

PRIMA GAMES & LIONHEAD STUDIOS PRESENT

the making of

**BLACK
&
WHITE™**



James Leach
Christian Bravery



primagames.com®

the making of
**BLACK
&
WHITE**

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“the making of

black &

white

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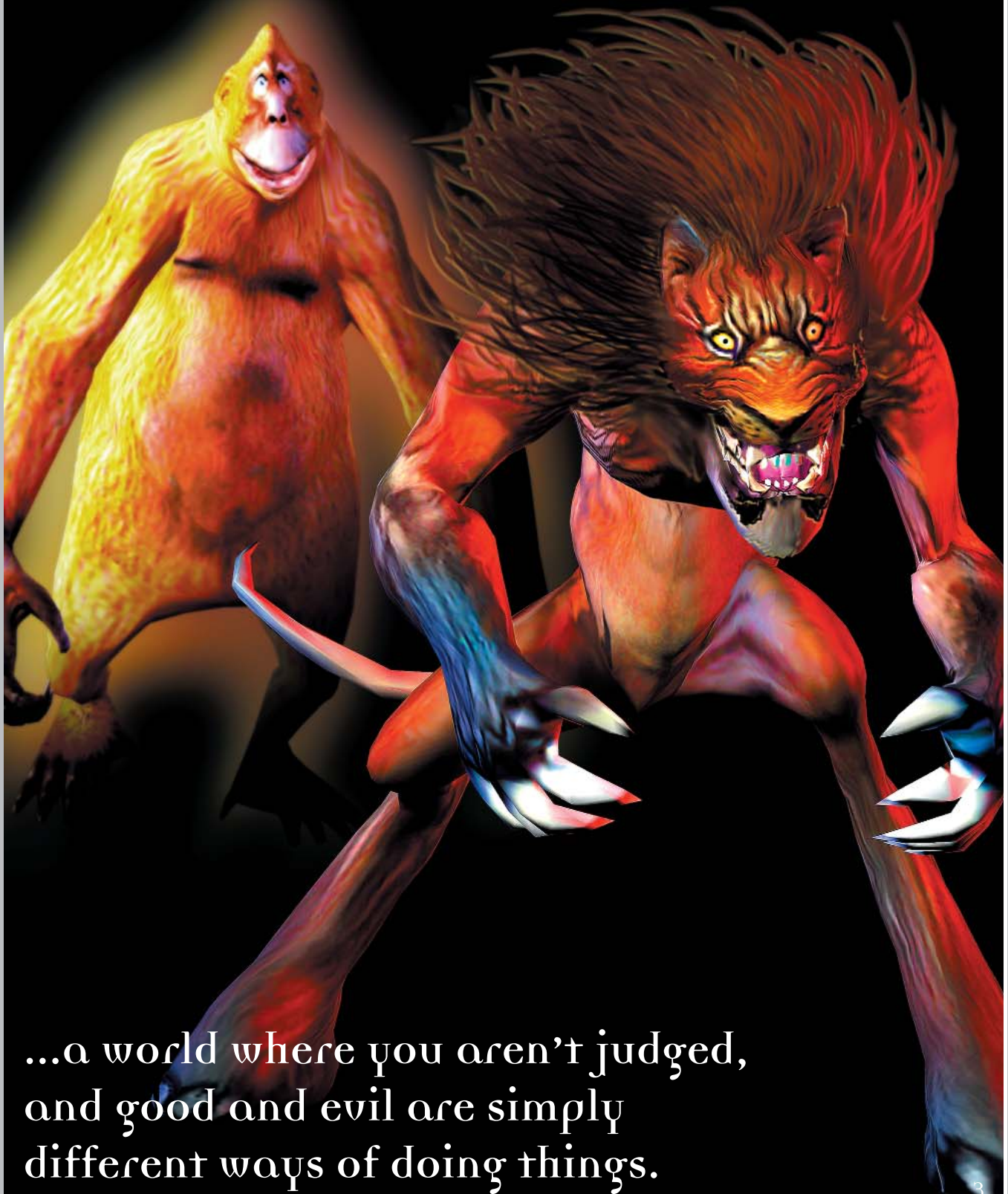
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...a world where you aren't judged,
and good and evil are simply
different ways of doing things.



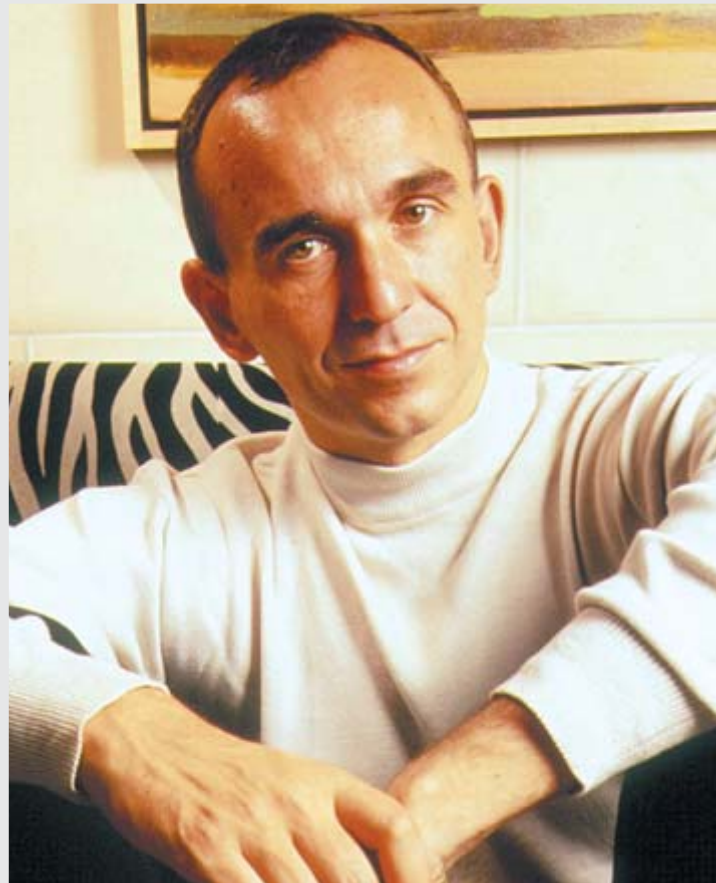
Peter Molyneux

At the end of 1996, the inventor of the god game for once had the ultimate luxury—he could sit back and, in his own time, decide what he wanted to do next. His foresight, his vision and his leadership had led him to great success, riches and enormous respect within the computer games industry. But right now, this bought him freedom. He could spend time thinking about whatever he wanted to. And because his name was Peter Molyneux, what he wanted to think about was games.

During that winter, as 1996 turned into 1997, that's exactly what he did. Like everyone else in the video games world, he had a hundred ideas, concepts and projects whizzing around his brain. And like everyone else, he knew that one can only give one's full attention to one thing at one time. But as he mulled over various projects, the same idea kept coming back. It kept haunting him. It was only a concept, but it could be the game he'd wanted to do for years. It was a project he'd nicknamed **Black & White**.

Molyneux explained where the idea for **Black & White** came from. And he talked about the things that brought it to life: "King Kong was made in 1933. You'd think it couldn't hold a candle to nearly all of the films that have been made since then. But there I was, just four years ago, leaning towards the screen, tingling with anticipation as I saw the giant gates on the island. I knew what was behind them. I also knew that, frankly, Kong's special effects have been superseded in the intervening 68 years. But the idea of a monster on that scale still kept me riveted to the chair. A creature so large it's barely aware that people are running around in front of it. It really made me think.

"And it wasn't long after seeing King Kong that I saw an episode of the American science-fiction series *The Outer Limits*. The particular episode was entitled *Sand Kings*. And it was a bizarre coincidence. Here it was again, this image of a colossus standing over a horde of tiny creatures. In the episode, some intelligent bug-like aliens come to worship the scientist who keeps them in a glass tank. They scurry around his feet in awe every time he strides into their domain.



"There I was, tingling with anticipation as I saw the giant gates on the island [in King Kong]. I knew what was behind them..."

Peter Molyneux, co-creator of Black & White

"The really interesting thing about this is that if you're worshipped with that level of devotion, you're basically a god, and you can, in the eyes of your followers, do no wrong. So you can rule your people, be they alien bugs or humans, in the manner you choose. From this came the idea of **Black & White**. A world that takes the form you wish on it; a world where you aren't judged, and a world where good and evil are simply different ways of doing things. A world that reflects you as an individual."

Molyneux's last game, written when he was still part of Bullfrog Productions, was called **Dungeon Keeper**. It, too, played with the concepts of good and evil. The premise here, however, was that rather than take the role of the heroes entering a dark underground realm looking for monsters to slay and treasure to recover, you were cast as the evil master of those dungeons. The monsters therein were yours to command in your battle to stop the forces of honour and goodness from plundering your ill-gotten gains. It turned the long-held premise of all computer games on its head. You weren't good, you were evil. And you delighted in it.

But as the idea of **Black & White** swirled around his mind and slowly took shape, Molyneux knew it was time to start assembling a team who could help him bring this vision to life.

But before he could start work on the game, he had to start a company. At his house in the Surrey countryside, early in 1997, Molyneux sat down with Mark Webley, who had been the most senior producer at Bullfrog and with whom Molyneux had worked closely for many years. He sketched out his ideas. Webley had proved himself a shrewd judge of game ideas during his Bullfrog years and he saw the dangers of such a venture, but he also saw the success a good, new, fresh game could bring.

Steve Jackson, co-founder of Games Workshop and co-author of the popular Fighting Fantasy books, was also there. He'd also been a long-standing friend of Molyneux's, and was a stalwart of Molyneux's regular board games nights.



Mark Webley



Tim Rance



Steve Jackson

Also present was Tim Rance, an ex-systems analyst from the City, who'd programmed the multiplayer version of Molyneux's first hit, **Populous**. Another friend of Molyneux's, he was extremely able technically, and knew a great deal about hardware, networks, the Web and systems. He also had a sound grasp of what makes a damn good game. He was, in short, vital.

This was the team of people who would start Lionhead Studios. The name was one Molyneux and Webley had come up with early on. Resounding with ambition and self-confidence, it struck just the right note. In fact, it was the name of Webley's pet hamster.

But fate soon struck and Lionhead the hamster died. This was not a good omen. The team reconvened and other names were debated—among them, Black Box, Red Rocket, Midnight and Hurricane. But an outside idea, Red Eye, appeared on the scene and this was a name everyone liked. The prestigious gaming bible, Edge magazine, was preparing to interview Molyneux about the new company, and were the first to announce to the world the existence of Red Eye Studios.

But when the so-called Red Eye team looked into the moniker in greater detail, it turned out that there are plenty of companies called Red Eye out there. There was a Red Eye Records, Red Eye Productions, a Red Eye Studio, and a host of others. Also, crucially, redeye.com and redeye.co.uk had gone. The final nail in the coffin came when it was pointed out that "red eye" might have unfortunate drinking connotations.

So the name reverted to Lionhead Studios. By this time, deadlines meant that it was too late for Edge magazine to change their copy, and although it wasn't their fault, for the first of many occasions, something was printed about Lionhead that wasn't strictly true. The legacy of this is that when the team is asked about the name, they usually say that Lionhead conjures up images of a proud British lion. The truth is that it's named after a dead hamster.



LIONHEAD
STUDIOS





“there
are no
mirrors
in
eden”

edden
mirrors
in
there
are no

“there are no mirrors in eden”



The ape surveys his realm.





So once there was a company, the four newly-assembled Lionhead minds turned to how best to create a game. At this point, it wasn't necessarily going to be **Black & White**. Although Peter Molyneux was keen on the idea, no game could be put together by just one person. After all, the only way to get a world-class title developed is if everybody on the project buys into it. So the new company, Lionhead, had to choose the game they were going to create. Molyneux put forward **Black & White** as a concept—but there were still other ideas vying for development. To decide what Lionhead was going to do, and to have the resources to do it, it was clear that a team had to be assembled from the outset. Jonty Barnes, the first programmer to be taken on, described the situation at this early stage.

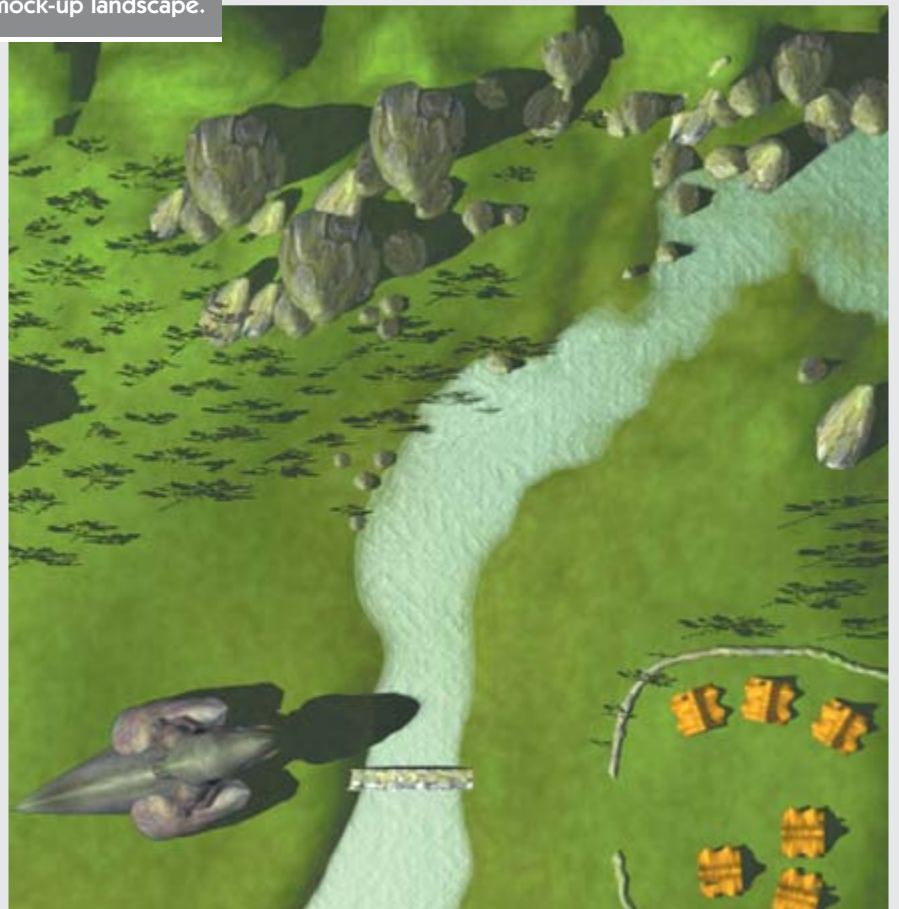
“For a long time, black & white existed only in our heads”

Mark Healey, artist

A top-down view of the first mock-up landscape.

“Lionhead was actually being run from the office to the rear of Molyneux’s house. At this stage, it wasn’t even set in stone that the game we’d be creating would be **Black & White**. There were three or four concepts knocking around. We also discussed the idea of a Mafia game, with deals, in-fighting and contracts galore. There was another idea, but it was so dire I can’t even remember what it was about!

“It was instantly apparent to us all, though, that the best idea, the one that got us all fired up, was **Black & White**. Even then, I remember that this was definitely its name. Unlike the company, the game’s name has never changed. Both the name and the game, as Molyneux saw it, felt right. We also knew that we were on pretty safe ground in that Molyneux was frequently called ‘the inventor of the god game’, and we’d all worked with him on the god genre before. So while **Black & White** was going to be different to anything we’d ever done, we were definitely the best people to do it.



“At this stage, the game was to feature battling wizards who would fire spells at each other across vast landscapes. These warrior wizards would be hugely powerful and they would feed off the people’s awe and belief in them to power the mighty energy blasts, along with all the other spellcraft they would use to fight with or undermine each other.

“The landscapes were to be big, hugely detailed and the wizards would be able to travel around them at will, carrying out good or evil tasks and vying for the support of the people under them.

“These wizards were so powerful that good or evil were simply different ways of playing the game. There would be no punishment for being evil. Molyneux kept reiterating that you would be able to do whatever you liked. Success or failure was to be more important than the concepts of goodness or badness.”



Concept art for the warrior character. This figure was dropped from the final **Black & White** game design.

More concept art for the warrior. An omnipotent divine entity eventually took his place...



As these ideas were batted around, night after night at Molyneux’s house during mid 1997, some things were clearly being mentioned again and again, and were getting defined as game features, even at this early stage. Mark Webley, who would soon become the project manager, remembers a couple of the concepts that everybody liked.



Black & White originally cast the player as a powerful warrior, wielding awesome magical spells in a bid for world domination. Concept art by Christian Bravery.



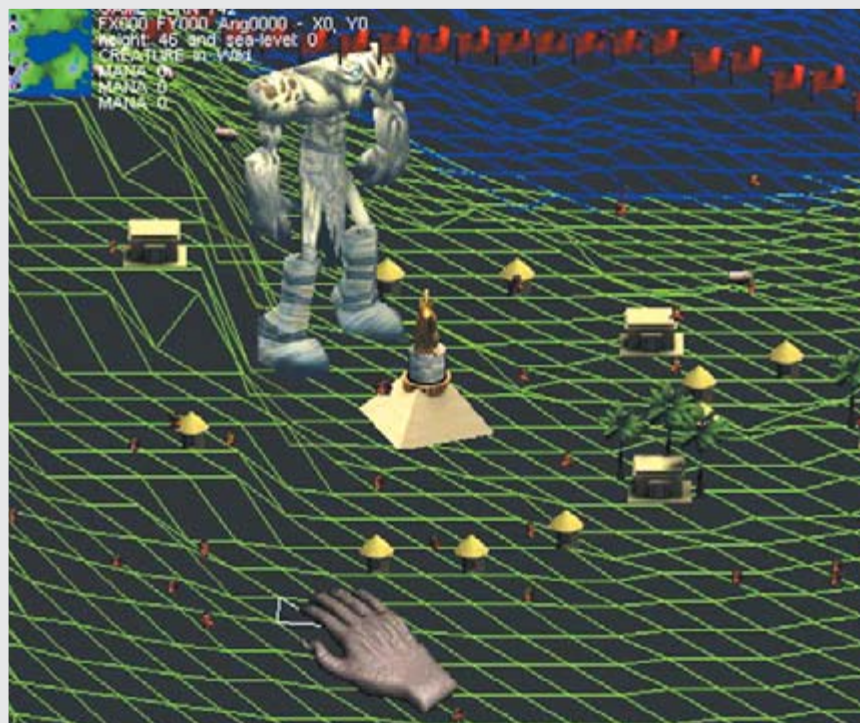


Concept artwork for a good Celtic human, by Christian Bravery. The tattoos shown here made it into the game—this creature did not.

“Although the wars between the wizards would be vital, and often hectic, we wanted the player to have to look after the people under their control. We wanted them to be more than just a resource. Even if you were evil, you couldn’t just treat them as a way of gaining power and nothing else.

“We also wanted to raise a creature. The idea started off with a discussion about wizardly powers. Steve Jackson is a man who knows all about magic, and he said that it would be good if you could cast a spell on any living creature, making it grow to a massive size and become your faithful servant. These beings would be called Titans.”

Jackson said, “Your Titan would do your bidding, but it would have a mind of its own, so would be more like a puppy dog which you had to train, than a robot which you ‘programmed’ and which would then do everything you asked it to do. We were keen on the idea that you could cast this spell on any living thing in the landscape; from an ant, to a human, to a bird, to an elephant.”



This cyclops was the first “creature” to make an appearance in Black & White, and survives in an evolved form in the final game as Sleg the ogre.

Mark Healey was now involved. He was an artist who had worked with Molyneux before, notably on **Dungeon Keeper**. He thought about the look of the gameworld and spoke at length to the team members about the sort of views the player would be able to access.

“For a long time, **Black & White** existed only in our heads,” Healey explained. “And it was pretty obvious to me that everybody’s inner vision was slightly different to everyone else’s. I decided to start doing some artwork and sketches to give the game a look and feel.

“But it was clear that this was an incredibly detailed world and rather than view it from one angle and one height, we were planning to give the player an unprecedented degree of control over where he or she goes.

“Molyneux wanted a god game in which you could be a part of the world. He wanted the holy grail of all games designers: limitless flexibility. With this would come the ability to get close enough to the landscape to see it through the eyes of the villagers to whom it is home. But in an instant he wanted to zoom out into the sky, above the clouds and into space.



The Alignment transformations for the creatures are planned out in this early sketch.

“One of the things I loved about **Dungeon Keeper** was the fact that you, as the all-powerful overlord, could dive from your aloof, far-off view and leap into the body of any of your minions to take control of it. You would see the dungeon you designed and created through their eyes. You would fight in it and navigate around it until you knew it as well as you knew your own house.

“We wanted the same for **Black & White**. In fact we wanted to go much further. Molyneux was keen to do away with panels of icons, mini-maps and buttons all over the screen. He wanted nothing to get between you and your world. As an artist, this filled me with joy. All computer game artists resent intrusion from the ‘real world’ in their creations. But the idea was also rather scary. One thing was certain; we’d need more artists. I designed an advert that ended up drawing a massive response from artists in the industry. We put in the words, ‘Working for Lionhead will ruin your life’ and we hadn’t a clue how true that would seem nearly three years later. But despite this warning, the response was incredible. That’s what happens when someone with Molyneux’s reputation starts a new company.”



Early visualisation—spellcasting in **Black & White**.





One of the people to respond to that advert was Christian Bravery. He'd been working as a 2D artist, drawing panels for 2000AD. He readily admits that he had very limited computer experience when he applied. And that he hadn't even heard of Molyneux.

Healey explains why Lionhead wanted Bravery. "We were hugely impressed by his drawing skill. You don't get your work in 2000AD if you're crap. But what we liked was the way he saw our vision for **Black & White**, and immediately started adding to it. And although he had no experience with computers, he'd spent the entire weekend prior to the interview without sleep, building and animating a futuristic hovercar, which was as good as something which would normally take a decent artist about a week to complete."

Lionhead was expanding fast, with another programmer, Paul Nettleton, already in place and writing a sprite editor. This was a tool that enabled the artists to draw and edit any of the moving characters in the game. It was just another way of getting ideas from their minds onto the screen.

“why would people choose a dim animal over a smart person for their earthly representative?”

Peter Molyneux,
creator of **Black & White**

An early concept drawing for the lion creature, by Christian Bravery.



“The thing about Lionhead at the start was that nothing at all existed,” Nettleton said. “With most companies there’s already a library of images, tools, data, engines and routines which you can call on to give you a head start. But a brand new company has none of this. I spent a long time writing my sprite editor while everybody else was busy writing other tools—and, basically, I ended up with an art package designed for this particular game. But if Lionhead had already written a game, we’d have happily used the sprite editor from that.”

“Having said this, it’s now clear that part of **Black & White**’s uniqueness is born of the fact that not only the game, but also the tools that made the game, were all created from scratch in the last three years. We wrote this product entirely from the ground up.”

But once the tools and routines started to work, the software side was beginning to catch up with the ideas. Molyneux and Barnes had started coding, and anyone in the office who had programming ability got to add to the two-dimensional test-bed. This was a simple chunk of code that enabled them to place objects and characters on a map and let them move around and interact with each other. Although it didn’t look like the game, it already held the seeds that would grow into **Black & White**.

Giant lizard creature concept art.



Every night there were discussions about the high concepts of the game, usually conducted over empty pizza boxes and involving mapped out squiggly drawings on A4 pads. One of the early creative casualties of this refining process was the idea of wizards.

“For a long time the idea remained that the player was going to take on the role of a wizard, battling against others,” explained Molyneux.

“As the scale of the game became apparent, though, we realised that no one human could wield such power. And also humans are often fragile and frail, even if they’re extremely good at magic-using. Also, humans can be judged by higher powers. We thought it would be better if you actually played a higher power. So we decided that you would have to be a god.



Concept art for the cyclops.



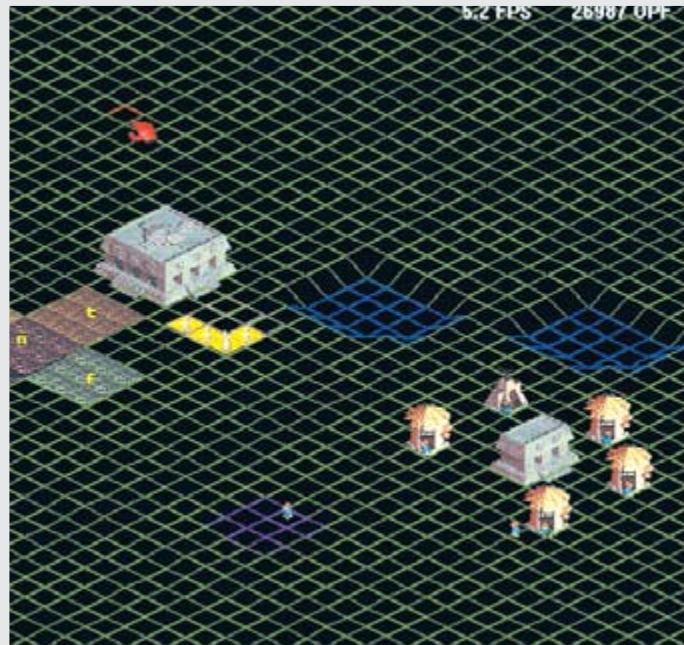


An idyllic Greek village in the dying light of the summer sun.

“Following this decision, nothing much would change as the game developed. The spells would become Miracles and the followers wouldn’t just support you, they’d worship you. You’d still have all that movement and control to enjoy, but now you’d be summoned by prayers and it would be the power of the worship of the many which would fuel your Miraculous abilities.

“Around this time there was another big change. We had to drop the idea that you could turn any living thing into a Titan. It was fraught with problems. For a start, if you chose a bird, you’d have an instant advantage over every other Titan, because you could fly.

“The other problem was that you could choose to turn any of your followers into a Titan. This included humans. But humans are clearly smarter than, say, sheep, so if you had a human Titan you’d expect it to learn more quickly and have a more developed personality than a ewe. However, this meant that the playing field would be extremely uneven. Why would people choose a dim animal over a smart person for their earthly representative?



This is the original form **Black & White** took: a 2D isometric view, featuring a grid landscape, sprite objects and little people. Notice the frame rate in the top right-hand corner—a snail-like five frames per second.



Concept art for the evil Black & White landscape, by Mark Healey. “This is how the world would end up if you were really nasty to your followers.”

“There was another Titan issue. And this one was worse. By this stage we were thinking about ways to control your representative, your Titan, in the game, and the idea that got the most votes was stroking and slapping. But with the current ideas it was clear that you could find yourself slapping a man or woman around. Although most games contain violence—and **Black & White** is no exception—we were uncomfortable with the idea of slapping a 50-foot woman to teach her not to do something. And when head of art, Paul McLaughlin, pointed out that all the Titans were nude, we decided that the idea of choosing any living thing just had to go.”



Early on, the settlements were more spread out. However, it was soon decided that more closely-packed villages looked better, and created a bustling feel.





So the problems of simplifying the game were already being addressed. Molyneux had repeatedly stressed that he didn't want icon panels and maps, yet the player was to be able to do so much with the world. A mechanism was needed.

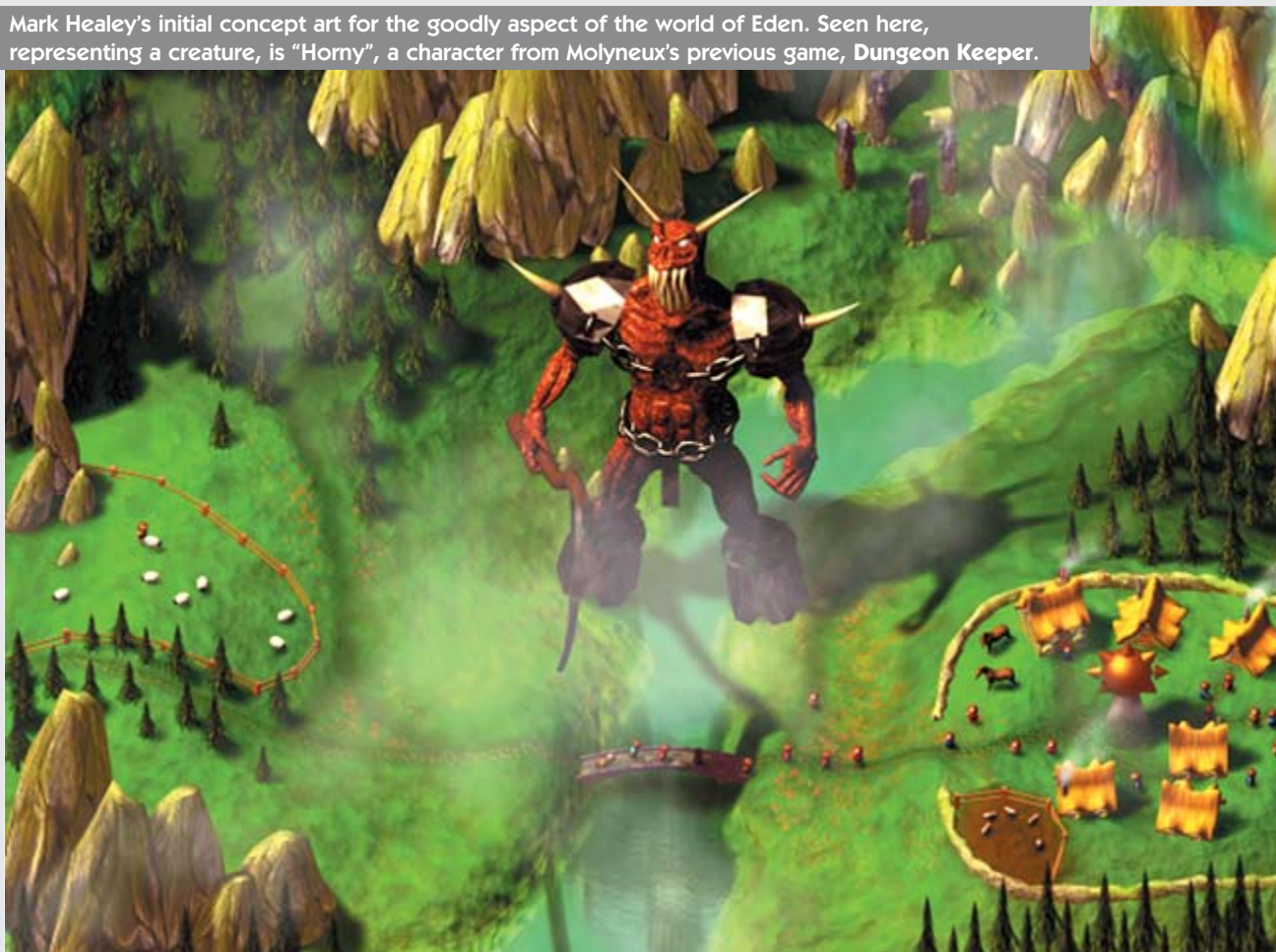
Artist Mark Healey was the first to start jotting down sketches of a godly hand that could be used to interact with the world, because he had worked on **Dungeon Keeper**. It wasn't a huge jump to see how the hand in that game, which the player employed to control the hordes of evil minions in his lair, grew into the godly appendage here.

"I wanted the hand to look more human than godly. You are the player and it's your hand you're looking at. Also I wanted it to work like a proper hand and to wiggle the fingers when you hover it above something you can pick up.

“we had to massively advance the idea of animation blending”

Scawen Roberts, 3D programmer

Mark Healey's initial concept art for the goodly aspect of the world of Eden. Seen here, representing a creature, is "Horny", a character from Molyneux's previous game, **Dungeon Keeper**.



Here's a screenshot from an early test-bed version of *Black & White*, showing the prototype 3D hand. To the left is the citadel, and the “creature training pens”. Each one was to have a specific role, sleep pen, training pen, torture pen, etc.—these were dropped as the game developed.

“If we'd gone for some weirdly glowing thing, it would've got annoying to look at, and you wouldn't have the ease-of-use affinity with it that you have now. One thing I am pleased with is the fact that if your Alignment is evil, your hand turns red and scaly. It implies that your entire appearance has become demonic. Although, of course, you never really see yourself. There are no mirrors in Eden.”

Programmer Scawen Roberts, another new recruit at this time, was given the task of animating and morphing the hand. He was determined to create something never seen before.

Roberts described the process: “We had to massively advance the idea of animation blending. The way the hand moves, the way it has mass and inertia, and the way the fingers move are all results of our proprietary animation blending technology.”



The hand. The control interface for *Black & White*.

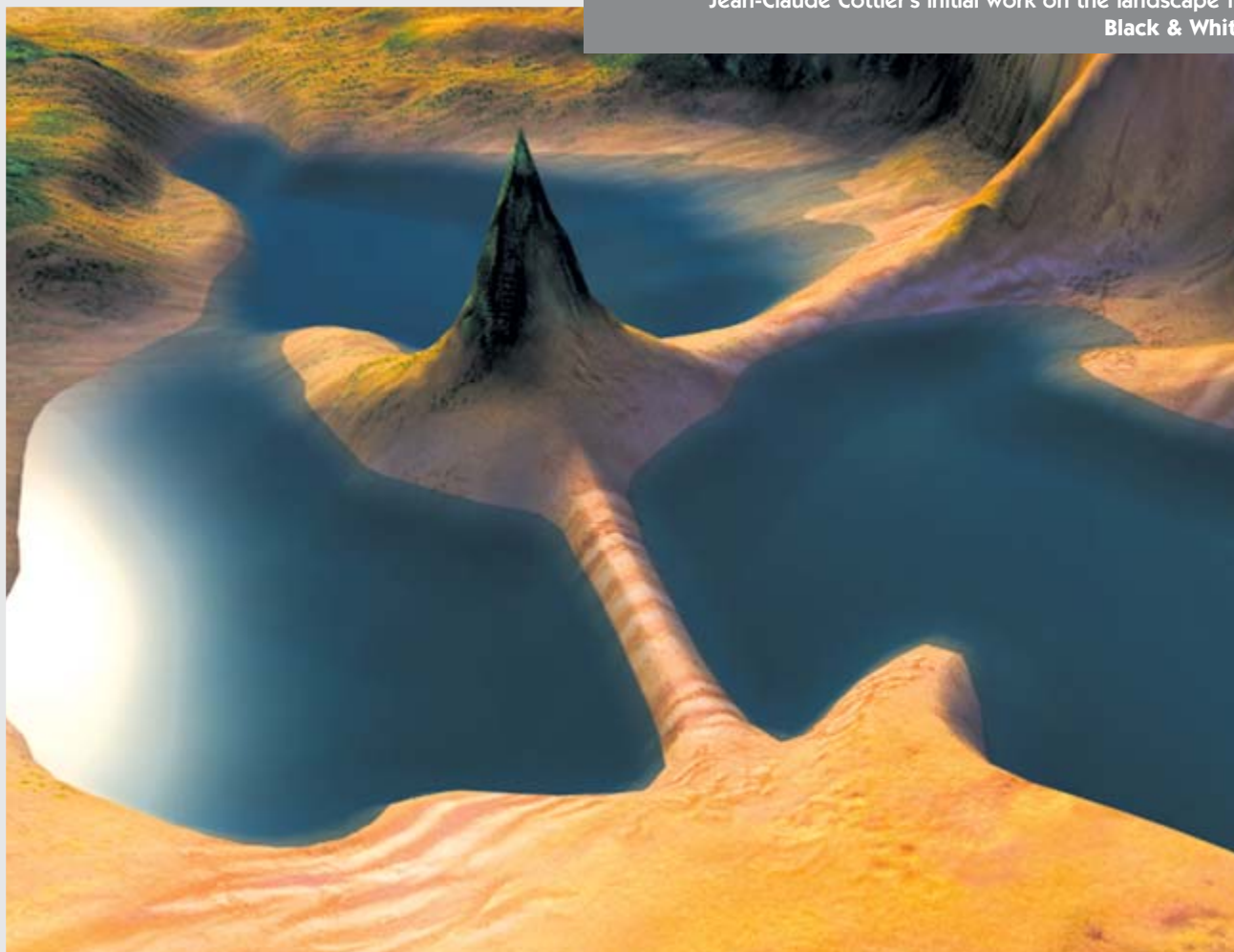
“It's fair to say that we have done more in the field of animation blending than anyone else to date. It gave us flexibility and added a huge amount to the characters and the hand in the game.”

And, what's more, after a quick discussion, it was decided that it would be unfair to discriminate against southpaws, and an option was added to provide a left-handed hand in the game.

“Not only could the hand do obviously hand-type things, like picking things up,” Roberts explained, “but it would also be a useful way to move. We realised that you could grab the landscape and pull yourself around. After this breakthrough, it was easy to add the other movements, like double-clicking somewhere to go straight there.”



Jean-Claude Cottier's initial work on the landscape for **Black & White**.



The hand would actually provide a moment in the game's development that would go down in Lionhead history. The Mayor of Guildford, keen to show he was on the ball with the latest technological advances, arranged a visit to the company. Expensive new china was bought, and a selection of biscuits and teas from around the world specially prepared. As Molyneux got more and more involved in describing the game, the Mayor looked increasingly parched, but politely said nothing.

Three hours later, the tea was cold and all the biscuits had been eaten by the team. The Mayor, who hadn't once been offered food or drink, was shown the final feature—Mark Healey's work on the hand.

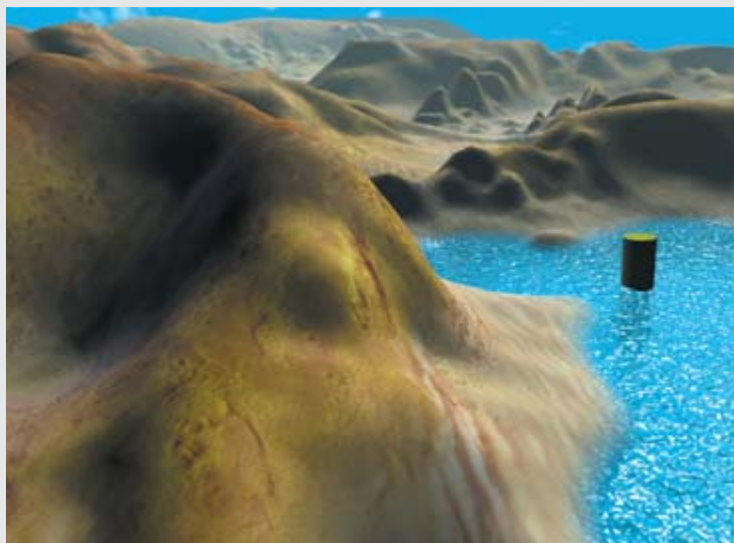
Healey, in the meantime, had stuck two old wires in a disgusting old woollen glove that he'd found under his desk. The other ends of the wires were poked into the floppy disk drive on his computer. As the Mayor watched, Molyneux, having suddenly understood what was going on, was forced to describe how the hand on screen mimicked the real movements of the electronic glove. Meanwhile, Healey's other hand, hidden from view, moved the mouse that actually controlled the hand.

The Mayor, impressed (but hungry and thirsty) left soon afterwards, his head full of the wonders of modern technology.

The hand was, glove or not, a huge success. But it was another recent Lionhead staff member, the head of music and sound, Russell Shaw, who came up with the idea of using Gestures. “The idea was that you could summon up any of your Miracles by using the hand to draw a special shape on the ground. Depending on the shape you trace, the Miracle would appear in your hand, ready to cast. Again, you wouldn’t need to click on a panel or select a Miracle from a list. And to cast several different Miracles, one after the other, would take a certain degree of skill, which fitted in with the game’s ethos.”



Concept design for the evil citadel, by Mark Healey.

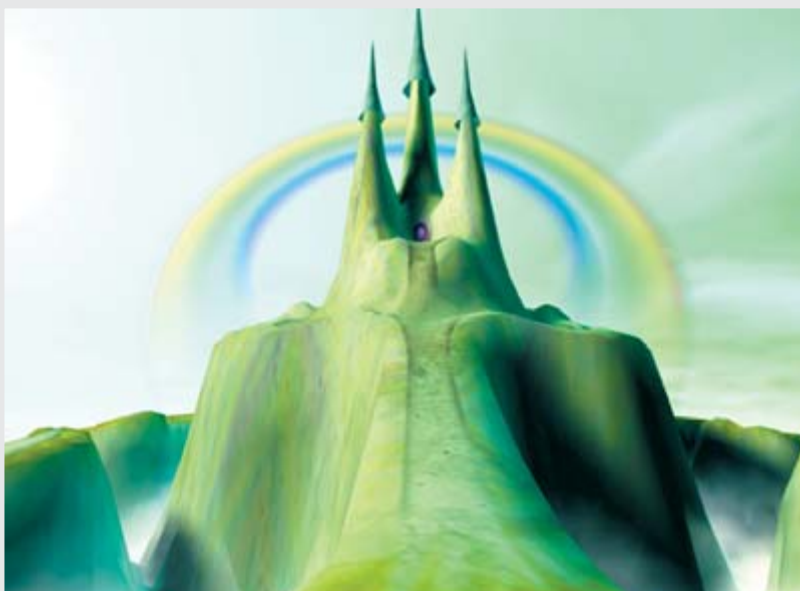


Mark Healey’s initial concept for the goodly citadel, or Temple as it would later be known.

An object placed in the sea shows the introduction of reflections in water.

“As soon as Russ mentioned the Gesture system,” remembers programmer Jonty Barnes, “I leaped on the idea and wrote a shape recognition program. But it proved more difficult to implement than we thought at first. You had to be able to draw on a 3D landscape, some shapes were a sub-shape of other shapes—so you had to be able to draw at any angle and direction—and drawing styles were an issue.

“My first implementation was therefore a little complex. We thought it’d be a great idea to record the speed the shape was drawn, how close to the desired shape the player drew, and the angle it was drawn at compared to the perfect representation. But what was meant as an interface shortcut soon became an art, and in god warfare it seemed wrong that you had to slow down to draw a shape before rushing off again to attack your opponents. After a time, we decided to make the Gesture system easier, not more challenging, and used simpler patterns instead. Luckily, it worked a treat.”





The village takes shape and contains a full complement of different buildings.

“...the truth is the world of
black & white is a binary
star system!

Jean-Claude Cottier, 3D programmer

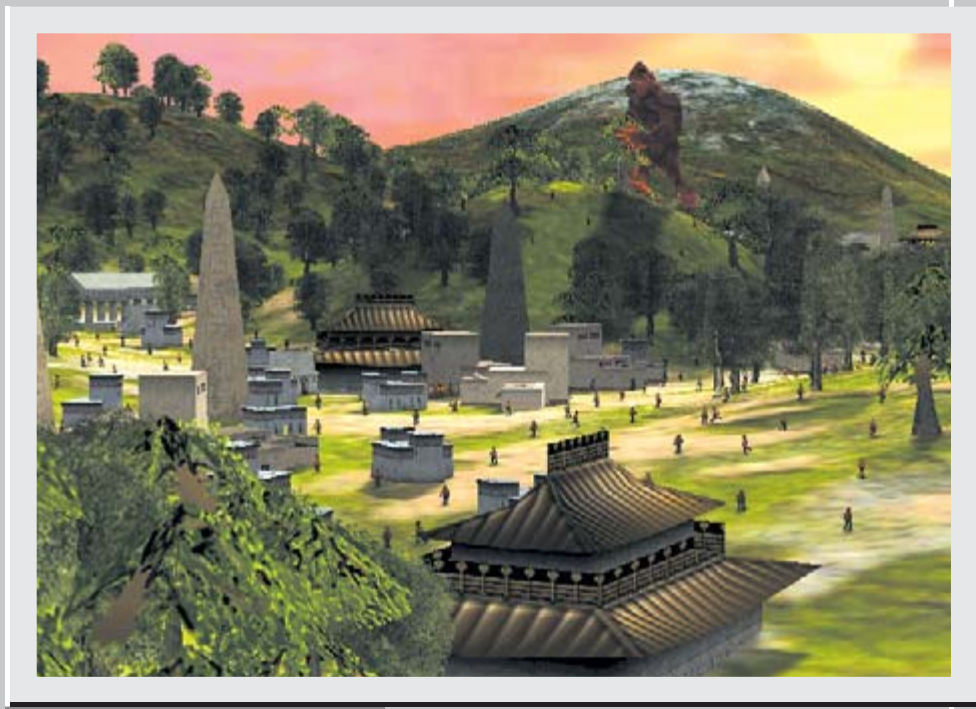
By this point, Lionhead had outgrown the back wing of Molyneux's house and had migrated up the A3 to Guildford's Surrey Research Park. It had once been the location of Bullfrog Productions, and for many of the ex-Bullfrog employees now part of Lionhead, it was a little like coming home.

The art team was now almost at full strength. Paul McLaughlin, Mark Healey, Andy Bass and Christian Bravery were all busy creating landscapes, objects, buildings and characters. Two 3D programmer additions to the team, Jean-Claude Cottier and Alex Evans, concentrated on developing the game and creating the technologies needed for such an ambitious project. They encompassed the spirit of a company which refused to have a proper staff employment plan, but instead worked on the premise that when a vacancy was obvious, they'd find the best person to fill it.

Jamie Durrant had already been taken on, and he immediately transformed a blank space on the Internet to a multiple-award-winning Website. His artistic skills and his technical ability were used to the full, and when the site became feted by the Web world, it only spurred Jamie to add more and go further. He created Lionhead's on-line community, with discussion groups, hints, images, advice about Lionhead and how to join, as well as covering **Black & White** in as much detail as existed at the time. During the entire length of the project, he somehow managed to act as Webmaster, as well as do all his other tasks.

Jonty Barnes was partly organising the big recruitment drive: “We had an unofficial way of doing things. We'd take on as much as we could handle and, when there physically weren't enough hours in the day to do all our tasks, we'd suggest that another person should be hired. If we all agreed, an advert would go out and we'd vet the applicants. In a surprising number of cases, one would stand out and we wouldn't waste time—they'd be hired almost there and then.”

The programmers Giles Jermy, a graduate in mathematics, and another maths genius, Richard Evans, holder of a masters in artificial intelligence, were all taken on in this fashion. Each would have a specific role to play, but the nature of the project was such that these would often blur and overlap.



The tribal differences are reflected clearly in the buildings each tribe constructs.

Evans mentions how it worked: “I was taken on to work with Peter on the villagers. We decided to have eight tribes, each with a different look and style, and each with different attributes. Peter had coded a great deal of the villager artificial intelligence, but, in a rare moment of fallibility, he'd realised that there was too much for him to do if he wanted to be demoing **Black & White** to people, making decisions about the game and making decisions about Lionhead and the future.

The first 3D lion gets to stalk among the buildings. It was a good test of scale—and gave a strong idea of how the creatures would interact with the complex settlements.



“He was thinking a lot about the creatures in the game. He knew that they would be able to demonstrate ground-breaking artificial intelligence, but he didn't want this to show up the villagers, who would look stupid in comparison. So together we devised a system of desires, whereby each villager has his or her own set of wants, likes, dislikes and preferences. These are variables, which slide up and down depending on whether they're fulfilled or whether something more important replaces them.

“For example, a villager might want to start a family. Fair enough. But if the food runs out, the same villager forgets about procreation and simply wants something to eat. If a 60-foot bear crashes through the village and eats some of that villager's friends and family, the villager forgets about being hungry and cries out for divine protection.





At the smallest level, your divine hand lingers inquisitively over an apple, complete with wriggling worm.

“Out of this came the idea of worship and the variables which govern how your people think about you. We found that it naturally worked like this; if you, as a god, look after your people, harvesting their crops, giving them trees for timber and saving them from disaster, they get used to being pampered and will become lazy. They’ll relax, not bother to worship you, and won’t look after their village. You might be a good god, but it won’t win you the respect and worship you’d expect.

“But if you fling them around, killing some and terrifying the rest, they’ll do all they can to simply stay alive and keep you happy. They’ll work as hard as they can, and will worship you out of terror. You might get a greater result from a few minutes of evil than from hours of goodness.”

So now the elements that would make this a proper game were drawing together. The size of the world of **Black & White** still wasn’t set, but it was getting a look all of its own. The original style was a cross between *The Lord of The Rings* and the countryside of South-East England. But with more art resources directed at it, the look improved until eventually it settled on the six lands the game ended up with.



Thanks to Jean-Claude Cottier’s 3D optimization technology, the player can seamlessly zoom from a close-up micro-view of objects (top left), through to a bird’s-eye macro-view of the entire game world (top right).



“there are no mirrors in eden”



From this lofty viewpoint, the entire **Black & White** landscape falls under your all-powerful gaze.



Jean-Claude Cottier, who had arrived from France with a head full of ideas, now began work on the 3D world. The challenge was making a world that worked when viewed from space and when examined in extreme close-up.

“Once Peter saw the ideas I was working on, he realised the power of the engine and he asked me if I’d do something specifically for him,” remembers Cottier. “Outside the Village Store, which we were then calling the Storage Pit, he wanted a barrel. On the barrel, he wanted an apple. And poking out of the apple, waving its little head around, he wanted a worm.”





“With Paul McLaughlin’s help, this got drawn and I put it into the game. And, sure enough, a little while later I watched Peter demonstrating the game to someone. He showed the worm wriggling in the apple, then, in one move of the mouse, he zoomed back out until the whole land was in view. He zipped upwards through the clouds and stopped on the edge of space. Below, you could still see the tiny island, which contained the Village, the apple and the worm. For a long time, while the game itself was being coded and new features were being added, the close-up of the worm and the view from space was his famous party piece.



A village placed in the original 3D landscape.

Black & White’s first textured 3D landscape.



“Also, one of the things I did—this time towards the end of development—was carry out several improvements. A problem, which bugged me a great deal, was the fact that the sun disappeared nicely behind the landscape, but shone right through buildings, the creature and other objects. It looked awful!

“To solve it, I had to delve into the Z-Buffer. This is a part of the game code that stores how far away things are from each other. In actual fact, the sun in **Black & White** is two suns, one drawn on the sky, the other drawn in front of everything else! That’s why the light was shining ‘through’ certain objects.

“I altered the game so that it consults the Z-Buffer and calculates that, if the distance from the front of the sun to the sun in the sky is ever reduced, an object must be between them. I then turned the front sun off.

“It doesn’t look like it, but the truth is that the world of **Black & White** is a binary star system!”

Interest in **Black & White** was increasing with every day. It wasn't always exactly what the team expected, though. Some time earlier, the Episode of the Italian occurred. One day, the buzzer in reception sounded and a young man entered, dishevelled after what must have been a long journey. “Where do I sit?” he asked. There was a degree of consternation about this. Was he a journalist or someone's friend, invited to view the game?

“I'm here to start work,” the Italian continued, in shattered English.

Webley spoke up: “But we've got no job vacancies at the moment. And we haven't offered you a position. Actually, we don't even know who you are.”

The Italian stepped forward. “I'm Giovanni. I sent Peter an e-mail saying I could start work today.” Slowly, the truth came out. He had e-mailed, but Molyneux gets so many requests of this sort, he doesn't respond to them, but passes them on. Clearly this guy thought he'd have a job on the back of one hopefully-sent mail.

Molyneux hastily convened a meeting in the boardroom. “This is fate. He was clearly sent by the gods. I say, rather than send him away immediately, we vote on whether or not to take him on full-time.”

Giovanni lost the vote overwhelmingly. It turned out that he'd spent all his savings getting to Guildford, and was so confident that he'd secured a job, he'd only booked a one-way ticket. Luckily, there was some money in a kitty left over from a company card game that nobody had won, so this was donated to him.

Giovanni left, looking crushed, for the station.



Early concept design for a fisherman.





“ a 100
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“a 100-ton cow doing the splits”



Concept painting of the lion creature, by Christian Bravery.





The creatures were always going to play a big part in the game, and Christian Bravery set to work designing their look and form. He spoke about the detailed processes involved: “Creating the creatures for **Black & White** was a terrific opportunity, and a major challenge. I was hugely excited about it and immediately began by producing a large quantity of development drawings to get a feel for the way we wanted the creatures to look.

“In **black & white**, the creatures were to develop their own identities through the course of the game”

Christian Bravery, artist



Concept design for the evil lion creature, by artist Christian Bravery. Lionhead was eager to make the creatures as interesting and compelling as possible.

“a 100-ton cow doing the splits”

A render of an early 3D version of the lion.



Concept art for neutral lion, by Christian Bravery.

“It was decided early on that they should be based on real animals, rather than fantasy or mythical beasts. Of course, the choice was enormous, and it was crucial we select the ones best suited to the feel we wanted for the game overall. A mixture of benign and aggressive animals was called for, to offer the player a wide variety of choices, so that everyone could choose the creature they felt best suited them.





Tiger concept art, by Christian Bravery. This creature is one of the three that the player must choose from at the start of *Black & White*.

“After much deliberation, we decided to go ahead with the anthropomorphised bipedal animals that we felt were shaping up best in the design sketches. Their resemblance to the human form conjured up the necessary sense of empathy, and ultimate believability in their potential for sentience. In addition to this, technical constraints meant that bipedal creatures would provide greater flexibility for both animation purposes and the unique game dynamics of **Black & White**.”



This cyclops was an early creature in **Black & White**. He survives in a different guise in the final game.



Early concept art for another creature.





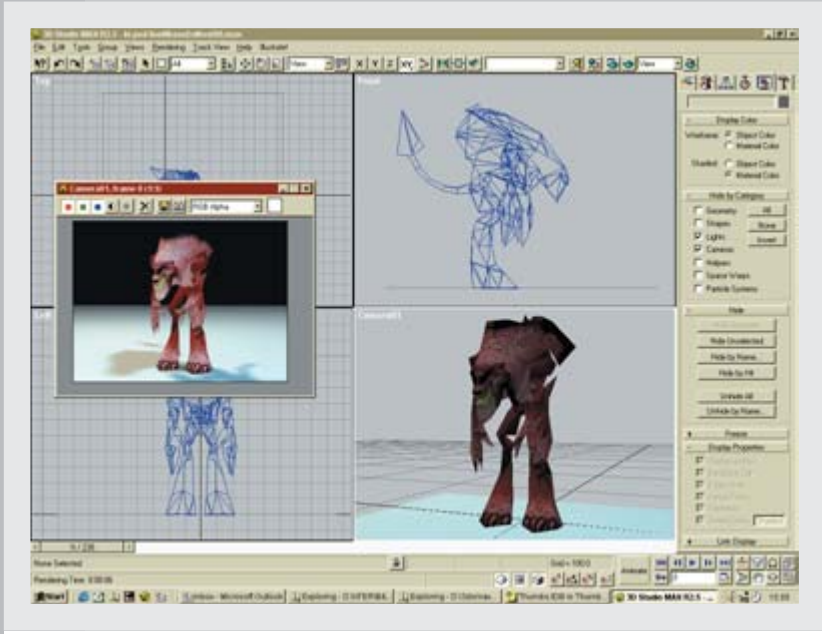
“Fittingly, the lion creature was built as a prototype for the game proper. The wire-frame mesh was constructed in 3D Studio Max using the design drawings as a reference. Once the basic model was built, the large, detailed textures—the skin of the creature—were painted in Adobe Photoshop. We used two texture pages for the basic creature, each page reduced to a square of 256 x 256 pixels. This is small, but memory constraints dictated the size. The more complex the graphics, the lower the frame rate in the final game, and a high frame rate is of paramount importance. We then applied these textures to the model.

“Finally, a skeleton was added. This is used by the animator as a tool to bring movement and life to the model, and acts very much like a human skeleton. You animate the ‘bones’ of the arm, hand and fingers, and so on, and the creature mesh follows suit.

The lion creature in his good manifestation—here showing mesh and textures.



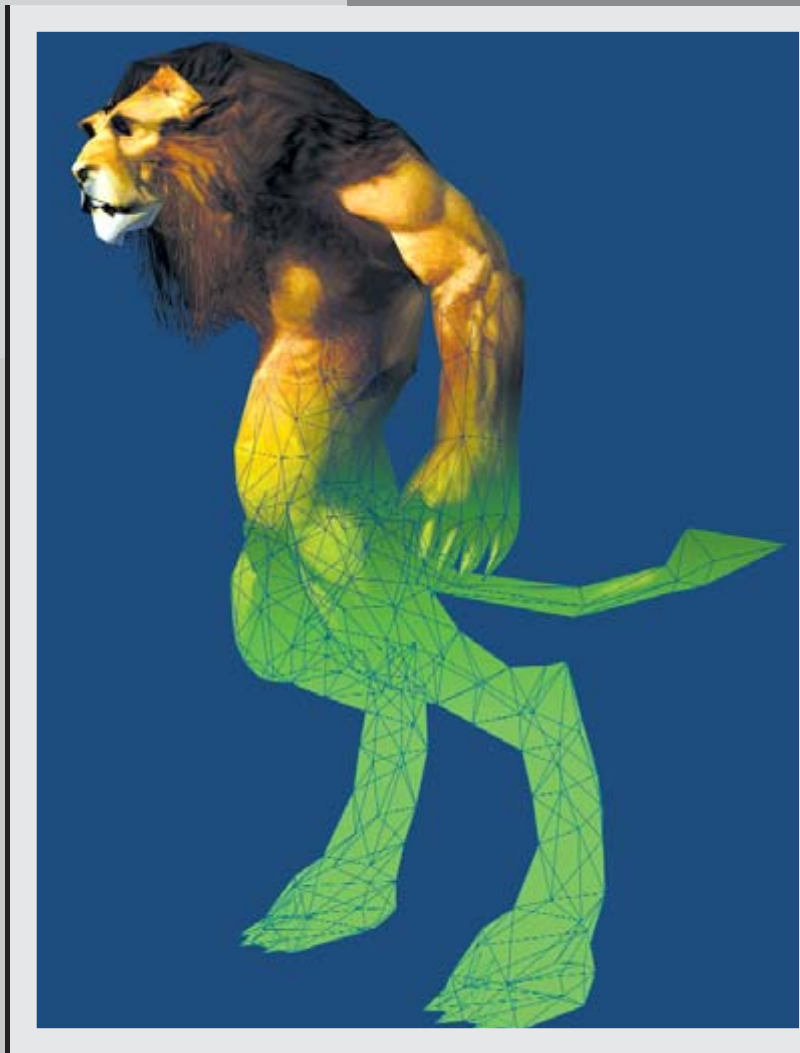
This render of the evil lion model highlights its wire-frame structure.



A 3D Studio Max screen showing an early concept model for the evil lion creature.

“The prospect of creating a set of creatures that could morph between good and evil, as well as through various body shapes linked to diet and activity, was exciting, but also presented us with a unique problem. Normally when producing designs for a new character, you generally have some idea of their nature and personality. In **Black & White**, however, the creatures develop their own identities through the course of the game, through interaction with the world and the player. This meant that we had to come up with base characters, neutral in every way. Once we’d designed the neutral base creatures—the raw material, as it were—we could develop the other variations. Evil was, of course, the most fun and therefore the easiest to get right. The good guise, however, was more problematic. We finally solved things by adopting a distinctive cuddly look.

The neutral lion, by Christian Bravery.



“Transforming the basic neutral creature, using a fine blend of good, evil, fat, thin, strong, weak characteristics, according to his lifestyle and alignments, was a huge challenge for us, especially for the programmers working on the creature morphing, animation and physics. In the end, each one was constructed from seven discrete meshes and three separate texture sets. This set-up enables a vast range of subtle variation for each creature, with all transformations triggered by his behaviour and the actions of the player.





The texture pages used for the tiger in his evil state.



The skeleton of the evil lion. This bones system is used to animate the creatures in **Black & White**.



Profile of the tiger, showing texture map and wire-frame.

“Achieving a real sense of the scale of the creatures was a high priority for us, and a lot of work was done to get that right. In **Black & White**, the creatures don't just scale-up, they actually grow bigger. Baby creatures display the same proportions as a real infant, while the largest giants have enormous barrel chests and weighty limbs, but proportionately small heads, to emphasise their huge stature.



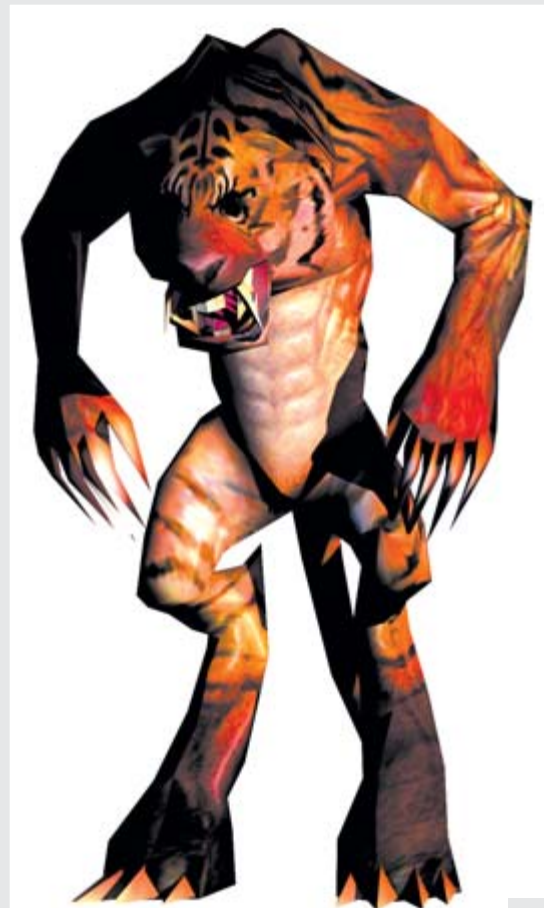
Evil tiger mesh.



Evil tiger: flat-shaded model.

“Bringing the creatures to life in the game was the final hurdle to leap; they had to be as realistic and believable as possible: living, breathing emotional individuals. In order to elicit the desired response from the player, the parental feelings we hoped to inspire, the creatures had to express a wide range of emotions. These emotional responses to and from the creatures were crucial to developing a bond between the player and his pet. A lot of work was done to get this right; to create the appropriate response in a given situation.”

Evil tiger: fully texture-mapped.



Bravery also turned his artistic attention to the eyes, traditionally the windows to any creature’s soul. “Originally, the creature’s eyes were just painted on the texture. But this was always an unsatisfactory solution. As a late addition to the creatures, we built new eyes from separate geometry that pivot independently to focus on the creature’s current point of interest. This really serves to bring the creatures to life.

“The eyes were added using the in-game creature editor, once the finished creature had been imported into the game. Full physics hair was also added, where appropriate, using this editor. It also helped to set up contact points for the fighting, as well as test animations on the various creature morphs.

“All this resulted in the potential for a huge array of unique creatures in the game. No two will be exactly alike.”

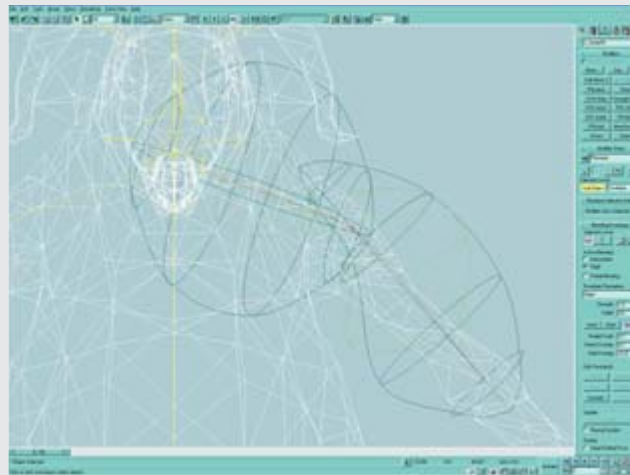




“Eric then made the break-dancing tiger, and we were pleased to see a screen of seven dancing creatures”

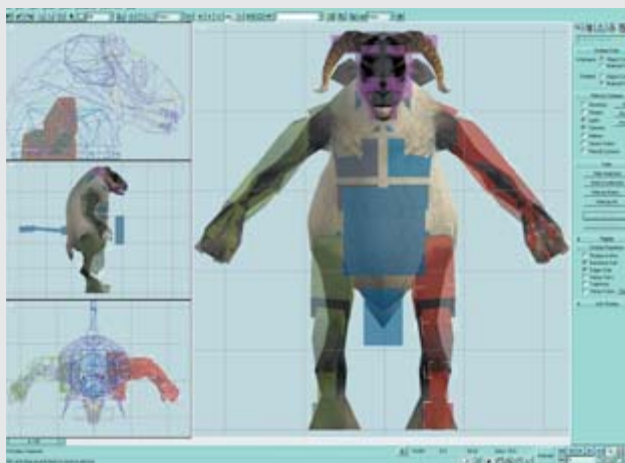
Scawen Roberts, 3D programmer

At this point, Scawen Roberts took over the story of the creatures. “When I arrived, it was straight down to work with Alex Evans and Jean-Claude Cottier, to start experimenting to see what we could achieve with a three-dimensional being from **Black & White**, which needed the ability to change radically from a totally evil-looking entity (usually crooked and bent over) all the way up to a noble, graceful creature (with a more upright stance). It would need to be able to change completely in appearance, even growing horns as it became more evil, and changing colour. In addition, it needed to get fat or thin, strong or weak, depending on its eating habits and exercise regime.



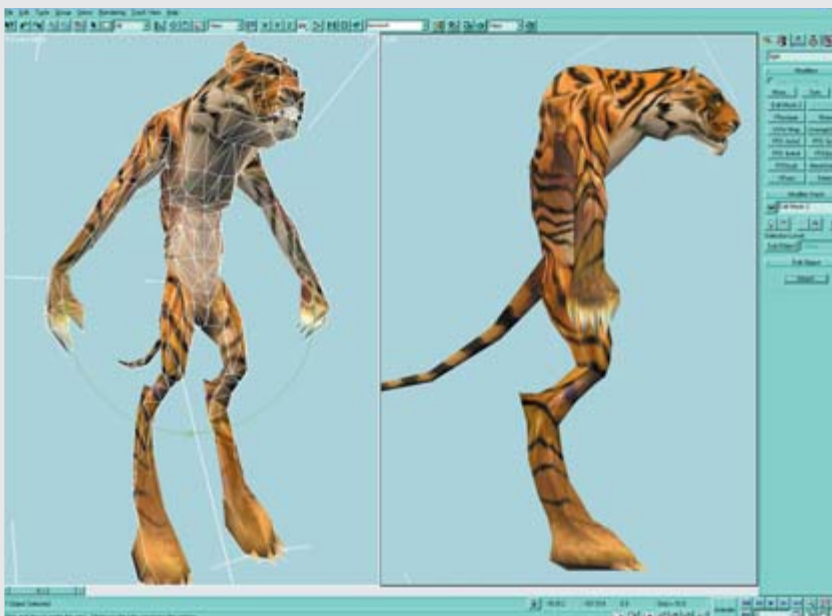
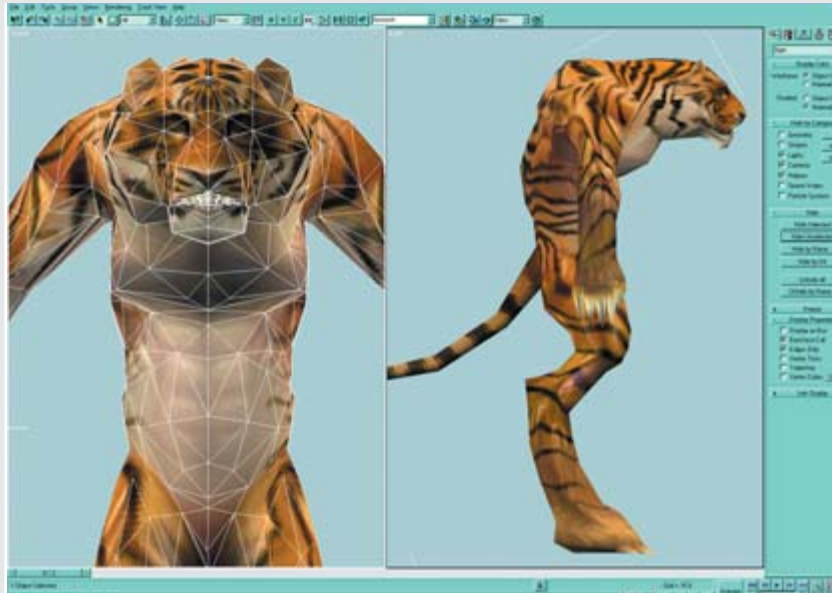
The Sheep mesh during the boning stage of development. The creature mesh is linked to the underlying skeleton by adjusting the large spheres of influence shown.

Sheep creature in 3D Studio Max, showing the animal's Studio skeleton.



“Alex immediately made an exporter, so that we could export 3D models and animations created in 3D Studio Max, while Jean-Claude set up the boned drawing system for the creatures. I made a program that could import the exported animations and run them smoothly on the original lion creature, created by Christian Bravery. The next stage was to load up an evil, neutral and good version of a creature, with the same number of vertices and the texture map lined up so that it could morph correctly, then write some code to interpolate linearly between the extreme and neutral incarnations, while doing a linear colour blend on the texture maps. And, finally, a system to create a blended animation between two very similar animations. Needless to say, we were delighted to see the first morphing lion, playing an animation continuously while we rapidly changed the creature from evil, through neutral, to good and back again.

Various tiger realisations in 3D Studio Max, showing wire-frame and texture.





the making of black & white

“The current system has a two-way blend on the animations: one way for the major good-evil morph and another way for the thin-fat morph, mainly to help deal with extremely fat creatures, which may have to walk and animate with their arms sticking out further than normal. There is some flexibility in the way the animation can change from evil to good, too. So, for example, the good ape creature (created and initially animated by Mark Healey) scratches his neck if he’s itchy, whereas the evil ape tends to scratch his groin.

“There were never going to be very many creatures active on one map at any one time. This meant that we were able to use a fair amount of precious CPU time to run many animations and blended animations at the same time on a single creature.



The artists used the creature editor tool to test the creatures' characteristics, like morphing, scaling, eye positions, etc.



“We felt that we could achieve a less wooden appearance than we’ve seen in many computer games by playing more than one animation at a time on one creature. The most interesting example of this is the look animations. The idea is that the creature is always staring at something, so his head will rarely be looking straight on. We didn’t know how good the result would be, but we took the approach of animating the body for his main animation, and after that applying a left-right look animation and an up-down animation on top of the existing position. We were pleased with the results and the look animations are certainly a major help with the realism of the creature. A similar technique was later used for facial expressions and simple animations, such as nodding or shaking of the head.

“a 100-ton cow doing the splits”



This sequence shows the lion morphing into its evil incarnation, complete with huge incisors, harsh-coloured skin and threatening posture.

“The creature code continued its development, while the artists created more creatures for the system. Eric Bailey had joined the company by this point, and took over all the creature animation. Although initially slightly shocked at the prospect of his first task—animating a giant two-legged cow created by Paul McLaughlin—Bailey soon impressed Lionhead with incredible animations, such as the 100-ton cow doing the splits or vomiting its guts out. Then he went on to animate some of the human creatures, which were very funny to watch: an enormous human who appeared to have lost half his brain somewhere, because Richard’s excellent AI was at the time unable to produce totally realistic human behaviour! The point I’m making is that it’s much harder to make a human look real, for artists or programmers, because we as humans are so good at picking out anything that looks at all strange.

“The fighting system was started at about this time, and Eric’s great spinning martial arts attacks began to put strain on my animation system that was at the time based on Euler angles. This was changed to a matrix interpolation system, which could better handle interpolation between any positions. Eric then revealed the break-dancing tiger, and we were pleased to see a screen of seven dancing creatures, proving that the system was flexible and usable.”





Richard Evans was now immersed in the artificial intelligence of the creature: “Our aim was simple: we wanted him to be plausible, useful, malleable and loveable,” Evans said.

“To make him plausible, we took a long, hard look at what it is to be a person, and tried to implement as much of that as we possibly could. Creatures have desires, basic physical urges, like hunger and tiredness, and also more interesting goals, like altruism, destructiveness, friendliness and playfulness.

“Creatures also have beliefs: they obey the basic requirements of Epistemic Verisimilitude—in other words, they only have informational access to things they can actually perceive.

“you can
even toilet
train him to
only poo on
enemy
towns”

Richard Evans, AI



“a 100-ton cow doing the splits”





This tortoise looks apprehensively toward a nearby enemy temple. "We tried to get as much life and expression as possible into the creatures for **Black & White**, more so than any other game had attempted previously," explains Eric Bailey, animator.

"We made your creature useful by enabling him to perform a variety of possible actions: he can pick things up, for instance, as well as drop or throw objects, so he can move resources around. He can also cast all the spells the player can, enabling him to water fields, magically create resources for villagers, use spells to heal himself and put out fires, attack aggressors, etc.

"We made him malleable by enabling him to acquire skills in a variety of ways. He can learn how to do things by watching the player or sometimes the villagers. As well as learning how to do things by himself, you can also train your creature to be greedy or abstemious, lazy or hard-working. You can even encourage him to be aggressive or altruistic, or just plain silly. It's up to you.



Achieving an appropriate sense of scale was one of the defining goals set during the development of **Black & White**.

"Furthermore, you can teach your creature what sort of thing you want him to be altruistic towards, or what sort of thing you want him to be aggressive towards. You can even toilet train him to only poo on enemy towns. These different types of learning are implemented in different ways: learning how to perform specific actions is straightforward. We just store how many times the creature has seen someone perform that action, and how many times he has attempted and failed to perform that action.



"Reflection mapping on the creature eyes helps to bring them to life," says Alex Evans, 3D programmer.



The evil tiger checks out his look point. At night, a glow around the player's hand illuminates the local area. Here, the tiger is lit from the direction of the hand in the bottom left-hand corner of the screen.

“Learning which desires to have on which occasion is implemented by perception training. Learning which types of objects are most suitable for certain desires was implemented by building up decision trees which minimise the entropy in the player feedback, based on the IDE system of Quinlan (1990). The most difficult thing was to make him lovable. We wanted our player to empathise with his creature, but how? We soon realised that empathy is intrinsically a reciprocal kind of notion: the reason it is foolish or childish to empathise with your teddy bear is precisely because your teddy bear cannot empathise with you.

“So in order to build up some sort of empathic bond with your creature, we realised that we had to enable him to build some sort of special empathic bond with you. So the creatures spend a large part of their computation trying to work out what you, the player, are thinking, and attempting to join in.

“Each creature has a mental model of his master; this includes information about what the player has been trying to do, which goals the creature thinks the player has been trying to accomplish, whether the player has been ignoring his creature, and whether the player has been kind to him or not. A large part of the overall effect of the creature is then down to the quality and variety and flexibility of the many animations.”

This evil tiger grins mischievously after dropping a large steamer on the centre of an enemy settlement. “The creatures are so realistic, they even poo in a manner which fits their personality,” says Lionhead artist Mark Healey.





Eric Bailey's animation skills were exactly what **Black & White** needed; he took the creatures, the people and the advisors, and made them come alive.

Bailey explained his methods: "I took a lot of inspiration from the original drawings of the creatures. The way they stood and the way they looked. The lion was always going to prowl, so it was just a case of working out the individual movements and putting them into a flowing motion. The cow had a gait like a fat old woman, and the turtle was always going to lumber around, as turtles do. Each character has a skeleton underneath it, and I worked out the basic animation using those. Then, when the look and feel was right, I fine-tuned the position of the hands, feet and head to enhance the effect."

“The cow had a gait like a fat old woman...”

Eric Bailey, animator



Impressing the little villagers is one of the player's main tasks—having a 40-metre tall extrovert for a pet really helps.

“a 100-ton cow doing the splits”



Scawen Roberts' route-planning guides the creature seamlessly through a maze of in-game objects and landscape features. Here, the ape makes his way through town.

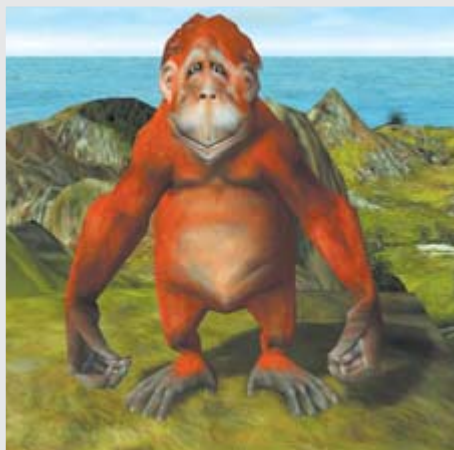
The ape was a huge favourite around the office. Making the player/creature interaction rewarding was the job of AI programmer Richard Evans.



The ape examines a look point marker. This gadget is part of the creature editor tool and enables the artists to check that a creature's animation blending is working correctly.



Isn't he cute?



The route-planning system was crucial to the usefulness of the creatures. If you had to lead them round by the hand all the time, they would've been useless.

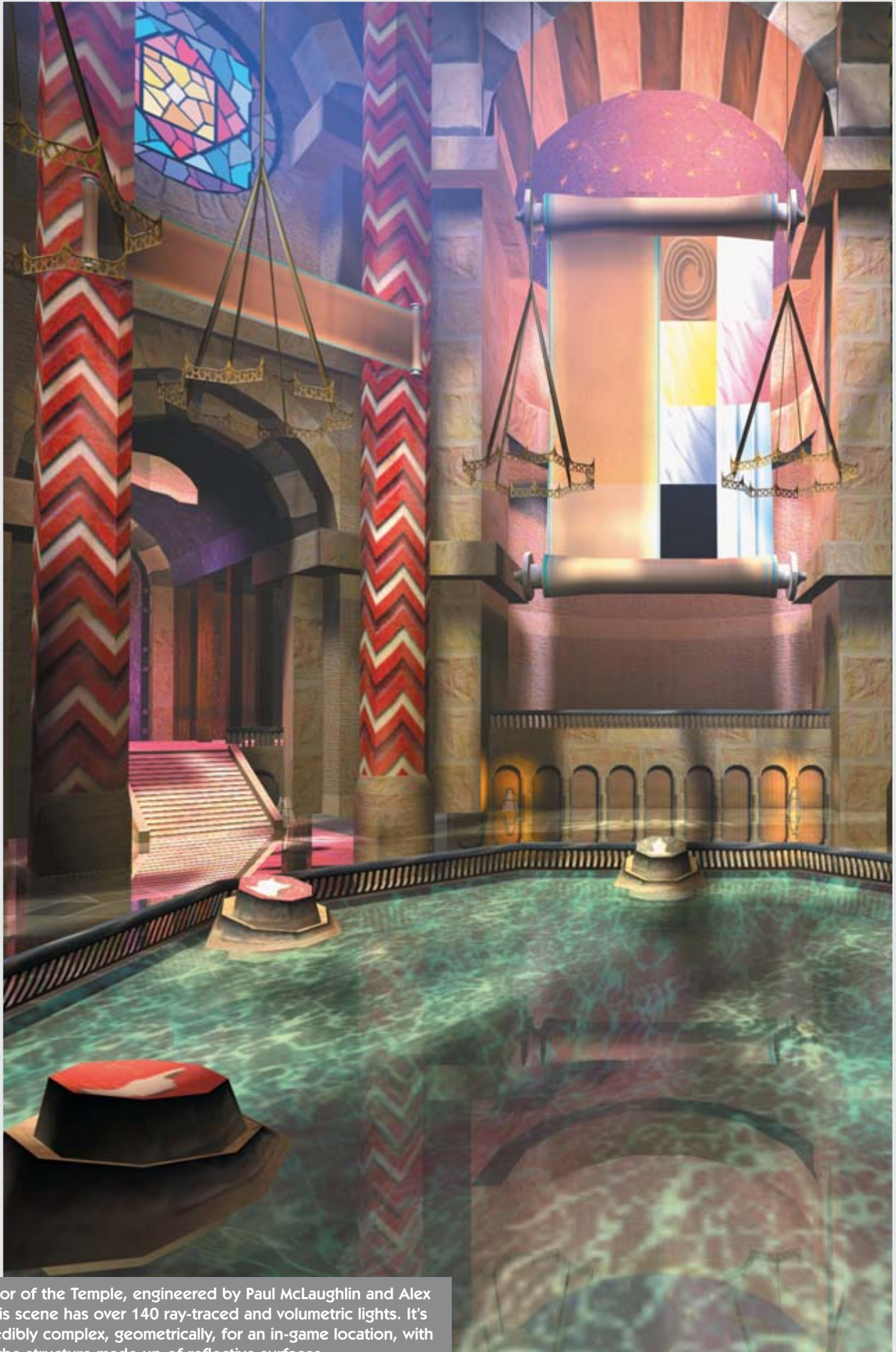




“computerised
architecture”

architecture”

“computerised



The interior of the Temple, engineered by Paul McLaughlin and Alex Evans. This scene has over 140 ray-traced and volumetric lights. It's also incredibly complex, geometrically, for an in-game location, with much of the structure made up of reflective surfaces.



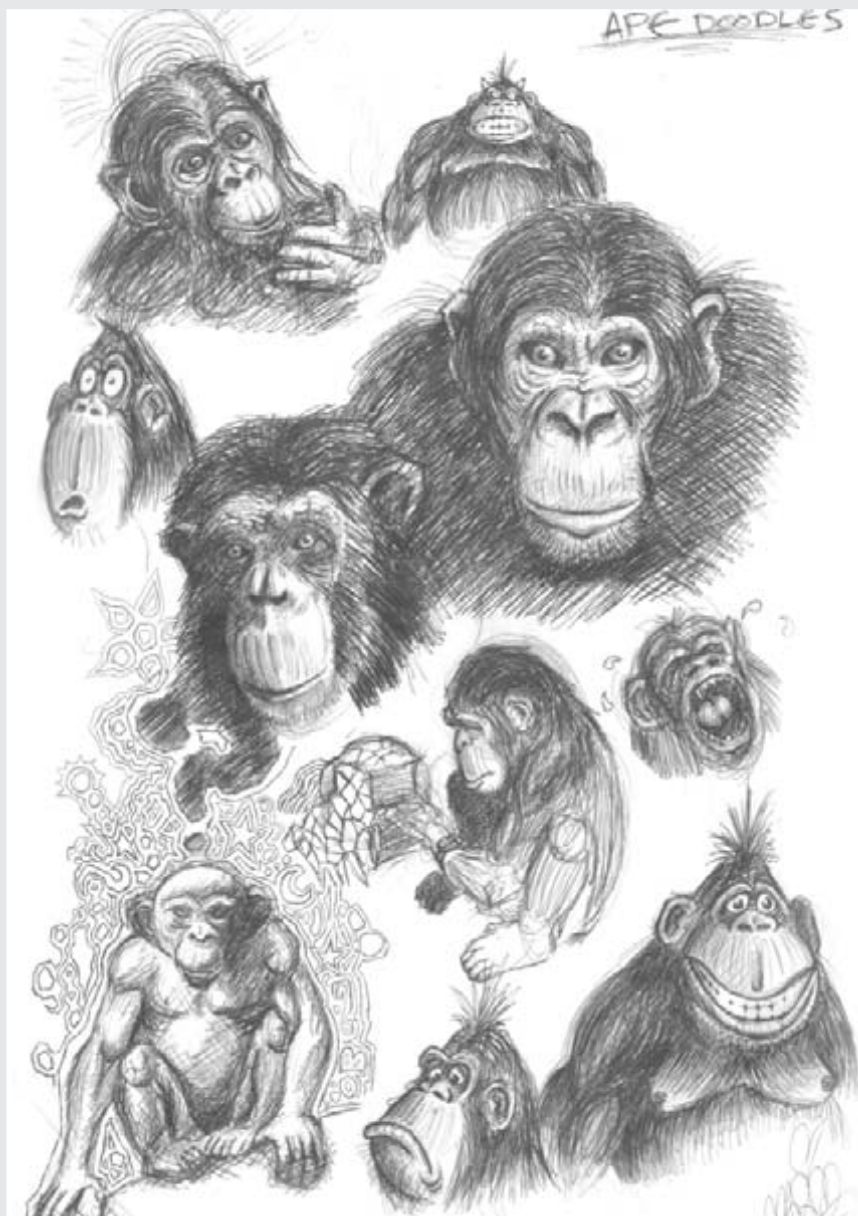


At this point in the project, rough art existed for everything in the game. Head of art, Paul McLaughlin, describes the way it worked: “We’d done artwork and images for everything, just so they were visible and recognisable in the game. Art is always an iterative process, anyway, and we knew that designing something that might be replaced was better than not designing anything at all.

“The lands have been referred to as things of great beauty”

Paul McLaughlin, head of art

Early development sketches for the ape, by Mark Healey.



“New features were also being added, and these required brand new artworks. An example of this being the huge gates leading to the Creatures on Land One. Originally, the plan was to have a rock-fall that only a god who was strong enough could remove. This proved you were worthy of getting through the valley and claiming your Creature. The gates were a cleverer, less natural way of achieving the same effect. As a player, you ask yourself, ‘Who built them? When? And what lies behind them?’ It’s an echo of Peter’s King Kong idea, and adds more to the game world than a pile of stones.

“I also worked on the Lands in **Black & White**. The landscapes can be broken down into three distinct elements: the shape, the texture and the furniture. Occasionally, they have been referred to as things of great beauty. However, the construction of those landscapes was a different story...”



Concept art for the evil sheep, by Paul McLaughlin.



Design for a neutral cow.



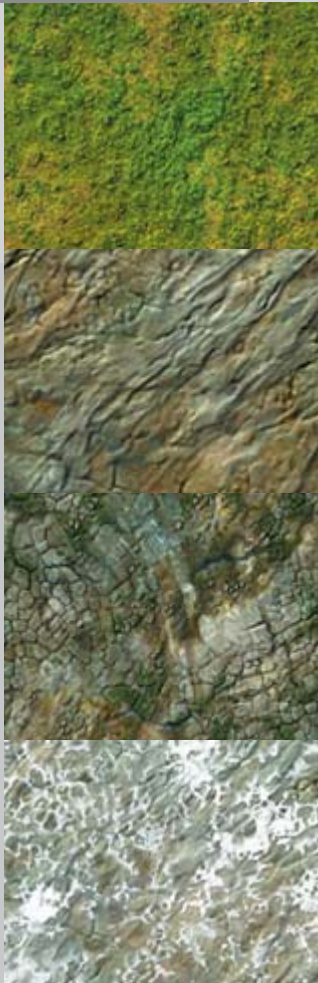
Concept design for the evil cow, by head of art Paul McLaughlin. At this early stage in development, quadruped creatures were still being considered.





An early design for the first map, Land One in Black & White. This underwent many changes during development.

Some sample textures.



Paul explains in detail: “The shape of the Lands, while appearing pretty natural, if not haphazard, are actually the result of a long and tedious process involving a variety of tools. We used an in-house terrain-editing tool known as Leadhead, which was written by Paul Nettleton. We thought the name Leadhead was a pun on what it did to our hair colour, but it’s apparently the nickname of Paul’s old science teacher!

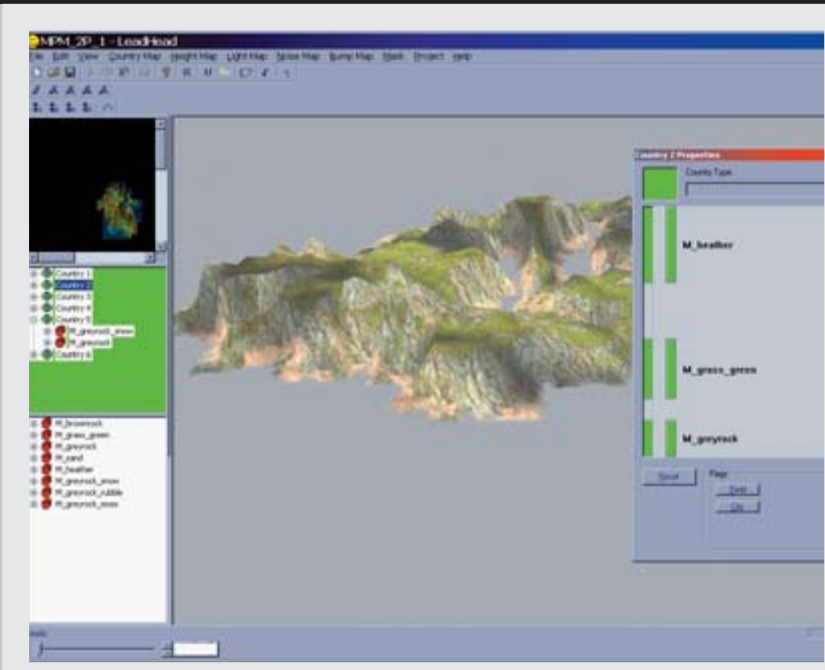
“We did much of the initial development in 2D using Adobe Photoshop, and much of the later development using another in-house tool written by Alex Evans. If it wasn’t for the middle bit, we’d all have been laughing. To be fair to Paul.Net (as he’s known at Lionhead), his editor was developed piecemeal over a protracted period of time, and he never really had time to maintain it properly.



“In simple terms, the landscape is what’s called a heightfield; a regular grid of polygons, the corners of which vary in height, giving the distinct impression of a landscape. The effect is similar to draping a checkered tablecloth over a pile of rubbish, the difference being that from above you always get to see a regular undistorted grid. We generate the heights of these corners using a small image created in Photoshop. The brighter a pixel in this image, the higher the corner of the respective polygon. It’s a pretty abstract process, but no more so than reading the contour lines on a map.

“With practice, it’s not particularly difficult to visualise any greyscale image in three dimensions. It throws a whole new light on the Shroud Of Turin (which is also a heightfield image).

“Once we have this image in Leadhead, we need to create some others before seeing any real results. There are noise-maps to randomise the blending between textures, bump maps to add detail to the land, a light map to simulate shadows, and, of course, the texture maps themselves, used to provide colour and, well, texture.

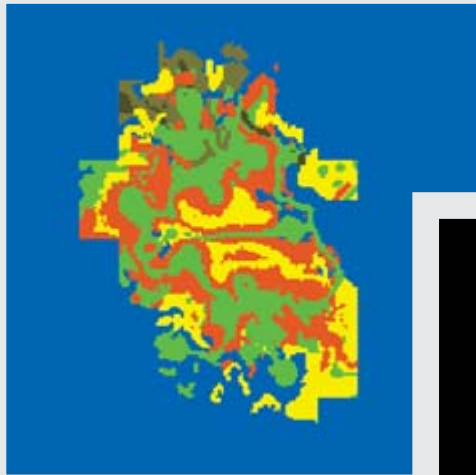


This is a screenshot from Lionhead’s proprietary Leadhead, the most crash-happy piece of software ever written, and the fateful landscape editor used to build the Lands in **Black & White**.

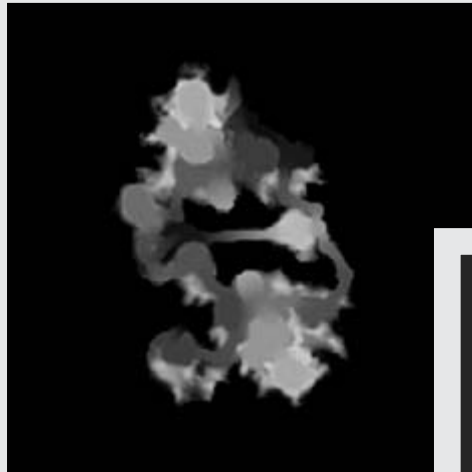
“It’s the texture maps which make the rugged landscapes in **Black & White** look so much like a real world environment. There are around 20 different textures in all, including grass, sand, rock, snow, swamp, and so on. These textures are applied to the heightfield in layers not unlike the rock strata in a real landscape. Generally we start with sand at sea level, rising up through grass, rock, etc. To stop everything looking like neat layers of distinct materials we use the parameters (light/dark value) in the noise map to offset pixels in the various textures, enabling us to blend adjacent textures into a more natural-looking surface. On top of these coloured textures we overlay a bump map. This adds high-resolution areas of light and results in a degree of detail being visible even when the player is quite close to the surface.



And here’s the in-game object editor in action. This tool was used to accurately place down all the buildings, trees and various other “furniture” in the **Black & White** world.



This is the "country" map, which enables the designer to control which landscape texture sets are "painted" where on the Land. Each colour here represents a particular texture set, previously defined in the landscape editor Leadhead.



This is the "height map". Basically, a grey-scale map graded in 256 stages from absolute black, the lowest point at sea level, to absolute white, the highest point allowed by the game engine.



This is the "light map", which defines the lit and shaded areas in the game landscape.

"Without this useful facility, the coloured textures would blur out to a soft indistinct mess when close in. The detail level in the **Black & White** landscape (which can be 5km across) is down to about 100mm. Once all this stuff has been piled in to Leadhead, we stir it about a bit and make a few adjustments. Given time and a couple of re-boots, a decent looking landscape generally falls out the far end. Once it's in the game engine, we can then use Alex Evans' editor to make fine the adjustments demanded by gameplay, and generally make it look prettier. This is mainly a matter of refining the heights of those corners again, but by hand in 3D.

"All that's left now to bring the land alive is the 'furniture'. By this I mean trees, bushes, boulders, buildings, special landscape feature, and so on. All of these are polygonal models created in 3D Studio Max. We place these down one by one in our in-game editor until

Here's the in-game landscape editor in action, with the land around this Celtic town about to lose that pleasant view with some high cliffs. A range of interesting effects can be achieved using the different "brushes".



“computerised architecture”

everything looks cool and nothing runs too slow as a result of the extra polygons. The number of polys in all the furniture typically exceeds the number in the landscape itself. The speed cost that would normally result from this added detail is reduced by using varying levels of detail for each object. The further an object is from the camera, the fewer polys in the mesh. Beyond a certain distance, we actually fade out the furniture objects altogether. This sounds intrusive, but it's actually rarely noticeable in the game.

“All in all, the **Black & White** landscape is pretty convincing. And when it's enhanced by the lighting, water effects, skies and weather, it makes an ideal playing field for the game.”



Build it up, build it up...

...build it higher!





Charged with the task of creating many of the buildings, senior artist Andy Bass buried himself in the world of ancient architecture. “This is a fantasy game, and I wanted to capture the very essence of the tribal styles. There wasn’t room to be subtle—we had to build structures that looked impressive and caught the eye from any angle and at any size.

“The Temple itself was a vital part of the settlement, and this had to tower over the people and their little homes. Not even the Wonders, majestic as they are, can compete with the Temple. It was called the Citadel for a long time, and indeed many of the people at Lionhead still refer to it as that. Although it went through many different looks and version, when I originally designed it, I always had strength and defensiveness as much in mind as awe and religion. When you go inside, it was more of a command centre feel than a church. That was deliberate, as you are such a hands-on god. On the outside, the long tapered walls that radiate out from it are actually fingers. If you’re playing as an evil god, your Temple changes and you’ll see these fingers curl up, holding the Temple in the palm of a devilish hand.

“we had to build structures that looked impressive and caught the eye from any angle and at any size”

Andy Bass, senior artist

Lionhead’s senior artist Andy Bass rendered this mock-up of the Egyptian village. “The pyramids seen here were eventually dropped from the game and replaced with an ornate pillared temple. They were just too low poly and ruined the scale we’d achieved in the game.”



“The constant improving and redesigning of the game led to us discarding the Egyptian pyramids eventually. They were a Wonder, but the trouble is, although they looked good, they were rather featureless things, and sitting next to a vast mountain with a 70-foot tall bear clambering over it, they lost much of their impressiveness. In the end, I did a huge Egyptian Mausoleum-style Wonder, instead, which better suited the Lands.”

3D programmer Alex Evans also worked extensively on the Temple, concentrating this time on the interior.

“One of my tasks was to create the inside of the player’s Temple,” he said. “I’d just returned from a trip to Rome, and had been amazed by the sight of light filtering through the dusty air in St Peter’s. Some people have said that the inside of the Temple must use a different engine from the normal **Black & White** engine, but that’s not true! It’s just a building like every other, with extra shadows painted over the top. It looks so different, because I spent a long time experimenting with ways of making those shadows and coloured lights as detailed as possible, so that when they’re laid over the top of the normal textures you get a depth of shade and light not seen in-game.”

This early concept design for the Celtic village seemed overly ambitious when proposed as a fully-working 3D game location. However, the final results in-game far exceeded even Lionhead’s initial expectations.



A mocked-up promo screenshot showing a Tibetan village.

“I quickly wrote a program which ‘painted over’ the top of the artists’ textures to create the impression of areas of light and shade. The problem then became this—how could the artist assigned to the job of designing the Temple, Paul McLaughlin, and I cooperate to get the very best out of the new lighting system?”

“After some discussion, I spent a few days incorporating my lighting code into a special plug-in extension to 3D Studio Max, the program we use to build all the objects and buildings in the game. It turned out to be time well spent—Paul could adjust and tweak the lighting and shadows using the familiar tools of 3D Studio Max, and then at the click of the button, immediately see what the effects would look like in the game.”

“Every day, he would find some new variation or trick which would inspire me to further code, or I would think of some new code trick to inspire him to greater feats of ‘computerised architecture’. In the end, the 3D Studio Max files for the Temple have so many different lights, interconnections and mysterious helper objects that it took a computer with a whopping 1 Gigabyte of memory to calculate all the lighting!”

This mock-up of a Japanese village, by Andy Bass, was rendered in 3D Studio Max, again for promo purposes. The boats were never included in the final game.





It was now decided that the art team should set about mapping faces onto the villagers. Bass explained why. “The villagers are all individuals, with different levels of desires and beliefs. They also have different names, which you see if you press ‘S’ in the game. We had the idea of auctioning off a couple of the faces for charity, so the highest bidders would literally appear in the game. Of course, quite a few of the Lionhead people are wandering around. An offshoot of this is that if you ‘know’ someone in your village, you’re more likely to look after them. You’ll find them and send them through any vortices you discover, so that they can continue from Land to Land through the game with you.”

“The villagers are all individuals, with different levels of desires and belief. They also have different names”

Andy Bass, senior artist

Populating the settlements with villagers was vital—to see whether the towns functioned and felt truly “alive”. Bizarrely, each person here has Peter Molyneux’s face.



Also highly visual were the Miracles. Giles Jermy worked on these, determined that they'd look better than any yet seen. He explained his thinking: “Spells, because that's what these essentially are, are seen in many games. Quite a lot of Peter's previous games contain them, and they tend not to differ massively from the Dungeons & Dragons stock that has been around for decades.

“We put our own godly spin on them, and made sure that the ones people would know the names of would be much greater in magnitude than any they'd seen before. Fireballs would have spin and aftertouch on them, lightning would find the highest points (or the people you target!) and shields would look like the work of the gods.

“Lightning would find the highest point (or the people you target!)”

Giles Jermy, programmer



“Much of the Miraculous stuff you do can actually be positive. Even if you're as evil as can be, you'll need to ensure your people have food and wood, and that they're not all at death's door. We were keen for players to use the creature to do practical Miracles around your villages, so any Miracles you learn, you can teach your creature. He has his own personality, so if you're evil and wouldn't be seen dead helping your people, you can send your creature to do it! The effect of this was that we had to tie the Miracles to the creature's intelligence. It'd be useless if he knew how to cause rain to fall, but didn't know he had to do it over crops, for example.”

Jermy, Richard Evans and Scawen Roberts all collaborated on the spectacular creature fighting features as well. Roberts, who'd programmed much of the game's physics engine, as well as the creature and villager navigation, was keen to test the combat: “We knew that battling creatures would play a big part of the game, and we wanted each different creature to have a special move or two. In order for them to engage in combat, though, they needed to be in an arena. We programmed it so that when they are, their brains change and they go into fight mode. All the stuff they currently know about is put on ice and they concentrate solely on knocking the enemy out.

He may be 25 metres tall, but he still gets scared... Sometimes.





“You can control your creature in combat, and again we worked on ways of rewarding the player if you do. A player-controlled creature will, if he’s being controlled with a certain degree of skill, be more effective than one just left to fight on his own.”

“The player’s hand relies on the same morphing and animation system, using combined animations to enable it to swing its fingers a little as it moves around the screen. It’s directly connected to the mouse’s position on screen, too, but moves in 3D, going into the distance to pick up a remote object or to pull the user towards a point.

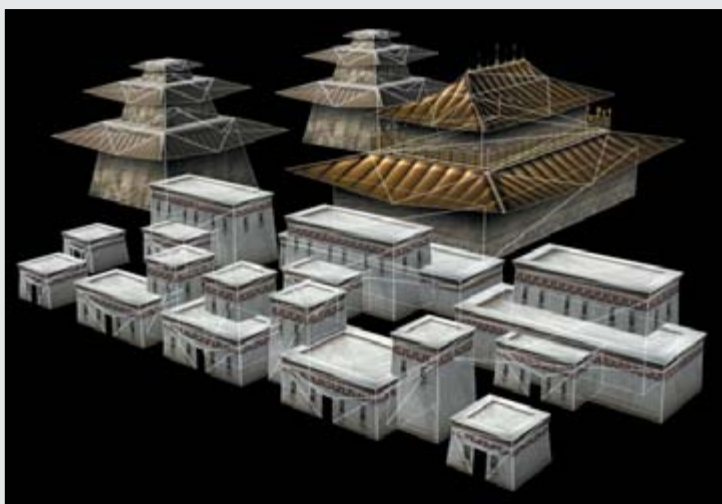
“The physics system was created and developed from the simple idea that the hand should be able to pick up and throw or interact with nearly all the objects in the game. This meant that we needed a rock that rolled and bounced in a realistic way, and I was keen to try an idea for this. I made an initial system that was able to roll a single rock around and experience gravity and friction forces. Alex explained the principle of the moment of inertia matrix to me and, using this, we were able to make a rock bounce more realistically, and see a totally different object such as a log behaving in a completely different way.



“This was immediately put into the game, and replaced the bouncing system. But the object could only detect collisions with the ground, and passed through all objects unheeded, which, of course, looked terrible. So I borrowed a polygon mesh intersection function that I’d written to enable blood to trickle down a creature’s body, slightly modified it, and used it to enable a moving object to detect collision with another object.

“The developing system took some time to implement and refine, because the game needed some control over the system. A rock which hits another rock moves it in a way that’s predicted by the physics system, for instance, but some things mustn’t be movable at all, while things like houses should shatter into many pieces. An object that’s moving in the physics system must constantly check all nearby areas, forcing any objects in the region to create a physical entity of themselves, ready to be tested for collisions. When a collision is detected, an appropriate force is applied to each of the colliding objects which causes the objects to accelerate and causes a torque which rotates the object, by changing the angular momentum. The force applied depends on the orientation of the surface in the collision; a spring force depending on how far one object has penetrated the other, plus damping and frictional forces.

More buildings for the Tibetan villages, by Andy Bass—complete with wire-frame meshes. “The buildings had to have a really low polygon count,” explains Bass, “because this is crucial for the ever-important frame-rate of the game. We had to use the textures well to get a nice result.”

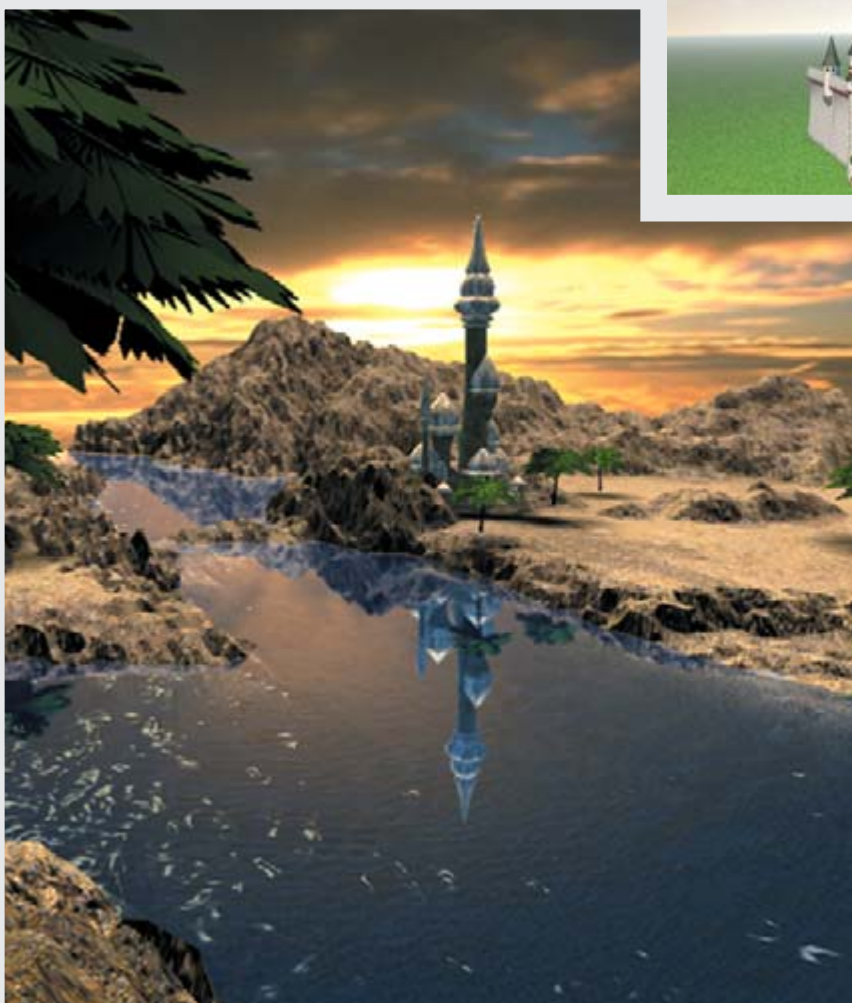


An ape roams the Land.

“The system caters for soft objects, such as trees, people or beach balls, yet also provides a reasonable approximation for hard objects, like rocks, by providing different physical constants used for that object—spring constant, damping constant, wind resistance, coefficient of friction, etc. The artists also had some limited control over the physics system; they’d create a simplified physics mesh for all objects in the game, usually using a lower polygon count to stop the physics system using too much CPU time. Andy Bass went through every single building in the game and added excellent physics meshes to them all!



Jamie Durrant was first to produce concept art for the temple, or citadel as it was then known. Here it takes quite a medieval fairy tale style.



An early mock-up of how the Temple, or citadel, could look in the finished game.

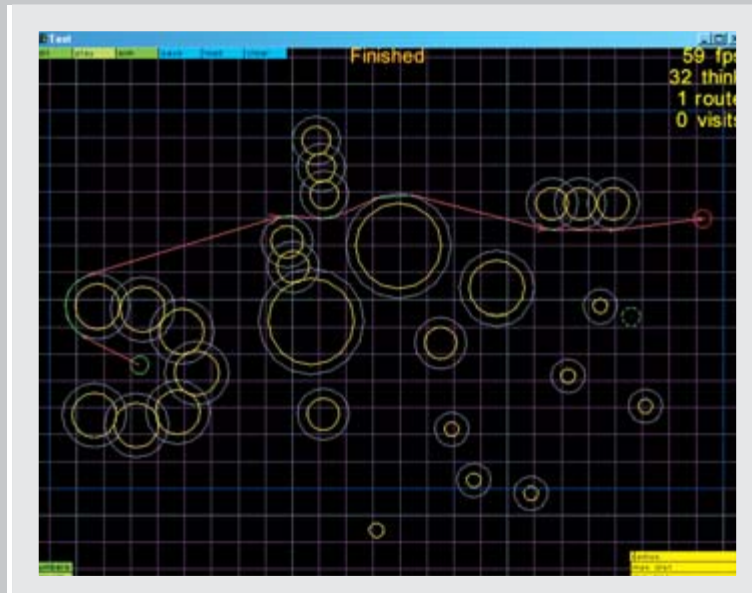
“A rock hitting a building with enough momentum will knock a roughly hacked cylindrical hole right through the building. You can chip bits off, bit by bit, by throwing rocks, too. We achieved this by intersecting a cylinder with the high-level mesh of the building, and cutting up triangles until they were small enough to look like broken fragments of a building. The parts which come off are given thickness and created as physics objects, so that they fall realistically to the ground. This proved to be a much more satisfactory than the older approach of simply replacing a complete mesh with a special damaged mesh.

“When this system was put into place there was the problem of remaining bits of building floating above the ground. This was fixed by analysing the whole destruction mesh after every impact, and seeing which parts of the damage are sharing their edges with other pieces that are in turn touching the ground.

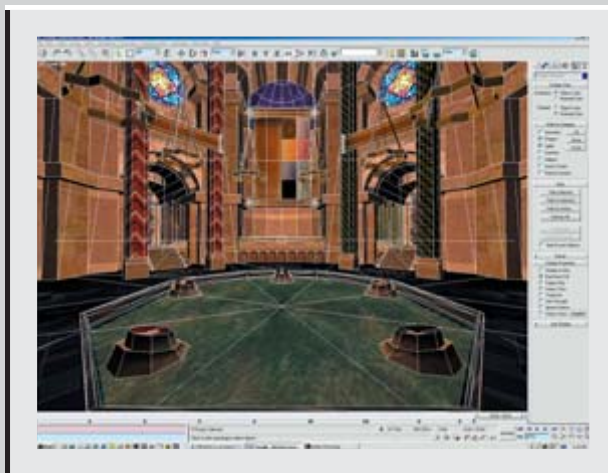




“The creature route-planning system was developed to help the creatures avoid houses, rocks, trees, steep slopes, cliffs and the sea. When he decides to go somewhere, or is asked to go somewhere by the player, he must first consider many of the objects between himself and his destination, feeling (in his mind) his way round every object he encounters, and prepare a path built up of curves and straights, using the shortest route. To do this, the creature route-planning system approximates every object into circles, a simple case being a single circle (for a round rock), or perhaps three circles for a long building. Even the edges of the mountains have been pre-computed, and are considered as rows of circles. Having objects as circles is a great help, because they make it reasonably easy to test any route line for intersections with a circle, plus you can use them to create the curves of the creature’s path.



Scawen Roberts' 2D route-planning test-bed for the creature.



The interior of a Temple, showing wire-frame and un-lit texture mapping.

“The route-planning system was a tough thing to implement, involving several late nights, peering at the screen, looking at circles and rapidly flicking routes, trying to catch the rogue routes which went through a circle. The problem with this route-planning is that it goes through thousands of stages before it gets to the one that’s gone wrong, and once you’ve seen it go wrong, it’s too late to see why it went wrong. So I ended up writing lots of debug code to show me as much as possible what was going on. Thankfully, it was also possible to develop the system in a separate 2D test-bed, making it almost instant between making a change and seeing the result, unlike working in the huge program of **Black & White**, which really causes the compiler to have a heavy think while linking the program together after any tiny change.

A long-range route-planning test on one of the multi-player maps.



“This really was one of those times in a programmer’s life when even your dreams turn into triangles and circles; when you’re being spoken to by another human and you can’t build a sentence, and just end up talking gibberish. So you give up and try and get some sleep. Then when route-planning your way around the house, trying to make a coffee in the morning, maybe the idea you’ve been looking for will pop into your head, and suddenly the dreadful obstacle has gone. These are the moments that can make a programmer happy with his work.”



The end of another hard day in the land of Eden. “The atmospheric lighting in **Black & White** enhances the mood terrifically; sometimes it can be breathtaking,” says Peter Molyneux.

Black & White analyses the player’s PC clock, date and location settings to produce moon phases and weather patterns accurate for that particular player.





“black & white
is a
reflection
of you”

of reflection
is a

black & white

“black & white is a reflection of you”



Black & White's Good and Evil advisors.





The team was happy with the progress of **Black & White**, but they still knew something was missing. Such an epic game couldn't just let the player do whatever they liked. There was too much freedom. There had to be some reason to play through the game. Something had to happen; some form of narrative was required. But before they could address this problem, there had to be a way to put a story into the game.

“By getting involved in challenges, you could have some fun!”

James Leach, writer

This Japanese Wonder recalls the splendour of the traditional pagoda.



Richard Evans, meanwhile, had been working on an early version of the story editor. He'd had to pass this over to Jonty Barnes and others when the work piled up, but thankfully the basics were already in place. This program enabled the team to come up with scenarios on the landscape that they then had to solve. A menu system let them communicate their choices back to the computer, and text was displayed describing the challenge to be overcome. The editor also enabled the setting of camera positions to show events on the world. Suddenly, the game was taking the highly visual, cinematic feel it has retained ever since.

“we imagined
the challenges
as little films
with lots of
endings”

Ken Malcolm, designer



An Indian Wonder.



An Egyptian Wonder—with wire-frame and textures visible.

Soon the much-modified script editor was ready to use. With it, the team could construct story elements and engineer things for the player to do. It was around this time that Molyneux and Webley contacted the writer James Leach. They tracked him down to an advertising agency in central London. He was another of the old Bullfrog people who'd previously worked with both Molyneux and Webley on a succession of games that had put the company on the map. Originally, Leach had been a respected computer games journalist, and Molyneux, realising that games would increasingly require stories, dialogues and scripts to provide them with sufficient depth and emotion, hired him to do just that for Bullfrog.

Leach's brief was clear. **Black & White** needed a story structure that took it from the start of the game to a final, cataclysmic finale. But it needed more. It needed a vast number of things for the player to do as they worked their way through the game. From this was born the idea of challenges and quests.

Leach explains: “When I joined, the team described to me what was needed. I saw that we'd want an epic tale in **Black & White**, but to be epic it had to have huge conflicts and twists, and no story, no game can be comprised of just those. There'd have to be more to it.

“Peter had told me about the ways of being good or evil and how they didn't affect the ultimate outcome, but they simply reflected the way each person approached the game. We worked out a system of what we called challenges. These would be little trials brought about by prayers from the people. They'd pray to you directly, asking for help. You didn't have to answer these prayers, and if you did, you didn't have to do what the people asked. The idea was that by getting involved in challenges you could have fun, gain possible rewards, exercise your godly powers and generally be tested in a few conundrums.





A Celtic house, shown in shades wire-frame...

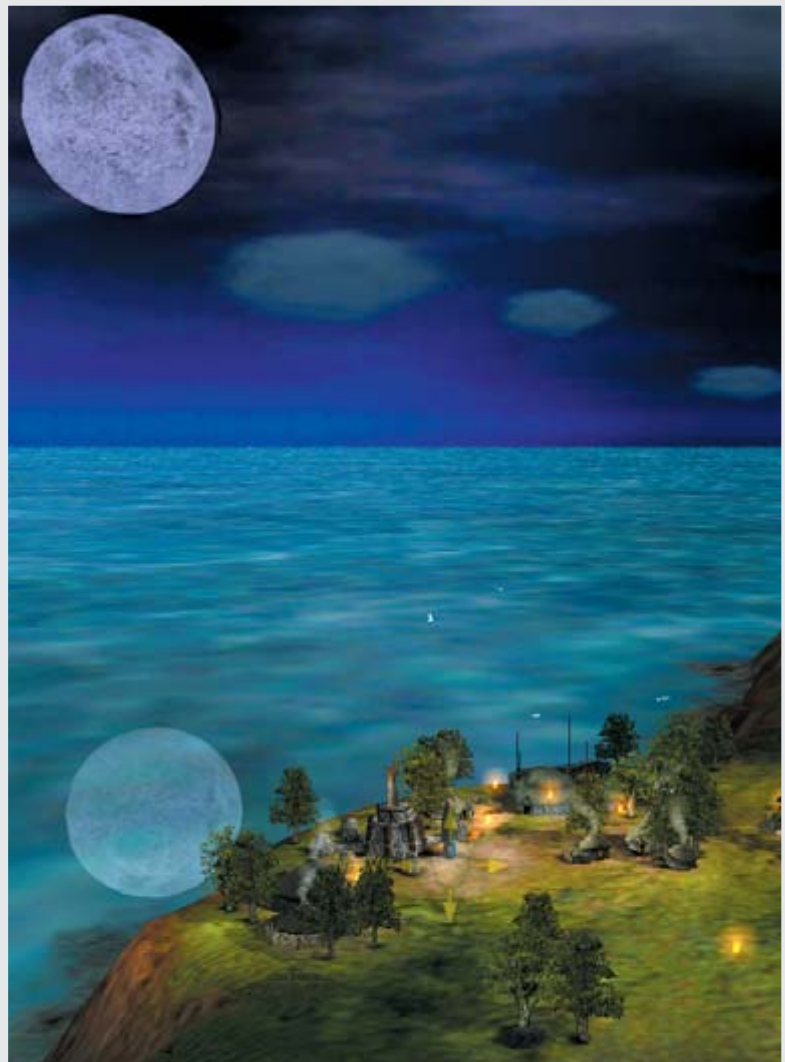


...and the same building with textures applied.

A Celtic town at night, the moon reflecting on the calm waters.

"I wrote hundreds of these challenges. Peter thoughtfully provided me with a copy of the Bible on CD-ROM (which I think he stole from the bedside cabinet of a particularly high-tech hotel) and he told me to explore good and evil as it relates to gods and men.

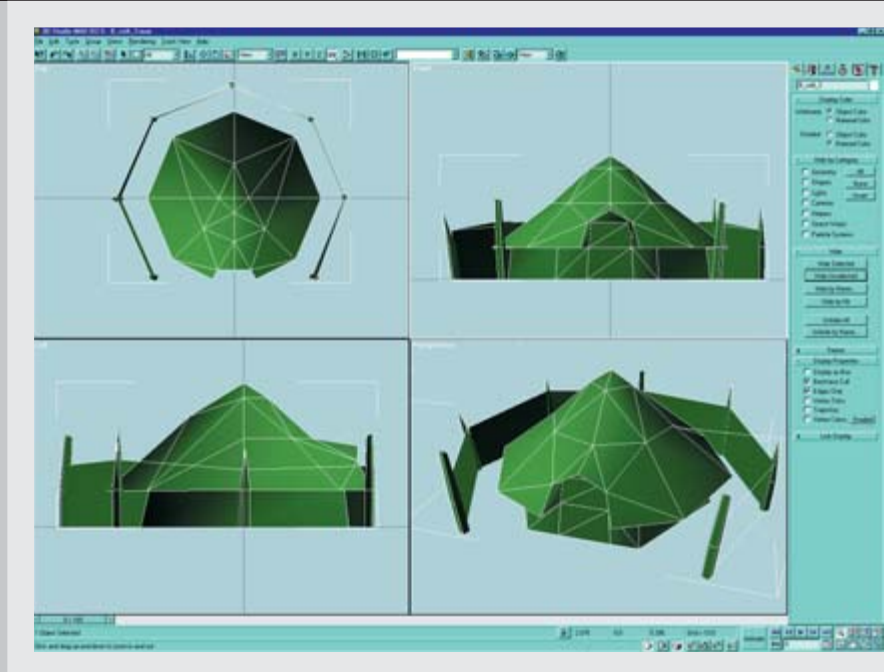
"Struggling with this made my nose bleed. The trouble we found was that we are brought up in a culture where good is constructive and always triumphs, and evil is destructive and ultimately self-defeating. Too often I was writing a scenario where you could help people and gain a reward, but if you decided to be evil you'd simply annoy (or kill) the people involved and would gain nothing. The breakthrough came when I decide to supplant the idea of evil with that of mischief. Although the two aren't quite synonymous, being totally evil was proving pointless. You'd kill all those who worshipped you and you'd never receive any support from those you spared. By introducing an element of spitefulness I realised that you, playing the spiteful person, would want to keep your followers alive, but would want to see them suffer, too."



Leach takes up the story, “Molyneux wanted a clash between good and evil. It’s the oldest story in the world. What was interesting was that you, as the player, could be either good or evil. The game is a reflection of you. You would face two other gods, one as powerful as you, the other more powerful than you’d ever hope to be. Whatever Alignment you were, good or evil, you’d find that these enemies would be the opposite. We coded it, so that much of what they said would be godlike rather than Alignment based. We added a god who’d be the same Alignment as the player, too. This was a means of introducing the player to Miracles and to the concept of battles between gods.

Molyneux, Leach and Webley thought long and hard about the ultimate story. By this time, Jamie Durrant, who was still creating art and maintaining Lionhead’s award-winning Web-presence, was now also involved in the scripting language. His artistic abilities would be invaluable here. Another new hire was Ken Malcolm. He was a level designer, and as such his skills at knowing how to turn an idea on paper into something challenging and playable proved to be a great asset.

Malcolm said, “The story elements were so different to most level-based games, so we effectively had to imagine the challenges as little films which required lots of endings. We had to have the fun elements, the lateral thinking and the gameplay, but really it was a case of: forget the rules and consider what you think a player would do.”

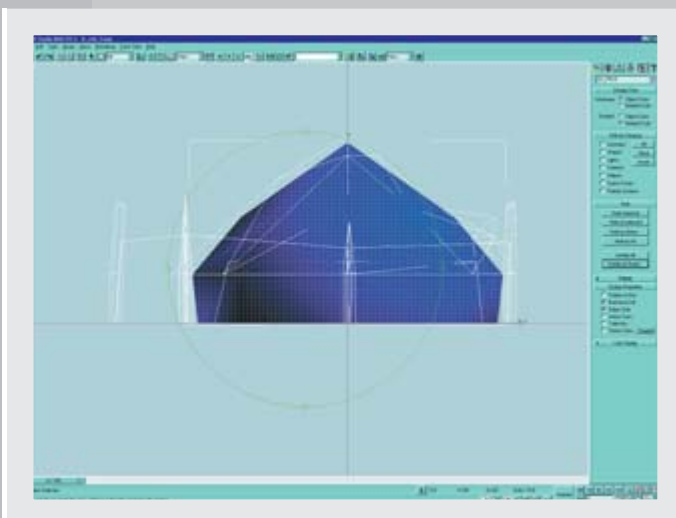


A typical Celtic house under construction in 3D Studio Max.

The story grew and grew. But what would the biggest prize of all be? Well, that was clear. If you gain your power by being worshipped by the tribes, you’ll want the entire world of Eden, all six Lands of it, to worship you and no other gods. In fact, you’d want to send all the other gods into the dreadful void, where deities with no worshippers languish, utterly powerless. Yes, total domination was the only possible goal.

But doing it by simply convincing the tribes, one after another, was the long way round. Something else was needed. And so the idea of the Creed was born.

“The Creed was a great idea,” Leach says. “It was a deus ex machina. A way of winning without having to go through every village and get their support. The idea was this. Each Creature would have an element of the Creed inside them. It would only be possible to get it once that Creature was dead. In order to win the game, you’d need three Creeds from the same Alignment. You’d need three evil Creeds or three good ones. If you had those, you could take them to the volcano on Land Five and drop them all in. The resultant explosion would shatter the world and change the universe and the game—and Eden would be yours.



A Celtic abode with its “physics mesh” highlighted. This mesh represents the building in a simplified form, as seen by Black & White’s physics engine. Impacts with creatures and rocks, etc, are correlated using this system.





A concept design for a Japanese village, complete with waterlogged paddy fields, by Paul McLaughlin.

“The list of possible names I came up with was huge. I recall Sardis, Demes, Ikons and Psiphs all being mooted and discarded. My personal favourite was Amalians. That, too, got binned. We never came up with a name that everyone liked, so the creatures stayed as creatures.

“Although the world was occasionally called Eden, it didn’t have any other names, and we thought it didn’t need one. The eight tribes on the world were simply called by their race: Norse, Aztec, Japanese, Greek, Indian, Japanese, Tibetan and Celt.



Concept artwork for an Inuit village of igloos.

“You would first encounter Khazar, a friendly god, who teaches you about Miracles and how to battle other gods. Standing in your way would be two gods whose Alignment would always be the opposite of yours, whether you chose to play good or evil. One was Lethys and the other was the biggest god in the game: Nemesis. The trick would be to write his action and speech so that all of the gods, Khazar your ally, Lethys, your first enemy, and Nemesis, your ultimate challenge, were neutral—because they could be good or evil.

“At some points, their actions and reactions were to be influenced directly by what you’d done, but because there wasn’t room to record all the alternative lines possible during the game, some would get spoken whatever Alignment you happened to be.”

Then the tricky problem of giving things names reared its head for the first time. Leach explains: “First, Peter wanted another name for the creatures. They used to be called Titans, but as Christian and the artists gave them each their distinct looks, the name didn’t seem to fit.

More Celtic village concept art, by Paul McLaughlin.



An early concept for the Egyptian village.



A Greek Wonder—the Parthenon influence is clearly in evidence.

“That left the gods. I had to avoid anything too aligned, too biased towards evil or good, because all the gods in the game could be either. Khazar and Lethys sounded suitably old and legendary, and I liked the mixture of Arabic and Greek or Roman-sounding words. I did intend to replace the name Nemesis with a huge, powerful name, but actually everyone liked it and it did fit.

“What’s nice is that once you’ve named something and people start using the name, it gets universally accepted. I still wonder whether, if I’d called the creatures Amalians throughout, it might have stuck and the creatures would be called that to this day.”



Sunset over a Japanese village. Notice the sun filtering through the objects in the scene.

A Japanese village at twilight.





The village and the villagers were greatly improved at this point by the recruiting of Jeremy Chatelaine and Oliver Purkiss. Peter explains candidly why they were taken on: "I didn't have time to sort out all my bugs. I needed some programmers who could be as versatile as everyone else at Lionhead. I also needed someone like Ollie to take over on my villager programming. And I needed a one-man rapid response team, like Jeremy, to deal with my bugs and work wherever he was needed."

Although the one thing that sets Molyneux apart from most other software company directors is that he still codes on his games, he can't do all the programming he'd like to.

"we didn't want any player thinking that the villagers were worthless or disposable"

Oliver Purkiss, programmer



Although it's easy to see the villagers as simple people doing their own thing, a vast amount of work went into them. Purkiss and Molyneux worked tirelessly to get to the stage where they had enough autonomy and individuality to be interesting, but without taking masses of processor time for every decision they made. After all, there can be hundreds and hundreds on one land in the game. Purkiss explained: "Without the people you're nothing in **Black & White**. It's their belief in you that maintains your power. We didn't want any player, good or evil, to feel that the villagers were worthless or, worse, purely disposable.



"Once we got the villagers to be self-reliant, we decided that they'd all have slightly different belief levels. These are set randomly when a villager is born, but basically, just as in real life, some people are harder to impress than others. You or your creature would have to do some stunning, highly visual things in front of the more sceptical inhabitants to get their jaws dropping in awe!"

Early concept designs for the villagers, by Christian Bravery. "After much deliberation, we settled on fairly child-like proportions for the little people," recalls Bravery. "This way they remain visible even at a distance, and hopefully evoke a sense of empathy from the player."

As the story formed over a series of meetings, one thing remained clear: the team didn't want to force the player along the story, because it wasn't what **Black & White** was all about. Having to keep up with rapidly-changing godly events would compromise the player's freedom to nurture villages, listen to the prayers of the people and play with, teach or utilize the creature. And the other thing the team wanted was for people to explore the world. And that's something you can't rush.

The eventual solution was neat and simple. To move the story along, the player would have to click on Gold Story Scrolls. These would only appear once the player had got to the right point, and the story would freeze until the player clicked on the Scroll to activate it. Which meant the story always unfolded at a rate decided by the player.

Another set of Scrolls was placed on the landscape. These wouldn't advance the Story, but they'd provide challenges for the player that could well change the direction and structure of the game.

Jamie Durrant was busy using the new script editor to implement the challenges the player would trigger. He describes the basic ideas: “The Gold Story Scrolls triggered actions and events which, sooner or later, the player would have to tackle if they wanted to proceed through the game. We called these quests.



“every time a better script or challenge appeared, a weaker one would be replaced by it”

James Leach, writer

“But the other Scrolls were coloured silver and clicking on them triggered scripts we decided to call challenges. These would not be mandatory. These were the little parables and events, which came about when someone on the landscape prayed to you, their god. You could zoom down and help them, or you could ignore them completely. You could also use them to spread a little evil around. You'd often get rewards for doing these challenges, but not so that you'd have a massive advantage that unbalanced the game. We had to think up dozens and dozens of challenges, and it wasn't easy.”

James Leach takes up the story: “The great problem was that you should be able to approach most of the challenges in different ways. In a game where you could do whatever you want, lateral thinking had to be supported. Also, if you were playing as an evil god, there had to be a way to gain from your somewhat darker approach to the challenges.

“The process was one of refining. Every time we came up with a better script or challenge, a weaker one would be replaced by it. There'd be challenges that required your creature, ones that needed brainpower, while others demanded mouse skills or sharp eyes.”





Meanwhile, Richard Evans had been busy. “I’d been working on villager reactivity. The villagers in the game all have their own personalities, desires and needs, and although their intelligence is nothing compared to that of the creature, they do react to what is going on around them. They also have a religious belief level, and it was important to make sure that they were only impressed by things they could see. Doing something godly and spectacular is all very well, but your people have to see it. If you do the same thing too often, it becomes old hat and they get bored of it.

Concept designs for the villagers, by Christian Bravery.



“my plan was to have two voices in your ear—your conscience talking...”

Peter Molyneux, creator of Black & White

“Once I was happy with the villagers, I turned my attention to the Alignment code. This determined whether you were good and evil, and it used your actions to do this. It became a complicated job, because the game had to log who is responsible for every single action. For example, if you threw a tree and it hit a rock that rolled into a house and damaged it, the game has to trace back all these actions to you, and make your Alignment more evil.

“Once that was done, I went back to the villagers. As I’d previously worked on their religious beliefs, it was down to me to get them to worship you, to dance and think as one. Although it’s not always obvious, when the villagers are dancing or worshipping, they’re in a sort of hypnotic trance, and they join together to provide you with prayer power.

“The villages were coming to life before our eyes, but there came a time when we had to give the player something to do. Essentially, we were creating a giant sandbox in which to play. If this were to be a game, rather than a hugely diverting enterprise, people would want to do stuff, beat others and win. We needed, in essence, a story.”



Concept designs for the villagers, by Christian Bravery.

By this point, there was a world with populated villages, creatures, and a growing number of things to do. It was time for another round of meetings. Molyneux called these because he had noticed that the game was becoming something bigger and deeper than he'd first expected. He was getting worried that people might get a little lost in it.

Molyneux explained his solution: “I proposed that we had guides who help you with the world of **Black & White**. My plan was to have two voices in your ear—your conscience talking to you. They'd provide you with information and advice, but they'd be like the angel and devil on your shoulder.

“When I told the development team, they took a lot of convincing. The main criticism was that having these guys talking would spoil the flow of the game, and would lead to an adventure-game style experience.

“But as I thought about it more, I felt that it would really add to the game. Your conscience would feature as part of the whole, rather than just as an information service. The angel and the devil would have personalities.”

The initial designs for the Advisors, as they were now known, came from artist Christian Bravery. These looked good, but they were too close to the classic ideas of angels and devils. In a game with so many new ideas, and one that was striving to keep clear of all organised religion, the designers would have to have a new idea.

Healey described his next attempt: “I totally redesigned the angel from scratch. From being a classic harp-playing type of character, I turned it into a sort of fairy. It wasn't long before I was accused of putting my girlfriend into the game, and, looking back, I suppose it did look rather a lot like her.

“essentially, we were creating a giant sandbox for you to play about in”

Mark Healey, artist



Concept designs for the villagers, by Christian Bravery.





This Evil Advisor concept was dropped, along with the cherub.

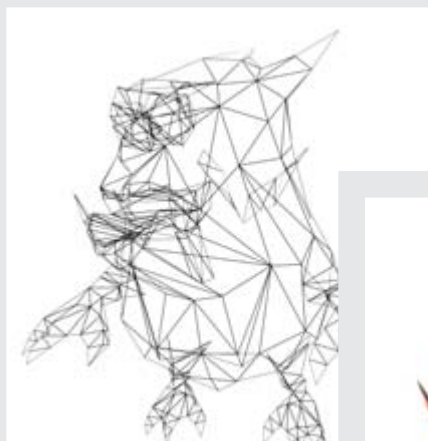
“The next go at the Good Advisor felt right from the start. To get away from angels and fairies, I went for an old man who’d be a sort of karmic guru type. He’d levitate around, and would be a cross between a yogi, a hippy and your standard kindly old man. The studio liked him from the moment he was finished.

“The Evil Advisor was, in contrast, pretty sorted from the start. I imagined a sort of cigar-chomping devil with a hacking voice and a zest for the seamier side of life. He wouldn’t be pure malicious evil, but would be mischievous, rude and up for causing mayhem and the odd sly death, rather than mass slaughter.”

The Advisors were originally going to pop up at the bottom of the screen, say their piece and simply vanish again. This tried and tested technique had been used to great effect on **Theme Park**, which Molyneux had co-designed, and **Theme Hospital**, which Webley had produced, and Andy Bass and James Leach had worked on.

It was the voice of programmer Alex Evans that piped up. He recounted the tale: “I saw that the Advisors could be these superb characters, each with a huge repertoire of animations, facial expressions and movements. We’d been at the cutting edge of animation blending, and this was another place it could be used to great effect.

“I wanted the characters to move around the screen, to interact with each other and, most importantly, I wanted them to lip-synch when they spoke. Up until then it was a problem we weren’t sure how to solve. One idea was to manually lip-synch their mouths to the words we’d get recorded. It’s the way cartoons are created. But this would have meant an enormous amount of work—someone would’ve had to be employed on the task full-time. It also would’ve caused massive problems when it came to the other languages. To get it right, they’d all have to be synched. And we were looking at 15 languages in total.



The wire-frame model of the Evil Advisor.

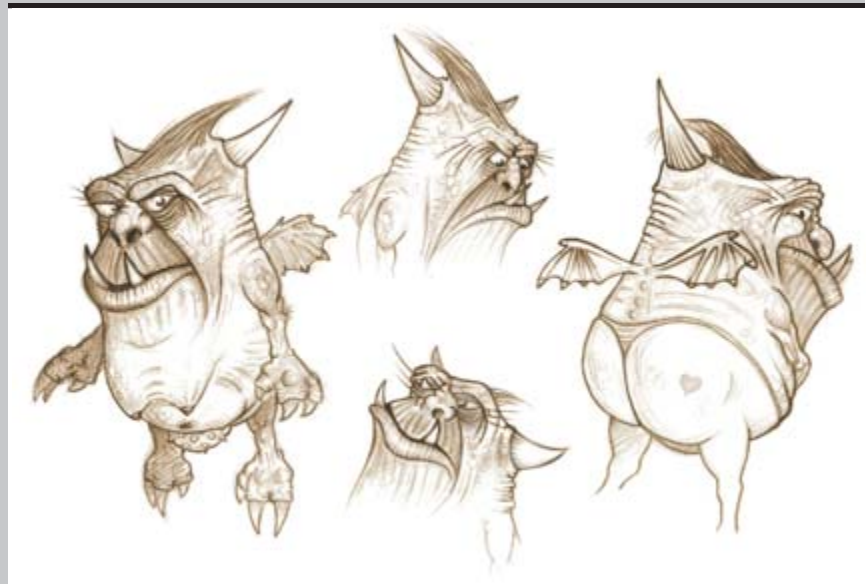


The Evil Advisor, 3D model visualised by Mark Healey.

“So I decided to create my own system. I wrote some code that would move the Advisors’ mouths into the most common phoneme shapes, and using this as a basis I turned the mouths into sensitive, responsive graphic equalizers that move in the approximate shapes, according to the sounds being played.

“The beauty of this system was that not only did it look good, but once it was in place there was no need for anyone to worry about lip-synching and other languages not working. Another benefit was that it was a first. We’d been building a reputation for pushing boundaries, so it was nice to see another one firmly trampled underfoot.

“Eric Bailey worked next on animating the Advisors, which had a whole load of emotions to show as well as animations. We wrote a list of all the emotions we thought we’d need: happy, afraid, angry, confused, sarcastic, and so on. At the same time, I worked on a host of little anims that could play at any time the Advisors were on-screen. These were such things as dances, pointing, hiding behind their hands, folding their arms and many more.”



Mark Healey's concept sketches for the Evil Advisor.

The voice characterisation of the Advisors builds on the archetypal imagery used in the initial design concepts.



The emotions and anims were triggered by embedded keywords in the text document, which contained all the game's text and speech. It was down to James Leach to put these in place. He describes the game's speech and text: “The Scripting document was a Microsoft Excel file and every line spoken or displayed in the game appeared in it. It grew to something like 7000 lines long, and half of it had to be recorded. The Advisors made up the bulk of this, because they had to comment on everything that happened in the game. They also had to have lines prepared for all the other possible things a player could want to do, both within the various challenges and storylines, and within the world itself.

“Luckily, Mark Healey's characters, Alex's control and speech mechanism, and Eric's animations meant that when it came to giving these guys a voice and a personality, it was pretty easy. And considering they say 50,000 words, the size of a decent book, they really did become established as strong characters in their own right. They're a far cry from the little heads that were originally going to pop up, state a brief fact and vanish.





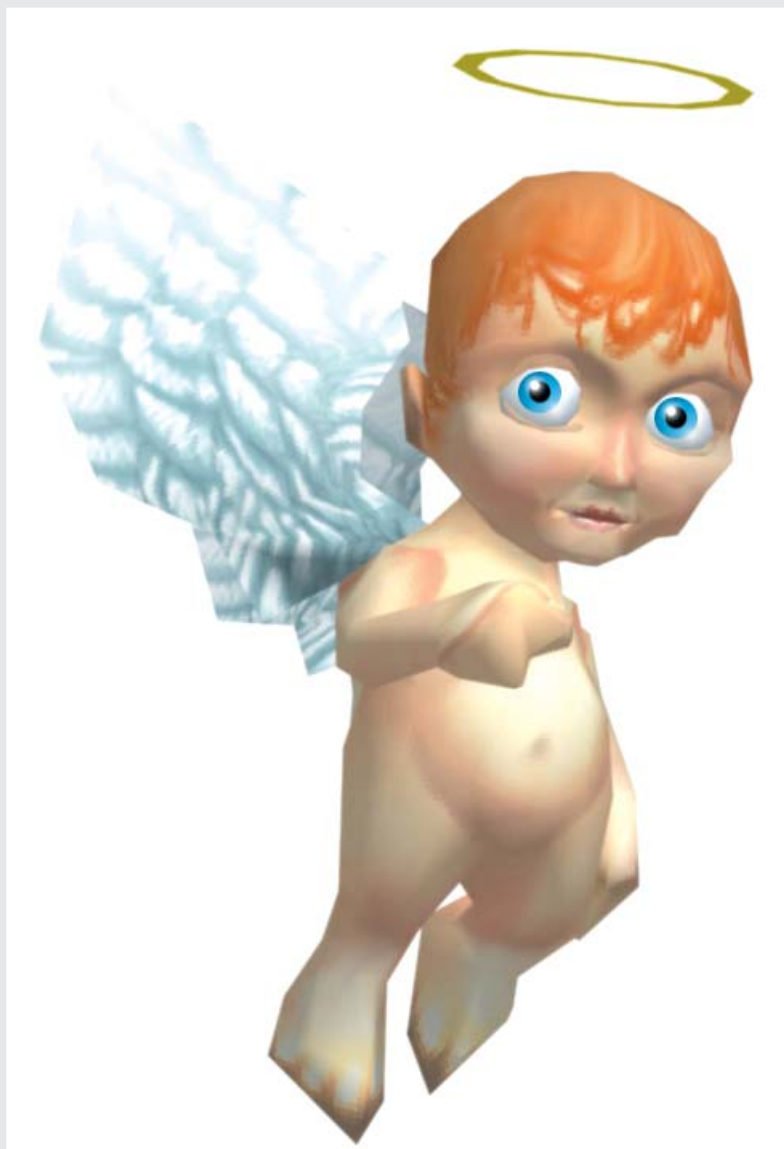
“As I wrote the Advisor dialogue, I now had to make sure I put in the appropriate emotion and animation tags. These fitted into a sentence like so: Evil Advisor: Boss, [afraid] there’s [shakehead] no way you’re getting me [fold arms] through that vortex.

“The only way I could make them fit was to act out each line, saying it aloud and trying out some of the emotions and animations. I did a lot of this working from home, but not only was it disruptive to have me hollering in the studio, but I was a little too self-conscious to be saying all this stuff and acting all the movements and expressions out.”



This Good Advisor, based on a cross between a fairy and Mark Healey’s girlfriend, was never quite satisfactory.

The original Good Advisor, by Christian Bravery. This was felt to be too biblical looking and was dropped in favour of the venerable old yogi.



One person who wasn’t self-conscious was Marc Silk. Leach and Russell Shaw spent a considerable amount of time hunting for the perfect voices for the Advisors. When they discovered Silk, they thought they had the perfect artist to become the voice of the Evil Advisor. Silk was an experienced voice-over man, cropping up in cartoons, TV ads, trailers, and even voiced characters for George Lucas in *The Phantom Menace*.

Shaw describes the first meeting with him: “Marc came down from Birmingham with no idea of what we wanted. He was a gamer and had heard of **Black & White**, so that made things easier. We showed him the two Advisors bobbing around on a screen, and we gave him our ideas of how we thought the evil guy might sound. Mark Healey still wanted a gruff New York cab driver style for him. Marc tried a few ideas and within a minute or two, he had it.

“We were happy with the voice and were prepared to leave it at that, but then Marc started to try out a totally different voice for the Good Advisor. The quirky, English tone that made it into the game took about three minutes to nail. He could do both with consummate ease, which meant we could almost halve the recording time, the dialogue would flow better and the two sides of your one conscience would, deep down, have one voice. It fitted beautifully.

“We went into my sound studio and recorded the first lines. At this stage, the game was still being changed, so James was editing and altering scripts left, right and centre. But simply to have the characters voiced professionally was a great help. Up until then, we’d had to do it ourselves. James is still teased about his version of the giant creature guide.

“Our studio manager, Janice Nussey, was also recorded as the placeholder female voice, which temporarily satisfied her acting ambitions!”

Shaw, as head of music and sound, had to deal with the voice recording, as well as all the sound effects in the game. In addition to that, he composed the music, commissioned instrumentalists and even played various instruments and sang in the game himself. The Missionaries Song on Land One features the voices of Shaw and Mark Webley, who still await the phone call that’ll catapult them to boy-band fame.



Concept art for the Good Advisor. These were introduced when the game design became so complex that it was felt some method was needed to help the player along.



Facial expressions were very important for the two Advisors, and a complex bones system, coupled with real-time lip-sync technology, was developed to tackle the issues involved in bringing them to life.

A 3D Studio Max render of the Good Advisor.



Shaw talked about the aural side of **Black & White**: “My original idea was to have no dialogue in the game at all—so that you never felt that you were outside of reality. Oh, how I laughed, remembering this, as I edited the 5000th line of speech.

“Anyway, the team had created a world in incredible detail. You could zoom in as close as you wanted to anything or anyone. So I knew that the sounds would have to be as rich as the visuals. I needed to create the ambient noise of a busy village, with dogs, chickens, bangs, and rattles everywhere as life went about its daily business.

“Once I had the tools at my disposal to create and implement virtually any ambience, it quickly became a game of ‘zero-silence’—virtually every area of the landscape automatically playing a rich texture of layered ambient sounds. The sky (or CD space) was the limit!”





But then Shaw also had to create the sounds of mighty Miracles, the gods themselves, of course, and the 70 tunes that get played as the player advances, with each set of sounds requiring a good and evil counterpart, depending on the player's Alignment.

Shaw continued: "Oh, and remember that there are eight tribes, each with a vastly different culture and set of musical styles. All those had to be catered for. My lack of ethnic instrument playing ability was looking like a big shortfall. Luckily, we enlisted the help of Steafan Hannigan, an expert on ethnic and cultural music instrumentation, who had played on projects for big-name artists such as Bjork and Gary Barlow. Hannigan enlisted a team of quality musicians that covered the instruments for all the tribes in the game. Once each soloist had recorded 15 minutes or so of catchy ethnic riffs and rhythms, the job of incorporating these into the ambient music backdrops was a painless task.

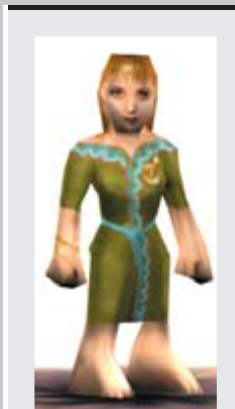
“All the tunes had to blend seamlessly between tribes as you moved around”

Russell Shaw, head of music & sound



Spiritual healer, a script character from Black & White.

Shaolin.



A Celtic woman.



A Celtic villager.



A hermit.



A skeleton villager.

“**Black & White** was a rich, lush game, both visually and aurally. And all the tunes had to blend seamlessly between tribes as you moved around the landscape, and between good and evil as you crossed godly boundaries. In fact, the sounds and music take up five times as much space on the CD as the game itself!

“Marc’s in-game speech was laid down over three and a half days at Electronic Arts’ huge sound studio in Chertsey. James directed the sessions and EA’s engineer Bill Lusty recorded all the lines directly onto hard disk; at the end of each day he dumped the massive tracks onto CDs, which I got the next day. I then had to cut up each line and assign it to the lines in the game so they’d play correctly. The game’s flexibility meant that each script or line could be triggered at any time, and they all had to be accessed easily and quickly.

“Later, we recorded two more highly experienced voice artists, Hugo Myatt and Shelley Blond at Lionhead. It put me under pressure, time-wise, because when we were recording I couldn’t be doing anything else. We got it all done, though, and after some extremely late nights I cut up the lines and put them into the vast sound banks which are accessed by the game.”

Early texture maps for an Egyptian inhabitant.





“a game quite
unlike

any
other”

οτρηετ

συη

αυηβε

σδωεδιε

“a game quite unlike any other”



Render of the finished lion creature, produced for the cover of Game Star magazine (Germany) March 2001 issue.





Jonty Barnes described the ideas and work that went into the script editor: “We knew we wanted to have a very involved story in **Black & White**, to add purpose to the whole game. At this time, though, we weren’t yet a complete company of employees, and everyone was at full stretch hurriedly trying to put together parts of the game for early demos to the press. So many scripts and so much work had been done, we had to make sure the script editor was powerful and versatile enough to deal with it. The construction of the editor is worth describing.

“we knew we wanted to have an involved story in black & white, to add purpose to the game”

Jonty Barnes, programmer



“After we came up with a rather ad hoc idea of what was needed, Richard Evans went out on a limb and started a script editor to see what was possible. Within a month, while working on the creature, he managed to put together a simple script editor where the programmer could make simple camera angles, and move characters from one place to another. Then, when 3D programmer Jean-Claude Cottier finally provided a widescreen function, we had our first script.

“Suddenly, the story was well underway. As usual, Peter wanted his ambitions realised as soon as possible. He wanted an epic tale; one not limited by player interaction, and which analyses the player throughout. The story must be able to harness everything in the game and make it beautiful. We needed a script system—and we needed it within the next month!

“The scripts were becoming complex things, and more serious tools were needed as a result. Artists were going to need to edit scripts, with camera tools for cinematography, creature analysis and manipulation, villager actors, player interface, Alignment, and ability analysis. And that was just for starters. The early prototype didn’t have what was needed, but it was a great start for us to learn from.

“Scripts weren’t allowed to interfere with the game too heavily, and the game couldn’t interfere with scripts or they’d go wrong, plus a safety system was needed so this could happen without too much difficulty. We needed some serious tools, but Richard now had a full-time job with the creature.

“We needed to design a tool which could be edited without the game updates affecting its data. Something artists could use to make things beautiful, something that enabled level designers to create suitable conditions for events to occur, and something programmers, if they really needed to, could make complicated scripts with.



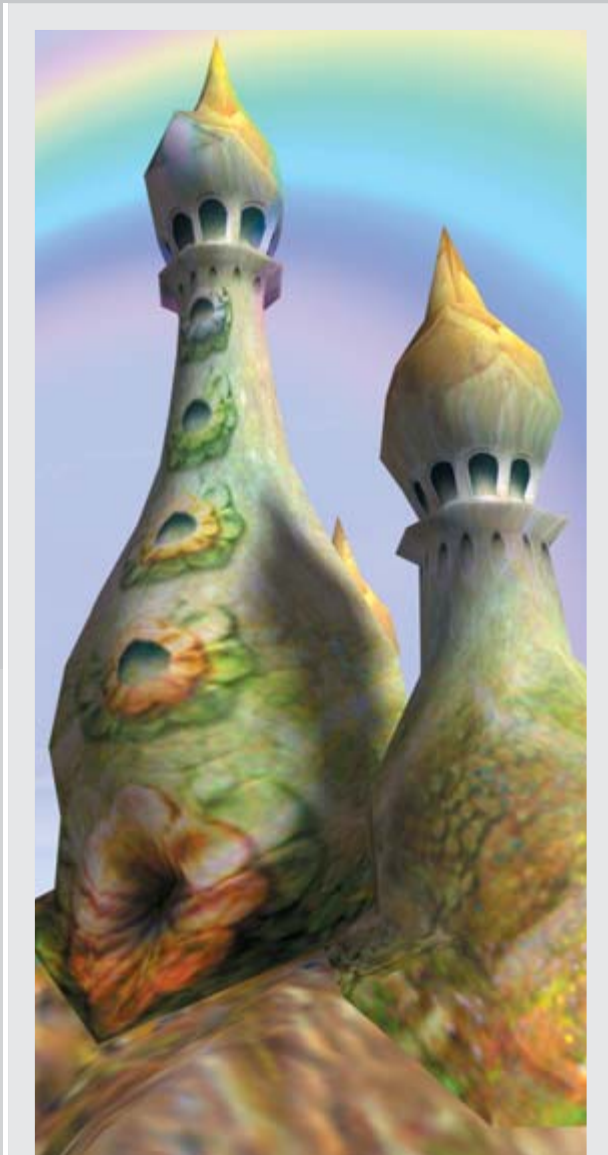
Your proud lion creature makes his way through a village, impressing the inhabitants, some of whom bow down to worship you.

“So a chap called Jason Hutchens, an expert in languages, was brought in, and Jason and I set about making a more natural language compiler for scripts in **Black & White**. A language which enabled people to easily perform simple functions, and yet get into more complex usage if required. What this really meant was people could work with script files and make lines like the following:

move lost brother to the
position of sister
wait until lost brother near
the sister

The graphics interface, designed to sit on top to hide the complexity, also enabled the manual editing of scripts.





Just one of Black & White's Temple structures for your subjects to admire.

"At this time, we had some challenge ideas together as examples. The earliest, and still present in the game, was the Lost Brother scenario. So we looked into what was needed for a simple script like this.

"In the game, you have a house, a sister and brother. The sister has lost the brother and the brother is ill in the woods. Do you reunite the sister to the brother in the script? Of course, the player should be allowed to do anything. They could destroy the house the sister lives in and kill or antagonise the sister in a number of ways—hit her with an object, throw her into the sea, remove the sister, but take the brother home, taunt the sister by holding the sick brother in your godly hand... You could do anything or, of course, you could do nothing at all!

"Any approach the testers, and ultimately the public, could come up with we needed to cater for. We needed a system which could generalise these conditions as much as possible. Otherwise, it was going to be a far too complicated task.

"So if we look at what's required in that 'simple' script now, we find:

- camera movement for cinematography.
- dialogue and widescreen control, so that only one script at a time grabs the player's attention.
- advisor control with animations: pointing, movement, looking, etc, and with text, which could be in any language and therefore last any duration.
 - events triggered on time, game conditions and camera position.
 - special effects.
 - screen fades.
 - snapshots and reminder system for inside the citadel.
- villager characteristic manipulation, movement, animations, and intelligence from the game AI.
 - music and sound effect functionality.
- 'containers' for manipulation of groups of things.

“As you can see, slightly simpler, but with the right tools such functions were simple enough for non-programmers to play with. Between us, we had come up with a script language in **Black & White** that, once implemented, started reaping results immediately, and was powerful enough for complicated scripts. I'd even created a debugger, so you could step through the scripts and find out what was going on.”

One habit Molyneux carried over from Bullfrog was his need to call Friday meetings. He'd discuss the game and the company—in fact, anything he thought the development team should know about. Early on in the project, these meetings usually introduced new recruits. But as the team grew to its optimum size and settled in, the talk turned back to the sometimes slow progress of Lionhead's epic **Black & White**.

Molyneux remembers: “One Friday, I told the team that this was the most complex piece of software I'd ever seen, let alone worked on. I even thought it might be the most complex ever written. I mean, there are over two million lines of code! What we had was a huge number of elements, many of which had been worked on separately. The creature, the villagers, the fighting, the Miracles—they were all distinct elements. And all the challenges still existed as code, rather than as seamless parts of the Land.



Now, is a Smiley going to impress the villagers at their local shindig?

“So now we got to the stage where the parts were being bolted together. It was like an aircraft being constructed. The wings come from Bristol, the body from Dusseldorf, the electronics from Lyon... But when you connect it up, it all works. And when the parts of **Black & White** were joined, they worked just as well. But there was one thing I knew would be problematical: balancing. The bugs were being fixed at a rate of knots, but balancing, as I said to the whole group, was now vital.”

It's one thing for a game to work, but it's quite another for it to provide the playing experience it was designed for. It was time for the Quality Assurance team to dictate the pace and direction. The kings of gameplay, these people went under the unofficial title of testers. Andy Robson was head of the department. He told the story: “We'd been checking anything and everything we could since the project started, but the big deal was when all these little sections were integrated.



The end of another day in a Japanese village.



“All the buildings, villagers, Miracles and so on in the game had a spreadsheet table of stats relating to them. And by altering a few, you could make the people live longer, believe in religion less, move faster, etc. Or you could alter the creature’s thought processes and abilities. You could even determine how much wood was in a tree or how much food a fish represented. You could alter practically every parameter.”

Nathan Smethurst was another veteran tester. Although he knew how easy it was to change things in **Black & White**, he also knew that that wasn’t the problem.

“Everything in this game interconnected,” Smethurst said. “If you decide that buildings spring up too easily, you make each one require more wood. But then the villagers decide to send more people out to get more wood, and they don’t tend their crops. So they’re working harder and eating less. They get ill. The player might have to look after them instead of hunting the Creed. Suddenly, the entire complexion of the game has changed. All because it takes an extra chunk of timber to build a house.”



And, not making things any easier, there was still the odd bug lurking in the game, as tester Joe Borthwick explained: “One of the big concepts was that you, the player, could do what you wanted. This freedom meant that we had to test and check every possible course of action. For example, nobody would cast a Miracle while staring directly down at the ground, inches from their face, but we had to try it, to see what would happen. Also, there were elements and objects in the game that were vital to the story. What would happen if you threw something like a Gate Stone out to sea?”

“We double-checked everything, but even quite late in the day there were still things we had to class as bugs—things that needed ironing out. And as I’ve often said, designers and artists create it, programmers make it—and us testers try to break it.”

For tester, Aaron Ludlow, **Black & White** proved a deep-end introduction to the field: “You can complete some challenges in up to 30 different ways, so testing took a lot of time and effort. But I’ve enjoyed every minute working with the most talented games designers in the business. Roll on, **Black & White 2!**”

Steve Lawrie, another staff member who spent a lot of time testing, recalled yet another complication: “We had several spreadsheets packed with data, all of which was being changed one number at a time. But the scripting spreadsheet James Leach had been placing all his text and dialogue in was actually turned into 15 variants, each with the text in a different language. We had to go through all of them to check that they all matched up. In projects of this size, tiny errors do occur, especially when a 7000-line document containing out-of-context scripting lines is sent to people who’ve never played the game before and don’t understand what they’re translating!”

Coding for the Internet and multiplayer elements in **Black & White** fell to Georg Backer, an Austrian. He and Leach flew to

Lion in the moonlight: “The lighting in **Black & White** is pretty realistic. We spent a lot of time getting it right, to add genuine atmosphere to our 3D world”, Alex Evans.



Bringing all the game elements together was a tough task.

Hamburg to oversee much of the recording of the German version: “All the European translations were of a high standard,” said Backer. “The people who did these hadn’t played, or even seen much of the game, and the lines were often hard to understand. For weeks, James had been answering daily lists of questions relating to slang, to abstract ideas, and simply to lines that refer to something being pointed at or shown.

“But the scripts which we were given in the studio at Toneworx in Hamburg were more accurate than we could’ve hoped for. A steady stream of voice artists came and went, and as James and I explained every context and answered questions, the huge scale of the project was brought back to us.

“Whereas we’d used just a handful of actors, the Germans ended up employing 26 to do the voices. The sheer range and variation sounded great, and it would have been fun to have heard a German equivalent of Marc Silk doing his repertoire, just to have compared them.”

The multiplayer and on-line elements of the game were written alongside the single-player version. For much of the project’s life, Lionhead had retained close contact with various worldwide fan-sites. Not only was this a good way of gauging what the fans were expecting the game to be like, but the company was greatly heartened by the warm support from this quarter.

Clans, groups of players who want to play together, were being born, despite the fact that they didn’t yet have a game to play. Jamie Durrant and Georg Backer, who dealt with many of these sites, describe the level of support. Backer said: “We were amazed by the amount of accurate information the fan-sites were getting. We were happy to provide them with interviews, images and the odd red herring, such as when we put the letter ‘J’ on a site, nothing more. We replaced it later by the word ‘Revelation’. The amount of discussion this caused was immense, but the truth was we did this as a teaser. It didn’t mean anything!”



“At Lionhead, we were often so busy that we didn’t have time to update our own homepage at <http://www.lionhead.com> as regularly as we would’ve liked, so I sometimes visited the fan-sites to find out info about the game I was working on!”

The multiplayer elements were finished, but now it was time to slot them in and test them. They gave rise to what became one of the most dreaded phrases in the building: The Out Of Sync.

Dan Deptford took up the story: “For a multiplayer game to work, all the connected machines must have exactly the same stuff happening on them. But the thing is this game is so flexible. You can do anything, and everything has a knock-on effect on something else. For example, you can throw a rock that knocks over a person who drops some food that doesn’t get to the Village Store that causes a shortage that... You get the picture. It’s a fractal system, so everything must match.

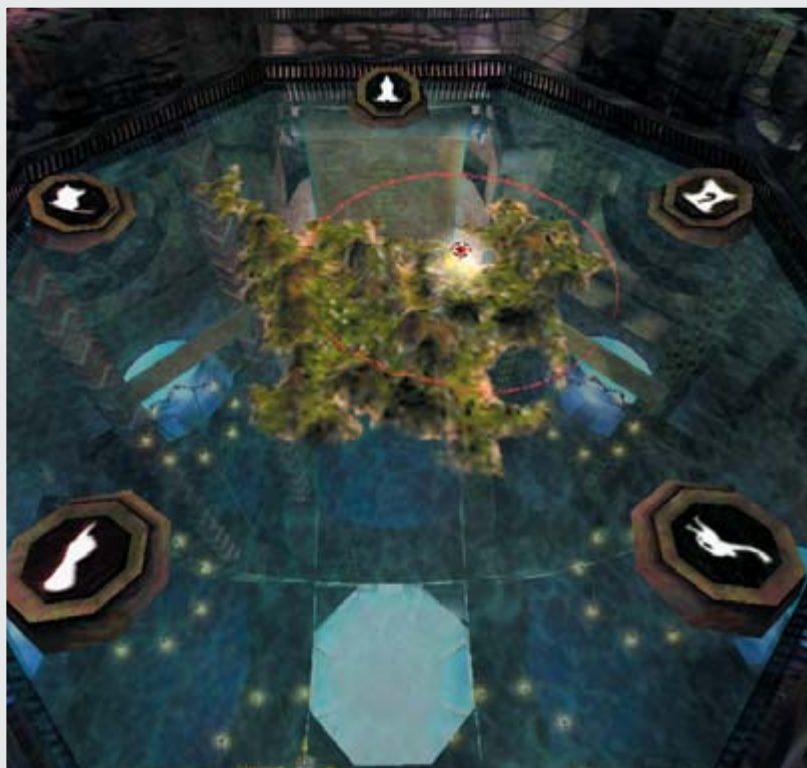


“This tool and the system behind it allowed the good and evil advisors to lip-sync their dialogue ‘on the fly’. This saved us hundreds of hours of animation time, as an animator would have had to animate the lip-sync for both characters in many different languages,” Alex Evans, lip-sync editor.

“Out Of Syncs occur when things don’t match perfectly between machines. Once we had two computers running the multiplayer mode and things seemed to be fine—but then an Out Of Sync reared its ugly head. One of the villagers on one machine had grown 0.005mm taller than the same character on the other machine. This was enough to cause a problem. At the time, I recall Tim Rance asking me why I hadn’t noticed the taller person. He narrowly avoided having a PC dropped onto his head for that.”

The real-time on-line weather system also produced effects the team didn’t expect. Georg Backer coded the feature and explained what happened: “If the player has a link to the Net, they can have the real-time weather for their location running on the lands in the game. We tested it with a friend of mine, and the game started in darkness. The family at the beginning ran down the beach to the sea in the middle of a snowy blizzard.

“It looked like a graphics problem, but then I realised that my friend was testing the weather at his location high in the Alps. And outside his window there was indeed a blizzard! After that, we switched the weather system from being a default to being an option you have to choose to turn on.”



Find out what’s going on where in the World Room.

Jeremy Chatelaine, who programmed the in-game weather generation system, commented: “My weather code might not reflect the real world, but at least you’re guaranteed some sunshine, some rain and occasionally snow, rather than sunshine, rain or snow all the time!”

Chatelaine also worked on the on-line game: “We wanted clan play, where two or more players could play the game as one god. This was something I really wanted in **Black & White**, but I had two weeks to implement the interface, or it wouldn’t have made it into the game. That was scary! The multiplayer modes are always one of the last things to finish, and we were desperate to get the clan features done. We went without sleep for a while as we did it, but the great day came when we tested it in-house, and four of us played as one god.”

To run the on-line side of the game, Tim Rance oversaw the installation of two massive servers in London, which would solely handle **Black & White’s** huge on-line community at <http://www.bwgame.com>. He spoke about how it went: “To minimise the chances of cheating, we decided to have all the clan creatures stored on our servers, rather than on players’ home machines. I had these enormous, heavy servers in the back of my old car, and when Georg and I turned up at the company with whom we’d booked space, the first thing they did was demand to see our passports. We didn’t have them.



Concept sculpture of the lion creature, by Richard Johnston.



“But you’re expecting us!” I argued. The security official would neither confirm nor deny that he was.

“We’re from Lionhead. You have to let us in.” I saw him staring at my ancient, battered car. He still wasn’t convinced. Luckily, Georg had his Austrian identity card and it turned out that the security man had served with the armed forces stationed in Germany, so he and Georg chatted in German and, finally convinced, he eventually waved us through.





Admiring the glorious architecture of your Temple.

Now this guy is most definitely batting for the dark side.

“The building was like something out of Blade Runner. Hundreds of locked steel cabinets hummed and whirred. This was where some of the most important servers in the country were located. We found our cabinet and squeezed our servers in. Inside, all we could see was one cable dangling down from the back. We plugged everything in and the servers powered up. Then, silently observed by a thousand video cameras, we made good our escape.

Communications within **Black & White** were also something the on-line team worked on. It provided Rance with a perfect opportunity to score points on one of his colleagues: “We included a feature which would enable anyone playing the game, single-player or multi, to check whether anyone else they knew was playing worldwide at the same time.



“To test this, I decided to send a message to Richard Evans, who was hunched over his computer late one night, struggling with some artificial intelligence problem. I didn’t tell him what I was doing, and I don’t even think he knew I was still in the studio. I sent a message and he jumped as he suddenly saw his creature sprout a speech bubble. In it were the words, ‘Richard, I think I’m falling in love with you.’ For a second, he thought his AI had got out of control and his Creature had formed a real attachment to him!”

From the middle of 2000 onwards, the game was officially in its final stages. The team, far from being able to take stock, faced the hardest work of the entire three years. As build after build of the software was burned onto CDs, bugs cropped up everywhere. It always happens with complex computer code, but each bug had to be found and fixed. And in the fixing, it wasn’t uncommon for a host of other bugs to be created.

Deadlines were looming. Molyneux is known in the games industry as a man who takes an elastic approach to dates and deadlines, but as 2000 rolled by, each Friday meeting contained a status report which meant more and more weekend working—and later and later nights for the team.

What slipped by almost un-noticed by everyone except the testing team was that the game was definitely getting better and better. No longer did it crash, hang or lock up. And now the graphics were honed, the text perfected, the sound and the code tweaked, it became the game it always promised to be.

Black & White was to be published by Electronic Arts, and as 2000 drew to a close, a team at EA took an active role in the game’s production. Testers there were employed, localisation people were on hand to check and alter the 15 foreign language versions, and adverts and marketing was set in motion.

It was up to Cathy Campos of Panache PR to ensure that everybody knew the game was finally coming out. Media attention had, thanks to her, always been strong, but now it was time to whip up a frenzy.



She wants you to find her ailing brother.
Are you in the mood to help out?

The bug list, on a whiteboard in the centre of the Studio, showed the number of bugs dropping, rising, dropping then rising again. But as the New Year came around, the number dropped quickly and didn’t go up again.

Many people outside the company were now playing the game. And already the atmosphere started to change. For the length of the project, the busier the development team had been, the less able they were to step back and see it objectively. Now that wives, girlfriends and others were coming in to play, the Lionhead employees saw the game in a new light. People marvelled at the landscapes, and were amazed at the villagers and the buildings. The realistic physics, the scripts, the animations, the game engine all looked and felt fantastic. The Advisors, the creatures and all the animals were incredible. The text, the dialogue and the story, the multiplayer game, the on-line clan elements had jaws dropping. And then the echoey vault of the spectacular Temple brought a hush to the testing room.





People were bowled over by their first view of a game quite unlike any other. And the team had confirmation of what they'd believed all along—they'd been working on something special. The fan-sites had always talked about **Black & White** making computer game history: now that prediction was coming true.

The entire team sat down and played the game on their machines. The intro faded, the landscape came into view and the first villagers appeared. The whole thing looked gorgeous. And, as the art team commented, it looked right.

The villagers on the beach spoke. The voices were in there, and they worked. And the Advisors arrived and introduced themselves, full of fact, emotion and sarcasm. Instantly, they became engaging characters, figures in the drama that you'd want to get to know.

Next came the villagers—dancing. Yes, the music was there, as was the chanting. It all fitted seamlessly.

And then the Temple. Not yet built by the teams of tribespeople, it grew until it towered over the land. Below it, the first settlement squatted, a microcosm of real life, with people going about their daily lives, perhaps with a new sense of purpose now they had a god to worship.

And then the first quests and challenges started. The complex script language, which let you do anything you liked, was there, and it did its magic behind the scenes, leaving you, the player, to get on and be the god you wanted to be.

And finally the creatures themselves. The great gates slid open, and down the valley path, there they were: three triumphs of AI, design and advanced blending animation.

As the team played on, tiny bugs were noted and corrected, and alterations made to timings and views, but the game took on a life of its own. As a stunning collection of elements and features, it was impressive enough. Nothing like it had ever been done before. But when the whole thing was melded together, it became an experience. It took gaming into a totally new world.



Early designs paved the way for **Black & White**.

During the wet month of February 2001, all the designing, the coding, the writing and recording was complete. Checks, tests, tweaks and bug fixes were drawing to a close and the massive marketing machine started to take over. **Black & White** had come a long way from the original idea and the small band of people who thought it through around a coffee table in Molyneux's home.

“a game quite unlike any other”

During its three years in development, the project changed to encompass new technology, new ideas and fresh thinking at every stage, and everybody who worked on it and tested it has left a stamp on the software. It can't be said to belong to any one person, but Peter Molyneux's comments probably sum up the thoughts of the 25 people who make up Lionhead Studios' development team, and who had worked the closest on this project:

A new day dawns: Lionhead's incredible **Black & White** is all set to revolutionise the way we play computer games.



“This is a game I've wanted to make all my life, and this is the team I wanted to make it with.”

Peter Molyneux,
creator of **Black & White**

“It's been an incredible game to have done. I think it's ironic that **Black & White** deals with such lofty concepts as good, evil and godliness, because for the team, it's been a life-changing experience. We put everything we had into this title, and yet the end result has totally exceeded my expectations. It's better than I ever could have hoped for.

“Lionhead Studios have achieved what we set out to do. This is the game I've wanted to make all my life, and this is the team I wanted to make it with. And we've thought collectively about it for so long, we're still thinking collectively now. Only this time, we're all thinking about taking a break, resting and coming up with our next game. Now I've got this idea...”





the lionhead team

Peter Molyneux, managing director



Paul McLaughlin,
head of art



Aaron Ludlow, testing



James Leach,
script writer



Ollie Purkiss, programmer

Alex Evans, 3D programmer



Steve Jackson, director



Scawen Roberts,
3D programmer

Jamie Durrant, Web
development and scripting



Catherine Tutton, admin • Andy Bass, artist • Cathy Campos, PR • Jean-Claude Cottier, 3D programmer



“a game quite unlike any other”

Christian Bravery, artist



Tim Rance, technical director



Georg Backer, Internet network programmer



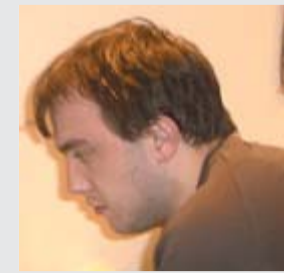
Claire Headley, office manager



Andy Robson, testing manager



Russell Shaw, sound and music



Nathan Smethurst, assistant test manager

Mark Healey, artist • Joe Borthwick, testing • Daniel Deptford, programmer



Mark Webley, project manager



Jeremy Chatelaine, programmer

Richard Evans, programmer



Paul Nettleton, programmer • Giles Jermy, programmer

Jonty Barnes, senior programmer





black & white

designed and created by
lionhead studios ltd

game programming

Peter Molyneux • Mark Webley • Jonty Barnes • Giles Jermy
Oliver Purkiss • Jeremy Chatelaine

3D programming

Jean-Claude Cottier • Alex Evans • Scawen Roberts

Art

Paul McLaughlin • Mark Healey • Andy Bass • Christian Bravery

Animation

Eric Bailey

Artificial Intelligence

Richard Evans

sound effects, Music composition & Arrangement

Russell Shaw

script & dialogue

James Leach

scenario & level design

Jamie Durrant • Paul Nettleton • Ken Malcolm

gameplay & testing

Andy Robson • Nathan Smethurst • Steve Lawrie
Joe Borthwick • Aaron Ludlow

internet programming, library & tools

Tim Rance • Daniel Deptford • Georg Backer

lionhead studios

Steve Jackson • Janice Nussey
Claire Hedley • Catherine Tutton