

Modeling vegetation

Mastering 3D Graphics ~ issue #1

in Rhinoceros 3D Ryan Knope

As you may have read Rhinoceros 3D 1.0 incorporates some of the best and recent nurbs modeling tools that are on the market. With this comes a masterful Nurbs application that you can use to create absolutely anything. Rhinoceros is a powerful modeler but it has major limitations in rendering and surfacing, as well as no capabilities for animation. For your surfacing and rendering, it would be most beneficial to use another application.



Modeling in Rhinoceros can be quite simple. Rhino has an interchangeable interface, it may benefit you to download a new and more colorful interface if you don't already have one. You can download custom workspaces at the links section of <http://www.rhino3d.com>.

Concept Sketches

Concept sketches can sometimes mean the difference between a quality model and a poorly built one. With concept sketches you will have a sense of what you want, and having it planned out will get the project done much faster. I would recommend drawing a concept sketch for any project that you do, it will help you get it done faster as well as better. **Figure 1** shows a rough concept sketch of the alien tree.



Figure: 1

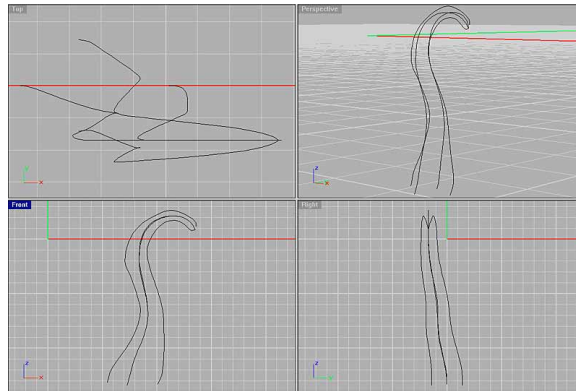


Figure: 2

Modeling in Rhino

The Trunk/Stem

There are many ways to make almost any object. With this particular object we will look specifically at the loft tools. Loft tools can be used in several different ways. Lets take a look at how to model an alien tree, the Weeping Ame.

To start the model we will draw a set of 4 profile splines for the stem, or trunk. The type of splines that we will use on this project will be interpolated curves. We will use interpolated curves because they are smooth and flowing. The second style of curve, the polyline, is not flowing and has straight edges. In **Figure 2** you will see the 4

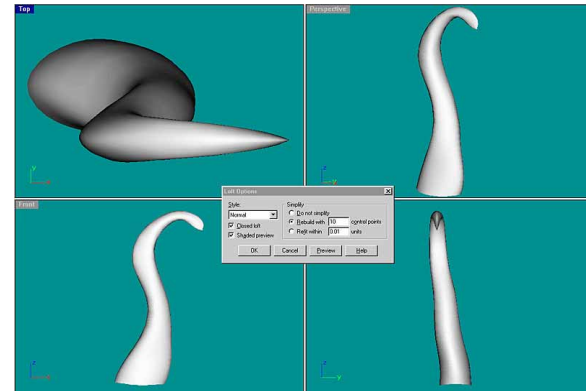


Figure 3: The loft options dialog.

profile splines completed. Once we have the splines drawn we will have to loft them to make a surface. To loft you will need to type Loft into the command line and press enter. Now you will have to select your splines in a counter, or clockwise fashion. It doesn't matter which way as long as they are in order. Once your splines are selected you must press enter and then you will see a loft properties box popup. Use the settings as seen in [Figure 3](#). Check the shaded preview box and press preview to view a quick render of your current loft object.

The terms and buttons of the Loft Dialog Box do the following:

Closed Loft: Closes the surface. (In this case we do not want to use this.)

Shaded Preview: When quick shade is activated, it shows the current loft in progress, in a shaded view.

Do not simplify: Uses the current set of points on a spline to determine where isoparms will be located.

Rebuild with **: Rebuilds a surface using ** number of isoparms (** is a number you indicate).

Style: Determines how your surface will be generated. Normal builds it with normal tightness and so on, while straight sections build a surface with straight sections at each isoparm. The splines are set in different colors for ease of understanding.

The Leaves

Now that you have the trunk/stem of the Weeping Ame we will work on the leaves. [Figure 4](#) shows the splines in different colors to ease understanding. All of the leaves splines are interpolated curves. This time as when loft we will use different settings. This surface will be open and only use 3 splines. Use the Loft command as you did previously, but use the settings as you see in [Figure 5](#). You can also see the loft preview in the previous figure.

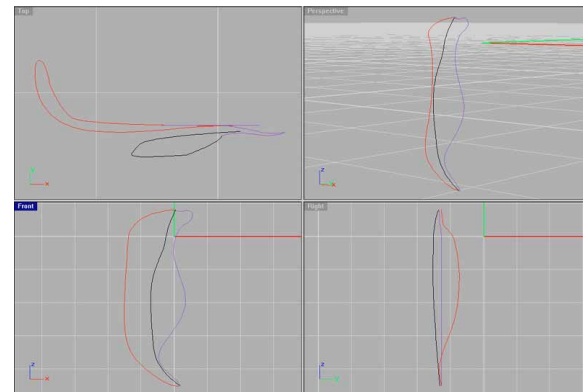


Figure: 4

Once you have completed lofting the leaf you will need to mirror and copy them over quite a few times as seen in [Figure 6](#). All leaves are in different colors to show where to place them. To access the mirror and copy tools, simply type Mirror, or Loft into the command menu. Once this is done you will have a stem/trunk and 10 leaves completed. Your scene so far should look similar to [Figure 7](#). To do a quick render as seen in this figure, use the ShadeAll command, all view-ports should become shaded.

The Flower Petals

The flower petals are modeled in the same way as the leaves, and are very similar in all aspects. This is

where we have decided it would be best to have a different output than our concept sketch depicts. [Figure 8](#) shows the interpolated curves needed to form the petal surface. Each spline is set in a different color. To build a

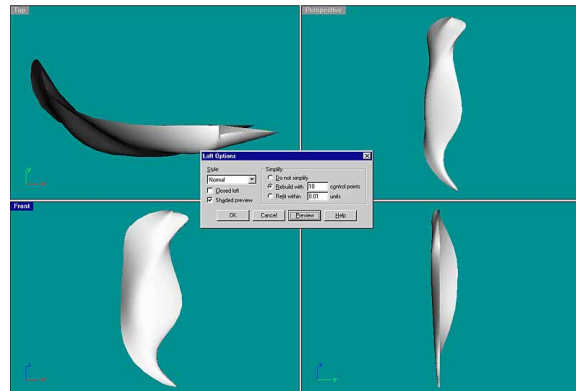


Figure: 5

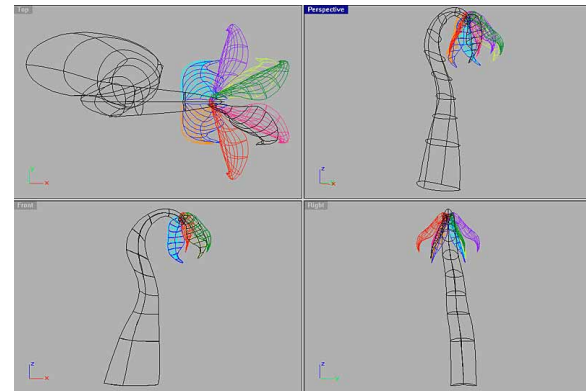


Figure: 6

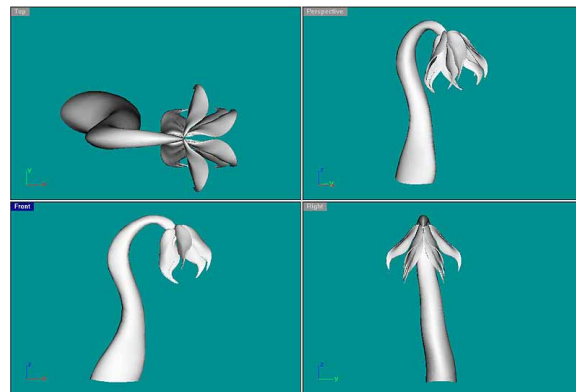


Figure: 7

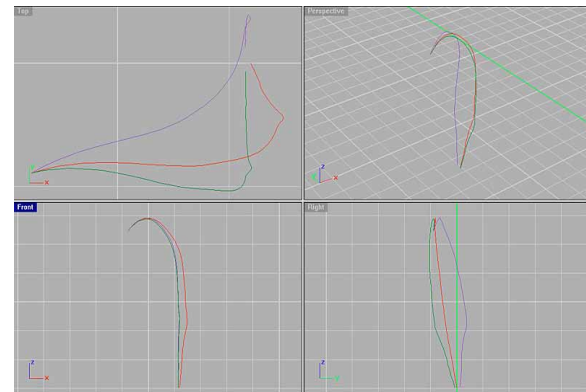


Figure: 8

surface from these splines we will use the same technique described above for the trunk. Use the loft tool and make an open surface (Make sure the Closed Surface box is unchecked.) A surface should be generated such as seen in Figure 9. You will now have to mirror, copy, and rotate the surfaces as shown in Figure 10. Use the respective commands for each, such as Mirror, Copy, and Rotate.

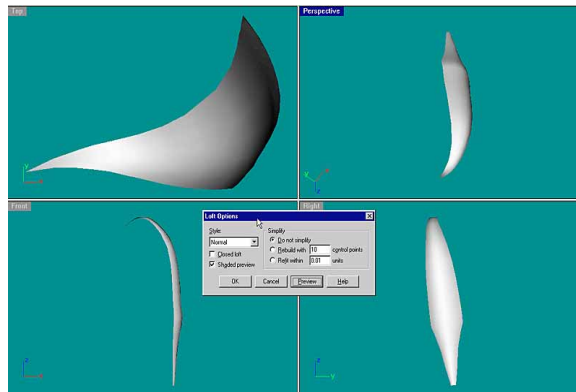


Figure: 9

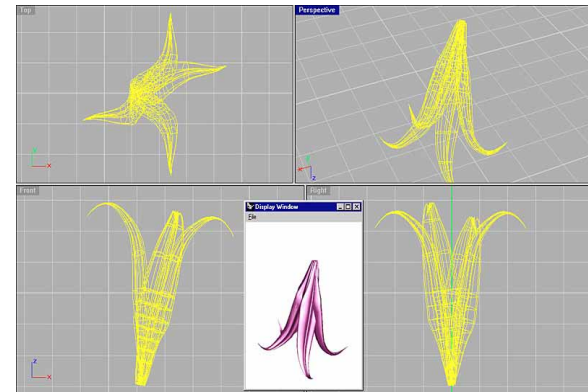


Figure: 10

Curled Leaves

For the curled leaves that are attached to the large leaves you simply need to copy, scale, and rotate the smaller leaves over to the other side as seen in Figure 11.

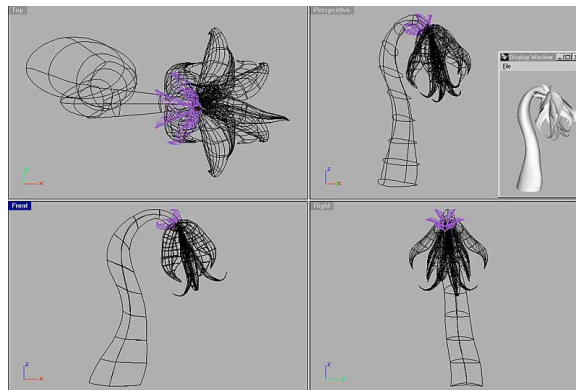


Figure: 11

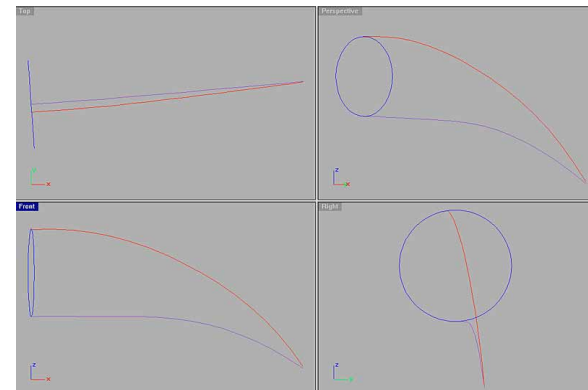


Figure: 12

Spikes

For the stem/trunk we will be adding spikes. You can do this 2 ways, if you are in a large rush you can use cones as spikes but I would recommend using a different method. In this case we will use the tool named 2 rail Sweep. This method uses one curve as the cross section, and 2 curves to sweep along. We will be using interpolated curves for these surfaces. [Figure 12](#) shows the splines drawn in different colors.

Now access the Sweep 2 Rail tool by typing the command Sweep2. Press enter and select your 2 rail curves (the ones in Red and Purple). Next select the cross section, which is the one in Blue. Once you press enter you should see a dialog box pop up, use the settings as seen in [Figure 13](#).

Finishing up the model

Once you have completed the tutorial up to this point, the only thing that is left is to copy and scale the

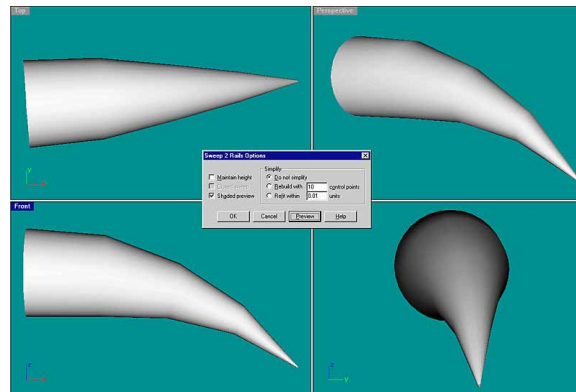


Figure: 13

spikes all over the trunk. You can see this in [Figure 14](#). The last thing is to Surface the model, which I do not advise doing in Rhinoceros, as it does not have a high level of support in the area of surfacing. [Figure 15](#) shows the final model surfaced in Inspire 3D.

Surfacing

Good surfacing can take an object from plastic to realistic, and turn objects from coal to diamonds. This is no different with trees and flowers. With these models surfacing is key, you should whatever map types your object requires including bump, specularity and even reflection maps if your object happens to be shiny. Bump maps alone can do a great deal to improve the look of an object. They can make the veins in a leaf stand out or the

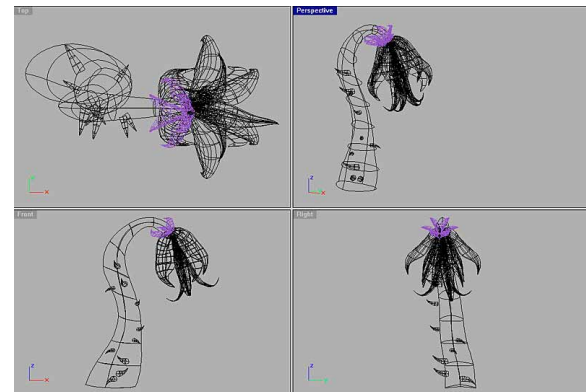


Figure: 14

bark of a tree appear rough. Adding specular maps is also a good idea. Specularity maps define what portions of your object are going to react to specular highlights.

All of these maps are done in grayscale, where the lighter shades add the specularity or bump, and the dark shades are not affected. Different applications take different approaches as to how each map is implemented on the model, but in most programs there is the option.

Conclusion

Rhinoceros is a great modeler and has hundreds of tools in which can make your work the best it can be. As with any application, taking full advantage the tools offered by Rhino may take a bit of time. With this tutorial we took a look at only a few of the many tools available, stay tuned next time to take a look at modeling more of the world of Intratega 2. Till then keep modeling.

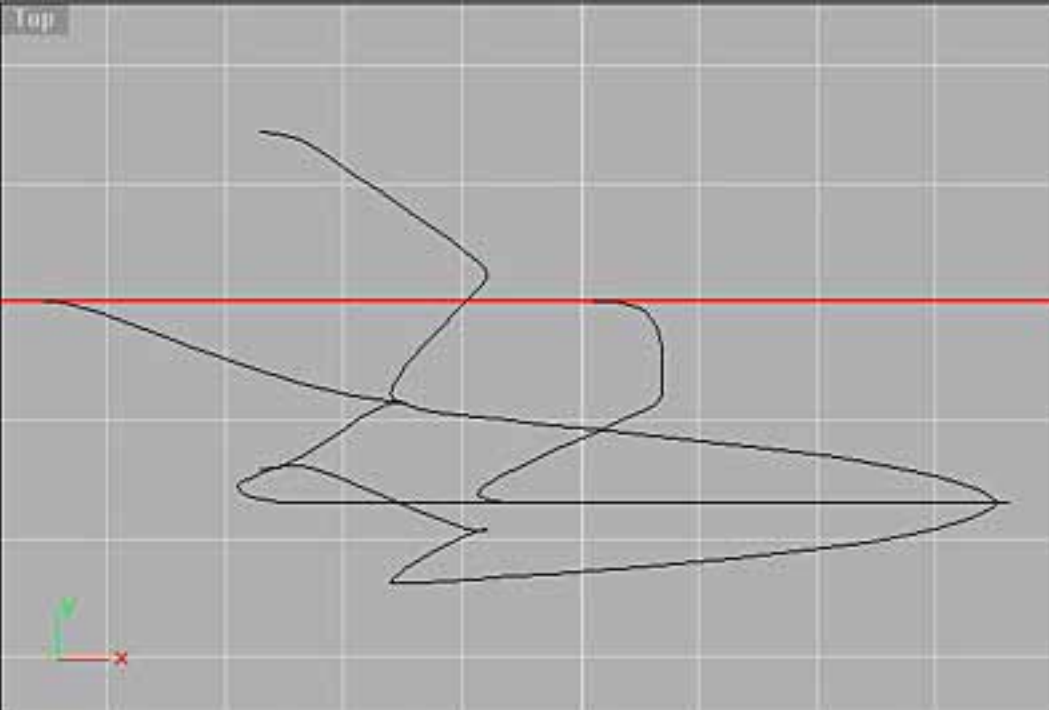
Send any Rhinoceros 3D Questions or tutorial responses to ryan.knope@komodostudio.com please.



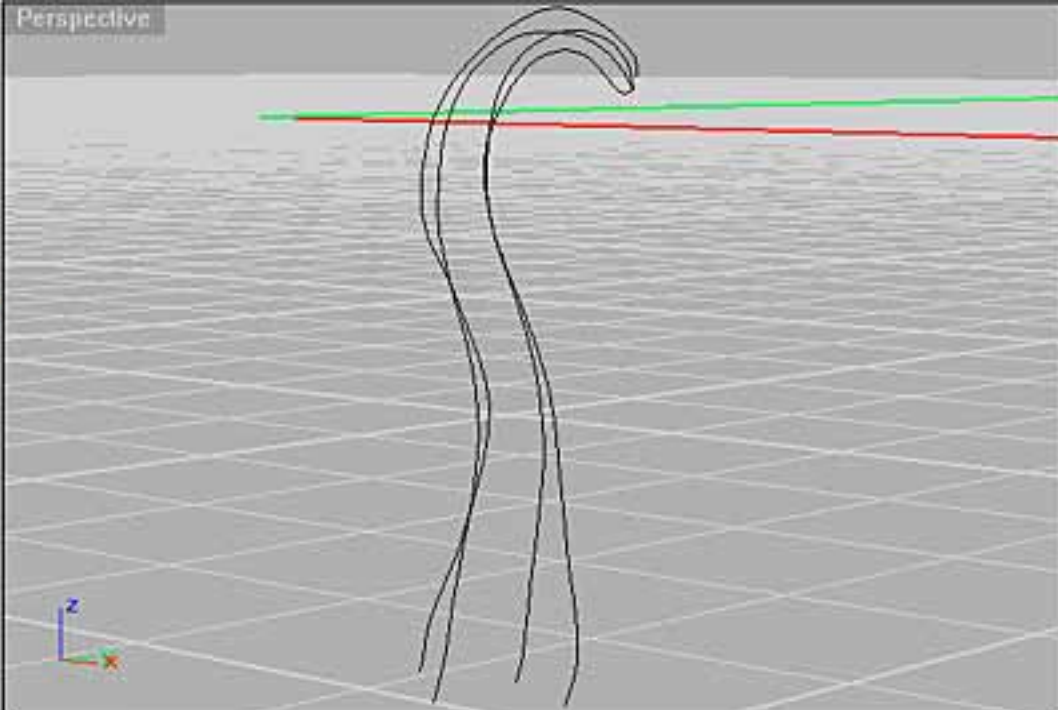
Figure: 15



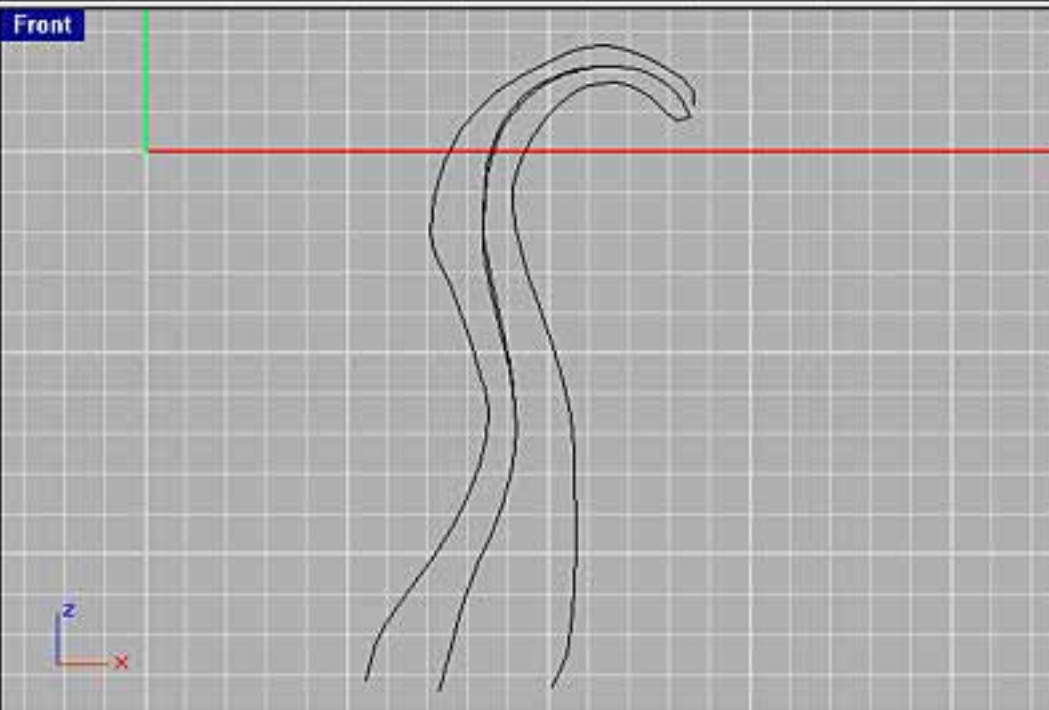
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Perspective



Front

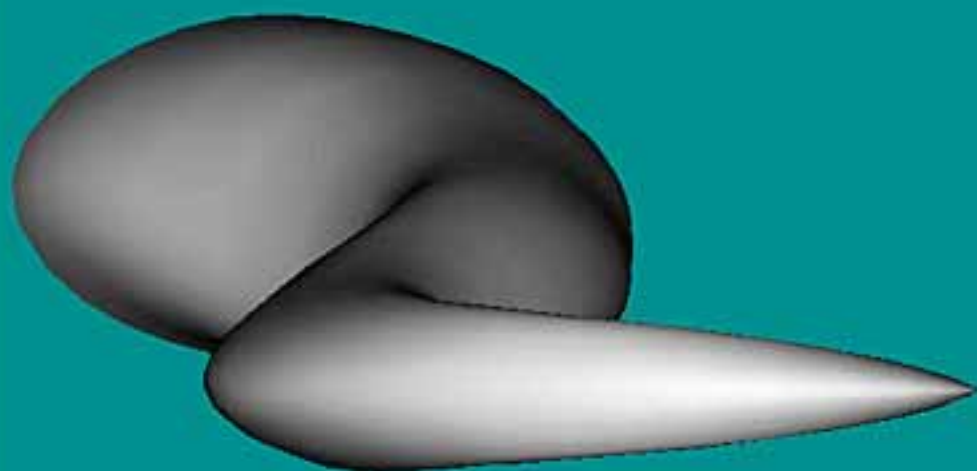


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Top

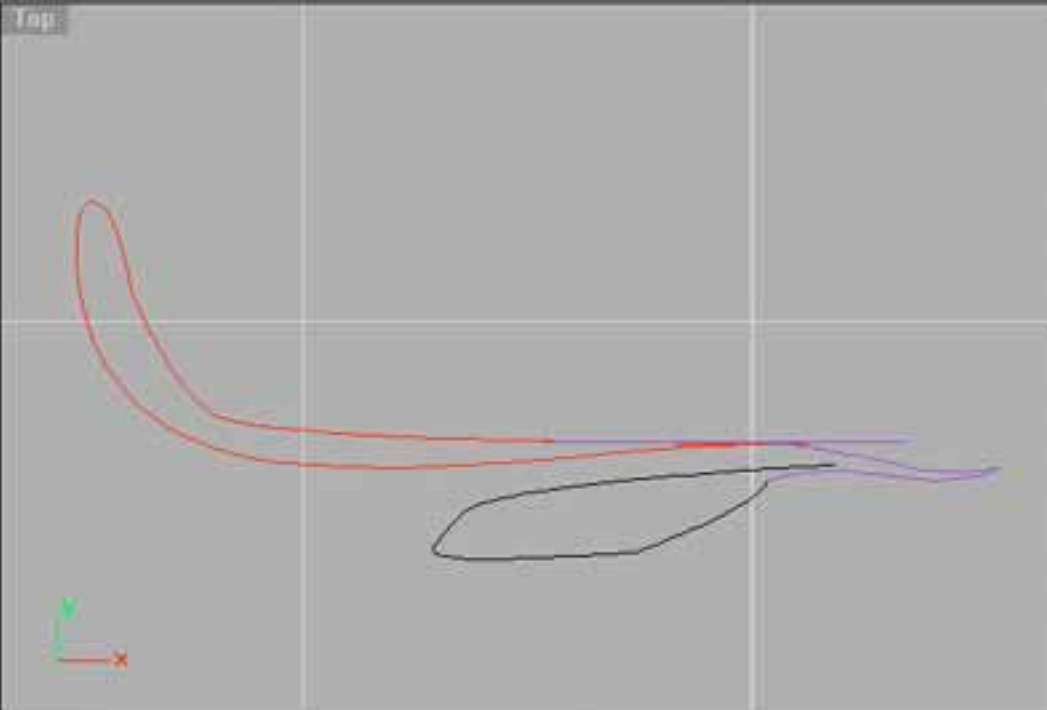
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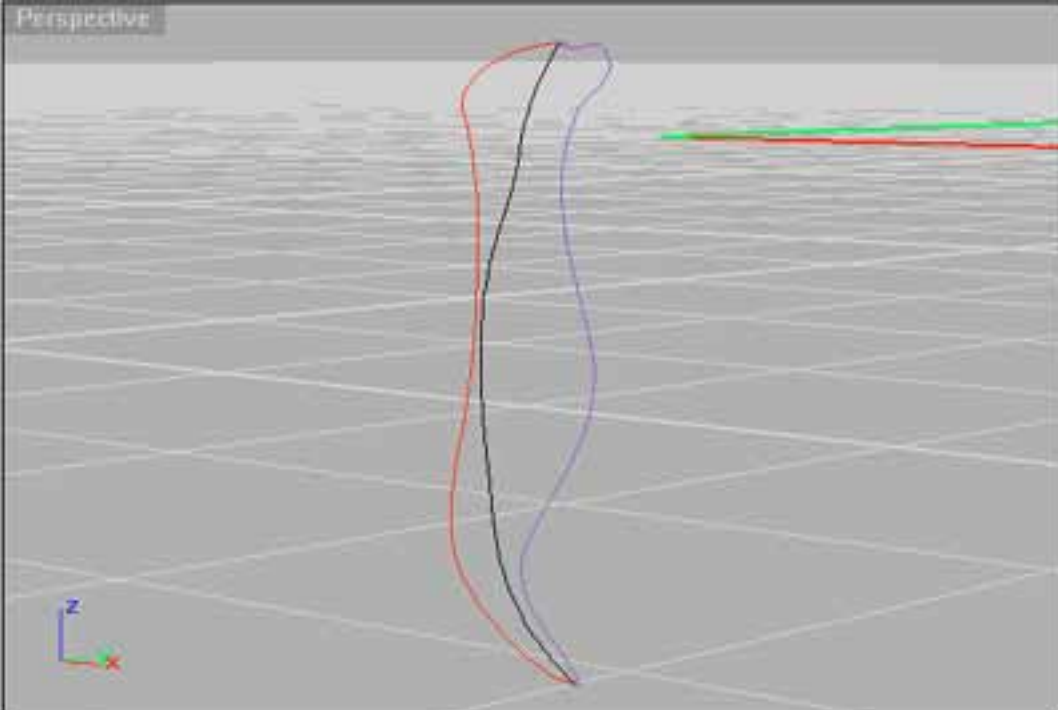
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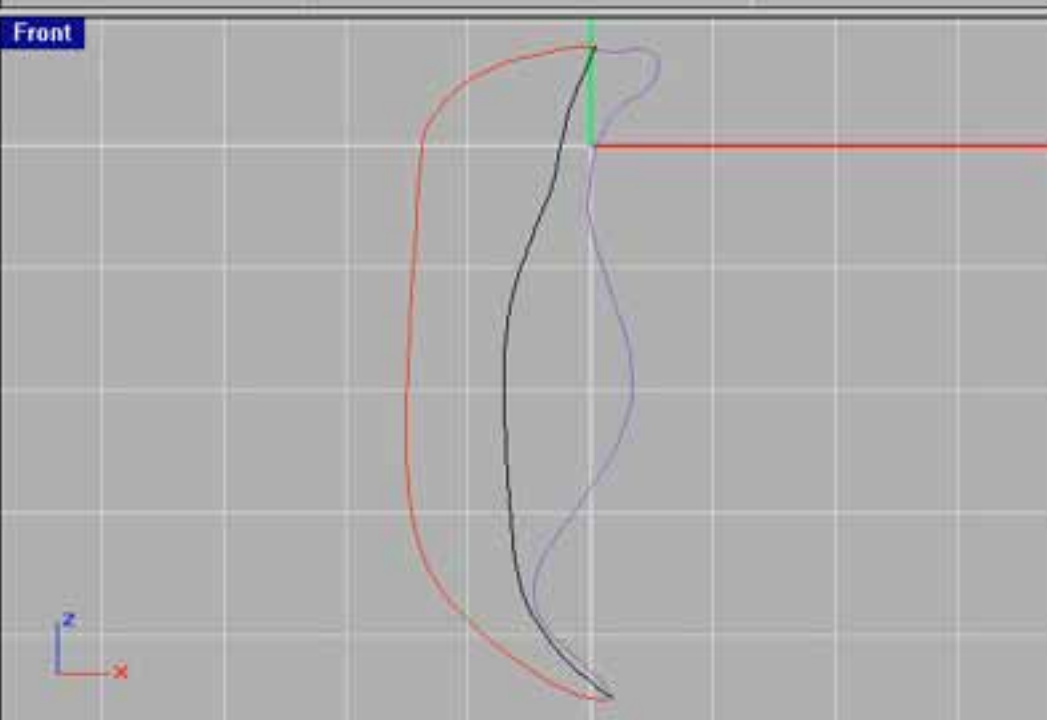
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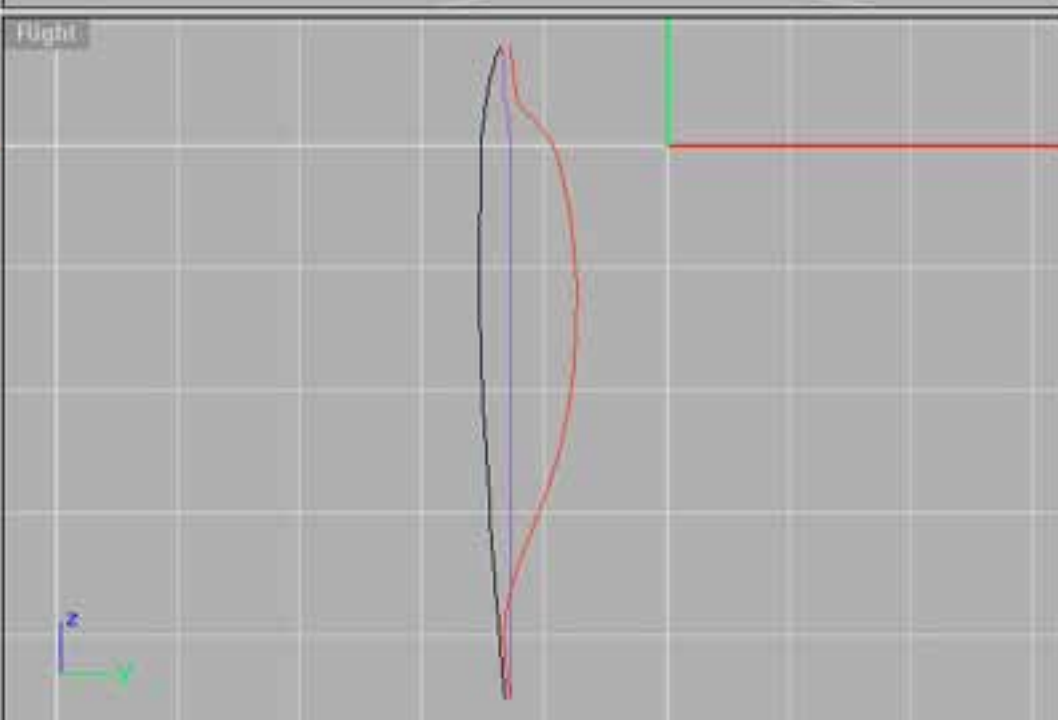
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Front



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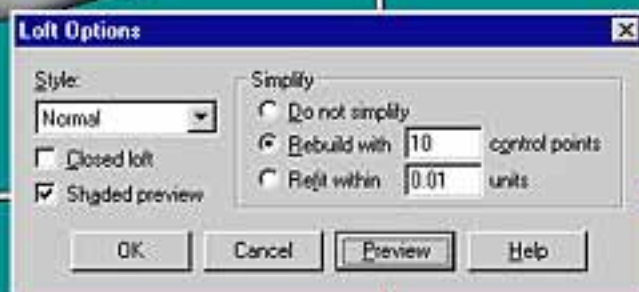


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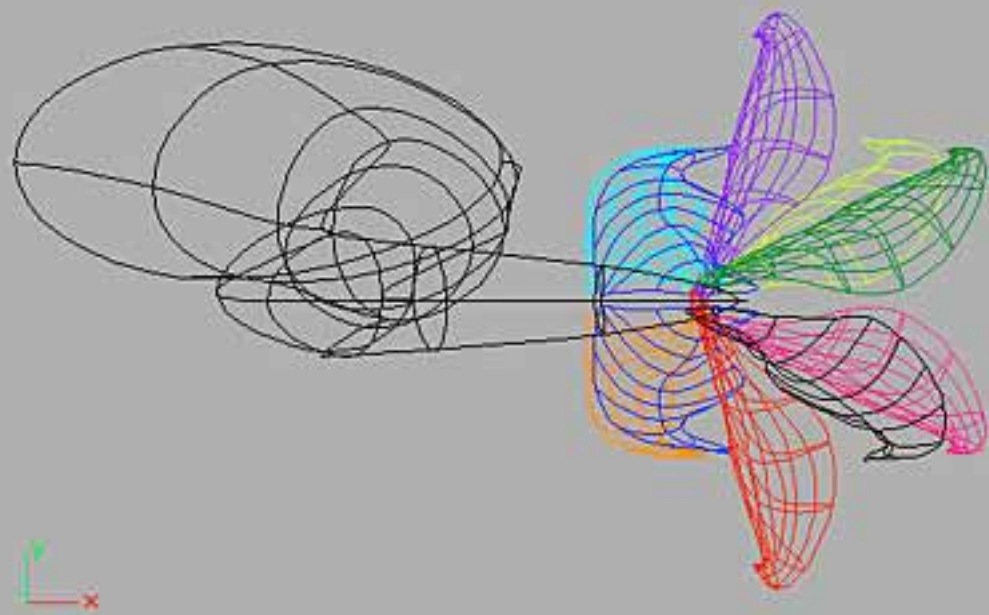
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Front



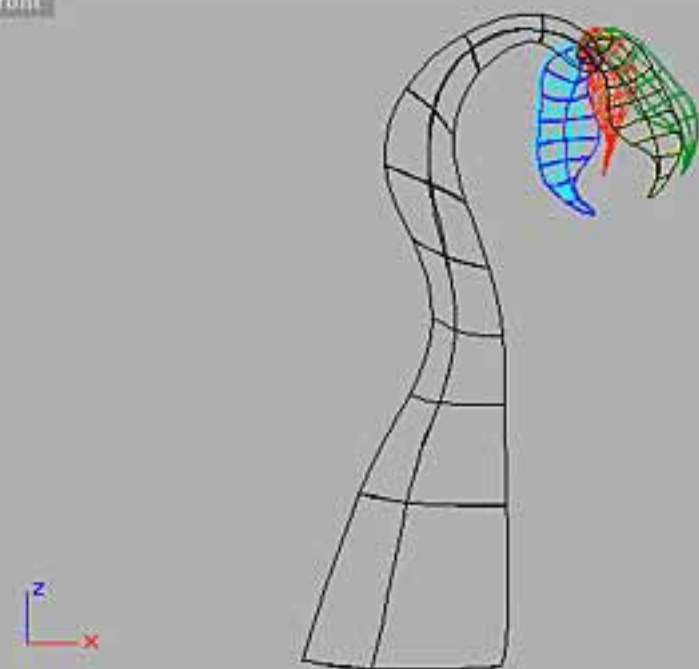
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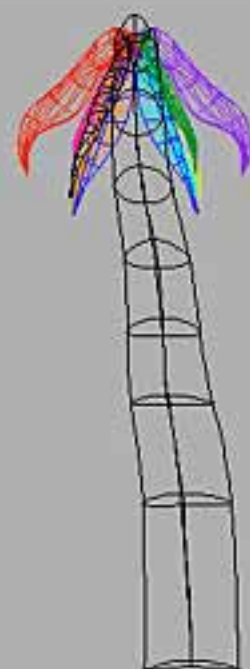
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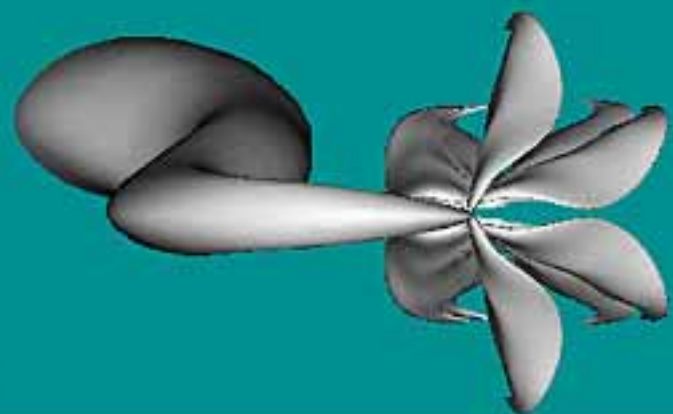
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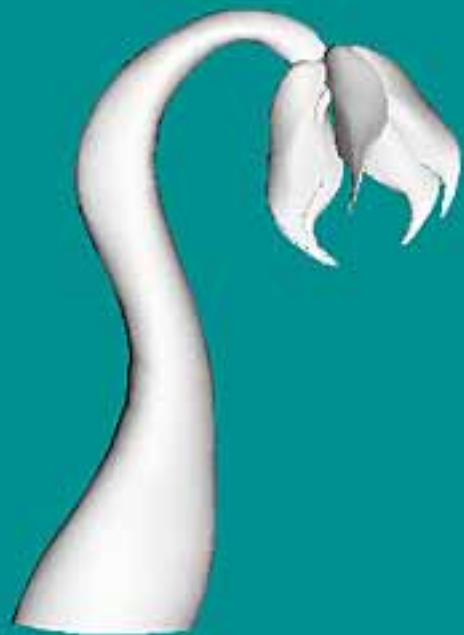
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Perspective

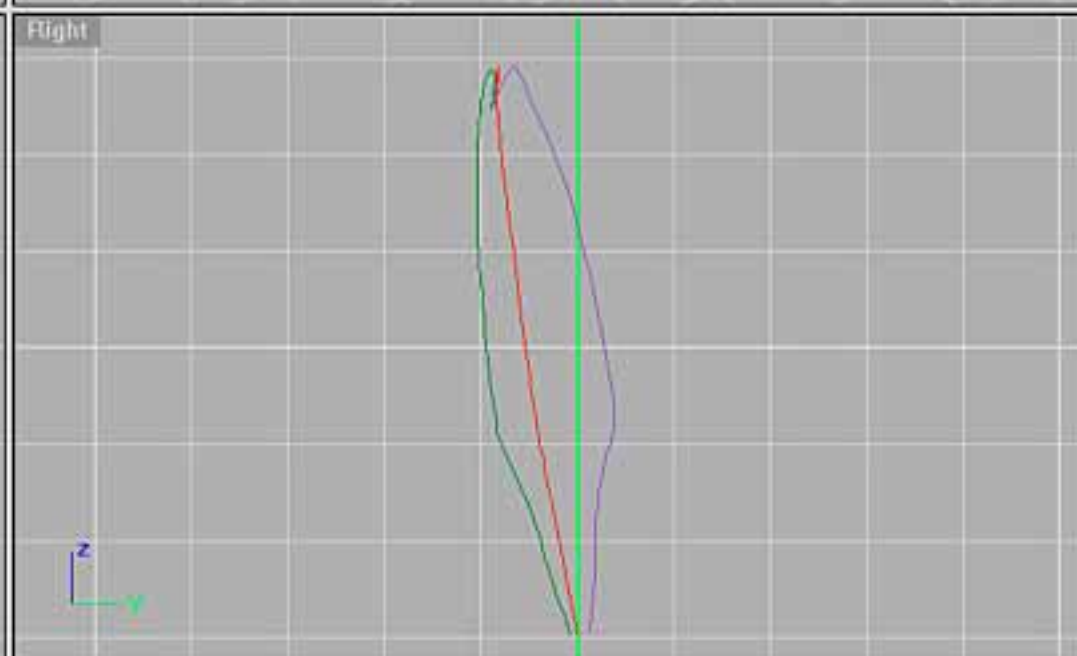
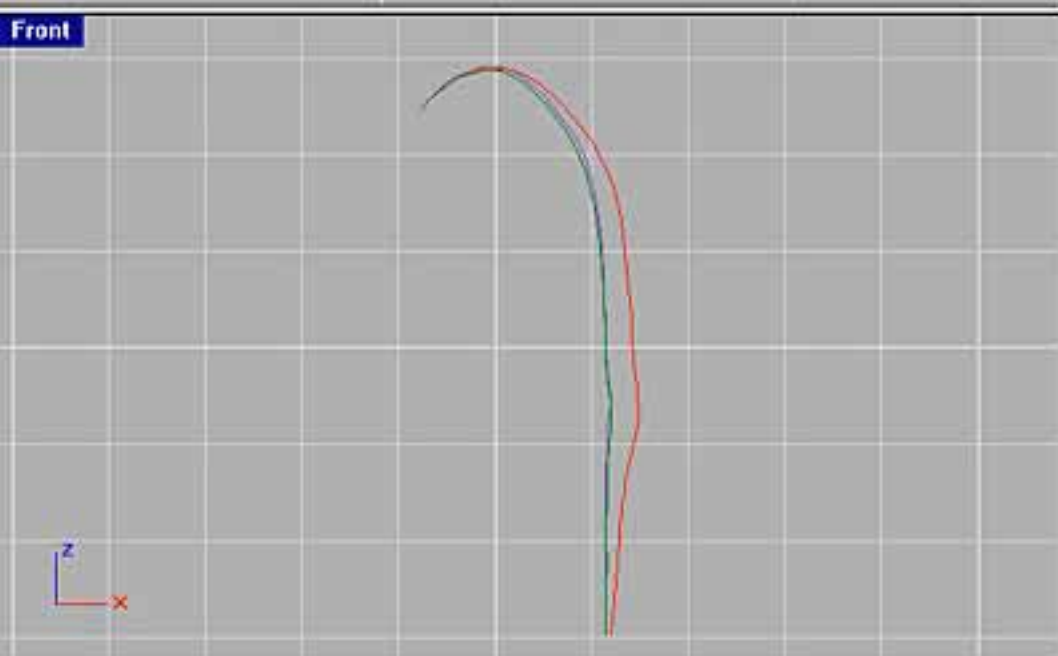
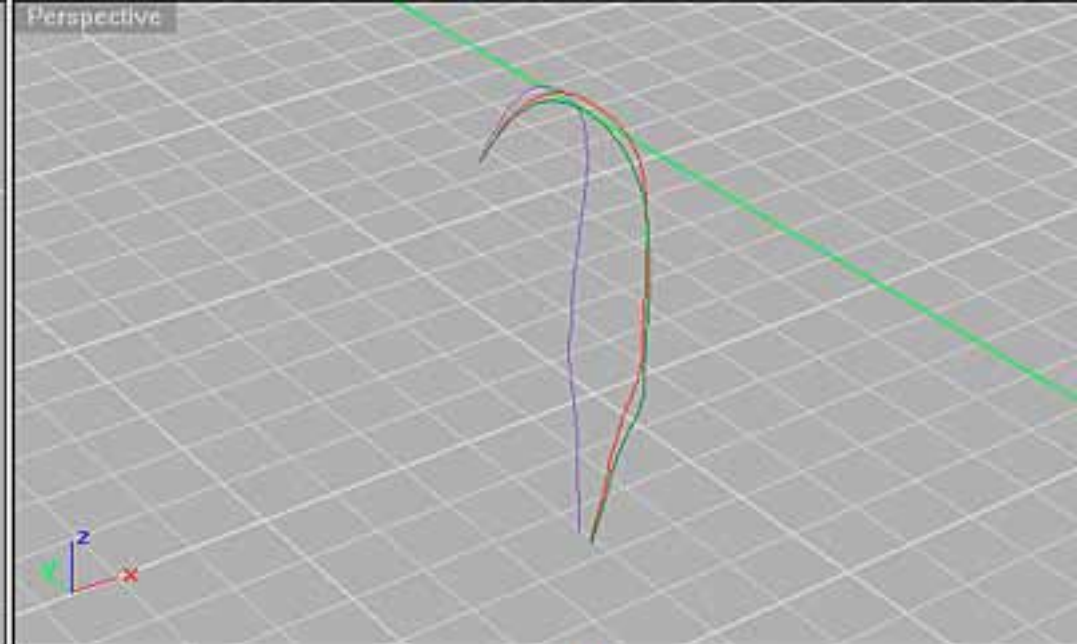
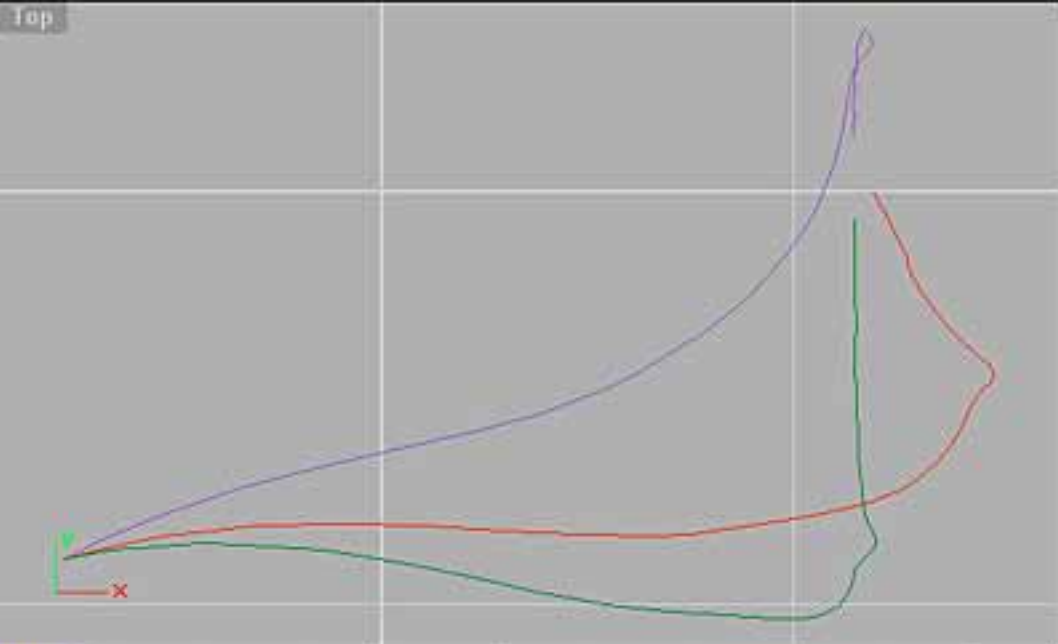


Front



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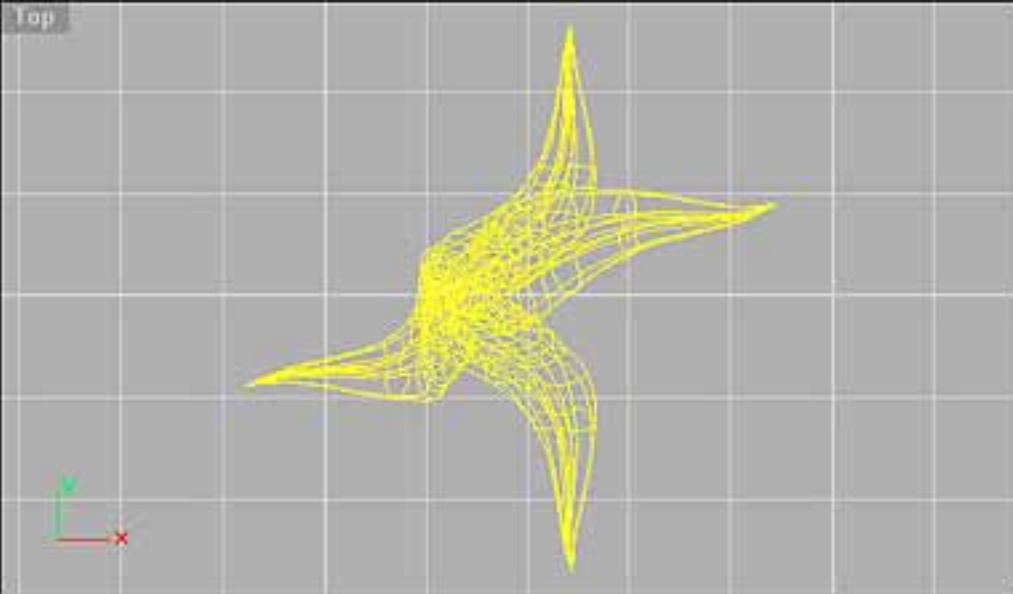
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Front

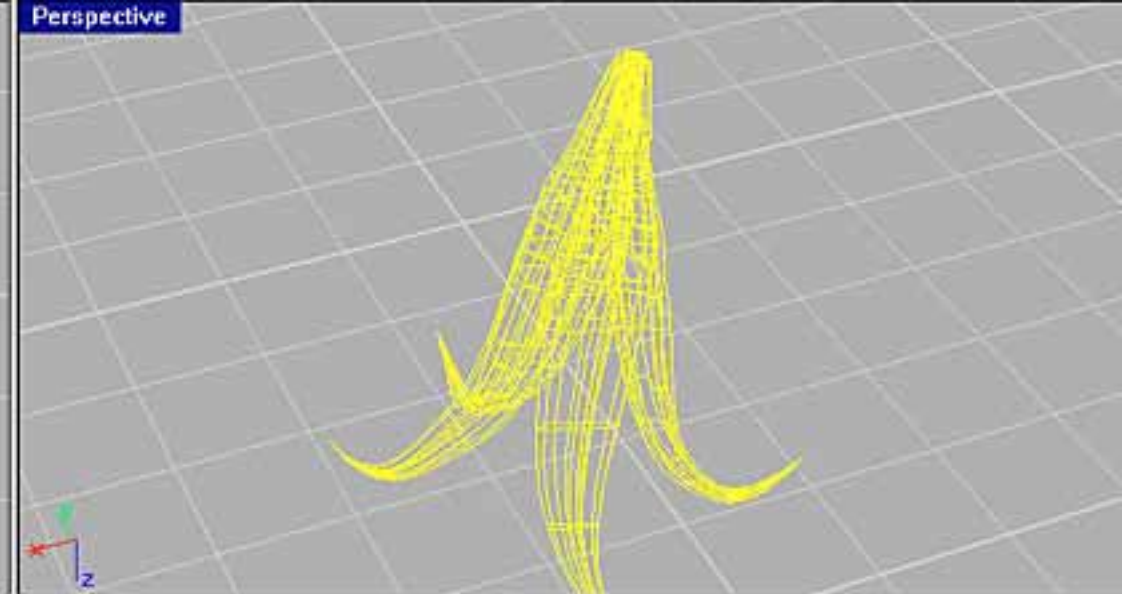
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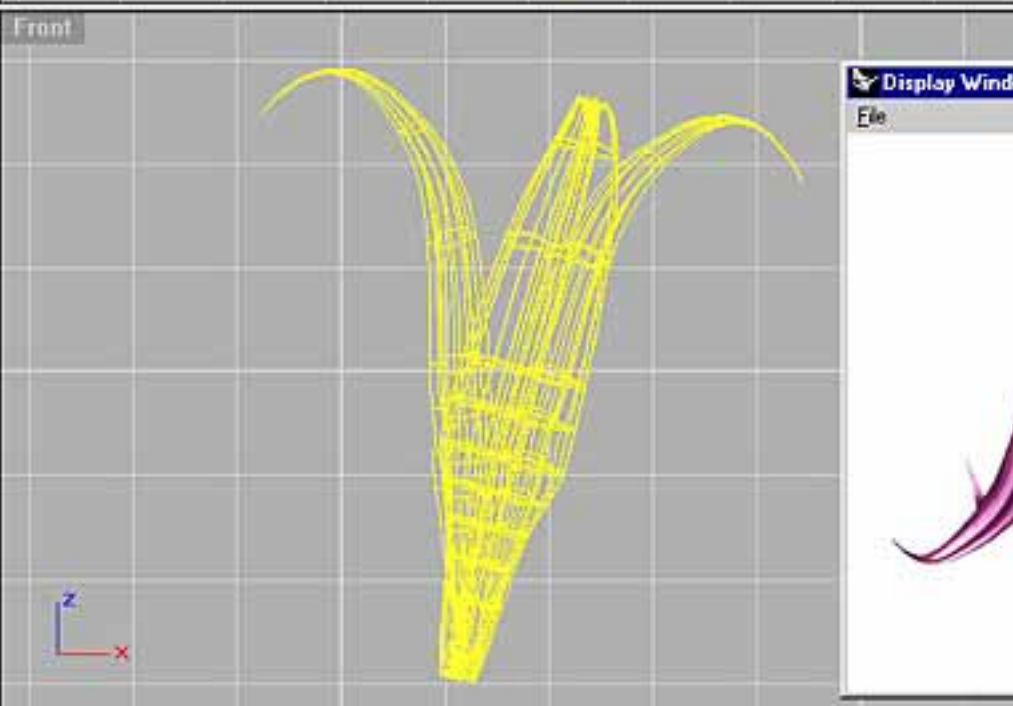
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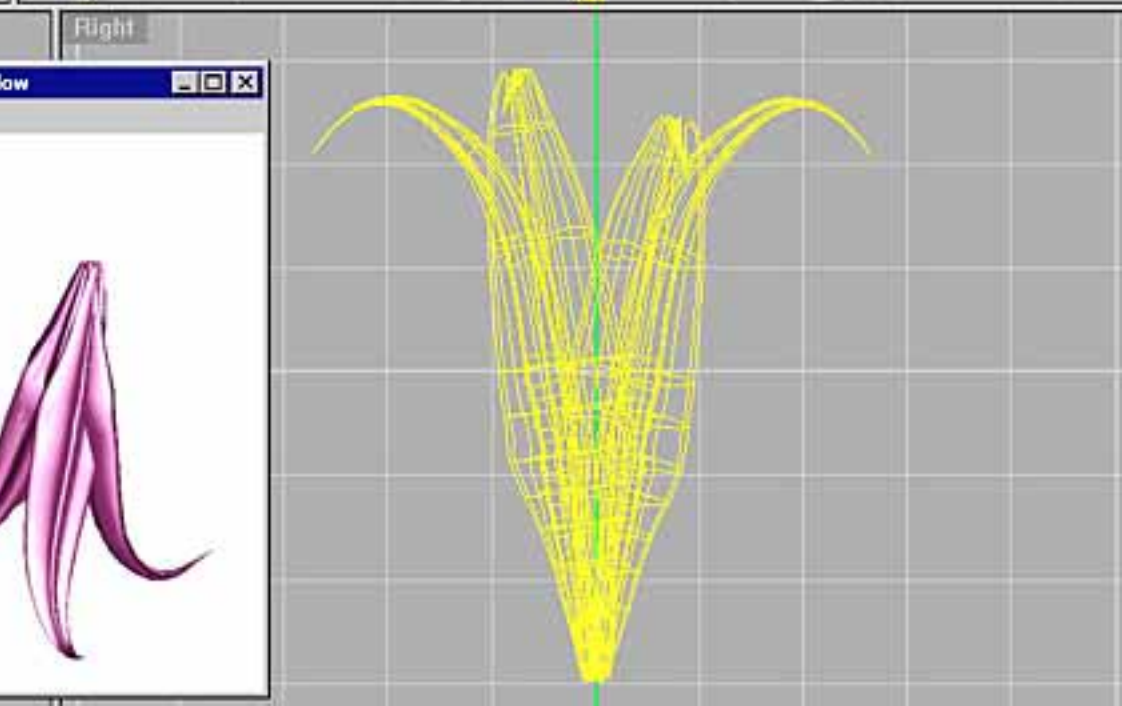
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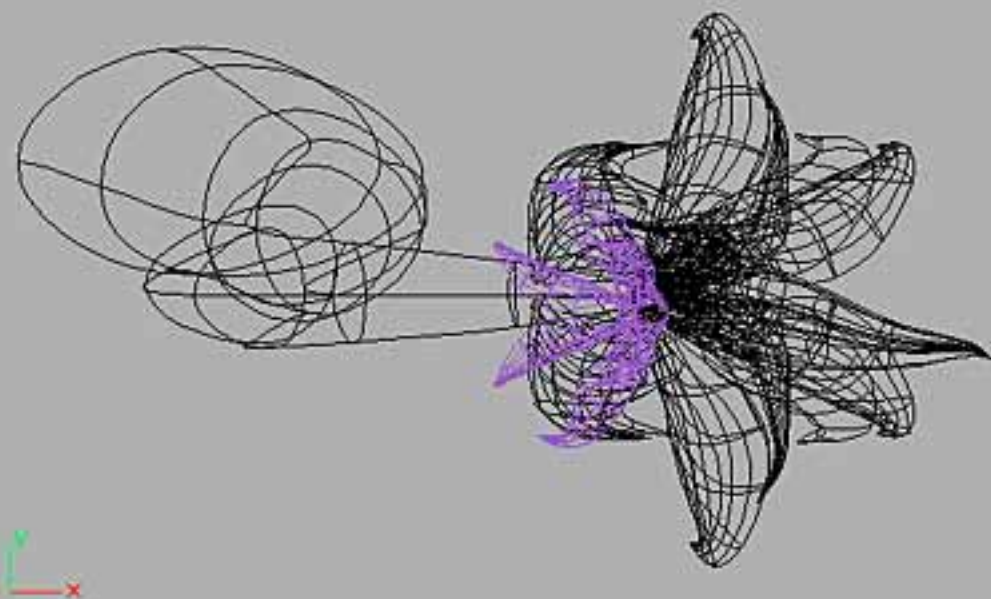
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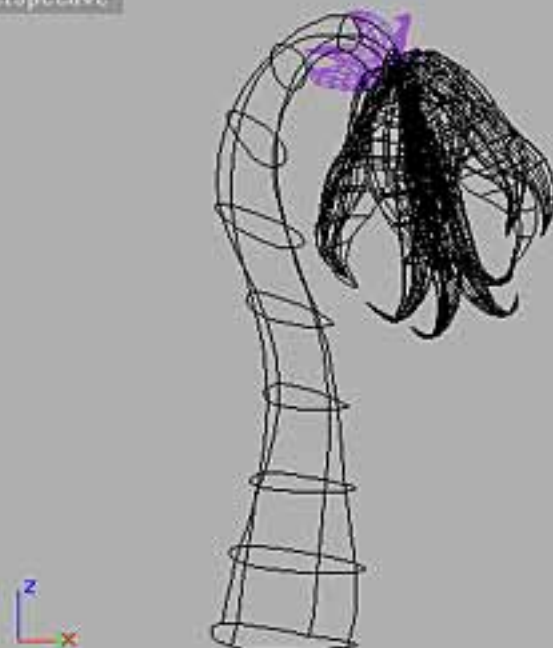
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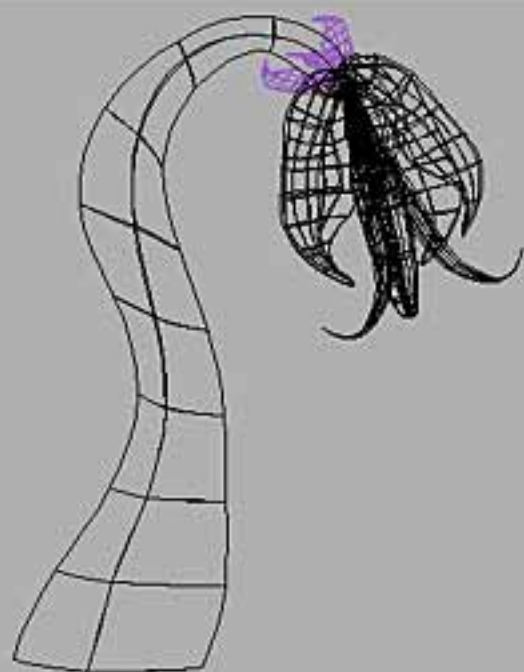
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Perspective



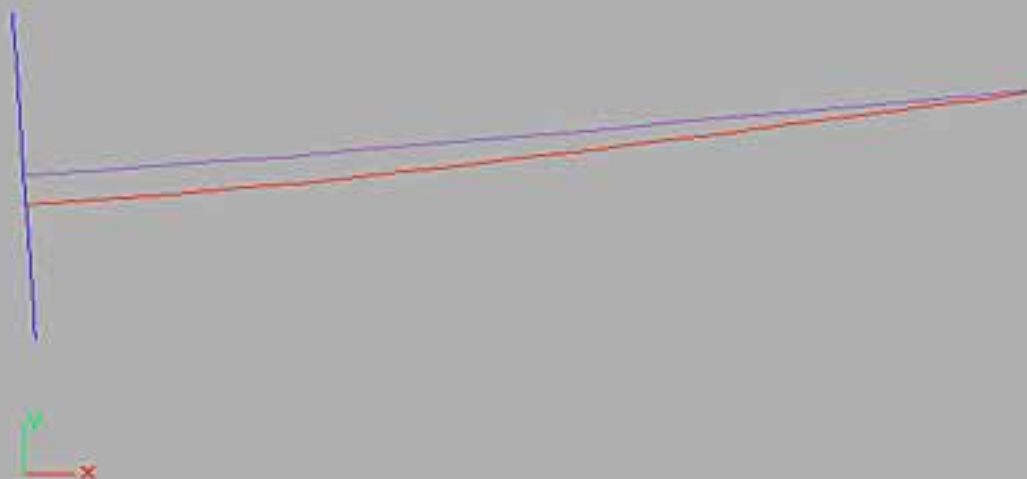
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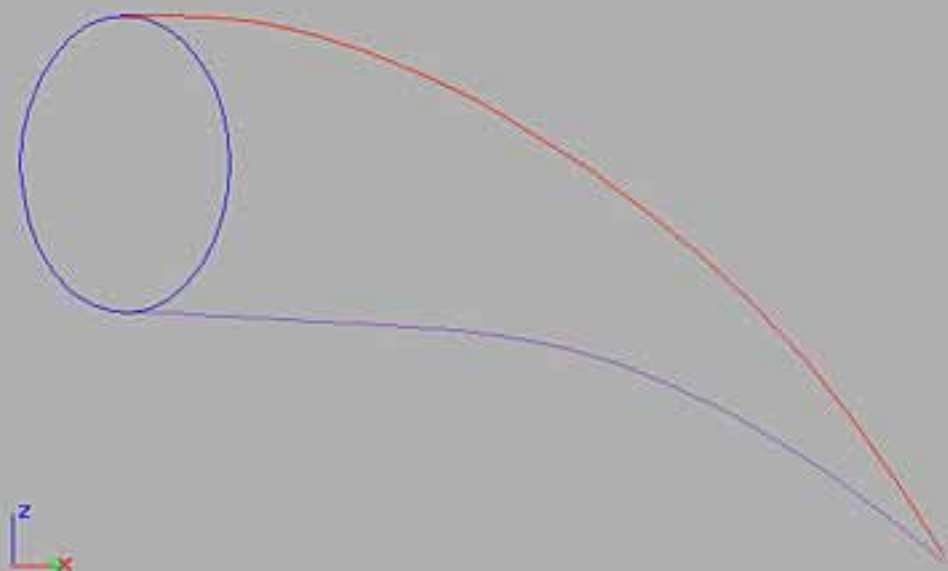
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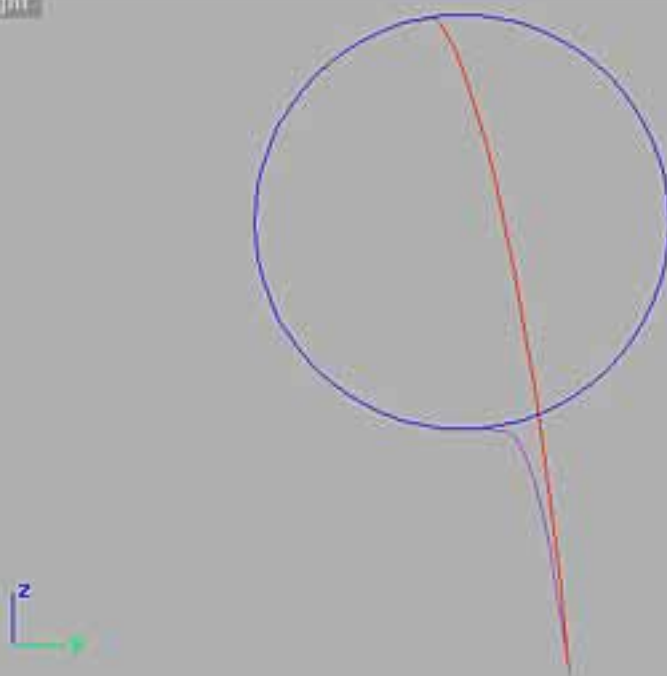
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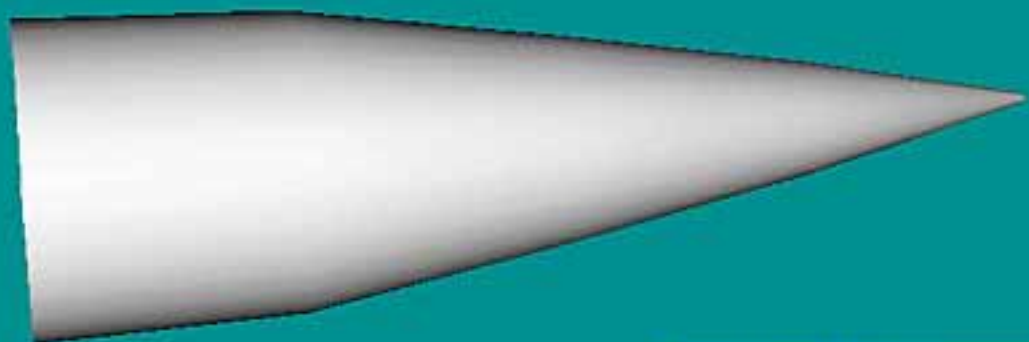
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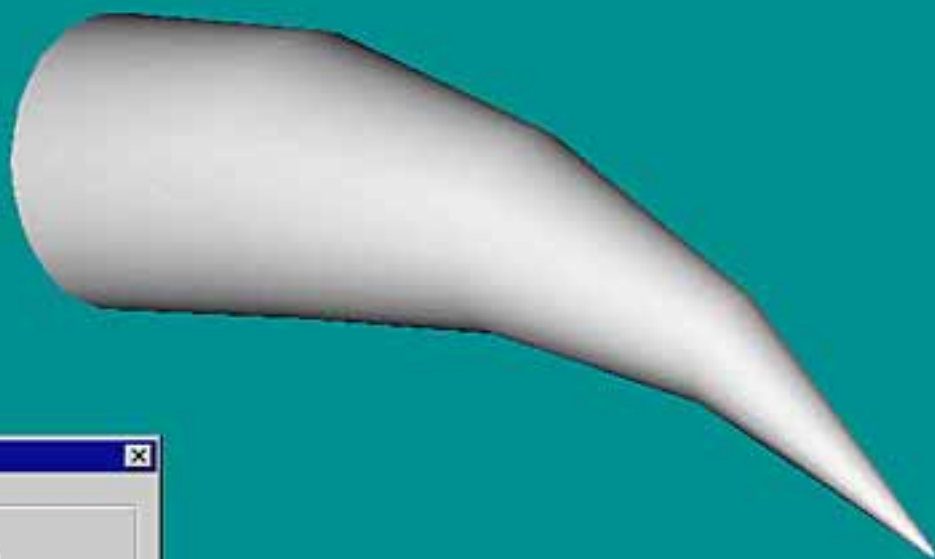
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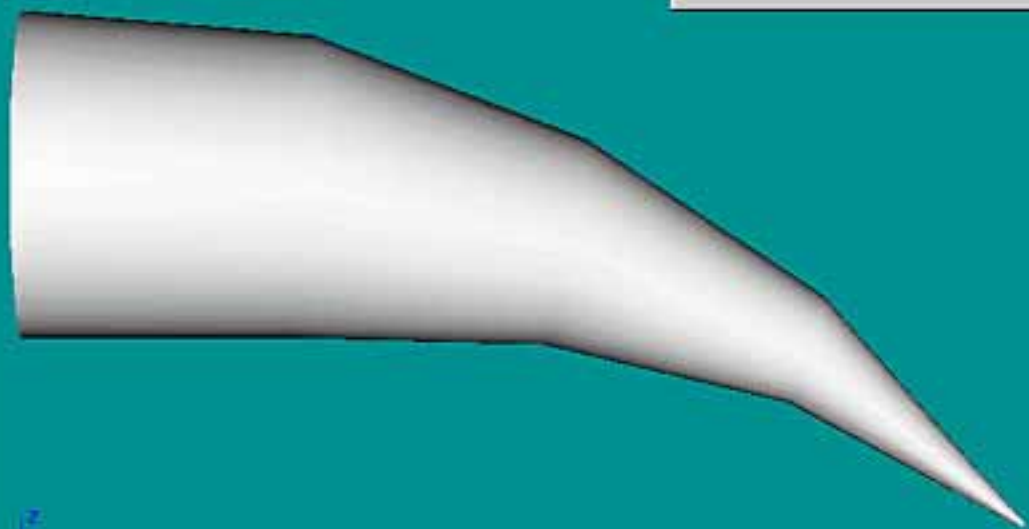
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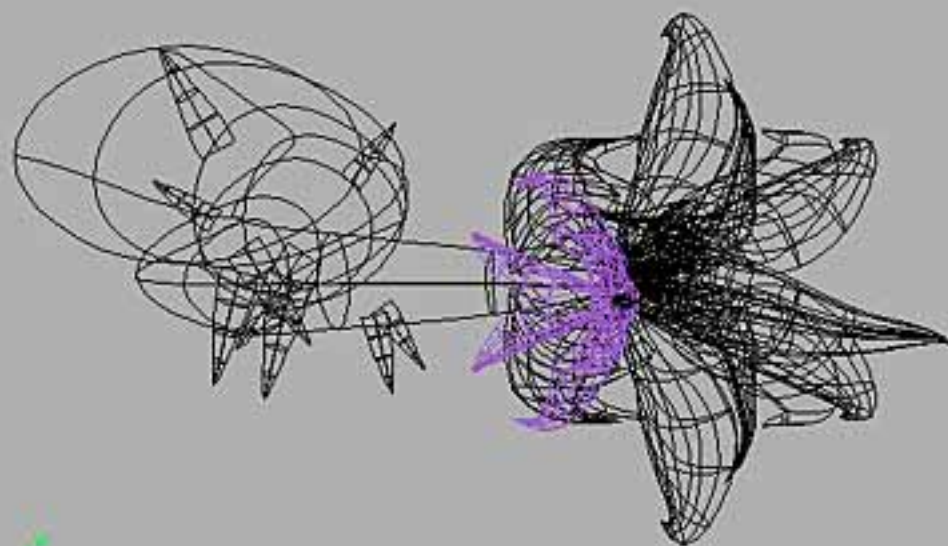
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Top



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