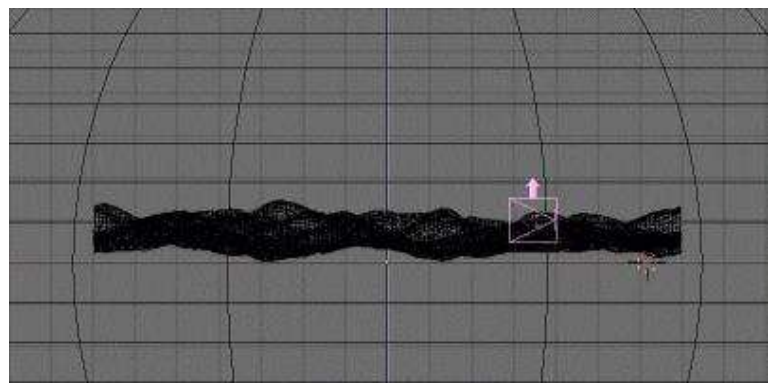
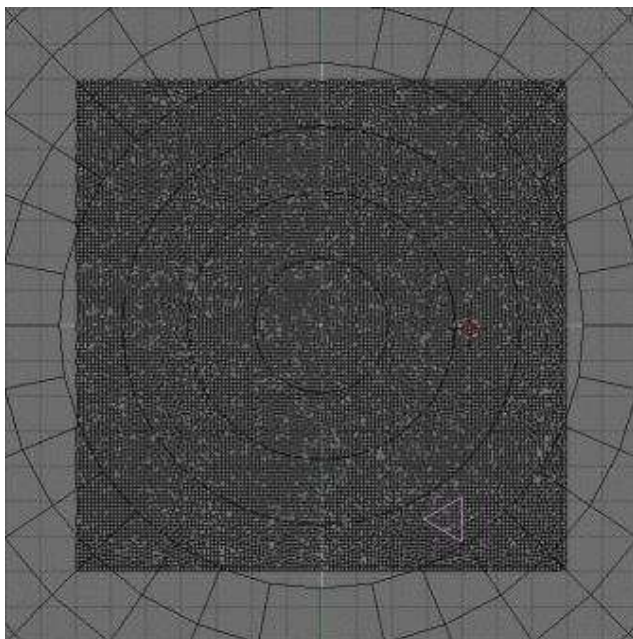
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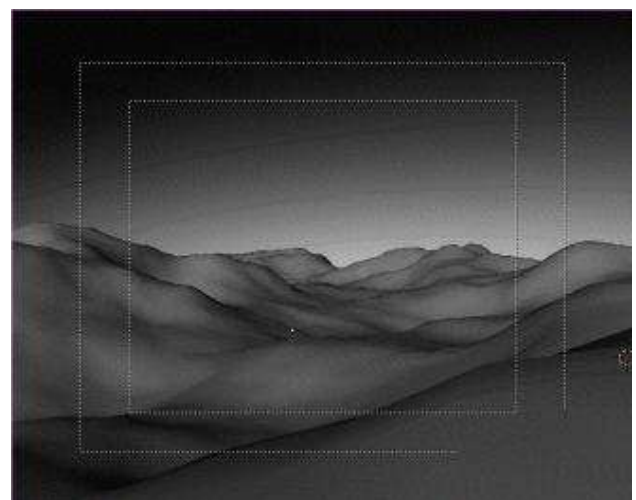


Step 5:

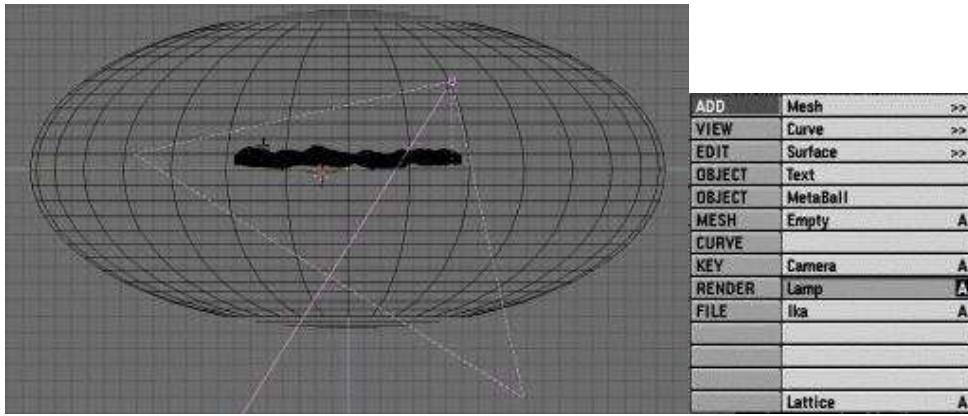
Using the G-KEY, the R-KEY, and the various points of view accessed by the NUM-7, NUM-1 and NUM-3 keys, move the camera inside of the landscape, but try to let it next to its border. Choose a place close to the floor, in order to add dynamism to the view. Check the good placement using the camera view (NUM-0 key) and the shaded view (Z-KEY).



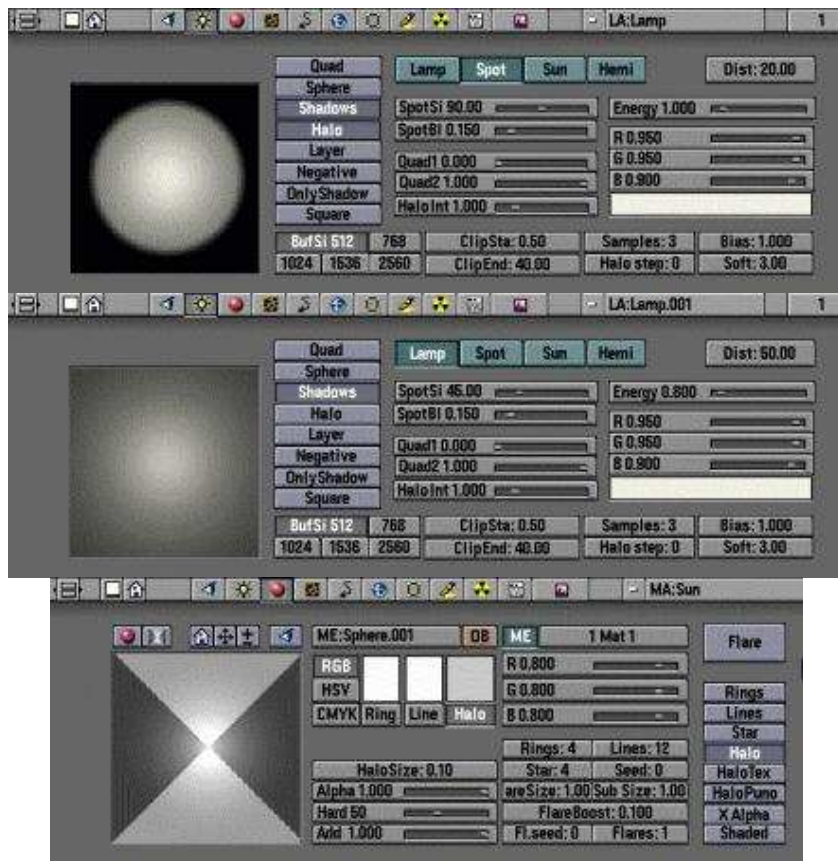
We now have to set some good light sources. Place a lamp in front of the camera at a good height : SPACE>ADD>Lamp. With the R-KEY and G-KEY, orient the spot in the three different views. You can then press the F4-KEY to get in the Light Buttons. Activate the Spot Button and give it an angle of 90° with the SpotSi cursor. Activate the Halo Button. Play with the color cursor to obtain a warm but soft light : R:0.950 V:0.950 B:0.9. Set Energy to 0.800 and HaloInt to 1.200. Select the Spot if it isn't pink anymore, then activate the Snap Mode with SHIFT+S. Choose Curs->Sel. Add another Lamp : SPACE>ADD>Lamp. Give it a Distance equal to 50, to be sure it will illuminate all the scene. Give it the same color than the Spot : R:0.950 V:0.950 B:0.9.



Tips : make sure that another Spot (located at the exact same place than the first) points directly toward the camera, in order to achieve the best illusion possible of a sun. Reduce a lot the angle of its cone (low SpotSi).



If you render now your picture, you'll see a feeble sun, not satisfactory. You can add a last object to your landscape, at the exact location of your two light sources by using SHIFT+S and Curs->Sel when the Spot, for example, is selected. Press SPACE>ADD>MESH>Icosphere. Confirm the number of subdivision, this is not a critical factor. With the S-KEY, lower the size of the Icosphere to something like these values : Sizex : 0.100, Sizey : 0.100 and Sizez : 0.100. In the Material Buttons (F5-KEY), assign a new material (call it Sun, for instance) to your Icosphere. Activate the Halo Button and lower the HaloSize to a low value, just like 0.2. Exit the Edit Mode by pressing the TAB-KEY.



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Step 6:

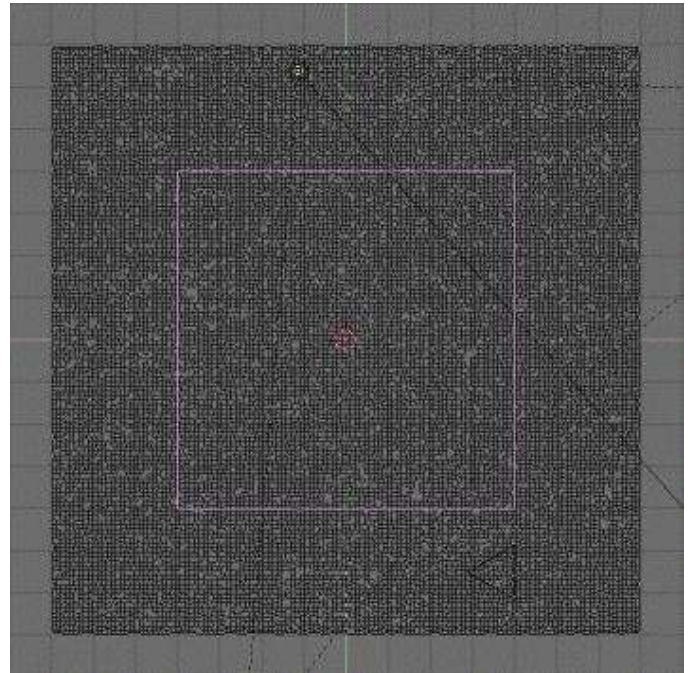
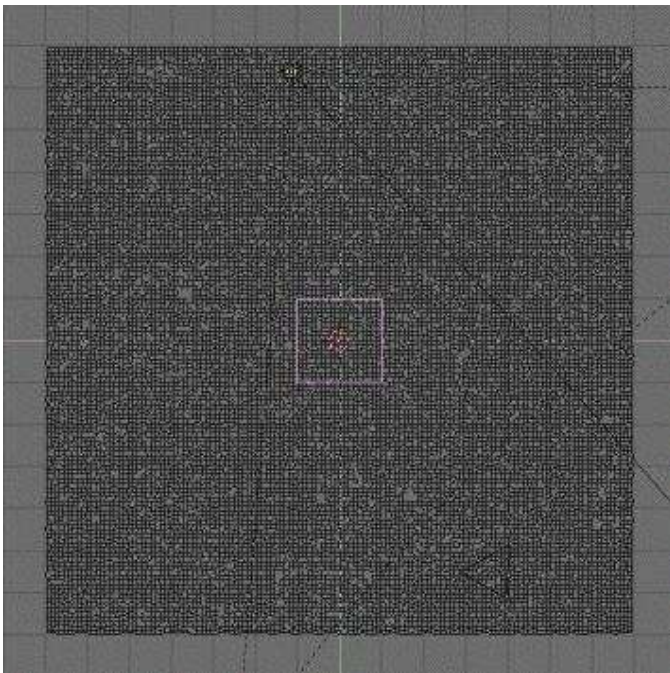
Last touches

We are almost finished, but we can now add a lake, which will have beautiful reflects if you are the happy owner of a C-KEY.

Tips : place the sphere on the second layer, because it can block our vision when we are in shaded view (Z-KEY). To do that, use the M-KEY and select the second little square from the left.

In top view (NUM7-KEY), add a plane at the centre of the scene (SPACE>ADD>MESH>Plane). Give it the name Lake (Ob:Lake). Leave the Edit mode (TAB-KEY). Multiply its size by four (S-KEY with CTRL-KEY being held until you have SizeX : 4.000, SizeY : 4.000 and SizeZ : 4.000).

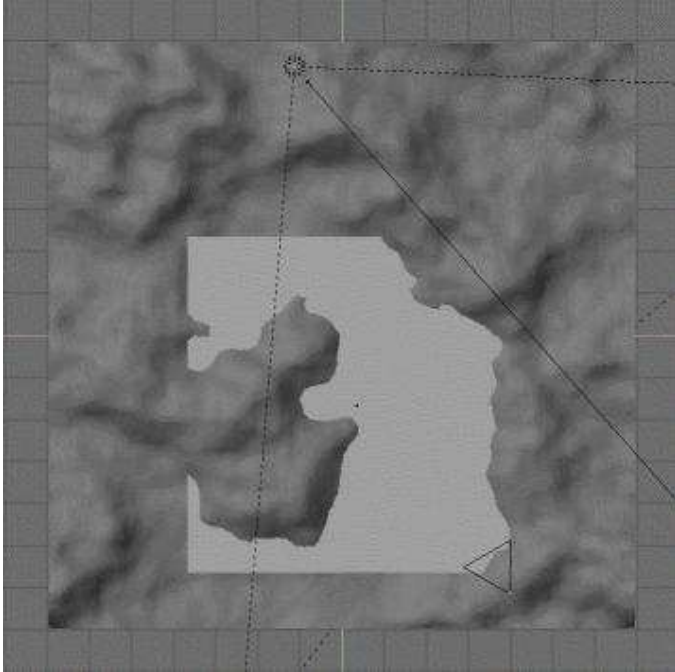
Move the plane somewhere in front of the camera (G-KEY) and then, in front view (NUM1-KEY), adjust its height to have it cutting through the landscape a pleasant way.



Go back in top view (NUM7-KEY) and activate the shaded view (Z-KEY). Figure out if the result please you, without caring about areas which are not in the view sight of the camera. To figure out this, go in camera view (NUM0-KEY) and adjust accordingly the position of the plane in the top view (NUM-7 and G-KEYS).

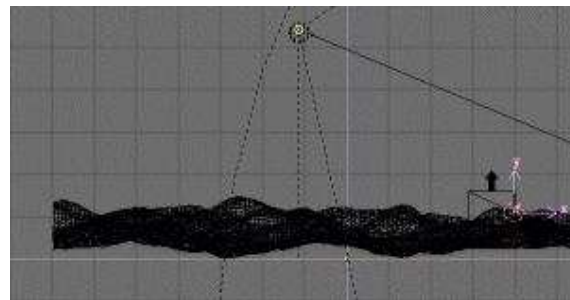
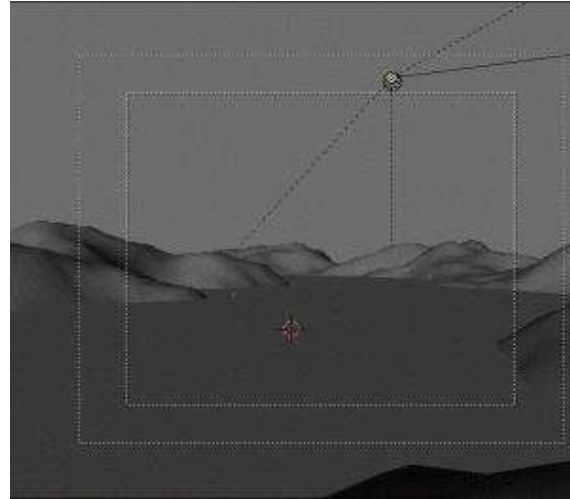
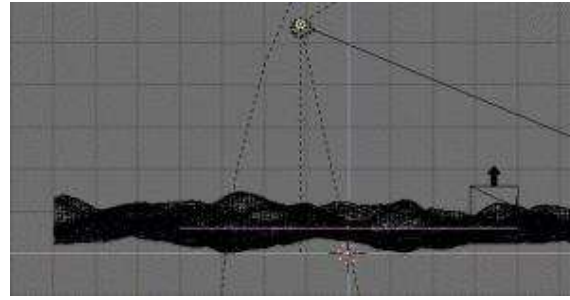
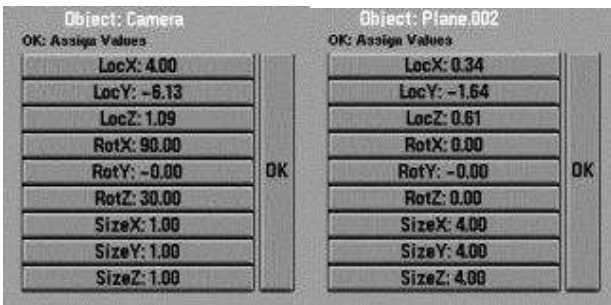
In either case, move the plane on the third layer (M-KEY, select the third little

square from the left and valid).



We are now about to deal with the critical point for the magic of Envmaps to work !

Leave the shaded view (Z-KEY again), then select the camera (right click with the mouse) and place the cursor on it (SHIFT+S-KEY, Curs->Sel). Add an Empty here (SPACE>ADD>Empty).



Reselect the camera and invoke its coordinates with the N-KEY, and especially note down LocZ and RotZ.

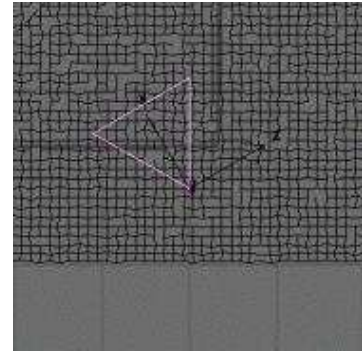
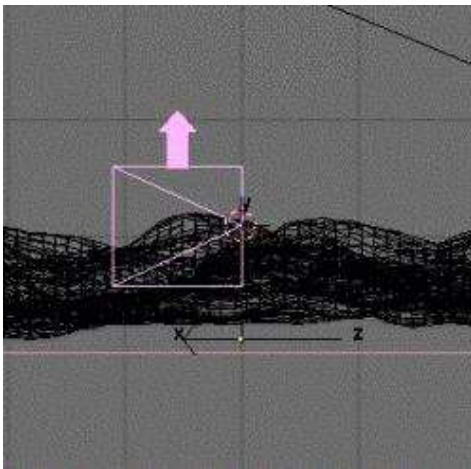
Select the plane and invoke its coordinates with the N-KEY. The same way as before, note especially LocZ.

At last, select the Empty and invoke its coordinates (N-KEY). Add to its RotZ the RotZ of the camera. The replace its LocZ by
 $: \text{LocZ}(\text{plane}) - [\text{LocZ}(\text{camera}) - \text{LocZ}(\text{plane})].$



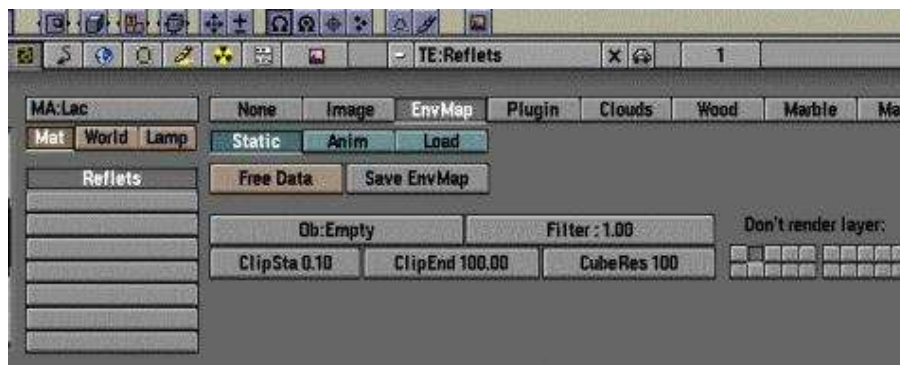
Step 7: This step is critical to make the reflection of the lake match perfectly to the reality !

Respectively in front view (NUM1–KEY) and in top view (NUM7–KEY), you should get a location for the Empty related to the camera near than this one :



Now that the pre-requisites are over, let's see the fundamental step, which is very easy.

- Select the plane and edit its material properties (F5–KEY) (Material Buttons). Add a new material and call it Lake (MA:Lake). Edit its textures (F6–KEY) (Texture Buttons).
- In the first channel, add a texture called Reflects (TE:Reflects). Click on EnvMap and specify Empty in the Ob button Ob:Empty). At the **Don't render layer** section, select the layer on which the plane is placed (for instance, the third). In the second channel, add a texture called Wave (TE:Wave). Click on Stucci.
- Go back in the material properties (F5–KEY) (Material Buttons). Select the channel Reflects. Activate the Refl, Col, Csp and Cmir Buttons. Give the Col slider a value of 0.6 (or any other that suits you).
- Select the Wave channel. Deactivate the Col Button and activate the Nor Buttons. Set SizeX to 1.000 and SizeY to 5.000. Play with the Nor Slider if you want to intensify the wave effect, 1.000 being a good starting value.
- Set the lake's Alpha to 0.9 and activate the ZTransp Button.





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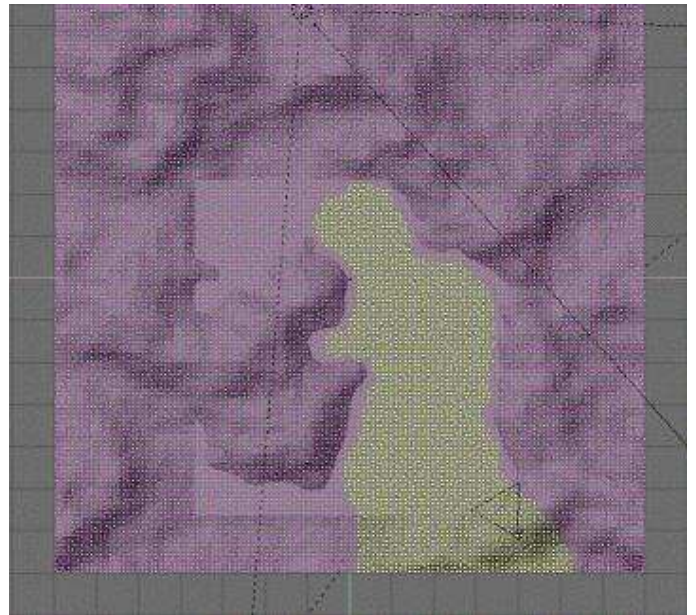
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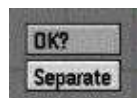
Step 8:

And now, the trickiest part...



If you render now your picture (F12-KEY), the surface of the lake will be almost entirely black, because the reflection angle has been calculated from the Empty point of view, and the Empty sees only the part of the landscape **under** our Ob:Lake ! What make sense for us being reflected is the part of the landscape that is **over** the water plane !

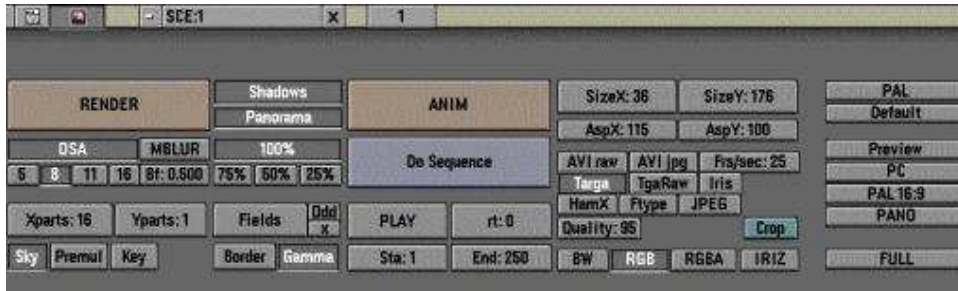
So go in top view (NUM7-KEY) and select your landscape. Then enter the shaded view (Z-KEY). Edit (TAB-KEY) the vertices of your landscape, and select (B-KEY two times) those who are strictly under the water plane, and up to the camera. With all these vertices selected, press the P-KEY. Validate the separation. Leave the Edit mode (TAB-KEY) and select the separated part. Move it on the same layer than the lake object (the third layer) with the M-KEY, as we did before.



At last ! You have nothing to do but to render your picture, now ! Select all the layers you have put something in (the three first layers), and make sure that the landscape, the lake and the sky sphere all appear from the camera view point. Call the Display Buttons with the F10-KEY. Activate Shadows and OSA. Press the F12-KEY and enjoy a quick and well rendered landscape ! **Tips** : when rendering landscapes, don't hesitate to use the PANO format, which is more pleasant (you then also need to activate the Panorama Button). However, as this tutorial has been written, you'll get a lake with strange and unrealistic frontiers if you do now ! You'll then have to divide (W-KEY) your water plane, and then delete or move the vertices that don't match your wishes.

Also, don't hesitate to add Flares, either in the material properties of your lco-sun (right-click on the sun so select it,

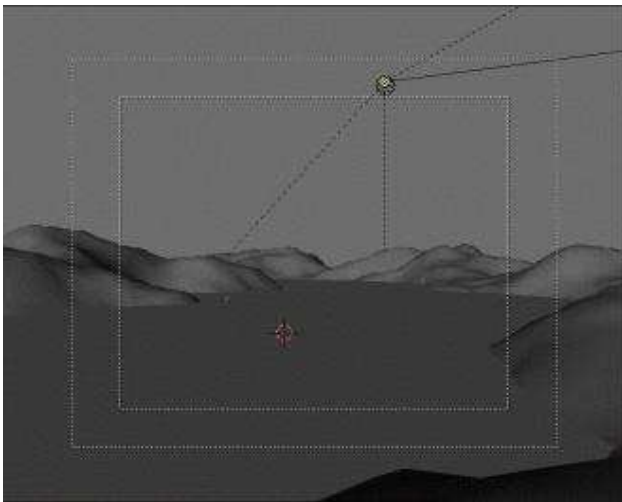
F5-KEY, activate the Flare Button and tweak the parameters), either in the GIMP once the picture is finished.



And here is the result of this tutorial ! Charming, isn't it ? There are many minor tweaking left to do, but all the basics are here.

When you'll have done this tutorial four to five times, you'll be able to render a landscape in about an hour (which is pretty quick ! it now takes half an hour to me to render such a picture). The spared time can then be spent in modelling trees, plants, animals and of course characters to fit in this landscape, can't it ?

Now it's your turn to play ! Don't hesitate to show me your works (but don't send them by e-mail ! I rather prefer that you give me an URL on the Internet where I can see them).



Key parameters. :Random Seed : 80 – Detail Level : 10.0

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