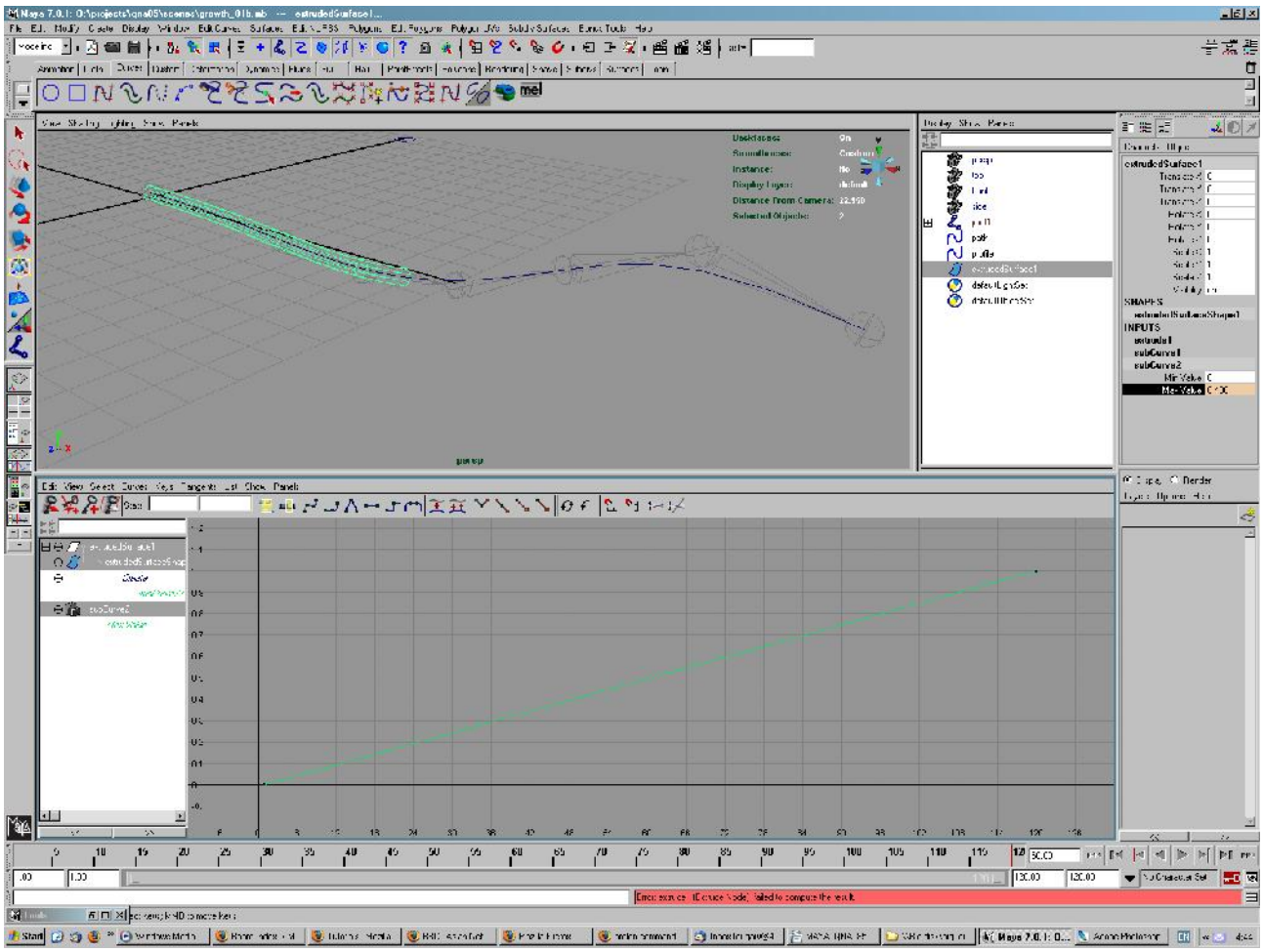
Maya QNA_85	First published in 3DWorld Magazine Christmas 2006
Question:	*How do I create a long curving tube, which progressively appears in small segments? - Chsalvia – the forums*

Unless you are a character animator using the pose method of animation in Maya, you probably never ever use stepped keys. It is often used to give animation the look of the cel animation format called “Two's” i.e each keyframe is held twice. Combining stepped keys and smoother keying solutions together can create some interesting effects too.

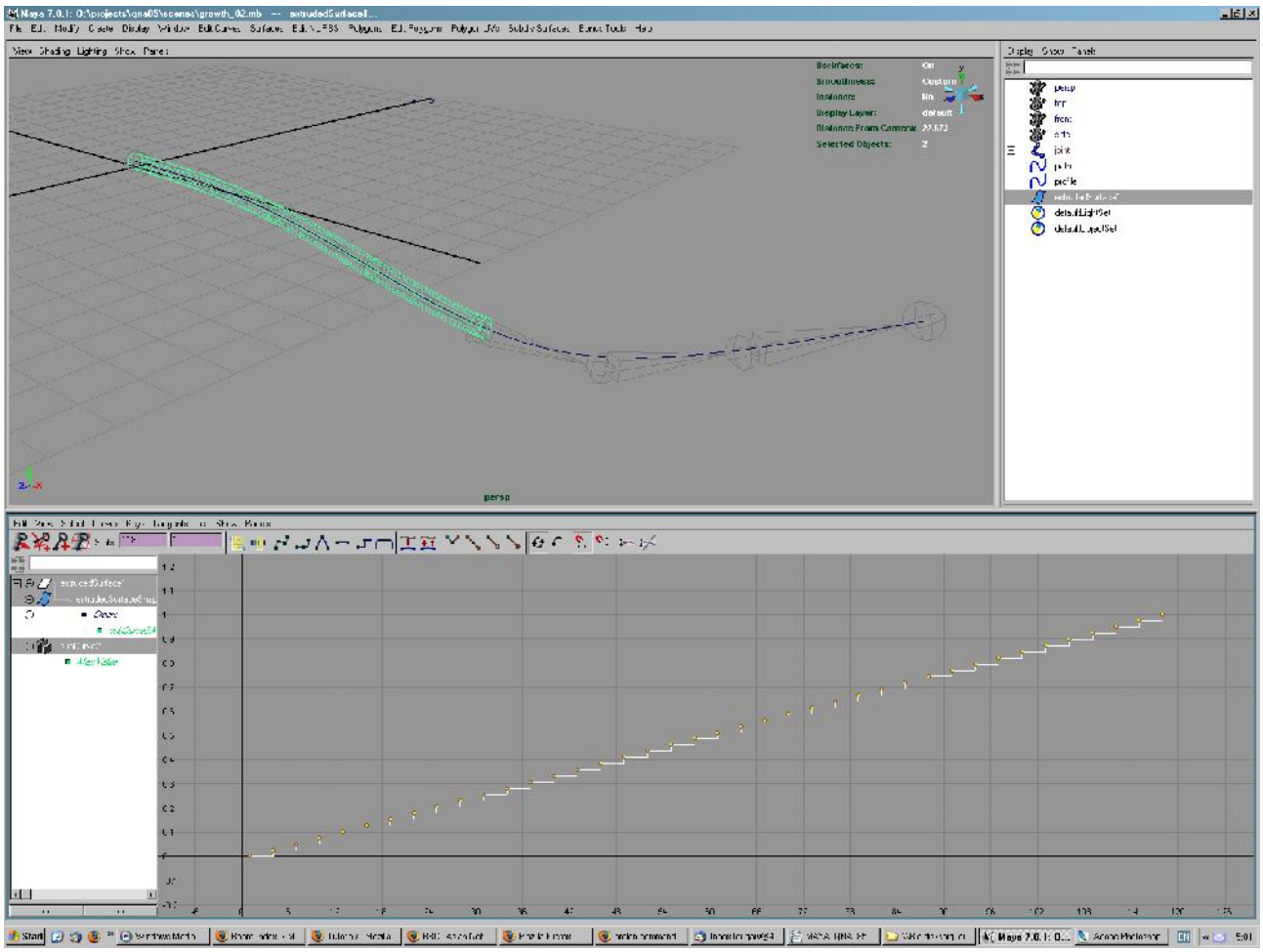
Let's take the curved tube and make it use stepped keys for its creation with smooth animation for its movement. If you open the supplied scene from the CD (growth_01.mb) there's an animated path and a profile curve with a timeline of 120 frames. Select both curves, the path first, and then **Surface> Extrude > Option Box**. In the Options set the **Style** to **Tube**, the **Result Position** to **At Path,** the **Pivot** to **Component,** and the **Orientation** to **Profile Normal.** Now set the **Curve Range** to **Partial.** Click **Apply**.

If you look at this object's Inputs in the Channel Editor you can see subCurve1 and subCurve2. Open subCurve2. If you scrub the Max Value you will notice that the tube recedes and grows between the two values 0 and 1.

At frame 1 set a keyframe of 0 on subCurve2's Max Value. At frame 120 set a keyframe of 1. Play this and the tube grows over this time line. But we want it to appear every 3 frames. To do this divide your frame range by your step time to give you a new frame range e.g. 120 / 3 = 40. In the **Window > animation Editors > Dope Sheet**, move the keyframe at frame 120 to frame 40. Now make a keyframe at every frame between 1 and 40 on the Max Value. In the **Graph Editor** select at the keys and click **Tangents** > **Stepped.** With them still selected click **Edit > Scale > Option Box.** Set the **Time Scale/Pivot** to 3 for scale and 1 for pivot and click Apply. Reset your frame range to 120 and playback your stepped animation.



Here is the animation of the subCurve from frame 1 to 120. You can see here that the tube is growing along the curve.



Here are the created stepped keys in the Graph Editor. Scaling keys is the same process in both Dope Sheet and Graph editor.

Quick tip

Path extrudes are a great way to build animating shapes such as arteries, whilst animating partial extrudes are good for growing text, tree roots etc.