BRYCE 2

MACINTOSH • POWER MACINTOSH

EXPLORER'S GUIDE

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The Visual Computing Software Company

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LETTER FROM THE PRESIDENT

Friends and New Customers:

We are very proud to bring you the highly-anticipated next generation of our award-winning software, Bryce 2.0. The original version of Bryce was a milestone for MetaTools, as well as the digital imaging community. For MetaTools, it was another step in our commitment to bringing state of the art tools to power users and hobbyists, and strengthening our relationship with the graphics community.

For our customers, Bryce meant that once again, they had affordable, playful, but powerful tools at their disposal. Once more, their creative boundaries were widened in ways they never thought possible.

A year and a half later, we've seen Bryce on magazine covers, CD covers, advertisements and more. Artists who have made a career out of their use of high-end imaging applications are still using Bryce in their daily work. Hobbyists, even kids, are discovering their untapped talent for digital imaging, creating alien worlds, stunning landscapes and breathtaking panoramas. Now, with 2.0, we're doing it all over again.

For those of you familiar with Bryce, you will find a host of enhancements here that will have you rediscovering what captivated you about Bryce in the first place. And if you've never seen Bryce, you are in for quite a ride. Thanks to Kai's advanced user interface, brilliant engineering from Eric Wenger and Sree Kotay, and Phil Clevenger's exhaustive attention to detail, Bryce 2 is unlike any software you've seen before.

As we at MetaTools continue to expand the horizons of digital imaging, we look forward to your continued input. Talk to us on AOL (keyword: MetaTools), check out our website (http://www.metatools.com), and stop by our booth at the next trade show. Your support

and enthusiasm has helped us to become "The Visual Computing Software Company" that we are, and we look forward to it in the future.

Sincerely,

John Wilczak
Founder and CEO

FOREWORD BY KAI

...he reached over to the Napoleon Cognac and dipped the chocolate into it. Quietly the three were listening to Black Adder when the tea arrived. Finally! They NEEDED that. It had been the 5th day of 14 hours non stop slapping-bits-together and the three were coming to an end of the third wind. Alas, here were the two trays of Lapsang Souchong with rock sugar and milk and a drop of Grand Marnier. Earlier they had nearly blown up from Barbara's soup, totally overdone it on fresh Baguettes and then the chocolate thing really nailed it. Thus was born Bryce 2. Amidst gluttony and time warps, between Casino Royale and "you fill me with inertia" out of 'Bedazzled' it took shape.

Many a time we were shaking our heads and proclaimed "they'll never appreciate it..!" as tiny pico details were taking their toll in hours of precious attention span vorteces. Worse yet, multiple ENTIRE interfaces were tossed away like so much extra ballast. The UI R&D folders were growing into hundreds of files, multiple gigs worth, with each palette ending up in 60+ layers. Scary!

After cut 30 the new look appeared, the "White Album" we called it. Simplicity and elegance reared their beauteous heads. In Paris, Eric Wenger had been working for the better part of a year on deep changes, on improvements across the board, from render speed to accuracy to a near endless list of feature enhancements. Spotlights came, glow lights, symmetrical lattices, random vertex rocks, the real model imports from other sources. Then Booleans in all their combinations exploded the arsenal of building blocks. In every area and palette things doubled tripled and tentupled. In the environments we saw new colors accessible, deeper variables like sky height brought out for direct control. And as he switched to tackle animation we took it upon ourselves to get all the features represented in a whole new light. We, that's Sree Kotay (known to many for Vector Effects), Phil Clevenger (known to many as one of the early wear-all-hats Metatools teamsters, who

already gave birth to programs with me from the early KPT days, and as me, in the structure and deep interface mode).

What happened over the course of several months and hopefully visible and appreciable for the general audience is that we added one after the other of new items. And while some are very obviously in your face wild and sexy, there are even more of the rather quiet subtle in between the lines features. To have all vector lines become 2 , 3 or more times faster is one thing, but to do so while now being ANTI ALIASED smooth completely took our breath away. Sree added various papers as backdrops, continuously variable depth cueing, user settable resolutions for steady state, selected and in-motion, casting shadows onto the ground. The result of that became almost 'pencil drawings on real paper', moving with ethereal beauty, hazed in 3-D space. It might get lost at first glance, and it wasn't in the top 500 of requested changes by the users, but what a difference it makes becomes clear when you return to other apps and normal vectors jagged on white.

The interface became a real 3-D scene, painted with little spotlights over white, all controls shaped within Bryce itself (the 1.0 version was still modelled in another app), a testament to the other deep theme that runs through this new version: "Hey, you might even still do LANDSCAPES with it!" Sree totalled surprised everyone, including himself, with the new grayscale to height extrusion editor. Here is the same old grayscale image. But now one can draw with brushes. And change their flow and size. Raise things and lower them. Then we added color by altitude, rotatable. and next thing an entire 3-D mountain is added. In the end it got so optimized that the terrain is rotating in realtime WHILE being painted in height and colors rotated, portions of the data cut, cropped or clipped. Seriously useful stuff and yet dead sexy at the same time, that El Dorado aim of software design....

We found that in each area we had pushed the envelope further out so one by one new demands were quietly building up, raising the bar on what was acceptable or an eye sore in need of total redo. And sure enough, in the end there was pretty much nothing that did not cry out to be redone and invented fresh. We added new modes for the cameras, new

views, view memories, an auto- rotating scene. Tripod mode for the camera, true orthogonal projections for 2-D views, new fast render preview modes, cool new selection mechanisms, soloing, an overlay marker pencil and on and on and on.

What's obvious in hindsight and seemingly simple to near simplistic in appearance often had gone through waves of unusably bloated palettes filled with options galore. Weeks would pass until each case and symmetry was folded in until a playful set of controls, generous and with ease, dominated the overall look. We made extra controls wake up, in layers, and fade away without use. Prelighting everything, pulsing quietly if the cursor rests over it, anti aliased text explaining it all in a multiplexed area, allowing us to keep labels off everything, without cryptic icon bars and yet have two lines of clear description.

Testing with gigantic files such as the BigRig by Artfx we approached our goal: make it seemingly trivial and fast to create ultra complex scenes and worlds and yet render them faster than ever. With full ray tracing without any compromises and without any trade-off between speed and beauty.

Much of that may be missed by the user for a while. There are many features in here that in fact can only please those few that really do venture deep and create true complexity. But that's part of the sincere charm and attraction: there is something on all levels. A palette with plants and rocks may be instant gratification for a new user, while the seasoned Bryce user can get equally excited over the Solo mode display and selections filtering.

The interface that can grow to large monitor sizes, clamp to any format ratio, and still be palette draggable was a very cool addition that did not come easy. The dialogs with real time anti-aliased text, casting soft shadows on the background, with each material having a preview, a title, a very long description field as well as a render cost index all prove to be very very useful. The less obvious details include that the preview can be any primitive and is still rotatable and zoomable to create the exact depiction the user would like to save to

illustrate her texture. Even less obvious is that even seemingly "had that, seen it" items like a plain water texture is harboring totally new and in some cases revolutionary increases in realism. (in the case of water it now has true to life changes of refraction versus reflection indexed by incidence of viewing angle and light source. In other words, the pool will be reflecting the sun in the distance but in the foreground one can see the caustics on the floor beneath. Very cool when it happens, yet totally invisible to a cursory glance.)

The nano preview as we call it is a small version of the full scene which can depict in seconds what the scene looks like, reflecting many changes almost instantly. Less obvious, again, are such power uses as viewing the scene in wireframe more from a top view, while auto-updating the nano view in 3D perspective, i.e. move objects precisely in top view and see the 3D result in small at the same time. Added to that is a real time small window popup to manipulate scenes especially quickly in wire mode (up to 10 times faster in that small window, when the right angle is found the larger preview window snaps to that...) We added Undos and viewing memories, extra buffers and such.

The big one, Booleans, will really take the cake and many precious nights of the users time along with that. What used to be a set of maybe 6 or 8 primitive Lego blocks is suddenly exploding logarithmically... Anything can now be set to have a positive, negative or intersecting render attribute, and so a negative sphere and one positive cube can result in the darndest complex curve object that would take some serious modeling with most other technologies. Since the raytracing sorts these out within groups it became extra powerful to allow stepping through both primitives and groups and families. These are constructs for the serious pro and the combinations of such hierarchy along with the VCR like scanning buttons and the audio-console inspired SOLO button allow the creation and editing of truly EXTREME complexity (the Big Rig and San Francisco Bridge files are 8 million polygons and more, and that's not reflecting that objects such as a sphere are not even polygonal but procedural! (In many programs a sphere has distinct n-gon silhouettes)

Also evident throughout is, hopefully, still a sense of playful wonder and tongue in cheek levity, after all, we always say, its not tax accounting or brain surgery but some enjoyable graphics fun we are dealing with here! So while the rotating terrain editor is easily found, it might take a few weeks for some folks to see what happens when you edit the inner diameter of a torus. Lets just say its not a dialog that asks you to type in "255" and it should make you smile a little.

But with every step of ease and lighthearted humorous treatment, make no mistake: we are also trying to stake something very serious and poke some big balloons. Here are some examples of new approaches and new ideas and new interfaces to prove that we cannot be stuck with single bit Chicago 12 and radio buttons or worse yet with the danger-ous homogenization forces under the guise of 'standards' in something like Windows 95. It is somehow our duty here to try to push the envelope a little, because very often the innovations need to come from unexpected places, small teams that are maybe not even on the radar screen. And while one can write lots of academic research papers on new concepts and designs, we are rather happy to do something much harder: bring it out as real products, with real numbers and real boxes in real shelves, and then make it easy enough to be used even by kids and inexpensive enough that they could actually have access to it. None of the above is really to be taken for granted. Very often things are end-ing up either in academia or on big iron boxes or with a week long training course attached to it. Think about it...

I also repeat my angle on "ethicsware" here: clearly no one could afford all software one might be interested in just to have a look. So, if you are checking out what this is and does, hey, who are we to stop you :) Lets just hope you got the CD ROM and this con-cise manual along with it... BUT: if you use this repeatedly like once a week, or if you use it for a professional project, then by all means please invest in your tools and allow us, the toolmaker, to improve and support them and to be strong enough to continue spitting out new ones. Doesn't this make eminent sense and has fair-play written all over it?

Luckily we do get mail from converts all the time, and if your friends copy of Bryce has skulls and crossbones on it, whack him over the head a little and get with the program... ;)

We divided Bryce marketing wise into a two stage expansion, realizing that even though it will be very sexy and cool to animate, there will always be a large percentage of uses, maybe the majority..., with a need for still images. From magazine covers to ads, web pages, CD covers to the cool examples of outright fine arts we are beginning to see. Bryce 2 contains all the new features (over 300 and counting) over Bryce 1 and renders single images at price point A and then Superbryce adds animation on top of that set with a rea-sonable jump in price accordingly. Considering how much there is to get familiar with we hope that everyone makes the first jump right away to get the feet wet and we follow with stage 2 the next quarter.

All this being said, we hope that you lose yourself entirely inside these places. Many of you will carve entire new careers out of it. And that's what is always the most gratifying feeling for all of us here: its nice to get the big awards and the stars and diamonds the way Bryce 1 already did, but there is nothing quite like shaking the hands of some kid from Sweden who built a company with his girlfriend making web page logos with Bryce. Or indeed the immigration officer at LAX who stared at my passport and with a stern look on his face finally asked for "your green card and when is Bryce 2 coming out"... Its then that one realizes how far the circles of technology are extending now, from the days of huge metal boxes spitting out paper tape of "this does not compute" to some egghead in a white labcoat. That was a mere 15 years back. Do take the time to look at the scenes on the CD ROM and realize that you can start off your explorations from any of these, chang-ing just a parameter here, the fog color there, move the camera or drop a 10,000ft ball in the grand canyon scene... And never mind the landscapes: consider the abstract pieces, the logos, the text treatments, the texture only renderings, the fine art composites, the photo collage work, or Mona Lisa in 3-D... SO much that can still be done, so much virgin snow without any foot prints in it. Maybe you can be the first to find those cool boolean

logo shapes or multi layer color vortex refractions or build a mock-up of 10,000 mirrors focusing light? Even in Bryce 1.0 someone built a working telescope (!) and another made planetary models. A large chunk of the Quicktime VR examples originate from Bryce and we will make that process even easier and with more options. Further extensions will come as we added a whole plug-in structure in Bryce 2 which will allow further modules to be linked directly and we all know how powerful plug-ins can be, eh ;)

Be sure to check our Bryce forum on AOL, check out pix updated often on the web site (www.metatools.com) and consider posting your own fave creatures. Send us everything, we rev the CDs and have many chances to showcase your works. Find us in the shows and live chats and when you see Sree, Phil and Eric, pat them on the back a little, this puppy took an extra ounce of stamina to get out.

With that we leave you to your explorations and hope you still find time for your significant others amongst all these insignificant digits.

Remember, life is good.

Kai and friends

Before You Begin

GETTING STARTED

Before getting too deep into Bryce, take a quick read through this section for some useful bits of information about the recommended hardware used to run Bryce, getting Technical support, what's new to version 2 of Bryce, and how this manual is laid out.

System Requirements

Because of the intense computation involved in rendering Bryce scenes, we highly recommend running Bryce on a Power Macintosh with at least 16 MB of RAM. While Bryce will work on less powerful machines, you may experience some delays in editing objects, using various preview modes, and rendering your final scenes.

For specific minimum system requirements, please refer to the enclosed Installation Sheet & Quick Reference Guide.

Installation

The Bryce 2 CD contains an installer program which will allow you to quickly and easily install Bryce 2 onto your hard drive. For detailed instructions on the installation process, please refer to the enclosed Installation Sheet & Quick Reference Guide.

Technical Support

The best way to get technical support for Bryce is actually from other Bryce users. We have a rapidly growing on-line community where questions can be asked and where tips, tricks and ideas can be exchanged. If you're on America Online, go to keyword MetaTools and browse the Bryce message boards.

You can also e-mail us with your technical questions via America Online (at KPT Support) or the Internet (at kptsupport@aol.com).

For the most direct source of information and assistance on Bryce (or any MetaTools products), check out our Website at http://www.metatools.com.

Registered users can call our Technical Services Department between the hours of 9:00 a.m. and 5:00 p.m. Pacific Standard Time, at 805-566-6200. Phone support for our products is free, but again, only to registered users (fill out that little yellow card and count yourself in).

WHAT'S NEW IN BRYCE 2

If you're familiar with the original Bryce, then a first look at Bryce 2 will tell you that this is no minor tweak to the software. We've packed literally hundreds of additions, enhancements and optimizations into a deceptively small space— a space, however, that grows ever deeper and more cavernous as you spend more time in it.

While Bryce excels at creating breathtaking landscapes and natural scenery, Bryce 2 moves into a realm that isn't quite modeling but isn't simply for landscapes, either. The ability to turn the environment off completely for a simple flat background, or project lights and slide images, or create complex shapes by combining primitives makes Bryce 2 a tool that nearly defies definition, and a tool you'll hardly be able to tear yourself away from.

Here's just some of the highlights....

· A whole new interface, designed for an uninterrupted creative process, with tools that appear when and where you need them, and that you can customize to suit your creative needs.

· More primitives and brand new objects, like the symmetrical lattice (for mirrored terrain) and Pict object (for easy importation of 2D images).

· A real-time Nano-preview that renders a thumbnail of your whole image on the fly, so you have a quick reference for your final image as you work. Like so many other new features in Bryce, you'll wonder how you ever got along without it.

· Wireframe objects displayed as real-time, anti-aliased vectors— they even throw shadows while you work! This is extremely useful for working in wireframe mode, as it gives your objects a 3D feel that isn't normally there until after you've rendered them.

- Wireframe depth cueing— as your objects recede, they fade out for the effect of distance. And you can control how quickly they do this, or even whether or not you want them to do it at all.

- 3D bounding boxes with control handles for resizing, rotating, color-coding, and more.

- Boolean rendering, which allows you to "carve" the shape of one object out of another. Incredible objects can be created with this technique using just a few primitives and simple terrains.

- Lights, lights, and more lights! Include multiple light sources with different shapes and properties, which can even change color or project slides.

The list goes on and on (and on!). Like we've said, some of these features will make you wonder how you ever got by without them. As for the newcomers to Bryce, you'll wonder how you every sat in front of your computer without it. Enough said. Keep on reading to see how it all works. Better yet, fire Bryce up and start rendering!

ABOUT THIS EXPLORER'S GUIDE

This Explorer's Guide was written assuming that you have a working knowledge of the Macintosh operating system. That is, we assume that you have an understanding of the Macintosh menu bar, using the mouse, and creating and saving files.

Secondly, this manual takes into account your work flow with Bryce. The topics are covered in the order in which you are likely to encounter them, from opening and setting up your work space, to viewing your work area, creating objects, laying out your scene and rendering your final image.

We encourage you to refer to this manual as a "last resort," and to make your first option simply installing Bryce 2 and diving in. Push the buttons, play with the interface, hit the big "Render" marble (in the lower, left-hand corner of your screen) and watch what happens. Have some fun and check out the technical stuff later. Of course, if you want to start at the beginning and learn it all, keep this Explorer's Guide handy while you play with Bryce. Experimentation and explorations are still the keys, but with this Explorer's Guide at your side, you'll at least have a road map (of sorts) to identify some of the more interesting sites along the way.

For those of you who just have to know every detail of all of the buttons, levers, and assorted widgets, we've included a Deep Features Reference Guide on the Bryce 2 CD-ROM. If you want to know something that isn't in this Explorer's Guide, chances are you'll find it in the Deep Features Reference Guide.

Getting to Know Bryce

Memory Dots

Nano-Preview

Create, Edit, and Sky & Fog buttons
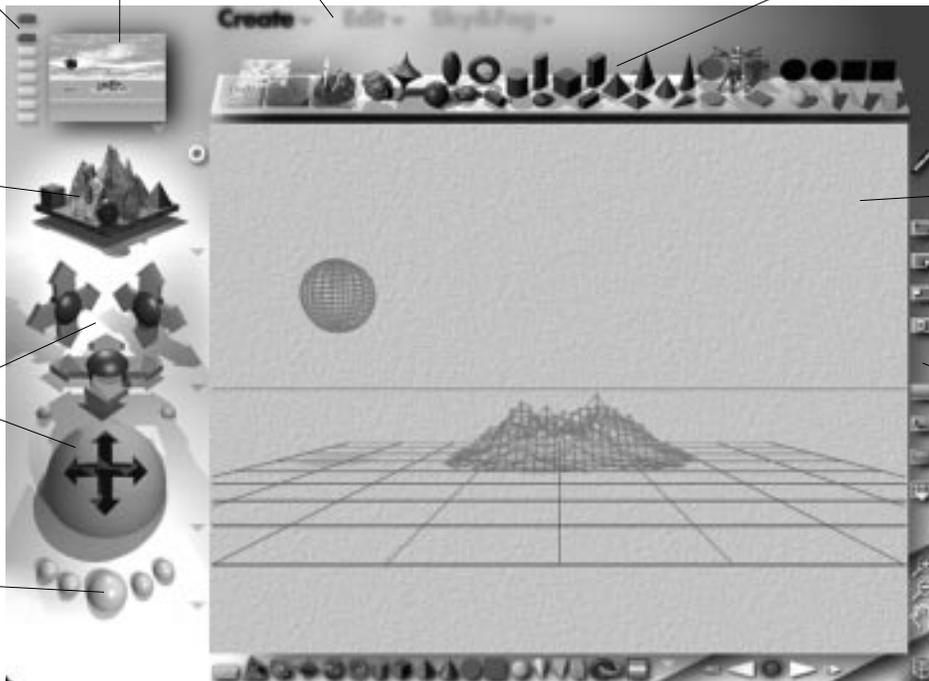
Create Palette

Views Control

Work space

Camera Controls

Display Palette
(normally hidden)

Render Controls

Create · Edit · Sky&Fog ·

Selection Palette (normally hidden)

THE INTERFACE

The interface in Bryce (your open document and its surrounding tool palettes) is designed to take over your desktop and give you an uninterrupted creative environment.

This environment can snap to the edges of your monitor, thus giving you a larger on-screen document to work with, or it can "hug" your document boundaries if you're working on an image less than 640x480 pixels in size (see "Display Palette" in Part VI).

Your objects are displayed against a paper backdrop that you can pick from a selection of presets (see "Display Palette" in Part VI). We could argue all sorts of functionality here such as intuitive design that makes your desktop more visceral blah, blah, blah, but really, we were just having fun.

Menu Bar

Your Bryce menu bar may not always be visible (selecting the Snap Minimum display option in the Display Palette hides the menu bar). If the menu bar is hidden, moving the mouse cursor to the top of the screen temporarily displays the menu bar.

The Bryce **File** menu contains standard commands for creating, opening, saving and printing Bryce scene files. You can also revert a Bryce scene back to its last saved version with the Revert command, view Pict files with the Open Pict command, and combine Bryce scenes with the Merge Scene command.

Besides the standard Undo, Cut, Copy, Paste and Clear commands, the **Edit** menu also contains commands for duplicating, replicating and selecting objects, plus render and preference commands.

The **Options** menu is used to access many of the deeper Bryce modes, such as the Terrain and Materials editors and Pict textures. This menu also lets you group and ungroup objects, change object display modes, and choose either quick or nano render modes.

Nano Views

The *Nano View* is a recurring interface feature throughout Bryce 2. You will see this come into play in your Control Palette primarily, where your entire document is updated in miniature as you work, and different navigational modes where your wireframe preview will be replicated in miniature for the sake of speed.

Bryce Tool Palettes

Bryce has six primary tool palettes:

The **Control Palette** resides along the left side of your Interface. This palette handles all of your camera view and rendering controls, along with your Nano Preview (the thumbnail preview of your image, which provides a continually updated render as you work).

The **Create Palette** holds all of the objects you put into your Bryce scene, such as ground planes, sky planes, terrain objects, primitive shapes (spheres, cubes, cones, etc.), light sources and Pict images imported as objects. Clicking on any of these Create Palette icons causes the corresponding wireframe to appear in your scene.

The **Edit Palette** is for basic manipulation of your wireframe objects, such as resizing, rotating, repositioning, converting, randomizing, and aligning. Additionally, it also provides access to the two deep areas within Bryce, the Terrain Editor and the Materials Editor.

The **Sky & Fog Palette** has been substantially enhanced from the original version, with features such as memory dots, random sky generation, and more. Many of the controls for manipulating your clouds, haze and fog have been divided into separate buttons for increased editing control.

The **Selection Palette**, located (but temporarily hidden) at the base of your Interface, is new to Bryce 2. This palette give you increased control over object selection. To view this palette, simply move your cursor to the bottom of the Bryce interface.

The **Display Palette**, located (but also temporarily hidden) at the far right of your Interface, provides a series of display preference options. These options include a wire-frame overlay on your rendered image, resizing the Interface, nano previews, and more (including a nifty annotating function), any of which can be turned on or off with a simple mouse click.

The Interface

THE CONTROL PALETTE

This is referred to as the Control Palette because it has the controls that you will use most frequently, such as your camera angles and rendering buttons.

Nano Preview

Starting at the top of the Control Palette (the upper left-hand corner of the Bryce interface), your Nano Preview provides a fully-rendered update of your image. Clicking on this Nano Preview window updates the nano-render according to any changes you have made to your scene file.

Nano Options

The Nano Options menu (the down arrow immediately under the Nano Preview) contains options for changing what parts of your scene will be displayed in the Nano Preview and the angle at which your scene will be displayed.

Memory Dots

The strip of oval dots down the left side of your Nano Preview are your Memory Dots. These allow for quick notation of your view settings as you work. More than a simple "Save as..." function, these allow you to save up to eight variations of your scene and compare them against each other.

Once you've arrived at a setting you like, click on one of these dots. It will darken, noting that you've saved all of the current settings for your scene file, including materials, environment and camera views, into that dot. As you change the settings in your scene file, you

The Nano Preview window.

can save these settings into another memory dot. Clicking on any of these memory dots will return your scene file to the settings stored in that dot.

The topmost dot returns your scene file to its original default state before you made any changes. It's also important to note that these Memory Dots are stored inside of your scene file. So, saving your scene file and reopening it also saves and reopens the corresponding Memory Dots.

A gray memory dot indicates that it currently holds no settings, while a green dot indicates that it does. A green dot with a white point in the center indicates that it has been "activated," thus changing the Bryce document to those settings.

Holding down the Option key and clicking clears a particular memory dot of its settings (though your top default dot can't be deleted).

Aerial Preview

The small ring below and to the right of your Nano Preview is your Aerial preview. Clicking once on this ring produces a rotating preview of your wireframe scene in the Interface. This is handy for an instant perspective of all objects in your scene relative to one another. Since this preview rotates from the center of your scene, it's a quick way to track hidden, out-of-range objects that might be taking up space in your scene file.

While in aerial mode, any mouse movement will allow manual rotation from around the center of your scene. Holding down the spacebar will pause this rotation, and you can change your current scene view to match this freeze frame by hitting the Enter key while the rotation is paused.

Clicking at any point stops the rotation and returns you to the last saved view of your scene.
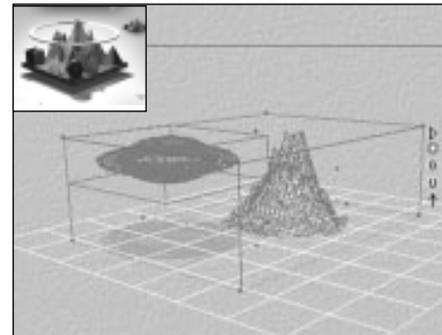
An aerial preview at work.
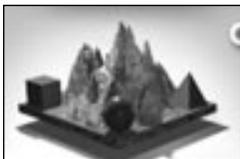
The View diorama.

Views

This is the small Bryce diorama on your Control Palette. Changing the view of this diorama changes the view of your wireframe in your Interface, allowing you different vantage points from which to manipulate your scene. The available options for viewing your scene (in the Options arrows below the diorama) are identical to the views available in your Nano Preview window: Main View, Top, Left, Right, Front, Back, Bottom and Reset (which returns your setting back to the default).

Camera Controls

The YZ Camera control.   *The XY Camera control.*

The XZ Camera control.

First, it's important to note that these controls only change the position of the camera within your Bryce scene. Nothing else in the scene itself is being moved. Each works on a dual axis, in a circular fashion.
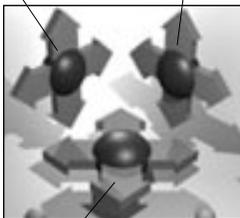
For example, the large, lower cross, the XZ Camera, works on the X and Z axis. Meaning, you can click and move your view horizontally (by dragging left and right) or according to depth (by dragging up and down). Dragging the mouse in a circular motion will make the camera view rotate in a circle parallel to the ground.

The YZ Camera, then, moves the camera up and down with a similar mouse drag, or back and forth with a horizontal mouse drag.

Finally, the XY Camera rotates the camera along the X axis with a horizontal drag, and the Y axis with a vertical drag.

Banking Control

To the lower left of the Camera Controls is the Banking globe. Banking refers to the angle the camera is tilted relative to the horizon. Imagine viewing the horizon line from the cockpit of an airplane as it tilts to one side, giving the appearance of the horizon slanting in the level view of the window. This is referred to as "banking."

By dragging the Banking Control left or right, you tilt your camera in that same direction. Therefor, dragging your Banking Control to the right causes your camera to tilt toward the right, causing your scene to tilt upward to the right, and vice versa.

The Banking globe.   *The Telephoto globe.*

Telephoto Control

To the lower right of the Camera Controls is the Telephoto globe. Clicking and dragging on this control appears to shrink or expand the wireframe within your Interface. What the Telephoto Control is doing, however, is increasing or decreasing the size of your camera lens, thus encompassing more or less of your scene inside of your interface.

Note that you are not moving the camera or your scene. The camera and objects are remaining exactly where they are, but you are seeing more of the scene in the camera.
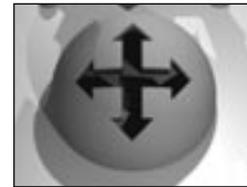
Trackball

This camera control treats the scene as though it were contained inside a virtual trackball. Dragging the mouse on this control rotates the entire scene within the trackball in any direction you move. For example, clicking and dragging from the center and straight up will rotate your scene backwards. Remember, you are changing your camera position, not the objects in the scene.
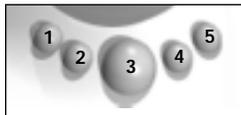

The Camera Trackball.

The Options menu just below the Trackball provides different methods for rotating your scene, such as from the center of your whole scene or from the center of only your selected documents. For a really detailed description (and other features), consult the Deep Features Reference Guide document included on your CD-ROM.

Rendering Controls

Rendering is not necessarily the final stage in creating a Bryce image. Certainly, you will want to do a final, full render of your image after you've invested creative time into creating it. However, rendering in Preview Mode, or without textures is often as much a part of the Bryce work flow as editing wireframes or designing a sky model.

Following are the options for rendering during the course of working on an image, including the final Render button which is the last process in creating an image.

Textures On/Off

The leftmost button of the Render Controls allows you to render the scene with and without textures. This is one style of previewing the scene quickly, enabling Bryce to render all of your objects flat shaded, with no textures. Your rendered image will have all of its objects look as though they were made of clay, retaining only their assigned colors and shades.

Preview Mode On/Off

Toggling on Preview Render mode renders your scene in two, quick passes. This is a detailed render showing all of your textures, but without shadow and highlight detail. What the Preview Mode does is oversample and render areas of high contrast and frequency,

The Rendering controls.

1. Textures On/Off
2. Preview Mode On/Off
3. Render
4. Resume Render
5. Clear and Render

such as distant cloud detail on the horizon or complicated rock textures. However, it ignores low frequency areas such as those in the foreground or on simple textures.

While this Preview Mode gives you a very accurate view of your image, it is not meant to be used as a final render.

Render

This button creates a *ray-traced* rendering of your entire image according to all of the settings you've assigned to your scene file— your objects, their orientation, their materials, the camera position and the environment. This is the same render function as existed in the original Bryce.

"Render" takes into account whether either of the first two buttons are checked; clicking anywhere in your scene interrupts the rendering.

Resume Render

This allows you to pick up rendering where you left off. In other words, if you have interrupted your render for any reason, Resume Render does just that, even if you have saved your scene file. Note that Resume Render only acknowledges the current scene. If you have made any changes to that file, your will need to Clear and Render (below).

Resume Render also works with Patch Rendering your image. That is, rendering small selections of your image at a time (below).

Clear and Render

In lieu of resuming your render, you may choose to interrupt your render, make changes to your scene file, and begin rendering again. Clear and Render means you start from

About Raytracing

Every pixel in an image has a certain color. In the case of a photograph, any given pixel's color is the result of light coming from a scene, through a lens, and onto film. Raytracing does the inverse: A virtual beam is shot from the virtual "film" through a mathematical "camera" and out onto a 3D scene. Eventually this beam connects with something in your scene; if it hits the sky, for instance, then the blue sky color ends up on that portion of the "film," the final image.

Raytracing becomes much more complex, though, when the beam strikes an object that's been given reflectivity, transparency, refraction, or other optical characteristics. These will actually cause the ray to be traced further into the scene, where it could end up bouncing from mirrors, dissipating through fog or bending through a chunk of glass. In this way, at some point a final color is determined for each pixel, one by one; this technique can involve staggering amounts of computation.

It is this kind of computation (which was not practical or even possible just a few years ago) at which KPT Bryce excels; raytracing algorithms optimized for the task of creating natural and supernatural landscapes of all kinds.

scratch if you've altered your scene file at all. Clear and Render also works with a single patch of your image.

Patch Rendering

Whether you've completed or interrupted your render, you can isolate a small patch of your image and render only that section. Simply drag your cursor to marquee a rectangular selection, and that selection lifts out (or "plops out") of your image, with its own set of rendering controls. This isn't simply cosmetic, as it provides the tools you need for this right where you need them.

The top button in these controls is a Clear and Render control for the patch, while the lower button is a Resume Render control. Inside the Options menu are items for scaling and cropping your selection, among others.

Help Text

As you move your cursor over the Bryce interface, the help text at the base of the Control Palette changes to indicate the icon you're currently pointing at. If your cursor is on top of your scene file, this readout will indicate the amount of objects and total polygons in your scene, thus giving you an up-to-the-second status of how complex your scene has become. This can be very helpful in anticipating render times.

Help Text.

THE CREATE PALETTE

This is where it all begins with Bryce. Here, you add objects into your scene and begin building your world. It should be stressed that Bryce is not a modeler in the strict sense of the term. However, with features such as Terrain Editing and Boolean Rendering, Bryce goes far beyond its previous definition of "landscape generator."
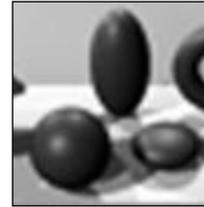
Primitives

The term primitive refers to crude, geometric shapes that are the building blocks of all large, complex scenes. The primitives included with Bryce are Sphere, Torus (the technical term for a doughnut), Cylinder, Cube, Pyramid, Cone, Disc, and Square.

By clicking on any of these primitive icons, the corresponding wireframe appears in your scene. From here, you can resize, reposition or rotate the object to your heart's content.

Of the primitives listed above, the Sphere, Cylinder, Cube, Pyramid and Cone all have alternate primitive icons in the Create Palette. The purpose of these alternate primitives is twofold: First, often the first thing one does upon creating a new cube is to elongate it (perhaps to use as a pillar), or upon creating a new sphere is to "squash" it (lots of UFO's came from the original Bryce). These alternate primitives have been created to accommodate some of the first editing operations one does with a new primitive.
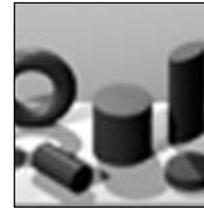
Secondly, objects respond differently to textures from the Bryce materials engine according to their orientation, due to the options a user has with texture mapping. For example, textures mapped to a cylinder turned on its side will respond differently to the cylinder primitive already laying down.
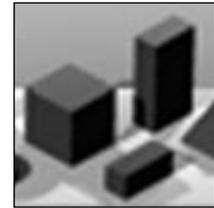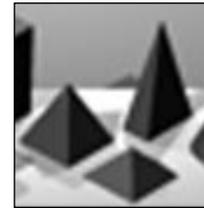
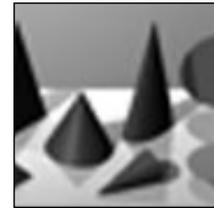
Sphere primitives
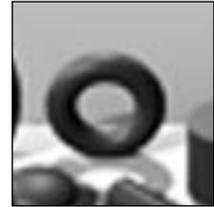
Torus primitive

Cylinder primitives

Cube primitives

Pyramid primitives

Cone primitives

Disc primitives   *Square primitives*

Cloud plane

Water plane   *Ground plane*

At the base of the Create Palette title is an pop-down menu that provides a graphic preset list of Boolean objects (see sidebar) among others. Picking any one of these preset objects will drop it into your scene, and you can resume editing it as you would any other object.
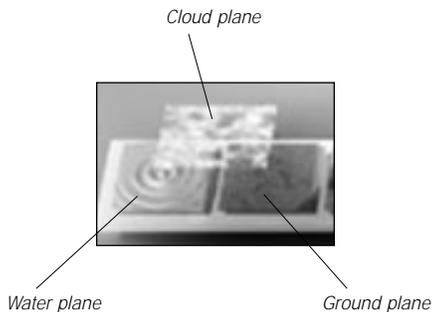
Infinite Planes

Infinite planes are not primitives in the traditional sense of the term. They appear in your scene file as finite wireframe squares (in other words, they appear to have a stopping point when viewed in wireframe mode) laying flat. What they represent, however, is an infinitely stretching field that extends in every direction. This is among Bryce's most unique features, as it rids designers of the typical tedium of concealing Columbus' horizon. While all infinite planes are technically identical, Bryce breaks them up into three basic categories (literally land, sea and air) for the ease of creation.

Ground

The Infinite Ground Plane appears in a new scene file, as this is typically your first action, and is fixed to a virtual "ground level."

Water

A water plane has a pre-assigned water texture (randomly picked from the water presets) rather than a solid texture. Like all materials, this water texture is fully editable. A water plane is not automatically inserted into a scene.

Cloud

Like the Infinite Water Plane, the Infinite Cloud Plane must be actively assigned to a scene file. However, it does not appear at ground level, and has a cloud texture, rather than a rock or water texture, assigned to it. Using a Cloud Plane in addition to an environment model allows you to create low cloud planes that "sweep" over the view of the user.

Terrain Object

The Terrain Object, our technophile term for "mountain," is one of the core elements in Bryce. A Terrain Object is an organic, mountainous shape that is created via a "random default." When you create a Terrain Object from the Create Palette, you create an object generated randomly with fractal noise. Bryce then does a bit of post-processing (to make your terrain look more natural) before it pops the terrain onto your screen.
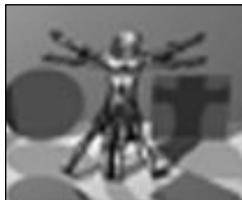
Symmetrical Lattice

The Symmetrical Lattice is best described as a "Siamese Terrain Object." In other words, it is exactly like an organic mountain object with one major addition: it has an exact, mirror replica of itself fused at its base. So, rather than a mountain that ends abruptly in a flat square, a replica of that mountain tapers off the opposite side.

This is a powerful addition to the Terrain Object that will be noticeable when using the Terrain Editor. At this point, Bryce will encroach on the realm of modeling, though in a non-traditional sense. Refer to the discussion on Terrain Editing in the Deep Features Reference Guide (included on your Bryce CD) for more details.

The Terrain, Rock, and Symmetrical Lattice objects.

Rocks

If we need to tell you what a rock is, you probably need to pack up your computer and get outside for a bit. In a nutshell, creating rocks with this icon generates random, organic rock shapes that you can assign materials to and position throughout your scene.

The Pict object.

Pict Object (the Leonardo Oscar)

Clicking here opens up a dialogue so you can import a Pict image and place it into your scene as a free-floating object. In other words, you needn't map a Pict image onto a surface to make it visible in your scene.

By placing a Pict into your scene as an object, you retain the proper proportions of your Pict— there is no distortion from squeezing it into the dimensions of a square. Further, you can include an *alpha channel*, to clip out a background and thus add people, trees, and other elements to your scene.

Lights

Among the most significant new features to Bryce is the addition of multiple light sources. So, not only can you create a natural-looking outdoor environment for your scene, you can also have lights striking (or emitting from) your objects. These new light sources are among the most significant tools you have to create other-worldly, more "abstract" images with Bryce.

Radial Diffuse Light works just like bulb or candle light. Light emits from a centerpoint, and travels outward in every direction. This is hand for creating effects such as hanging lanterns, light bulbs, celestial bodies, etc.

The Radial Diffuse, Circular Spotlight, Square Spotlight, and Parallel Projection light objects.

Spotlights are just what you expect. They have a point from which the light emits, but they travel in a specific direction. Bryce provides both the standard Circular Spotlight, much like you would see in a live theater, as well as a Square Spotlight, that works like a slide projector (all lights, however, can function as "slide projectors" with the use of "gels," described below).

Parallel Projection Lights work like Square Spotlights, with one physical property that doesn't exist in the real world: The light rays they project do not diffuse as they travel. Instead, Parallel Projection Lights emit rays that are parallel to one another. The spot that strikes your scene will be exactly as big as the source projecting it.

A Note About Spotlights

Keep in mind that while your spotlight might have a very small starting point, the spot that strikes an object in your scene could be very big (depending on the distance travelled by the light), much like a small flashlight projects a very wide beam when you're walking through a cabin that legend says used to be occupied by a chainsaw killer but nobody's really sure since they never come back when they go exploring and your friends who dared you to go inside and walk upstairs are waiting back at the campsite safe and warm and dry.
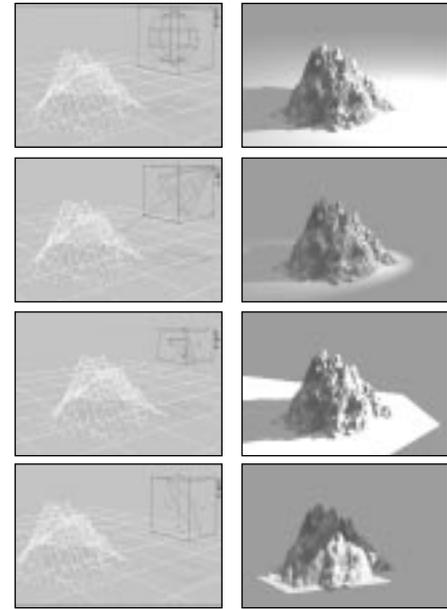
Each of the four light sources (diffuse radial, circular spotlight, square spotlight, and parallel projection) and a sample of how they illuminate objects in a Bryce scene.

THE EDIT PALETTE
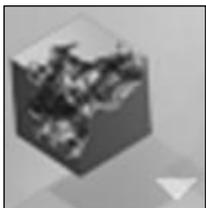
Materials control

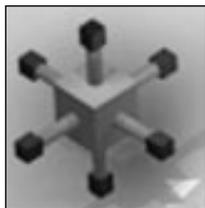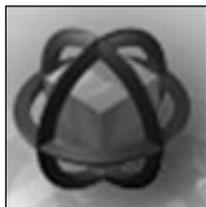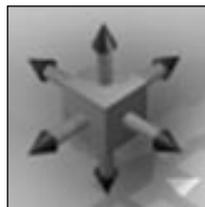
Resize control

Rotate control

Reposition control

Alignment control

Randomize control

Okay, so you've made a cube... now what?

For starters, just like the Create Palette, you have a pop-up menu of graphic presets showing you a host of materials to apply to the surface of your object. Picking anyone of these materials will assign it to your selected objects, so they will take on whatever water, stone, mud or lava material you assign them. Additionally, you can edit these materials to your liking. For more information on editing materials, refer to the Deep Features Reference Guide on your Bryce CD-ROM.

The **Materials** control lets you access the Materials Editor, one of Bryce's "deep" environments for precise, professional control of every aspect of materials, including bump mapping, specular and diffuse properties, etc.

The **Resize** control allows you to stretch your object along the X, Y or Z axes, much like grabbing it at one of the bounding box points. There is also an options menu for numerical entry of these coordinates, and for applying them to Object, Camera or World Space.

The **Rotate** control is for rotating your object in a fixed fashion along one of the three axes, instead of the trackball motion available in your object's bounding box. As above, an options menu is available for numerical entry and determining the relative space of these edits.

The **Reposition** control is next. By repositioning your object, your scene and camera keep their current orientation, but you move your object freely within your scene, the standard options menu is included.

The Resize, Rotate, and Reposition controls work via a click and drag along their appropriate axis.

The **Alignment** control is a crucial tool not available via your bounding boxes or Plop-up menus. This is how you precisely position objects relative to each other. You must have two or more objects selected, and then decide how you want them aligned.

The best way to explain this is that if you align two objects along their X axes, you will align them so that they occupy the same point horizontally in your image. Aligning them according to the Y axis will align them vertically, so that they're all "floating" or "resting" along the same plane. Finally, aligning them along the Z axis will place them all the same distance from the camera.

Simply put, the **Randomize** control takes all of your selected objects and randomly orients them according to the above defined parameters. Randomizing a group of selected primitives has the effect of "exploding" them throughout your scene, and can result in some very abstract and kinetic images.

The options for randomizing your objects are as follows: Randomize Position randomly places selected objects, as they are, throughout your scene; Position & Size is the same as Randomize Position, but randomly alters the size of each selected object; Position & Rotation keeps selected objects the same size, but "throws" them throughout your scene, varying both their location and orientation; and Position, Size & Rotation combines all of the above for completely unpredictable placement, size and orientation of selected objects.

The Edit Palette also contains controls for accessing the deep Terrain Editor, converting your objects to other object types, etc.
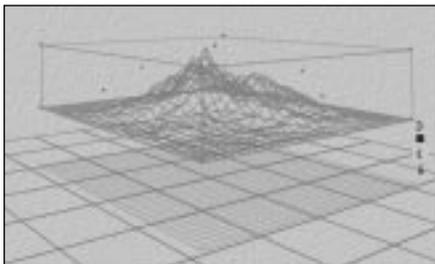
Object Properties

The objects you create in your scene file have several native characteristics before a material is assigned and they are rendered. These properties of the wireframe make it easier to manipulate.

Shadows

A wirframe object with a shadow and bounding box.

You will notice that for each wireframe object in your scene, a virtual shadow of that wireframe is cast on the ground level of your scene file (whether or not you have a ground primitive in the scene).

This serves a very useful function in giving your wireframe scene a three-dimensional orientation. Because your objects cast shadows, you can tell which objects are close and far, big and small, and so forth. Turn the shadows on and off (see "Display Palette" in Part VI), and try your wireframes without shadows to see how shadows help you in your wireframe orientation.

Bounding Box

Once you have a wireframe selected, a box appears which encompasses the wireframe object to its furthest reaching points. Multiple selections will be encompassed by a single bounding box. This leads to a few other significant tools...

Resize Controls

At each corner point of an object's bounding box, along with the centerpoint of each face of the bounding box, resides a bold point that functions as a handle. If you place your cursor on top of any one of these points, it changes into a resize icon.

By clicking and dragging horizontally, you stretch your object from that corner, effectively maintaining the proportions of your object. If you drag from a face of your object, you stretch your object along that face. This would, for example, change a sphere from a plain sphere into an oblong "pill" shape or a flat "tablet" shape.

Note that your resizing is done according to the handle you grab. For Example, if you grab the handle on the face of a square, resizing will be done from that handle, extruding your square into a rectangle shape (or compressing it).

Rotation Controls

Clicking on any of the object handles with your Command key held down changes your cursor to a rotation cursor. Dragging on any of the corner control points on your bounding box revolves your object on a virtual trackball, rotating from the centerpoint of that object. This way, you can almost "pick up" a wireframe object and turn it over in your hands, without disturbing any other object or any of your scene settings.

Rotating an object from a control point on the object's face will rotate according to that point only. For example, if you rotate a cube from the control point, or handle, at the top center of the cube, the cube will rotate from the Y axis.

Plop-up Menus

Well they don't "pop-up" in the traditional sense... they combine the characteristics of the click-and-drag pop-up, as well as a standard dialogue box. So what do we call them?

Plop-up menus are significant for two reasons: First, they provide the numerical entry that so many Bryce power users crave. Secondly, each plop-up menu resides within its own
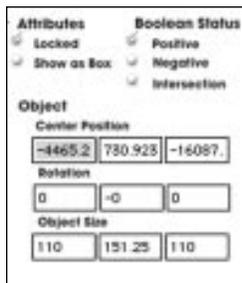
A sample plop-up menu (or dialog box).

object. In other words, each object has its own plop-up with the settings for that object. This provides users with a wealth of information about a scene, hidden within the scene.

For most objects, the plop-up menu will contain the following information:

Attributes

Locked: Checking this option locks your object "as is" and prevents any further changes being made to it. Its size, orientation, position and materials remain fixed until you unlock the object.

Boxed: This option creates a simple box shape in your scene in lieu of a detailed wire-frame representation of your object. This is handy if your scene becomes very complex or if you have a complicated grouping of objects. Viewing your scene with a box or boxes simplifies navigation and editing of your scene file. Obviously, the box is only symbolic of your object. It renders in full detail regardless of whether or not the wireframe is viewed as a box.

Positive, Negative & Intersect: *Positive* means your object will be treated as a positive substance, and will only be invisible where it merges with a negative object (i.e., an object with the *Negative* option checked). *Intersect* means both objects are Negative, except where they merge. (see the "Boolean Rendering" sidebar for more details).

Position, Rotation & Size: These three options allow you to enter numeric values for the X, Y or Z coordinates of an object, which alter your object according to "object space." In other words, it changes the object relative to the space and position it originally appeared.

Object Editor: Certain objects will have a small "E" beside their bounding box. This is an entry point for an editing mode unique to that object. For example, the "E" next to your terrain object will open up the Terrain Editor.

With multiple objects selected, a single bounding box appears around all of them. When this happens, a small "G" appears to the right of the box, which is an on/off switch for grouping. You will need to group your objects for any assigned Boolean properties to occur. When objects are grouped, the "G" changes to a "U" for the option of ungrouping.

The Landing Arrow: *Landing* an object refers to placing it directly on top of the nearest object below it. For example, clicking on the landing arrow of a newly created sphere in a new scene file will land it on the ground plane.

Families

Families are color-coded wireframe assignments that allow you to group objects and select them by their assigned groups. Whenever you have an object selected, the wireframe color is red. However, an unselected object has a different color wireframe. The color of the wireframe tells you the family of your object.

All objects have some kind of default family color when you enter them into your scene. For example, all of your primitive shapes have a dark gray wireframe as their default family color. Your lights, on the other hand, have a yellow wireframe color for their family.

Whenever you have an object selected, you see a small color swatch to the right of its bounding box. This color swatch matches the wireframe color for that object. By clicking on this swatch, you open up a color picker that allows you to change the color for that wireframe, thus assigning it a new family.

For example, you can select all of your spheres in a scene and assign them a color of their own, so that now your spheres all belong to their own unique family. Or, you can have different family colors assigned to different terrain objects, indicating different materials assigned to them.

Among the options in your Selections Palette (see Part VI) is the option to select entire families of objects in your scene, according to wireframe color.

THE SKY & FOG PALETTE

The Sky & Fog Palette is the control center for Bryce's virtual environment. This environment permeates your entire scene, rather than being a simple backdrop. For example, if you place an object in the distance and it is still visible to your camera, it might be invisible when you render the scene if you have used a lot of fog and haze. Additionally, the colors in your environment interact with everything in your scene just as they would in nature. Red sunlight, for instance, would be invisible until it strikes an object. In the case, the sky would still be blue, but the clouds would have a tint of red. Blue objects, on the other hand, might take on a purple cast when exposed to red light.

All of the buttons in this palette are controlled via a click and drag, with built-in animations with each button that illustrate what is being done to your scene file. Clicking and dragging on the Fog button increases or decreases the amount and height of your fog, and animates this as it does so.

As with previous palettes, a graphic preset picker resides beside the Sky & Fog title, offering a selection of pre-designed environments for you to drop into your scene.

At the base of each one of these animated buttons is a small color swatch. By clicking on any of these swatches, a pop-up color-picker appears that you can click and drag through, and change the color for that particular setting. For example, once you've set the amount of fog you'd like, clicking on the color swatch below your fog button changes your fog color accordingly.
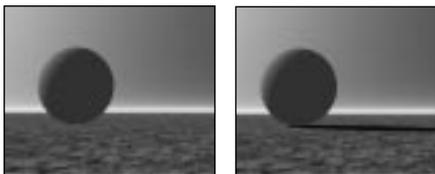
Sky Mode

The first button in the Sky & Fog Palette is the Sky Mode, which selects from one of four sky modes:
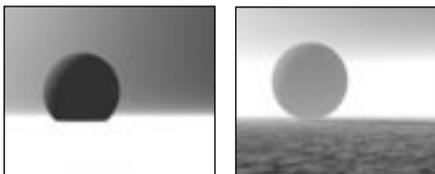
Soft Sky & Darker Sky: These are both very similar, as they both treat the sunlight as an environmental influence, and are affected by the position of the sun.

Custom Sky: Custom sky works like a normal sky, except for the fact that the position of your sunlight doesn't alter other environmental parameters. For example, if you've colored your haze, it will retain that color and ignore the effects of sunlight refraction moving through it. This allows you to create strange, alien worlds that bend the rules of nature.

Sky Off: This toggle allows you to disable your sky (but still keep your fog and haze) for a solid background color. This can be used for other-worldly effects, or to create a flat back-drop for a more abstract image.

Shadows

By clicking and dragging on the Shadows button, you increase or decrease the intensity (or darkness) of your shadows. If this button is set to 0, none of your objects throw shadows, regardless of the angle of your lights.

Since your shadows are a function of ambient light, your color picker in this control isn't simply "coloring" your shadows, but coloring the ambient light in your image. Make note of this, as changing this color can tint objects in your scene.

Fog

Two identical Bryce scenes with no shadows (left) and full shadows (right).

A Bryce scene with dense low fog (left) and high thin fog (right).

You have a single button that controls two settings for fog: Fog amount and height. Dragging your cursor horizontally from the Fog Control increases and decreases the amount of fog that's in your scene (this is the first number in your help text readout); dragging your cursor vertically increases or decreases the height of your fog (the second number in your help text).

For example, you might have a fog amount of 20 with a fog height of 80, giving your scene a foggy, but still visible feel. Or, you might have a fog amount of 100 while having a fog height of 10, for that thick, ankle-deep blanket of fog you only see in vintage horror movies.

This feature has been greatly enhanced since version 1 of Bryce, so as to allow for greater control over fog at lower altitudes.

Haze

Next time you have an opportunity to gaze out onto an infinite plane disappearing onto the horizon (such as the ocean), notice where the haze meets the sky (and note the haze color, too). This control governs that property. A normal haze setting will have a clear environment, with a band of this haze compressing at the horizon.

Clicking and dragging, like the rest of the Sky & Fog controls, increases and decreases this haze.

Cloud Height

Clouds, like fog, have dual settings of both quantity and height. However, they are divided into separate buttons with the cloud controls. Cloud height increases or decreases the height of your clouds, regardless of how thick they are.

For example, you can have very thin, wispy clouds very high in the sky for the effect of a clear, summer day. Or, for the effect of a dark winter afternoon, you can have very dense clouds very low in the sky.

Cloud height has the additional effect of affecting the height of your haze.
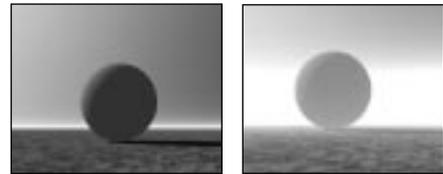
A Bryce scene with minimal haze (left) and more intense haze (right).

Cloud Intensity

This refers to the density, or the amount of coverage your clouds have and how much they obscure the sky above them.

Cloud Frequency & Amplitude

This dual click and drag control determines first the Frequency of your clouds, which means how much the cloud pattern repeats itself in your sky. Dragging to the right increases the frequency of the clouds, which means they become smaller but repeat themselves throughout your sky more.

The softness of the clouds is determined by their amplitude with a vertical click and drag. Dragging upward increases the amplitude, which gives the clouds a hard edge and a more solid feel. If you drag down and decrease the amplitude, the clouds take on a softer, wispier feel.

Day/Night Toggle

As Bryce affords you the ability to create a natural environment, you have the option for creating a daytime or nighttime scene. If you change your setting to nighttime, your Light Position (see below) is inverted from its current daylight setting.

Light Position

This controls the direction from which the sunlight or moonlight is coming. Think of it as a compass; if the highlight is positioned at 12 o'clock, the light comes from the North, and

A Bryce scene with minimal clouds (left) and more intense clouds (right).

so on. Or, think of it as a bird's eye view of your scene. If the highlight is positioned in the center of your sphere, the sun is shining straight down, making it "high noon."

The color picker for this feature is located just below the Light Position Sphere.

Memory Dots

The Memory Dots for the Sky & Fog Palette serve the same function for the environment as they do for the views in the Control Palette. By clicking on a dot, you save all of the environmental settings into that dot, allowing you to toggle throughout them for comparison and contrast.

The first dot is set to retain Bryce's initial settings, and cannot be cleared. The other dots are cleared with an Option-click.
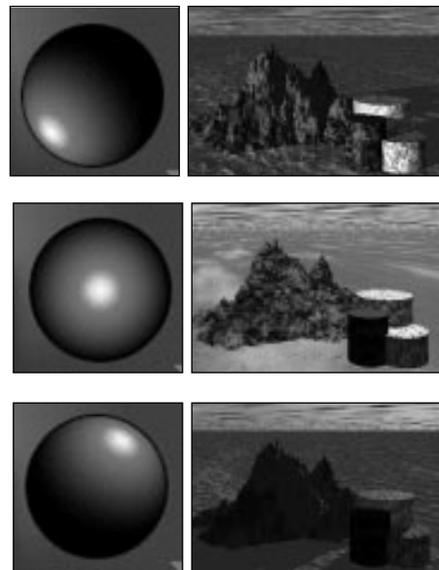
Three different light positions (sunrise behind us, high noon, and sunset in front of us) and the corresponding rendered images.

THE SUPPORTING PALETTES

These palettes are smaller than the tool palettes discussed above, and they also "go to sleep" when you're not using them. That is, they fade from view until you move your cursor to their location. At that point, they "wake up" and appear with all their working buttons, and then fade out again once you're finished.

Selection Palette

The Primitives in the Selection Palette

This palette resides along the very bottom of your monitor and allows you to select groups of objects for editing. All of the primitives are represented here, so that clicking on any one of them selects all objects of that type in your scene. For example, clicking on the sphere primitive in the Selections Palette makes all of the spheres in your scene active. Then, by picking a single material from the preset materials library, you assign that one material to all spheres.

Additionally, you have three other controls here. First, you can select all grouped objects in your scene, regardless of what primitives make up that particular group.

Further, you can select all Boolean objects. So, you can distinguish between objects that have been grouped and objects that have been both grouped and assigned Boolean properties.

Finally, you have the option to select object families according to the colors that have been pre-assigned to them, or according to the colors you have created for your own types of families.

Video Selectors

In addition to selecting objects by type, you can toggle through your scene using the Video Selectors in Bryce.

The large arrows work by toggling through a scene according to the first of each object. For example, if you had multiple spheres, cubes and cones in a scene, the large arrows would toggle through the first sphere, then to the first cube, then to the first cone and back to the first sphere.

The small arrows, on the other hand, toggle from object to object throughout your entire scene in the order they were created.

Solo Mode is the green button between the sets of large and small video selectors. With several objects selected and Solo Mode activated, all of the unselected objects in your scene are hidden. This allows you to edit only your visible objects in every capacity available outside of solo mode. For example, you can video-toggle through your visible objects, group them, perform Booleans, etc. When you are finished, disabling Solo Mode returns your whole wireframe scene to normal.

The Video Selectors.

1. Previous object
2. First object of previous (primitive) type
3. Hide/show unselected objects
4. First object of next (primitive) type
5. Next object

Display Palette

This palette resides along the right hand edge of your monitor, and allows you to customize your Bryce working environment, with functions that range from the amusing and cosmetic to the subtle and extremely useful.

Marker

Clicking on this marker temporarily overrides your cursor with a red marker to treat your Bryce scene, and your whole Bryce interface, like a white board. You can actually write on

The Display Palette.

Marker

Interface Snapper

Background Papers

Nano-editor

Non-patcher

Depth Cueing

Shadows

Underground Lines

Wireframe Resolution

Zoom In

Zoom Out

Pan (Move)

View Flipper

your scene, annotate or call out certain elements, all without effecting your file. As soon as you click on the marker again, your cursor changes back to normal and the annotations you've made are automatically undone, and you can resume work on your scene. This is for use as a presentation tool only, as Bryce does not remember your annotations.

The Interface Snapper

The Interface Snapper is an on/off button that controls two modes. Bryce can either "hug" your document (if your document is very small and your monitor very large), or snap to the outer edges of your monitor for very large Bryce documents.

Background Papers

We mentioned the cosmetic and amusing... You have a selection of papers on which to have your wireframe rest. Options range from the subtle to the silly, such as a legal pad or graph paper, as well as simple background colors.

Nano-editor

Any action in the Control or Edit Palettes will produce a miniature, real-time preview at the location of your cursor. This is extremely useful when manipulating complex scenes.

Nano-patcher

Patch rendering was discussed under the Control Palette. This option doesn't disable patch rendering, but it does disable the 3D plop-up, for the sake of comparing edges between your original image and your re-rendered patch.

Depth Cueing

A subtle but very useful feature in Bryce is the depth cueing of your wireframe objects. As mentioned earlier, it's often difficult to judge the relative positions of wireframe objects, since they don't look 3D, unlike your rendered image. This is the main benefit of wireframe cast shadows, so as to provide this kind of 3D information. In addition, Depth Cueing provides 3D information to your wireframe scene by having objects that are further from your camera fade out as they move backward, as if they were receding into a fog.

This is not an on/off control, but rather an analog control where the intensity of the depth cueing is controlled with a click and drag.

Shadows

As mentioned above, your wireframe objects cast shadows onto the ground level of your scene file, to provide you with information regarding their relative positions. However, if this is distracting to you, you can turn those shadows off. This is also useful if your scene is growing in complexity, or if you are working on a slower machine, and you want to speed up your navigation throughout your scene.

Underground Lines

A feature that we started with Bryce 1.0 was the ability to hide your object's wireframe if you moved below the default, virtual "ground" level. This provided you with a visual cue, prior to rendering, if your rocks were below the water level, or if you had a mountain that you didn't want to be floating above your sand dunes. Like other controls here, this is an on/off toggle.
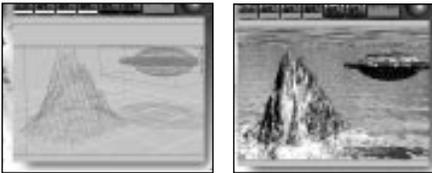
Wireframe Resolution

Prior to rendering, your objects are represented in 3D with a wireframe. You might want to increase the density of the wireframe to make the objects more visible or, if you're working on a very complex scene (or a slower machine), you can reduce the resolution of your wireframe object.

You have options here for both static (objects that aren't moving) and motion. For example, you might want to have a very low resolution for objects that are in motion (as this will speed up your editing), but have a very high resolution for stationary objects, for the sake of visibility. Finally, you can determine the resolution for selected objects, even though they are stationary.

Zooming and Panning

These controls are standard, as seen in other graphics applications. Clicking on either of the magnifying glasses zooms in or out of your wireframe scene and your rendered image.

Clicking and dragging on the little hand pans through your image. Note, this does not change any of your scene settings, object coordinates or camera position, but only the two-dimensional projection of your scene.

View Flipper

This final control in the lower right hand corner of your image allows you three methods for viewing your scene. After you've rendered your scene (or started to render, but interrupted it), you can toggle back and forth between your wireframe and your rendered image with this button.

A Bryce scene in wireframe mode (left) and fully rendered.

A third option is viewing your rendered image with your wireframe scene overlaid onto it. This affords you the ability to judge how your image will render if you move a primitive object after you've rendered it.

LOOKING DEEPER

Editing Terrains

Terrains, or "Terrain Objects," are the natural formations that mimic mountains, icebergs, cliffs, mesas and other land masses within Bryce. By clicking on this icon in the Create Palette, a "random default" terrain object is inserted into your scene. These terrains can be editing in depth by clicking on the "E" button in the lower, right-hand corner of the selected terrain's bounding box.

Following is a brief overview to editing your terrains in Bryce 2. We urge you to play with this interface and get familiar with it. As you dig deeper, you might want to look at the "Deep Features Reference Guide" for in-depth details on sculpting your terrains.

Grayscale to Height

The shape of your Terrain is dictated according to a Greyscale-to-Height Map. This map is simply a two-dimensional, black and white (and gray) image that represents a topographical view of your terrain. Each level of gray represents a different point of height on your terrain object, with pure black being the lowest elevation, and pure white being the highest.

By altering the gray levels on your map in the Terrain Editor, you alter the shape of the final terrain object.

Map

The upper right-hand corner of your Terrain Editor shows you the grayscale map of your Terrain Object. Remember, white corresponds to high points, and black to low points. To the very left of this map is a gradient, showing the sweep from black to white occupied by this Terrain Object.

For the sake of reference, you can replace the black to white sweep shown in your Terrain Editor with a color map. Click on the arrow at the base of the gradient to add color to this map. There are several color schemes to choose from, and you can cycle through them with repeated clicks on this arrow.

These color maps are for use as a visual aid only... Bryce still "sees" your terrain object in.

To the very right of the terrain map gradient is a bracket (you might recognize this feature from the Gradient Designer in Kai's Power Tools). This bracket, as it encompasses your gradient, tells you which portions of your gradient are contributing to your Terrain Object. By moving the ends of the bracket inward, you eliminate certain gray levels (or colors) from your map. By doing this, you physically "clip" the top or bottom levels of your terrain object.

This is handy for eliminating the "injection molding" at the base of your mounting, or shearing off the top of the mounting for a plateau.

Preview

At the lower left of the Terrain Editor is a flat-shaded preview of your Terrain Object in 3D. By flat shading, we mean that no textures have been assigned. Instead, the only material you see on this is the color of your terrain map.

At first, your Terrain Editor will open up with a black to white gradient next to the terrain map, and your preview terrain will be shaded accordingly. If you assign color to your map, your preview terrain takes on those colors.

This preview terrain is useful for viewing your terrain object as you edit it, allowing you to make educated choices about "sculpting" your terrain before assigning those changes to your wireframe.

You can view this preview terrain from any angle by simply clicking and dragging directly the terrain, and rotating it on a virtual trackball around its center.

Additionally, you have two preview modes available in the buttons just above this terrain preview. The first button is an on/off button for rotation of your preview. Turning this on will have your preview terrain perpetually rotating as you edit, so that you can constantly view your changes from all sides.

The second button is for a full screen RIP of your preview terrain. When viewing your preview at full screen, clicking once in that preview takes you back to the terrain editor.

Painting

At the base of your Terrain Map are your painting tools. You have two sets of brushes to pick from, hard edged and soft edged, each with a range of sizes. These allow you to paint in black (depth) or white (height) on your map, the results of which can be seen on your Preview Terrain.

Editing Modes

At the upper left of your Terrain Editor interface is a series of three tabs that allow you to toggle between the three major editing modes of the Terrain Editor.

Elevation, the first of these, provides the deepest level of controls for editing your Terrain Map. Each one of the buttons works by clicking and dragging to increase or decrease the desired effect. Also, a single click on any one of the buttons will apply the effect incrementally.

Filtering

Think of this as a visual aid in viewing your light to dark ramp for your Terrain Object. What the filter graph shows you is the progress from black to white, starting at the base and moving upwards toward white. By clicking and dragging in this window, you will notice that the graph fills in black in real time according to the position of your cursor.

By doing this, you effectively change the gray levels at different portions of your map. For example, by clicking just above the midpoint of this graph, your cursor creates a little spike, thereby raising the gray values on those points of your map. In other words, those midranges of gray become white, creating drastic elevations in your Terrain Object.

Pictures

Bryce is able to translate the gray values from any image (in Pict format) into height information. The Pictures portion of your editing modes allows you to open up a Pict image, combine it with your current terrain, and convert that information into a Terrain Object.

This is useful for extruding text and logos into mountains and, in combination with your painting tools, opens the door for Bryce to be much more than a literal landscape generator.

Like everything else in Bryce, the interface on the Terrain Editor is designed to encourage exploration and play. Find what works best for you, perhaps dig up a method for producing

an effect that a fellow Bryce-head hadn't come up with.... there's lots of room for exploration.

Editing Materials

As you might have seen by now with Bryce 2, a rendered image with no materials looks as though your objects were made from simple colored clay. It's the materials, the rocks, marble, glass, wood and other substances, assigned to your objects that contribute to making your Bryce images so photorealistic. Included with Bryce 2 in the Edit Palette are preset materials, categorized by type, such as water, clouds, stone, wild effects, and so on. Picking from these materials and assigning them to your objects is your first step in going beyond the flat shaded, clay images and stepping into what makes Bryce so powerful. Although we've provided a wealth of preset materials, you will want to manipulate them for your specific purposes, perhaps even create your own.

As with the Terrain Editor, we've left this more detailed version of Bryce in the "Deep Features Reference Guide" on the enclosed CD-ROM for users that are finished tunneling through the surface of Bryce and want to learn more. Once you've read through this, you can begin creating your own realistic and surrealistic materials, and even trade hints and techniques with other Bryce power users.

The Deep Features Reference Guide

We hope you enjoyed this "deep introduction" to Bryce 2. The application has changed so much since the first version that you might want to take your phone of the hook for the next couple of weeks. With that in mind, the goal behind this manual was to give you an overview of the significant changes in the software. However, there's still more. For those of you who want to really tunnel in, we'd once again refer you to the Deep Features

Reference Guide. This document is a PDF (portable document format) file, which can be viewed by virtually any Macintosh and printed to any printer. Use this Deep Features Reference Guide when you need help with an advanced topic not covered in depth in this Explorer's Guide.

As we mentioned earlier, we encourage you to visit our Web Site, join our community on America Online, and contribute to the growing network of users pushing the boundries with Bryce's capabilities.

In Closing

GLOSSARY

additive mode. A color blending algorithm which adds the brightness value of colors from one item to the brightness values of another.

algorithm. A finite step-by-step problem-solving procedure.

aliasing. A visual artifact caused by low resolution sampling that can cause hard edges or areas of high frequency in an image to look jagged (often referred to as "jaggies"). See "antialiasing."

alpha channel. A separate grayscale channel accompanying any PICT file that can determine which areas of the PICT will be visible in the final image and which will not. Typically, white areas in the alpha channel describe the areas in the corresponding PICT that will be visible, while black areas in the alpha channel describe the areas in the corresponding PICT that will not be visible. Also referred to as a mask. In the absence of an alpha channel, KPT Bryce can use the luminance values of any 2D PICT or 3D solid texture as alpha information.

altitude. A measurement of height. In KPT Bryce, many textures will change their behavior based on altitude.

ambient. Light that has no point of origin or specific direction, and is presumed to strike every point on every object with equal intensity. Since it is not affected by other environmental light, it tends to affect objects in shadow, and can make objects visible even with no specific light source.

amplitude. In KPT Bryce, this refers to the intensity of the cloud definition. Increasing the amplitude will make cloud contours harder, while decreasing it will result in softer-edged, more diffuse cloud formations.

antialiasing. The process of eliminating aliasing by higher resolution sampling, so that hard but jagged edges appear smooth and clean. Bryce uses a nine-times oversampled algorithm to achieve this. See "aliasing."

bitmap. Literally, a "map of bits." Your screen is comprised of pixels, and each one of those pixels expresses a level of color, whether it is one bit (black and white) or 24-bit (millions of colors). Your image, when rendered, can be thought of as a pixel-by-pixel map of color, hence the term "Bitmap".

boolean rendering. A rendering process wherein either the space taken up by "negative" objects is subtracted from "positive" objects, yielding an object with portions removed; or two or more objects are combined to form a composite object combining the mass and dimensions of all contributing objects.

bump mapping. A process that interprets changes in an object's surface luminance or color values and, without actually affecting the object's geometry, expresses them as perturbations on the object's surface.

camera. A metaphorical "tool" for viewing areas in a scene. The metaphor refers to the conical projection of the scene onto a 2 dimensional plane along a specific direction.

center scaling. The ability to perform resizing or rotating operations on an object based on the object's center, rather than an alternate point, such as its base.

CMY color. A well known subtractive color standard widely used in the print industry. CMY color models blend Cyan, Magenta, and Yellow to approximate colors for print; almost always used with a fourth ink, black (K), to compensate for ink impurities.

diffuse. Light that is evenly reflected from an object's surface, visible regardless of the angle from which it is viewed. Diffuse is associated with matte objects.

edit. Any action performed on an object after its initial creation. Includes moving, resizing, rotating, copying, assigning textures, pasting, and more.

family. A user-defined grouping of objects, as determined by the color assigned to the wireframes of the family "members."

frequency. A measurement of the number of times certain textural characteristics repeat themselves within a fixed area.

grayscale-to-height mapping. A process that interprets a grayscale range from black to white and expresses that range as height, from low to high.

ground plane. A two-dimensional surface that extends to infinity in all directions. In Bryce, this plane enters a scene at ground level, and can be saved as a Preset into the Grounds library.

HLS color. An alternative color model: Hue, Lightness, and Saturation.

HSV color. An alternative color model: Hue, Saturation, and Value.

illumination. In KPT Bryce, any property or characteristic related to how an object responds to light. This includes Ambient, Color, Diffuse, Reflectivity, Refraction, Specular, and Transmitivity.

image resolution. Since Bryce renders bitmaps at 72dpi, the only image resolution you need to determine is the height to width ratio of your image.

infinite plane. A two-dimensional surface that extends into infinity in all directions. Unlike the Ground Plane, an Infinite Plane will enter a scene slightly above the ground level, and can be saved as a Preset into the Skies library.

landing. Dropping an object straight down onto the object directly beneath it. Usually used to "land" an object on the ground.

mapping. The process of interpreting data input of one kind and expressing it as another. See Bump Mapping, Grayscale-To-Height Mapping, Pict Mapping, and Texture Mapping.

material. In KPT Bryce, the sum total of a 3D Solid or 2D Pict texture (if chosen), any procedural effects, and illumination characteristics.

nano-view. A small preview of an object or scene. The Nano-view window is at the top of the Control Palette.

opacity. The degree to which light cannot pass through an object. In Bryce, the term primarily refers to the opaque portions of alpha-channels.

PICT mapping. A process that interprets a 2-dimensional Pict and expresses it as the surface of a 3-dimensional object, according to a specified algorithm.

polygonal. All 3D objects in KPT Bryce are built from polygons, or multiple-sided geometric planes, and are therefore inherently polygonal in nature.

primitive. A basic geometric form, such as a cube or sphere, used as a basis for constructing compound 3D objects such as buildings, rocket ships, or snowmen.

raytracing. An image synthesis technique by which a virtual beam of light is projected from a virtual camera into a 3D scene in order to evaluate shading and visibility. The virtual beam may be absorbed, reflected, or otherwise affected to some degree by every object it strikes. For instance, if it hits your sky, then a blue sky color ends up on that portion of your virtual "film", your image. In this way, a final color is determined for each pixel in your image.

reflectivity. The degree to which an object bounces light back from its surfaces.

refraction. As a light wave passes from air through another medium such as water or thick glass, it seems to bend or turn to a certain degree. This phenomenon is known as refraction, and the degree to which light bends or turns in these situations is controlled by the Bryce's Refract Index control.

render. The complex process of building a 2-dimensional bitmapped image from all the information contained in your 3-dimensional wireframe scene.

scene. a) The complete content of your Bryce world; b) The two-dimensional screen projection of your 3D scene; c) The file that Bryce saves, containing all information regarding your landscape.

solid texture. A three-dimensional mathematical description of an object's textural characteristics. Often referred to as procedural texture.

specular. The "highlight" of any object with a shiny surface; light that reflects non-uniformly in specific directions depending on the surface roughness. "Specular highlight" refers to the point where specular reflection is most pronounced.

terrain resolution. Terrain geometry can be rendered at several levels of detail. At very low settings, you may see geometric "facets" in your terrains, even with "smooth surfaces" selected. In this case, increase your terrain resolution. Low resolution rendering is often best for items in the far background, where detail is not so important.

terrain. A randomly generated fractal object used in KPT Bryce as the basis for mountains, islands, plateaus, and other landscape objects.

texture mapping. A process of applying detail to a surface without actually affecting the object's geometry. Values from the texture can determine or affect any surface characteristic, including color, reflectivity, transparency, or bumpiness.

transmitivity. The measure of an object's ability to transmit light through its surfaces. Also referred to as transparency.

transparency. The measure of an object's ability to transmit light through its surfaces. Also referred to as transmitivity.

unity. The state a Bryce object is in when it is first created, or just after the Unity button has been pressed; positioned within a "cube" of fixed size in an invisible 3D grid, with no rotation applied.

view linking. A Bryce function, available in the Create and Sky&Fog Palettes, that makes your action relative to your camera position. With this option selected in the Create Palette, any object you create will pop into your scene directly in front of the camera instead of at the default location. With Sky&Fog, it means that what you see in the Sky&Fog preview is what you will see in your scene regardless of which way your camera is pointing.

view. In Bryce, the camera position relative to your scene. Refers to the camera and the scaling/offset of the two-dimensional projected scene.

wireframe. A mesh representation of a 3D object.

wireframe resolution. Your onscreen wireframe objects can be displayed at several levels of detail, ranging from 8 to 64. At higher settings, you see more detail while in wireframe mode, but wireframe motion becomes slower.

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