Being structurally sound, the influx of animals into this level has been partially controlled by the Guardians, but an unstable power-balance exists here, which the Guardians are slowly losing as the animals continue to multiply on Levels One and Two. They are attempting to redress this imbalance by befriending a small number of Mogs (detailed later) and allowing them to live on Level Three as 'watch-dogs'. But the Mogs have long memories and have been mistreated by the Guardians in the past, so a player should be able to bypass them without too much trouble.

The main dangers on Level Three are the more vigilant Guardians and the small but hardy selection of animals that manage to stay there.

Level 4

Level 4 consists mainly of the long corridors that bring the player at last to the Sanctum Atrium – the approach to the Inner Sanctum itself. The Guardians have maintained control of this level completely, which means there are very few animals here for a player to contend with. There is one particular nasty however, that the Guardians have deliberately introduced as a final barrier against intrusion – a large, voracious predator from the caves below which they call Leo. It is a meat-eating dinosaur that is now, of course, perfectly adapted to life in Aeternis. Contained within this level, alone and hungry, it will track and kill any living thing that enters Level 4. There are ways a player can by-pass Leo, which are detailed later in this chapter.

The eastern hallway

Level 5

Consists of two areas; the Sanctum Atrium (the long and majestic approach to the doors of the Inner Sanctum) and the Inner Sanctum itself. The Guardians have many secret means of getting quickly from level to level, and may manage to launch a last-ditch attack upon the player along the concourse of the Atrium. They cannot enter the Inner Sanctum any more due to the bright golden light suffusing the Holy Grail chamber, which their sensitive eyes find extremely painful.

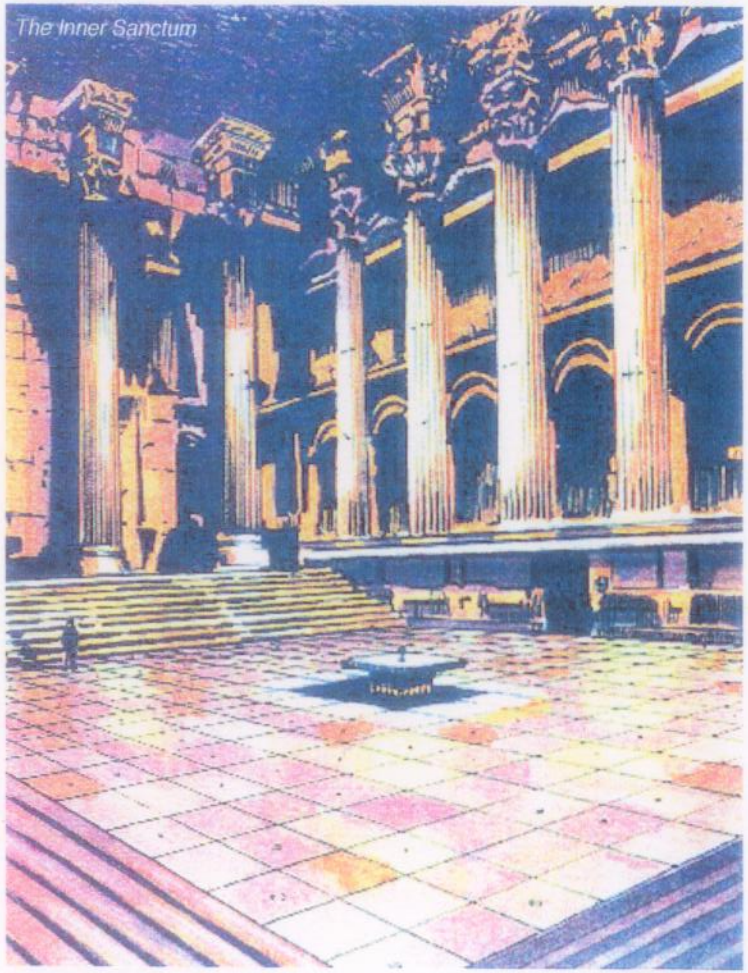
There is one last test for the player who successfully reaches the huge, double-doors of the Inner Sanctum – a final puzzle which must be answered before entry is allowed.

Once inside, the player is safe from all creatures and Guardians, and has only the challenges of the room itself to contend with (unless another player is in there at the same time of course). Stairs lead down to a large, marble-tiled floor, in the centre of which is an ornate altar with the Grail in the centre. The whole room is lit by a golden light about the Grail, and a strong shaft of bright sunlight stabs down through the ceiling high overhead to highlight the altar and the Grail. The solar cells of the helmet begin to re-charge rapidly and any physical damage the player has encountered begins to heal.

Having reached the altar, the player will now try to lift the Grail and place it in his pack. Removing the Grail from the alter also causes a deep, slow warning bell to toll continuously throughout the temple, alerting the Guardians that the Grail has in fact been removed. Also, the grail is quite heavy, and cuts down on the amount of equipment the player's Raptor can carry.

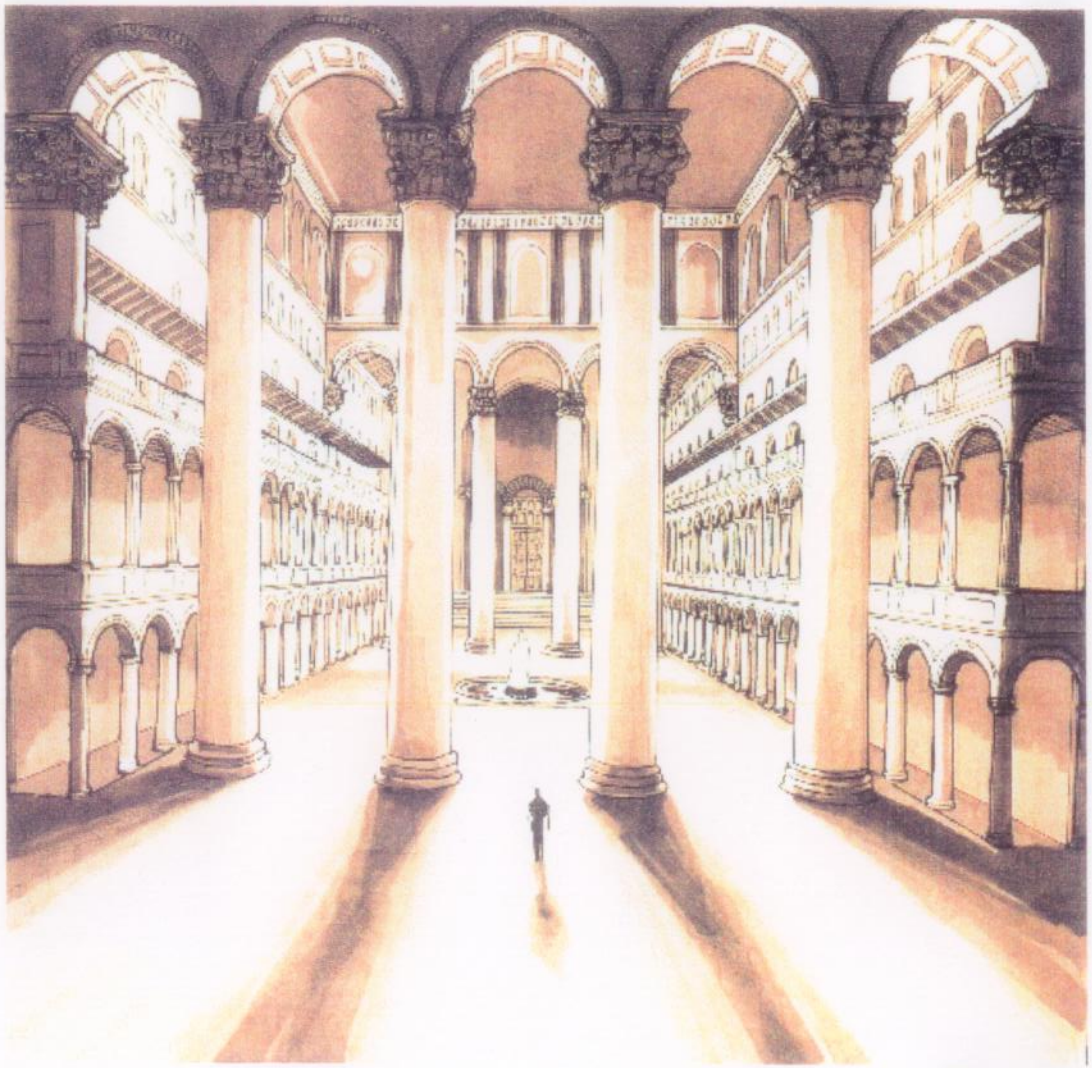
Having successfully stolen the Grail doesn't mean that the game is nearly over, on the contrary, the player must now make their way back through the same levels and dangers to the freedom of the outside world. Fortunately the possible ways out of the temple are as varied as they were on the way in.

A player who is killed during this escape will of course have to start again, and will find that the Grail has been returned to its rightful place upon the altar. There is also another danger for the newly-successful Raptor, which is that he may be tracked and held up by the other Raptors who have by now also been alerted. A player who is held up and relieved of his precious booty will need to track the thief and steal the Grail back before they reach the exit.



The Inner Sanctum

The Sanctum Atrium.



Creatures

Mogs

Mogs are an extremely ancient form of human being that inhabit certain rooms and chambers within Levels One, Two and Three. They are in fact the missing link between man and ape and are secretive, private and jealously guard their territory against intruders.

They have evolved within Aeternis and can now speak a crude form of English, but their intelligence is still fairly limited. A player coming into Mog territory will be asked politely but firmly to find another route. Doing so will show respect for their privacy and may bring benefits later in the game. Continuing to invade their territory will often provoke them to violence. Sometimes this is unavoidable, particularly if being pursued by a Guardian, but a player can usually see them off with the help of his modern weapons. By doing so however, that player will then be marked as a' Mog enemy' for the rest of the game.

Their weapons are crude spears and arrows, but their intimate knowledge of the territory and their natural stealth make them dangerous opponents. Their are six tribes living within Aeternis, each tribal group numbering about ten individuals.

Lurka

Lurka is a Mog who has been adopted, trained and educated Tobias. He now has similar intelligence to that of a human and Tobias' eyes and ears within Aeternis, reporting any news and ents back to him in the Grand Library. He also issues orders or rries out specific actions under Tobias' command.

Lurka has a cunning and inquisitive personality, and enjoys the position of power he holds within Aeternis. He is aware of the Raptors and their objective, and is intelligent enough to suspect that the theft of the Grail will diminish his master's purpose and powers – his real fear however is the effect that this will have upon his position of authority within Aeternis.

He always obeys his master's orders however, for he loves him in his own way, but he has no love for the Raptors. He therefore appears at various times throughout the game offering advice or clues from Tobias, but usually hiding this information in the form of a riddle or a nonsense verse. He will appear like a mischievous imp to the player, who will have to tolerate his riddles and non-sense for the valuable information they will eventually divulge.

Sasha

Sasha is a water creature who lives in the canals, fountains and waterways of Aeternis. She is the last of an ancient race of beings who have vague links to both humans and whales. She looks human and female but is not, for her skin is composed of millions of minute scales, her long, clawed fingers are webbed and her bottom half consists of long dual fins. Her teeth are sharp and triangular and her eyes are slit like a lizard's, with a double eyelids like an alligator's. All the creatures of the waterway obey her.

The rest of her race inhabited the open seas and died out many millions of years ago, but she favoured the deep, ancient waterways of the caves under Dunstanburgh and survived, nurtured by the surrounding Grailstone. She is old and wise now, but terribly alone.

Tobias found her centuries ago, befriended her and taught her to speak English. She is therefore aware of the Holy Grail, the Raptors and the terrible vision of the future that Tobias has foreseen.

A player can sometimes summon her by tapping on the side of her fountain on Level One (near the Grand Library) or else she may appear in one of the other fountains or canal ways on Level Two. Her thought processes are very different from ours which makes her difficult to understand, but if a player perseveres and a relationship develops, she may confer a gift of knowledge about the waterways.

Leos

Leos are one of the three species of dinosaur that escaped extinction by accidentally wandering into the cave systems millions of years ago. They have adapted perfectly now to life in complete darkness, and have long since lost their eyes. Instead they have gained a large, fan-shaped extended ear which runs along the back of their heads, which allows them to track their prey by sound. They use this 'ear' in conjunction with a complex sonar system which emits high frequency 'blips' from the front of their snouts. A player being tracked by a Leo can actually hear these sonic 'pings' getting louder as the animal zeros in – an unnerving experience.

This very sensitive and efficient system allows the Leos to almost 'see' in the dark, but relies completely on a moving target. By standing still a player can therefore obstruct a Leo, but they are not stupid and will roar and thrash about, hoping to intimidate the prey into moving or running away. But if the player holds their ground the Leo may pass them by. A player can also escape by firing on and damaging the large frilled ear at the back of their heads, but unfortunately this requires the animal to be quite close.

Their sense of smell has also become much more attuned, and this is usually how they begin to hunt.

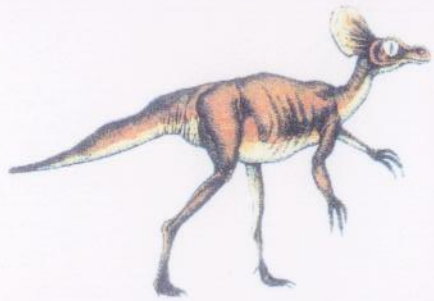
Skin colour and markings are of no importance in the dark, so their skins have lost their pigmentation, becoming almost transparent. A full-grown Leo stands about four metres high.

Thankfully they are small in number, but do hunt on all levels except Level One. Those still in Underworld often try to attack players who go too close to the bars.

All the dinosaurs in Aeternis are merciless, predatory scavengers, and have therefore been named by the Guardians after certain relevant Popes in history.

Theos

Theos are like smaller versions of Leos but have adapted back to the semi-darkness of Aeternis, retaining their eyes and pigmentation. Those that dwell in Aeternis have lost the ability to use sonar, and the frill at the back of their heads has reverted back to a purely ear-like function. This is not a disadvantage because they have developed a unique style of hunting – their skin has evolved the chameleon-like ability to change colour to match the surrounding brickwork. Thus they blend into the background, waiting for prey to come past them – then they attack suddenly and violently, seemingly coming from nowhere. A player must therefore shoot quickly and accurately to despatch them.



This method of attack makes them extremely dangerous to a player, for the MS-2 helmet relies primarily on movement for detection, and thus there is no prior warning of their presence. A keen-eyed player will sometimes be able to see them in advance however, lying flush and motionless against a wall, and will easily see them off with a shot or two. The player must therefore learn not just to rely on technology but use their eyes as well.

An adult Theo stands about two metres high. They occur on Levels One, Two and Three and rely on surprise and speed for the kill.

Other Humans – Living

Eugenes

Eugenes are about the same size as a turkey. They make a precarious living as egg-stealers and as such help to control the populations of Leos and Theos, scavenging for food when times are lean. They are also the favourite prey of many predators in Aeternis and are therefore sly and nervous creatures by nature. As a side-effect of this, they tend to congregate in areas of brighter light, since most of the other creatures which inhabit the temple find it uncomfortable.

The only direct threat they present to a player arises if the player's Raptor is unconscious or immobilised, when they might attempt to eat them, believing them to be carrion. The largest threat they pose is indirect, for if startled they will run away noisily, squawking a warning to their fellows which often attracts the unwanted attention of nearby hunters.

They occur on Levels One, Two, Three and Four.

The surrounding caves and the general decay of the temple walls have created many opportunities for people throughout the ages to stray into Aeternis. Many entered, survived and later left – they all rapidly aged and died once away from the Grailstone.

The following are those who never managed to find the way back out again. A player coming across these characters may be able to form relationships or partnerships with them if they can win their trust.

Ulrik

Ulrik is a Viking marauder, who became lost and trapped within the subterranean cave-systems over a thousand years ago whilst taking part in a raid on Scotland. Somehow he survived long enough to migrate with the animals into the more comfortable surroundings of Aeternis.

That he survives at all under such conditions is a testament to his abilities as a warrior. Of course the Grailstone has had a part in this, adapting him so that he can see in the dark and adjusting his metabolism to the cold. But he is unaware of this, and simply believes that his surroundings have become lighter and warmer with time. He is of course aware that odd and unnatural things are happening around him, and even to him, but simply puts this down to some act of the Gods. He believes his role is to simply survive until the Gods have finished toying with him, and that then he'll be allowed to go home to his family.

This simple attitude of accepting circumstances has been the real key to his survival, for there is no real conflict within Ulrik's mind which the Grailstone could exaggerate and distort. If anything, the Grailstone has strengthened these simple beliefs and increased his strengths and abilities as a survivor.

Ulrik's attitude is gruff and unfriendly, at least to start with. He is uncomfortably aware that he is a raider trapped on foreign soil, and may even attack the player on first sight, believing him to be a Scottish warrior sent into the caves to find him. Because of the time distortion, Ulrik believes that he has been underground only about six or seven years.

A partnership with him will be difficult to forge as he prefers being alone – but he may join the player for a while if he believes that the successful completion of the Raptor's quest will end his own ordeal.

Captain Ethleridge

Captain Ethleridge was the Captain of the naval frigate 'Dependable' and disappeared from human history on the 9th November 1863. On shore leave at his home near Dunstanburgh he told his wife he was going for a walk along the cliffs – and never came back. It was presumed that he fell into the sea and was drowned.

His military training and natural resourcefulness have kept him alive, but he is utterly bewildered by Aeternis and its inhabitants. However, his stiff and stalwart Victorian mind has put all of this aside as sheer poppycock and rubbish, which he and the Royal Navy will put to right if only he could find his blasted way out of this infernal place.

Behind his pragmatic nature he is in fact a kind and gentle man, eager for news and conversation. He believes that he has been underground only about two months, so he will have questions about outside (1863) world affairs which the player will find difficult to answer – unless he is of course completely honest with him up front.

He has also found a sword within Aeternis, which he knows how to use and which makes him good company in a fight. He has met Ulrik, found him vulgar and now avoids him.

Jack Sinclair

Jack was in the Home Guard during the last war. He was patrolling the Dunstanburgh coastline one dark, cold night in 1943, thought he heard a noise in one of the caves and decided to investigate. He was never seen again.

Jack is old, but he was in the trenches of World War 1 and much more besides – in short he's been around. Faced with the daunting realities of Aeternis he quickly discarded his first conclusion; which was that the Nazis were behind it somehow, and even his second guess; which was that it was some top-secret War Department project and came up with the more or less right answer – that something much older and more sinister was afoot. Since that time his sharp and logical mind has pieced together most of the truth behind Aeternis.

He was rattled by the ghosts and wild creatures of Aeternis, but seeing Ulrik and talking with Captain Ethleridge disturbed him most of all. For these two were alive as he was, but were clearly unaware how far they were outside their own time! He was forced to conclude that time itself was being distorted here and that he too was now becoming a victim, being more removed with every hour that passed.

Realising his dilemma he tried desperately for several weeks to find an exit, but failed. After twenty days underground he gave up, for even his rough estimates placed him now at least forty years outside his own time. The player will now find a man saddened by his loss, but also a man determined to bring Aeternis to an end.

Ghosts

Many ghosts exist within the game. This is because any living thing that dies within Aeternis is held back from final rest by some strange property of the Grailstone. This also applies to animals, which is important to note as phantom animals can often appear and startle a player, despite his equipment telling him that nothing is actually there. They cannot physically harm a player but are often hard to distinguish from the living article, which can be confusing and often unnerving. A player will quickly learn to trust his instruments about what is real and what is not.

The ghosts within Aeternis fit into two categories; minor ghosts and major ghosts. The minor ghosts are the merest reflections of their owners and offer only annoyance and inconvenience. The major ghosts, though confused and disorientated by their present unnatural states, can still carry out short but often helpful conversations with the players. They are listed below.

Tomas

Tomas was a foreman slave who died in a rock fall shortly before Aeternis was completed. His ghost, along with several minor ghosts, now haunts the Workers' Crypt.

The slaves at that time suspected the cruel fate that awaited them, and engineered a daring plan for freedom. As foreman slave, Tomas was able to orchestrate their secret labours and construct a tunnel, under his master's very nose, that lead directly from the Inner Sanctum to a store room on Level Two. Unfortunately he alone knew the means of opening the entrance to that secret tunnel, and to his eternal rancour that information died with him before his friends could use it.

Like all ghosts, he can be found lingering close to his bones in the Crypt, but he is surly by nature and not one to be summoned casually by anyone. The other ghosts may help or hinder the player, but ultimately Tomas himself will not appear unless he wishes to do so.

If a player perseveres and wins his confidence, he may disclose the way into the secret tunnel. This can be an immense advantage after stealing the Grail.

Niamh Cinn Oir

Oisin left his home, met Niamh Cinn Oir and journeyed to Tir Na n Og (the Land of Youth). Timelessness – he stayed 300 years though never aged. Returning to Ireland he found St Patrick and Christianity now had control and, putting his foot upon the earth, lost Tir Na n Og and so aged and died.
– Celtic myth

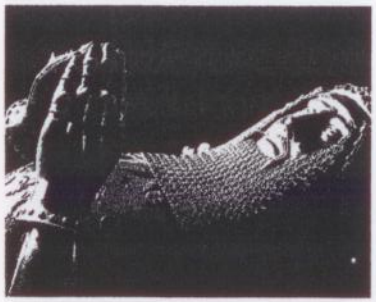
Niamh 'golden hair' was a member of the Celtic tribe called the Solenta, who originally came upon the caves of Dunstanburgh about 1900 BC (see History). She was forced into the caves as a human sacrifice by the Druids in a fruitless effort to appease the evil demons within. The Druids kept sending miners into the caves in an attempt to extract the valuable Grailstone, but each expedition was brutally driven back or lost. Eventually and reluctantly the site was abandoned and the Solenta moved on.

Deep underground, lost and alone, the beautiful Niamh survived.

As mentioned in Celtic mythology, Oisin came upon her several hundred years later in his wanderings. They fell in love, but any attempt to leave the caves made her ill and weak. He turned his back upon the world and joined her in the caves as her lover.

When she died tragically several years later, he left and returned to Ireland. He of course died shortly afterwards of old age, terribly alone and astounded that three hundred years had passed in his absence.

In 1364 the Guardians came upon her ghost whilst exploring the caves. Touched by her sad beauty they moved her bones above into the holier surroundings of Aeternis. She resides now in the Chapel Minor on Level Two.



Vincent 'the Innocent' and Ewatt of Cloyes

These two knights were murdered in the uprising led by Mallik in 1753 and were buried with honours in the Main chapel on Level Three.

Being dead they have a clearer perspective of matters, but a poor grasp on reality which makes them difficult to converse with. They are both aware now of the terrible danger to humanity that Tobias has foreseen, but have differing views on their continued roles within this struggle. Vincent believes he should help any potential thief to get the Grail back above-ground where it belongs, whilst Ewatt's view is that they shouldn't interfere in Gods plans. The player will therefore find Vincent helpful with advice, but Ewatt will only appear to dissuade Vincent from saying too much.

Father Dunstan

Father Dunstan befriended and nursed Richard of Bramley through his final days in Embleton in 1763 (see History section). He also recorded Richard's last will and testament, and his very specific instructions for burial. He therefore learned all about Aeternis and the holy treasure that lay waiting there, ready for a brave and righteous soul to bring back into the service of mankind. He was sure that he was the man for the job and that God was on his side.

Armed with his simple faith, a sturdy walking-stick, some supplies and plenty of candles he descended into Aeternis. He lasted less than an hour – a Theo took his life on the western side of Level One.

Father Dunstan's ghost is warm and friendly, but of little help to a player who can do little more than take up his kind offer of helping himself to his food, water and candles.

Colin Scott

Colin is the Raptor who first uncovered Aeternis. He actually made it as far as the Inner Sanctum before being tumbled into the Northern Holding Chamber and dying from a broken neck.

His body is still there, as is his ghost which is confused and hasn't yet admitted that he is dead. This mixture of confusion and despair makes him difficult to deal with, but if the player can avoid alerting him to his death, they will find that he has invaluable information. Besides trying to help him adjust, a player should also take the opportunity to re-stock his supplies from Colin's satchel.

Chapter 6 The Raptors

The game is set in the year 2003 AD. This world of the future is very different from the world we now know; China has become a major world power while America, Japan and Russia have fallen into decline; the Third World has become poorer and the West has become richer...but it is not the purpose of this text to explain these events.

Moreover, the world's climate has also changed significantly - and in particular, global warming has become a reality. All nations have been affected by this, some disastrously, but again it is not relevant to go into detail here. However, one affected area which does in fact relate to our story is that of archaeology, for the world's changing water levels have led to the discovery of an astounding number of archaeological sites that had been lost for thousands of years. This did not just happen within the Mediterranean basin or Northern Africa, but in some very unexpected places, such as South America, Canada and Australia.

Most of these newly discovered structures were underground and some were vast and magnificently constructed complexes. They were discovered by indirect means; the fallen water levels revealed ancient waste drainage outlets, but what was interesting was the sheer quantity of sites and variety of cultures who had built them. It seems that the history of mankind was much longer and more complex than had been previously thought so that the textbooks on ancient human history needed to be drastically revised.

By the year 2000, sixty-four new sites had been exposed to the world, twelve of which were constructed by previously unknown civilisations. The most exciting of these were three intact subterranean Mayan complexes, two vast ancient Egyptian temples and evidence of an advanced culture who lived underground in Northern Australia nearly 4000 years ago. These discoveries generated a huge amount of excitement and the public became very interested in archaeology and early human history.

The discoveries also sparked a much-needed regeneration of pride in human achievement and a renewed sense of optimism for the future. People became proud again to be called human. The artefacts became the symbols for this new change in attitude and a new obsession swept the world. People started buying artefacts, and those that could afford it wanted the genuine articles. It soon became a social necessity among the wealthy to have at least one valuable artefact on show in the home.

Large corporations too wanted artefacts in their foyers and offices - a symbol of new hope and pride in a shared humanity. Serious collectors desperately wanted genuine artefacts from the recent finds. They were willing to pay extraordinary prices, and they didn't care whether they came from legal or illegal sources. The demand couldn't be met by the existing, inadequate black market, so new entrepreneurs came in and filled the vacuum.

At the top end of the plundering trade a new breed of young, smart and ambitious people emerged. Employing a large network of spies and using the very latest technology, they were soon exposing and exploiting new sites before the archaeologists had even started packing their suitcases. These were the elite of the plunderers, professionals who took only the best, and left the rest for the small-time operators or, heaven forbid, the academics. Competition between them was fierce but good-natured (after all this was a time of plenty) and by the end of 2002 it was estimated that between 40 and 50 million pounds had been spent by the most ambitious and acquisitive collectors on antiquities. It was big business. By 2003 this elite group of plunderers had gained a code-name; 'Raptors' meaning plunderer in Latin. They are a group of nine men and women whose identities remain secret to all but a privileged few. The following are regarded as the best plunderers in the world.

Lincoln

Age: 29

Lincoln first became aware of the plunderer trade while working in the buying department of an exclusive artefacts shop on London's Bond Street. It didn't take him long to see the earning potential in 'artefact acquisition' as it was called by the company's more genteel clients, and he quickly decided on a career change. He has never looked back.

A qualified pilot and Olympic oarsman, his obsessive fitness and an ability to remain cool under pressure have brought him rapidly to the forefront of his new trade. Intelligent and methodical, Lincoln has constructed an efficient network of paid informants within the archaeological and artefact fraternity. These individuals, while often in senior positions of trust and confidence, nevertheless keep him well informed about choice pickings all over the world.

His retail experience has provided innumerable contacts among those who merchandise and distribute artefacts, many of them influential people whose interests are expressed in a wide variety of business activities. He lives in Kassel, Germany with his girlfriend, Greta. They have lived together for three years, and have a four year old son, Karl Wilhelm.

Lincoln also supports his recently widowed English mother. His frequent visits to the family home in London's Chelsea often mask the real purpose of his travels which is to pursue contacts in the many London clubs of which he is a member.

Emma

Age: 32

Emma is probably the least likely person to find within this unusual profession. Well-educated, (Cheltenham Ladies College and Newnham College, Cambridge) and with a double-first in Natural Sciences, she stumbled into the trade following the tragic and mysterious death of her husband Daniel in 1998.

Daniel M. was a notable plunderer before his death, operating his business from the cover of an apparently respectable antiques shop near the Angel, Islington. Unfortunately he had secret gambling debts, so his death in a hit and run accident in which the offending vehicle and driver were never identified was a double tragedy for Emma who had to cope with both a sudden bereavement and impending bankruptcy.

With typical courage she picked up the threads of her husband's business, successfully staving off the creditors until she could start repaying them. She is gradually paying off the loan - despite crippling interest charges. She now runs the business better than her husband Daniel ever did, which is one of the reasons why the creditors have been willing to wait. She has strengthened and refined the network of informants by relying on the influence and information supplied by Cheltenham old-girls as well as many of the contacts she made at Cambridge. This has given her a highly developed ability to select her assignments carefully, and above all, profitably.

Always strong-willed and highly motivated she has rejected all requests of marriage despite several tempting offers. The more malicious imply that the proposals are generated by her evident wealth and intellect rather than her looks. The spectacles she wears are not really necessary, her sight is as sharp as her mind, but she believes - rightly - that they intimidate many men.

She is currently planning one last success in order to break free from the burden of her husband's debts.

Warren

Age: 41

Unaffectionately known as 'the Weasel', Warren is a shifty character. Nevertheless he is intelligent, unscrupulous and has the ability to make money fast - in any enterprise. He is helped in this by not being burdened with the usual financial encumbrance of a large and avaricious network of spies and the need to bribe petty officials. This is because he simply steals information from the plunderers themselves! - in short, he plunders the plunderers.

Warren used to own a small company which supposedly specialised in corporate security, but really excelled in corporate espionage. His company secretly sold the inside information he gained about his clients to their competitors. The business was first exposed by the 'Accurate Eye' investigative television programme and subsequently shut down in 1998 by the Corporate Espionage Division (CED) of Scotland Yard acting under orders from the Department of Trade.

Skilfully avoiding the pursuit of journalists, the police and court officials, Warren moved into a new and more-exciting profession - plundering. He now spends most of his time carefully stalking his fellow Raptors. Few jobs, particularly large ones, can be researched and prepared for without his becoming aware of it. He then employs a large arsenal of electronic bugging equipment, sophisticated shadowing techniques and illegal break-ins to discover the whole story - before moving with astonishing speed to plunder the site first. These tactics combined with the latest in espionage technology have raised him to the heights of his new profession.

He employs a corps of small-time East End crooks to do his dirty work, controlling them through blackmail and intimidation. Only very occasionally does he take on a job himself if the prize is so large that his minions can't be trusted. But in general his reputation for nastiness is such that few of his 'employees' ever dare to step out of line. This professional parasite is of course exceptionally unpopular with his hosts, many of whom have sworn to cut off vital parts of his anatomy if only they could find him.

However, he is an expert at concealment, and has yet to be found by anyone - plunderers, police, journalists or debt collectors. Kurt in particular has been financially crippled by this leech on more than one occasion and has sworn to kill him. In the meantime Warren continues his parasitic existence unabashed and unpunished.

Conrad

Age: 28

Conrad comes from a wealthy American family who winter in Aspen, Colorado and spend the summer in Newport, Rhode Island. Descended from Ukrainian immigrants, the original family fortune was based on railroad speculation and then first world war armaments.

Conrad enjoys a hard and fast life-style and revels in physical action and excitement. He enjoys a reputation for recklessness but in fact everything he does is finely and carefully calculated. Essentially rebellious, he cannot tolerate authority of any kind. His father George owned several key companies operating within the North American military industrial complex. One such company, RaXXol Specific Technologies, developed and manufactured the MS-2 Helmet. Because such products could fetch phenomenal prices on the black market, Conrad was never averse to bucking the system and earning a little extra money. It was therefore while handling a deal on a couple of MS-2s that he first became aware of the Raptors and their lucrative profession.

His reclusive father developed Alzheimer's disease but surprised everyone by marrying his Louisiana nurse (Ginney, the 23-year old former beauty queen 'Miss Cajun Country 1998') and then dying shortly after their sexually energetic honeymoon in the Bahamas. His father left everything to his briefly grieving young wife.

The estate was immediately plunged into extensive litigation which promised only to enrich the competing lawyers. Meanwhile, unable to sit around and await the outcome of the litigation, Conrad decided to satisfy his needs for physical excitement and social rebellion, and to finance his expensive life-style - through becoming a professional plunderer. In the three years since, through tenacity and courage, he has at last joined the unofficial ranks of the elite and is now one of the top plunderers in the world.

Patrick

Age: 51

Patrick is a veteran of the trade and has seen plunderers come and go. He started business in the late 1960's, uncovering and selling bronze Celtic relics to private collectors in America and Italy.

The next two decades were the boom years for Patrick, before governments clamped down on cultural and archaeological pilfering. Now he's struggling as the business he's known all his life changes beyond recognition - becoming more technical, competitive and highly organised as the new blood moves in. The real problem for him is that the industry has become immensely profitable, attracting the young, well-educated and ambitious with whom he cannot compete.

Like all the 'big league' plunderers he has a network of paid informants within the industry (mostly relatives or old friends) but like him they are getting on and many have retired. Thus his international dealings have fallen back rapidly in the last few years but he still dominates the small market in Ireland.

Married for 32 years with 6 children and 3 grandchildren Patrick wants to retire. But he also wants one more big win to finish off - he wants the Grail.

Helga

Age: 29

Helga is beautiful, dangerous and the undisputed wildcat of the plunderer elite. Little is known of her early background but police records in Colombia show that she became involved in petty crime and drug-dealing during her teens. By the time she was twenty she had progressed to cat-burglary - an area in which she obviously excelled.

How she became involved in 'artefact acquisition' is not clear, though the noted plunderer Henri Montagne was reputed to have been one of her many lovers at that time. She was certainly well-suited to the task and has risen rapidly to the top echelon of her new career within an astonishing 18 months! The reasons for her success are many.

First is her complex personality which combines a fearless determination and street-wise cunning with a rebellious and aggressive sense of independence. Second is her superbly fit, cat-like body which is both strong and extremely agile. Finally there is her previous criminal experience and links with the South American underworld. All this combines to make her a formidable female. She is notorious for her ability in street-fights, mostly learned the hard way, in the back streets of Bogota, and is an expert with a flick-knife. She lost her right eye in a knife fight in Marseilles in 1985 but the diamond-decorated eye patch she subsequently wears only accentuates an air of mystique.

Her earnings fund a lavish and promiscuous life-style. Her rebelliousness appears again in her love-life where she is rumoured to be 'flexible' regarding the gender of her lovers - but this has not been verified conclusively. She has a large network of contacts, both professional and romantic all over the world. Interestingly her longest known affair was with fellow top plunderer Kurt W. which lasted almost 12 months. Their reasons for parting are unknown.

Kurt

Age: 42

Kurt was a soldier who left the Parachute Regiment to become a mercenary and gun-runner. This lucrative and promising career came to an end in the year 2000 after a parachute accident left his right leg broken in five places. As a result he still has difficulty moving fast. While recovering in a private Cuban hospital he had the good fortune to meet the plunderer Graham Wiley, who had been injured while on a job nearby.

Wiley immediately saw Kurt's potential and over the following days convinced him to become a partner in his small business. Wiley then taught Kurt the trade. Kurt was a natural, and master soon became student as Kurt forged ahead. By hard work and a determination to be the best, Kurt single-handedly turned the business around, pushing it towards the top end of the market. This brought him into heated conflict with the lazy Wiley who liked 'his' business as it was.

Following a violent and regrettably public argument in one of Havana's most prestigious gambling houses, Wiley's body was found by police, apparently stabbed after a clumsy mugging. Kurt was suspected, but there was insufficient evidence to link him with the murder. The following year Kurt achieved his ambition and joined the Raptor elite.

The reasons for his success lie in his military background, his controlled killer instinct and his ability to stay cool under pressure. His ruthless determination to succeed and survive have often seen him finish jobs that others wouldn't have dared to attempt.

Kurt is unmarried but his roguish charm and rugged good looks have won him many hearts over the years - most notably that of fellow plunderer Helga R. who lived with him for nearly 12 months. Their reasons for separating are unknown.

Ingrid

Age: 39

Ingrid studied archaeology at Copenhagen University, and later opened her own business as a dealer in ancient artefacts. She married a wealthy Swedish businessman in 1995 and moved to Zurich but continued her passion for collecting. She is a gentle but head-strong woman who refuses to deal with middlemen. Eventually she made direct contact with two of the elite plunderers, Helga and Kurt, who then provided her with some of her better and most valued pieces - but always at a price.

She became an obsessive collector, always demanding the best. This eventually led to friction with her husband, a commodity speculator, whose soaring personal income could not keep pace with the increasing cost of his wife's expensive hobby. This tension increased as the prices for these artefacts kept escalating, but Ingrid was by now a fanatical collector. Suddenly she hit upon a desperate idea to curb expenditure - she would do her own plundering!

But could she really do it? The more the idea grew in her mind the more she liked it. After all she was fit, intelligent and had always found a thrill in extreme physical action. She became excited by the idea and decided to try it! Tentatively at first, then with more confidence, she began constructing her own network of informants. Next she started compiling the technical equipment she would need for the job, carefully keeping all this secret from her husband.

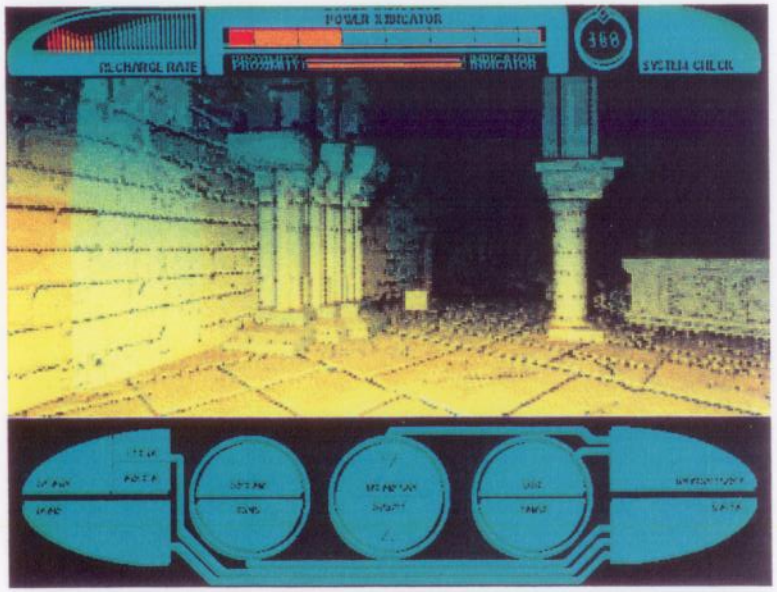
She carried out her first raid in October 1999. She failed to get there first, but the excitement she felt during the raid was to become a new obsession for her. Her fractured marriage did not survive, however, and she was divorced in the year 2000. She was forced to sell part of her precious collection, but by then she was already organised and well along the path to becoming a top plunderer. By 2003 she holds a place within the Raptor elite.

Colin

Age: 32

Was once a member of the elite but died recently within Aeternis.

Raptor Equipment / Head Up Display



The Raptors are sophisticated cat-burglars by nature. Not for them the heavily armed storm-trooper approach, they prefer to be light and fast, quietly finishing the job before anyone even knows they're there. Clothing-wise, they therefore tend to wear light-weight thermal leotards with soft-soled sneakers. They also carry a light back-pack or satchel which holds their tools and supplies (the specialised tools that they carry and the weapons they use are detailed in the next chapter). For maximum speed and efficiency they never carry more than 15 kilograms - this is for satchel and weapons combined.

The only other piece of equipment still to be discussed is the MS-2 Helmet. It is a piece of sophisticated military hardware, equipped with a range of multiple technical functions that are superbly suited to the Raptors' profession. It is an expensive and impressive piece of equipment, difficult to obtain but considered now to be standard kit for any serious Raptor. It is in reality a minute and complex computer set into a hard-shelled helmet, that can provide a vast array of functions for its user. It can be powered by any source but relies on solar-power while in Aeternis. It is completely capable of auto-repairing itself when damaged. It is however a fairly new product and as such is not completely free from the occasional 'bug'. Primarily, it provides the Raptor with sophisticated 'Head-up display' information in the form of text and wire frame pictures in the style of the film 'Terminator'. A list of its major functions follows:

Power Indicator

Shows the current power level, and is calibrated loosely in percentages of the maximum; it is linked closely to the light meter allowing quick feedback and advice when the power level is low, as well as automatic warning systems for when power has reached critically low levels.

Detection

This facility reports the distance, direction and classification (Guardian, Creature or Other Player) of any target within its detection range. The range is dependent upon power-levels. This information is represented as text scrolling down an area of the viewing window in the manner of a Terminator-style display.

Light Meter

The Light Meter function advises the distance and direction of any light source within its detection range. This allows a player to re-charge power-levels when needed.

Translation Module

This function allows the user to understand and converse with people using foreign tongues. This module does however have difficulty with the outdated and often strange dialects spoken within Aeternis, and so therefore may sometimes provide only patchy or partial translations. This function also links to a player's database of stored dialogues which will act as a library of clues and information throughout the game.

Strategic Scan

Allows the user to scan in front, to the sides or behind, providing detailed information on all living creatures and Guardians within the chosen direction, up to the detection range. This is a more powerful tool than the normal detection system, and can be used to warn the Raptor about life-forms a considerable distance away, but it is correspondingly expensive in energy consumption, and can only be utilised for short periods of time.

Navigation Assistance

Provides a constant location guide for a player in Aeternis. It does this by supplying an on-screen compass and the facility to refer to Sir Richard's hand-drawn map.

Map

This map has been scanned into the Helmet's memory and can be accessed and referenced at any time by the player. As the player moves around the complex, the map will update to a technically accurate version, generated by the helmet and lying over Richard's version. The map can also act as a database access, and selecting areas or objects on it can activate information stores which tell the player all that they have discovered about the relevant object.

Systems Check

This feature reports on the operational status of all on-board electrical and computer systems. If any function is damaged the diagnostic features will automatically provide self-repair timings and inform the wearer when that function comes back on-line. The diagnostic function also reports on the physical status of the player, detailing physical damage and the effects of such damage, levels of exhaustion and degrees of dehydration.

Knowledge Database

The helmet keeps track of all objects, characters and information encountered by the player. This forms a database of linked items to which the player may refer to at any time. Information may be relayed from helmet to helmet, allowing the exchange of information between raptors.

Chapter 7 Puzzles

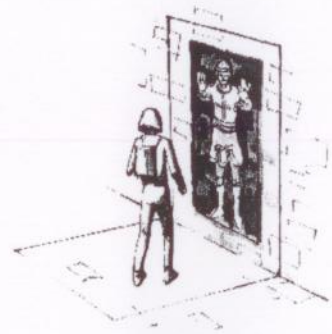
There are 5 basic principles which govern the generation of puzzles in the game. They are as follows:

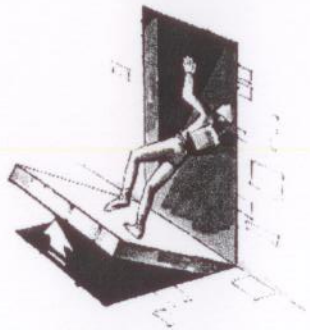
1) All puzzles will be linked together, either in short chains or as parallel paths through the complex. No puzzle will stand entirely alone.
2) Puzzles serve to build up the player's knowledge about the temple and how to pass through it, with the solutions to the puzzles themselves adding to the usable information the player has. Wherever possible, 'real' mediaeval symbols and information will be used, to give a feeling of high authenticity to the setting.
3) Some of the puzzles will require player co-operation with other characters, including other Raptors, and many will become considerably easier using thismethod. It will be possible however to complete the game without co-operating with anybody, but in this case another Raptor would probably find and remove the grail first. The player would then have to steal it from them on their way out of the complex.
4) Most of the puzzles will have more than one path to their solution.
5) The paths to solving the puzzles will be influenced by the personality and inter-relationships of the character adopted. All puzzles may, however, be dealt with to some level of satisfaction in the style of any of the Raptor characters.

Each puzzle will offer a reward to the player who completes it and give feedback to the player while its solution is being sought. The reward for a correctly completed puzzle varies according to the complexity of the puzzle itself. Solving puzzles can provide accurate and detailed inside information on the chambers and creatures that lie ahead for the player, open small, hidden recesses which contain useful tools, documents or suchlike, or can open secret doors or passageways which lead to other areas of the temple.

Example Puzzles And Situations;

1) The 'rotodoor' trap as the player approaches a wall, they trip a pressure switch, and the floor rises up beneath them, rotating to drop them into a chamber on the other side. The floor and wall form an L shape; it rotates until the floor beneath the player becomes the wall behind them, leaving them standing on the wall that had been in front of them. In order to leave the chamber, they have to operate a water clock device which eventually tips them back out & resets the trap. There is then an opportunity to use the set-up to trap a monster or other character and prevent them from following the player.





One of the murals used in the puzzles

2) A large carnivorous dinosaur(a 'Leo')stands blocking a passageway. It cannot be moved by direct gunfire and is too dangerous to move around. The way to by-pass it is by using another character to lure it forwards into a larger space, either by persuasion or by overpowering them. In the former case, some benefit must be offered to the character (the return of an object in the case of Edgar, or for Ulrik the mere challenge of fighting the creature in plain sight) or they must be fooled into participating. This could be combined with another puzzle in which a group of Eugenes guards a valuable source of light. In order to remove them without attracting predators, the player has to lure them away using some of their food, moving them into the 'sight' of the Leo. A more dangerous alternative would be to fire on the Eugenes: the noise they make will attract the Leo, and the ready food they represent will distract it for long enough for the player to squeeze past.

3) Light is directed about the complex by means of bronze mirrors. In some areas a mirror might be loose in its setting, allowing the player to direct the light it provides selectively among a few rooms. Options include starving a couple of rooms of light in order to make them more attractive to beast, or less attractive to Raptors and Guardians, to move a group of Eugenes around, or to light up an interesting object in a room.

The mirrors that direct light about the complex could also be mechanisms for Tobias to give helpful hints or present puzzles. He appears with a recorded message, and then fades out again. A Raptor could break the mirror after having heard the message to prevent others from gaining the same information.

4) This puzzle is set in a large room with a domed ceiling arranged in an octagon/Greek cross.

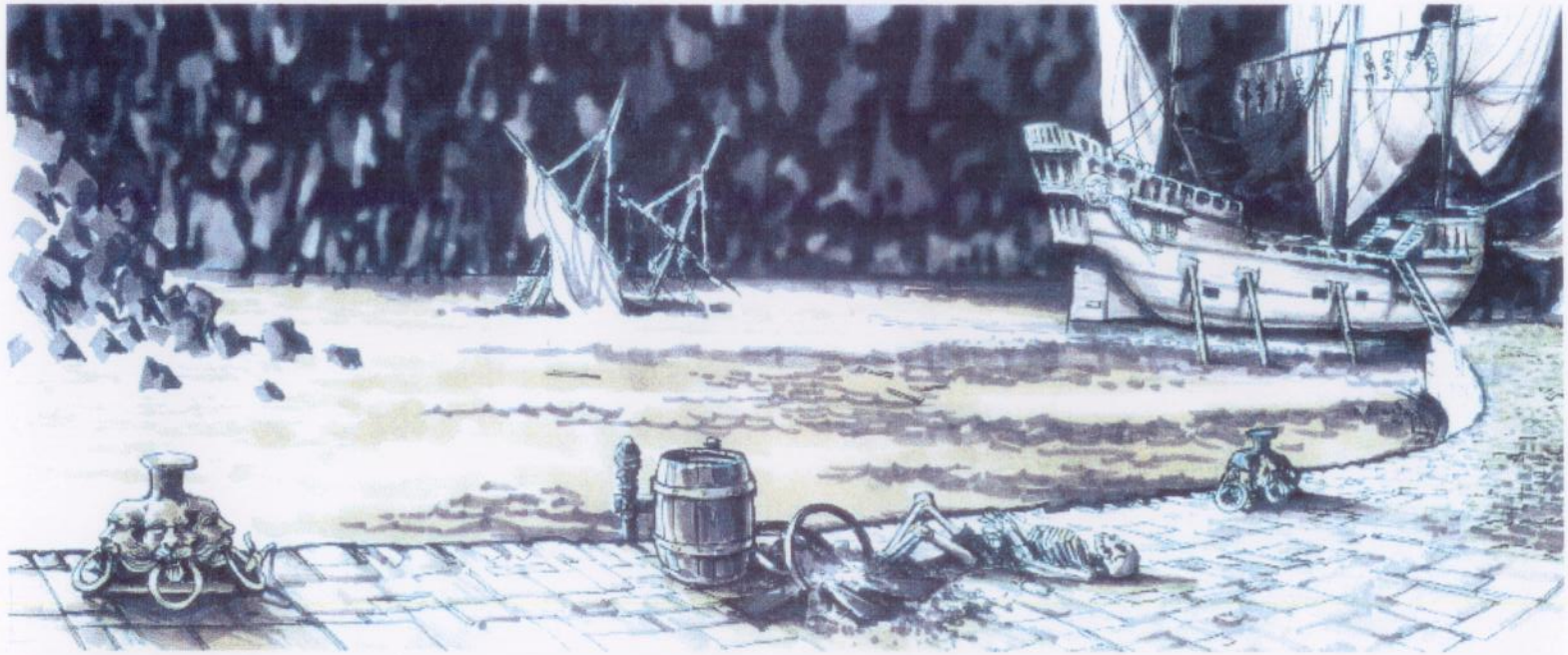
On the floor is a circular Mappa Mundi (map of the mediaeval world), in the centre of which is a golden Orrery(mechanical device for replicating the movements of the planets). The two Grail sites are represented as large set jewels, and the whole map is made up out of tightly interlocking circles. By moving the elements of the orrery, the player can move sections of the map, but will only notice the form of the changes from the viewing platform. When the player brings the two Grail sites together, another part of the map forms an explanatory diagram for a further part of the complex. The map starts and ends as an ordered representation, but there is a period of chaos between the two states.

On the underside of the orrery there is a further device of concentric rings, painted red & covered in deeply carved names. Its discovery and manipulation lead to another chamber below the map chamber which contains a schematic map of Hell, the roof of the chamber being covered with gears & workings for the map above. At the centre of the map is Mallik's name, scrawled obsessively into the stone. If the player aligns the circles of hell, they open an aperture to Underworld (from which many monsters pour), or are rewarded with a visitation from the ghost of a murdered worker who tells the player the characters of the knights & who they might trust.

Note; there are different layers of information to be gained from this puzzle, so the player will keep returning and get more from it as their knowledge increases.

Linked to previous puzzle; one part of the orrery is missing - it is one of the knights' precious objects, and must be wrested away from them.

5) A puzzle in the form of a mural, containing seven planets. A man indicates one of the planets, and wears a robe of seven colours. The player must talk to Lurka to connect the colours and the planets. This should not be immediately obvious to the player because the mural will contain many colours, and the man's clothes might only contain decoration using the planetary hues.(If Lurka tells you that the planet is Mars and the colour red, the player might be rewarded with an item of iron-perhaps a magnet). This might lead to a follow-on puzzle where the player uses their new knowledge of colour correspondence to identify Saturn as black, is given some lead, and then has a weight and a magnet with which to solve a more physical puzzle.



6) A capital for a door is positioned near the floor, and there is a slight gap between wall & floor immediately under it. Upon deciphering of the carvings on the capital, there is revealed to be a buried door there, and an animation plays of the floor dropping into the shape of a Roman amphitheatre, leading down to the now exposed door.

6a) Linked to the previous location- there is a lowered section of tunnel, filled with water from the river that flows through part of the temple. By diverting the river, the player can make the passage passable. Beyond it is a dock area, with a small inaccessible aperture to the outside world (which might alternate rapidly between light & dark) and a large decayed galleon which the player can move onto. If a further puzzle is completed on the ship, the he player is rewarded with information about the history of the temple culminating with instructions on how to find Tomas' tunnel from the Inner Sanctum to an outer layer of the complex.

7) Door puzzle: in this one the player is directly opposed to Tobias, with his pre-cognitive powers and ability in manipulation. This puzzle seems most suited to a position by an important door, the complexity of the puzzle being offset by the immediacy and apparent nature of the reward. The player is presented with a capstan-like pedestal, with 4 apertures at the cardinal compass points. Within each aperture is a switch with 2 positions (up & down). Only two of the apertures can be accessed at a time (the others scythe shut), and between accesses, the capstan spins around by an unpredictable amount. The aim of the puzzle is to have all of the switches facing the same way, in which case the door will open. The capstan is controlled by Tobias, who ensures that no matter which apertures the player decides to investigate, the least helpful pair are presented (without physically changing the order/status of the switches). In board game play, one simply decides which apertures are presented after the player has decided what configuration to investigate. Since there are only two configurations the player can choose (opposites or adjacents), the computer will also be able to use pre-set presentation decisions for each possible situation.

Solution: At the start, there must be either 2 up/2down; or 1/3.

If the arrangement is

u
d d
d

and the player picks adjacent holes, you'll get d-d. Flip one of the switches to yield;

u or u
d u d d
d u

Next choose opposite holes. If they are the same, change them both and solve the puzzle. If they are different, flip them over to yield the last pattern shown, then choose opposites again.

8) Claude and Ewatt, the two ghost knights, still fight out the battle Mallik began. They are the only standing figures left in a chamber filled with skeletons. The player must intercede between them and settle their dispute, which incidentally will lead to the player's learning about the battle, and Mallik. If they succeed, they are rewarded with a great deal of information, especially about the other surviving guardians.

9) The player encounters an alchemist, trapped in an Iron Maiden. Hated and reviled by the other guardians, he has been imprisoned here, suspended from death by the influence of the grail. If freed(not an easy thing to accomplish in itself)he will become a loyal companion, a useful key to the meanings of the mural puzzles, and a guide around the temple. However, on discovering him at large, the other knights will attack both him and the player, and will refuse to deal with either of them.

The mosaic pool – another puzzle

Chapter 8 The Production Team

Producer

Matthew Stibbe B.A. (Hons) History - Pembroke College, Oxford

Matthew has been running the company full-time since graduating in 1991, having run the company in his spare time since 1988. Matthew not only oversees the development of all Intelligent Games products, but is also involved with the design and coding and has personally programmed several products, including AutoRoute and 'Nam.

Designer

Ken Haywood

After a two year, part time, fine art course and a full time two year graphic design course in Sydney, Australia, Ken moved to London. He has been a professional graphic designer for five and a half years and is currently self-employed in Winchester. He has also worked as an illustrator while freelancing. His interests in fine art, history, architecture photography and design have come together in Raptor.

Artists

Richard Evans B.A. (Hons) Graphic Design - Middlesex Polytechnic

Richard graduated in 1991 and, after Matthew Stibbe, is the longest-serving member of the Intelligent Games team. A specialist in animation, Richard's work is unique and distinctive. Richard has used our *VideoWrap* technology (texture-mapping live action video onto three dimensional models) to great effect in producing the graphics for a prototype CD-ROM game, and has also worked on the design and scripting of several projects.

Richard Guy B.A. (Hons) Fine Art - Oxford University

A graduate in fine art from Ruskin College, Oxford University, Richard can contribute a detailed and creative edge to Intelligent Games graphics and his long-standing interest in role playing games will help him interpret and enhance Ken Haywood's design.

Programmers

Harry Holmwood B.Sc. (Hons) Computer Science - Southampton University

Since graduating in June 1992, Harry spent some time touring and recording with a rock band, both sequencing keyboards and playing bass guitar, before joining Intelligent Games as a musician and programmer. At university, Harry undertook a project involving artificially intelligent music generation. Harry will be project leader for Raptor and will also produce the music for the game.

Other Personnel

Script Writing: Mark Giles. Mark wrote the scripts for a Virgin Interactive Entertainment CD-ROM title for Intelligent Games, and is currently working on new scripts for the company.

Second programmer: A second programmer will need to be hired to work on the game. A third programmer may be hired to augment the OVM tools development system.

Intelligent Games background

Intelligent Games Limited is a small computer software company, specialising in computer strategy and role-playing games. It has been operating on a full-time basis for the past eighteen months, although the company was started by Matthew Stibbe 1988, and run by him in his spare time at university until August 1991. Since leaving college he has turned this hobby into a thriving small business employing eight people.

Philosophy

At Intelligent Games, we believe that a computer game needs more than impressive graphics to maintain any appeal for the player. It must have real depth and gameplay. For this reason, we build our games 'bottom-up', often creating a playable prototype which we can test for playability and depth *before* adding the graphical and aural polish. We are now at a stage where all computer games, including ours, have stunning rendered graphics and breathtaking animation, but many games on the market fall short in terms of sheer playability. This is where we make a difference.

Previous work

- Imperium, published by Electronic Arts. Designed by Intelligent Games.
- 'Nam 1965-1975, published by Domark. Designed and programmed by Intelligent Games on Mac and PC.
- AutoRoute - programmed a Macintosh version of the popular PC electronic atlas.

Current Work

Intelligent Games has three games in production for publication in 1994. All our games are produced first on PC and some will be translated to Mac or Windows. One game, to be published by Virgin, is a CD-ROM based title; another is for floppy distribution by Maxis.

Target Platform

CPU: 486 SX, 25MHz
RAM: 8MB
HD: 20MB Free
OS: MS-DOS 6, running in protected mode
Video: SVGA running VESA mode 101 (640x480x256 colours)
CD-ROM: Capable of 300Kb/S transfer rate minimum

Development environment

Video Grabbing

VideoVision Studio. Server upgrade to include: .CD-ROM gold disk mastering. CD-ROM player. 4 GB hard disk.

Programming

486/66s, 170MB Hard disk, 16MB RAM, Network card, Windows, DOS, Mouse.

Watcom C++ 9.5, Rational DOS 4GW DOS extender, WVideo debugger, Delta source code control.

Testing

One 486/33, 170MB Hard disk, 8MB RAM, Network card, Windows, DOS, Mouse. 1GB hard disk to simulate CD-ROM. .

Artwork

One Macintosh Centris 840AV. 20MB RAM, 2GB Hard Disk.
Canon CLC-10 Scanner / Printer
Adobe Photoshop, Adobe Premiere, Studio/8, Morph

Rendering and modelling

Silicon Graphics Indy 1GB disk, 48MB Ram, SoftImage or Alias software, tape backup.

Software tools

Intelligent Games tools

Intelligent Games will contribute its OVM class library with a non-exclusive, single product licence, in object code only format. OVM stands for Object Virtual Machine and is designed to speed implementation and porting of computer games by providing a standard API to wide variety of generic components. Some components will be enhanced for use with CD-ROM titles. Detailed user documentation is available for all the components, and demos and test programs are available for most. OVM consists of the following components:

GFX	Low level graphics
SND	Digitised and MIDI sound manager
RES	Resource manager
MEM	Memory manager and protection
DBG	Tracing and other debug tools
SEQ	Synchronised sound and animation
VWM	View hierarchy manager for high level user interface work
APP	Application shell
GEO	Geometric primitives
FLI	Animation player
FIL	File handler
FON	Font manager
EVM	Event manager
CC	Collection classes

Publisher provided tools

Miles Design sound drivers.

If necessary, video compression software.

Chapter 9 Implementation Details

Interaction with non-player characters

Dialogue and knowledge acquisition

When the player meets a non-player character (NPC), s/he may elect to engage them in a conversation. Conversation takes two main forms :

Branching dialogue trees will be used to convey information about the characters themselves - the player may have a variety of questions and statements which s/he may ask the NPC - these will be about general topics (which will depend upon the game status and the player's relationship with the NPC) and exist partly to give the impression of natural speech and partly to introduce the player to new topics via the NPC's answer. The NPC will also have a number of these questions available - deciding which one (if any) will be done using our existing 'branching plot' code. If the player chooses not to start a dialogue, the NPC itself may start one. This works as follows :

A *dialogue lookup table* is a two-dimensional array with one character as the 'x' index and another as the 'y'. By examining the array entry at the point (x,y) for two characters, a pointer to a list of possible dialogues for those two characters is obtained. Associated with each possible dialogue is a flag which stores the probability of that dialogue occurring for a particular situation (if the dialogue has already occurred between two characters, then the chance of it occurring between them again is zero). By taking the most likely dialogue, and entering into it (all the dialogues are stored in a third table), there is no need for random numbers to generate realistic evolving conversations. Certain game events and changes to variable values (such as the *empathy* variable) will change the values of some of these flags, making different dialogues available.

Once a dialogue has been entered into, it may still branch and flow in a number of ways - at each point in a dialogue, the player (or NPC) may have a choice of a number of paths to take the conversation through. In the player's case this choice is his/hers, and will be chosen from a list on the HUD. For NPCs, the branches will be prioritised, the priority values being decided by that character's empathy for the player.

Non-branching dialogue is at the heart of many of the game's puzzles. Like the player, the NPC raptors in the game are searching for information which will help them in their quest for the grail. When a Raptor first enters a room, meets a character or examines an object, s/he will have acquired a basic piece of information. Generally, all characters, objects, locations and puzzles will have several pieces of information about them which can become available to the raptors over the course of a game. These will have associated with them an *importance* variable, hidden to the player, which is used to rate pieces of information according to their value. Therefore, in addition to the questions and statements the player may issue, s/he may also select '*Tell Me About...*', at any point in a dialogue situation. Once selected, the HUD will prompt the player to select whether s/he wants information about a location (which includes any objects the player may see from that location), a character (which includes generic creatures such as Theos and Eugenes) or an item (anything that any character may have in their possession). The player's choice determines what is overlaid on the head up display next :

Location

The map appears on the head up display (HUD). The player may select an area of the map to ask about, either by clicking with a mouse or by cycling through the available locations with a key press. Only locations previously visited by the player may be asked about. If the location contains a number of items about which information exists, the player will be further asked to specify which object is needed.

Character

The player is presented with a scrolling list of character names to choose from. One is highlighted at a time, with a picture of the currently selected character shown to the right of the names.

Item

The player's inventory window is overlaid onto the HUD, and s/he must select one item to ask about. If the desired item is not a part of the inventory, the player may click on the 'Other...' option. Now, details of all non-inventory items that the player has seen or heard of will be displayed on screen (in the same way as for characters) and the player may now select one of these.

If the NPC knows anything about the selected subject s/he may or may not decide to give away the information. This depends upon the character's *empathy* variable for the player, which itself has been determined by the player's actions in the past. Unless the character has a very high empathy value for the player, it is likely s/he will want something (either an object or information) in return. What the NPC will want is determined by examining where that NPC has explored (assuming the NPC is a Raptor) and the relative values attributed to the relevant pieces of information. For non-Raptor NPCs, there will be pre-set questions to which they require answers.

Information given to the player is added to the *knowledge database*, which may be called up at any time for reference or to give information to an NPC. Along with the information is stored details of how the information was acquired (either directly by the player, or the name of the character revealing the information) and the time of its input. This information allows the player to judge the reliability of any piece of information based upon his/her relationships with its provider at the time.

Lying

If an NPC has a very low empathy value for the player and is asked for information, s/he may lie. Whether or not an NPC will lie will depend upon both the NPC's *truth* variable, and that NPC's empathy value for the player. The incorrect information will still be added to the knowledge database, but if the player discovers contradictory information directly, the lie will be erased from the database - the player will know not to trust that character in the future. If two NPCs give conflicting information, both pieces will remain in the database - the player must use his/her judgement of the NPCs to decide which to believe. NPC lying may be used to the player's advantage - by asking a question to which the player already knows the answer, s/he may 'test' an NPC's honesty, and can decide whether to trust them in the future. Sometimes, the lies will be less believable than others, allowing the player to use his/her judgement in deciding what to believe.

The player may also lie to an NPC during conversations, but obviously this can lead to NPCs being unwilling to help in the future.

Object Exchange

Additionally, the player may, at any time in a dialogue, ask an NPC to '*Give me...*' an object. The player may have used his/her scanner to determine which objects the NPC possesses. Like pieces of information, objects have values attributed with them - these are determined by the number and difficulty of puzzles which can be solved with them, as well as their material worth and apparent usefulness to the casual observer. An NPC will often be unwilling to trade objects of high value for lesser ones.

Character Collaboration

Many of the puzzles within Aeternis can only be solved by two characters working together. At any point in a dialogue, the player may select '*Join Me*'. This is an invitation to the NPC to join with the player temporarily to achieve a common goal. Whether or not an NPC will join with the player depends partly upon their empathy for the player, and partly on how successfully the NPC is progressing alone. Generally, NPC Raptors will be far more willing to join a player than the non-raptors, although even they may be persuaded in exceptional cases. Once joined to an NPC, the player takes the dominant role. From this point on, when a dialogue occurs with the NPC, a further set of choices appear :

Go To .... : The player may instruct the NPC to travel to a particular location, selected from the map on the HUD. Alternatively, the player may select another character - in which case the NPC will try to find that character.

Wait For .... : The player may choose either a period of time (measured in seconds, in the time which characters experience in the presence of the Grailstone - therefore '*Wait for 30 seconds*' will cause the NPC to wait for around 30 seconds of game time) or a character (selected using the HUD in the way described previously).

Kill .... : The player may instruct the NPC to attack a character. Obviously, the Grailstone will generally render any injuries temporary.

Fetch .... : The player may instruct the NPC to get an object. The object must be in the room the NPC is in at the time the order is interpreted.

Use .... : The player may instruct the NPC to use one object on another object, location or person, or to use 'themselves' on an object, for example to move it.

Leave .... : The player chooses this if s/he no longer wishes to associate with the NPC.

An NPC will store its forthcoming actions (whether orders or independent actions) as a list of the above statements. The player may, when giving orders, use the word 'THEN' to separate actions, allowing the issue of complicated orders to be given.

Example :

The player, playing the part of Ingrid, has persuaded Conrad to join her. She has seen a heavy portcullis blocking her way into a small room - surely these measures suggest there's more to the room than meets the eye. She orders Conrad to '*Use yourself on the portcullis - THEN wait for me*' - he cannot lift it alone, so she helps. Together, they manage to lift it just enough for Ingrid to slip underneath. Once inside the room, she soon discovers a hidden panel and crawls away. Realising he's been tricked, Conrad swears never to trust her again. Ingrid doesn't care - she's gained a valuable advantage.

Mutiny

In the above example, Conrad would, having discovered Ingrid's deceit, immediately stop co-operating with her.

Whenever an NPC enters into a partnership with the player (or another NPC), a new variable comes into play. Known as the *co-operation index* this measures how willing the character is to continue the arrangement. When this variable reaches a certain level, a *mutiny* situation will occur. At this point, the NPC will break the partnership, and will have his empathy variable for the player reduced. Therefore it is in the player's interest to keep co-operations as short as possible - the player can break the partnership with little or no damage to the empathy value. Situations which would reduce the co-operation index include :

- Another character persuading the NPC to join him/her.
- Giving too many orders (each one will decrease the empathy value a little).
- Putting the NPC at unreasonable risk.
- Asking an NPC to kill a character whose empathy value is higher than that of the player.
- Failure to give the NPC any orders - to start with the NPC will generally follow the player around. All the time, however, the co-operation index is being reduced, resulting in a mutiny within a very short time.

NPC-initiated dialogue

With the player

Obviously, NPCs may start dialogues as well as the player. This will happen if the NPC finds that the player has items which s/he might find useful, or if the NPC needs a piece of information that the player might have. Because the NPC objects essentially have access to solutions for all the puzzles in the game (although the game engine will only ever let them behave as though they are slowly working their way through), they will always be able to ask the player questions (they know what they need). However, NPC behaviour scripts and AI routines will be such that the characters will always appear to be struggling as much as the player.

To initiate a branching conversation, an NPC will examine his/her branching dialogue table, to see which dialogues (if any) are available at that time.

With another NPC

NPCs must also be able to converse with each other, without the interference of the player. There are two mechanisms for this :

NPC-NPC dialogue in the player's presence

The player must be able to observe and overhear dialogues between NPCs (for example, the player could be hiding in a dark area of a room, hoping to overhear a conversation which could provide important clues. To achieve this is very simple - both NPCs will behave as if the other was the player. With no additional coding, once one NPC has initiated a conversation, it will flow as easily as any NPC-player dialogue. The distance between the player and the other speaker will be used to determine how much of the dialogue can be heard. The dialogue will be delivered at a reasonable pace, to allow the player to understand what is being said.

Should the player decide to leave the area during one of these dialogues, the dialogue will cease to be spoken, but will continue as a dialogue in the player's absence (see below).

The player may also interrupt the dialogue by making his/her presence known (by walking past, or making a noise). In this case, the NPCs will stop their dialogue. Once stopped, they will carry on their normal activities (which will often involve attacking the player) - two NPCs who have been speaking together may well have formed a partnership, and could thus represent a serious threat to the player.

NPC-NPC dialogue in the player's absence

If the player is not present, there is no need for the dialogue to take place. Processing time and disk access can be saved if such NPC meetings simply concentrate on information and object exchange. When two NPCs meet like this, both will 'know' which objects and pieces of information they need. If a situation occurs where an exchange of information or objects of approximately equal value can occur, and this change would benefit both characters, then the exchange may take place. Naturally, no branching dialogues will take place in the player's absence.

Speech

Whenever the player observes or indulges in a dialogue, sampled speech will be heard through an appropriate sound card. Most of the NPCs will speak in English, particularly the Raptors and characters who have entered Aeternis relatively recently. Each character will have a unique and distinctive voice, with each phrase spoken by a real actor/actress. Because there are many dialogue segments which could be spoken by a number of characters, it is necessary to distinguish between spoken dialogue and information exchange (between raptors) via the MS-2 helmet.

For branching dialogues, all lines that an NPC can speak are stored together on the CD-ROM. Storing them together will minimise the seek time required to find the next dialogue segment. For NPC-NPC dialogue in the player's presence, the whole dialogue and its outcome will be cached to hard disk for one of the NPCs before the dialogue session begins. In this way, one NPC's dialogue can be taken from the CD-ROM while the other is taken from the hard disk, eliminating the need for the CD-ROM drive to jump from character to character.

With non-branching dialogues, it is important to differentiate between the character who *originates* a piece of information, and those raptors who merely pass it on via their HUD information stores. If a character (often one of the Templar Knights) has a piece of knowledge specific to him/herself and chooses to reveal it to the player, that piece of information will be spoken in the appropriate character's voice. If, on the other hand, a fellow Raptor has acquired a piece of information and decides to reveal it to the player, the information transfer will occur between their helmets, avoiding the need for each speech segment being stored in each possible character's voice.

Interrogation of the knowledge database

At any time during the game, the player may examine his/her acquired database of knowledge. The MS-2 helmet stores every piece of information the player encounters, whether about locations, characters or objects, as well as when and how the information was acquired.

By selecting the 'database' icon, the player enters the database interrogation mode. The HUD overlays an 'index' of topics, which the player can manipulate like a hypertext system, using interactive 'hot links' to join related topics. The first section gives the player a choice of 'Character', 'Location' or 'Item', and the player may select a topic in exactly the same way as with non-branching conversation. Now, details of the relevant topic appears overlaid on the HUD (with a picture if the player has seen the location/item/character). These will be presented as a series of pieces of information, each of which is time-stamped and features the name of the character (if any) who provided the information.

Information which the player has found for him/herself will be shown in a different colour, as it can be assumed to be 100% reliable.

Often, these pieces of information will contain references to other objects, characters or locations, which can be clicked upon to change the selected item. Any information known about the new item will now be displayed in a similar fashion. At any time, the player will be able to click on an 'Exit Database' button, whereupon the HUD overlays will be removed. Note that database interrogation takes place in real-time, so the player must remain alert while using the system.

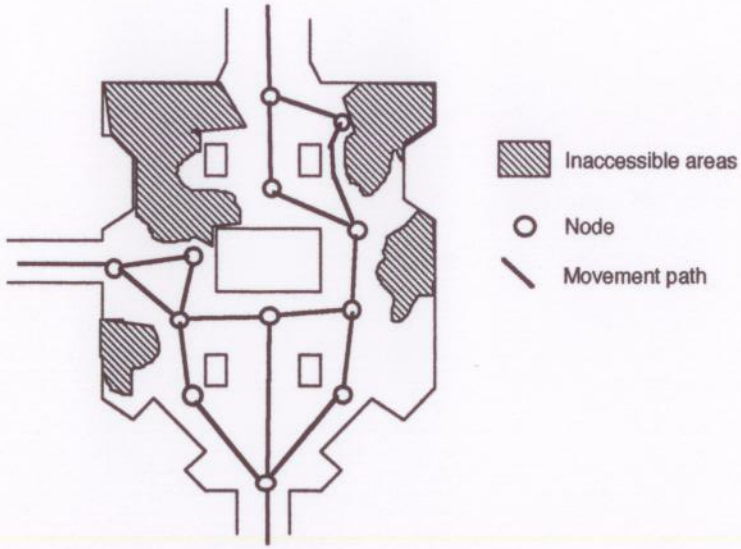
The knowledge database system will be derived from our existing hypertext code.

Screen Display

The game will run in SVGA mode 101. This has a resolution of 640*480 pixels, at a depth of 256 colours. Most of the screen will be taken up with the view through the HUD, which shows a three-dimensional first-person view of the world (in a cinematic 640*280 window), overlaid with a constant stream of analytical, computer-generated information. The HUD is generated from a 320*140 image by doubling the size of the pixels. This reduces the disk space, processor loading and caching requirements while allowing the HUD to take advantage of the extra resolution.

Nodes and Links

All background graphics will be pre-rendered using Silicon Graphics workstations running Alias software. Unlike existing CD-ROM games, Raptor will feature very high granularity movement - the player may move to many different viewpoints within each room. This is achieved by subdividing the entire play area into a series of linked nodes, each node representing a place where the player may stand. At a given node, the player may rotate the view through a full 360 degrees, allowing inspection of an area from any angle.



The above diagram shows an example of a room. The nodes, represented by circles, are the places in the room where the player may stand. The player can only move between nodes along the movement paths shown. Some rooms will be designed in such a way that some areas will be inaccessible (because of rubble or other obstacles), which allows us to reduce the number of nodes required. More nodes will be present around important objects to allow the player to investigate them more closely.

Although each node stores 360 degrees of rotation (rendered using a 'slot camera' in Alias to maintain perspective), the player only ever has a 90 degree field of vision. The graphics for each node will be stored as two 640*140 PCX bitmap images (known as a *node map*). Often, when the player first moves to a new node, only one of these images needs to be loaded immediately, the other only being needed as the player rotates. This will reduce the time taken to move from node to node, as only 60k of data (assuming 30% compression with the PCX file format) needs to be loaded at a time).

A average of 120k of disk space will be required for each node. These graphical backgrounds will be spread across the two CD-ROMs (a total of 1.2 Gb of storage space). Of this, we will allow around 600Mb for the node rotations, which allows a maximum of 5000 nodes to be modelled in the game.

Caching of Node Graphics

Whenever the computer is idle, it will be busily copying graphics from surrounding nodes from the CD-ROM onto the hard disk and into memory. The computer will store the location of each node (i.e. whether its graphics currently reside in memory, on hard disk or on CD-ROM). This means that, when a new node graphic is required, the game engine will be able to find the quickest way of loading the data onto the screen. The caching algorithm will be intelligent, and will attempt to predict where the player is likely to go next, on the basis of play test data, caching the graphics before they are needed, and discarding them once the player has passed through.

Physical node co-ordinates

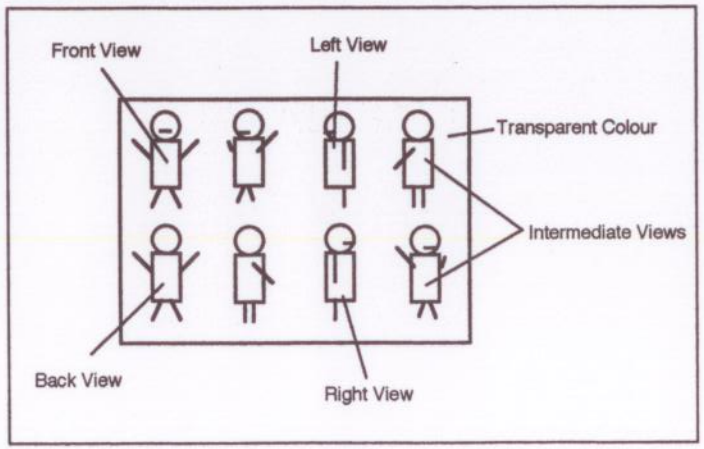
It is not enough simply to represent the game world in terms of nodes and links - because the nodes are not uniformly spaced, we must assign an (x,y) co-ordinate value to each node in the game world. Therefore, each node object will contain a *TPoint* member variable (a class from our OVM library, storing a pair of co-ordinates to represent a point in 2-D space), with the two co-ordinates representing a distance in metres from an origin at the top left of our game world.

Sprites

All creatures and characters (except Sasha) in the game will be modelled as sprites. The sprites will be generated using Alias animation software on Silicon Graphics workstations (with the possibility of rendering the individual frames over a network of PCs using Pixar Renderman or equivalent software).

Sprite Rotation

Although the player will have total freedom to rotate his/her viewpoint through 360 degrees, it is not feasible to store a view of each sprite for each of these angles. Therefore, each sprite can be viewed from any of eight angles. A sprite will be stored as a series of animation files, stored in our variant of the FLI file format, with one section of the bitmap area of each file given over to one rotation :



Each sprite action (such as walking, shooting or picking up an object) will have its own animation file. One frame from such a file is shown above. The FLI format stores only the differences between each frame (this is known as *delta compression*) to save space and time when loading a new frame. By holding one bitmap which holds all possible views for a sprite at a given moment in time, there will be no delay in accessing a new view for a sprite when the player rotates the view or when the sprite turns around.

When the system knows that a sprite may be visible (see below), the relevant NPC object is examined to see which action it is performing (running, shooting etc.). The appropriate FLI file for the sprite action can then be accessed - in a similar way to backgrounds, these will be cached to hard disk and memory whenever possible. Once one of these files has been accessed in this way, it will constantly cycle through its frames in an off screen buffer, meaning that any rotation of the correct frame can be accessed at any time.

All sprite animations will start and end at the same frame, so that they may be looped, and so that one animation can lead onto another one seamlessly.

Sprite Location

Although the player's viewpoint may only occur at the pre-set nodes (there will be around 5,000 such nodes in the game), NPC sprites must obviously be seen to move freely around the game world. Conversely, the player must not get the feeling that NPCs appear to travel anywhere, whereas s/he has only limited movement. This problem is avoided in two ways. Firstly, the very large number of nodes means that the player does indeed have total freedom of movement. Secondly, an NPC sprite moves along exactly the same movement paths as the player, but can exist 'in between' nodes, which the player cannot.

An NPC's location can therefore be measured in terms of one or two nodes - at all times the NPC will either be on exactly one node, or will be moving from one node to another. The NPC's position in the game world will therefore be represented as two pointers to nodes, with an integer value representing the distance the NPC is from the first.

View Calculation

Every time the view is to be recalculated (the exact frame rate will depend upon the host machine's capabilities), the game engine will examine the player's current node to determine which node map is required. A lookup table will be examined to determine whether the map is already in memory (most likely), cached to hard disk, or only on CD-ROM (only likely if the player moves very quickly and unpredictably for a considerable period). If necessary, the map will be loaded into memory.

Next, the player's rotation is considered, and used to calculate exactly which section of the node map will be visible to the player. This area is then copied onto the screen.

Next, the game must decide which sprites will be visible. For each player node, there will be stored a list of which other nodes are visible (including any which may be brought into sight by rotating the view). Whenever an NPC moves between nodes, its new node stores a reference to it in a list structure. Thus, by iterating over the list for each visible node, it is possible to generate a list of (possibly) visible sprites. Note that this need only be done when entering a node, subsequent changes being made only when an NPC arrives at a new node. When an NPC is travelling between nodes, it will be pointed to by both nodes' list structures. Only upon its arrival at the new node will it be deleted from the old one.

Now that we know which sprites *may* be visible, we can use their rotation relative to the player to calculate which of the eight views of the animation will be visible. Because, once the system knows that a sprite may be visible, its relevant (for its current action) animation file will be in memory and cycling through its frames, it is possible at any time to pull a frame from the off screen buffer. In this way, the player can move around a sprite, the sprite continuing its actions smoothly, independent of what angle it is viewed from.

If a sprite is found to be visible, but such a long distance away that it would appear very small, there will be no need to scale down the full-size sprite - this is simply a waste of processor time. Instead, there will be a number of very small 'walking' sprite animations, which can be scaled up or down slightly for characters a long way away. Far fewer of these sprites will be needed as, at this distance, it will be difficult to distinguish between characters. For example, we will need only one generic Raptor sprite and one generic 'cloaked figure' for the Guardians at this size. Therefore, the disk space requirements for these sprites are negligible.

Lighting Effects

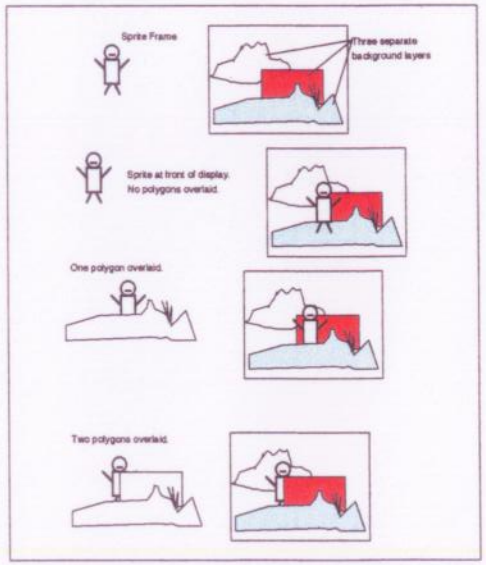
Raptor's pre-rendered backdrops will use ray-tracing to allow dramatic lighting effects. To prevent the sprites from looking out of place against these backdrops, the effects of this lighting on the sprites must be simulated in real-time. Two mechanisms will be used :

A variant of the *Depth cueing* technique - This involves adjusting a sprite's brightness and contrast according to the distance from the viewer. The further away an object is, the darker it will appear. This is a relatively simple process, which will involve calculating the physical distance (in metres) from the player of the sprite, and using an extended Bit Blit routine to use a lookup table which will take, as indices, the distance (to the nearest 10m) from the player to the sprite, and the colour of a specific pixel. The lookup table will return a palette value of a darker colour, which will be substituted for the initial one.

For rooms with complicated lighting patterns, for example if a shaft of light rises from the centre of the room, the depth cueing method will not be adequate - here, we would want sprites to appear in silhouette if they appear between the player and the light source, but brighter if they are in a position illuminated by the bright light. To achieve this effect, some nodes will have a list of lighting values for all other visible nodes. These values will indicate the relative brightness of the various visible nodes from that viewpoint. By examining the brightness value at each NPC's node (or interpolating between two brightness values for two nodes), the required brightness for each sprite may be determined. Note that this method will require considerable hand-preparation to identify which nodes are in light and their relative brightness, and so is only to be used for rooms needing specific treatment for dramatic effects.

Murphspective

Finally, each sprite must be 'cut' to take into account any obstacles between it and the player. For each node map, there will be an associated list of polygons which define the boundaries of each 'foreground' object (a foreground object is anything which is not at the very back of the picture). Associated with each polygon is a depth value, which indicates its distance from the viewpoint. Using the Murphspective system, we can check each sprite's depth against those of the polygons, to see if any objects should appear in front of the sprite. Any overlap between the sprite and a polygon is drawn onto the sprite frame in a transparent colour, so that when the sprite is finally put on the screen, the transparent colour will not be shown, leaving the background still visible, making certain objects seem as if they are in front of the sprite.



This method avoids having to store (and draw) multiple planes of bitmapped graphic background material, while allowing any number of depth planes.

Pre-set NPC behaviour

NPCs will have pre-set structures of linked behaviour states, which will allow them to behave independently and intelligently. At a given moment in time, an NPC will be able to select a new state to move into, the available states being determined by previous game events. When, as in the example above, an NPC is unable to satisfy its current requirements (to move to a specific node) it may simply select another set of states and state transitions to enter into. These behaviour states will be stored in a similar structure to that used to store branching dialogues, with a transition (the movement from one state to another) occurring when one state's goals are either achieved or deemed unachievable.

Whenever an event occurs which interferes with the NPCs current state, such as discovering a new location or object, or meeting another character, a state transition will occur, resulting in the NPC now entering into a state suitable for dealing with the external stimulus. Once this event has been dealt with, the NPC may either return to its previous state, or, if the event has made changes to which states are now available, will branch to a totally different state.

Because these states are essentially hierarchical in structure, each NPC will have fundamental states (desires), all other sub-states being simply means to achieve the state above them in the hierarchy. For example, a raptor's primary desire is to possess the grail (in this respect they are all the same), and a sub-state of this is to reach the centre of Aeternis. It is the sub-states below this that provide the differences between the raptors, since their behaviour structures will be different from one another.

Character's states, and the rules surrounding their transitions, will be determined by role-playing the characters as part of a board game version of Raptor, and eventually by building a network-based testbed where human players can assume the roles of different NPCs, allowing their actions to be studied and mimicked in the computer game - this will provide the maximum level of realistic behaviour.

The player may 'exist' only at specific points (called nodes) in the game world. At each node, the player may rotate his/her view through a full 360 degrees, by pressing the left and right keys. Equivalent actions may be performed by moving the mouse down below the HUD and its icons and pressing the left or right mouse buttons.

User Interface

The game will be presented through the eyes of the player's chosen Raptor, who is wearing a state-of-the-art military-issue MS-2 helmet, which provides a constantly updated supply of invaluable information about the surrounding environment and characters, and can scan the area around the player to identify points of interest.

The game may be controlled with the keyboard, a mouse pointer, a joystick/ joypad or a combination of two of these. This gives two advantages :

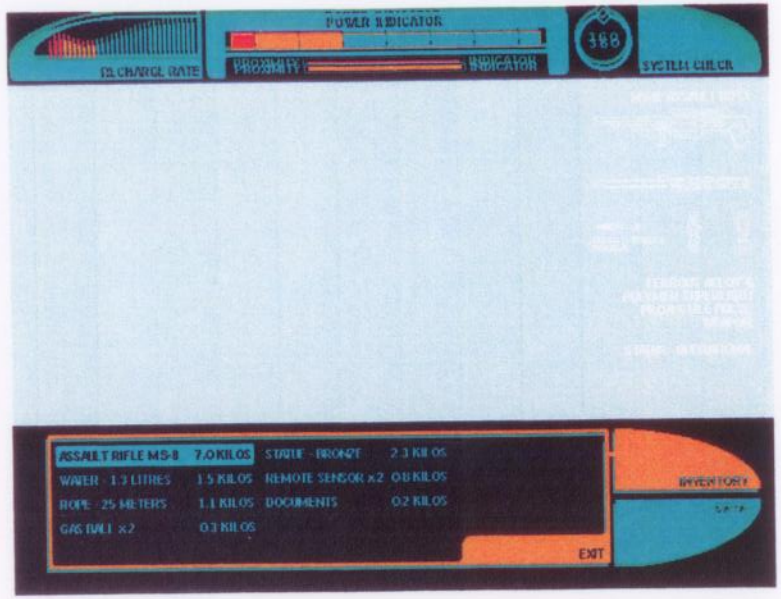
- The player may use whichever system s/he is most comfortable with.
- Porting to other platforms (such as those without a mouse or keyboard) will be possible without radical changes to the look and feel of the game.

Despite the above, it is anticipated that the game will play best with either a joypad (provided it has at least two fire buttons) or a computer keyboard. This allows the use of specific buttons for moving forwards and backwards, and for turning left and right.

Below the main display will be located a number of icons, each of which performs a specific game action. There will be several mechanisms to activate these icons - the player may press the TAB key on the keyboard (or button 1 on the keypad) to indicate that s/he wishes to select an icon. The leftmost icon will then be highlighted. Successive presses of TAB (or button 1) will result in the next icon being highlighted, until the player presses SPACE (or button 2) to select that icon. If the player tabs past the last icon, the selection will be cancelled and no icons will be highlighted.

Secondly, when using the keyboard, the player may press the first letter of an icon's name to select it. The icons will be carefully named to avoid any conflict of initials.

When a mouse is to be used, the screen will feature several areas, each providing different functionality for the mouse. In the centre of the screen (i.e. over the main HUD area), the mouse will appear as a set of cross-hairs, in the style of other HUD items. The player will be able to use these cross-hairs like a mouse pointer, and may click on items on the screen to perform actions on them.



Sample inventory screen

Movement

For the purposes of this section, the cursor keys on a computer keyboard and the directional control on a console-style joypad may be assumed to perform the same function.

From any given node, there will be one or more directions in which the player may travel. Pressing the up arrow (or forward on the joypad) will allow the player to move forward. If there is no forward route directly in front of the player, but there is one within a relatively small (30 degrees) arc, the view will rotate smoothly to that point before taking the player to the next node (and updating the positions of all other objects in the game world taking into account the time the player's character would take to move to the new node in the game world). The time taken to move to a new node should be well under 1/2 second.

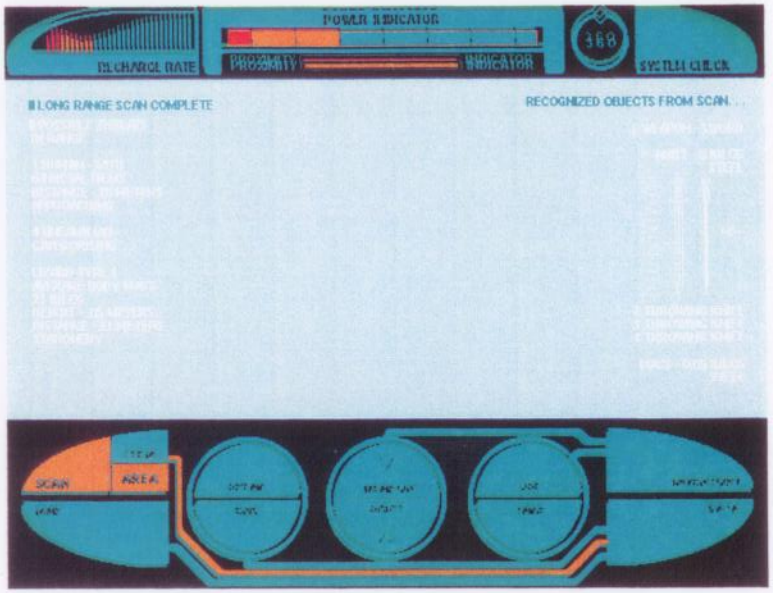
To move to a new node using the mouse, the approach is quite different. Here the player must move the cross-hairs on the HUD over the area s/he wishes to move to before pressing the right-hand mouse button. If the move can be done, the player will change nodes.

Graphics

The icons at the bottom of the screen are as follows :

Scan - Clicking once on this executes a scan of the currently selected scan type. Clicking and holding down this icon results in the choice (Area / Object/ System Check) being displayed on the HUD. One of these may be selected by clicking on it or by highlighting one with the cursor keys/joypad. When an area scan is to be performed, the HUD will systematically identify (if possible) any life forms in the surrounding area. An object scan will prompt the player to select an object or character (by tabbing through or clicking on it) to scan, and will overlay a wire-frame model of the item on the HUD, adding any information known about the object to the knowledge database. Finally, a System Check will overlay the HUD with information concerning the player's heath and equipment status.

Talk - If there are any NPCs in the vicinity the player must click on them to indicate that s/he wishes to enter into a dialogue.



Head up display layers text information over the player's view.

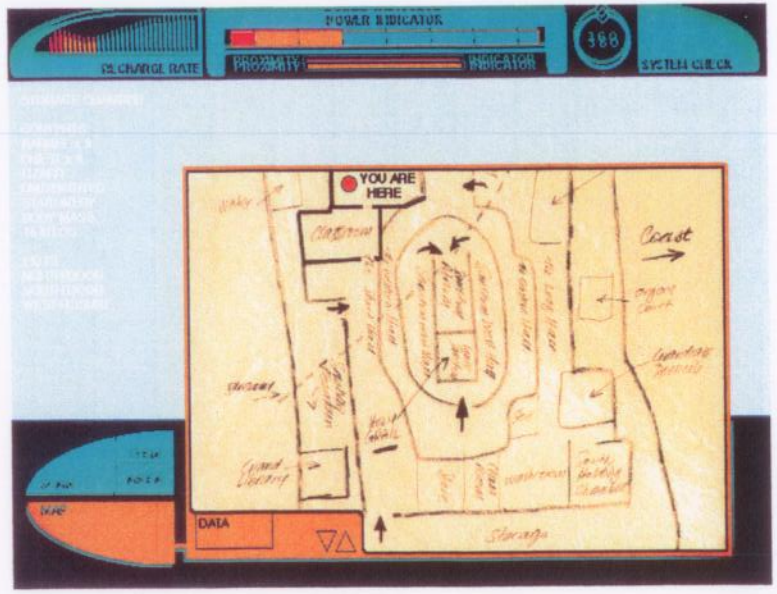
Inventory - Selecting this icon places the player in inventory mode. Here, the HUD displays each inventory item (allowing scrolling of the display if there are too many items). At any time, two items (one weapon and one non-weapon) may be specifically highlighted. The highlighted weapon is the one which will be used when 'attack' is selected, with the other highlighted object (if any) will be used when 'use' is selected (see below). The player may click on an item to select it (be it a weapon or not), and may drag one object onto another, in an attempt to use one on the other, possibly to create a third, more useful, object. Additionally, the player may interrogate the knowledge database (see below) for more information about the object (if any is known).

Use - This has two modes - when no inventory objects are selected (except for any weapons) the player may click on or select an item on the HUD, to attempt to use it. The actual function performed on the object will depend upon the context of the operation. For example, selecting 'use' then clicking on a lever will result in the player's Raptor attempting to pull the lever. Alternatively, if an inventory object is currently selected, it will be shown on the HUD as soon as 'use' is clicked upon. The player may then click on an item in the HUD to use the inventory item on it (for example, opening a door with a key).

Attack - This readies the player for combat, and is essentially an on/off toggle. When it is selected, any character in the HUD clicked upon will be attacked using the currently selected weapon (see section on inventory). Additionally, any object clicked upon will be 'attacked' with the weapon - for example, firing at a door in an attempt to break it down.

Map - Overlays the player's map on the HUD. At the start of the game, this will simply be a computer scan of the hand-drawn map given to the player. As the player progresses through the game, the map will 'auto-correct' itself to show the maximum amount of detail. The player may zoom and pan the map, and may click on key areas to interrogate the knowledge database (see below).

Database - The player builds up a detailed database, containing information about all the characters, locations and places s/he has encountered. This build up into a highly visual hypertext-like system, which appears overlaid on the HUD and can be interrogated at any time to provide a wealth of invaluable reference information, and can also be used to exchange with NPCs for information, items and assistance. See the section 'Interrogation of the knowledge database' for more details.



Map display on HUD

Chapter 10 Media Requirements

Total Disk Space Requirement

Total CD-ROM space required for game = 1033 Mb.

Backgrounds

One node stores 2*640*140 bitmap images = 180kb uncompressed,
120kb PCX compressed.
To store 5000 such nodes requires 5000*120 = 591 Mb.

Sprites

On average, one animation frame containing 8 sprite rotations will require 15 KB (FLI compression of a 320*140 bitmap). Each animation will last for around two seconds (and can be looped), at a rate of 12 frames per second.

Therefore, total number of frames per sprite, per animation = 2*12 = 24 frames (each with 8 rotations).

Each sprite will have, on average, 10 animations associated with it = 10*24 = 240 frames.

Sprites required

- Eight Raptor sprites : Kurt, Lincoln, Emma, Warren, Conrad, Patrick, Helga, Ingrid
- Four generic creature sprites : Mog, Leo, Theo and Eugene
- Seven Guardian sprites : Tobias, Edgar, William, Phillip, Odro, Tallum, Geffrye
- Five Ghost sprites : Tomas, Niamh, Vincent, Father Dunstan, Colin
- Four other sprites : Lurka, Ulrik, Captain Ethleridge, Jack Sinclair

Note - Sasha does not move around the game world accessible to the player, and is thus not modelled as a sprite.

There will be 28 sprites, so number of FLI frames needed = 240*28 = 6720.

So, for all sprite animation, number of individual sprite frames = 3600*8 = 53760.

Space required for all sprites = 6720 frames * 15kb per frame = 100Mb.

Some of these sprites (all raptors plus around six others) must be on both CDs, but the others will only be needed in specific sections of the game, and so need appear on only one disk. Therefore, it is anticipated that 75Mb of each CD will be taken up with sprites, so the actual total storage space required, including duplications, is **150Mb**.

Speech

For all the characters in the game (with the exception of the generic creatures) there will be a certain amount of sampled speech.

Speech will be stored as 8-bit mono samples, sampled at 30kHz. This requires 30kb per second (uncompressed) or 1.8 Mb per minute.

For the Raptor characters, this speech is limited to fairly simple branching dialogues (see NPC dialogue section) which set the scene and characters and provide the player with feedback on how the other raptors feel about him/her - any exchange of information here takes place via the player's HUD, so no speech is needed. For each Raptor, we should store around 2 minutes of sampled speech. Total = 16 minutes.

The Guardians and ghosts have a more complicated role in explaining the plot and giving out information - they will have 3 minutes of speech each. Total = 36 minutes.

Ulrik, Captain Ethleridge and Jack Sinclair will require only 2 minutes each, as they have been in Aeternis for a shorter time, and have less information to convey. Total = 6 minutes.

Sasha will require 2 minutes of speech.

Lurka will be used more extensively than any of the other characters (in terms of speech). Tobias' representative for much of the time, he will require 6 minutes of speech.

Unlike the sprites, most speech will not need to be duplicated across the two CD-ROMs. The exceptions to this are the raptors, and it is estimated that about 45 seconds of speech will be duplicated, per Raptor. This brings the total speech required for the raptors to 22 minutes.

Therefore, total speech required = 72 minutes.

Storage space for speech = 130 Mb.

Music and Sound Effects

Music and sound effects will be treated slightly differently from speech - the sample rate used for a sound effect will depend upon the effect itself. Low-frequency effects, such as earth tremors and falling bodies, can be sampled at 8-bit resolution at a very low rate (such as 15kHz), whereas high-pitched sounds, such as the screams of a Eugene or breaking glass, must be 16-bit samples at rates in excess of 30kHz. The Nyquist limit states that a sound must be sampled at a frequency twice that of the highest pitch in the sample to avoid aliasing (unwanted sound shapes being superimposed upon the sample). The threshold of human hearing is 22kHz, and hence the sample rate used for CD audio is 44kHz (allowing any sound the human ear can detect to be reproduced perfectly). Most of the sound effects will be sampled in 16-bit mono, and can be panned during the game to appear anywhere in the L-R field. Around **20Mb** will be used for sound effects.

Music will consist of 16-bit samples, both mono and stereo, triggered by appropriate game events. It will be sampled at around 35kHz, which will provide a quality very close to that of CD audio. In total, the game will feature around 20 minutes of music. This will be formed into loopable segments which will fit together interactively, allowing long periods of non-repeating music to be played without excessive disk use. This music will be spread evenly across the two CD-ROMs, and will require a total of **80Mb** of storage (70kb per second).

Cut Animations

These are animations which, although not interactive, are essential for building the atmosphere and explaining the story. They include the intro sequence, visions the player may experience, set-pieces with Sasha (among others) and so on.

These animations will be stored as FLI files, generally at a resolution of 320*140 (although a few of them will be stored full screen). We will display these animations at a rate of 12 frames per second, with each frame, on average, requiring 10kb to store.

Including all intro, end game and in-game animations, there should be around 10 minutes of cut animations.

600 seconds * 12 fps * 10kb = **72Mb** of storage, spread across both CDs (no duplication).

Other Items

Other items, such as game code, maps, text files and sound drivers will be stored on disk one and will mostly be copied onto the hard disk at install time. This should take up no more than **10Mb**.