



# On top of the world

Benjamin Woolley and Bryce build a world in seven days: see how they set about their mountainous task. Ben's design style could be hampered, however, by the lack of file formats

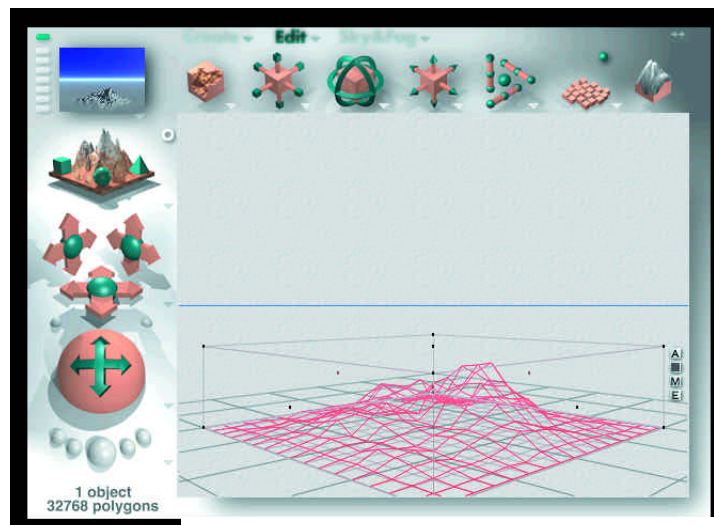
**I**t was an ambitious project. For the last episode of BBC2's *The Net*, I decided to have a go at building the world in seven days using nothing but 3D Studio Release 3 running on my Compaq Deskpro XL (which had what then seemed like a warp-speed 66MHz Pentium and a vast 16Mb of RAM).

I built up the world around me: a desk, a room, a fireplace, and a window overlooking a forest and snow-capped mountains. For the finale of this spectacle, the (virtual) camera zoomed out of the window, up through the soaring trees, up through the plumes of magnificent fireworks, and then turned to peer down as we pulled away into space, watching the mountainous terrain recede until we could see only continents and, finally, a globe like our own Earth floating in the speckled firmament. All this was done to the sound of the incomparable Sachmo singing It's A Wonderful World.

It wasn't a wonderful experience. Day in, night out, I had to re-render each sequence, then re-render the re-renders. Nothing went right, nothing. That is, except the bit I expected to be most difficult: building my virtual world's mountainous terrain.

One of the plug-ins then just released for 3D Studio was called Displace. You started off with a flat plane split up (tessellated, like a mosaic) into a fine grid. Each intersection in the grid represented a vertex, a point in the geometry. Over the top of this plane you mapped a two-dimensional image. This image was created by a fractal generator, which produced what looked like a black-and-white satellite image of a mountain range: peaks of white fading away to valleys of black.

The displacement plug-in used this



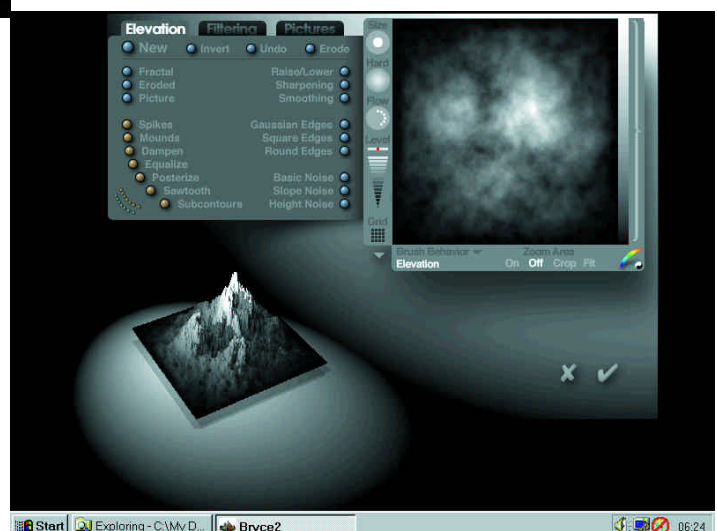
**Fig 1 (left)**

Bryce 2's artistic interface

**Fig 2 (below)**

Bryce 2's "terrain editor"

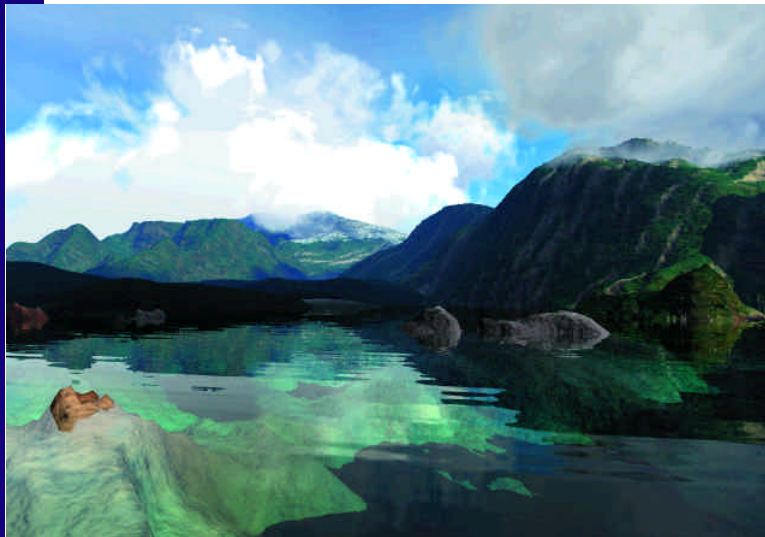
fractal image to calculate how much to displace — or elevate — each vertex in the flat plane. The vertices mapped to the bright pixels were elevated the most; the vertices mapped to the darkest ones were elevated the least. The result was surprisingly natural-looking geology, produced in an instant. By exporting the fractal image to a paint program and adding colour to it, I could also create an accurate texture map to drape over the newly generated range, knowing that the rocky screes, grassy plains and snowy peaks painted into the



picture would settle exactly onto the correct bits of the geometry.

I did not have time to get the terrain as richly textured as I hoped, but it did make me appreciate 3D software's potential to produce breathtaking natural vistas without demanding breathtaking skills and resources. Enter Bryce from software house,

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**Fig 3** One of the samples supplied with Bryce 2. It's called *Scotland*, and is the work of Kai Krause, Metatools' resident guru

joined in the middle by the horizon. Each Bryce scene has these by default. You can also have infinite water and cloud planes that sit in between.

Metatools, the second version of which is one of the most enjoyable 3D tools around. Bryce falls into a new category of software product that is becoming increasingly common in the graphics market: plug-ins that have gone solo. Fractal (which, at the time of writing, was planning to merge with Metatools) did this with Detailer and Poser. Metatools did it with Goo and Bryce. Goo is for stretching and distorting bitmaps, and is firmly aimed at the recreation market. Bryce (named after a canyon in Utah) is for generating landscapes. It does it using the same basic principle as the 3D Studio Displace plug-in, but with some clever embellishments and the prettiest interface you've ever seen.

Firstly, the interface (Fig 1). It breaks all the conventions of the Mac (the platform for which most of Metatools' products were originally developed) and Windows. This isn't a dull desktop you're working on. Nor is it the sort of engineering studio-cum-nuclear-power station control room you get with products like 3D Studio MAX. It is, flatteringly for those of us who aspire to being artists, a studio. The icons pulse seductively when the pointer strokes them, giving a teasing hint as to what will happen if you touch them. The menu items are in soft focus and glow when you select them.

Behind the interface lie three main components. In conventional 3D parlance, you would call them a scene builder, a modeller and a materials editor. The scene builder allows you to create (from a wide selection of primitives) and manipulate objects — in particular, planes. A landscape is, when you think about it, a set of objects arranged between two infinite planes: a ground plane and a sky plane

You can then add a number of finite planes, perhaps one big one in the background that acts as a mountain range, and a smaller one in the foreground that represents the foothills. Where the peaks of the mountains poke through the cloud plane they are swathed in mists, and where the valleys dip beneath the water plane they become submerged beneath lakes.

To edit these planes you use the terrain editor (Fig 2), Bryce's main modelling tool. This is basically a bitmap editor for manipulating greyscale displacement maps. The window in the top right of the screen shows the map. To the left is a panel of tools for changing it, including ones that will add "erosion" (lots of little black cracks that creep in from the edges), raise or lower the elevation (increase or decrease the brightness), add noise, and so on. You can, of course, import bitmaps (created using a paint program like Photoshop) and even mix two together. The 3D black-and-white mountain range in the bottom left of the editor shows what the resulting terrain will look like, updated in real time. This sample terrain can be rotated using the mouse, so you can see it from all angles.

You texture these terrains using a type of material unique to Bryce 2. It is called a 3D texture, and the explanation in the manual is so paltry I didn't understand it. Suffice to write that the way the texture is applied to an object changes depending on the object's height and the angle of its sides. If the object is in the shape of a mountain, one texture can be used to put a white snowcap on its peak, a brown rock face on the slopes, and grassy cover on the plateaux.

The Materials Editor is not nearly as easy to use as Bryce's other components. For

one thing, the terminology in the manual is non-standard. For another, trying to figure out how a 3D texture will be applied is about as intuitive as quantum mechanics. Thankfully, there is a generously stacked library of ready-made textures supplied with the CD, and, at extra cost, there is an Accessory Kit with more samples of both textures and terrains.

### File formats

My dream is that products like Bryce will become the norm in the 3D world, replacing monstrous applications like 3D Studio MAX and Lightwave. Plug-in architecture is all very well, but it is expensive and cramps developers' design style. Instead, it would be much better to have separate applets: a selection of renderers, texturers, scene builders and modellers, each one with particular strengths for particular jobs.

There is one large obstacle standing in the way of this vision: file formats. Currently, there is no single standard for interchanging 3D data sets between graphics tools. This is partly because of proprietorial protectiveness of the software houses, but the problem goes deeper than that. With programs like Bryce having rendering novelties like 3D textures, it can be technically difficult to translate the resulting file into another format without losing important information. The most common interchange format in the PC world, DXF, is not up to the job, as it was developed centuries ago by Autodesk for CAD files and is really only suited to swapping untextured objects and meshes.

I do not know if it is possible to create a standard format that is capable of embracing all the novelties that products like Bryce 2 and Poser are bringing to the market. VRML 2, being extendible, may be up to the job. Apple's 3DMF, the format developed for its QuickDraw3D API is popular with companies like Fractal and Bryce (which have their roots in the Mac world), and it is flexible, so that may be one to consider.

Whatever happens, until a powerful interchange format emerges, the benefits of products like Bryce 2 will remain locked in their own little worlds.

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