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MENACE CODE AND DEMO: Latest update for aspiring programmers ■ **VIRUS X 4:** New version of the indispensable virus killer ■ **DEVPAC 2:** Useable demo of Hisoft's assembler/editor/debugger ■ **SLEEPY:** Utility to change the 'ZZ' cloud ■ **GAMEBUSTERS:** Three more devious pokes ■ **WORKBENCH HACKS:** More entertaining hacks
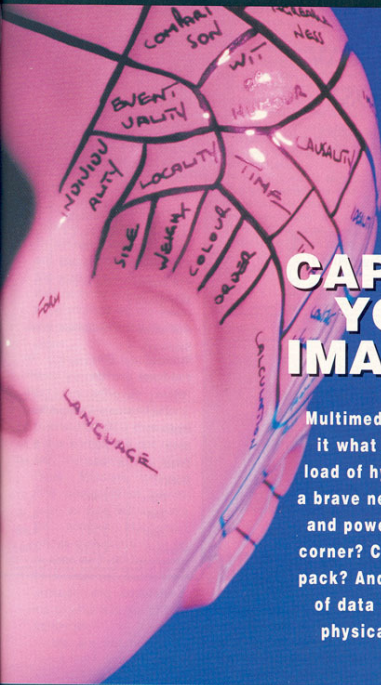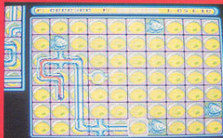
CAPTURE YOUR IMAGINATION

Multimedia, Hypermedia… call it what you will. Is it just a load of hype, or is there really a brave new future of simplicity and power waiting around the corner? Can the Amiga lead the pack? And will the Cyber-dream of data perceived as a solid physical world come true?

REVIEWS

In Screen Play: *Conqueror*, a tanking good game.

In this game you have chosen to play the part of the Americans and that German King Tiger is proving to be a real pain.

While his attention's drawn, you have a chance to take your Pershing round the back and hit his weaker rear armour.

A side shot from another Pershing has knocked this one out before he could get a shot off at the fast moving Chaffee.

Those of you who like to keep abreast of developments in the computing world in general – and not just what's happening on the Amiga – might just remember a couple of Archimedes games that appeared a while ago: *Zarch* and *Conqueror*. *Zarch* has been available on the Amiga for some while under the pseudonym *Virus* and now here's Amiga *Conqueror*.

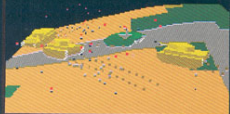It's a tank wargame simulation for one player that comprises three games. Just like in *Virus*, the player has a limited view of the total game area when actually controlling a tank, but can see the whole game map simply by hitting a key. In fact the game uses the very same landscaping routines that were first developed by David 'Elite' Braben for *Virus*.

Before starting a game you have to decide whether you wish to control American, German or Russian World War II tanks and who you'd like to fight against – it'll always be Germans vs either Russians or Americans, but never

CONQUEROR

RAINBOW ARTS £24.99 ■ Joystick, Mouse and Keyboard

Russians vs Americans since they were allies during the war.

You also have to decide which control method you'd like to use, and here's where you can get a friend in on the action. To play you'll have to both drive the tank *and* fire at enemies, so you can do both yourself or choose to let the computer (or a friend) take over one task while you concentrate on the other. For example, you can drive the tank from the keyboard and use the mouse to control the turret, or you can use two joysticks, either to just drive and leave the firing to the computer, or use them both to drive and fire.

GRAPHICS	9
SOUND	6
INTELLECT	6
ADDICTION	9
OVERALL	93%

Either way, controlling the thing is going to be pretty tough at first.

The three games are arcade, attrition and strategy. In the arcade game you have three lives, start with the lightest tank and have to fend off wave after wave of enemy light tanks, scoring points for every tank killed. After a few kills you move on to a medium tank, as does the enemy, and if you're still alive after a few more kills you move into a heavy tank and just keep going for as long as possible, always outnumbered by enemy heavy tanks.

The attrition game is a mix of strategy and arcade where you start with a selection of tanks (one light, two medium and one heavy) and the computer starts with an inferior selection. The idea is to fend off the enemy waves for as long as possible – once you lose a tank, it's gone for good. Obviously you only control one tank at a time directly, but you can give your other tanks orders simply by selecting them on the map screen and putting a destination cross somewhere on the map. The remote-controlled tank will then head for the cross and will either stay there or pick a new destination depending on whether you select auto or manual strategy from the map page. The last tank you position on the map screen

The strategy game. First thing to do is place your tanks on the base line. Luckily the circle is nearer your side so you should be able to get to it first – then you only have to hold it!.

will be the one you're controlling on the action screen.

In the strategy game you buy whichever tanks you can afford from your points (up to a maximum of 16). At first you only have a few points so you can only afford a couple of light tanks (generally, the heavier the tank the more firepower it has and consequently the more it costs). Then you place your tanks at the bottom of the playing area while the computer places his at the top: the idea of the game is to control a randomly-designated area of the map, so you must allow no enemy tanks to enter the area, for a period of one minute. Every time an enemy tank enters the area the clock stops and will only restart once the enemy tank has been destroyed or left the area.

With a squad of 16 Pershings, the next scenario seems likely to be a real firefight!

Winning involves either holding the ground for a minute or wiping out all the opposition for that mission. Bonus points are awarded for knocking out the enemy and for completing the mission and these points can then be spent at the start of the next mission on more, better and bigger tanks. ∎

GRAPHICS AND SOUND

Everything is well animated and smooth too. The tanks are a bit blocky, but at least they look like tanks. The landscaping, although not original, works extremely well and you really get the feeling you're trundling over a real landscape. Nice touches include the track marks that gradually fade and the smoking hulls of knocked-out tanks. The sound is not so impressive being limited to some high pitched explosions and chugging engines. Looks excellent and sounds all right.

LASTING INTEREST

Getting to grips with the control is the first priority and once you've done that it'll take you a while to learn just how to survive in a tank with inferior fire power to your enemies. After that you'll be playing it for hours at a time and as often as you can.

JUDGEMENT

A corking game that's very playable and surprisingly addictive. It's also very tactical at times and will appeal to everyone who likes a good blast but also likes to think they can master a situation by good tactical planning as well. A first-class game that's going to have you begging for a follow-up.
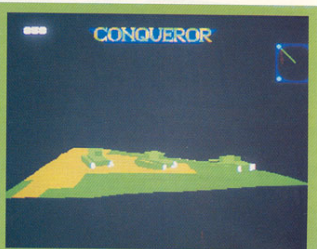
Above: At the start of another game three Pershings move off together in search of some action with the enemy.

Below: One of the Pershings lurks in a small village, waiting for any combat vehicles of the opposite persuasion to appear.

Andy Smith

SHOOTING GALLERY

THE GERMAN PANZER III

The Panzerkampfwagen III (PzKpfw III) first entered production in 1936. Initially it was armed with an L/37 45mm gun, but like most of the tanks at the time it was upgraded throughout its life and ended up with a L/75 24mm in 1942. The version used in the game is based on the Ausf L which was equipped with an L/50 60mm anti-tank gun (like the one pictured here). At the start of the war the tank was equal to its adversaries, but it was soon left behind and even upgraded versions were unable to take on the Russian T34s and KVs.

THE AMERICAN M24 CHAFFEE

The Chaffee saw extensive action during the last few months of the war and it was well liked by the men that recieved them as an upgrade to the M5A1. It was roomier and had distinctly better firepower (75mm gun). It was still too lightly armoured to withstand anti-tank or tank gun fire but twin Cadillac engines gave it a maximum cross-country speed of around 40 KPH which enabled it to out-manoeuvre almost all German tanks, and it was especially effective in support of infantry against enemy troops lacking anti-tank weapons.

THE RUSSIAN IS II

(IS = Iosef Stalin. The common transliteration 'JS' is, strictly speaking, incorrect). The first IS IIs were issued early in 1944. With a massive 122mm gun, this was the first Soviet tank to be able to take on Tigers and Panthers at long ranges and knock them out with ease. This gun offered 2.7 times more kinetic energy on impact than the 85mm originally pencilled in. Unfortunately, the two-piece round with a separate brass cartridge slowed the firing rate to about two or three a minute and only 28 rounds could be carried.

The start of a new game. Mahoon has been fortunate so far, grabbing most of Europe with little interest shown by the other players (in this game the players are choosing their own countries rather than letting the computer dish them out randomly).

Andy Smith

RISK

LEISURE GENIUS £19.99
■ Mouse or Keyboard

There's a streak of megalomaniac in each of us, so what could be better than playing a game that gives you a shot at world domination? Up to six players, computer or human, can compete for control of the 50-odd countries that make up the world in this translation of the hugely popular board game.

The game starts after all the countries have been divided up between the players (or the com-

puter has dished the countries out at random depending on whether you're playing using US or UK rules) and your initial batch of armies has been placed on those countries you own.

The game is played in turns and whoever starts is awarded extra armies, the number depending on how many countries the player owns. If later on in the game a player manages to gain

control of all the countries making up a continent, then extra armies are awarded, in proportion to the size of the continent, on top of the normal number allocated.

What happens next is what the whole game is about. The attacker tries to conquer a neighbouring territory by rolling up to three dice. The defending country can also roll dice and whichever side scores highest wins.

For example, an attacker throws three dice and scores a six, four two and the defender rolls a five and a three. Both the six and four of the attacker beat the defender, so in this instance the defender would lose two armies from his country. If that now means he has no more armies in that country then the attacker can invade and take control of it. Defenders always win draws, so if a defender ever throws a six he knows the attacker will be losing at least one army.

Attacks continue in this way until the attacker feels he has had enough and retires. If he has captured at least one country he then receives a Risk card. There are three types of card: artillery, cavalry and infantry. Three cards of the same 'suit' count as a set as do one of each type. Sets are handed in at the start of a player's attack phase for extra armies.

Playing successfully is a careful balance between conquering countries and not leaving any gaps that would allow the following player to walk right across you: there's nothing more annoying that capturing seven countries on one turn to find you haven't enough armies left to defend them and the next player goes in and takes them all off you. The person who conquers the world is the winner! ■

After one round Mahoon is still in a strong position in Europe, but the brown player has grabbed Africa, denied Mahoon the whole of Europe and denied the grey player the whole of South America.

GRAPHICS AND SOUND
Simple beeps are hardly anything to get excited about, but that's all you'll need to play the game. The graphics are basic but at least the scrolling is smooth. It doesn't look or sound great, but then it doesn't have to.

LASTING INTEREST
As well as the basic game there are a whole load of options which allow you to change the game's parameters. Mission games can be played, where the computer gives you a mission card at the start of the game – for instance, 'Knock out player three' – and you can then concentrate on trying to fulfil your objective. There are a load of other options including a cheat option and a fast option, all increasing the lasting interest of a game that's already packed with it. You'll be coming back to this for years.

After several rounds. Having kicked player three out of Europe, Mahoon built up his forces while brown exhausted his armies in a pointless battle over South America with the grey player. That let Mahoon into Africa and it looks as if things are going his way – but things could change.

JUDGEMENT
If you've ever played the board game you'll know just how compulsive it can become, and the computer version has everything the board game has (and more). Play with a few friends and you'll be in for some long sessions of enjoyable play. It may not be the most complex strategy game in the world, but it's certainly one of the most enjoyable.

GRAPHICS	6
SOUND	2
INTELLECT	8
ADDICTION	8
OVERALL	85%

GRAPHICS AND SOUND

There's not too much animation because this not really an action game. The rest of the graphics – maps, portraits and so on – are all very good. The atmospheric background music compliments the stunning visuals. Excellent stuff, especially when you take into account the strategic nature of the game.

You're playing Ametrin, the Green Beast, in this game, and here's a picture of your castle in the northwest corner of Anrea.

DRAGONS BREATH

FORMAT
AMIGA
GOLD

PALACE £29.99 ■ Mouse and Joystick

Andy Smith

A close-up of the area which we are planning to inspect in detail. Click on the magnifying glass icon to zoom in on Kilop.
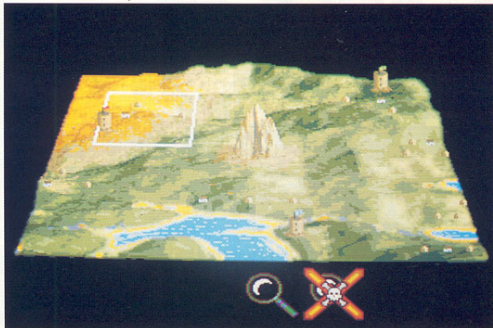

And here we are in 'zoom-in' mode. A whole heap of different details about the towns and villages can be called up here.

Putting one of your eggs on the boil. Just sit back and wait several months and with reasonable care a dragon will hatch.

In the spell room, which is where ingredients are mixed, cut or ground together to produce potentially potent potions.

In the land of Anrea stands a lofty peak known as Dwarf Mountain. Within the mountain hides a great castle and within the castle lies the secret of immortality. Three people wish to know the secret and so the governors of Anrea, the Great Lords, have granted the honour of entering the castle to the first person to find three parts of a smashed talisman scattered around Anrea.

That's your objective in this one to three player fantasy strategy game: find the parts of the talisman before your opponents do. It's not going to be too easy, though, because in order to find the pieces you're going to have to enlist the aid of dragons.

The land of Anrea with Dwarf Mountain dominating the centre. That white square in the top left corner allows you to zoom in on a small section of land.

Each player starts the game with one dragon and a batch of twenty eggs and a few gelds (money in Anrea). Keeping a dragon and incubating the eggs costs money and your only way of making money is to become a tyrant, using your dragon to conquer the villages and towns of Anrea. Then you can impose a tax on the local population to fund your exploits.

The game is played in monthly cycles, each player using the icons at the base of the screen to decide the month's actions, such as sending out a dragon or putting an egg on to hatch. Once everything's organised, the dragons go about their business and then a new turn starts.

That's the basic idea of the game, but things can get a lot more complicated. For example, the simple process of incubating an egg is really quite difficult. Every egg takes several months to hatch, but the process can be speeded up by increasing the temperature on the incubator. This, however, increases the cost and will also make the dragon that emerges weaker than one that's taken longer to hatch. Then there's attacking the towns. The physical distance between the town and your castle affects your dragon's strength and his effectiveness at wiping out a third of the population, a target of attrition which has to be achieved if you are to become controller of the town. Plus there are variable factors that come into play, like wandering barbarians, the town's defences and the amount of zeal you order your dragon to attack the town with.

By far the biggest complication, though, is the introduction of magic. Every player has the ability to cast spells at dragons, villages and towns and eggs, among other things, and the whole spell-casting process is a sub-game in itself.

There are a couple of dozen magic ingredients divided into two major categories: directors and affecters. Directors direct power at the target whilst affecters affect an attribute of the target (population, strength, disease and so on). To cast a spell, a director needs to be mixed with an affecter to get either a positive or negative result depending on the ingredients used and the method of mixing, so there are several tables to consult to see how best to use and mix the ingredients to get the best possible result from your spell. The game is lost when you have no money or dragons and a game is won by the first person to find the three scattered parts of the broken talisman, and have a dragon guarding each piece. ∎

LASTING INTEREST

Heaps of it. Just playing a game will take a very long time – thank heavens for game save options – and if you can invite a couple of friends to join in the fun you're likely to be playing this an awful lot. The gameplay is such that you can come back to this time and time again and it won't lose any appeal.

Your library contains three books (which allow you to keep an eye on current affairs in Anrea), as well as your list of spell ingredients and a report on your character's status.


Here's one of your dragons. Check on his state of health simply by moving the mouse pointer over parts of his body.

JUDGEMENT

Dragons Breath is in serious danger of becoming a cult computer game. People who are fans of the D&D series of games or fantasy role-playing games in general are going to find this almost impossible to resist. It's very strategic, takes dedication to play well and will not appeal to those who just want to relax for half an hour or so. But if you have a couple of like-minded mates who you can invite round for an evening every week, then you'd better prepare yourself for some engrossing, entertaining and thoroughly enjoyable playing sessions. If you have to play solo, you'll still find it excellent stuff: the computer players are no pushover by any stretch of the imagination.

GRAPHICS	8
SOUND	7
INTELLECT	7
ADDICTION	8
OVERALL	94%

BURNING DOWN THE HOUSES
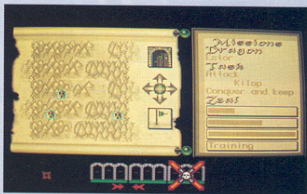
Once you've decided which village to attack, set the dragon's zeal level and wait for the end of the turn...

...and you can watch your dragon at work.

You also get progress reports on the other players' dragons.

Luckily for you, your first attack was against a village at war with a neighbouring village, and they're so pleased with your dragon's efforts they've had a whip round for you.

PIRATES!

MICROPROSE £24.95
■ Mouse

"I said: It's that grinning smuggling Mr. 'Midnear' A seedy group of 24 men asks to join your crew. Do you...

Turn them away?"

The start of your buccaneering career and already you've impressed a bunch of cut-throats with your swashbuckling!

O ver two years after the C64 version first appeared comes the Amiga version of this swashbuckling adventure, that puts the player in the boots of a 17th Century buccaneer.

Out in the Caribbean, the general idea is to take command of a ship and sail around seeking fame and fortune. You start off at an English-owned port (usually the town of Port Royale in Jamaica) with a small sloop and a handful of men. Sailing around will soon have you coming face to face with an enemy ship (at the start of the game the English are at war with the Spanish and Dutch) and, as you've been charged to seek and destroy enemy ships and towns, it's time to engage in combat.

Combat involves moving your small ship around the screen and trying to get a shot off at the enemy while avoiding any of his salvos. Almost invariably, though, the two ships collide and combat is ultimately resolved by taking on the enemy captain in a duel, which is never too hard to win. Then you're left with the option of either plundering and sinking her or sending a prize crew over and making her a part of your mini fleet – handy because you can always sell unwanted ships at a port. Either way you'll be making money, which always impresses the governors of English ports.

After a battle with a pirate vessel, you have to sword-fight with the captain of the enemy ship to resolve the outcome.

Force: Captain   Mahoon
         22 men   42 men
Morale: Panic   Wild
Weapon: Cutlass   Longsword

The two ships crash together. Though the enemy has got inside firing range approaching...

Have at you! Your superior swordsmanship has put an end to this pirate's cowardly ways...

While you spend your life sailing around plundering enemy ships and towns – or your own if you fancy becoming a real pirate – you can often be sent off on little subquests like delivering messages or searching for your long-lost sister. You can also sail around collecting pieces of a map to guide you in a treasure-hunting expedition. Once you've had enough of the sea-faring life you can always retire and take up another life depending on how successful you were and whether you found a wife. ■

Captain, we've captured Colonel Vasquez and a 4-gun pinnace of 20 tons. We have space for 75 tons in the hold. Shall we keep her?
Yes, send a prize crew
No, plunder and sink her

...leaving you with some more booty to add to your collection.

GRAPHICS	7
SOUND	5
INTELLECT	4
ADDICTION	7
OVERALL	74%

GRAPHICS AND SOUND
The little tunes that play occasionally are nothing special, but fortunately the graphics are much better, even though most of them are just still portraits or pictures of towns and the like. During the action scenes – sea battles, or attacks on towns – the graphics are very simple and blocky, but at least you can see exactly what's going on and whether you've hit or missed your target.

Off the Spanish Main and it's time to give those Spaniards a taste of your cutlass.

The lady like a Saragos, captain. Shall we... Intelligence? Sail her away?

He's flying Spanish colours, Captain. Shall we... Close for battle? Hail her first? Sail away?

LASTING INTEREST
The game save option means you can keep one character going for a long time, which means you'll be coming back to this whenever you feel in the right frame of mind. Which is surprisingly often, because the game has a strange sort of addictiveness about it.

JUDGEMENT
Microprose have a nerve to bill this as a simulation but it's still lots of fun to play. After a while it becomes a bit repetitive but it certainly appeals to the greedy nature in most of us as it's hard to resist grabbing out and plundering a bit more to make some extra money. If the gameplay had been deeper and more complex it could have been better.

Andy Smith

DR PLUMMET'S HOUSE OF FLUX

MICROILLUSIONS £19.95 Keyboard or Joystick

There aren't too many Thrust clones on the Amiga, so American publishers Microillusions reckon it's about time there were more.

This one gives the player 28 levels spread over four increasingly difficult missions, where the idea is to fly around the often bizarre and psychedelic levels and rescue a set number of highly animated astronauts by flying into them. Collect all of them and you move on to the next level. The levels vary in size and complexity, including extremely thin tunnels, gaps and gravity which have to be negotiated on some of the later levels.


On Mission Two. That object on the left's actually an astronaut who would appreciate a rescue.

Just to complicate things more, there are enemy bases on later levels that fire at the ship whenever it gets too close.

Simple ideas are often the best and if you're a fan of precise control and gameplay, with just the right level of frustration, you're going to be wowed by this. It's tremendous fun but all that concentrating can give you a headache after a while. Everyone should have at least one game of this type in their collection. ■

GRAPHICS	6
SOUND	4
INTELLECT	6
ADDICTION	8
OVERALL	77%

Andy Smith
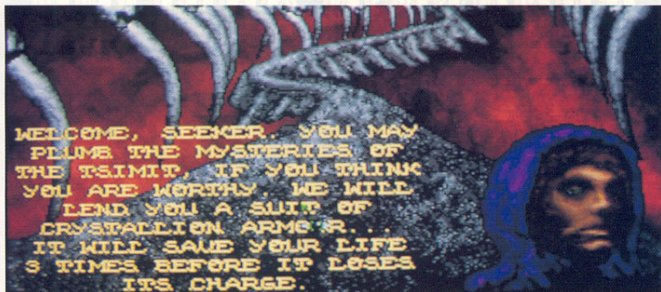
Make sure to introduce yourself to the Keeper of the Tsimit before venturing into the Veils of his domain. This time he allows you to pass into the caverns, but entry depends on your contributions to the Keepers' funds.

KNIGHTS OF THE CRYSTALLION

US GOLD £29.99 ■ Mouse

GRAPHICS AND SOUND

It is obvious right from the film-style intro that a great deal of effort has gone into making *Knights of the Crystallion* a truly impressive-looking game. The use of HAM mode gives the ability to use more colours to create a subtle and suitably 'mystic' atmosphere. The shadowy caverns of the Tsimit and the flickering candlelight of the Deketa game are a most impressive demonstation of what can be done to create a good feel with HAM graphics (rather than some more gaudy efforts such as Mandarin's *Pioneer Plague*). The sonics department uses a blend of ethnic and synthesizer sounds to heighten the mystic feel of the game and make a nice change to the Hip-House variations usually on offer.

This is the main selection screen. Effectively, you must return to the city of bones each time to choose your next task.

L ong ago, when the huge reptiles roamed the Earth, a giant sea creature swam the oceans. This creature was the Orodrid, a beast so large that it had to eat constantly to stay alive; and it was this outrageous appetite that caused its demise.

Once upon a time, the huge animal became wedged in a narrow canyon while chasing a whale and because of its size it couldn't turn around to escape. Time and the elements wore down the remains of the Orodrid so that all was left was its massive skeleton, lying lost and forgotten on the bed of the river Odruilen.

Ages passed, and a wandering tribe discovered the skeleton. They discovered that no matter how far they walked, they couldn't leave the shadow of the beast (where have I heard that before?) so they decided to carve into the bones themselves to create shelters. Throughout the generations the tribe grew into a giant community – the Orodrim.

In *Knights of the Crystallion* you take control of the Adreni family, part of an Orodrim Haresh (a type of clan). It is up to you to control the budget of the Adreni family, keeping the other members of the Haresh happy and making

sure that you don't go under. The city of Orodrid doesn't live in the way of normal beings, however: there is much more to Haresh life than balancing the books.

Within the skull of the Orodrid skeleton, crystallised brain cells were found. The power from these cells flows though the whole city, giving its inhabitants telepathic powers. A few of the most gifted telepaths may even go as far as to ride their own Crystallion.

You may just have the necessary power for this honour, but to prove it you will first have to undergo a series of tests during which you must prove yourself…
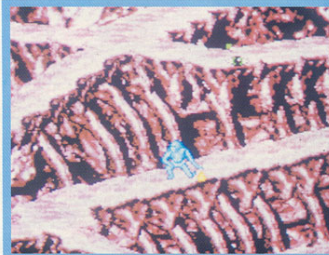
1

THE TSIMIT

This is where the Crystallions are born, deep within the fourth Veil of the Tsimit. You must negotiate the caves, collecting crystals and warding off the evil creatures that lurk in the dark. Sometimes, depending on your mental skills, your unborn Crystallion will help you.

Green, lizard-like Crodas wander around the Tsimit attempting to strangle you.

Below: The Haresh page where
you compare your progress with
that of other families and judge
the state of the markets.

This is the Haresh page, where you become involved in the business life of the community. Raise and
lower prices to keep money coming in, and pay taxes to the Tsimit to ensure their continuing help.

LASTING INTEREST

As is the way with many adven-
ture/role playing games, you
may find yourself initially baffled
by the sheer volume of things
you have to learn to begin play-
ing the game, but if you manage
to overcome the initial confusion
you will soon be drawn deep into
a magical world with a lot more
character and depth than many
role-playing games.

The complexities that seem
rather off-putting at first soon
become a way of life, with subtle
shifts in the pattern of play mak-
ing you bend your brain around
the problems instead of just fol-
lowing clues. It will take quite a
few failed attempts before any-
thing of note is accomplished,
but soon things begin to fall in
place like pieces in a jigsaw.
Having said this, there is abso-
lutely no way that you will finish
Knights of the Crystallion inside
a week, even though the
hypnotic quality will keep you
playing for hours at a time!

2 DEKETA

This is a game of 'pairs' played with magical cards to help you hone
your telepathic skills to the utmost effect. The shifting patterns on
the cards give clues to those with a strong mind.

The card game Deketa: keep turning over cards until you can
match pairs without mistakes, giving you powers within the Tsimit.

3 BOSU

A board game to test those
who are successful at battling
through the Tsimit labyrinth.

Bosu: a game rather like
Nine Men's Morris, but the
idea is to capture junctions.
At the end of a Veil you
answer a question on the
Tocanon then play a game of
Bosu. Your score affects
whether you keep crystals
and move to the next veil.

JUDGEMENT

Not many games use HAM mode
to portray the action, so at first
sight it may seem that US Gold
are just going for a gimmick.
Even if this is the case, *Knights
of the Crystallion* has enough
depth and gameplay to stand up
as decent game in its own right.
Sure, the beautiful graphics and
haunting sound don't hinder
things any, but there is much
more enjoyment to be had play-
ing *Crystallion* than simply
watching a demonstration of the
Amiga's capabilities, a fact that
role-players, adventurers and
even arcade adventure fans will
appreciate once they play for
themselves.

4 THE PRODA

A strange room where the most adept crystal-wielders can charge their crystal suits.

The Proda, where you lay your crystals in a shift-
ing pattern. Power is transmitted to your crystal
suit when the 'Prods' are close to your crystals

The pink and blue are crystals, the orange blob
is trying to nab your crystals, and the egg-cup-
like affairs are the Prods, which move constantly.

GRAPHICS	9
SOUND	8
INTELLECT	8
ADDICTION	7
OVERALL	**91%**

Marf Evans

ROTOR

ARCANA £19.95 ■
Keyboard or Joystick

A really tough mission this, especially since you've just exposed two mines and there's nowhere to go to escape the blast!

Arcana have been very quiet for the last year trying (and so far, failing) to get *Mars Cops* out. While we wait, here's one to fill the gap.

Set in the future, when most young adults have the choice of either working in slave-like conditions in Antarctic mines or joining the Roto-raiders attack force, this one-player game has its roots in classics like *Thrust* and *Oids*.

As a member of the Roto-raiders (well, a game about mining in the Antarctic wouldn't excite too many people) you have to infiltrate four enemy fortresses, destroy any hostile installations and collect any useful gadgets thoughtlessly left lying around by the enemy.

Your ship, viewed side-on, is armed with a front-firing gun, a tractor beam for picking up cargo and a limited shield to protect you from enemy fire.

Once you've proven proficient, first at handling your ship and then at firing and using the tractor beam, in the two simulators, you're given a three-letter code which allows you access to the first three missions.

Missions involve flying around the enclosed enemy fortress, taking out the enemy and collecting containers. Inside the containers you'll find ammunition and fuel which your bosses want you to beam back to them using your on-board transporter. Other things to

collect include energy crystals which can be converted into useful power-ups like extra hull armour and better weapons. As well as power-ups, collecting things (and destroying enemy installations) earns you Prestige Units and enough PUs have to be earned during your missions to allow you to progress to the next level – right up to Level Six (where things are really tough!) ■

GRAPHICS	8
SOUND	5
INTELLECT	6
ADDICTION	8
OVERALL	84%

GRAPHICS AND SOUND
There isn't too much in the sound effects department, but the ones that are there are fine. The graphics are much better, being very colourful and well animated. The graphics aren't the most important thing in a game like this but obvious care and attention has been paid to them which is nice to see.

LASTING INTEREST
Getting to grips with the controls will take you a while, but once you do you'll find the game will keep you playing for months.

JUDGEMENT
The idea may have already been done, but there are enough new features in *Rotor* to keep it exciting. Fans of precise control games will love it, and you'll be surprised how addictive the thing can become thanks to the good difficulty tuning. It's not varied enough to receive a Format Gold award, but then again we're renowned for our hard marking.

THE GRAVITY OF THE SITUATION

The manoeuvre simulator, in which you learn to fly and also to collect objects.

The combat simulator where you then learn how to deal with things firing at you.

On an actual mission, the star shape top right is a sun crystal you must collect to get home.

FIRE

NEW DEAL ■ £29.95
Joystick

Fly along, mind the balloons and peasant huts and destroy the enemy helicopters and installations.

Who said there were only seven stories? Well, it's looking more and more like there are only seven computer games. This five-stage, one-player game harks right back to those early days, the days of *Defender*.

You're in control of a helicopter, viewed side-on, moving across a horizontally-scrolling landscape. The idea is to do good deeds on each of the five levels by destroying baddies who send jets, helicopters, tanks and so on

against you. On the first level you're trying to put a halt to drug trafficking in South America, before moving on to rescue some innocents in Beirut.

It's all very similar stuff and it's all been seen before.

Everything is well animated and colourful and it's been well put together, but it's very dull.

Defender had something in it to get excited about ten years ago, and if a bit more thought had gone into the game design of this version it might have turned out a bit better. Which is not to say it's complete rubbish by any means, but if you're really after a new shoot-em-up there are plenty of better ones to choose from around now. ■

GRAPHICS	6
SOUND	5
INTELLECT	3
ADDICTION	5
OVERALL	43%

Kit out your car before taking on the dangers of the outside world.

Superb ray-traced graphics serve to introduce the action.

OVERLANDER

ELITE £19.99 ■ Joystick

Originally released a couple of years ago on just about every format except the Amiga, *Overlander* follows in the footsteps of games such as *Roadblasters*, and *Fire and Forget* – it's a 3D driving game with a generous helping of the old blast-the-enemies-to-bits with your on-board weapons.

The plot places you in the future as a driver in the year 2025. CFCs have destroyed the ozone layer, so that the human race has had to take refuge away from the suns harmful ultraviolet radiation in huge underground cities. Because of the vast distances between the cities, the only way of getting from one to another is via the old freeways. These roads are not the place for normal citizens, due to the radiation above ground and the violent mutant beings living on the surface. Whenever a trip is necessary, the government sanctions

the use of the Overlanders – mercenaries with extremely powerful vehicles at their disposal. The reason for the trip doesn't bother them – they only want the money so they can improve their cars.

You are one of these drivers taking on a government funded mission. Half the money is given up-front to give you some cash to add some kit to your car. Add-ons range from $100 flame bombs to a $10,000 lean burn engine, but a stock of fuel is needed before you can go anywhere and that costs money too! Don't worry too much though, since dosh can be topped up by blasting the overground mutants with your on board cannons or any other weapons you may have bought.

If you manage to reach the end of the level, the other half of your fee is paid and you are given another choice of missions. ■

GRAPHICS AND SOUND

Whereas the sound is the usual run-of-the-mill boppy bassline and drum machine effects, the graphics are much more impressive. The depth-cued shading gives the game a realistic quality and the nicely drawn open desert wastelands have a suitably desolate feel, in fact the appearance in general is very atmospheric. Even the selection screens have been beautifully designed, with small but perfectly formed symbols to represent the options. One more thing – why don't more
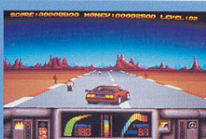

Blast everything out of your way with the subtle ploy of firing a few firebombs.

Destroy the truck, but watch out for the explosive canisters it drops in your way.

Look out! That cyclist is far from being as innocent as he might first appear!

DRIVIN' FORCE

DIGITAL MAGIC £24.95 ■ Joystick or Mouse

Hurtling around race circuits in a high-powered racing car is all very well, but haven't you ever fancied trying your hand at one of those huge American trucks? You now have the chance.

There are nine, count them, Formula One racing cars, ordinary sports cars, buggies and motorbikes to race around in this one-player game. Which vehicle you race in depends on which of the four competitions you enter. For example, in the

league game you race in all the five vehicles, one after the other, over increasingly difficult courses (each vehicle has five different courses). If you start in the trucks, you race then move onto buggies on another course – get the idea?

The knockout competition is similar in that you race in all the vehicles, but the tracks are in a random order; so you could race in the buggies over a difficult course, then cars over an easier

one: to continue racing in the knockout competition you have to finish each race in the top three. Then there are mini versions of knockout and league: you choose the vehicle you want to drive or ride, but in the knockout you race that vehicle's courses in order of difficulty whereas in the league you race in a random order.

Like most racing games, it's best not to crash into roadside obstacles or the other road users. Actually, you simply bounce off them, but it does lose you valuable time and more often than not a couple of places too. Far more serious, simply because it takes longer, is when you fall off of a section of the circuit that's suspended above the ground: you fall to the ground and have to wait until you're re-positioned on the track before you set off again. ■

GRAPHICS AND SOUND

Boy, do those graphics shift! This is arguably the fastest race game to have appeared to date. The impression of speed is great, and the way it's been done is by using a roadway system similar to that used in games like *Power Drift*: a roadway made up of log shapes that grow in size as you move towards them. This does tend to give everything a blocky appearance, especially roadside buildings and trees. The sound can be switched between a number of jaunty tunes, which are all right, or sound effects (engine noises) which are also fine.

LASTING INTEREST

With 25 tracks to race round you're bound to get wrist-ache. The different vehicles are different to drive and handle differ-

people use the Amiga's overscan mode? As *Overlander* definitely benefits from its use.

LASTING INTEREST

The obstacles and enemies on every level fall into a definite pattern, so that you can learn just what lies ahead and remember how to tackle it next time. Not that you'll get through straight away though, it's going to take a good few goes before you start beating the roads!

JUDGEMENT

This type of game was all the rage a couple of years ago, so why has it taken so long for Elite to get an Amiga conversion of it together? Probably because the programmers wanted to do it properly and to be honest they have produced a good looking and playable game. It's not exactly an innovative idea and hardly breaks new ground in technical expertise, but it does provide the driving, shoot-em-up addict with a high quality fix of blasting action. Fans of *Roadblasters* should put aside their disappointment at the official conversion and try this for size, but casual players should check it out carefully before slapping the money on the counter.

GRAPHICS	8
SOUND	6
INTELLECT	2
ADDICTION	7
OVERALL	81%

SPECIFICATIONS: 500cc

ENGINE:
CARBURETORS:
SUSPENSION:
BRAKES:

Cut your teeth on smaller bikes then move to the big 500cc model.

THE CYCLES

ACCOLADE £24.99 ■
Joystick or Keyboard

Following on from *Grand Prix Circuit*, which put the player in a Formula One racing car, comes *The Cycles*, which puts you astride a 125, 250 or 500cc motorcycle.

There are fifteen international tracks to race round (thirteen on a 125) and nine computer-controlled riders to beat. Pick your bike and spend a couple of laps practising before setting out on a real race. In this mode your competitors get out of your way, the gearbox is auto, you can't blow your engine through over-revving and spin-outs are impossible. Step up a couple of difficulty levels, though, and you'll have to start changing gear yourself while ensuring you don't blow your engine.

The number of laps per race can be set by the player (up to 99) but the default setting is three. High-score fans will be pleased to learn that the four top times for each circuit and for each bike class are saved to disk.

In the real race you have one qualifying lap to determine grid position before starting. Then it's a case of avoiding the other riders (crash into one and you'll probably go flying across the track and out of the race) and also trying to stay on the raceway: on the higher difficulty levels your bike's handling can be harmed by riding across the grass. Select the bike type, choose the circuit and go! ■

GRAPHICS AND SOUND

It all viewed over the handlebars, which works well, and it's faster than *Grand Prix Circuit*, giving a good impression of speed. The animation is not outstanding but it's more important to have that impression of speed.

The rear-view mirror is a nice idea and can be useful at times. The sound is nice, though not as throaty as you'd expect.

LASTING INTEREST

Biggest problem with other riders is crashing into them as you overtake: otherwise they're not difficult to beat even at Pro level. A shame, because you're left to beat your own lap times. Still, there are plenty of circuits to race on and most of them take a lot of practice, which means you'll be at it for a fair while.

JUDGEMENT

A classy racing game, fractionally better than its predecessor. If you're a fan of racing sims (cars or bikes) you'll find this well worth some shelf space.

Suzuka, in Japan: the tunnel after a bend can be a problem.

You've overcooked it racing in Austria: end of the race for you.

GRAPHICS	8
SOUND	7
INTELLECT	6
ADDICTION	8
OVERALL	84%

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ently, but not vastly so. A good one to boot up whenever you feel like a race.

JUDGEMENT

The game's biggest let-down is the completely unreal feel to your vehicle as you drive around. It swings from one side of the road to the other and through corners most unrealistically: but then it's arguably not a sim. This does take something away from the gameplay, turning what could have been an excellent driving game into one that's just good.

GRAPHICS	8
SOUND	6
INTELLECT	2
ADDICTION	7
OVERALL	81%

CARS 'N' TRUCKS 'N' BIKES

The start of the truck-driving leg of the league. These are the big fellas of the circuits!

On a motorbike this time, about to proceed onto an elevated section of the course.

Formula One suspensions just weren't really built to go over these kinds of bumpy tracks!

Clonk! That rock is solid! Just as well you'll bounce off and lose only time, not your wheels!

One of the intermediate screens: the next race looks likely to be very slippery.

More truck driving, and fortunately you've made it over the tricky raised section.

Right: The start of the game. You dive left to avoid the gun-fire, but there's a tank ahead which could make life difficult.

Ocean are fast becoming the industry specialists at *Operation Wolf* and *Operation Thunderbolt* type games, as evidenced by the arrival of another one. This time, though, it's a Tad coin-op conversion not a Taito one.

The scenario is simple enough. You're behind enemy lines and have to fight through five levels, each with four stages, to get back to your own lines. It's a simultaneous one or two player game and the general idea is to move your character around the bottom of the screen shooting at all the enemy soldiers that come running on from the sides of the screen.

Armament consists of a sub-machine gun, the direction of fire indicated by a large sight on the screen. With the fire button pressed you fire the gun and move the sight around. Release the fire button and control reverts to moving around the hard-bitten warrior, who can move from side to side and even roll along the ground – which is handy because all the enemy soldiers are armed and taking a hit from them removes one of the five lives.

There are also things to hide behind at the start of each level but they can be destroyed if they get shot enough times. Buildings can also be removed in this fashion, making it easier to hit the enemies that would normally hide behind them.

As well as soldiers there are also bigger things to shoot at including tanks, helicopters and trucks – all of which can be destroyed with machine gun fire, but you may find it easier to kill them by lobbing one of the limited supply of grenades at them. Extra grenades and extra weapons, including better machine guns, can be collected on each stage by picking up the symbols that come flying from the back of the screen to land at your feet. Unfortunately once a life is lost you also lose any extra weapons collected.

There's a fixed number of enemies to kill before progressing to the next stage and once the fourth stage is completed there's an end of level guardian to defeat before moving onto the next, increasingly difficult, level. ∎

CABAL

OCEAN £24.99 ∎ Joystick

GRAPHICS AND SOUND

The main sprites are not very well drawn but the rest of them including the hardware are all right. It's all well animated and the most crucial part, the gun sight, moves smoothly and swiftly. Sound is limited to a rat-a-tat machine gun rattle which is fine but a few explosions would have been nice.

Below: Two players: collect that rifle for a mega-hard weapon and go on a killing spree.

LASTING INTEREST

The hardest things to overcome are the end-of-level guardians which will pose a few problems, even for two players, so it will take a while to complete. With some 20 stages to survive it's got a fair amount of lasting interest for a game of its type.

JUDGEMENT

Although it lacks the class and polish of the *Operation* games it's still fun to play, especially in two player mode, and is addictive. It's also been well converted from the coin-op (which also lacked the class and polish of the *Operation* games) so fans of that will not be disappointed.

GRAPHICS	7
SOUND	5
INTELLECT	1
ADDICTION	7
OVERALL	71%

Andy Smith

There's a porky hard gunship out to get you and you have absolutely nowhere to hide.

Get your hands on the grenades and go make their life hell.
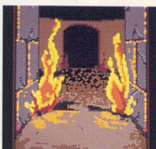
Your trusty but totally muddle-headed mongrel chum, Sam. He might look cute and useless but he has a nose for trouble too.

What lies behind the gates? It might take an age to find out, by which time the world might be decimated by the demon.

How did you do in the prologue? Did you hide the clues before getting fried? Your son will find out before long – so be sure!

DEMON'S TOMB

MELBOURNE HOUSE £19.99 ■ Mouse and Keyboard

This demon – well Brian, he's a demon. A terrier of quite extraterrestrial proportions. So vicious that he makes Vinny Jones look like a pacifist. Your job, in this text adventure, is simply to stop the hideous creature from wreaking violent vengeance on this poor planet of ours.

It would appear that there was once this fellow Barfwyd who had two sons, Thai and Tzen. Both good boys, nice to their father and learned in the craft of high priesthood. Unhappily the two lads argued about whether or not the Universe had an end, as one does. And as usual one of them, Tzen, turned to the bad. Not just smoking behind the bike sheds: the Forbidden God, Darsuggotha, got his claws into him. After a bit of openly worshipping the Forbidden one, Tzen was banished to the 'Unholy Island of Breton'. But he's all set to rise again – a mere vehicle for the evil Darsuggotha. Unless, that is, you can stop him.

The game begins with you playing archaeologist Prof Edward Lynton. You are exploring a burial mound and have realised that dark things are afoot. Why do you begin by playing your father? Easy. Pa gets it in the neck within the first few rounds. Burnt to a cinder. The point about this prologue is firstly to get a feel for the game and secondly to allow the poor professor to save some clues from the flames. There's no way you can save the sorry chap so don't waste time trying. You only have

a precious few rounds in which to secrete the secrets. It must be said that this 'straight-in-at-the-deep-end' approach works a treat. All very turbo-charged, it forces you to think but provides some excitement too.

Once you are happy that you have saved enough clues as well as leaving a few pointers too, you die and the game passes over to your 16-year-old son, Richard. Your dad's never been too together but this year he even managed to miss your birthday. So, bereft of prezzies and just a little worried about the old duffer you go out looking for him. Oh, there's also your trusty though utterly brainless dog, Sam.

What makes it easy to 'feel good about yourself' are the excellent documentation and numerous ways of playing the game available to you. Demon's Tomb can be played via a menu system, straight text entry, two column screen, different colours and a whole host of other wonderments. If you get too lazy to bother thinking up verbs for yourself, use the menus. If you're feeling a tad more adventurous you can define one word to mean another and define macros, which are multiple commands. ■

GRAPHICS AND SOUND

For some strange reason, still beyond me, text adventures suffer in the sound department. Demon's Tomb has no sound at all. While it doesn't suffer by this, it might have been improved by the occasional screaming howl and spooky tune.

The graphics are adequate. With Graphics mode on, a press of F1 will bring up some well-crafted piccies, which might even hide some clues. F2 acts as a here-comes-the-boss button for those terrible people who play when they should be working. Happily then, the crucial atmosphere is not adversely affected and the pictures really add to the enjoyment of the game.

Below: Demon's Tomb can be played straight from the keyboard or with a handy menu system. A combination of the two makes the going a little easier but the game just as hard.

LASTING INTEREST

This one should run and run. You, rather than the game, make the discoveries, solve the puzzles and get irritated by Sam – the lovable mutt. The descriptive passages, which can make or break a game of this type, are evocative, witty and far from being intrusive. Demon's Tomb has a good, solid, no-mucking-about feel to it which doesn't detract from the intelligence needed to play it or the excitement it generates. Not only are repellent demons, dead dads, windswept moors and impenetrable mansions in abundance, there are also innumerable strategies to cope with them.
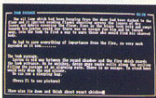
Above: You can run but you can't hide. The opening sees you chasing against time to leave clues and defeat the demon.

JUDGEMENT

As a down-the-line text adventure, Demon's Tomb has a great deal in its favour. The opening rounds, in which you play the dad, are an excellent way to get into the game. Scenes, plot and puzzles are provided with intelligence and not a little flare.

Defeating the foe and avenging your father's death (and your lack of birthday goodies) are not easy tasks to complete with sanity, body and dog intact. The help pages at the back of the manual provide hints and tips in an encoded form, so even when you're attempting to cheat you still have to think. Lord knows what Demon's Tomb – He's Awakened and Wants his Breakfast – will be like, but we can only hope it will be as good.

GRAPHICS	7
SOUND	N/A
INTELLECT	9
ADDICTION	6
OVERALL	**80%**

Tim Smith
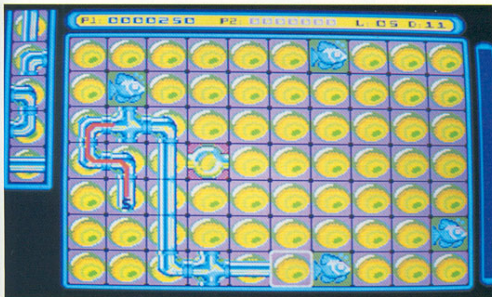
Level Five. That fish can't be moved, so you'll have to turn (head for the reservoir to gain more time).

PIPE MANIA

EMPIRE £24.99 ■
Joystick or Keyboard

Simple ideas are often the best, they say, and here's a case in point. Way back at the start of the Eighties one of the early 'classics' was a game (and its clones) based simply on building a pipeline across the screen before the time limit and the slime caught you out. The longer you survived, the more points you got.

Here we are in the Nineties and here we are with a pipe-laying game. This is a one or two player game with loads of improvements over the originals, but with a remarkably similar gameplan.

You play on a 10x7 grid of tiles: a timer ticks down on the right of the screen and a tube of tile-sized pipe pieces is on the left. There's a tile somewhere on the grid with a big S on it – that's the start tile. The idea is then to move a hashed line around the grid and press fire when you want the bottom piece of pipe from the tube to be dropped on to the selected tile. Once the timer reaches the bottom, ooze flows from the start tile through the pipe you've laid. Obviously, the more pipe tiles laid, the longer the ooze will flow and the more points you'll get.

But where's the catch? Firstly and most importantly, the pipe sections cannot be chosen: you have to take the bottom one every time. There are ways to get round this – pipe sections can be laid on top of other ones, so you can keep laying pipes until you get the right section. Then again you can lay pipe sections all over the grid until you get to the right one. There is a drawback to this method though: every section costs points, so you can't go chucking them around everywhere. Once you've played a few times you'll realise that you can start laying unwanted pipes in anticipation of where you're going to be running the pipe.

The other major problem is the introduction of hazards on later levels. Things like obstacles which won't allow you to lay pipes on them, or one-way pipe sections and so on.

There's a plus side to the later levels, though, including reservoirs which buy you a little time if you can get the ooze into them and side-of-screen escape routes (holes in the side of the grid that allow you to escape to the other side of the screen). Work through the game and every four levels or so you get a bonus level and a password which means you don't have to work through early levels every time you boot up. ■

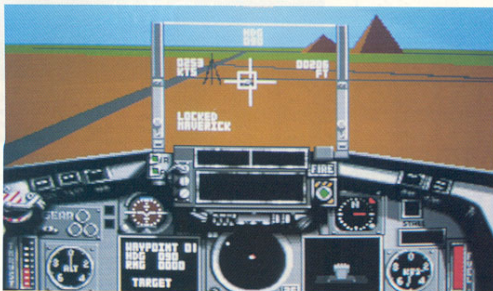| GRAPHICS | 7 |
SOUND	5
INTELLECT	7
ADDICTION	8
OVERALL	**81%**

GRAPHICS AND SOUND
It looks simple, but it's very effective. What graphics it has are good, but you'll be far too busy wondering where to put the next pipe to worry much about them. The tunes are all right but get on your nerves after a while: fortunately it plays just as well with the volume turned down.

LASTING INTEREST
It has a fair amount: you'll spend long sessions with it and come back to it often too.
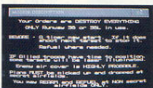
JUDGEMENT
Unless you like games that stretch your mind and frantic, frustrating gameplay you're not going to enjoy this. On the other hand it's very addictive and playable and has heaps of the 'one more go' factor. Good stuff – not excellent, but good.

The start of the game: with only five pieces laid it looks as if you'll have to start all over again.
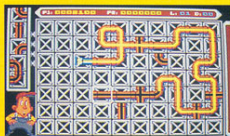
That's better! Loads of pipes laid.
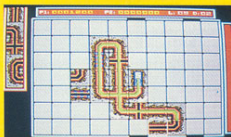
Level Nine, and those awkward one-way pipes make an appearance – help!
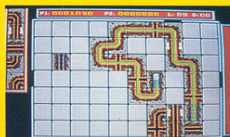
You've just got the ooze through a bonus pipe which means big bonus points.

Video-guided Maverick missiles are extremely effective against installations.

Andy Smith

FIGHTER BOMBER

ACTIVISION £29.99 ■ Mouse/Keyboard

There are already a good few combat flight simulations around, so what makes Vektor Grafix, the people behind *Fighter Bomber*, think they've got more to offer?

Well, for a start the game is apparently based on the annual Strategic Air Command Bombing Competition that's held in the heart of the American West. Several nations take part in this contest, including the Russians and British, which comprises a series of missions designed to show off the aircraft. The nation which performs best is awarded the Curtis LeMay

Bombing Trophy: America have won it most in the last 20 years using F-111s, but the Brits have pinched it twice using Tornados.

The first thing to do, then, is decide who you'd like to fly for, the list comprising the USA, Russia, Germany, Sweden and Britain. The Americans have several planes to choose from including: F-15, F-4, and the F-111. The Brits and Germans are offering the Tornado, the Swedes the Saab AJ37 and the Russians the MiG 27. Then you can select the sort of enemy plane you'll be likely to encounter, includ-

ing the brand-new MiG 31, the old F-14 and the sim writers' favourite of the moment, the F-16.

As with all flight sims, the next thing to do is get to grips with the controls and learn to fly the thing. Once you've got that out of the way, you can start the game proper and start hitting targets. As your level of competence rises so does the complexity of the missions until you end up trying to hit multiple targets: check them out on the mission briefing map before setting off or you could end up arming your plane with completely the wrong armaments! And once you get far enough into the game you'll have to attempt refuelling in mid air, by locking on with a jet tanker, and then continuing onto other targets (including non-military targets like bridges).

Once you've completed the set missions there is also the facility to design, test and fly your own missions – but remember, all your progress is saved to disk! ■

The mission briefing. After many flying hours you're ready to take on some tough jobs.

Once you know what you'll be up against it's time to fit the plane out accordingly.
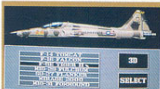
GRAPHICS	8
SOUND	7
INTELLECT	7
ADDICTION	8
OVERALL	87%

Using video-guided Mavericks, killing an enemy tank shouldn't be too much of a problem.

The enemy? You have a sidewinder locked on but the 'bogey' might be your own tanker.

Choose your enemy...

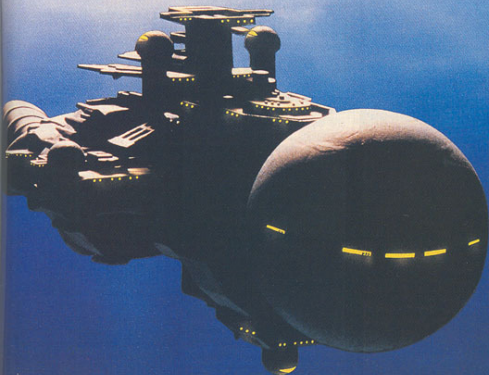...and do a recce. White planes are mid-air refuelling points.

Then start the mission. Engines straight up to 100%...

...and you're away. Here's a rear view of the runway.

DESIGNING THE MAIN SHIP

Top programmer **DAVE JONES**, author of Psygnosis' hits *Menace* and *Blood Money*, reveals more secrets of the art. This month:

THE WHOLE TRUTH ABOUT GAMES PROGRAMMING: 3

One of the most important things about an arcade-style game is the look and feel of the object the player is controlling. Ninety-nine percent of the player's attention will be focussed on controlling and watching this object, so any problems in the control method or any dire-looking graphics will soon put people off playing the game: so it's wise to put an awful lot of effort into movement and definition of the main character.

With *Menace*, we tried a few different spaceships before we found one that most people liked. The control method for moving a ship about the screen was, of course, to be a nice, simple eight-direction affair, because you can't really ask for too much variation in a scrolling shooter.

However, because we wanted to control the ship with the mouse as well as with the joystick, some inertia was added to the ship. This makes the mouse-controlled ship move more like a cursor would under mouse control.

The inertia is simply a snippet of code that prevents you instantly switching direction, and instead forces the ship to slow down in the direction it was going, stop, and then accelerate to its maximum speed in the chosen direction. It is not so noticeable on the initial speed of your ship, two pixels per frame, but try changing the speed in the source to, say, six pixels and then give the ship a test run. ➤

Shaping the Ship

This month's source adds the main ship and weapon code to last month's scrolling background. It was decided right at the start of writing *Menace* that the main ship should make use of the Amiga's hardware sprites. There are normally eight sprites available, each of which can be 16 pixels wide by any height in three colours. However, the wider-than-normal screen on *Menace* steals some DMA cycles from the background allowing only six sprites to be displayed. This would seem to be enough for the main ship, if we allocated two sprites for the outriders, leaving four sprites for the main ship. So take a quick look at Figure 1. This shows the first ship

we used in *Menace*, which, you have to admit, does look pretty dire! The restriction of three colours was detracting far too much from the main ship, making it look pale compared to the rest of the graphics.

The next step, then, was to use the sprite overlay technique that the Amiga allows, which basically means that two sprites can be combined as one but with 16 colours. This chopped us down to only three sprites maximum. By combining the outriders with the back of the ship as one sprite, and the front of the ship as another sprite, this left us with one free for use if we needed it (which in the end we did not). The result was the ship in Figure 3, which is the
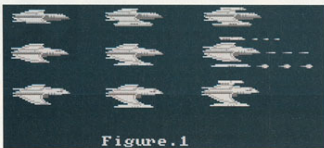
Figure.1

ship that appears in *Menace*. Figure 2 was another ship we tried, which was my favourite but the big publishers in the end plumped for the other one, so I gave in...

Adding up the Anims

The boxes around the ships outline the actual size of the sprite that had to be stored in the game. At the back of the ships you will notice the spaces at the top and bottom of the box. This is where the outriders appear, attached to the ship. The ship can be viewed straight on, or tilting up or down. Each weapon added therefore required another three animations to be drawn.

There are also two extra weapons in the form of cannons and lasers, making a total of nine animations, plus the ship with both weapons attached bring us to the total shown of twelve animations. The outriders have a possible five directions but rather than store the animation for every possible combination (12x6 = 72 animations) of ship with outrider, the outriders are stored seperately and drawn into the extra space left at the back of the ship every frame in the game. This is provoked by the usual speed to memory trade-off.

Creating the Code

Now on to this month's source code from the Coverdisk. The source has the following functions implemented since last month:

- Inertia ship movement
- Overlayed hardware sprites
- Joystick read
- Mouse read
- x,y to hardware sprite coordinate conversion
- ship animation

The ship is 32 pixels wide, and will therefore need two hardware sprites as a hardware sprite is a maximum of 16 pixels wide. The ship, however, contains 16 colours which is only possible by

overlaying hardware sprites, which brings the number used to four. Figure 3 shows the *Menace* ship with the size box drawn around it. The back of the ship is 44 pixels high to accomodate the outriders: the front of the ship is 22 pixels high. The file **ships.s** on the disk contains the hardware sprites in source format. In this file you will see labels named **ship1** up to **ship4**. These correspond to the following basic designs:

ship1 – basic ship, no weapons
ship2 – ship with cannons
ship3 – ship with lasers
ship4 – ship with cannons & lasers

Each ship also has three sets of data: **shipN.1**, **shipN.2** and **shipN.3**, where the **.1** is the ship tilting up, **.2** is the ship side on and **.3** is the ship tilting down. In the source you will see a DC.L 0 statement at the begining and the end of each piece of data for a hardware sprite. The one at the beginning will contain the two control words defined in the hardware manual that describe the sprite's x,y position along with overlay information. The long word 0 at the end signifies the end of the sprite. The way the control words are layed out is quite messy, with bits and bytes in akward places. The routine in the source called 'xy to sprite' takes a normal x,y pixel position in a couple of registers and returns the long control word in the correct format. A small routine like this will always come in handy from project to project.

We can work out how many bytes a ship animation takes with the following method:

back of ship = 2 bytes wide * 44 high * 2 planes = 176 bytes + 2 long words (control) = 184 bytes

front of ship = 2 bytes wide * 22 high * 2 planes = 88 bytes + 2 long words (control) = 96 bytes

ship animation = (184+96)*2 (due to overlaying) = 560 bytes ➤

This figure of 560 bytes will crop up quite often in the source to calculate where a certain ship animation is. The ship animation routine for tilting the ship up and down works by storing the animation address for a particular ship's side-on view: when the joystick is pushed up or down another variable is set to either –560 or +560 (normally 0 for the side-on view) which automatically adjusts the animation that is viewed. Changing the animation address to the ship with cannons for example, will still tilt the canons up & down as the offset from the side-on view to tilting up or down is still +/- 560.

Reading the Input
The joystick/mouse is read every frame, and the ship moved at this rate. Using hardware sprites makes this very simple no matter what speed the game runs at. Blood Money runs every three frames, but the players' ships are updated every frame. This has the advantage that even if a game slows down occasionally the player can still zip about at the same speed, so the slow-down is much less noticeable. This is accomplished by making the ship movement integrated into a vertical blank interrupt routine. Menace does not require this as the game runs in a frame anyway.

The joystick read routine is quite simple, the basics being explained in the hardware manual. The mouse routine was included to emulate the joystick if a joystick was not available. It is not a true mouse read routine as it only checks if the mouse is being moved up/down/left/right. If so, it modifies the results the joystick routine returns, making it look as
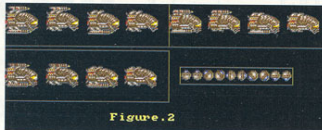
though the joystick had been pressed in a certain direction. This method does away with having a mouse/joystick option in the game as you can use either at any time. A full-blown mouse routine would return information on the direction and speed of the mouse, and it is not too difficult to modify the routine to do this if you require this in your own game.

Making Motion
The 'moveship' routine is the main part of the ship code. Its main dealings are with the inertia on the ship. If, for example, you are moving right at three pixels at a time, you cannot simply press left and go left at three pixels at a time. A vector is used to gradually reduce and then increase your speed in the form +3,+2,+1,0,-1,-2,-3. This leads to a much more realistic feel to the movement on the ship. Small touches like this often make the game that bit more playable.

Tricks and Treats
Although only eight hardware sprites are usually available on the Amiga there are some tricks worth mentioning that can stretch this amount a little bit.

After a hardware sprite has been displayed it can be used to display some new data one scan line after the end of the last. For example, if the ship in Menace was

at the top of the screen, then 45 pixels down (height + one scan line) we could draw the ship again if required on a different x position (or any y position > 45). This we could repeat all the way down until we ran out of space. The obvious drawback with this is that objects would always be in rows across the screen: they could not pass over each other vertically.

Other hardware sprites can cross over each other, though, so if you had some clever code that manipulated all eight sprites and sorted out sprites by saying 'This object here is further down the screen than this one, so I can re-use the same hardware sprite to display it, but this object has the same Y so it will require a different 'multiplex' sprites. In some instances you can multiplex 64 sprites down to the Amiga's eight depending on the restrictions you apply to their movement. This technique was extremely well used on the C64 and is now being used to some good effect on the Amiga. Battle Squadron, for example, uses hardware sprites for all the enemies' bullets and the players' firepower, which looks in excess of 32 sprites being displayed at once. ∎

■ That's my ramblings over for this month. Back next month with some more juicy source.
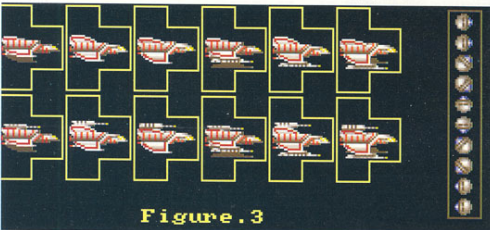

Figure.2

Figure.3