



## A new dimension

**There are few things more weird and wonderful than the sights that might await you as a result of tinkering with 3D graphics. In his first column for PCW, Benjamin Woolley puts you in the picture.**

### Welcome to the 3D zone

This is our latest addition to the *Hands On* section and deals with the subject of 3D graphics. Writer Benjamin Woolley has tussled in anger with the technology for the purposes of TV and a little bit of *World Wide Webbery*. The package he knows best is 3D Studio, but most, if not all, of what he will be surveying during the coming months will be common to all 3D packages and platforms.

Gary Yost, the creator of Autodesk's 3D Studio, once told me that he conducted his first experiments into 3D graphics on a Sinclair ZX81. That's like NASA saying it conducted its first experiments into orbital flying using a Frisbee. 3D graphics demands more advanced technology than any other computer application. The idea that you could generate them on a ZX81 is ridiculous.

But Yost has a taste for the ridiculous, and encouraged by his success at squeezing quarts of computing power out of the pint-sized Sinclair, he set about doing the same with the PC. The result, 3D Studio, was the first serious 3D modelling and animation package for DOS-based systems and, other than the Amiga-based Video Toaster (which relied on the Amiga's far more adventurous architecture), the only one capable of producing professional-grade computer graphics on cheap hardware. It had a quirky interface, mind-warping texture mapping facilities and configuration files written in Chinese — no-one could deny that. But it meant that a standard issue 486 could be used to model, animate and render quality work; perhaps

not *Jurassic Park*, but certainly an ad for Now That's What I Call Music 25.

### Affordable 3D

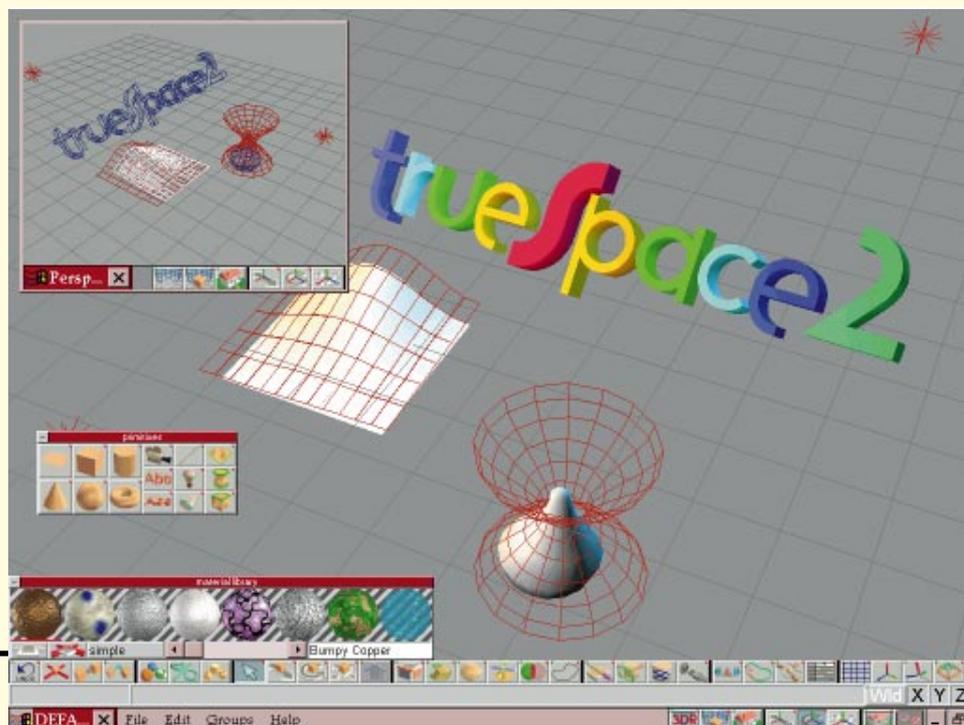
Having helped pioneer the territory, 3D Studio finds itself confronting competition from all quarters. And formidable competition it is, too: Caligari's Truespace (Fig 1), Macromedia's Extreme 3D, and NewTek's Lightwave (offspring of the original Video Toaster) are all capable of running under Windows 95 (which 3D Studio Release 4, the latest version, cannot). All are beginning to bring the cost of 3D to within the reach of semi-pro, and even amateur, animators and artists. Also, there is an emerging generation of really cheap tools — Ray Dream Studio, Visual

Reality, Simply 3D, Instant 3D — which means that just about everyone can join in with the fun.

### What's what in 3D

So where to begin? A good starting point might be to map out the increasingly complex 3D market and its likely development in terms of the tools available and the uses to which they are being put.

Right at the top is the equipment responsible for high-profile effects such as the dinosaurs in *Jurassic Park* and the saccharine spectre in *Casper* — the workstation-class packages from Alias/Wavefront and Softimage. Alias/Wavefront is now owned by Silicon Graphics, the company that produces the graphics workstations used to run this sort of software. Softimage has been taken over by Microsoft. Both are hugely expensive suites of software run on Unix boxes (though a Windows NT version of Softimage 3D version 3.0 has just been made available) and require a great deal of experience to use.



**Fig 1** Truespace 2 brings formidable 3D facilities to animators and artists



**Fig2** Wall texture map

Lower down the scale we find 3D Studio. There are now two versions: Release 4, which runs under DOS, and the all-new MAX, which runs under NT. Autodesk

is currently promising to "maintain and extend" Release 4, but its future must be questionable as DOS starts to disappear. A MAX upgrade has been available free with all purchases of Release 4 since the announcement of MAX last autumn, so there is little incentive to stick with DOS unless you are a glutton for user hostility.

Next rung down the cost ladder comes Lightwave, from Newtek. This is a package which, as mentioned above, has its origins in the extraordinary Amiga-based Video Toaster system and has attracted considerable kudos thanks to its use in series like *SeaQuest* and *Babylon 5*. This is something 3D Studio cannot yet boast, though it has been used in a couple of movies, *Johnny Mnemonic* and *Virtuosity*. It costs £695 and runs under Windows 95 as well as NT and the dear old Amiga; the company is loyal to its origins. It uses a "ray tracing" renderer, which produces fabulous results but makes huge demands on your hardware.

I have not used Lightwave myself but among users there is a general consensus that it is quirky, sometimes awkward and betrays signs of its age and origin, yet is extremely powerful for the price.

The first brand-new package on the 3D market appears at the £500 region. It is

called Extreme 3D and comes from Macromedia, the company that made its name with the Director multimedia authoring package. It looks very easy to use and quite powerful, although so far I have only seen demos. I will be able to provide a fuller picture of what it's like to use in next month's column.

For over £100 less (street

ing almost weekly, driven partly by the explosion of interest in VRML (Virtual Reality Modelling Language), the standard modelling language for the Internet — but more of this next month. Nevertheless, a clear picture is emerging of 3D as a mainstream application of PCs, and one that gives us exciting new ways of exercising the computer's creative potential.

### Texture du jour

Textures are crucial to building convincing 3D models but creating or finding suitable ones isn't always easy. I hope to bring you interesting examples on a regular basis.

There is nothing particularly clever about the one in *Fig 2*, but it does reveal some of the basics of texture creation. It is based on a photograph of a wall of Chichester Cathedral. I had the film (standard 35mm) developed onto Photo-CD (which can now be carried out at a number of film development centres, including Boots) and I edited it using CorelPaint 4.0 — my least favourite bitmap editor but the one I bought.

Using "cloning", which allows you to copy one part of the picture to another, I have made the image "tileable". In other words, when it is applied to

an object (say a column, as you can see in *Fig 3*) it forms a continuous pattern even though the same image is repeated over and over again along the length and height of the object.



**Fig 3** A scene rendered using the wall texture map

price around £370) you can get an ambitious and extremely tempting package called Truespace 2.0, from Caligari. This aims to bring the full 3D modelling and animation monty to the Windows 95 environment — a feat it pulls off if you confine yourself to manipulating relatively simple models. It is ideal for producing little .AVI files for use in presentations. Cheaper still is Visual Reality 2.0, which costs just £170. Like Truespace it tries to offer the lot, but as a result perhaps overreaches itself.

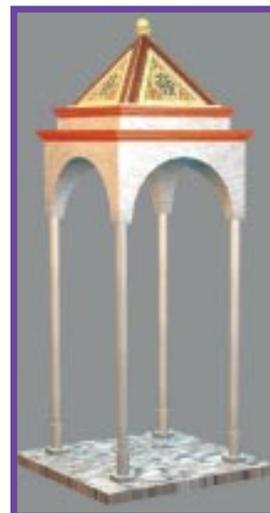
Visual Software, which produced Visual Reality, has come up with something far more interesting with Instant 3D; it doesn't bother to emulate a full authoring package but provides the facility for creating little 3D objects (typically logos) for dropping into OLE-compliant packages such as Word. It is fun to use (though it did crash a couple of times) and at just 30 or so quid could provide just about anyone with a tantalising taste of the allure of modelling.

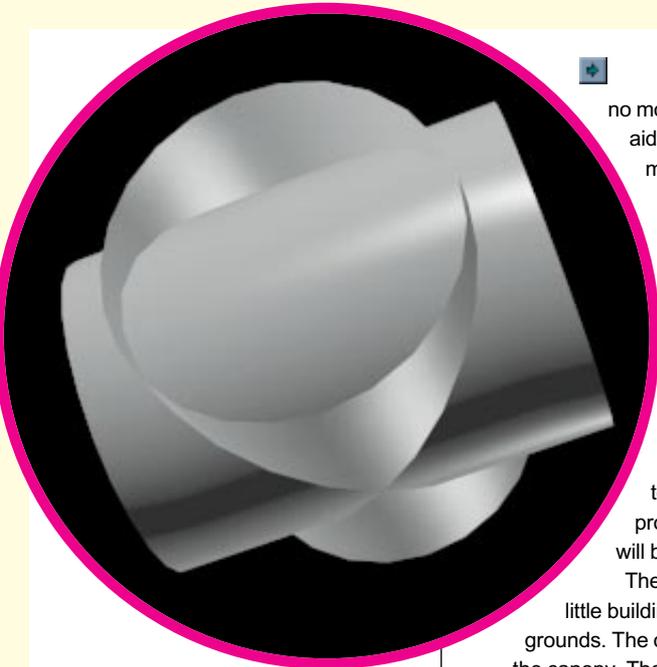
This is by no means a comprehensive survey. New products seem to be appear-

### The Memory Palace

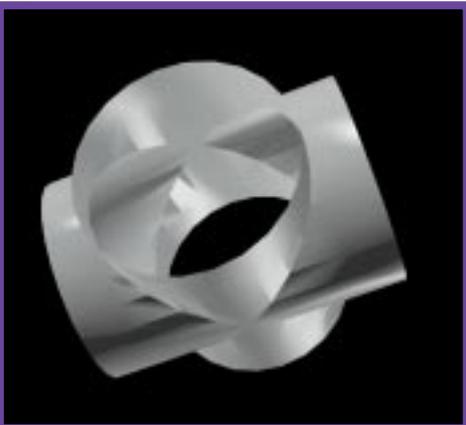
I began building a virtual palace for a BBC2

programme called *The New Middle Ages*. It was, I think (and no-one has yet denied it) the first documentary to have been filmed using virtual sets throughout. It was a tough assignment completed for virtually

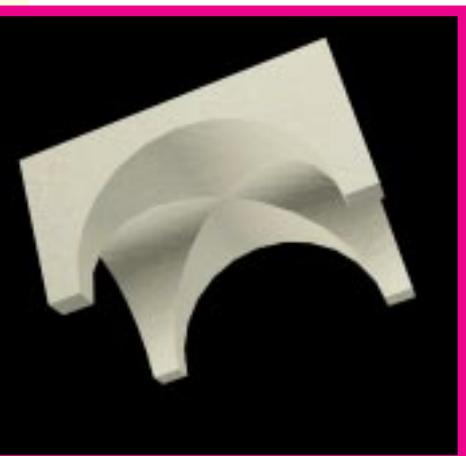




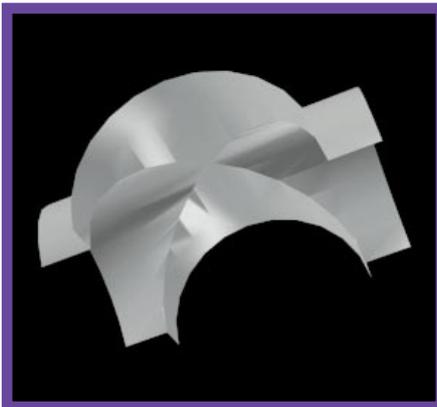
**Fig 3** *Two cylinders at right angles before the boolean operation*



**Fig 4** *And after...*



**Fig 6** *The completed arch with basic texture applied*



**Fig 5** *And sliced in half to create the interior of the arch*

using a detail from a picture by the early Renaissance painter, Giotto, as the texture.

The most difficult part to model was the arched roof, and in the end I used a Boolean operation. This is a process that allows you to build one object out of a selection of others; in this case, two cylinders formed into a cross. The trick to making Booleans work is to ensure that the component pieces have compatible geometry (for example, edges and corners should coincide wherever they can). In this case, I achieved it by cloning one cylinder from the other, turning it through an exact right angle, and making sure that the point where they cross was perfectly aligned (*Figs 5-8*).

### PCW Contacts

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no money, with hardly any time, but aided by my friends at the 3D modelling company, Modelbox.

I have decided to keep working on the "Memory Palace" (the reason for its name need not concern us here; suffice it to say that it refers to a medieval method of remembering stories). I hope to show the work in progress in this column and discuss some of the techniques involved and the problems encountered — there will be plenty to talk about.

The Palace comprises a series of little buildings scattered around its grounds. The one pictured in *Fig 4* is called the canopy. The roof is "decal" mapped