AMIGA
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THRILL!
To movies, monsters, action and adventure from the big screen to the Amiga

COVER
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DISK

CADAVER
PLAYABLE DEMO OF THE STUNNING NEW 3-D GAME FROM IMAGEWORKS

NO COVERDISK?
THEN ASK FOR ONE FROM YOUR NEWSAGENT

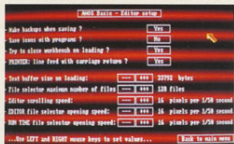## GASP!
at the wonders of Pro Draw 2

GRAPPLE!
with the best in programming languages

SCREAM!
with delight at the arrival of AMOS

SWOON!
in amazement at all the new games

08

9 770957 486004

COVER ILLUSTRATION: ROY ELLSWORTH

MOVIEDROME p15

Games take much of their inspiration from the movies...and why not, because that is, in a sense, what they're there for – and there you have it...

TFMX 131

Making Music for Games is Made Easy!

SCREENPLAY 38

Kick Off 2 – As good as it should be?
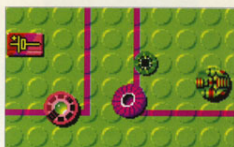
SCREENPLAY 46

Projectile – A whole new ball game

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Disk Extra

CADAVER
PLAYABLE DEMO OF BITMAPS' CASTLE CAPERS FROM IMAGEWORKS

FENSTER: Amazing screen handling ■ **POPUPMENU:** Makes menus much simpler ■ **ZAP:** Multitasking binary editor

MENACE
DAVE JONES COMPLETES HIS SERIES AND HERE'S THE SOURCE CODE

LHARCA: Friendly archiving facility ■ **COPPER TUTORIAL:** Graphics tricks to go with the programming feature

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COMING ATTRACTIONS

Summer at last, and a heap-and-a-half of new releases storms onto your screens soon!

① Welltris

Alexey Pajitov may not be as famous or have as much of a pop star image as, say, the Bitmaps: but he's written one game to rival anything they've produced – the phenomenal *Tetris*. Alexey's been hard at work over the last few months on the sequel, due out shortly from **Infogrames**.

As in *Tetris*, the object is to manipulate shapes and get them to lock together. *Welltris* almost literally adds a new dimension, however, in that the pieces are falling down a well which you view from above. Lines of fitted shapes can now be made vertically and horizontally. Eggheads and frustration players, this is what you've been waiting for.

② Murder in Space

Amateur detectives out there will soon be able to excercise their skills in this one from **Infogrames**, which sends you to the year 2005 on board an orbiting space station to save the lives of eight crew members.

③ Metal Masters

If you'd rather be at the controls of a skyscraper-sized robot, then there's always **Infogrames'** *Metal Masters*. This is an arcade game where you first have to buy and assemble your 'bot before entering it into either a combat arena or a sports track to take on other robots. This hi-tech mayhem is due around September time, so look out for it.

④ Final Countdown

As a beautiful female spaceship commander (with a propensity for wearing bizarre jumpsuits and only one stocking) it's your job in this arcade adventure to penetrate the hull of a large spacecraft disguised as an asteroid on a collision course with Earth.

This **Demonware** game has a huge game area and a real *Impossible Mission* feel about it as you troll around the ship hacking into its computers and solving puzzles as you go. *Final Countdown* should be around even as you read this.

⑤ Oops Up!

Demonware have also been beavering away on a wacky mix of platform, puzzle and shoot-em-up called *Oops Up!* The scenario (apparently) has you buzzing round the galaxy trying to procure parts of a large spaceship. *Oops Up!* promises to be one of those very simple but very addictive games. You'll be able to find out very soon.

⑥ Hagar the Horrible

Coming from **Kingsoft** through the very same publishers is the conversion (from the cartoons) of that loveable rogue Hagar the Horrible. Details of the game are sketchy at the moment, but it's believed the game will be some sort of humorous arcade adventure. More details as soon as they come in, but in the meantime here's a picture to keep you going.
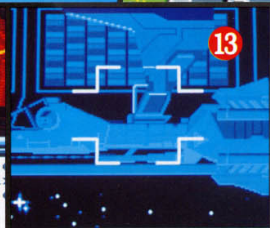
7 Time Machine
The team behind the great game *Hammerfist*, Vivid Image, have been working on another game to come out on the **Activision** label. *Time Machine* is billed as a 4D fantasy role-playing arcade adventure. There are puzzles to solve as the player takes on the persona of Prof Potts, who must manipulate history and create the future by interfering with evolution. August should see the release of this 'deeper than your average' game.

8 Yolanda
Millennium will shortly be following up the superb *Resolution 101* with a new Steve Bak game. It's a platform game, with the player becoming the daughter of Hercules and having to undergo the famous Twelve Tasks in order to lift a curse from her father. This is a re-working of a C64 game (imaginatively called *Hercules*) and features some 50 levels with a special beginners' training level.

9 The Gold Of The Aztecs
That's the prize for any brave adventurer who can work his way through 80 screens of puzzles and traps which will test not only your mind, but your joystick reactions as well. There promises to be a surprise round every corner in the jungle world of this latest **US Gold** game!

10 Snow Strike
For those who fancy their fun a bit further off the ground, **US Gold** are also gearing up to release a combat flight sim called *Snow Strike*. In the game you'll be flying specially converted F14s on 10 top-secret missions to destroy drug barons.

11 The Spy Who Loved Me
Bond makes another appearance on the small screen in an escapade based on one of his earlier films. The game is due in September and promises to be an action-packed thriller which follows the plot of the film closely. As Bond your mission will

be to liaise with the beautiful Soviet agent Anya Amasova... pay attention, 007!... and put a stop to the evil genius Stromberg who's captured a couple of nuclear submarines and is threatening to take over the world.

12 Neuromancer
Electronic Arts have decided it's high time us Amiga-owning Science Fiction fans should have *Neuromancer* to play with. The game's a role-playing affair based on the best-selling book by William Gibson, king of Cyberpunk (*Cyberpunk n. adj. genre of writing involving humans at conflict with a decaying high-technology society*). The game's set in 21st Century Japan and the player plays the part of a hacker out to survive on the tough streets of the future world.

13 Magic Fly
Also set in the future is **Electronic Arts'** *Magic Fly*, a vast search and destroy game which sees the player pilot-

ing the ultimate confined-space fighter in a bid to bring a bunch of future crims to their knees. Get ready for plenty of blasting action as you battle against over 30 different alien craft all beautifully rendered in yer 3D solid vector graphics (whatever they are...)

14 UMS II
After much umming and aaahing it seems the follow-up to one of the best 16-bit wargames ever to appear is almost ready to be unleashed on a world of megalomaniacs.

UMS II is a global strategic warfare simulator (as opposed to the tactical simulator *UMS*). The player will have armies from all time periods to fight with, across the whole world – a world the player can design, alter and play about with as much as is wanted.

UMS II will feature so many options and choices we simply don't have the space to even start to go into them, so watch for the definitive review in next month's action-packed *Amiga Format*.
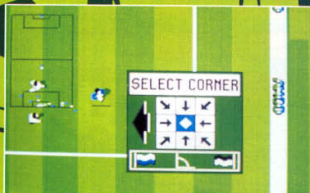
Playing as Italy against Austria on a plastic pitch you now have a corner and can decide on the direction and strength of the kick.

KIT DESIGN

ENGLAND

Team A	Team B
ENGLAND	SPAIN
FRANCE	GERMANY
ITALY	SWEDEN
HOLLAND	SCOTLAND
DONE	

Fancy yourself as a fashion designer? Here you can pick the style and colour scheme of your fave team's kit - having them play all in pink can be a laff!

OPTIONS

The options screen where you can alter any outside influences and decide game length, amongst a myriad of others.

WORLD CUP

GROUP A	GROUP B	GROUP C	GROUP D	GROUP E	GROUP F
NAME	C	P	H	D	L	GF	GA	PTS.
AUSTRIA								
CZECHOSLOVAKIA								
UNITED STATES								
ITALY								
CONTINUE		SAVE		LOAD		QUIT		

The World Cup league table shows each team's positions within their group.
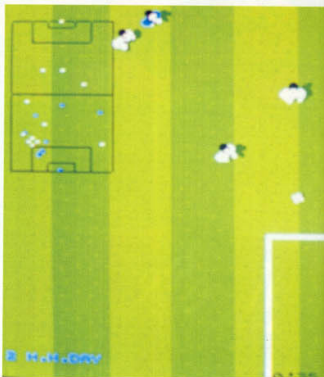
The second half – Austria are threatening with a free kick near the bo

KICK O

ANCO £19.95 ■ Joystick

One year after an original that set the games-playing world alight, the much-anticipated and much talked-about sequel has made its appearance. Kick Off 2 looks set to follow on from Kick Off, but with a host of new features to enhance the superb gameplay. Question is, has Dino Dini been too ambitious? Has he screwed up?

To start with, up to four players can play simultaneously (two players against two players). There's a league competition so loads of you can all compete together. There's a cup tournament, so you can knock your friends out and grab the glory, and there's also the World Cup tournament so you can persuade 23 other people to take a team each.

The gameplay enhancements include a new spotted ball, different match surfaces (including plas

tic and soggy) the ability to change the team strip, the choice of long or short throw-ins and - possibly one of the biggest differences - the introduction of defence walls during free kicks.

There is also a new control touch added to the ball, called aftertouch. The player is now able to bend the ball slightly after it's been kicked by holding the joystick in a certain position, which can be very effective but does take a lot of practice.

The other main improvements include the ability to load in teams from Player Manager (the first real follow-up to Kick Off, for one player, which contained a whole management game) so you can play your lovingly-created team in the league against another team that someone else has spent blood, sweat, tears and lots of money building up. Now the player

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GRAPHICS AND SOUND

Spot effects, such as the ball thuds and the crowd cheers, are excellent. The graphics are great too. The action is all viewed from above, which works very well for a game of this nature. The sprites are well defined and wonderfully animated and the pitch graphics are highly detailed including observations such as muddy areas in the goalmouth on soggy pitches or a squeaky-clean surface on plastic pitches. The graphics and sound mix together extremely well and compliment play brilliantly.

LASTING INTEREST

Well, Brian, this will run and run. It's perfect for 'booting up' (groan!) whenever you fancy either a quick 10 minutes or a good hour or three. In years to come this won't be sitting on your shelf collecting dust, because you'll still be playing it.

JUDGEMENT

If you don't own Kick Off, go for this instead. If you do already own it or own Player Manager it's still well worth considering. This is the best footy game to have appeared on any machine and the beauty of the game is the fact that it just plays so damn well. Novices will enjoy it right from the start, and it's surprising just how skilful a player can become after just a few short weeks.

Last year, here at Future Publishing, Kick Off inspired us to start a league which grew into a four-division affair with 32 players taking part - even people who'd never played any game before! The league grew into a Cup tournament and hardly any work was done for months - the game actually became officially banned during working hours. Now there's talk of re-starting the whole thing again with Kick Off 2. You can't get a much higher recommendation than that.

can also have control over the strength and direction of corner and goal kicks.

The majority of play is much the same as before. Each team contains - of course - 11 players and the player you are controlling is highlighted by a line beneath his feet. As in Player Manager you have a choice between controlling the whole team, in which case control switches constantly to the player nearest the ball, or playing in one position.

Once you've gained possesion of the ball your man automatically dribbles it and passes and shots are made by pressing the fire button and holding the joystick in various positions. Controlling your team takes a while to get used to, but practice really does make perfect and after a while your handling of the player improves significantly. **Andy Smith**

The Italians are getting heated and have given another free kick away. The Austrians float the ball into the box...

...the keeper has dived and missed the ball, the Austrians have a golden opportunity...

...as their striker nods the ball towards the other side of the goal...

... but, oooehh! How unlucky: the ball's hit the post and will be collected by the keeper. Italy breath a sigh of relief.

GRAPHICS	9
SOUND	6
INTELLECT	4
ADDICTION	9
OVERALL	94%

Before starting each wave you're left in no doubt as to what you're supposed to be doing.

A Klax will be created when you tip off the white tiles from the paddle onto the white one in the bin.

KLAX

DOMARK £14.99 ■ Joystick or Keyboard

F rankly, it comes as a nice change to play a game in which you don't have to save the world from aliens, run about kicking seven shades out of baddies, or race round a maze collecting keys or pieces of puzzles. In Klax the only objective is to survive as long as possible and score points.

The game is very easy to play. A horizontal platform five lanes wide sits pointing towards you. Coloured tiles start at the end furthest away from you and roll towards you. There are five bins at the near end of the platform that the tiles fall into. Each bin holds five tiles, but should all the bins fill up then you lose a life.

How do you stop them filling up? You can't really, but you can buy yourself some time by using a small tile catcher at the end of the platform, which you can move left and right to catch tiles as they fall off. Then you can decide which tiles to drop in which bin by hitting a key and flipping them off the catcher into the bin. And here's the key to winning the game - any line of three or more tiles of the same colour, either vertically, horizontally or diagonally, makes a Klax. The Klaxed tiles then disappear, leaving more room for more tiles in the bin.

The game is played in waves, with a specific objective given for each wave. For example, you may just have to get three Klaxes, or maybe three diagonal Klaxes, or score 10,000 points. The points system is based on difficulty. Anyone can get a vertical Klax, so you only get 50 points for each one. Horizontal Klaxes are harder, so score 1,000, while diagonal ones are harder still and score even more points. Once a wave is completed points are awarded and you move onto the next wave.

That's basically it. Oh yes, the catcher at the end can hold up to five tiles at any one time, so you can organise Klaxes slightly more easily and you can also flip a tile

In simultaneous two player mode where things can get very confusing (and heated!).

Errm... the catcher is completely full, and there's no where to drop them and ...help!

The next wave. That blue diagonal earns a massive 5,000 points.

back half-way back up the platform to gain yourself a couple of seconds while you go for another tile. Any tile that falls off the end uncollected by the catcher scores one on the drop meter - once you've filled that up you lose a life. Plus, of course, the tiles speed up as you progress through the levels, making it even harder to get the particular Klax you're after. **Andy Smith**

GRAPHICS AND SOUND

The sound effects are nothing to shout about, but at least you know when your catcher is full and when you've made a Klax. The graphics are nothing special either, though the diminishing perspective is quite pleasing. The viewing angle does make it a little difficult to tell when a bin is full, for example, but the thudding sound effect lets you know if you try to put more tiles in it.

LASTING INTEREST

A game to last for years. It's a 'quick 10 minutes' when you feel like it and it's also a 'good three hour session' when you've got time. A timeless game that you'll come back to again and again.

JUDGEMENT

Look at that! Right the way through the review and not a mention of Tetris! Comparisons have to be made simply because they are both very simple space-filling games that play remarkably well. Tetris is a slightly better game, but Klax gives it a damn good run for its money and it really should be in your library.

GRAPHICS	6
SOUND	6
INTELLECT	7
ADDICTION	9
OVERALL	88%

Things start to get hot, as fire arrows reign in on Level Two.

DYNASTY WARS

US GOLD £19.99 ■ Joystick

China in 184 AD. A group of soldiers murder wave after wave of weaker opponents. In response, the remnants of the Han clan lead this horizontally-scrolling quest for revenge through ancient China, splatting anything in sight.

The horseback heroes can either fire fast, stabbing short-range shots or store them up into one massively mean megablast.

The evil General's minions aren't tough; one quick poke in the head and they're history. Save up a big shot, by holding the fire button down, and a single blast can bag three at once. The end-of-level Generals are a different kettle of foe, though. They've mounts, decent armour and extremely large weapons. They'd pose no real problem if you could face them one on one, but they pop up when the screen's already undergone a population explosion.

This is where the Dynasty Warriors play their trump card – tactics! Rather like a medieval air strike, with rocks or fireballs instead of Napalm, magic cleanses the area. Tactics kill all

Don't mess with Shang Fei, especially on bridges!

normal folk and weaken the Generals, but leave you unharmed.

The four Han clan warriors who are on offer vary in ability, with the amount of damage they can take balanced inversely with the amount they dish out. A real big hitter is needed to waste the Generals, but a durable weak-weaponed guy has the advantage

of surviving long enough to actually meet them. And of course famous warriors like these can't wander round with a wimp's weapon all their lives, so en route there are more powerful blades to collect and keep, as well as extra hit points which help to cure any warrior who is careless enough to get sliced. **Trenton Webb**

GRAPHICS AND SOUND

The introductory screens create an atmosphere of legend and these pictures are echoed on the playing screen with animated faces that contort in anger and pain, but this level of detail isn't carried into the battle. The backgrounds are excellent, but the playing area is too small to cram in the detail, especially at the end-of-level showdown: there are so many people on screen it's hard to know who you're killing. All very realistic, but not helpful.

Annoyingly, the music plays throughout the game. Not that the music is bad - it's atmospheric, if a tad up-tempo. The irritant is simply the fact that there are no sound effects. All the obvious opportunities for blood-curdling martial arts battle cries and the crisp swish of blades have been missed, which is sad.

LASTING INTEREST

Dynasty Wars' core problem is that there isn't an awful lot to do! With only two modes of attack you either have to use spear power to spike enemies or call in magical tactics. And with only tiny guys on horseback to look at – some of whom apparently ride side saddle! – there's not much to keep you rivetted to the screen. The similarity of foes too, makes the game easy, with the higher levels reachable in the first few attempts. The war, it seems, will definitely be over before Christmas, maybe even August!

In spite these factors and the deliberately slow pace *Dynasty Wars* has an undefinable charm. There's a sense of tension, while the sheer number of opponents makes life awkward. The levels, while similar in concept, are very different in design, ranging from burning bridges to snow-swept wastes. It's worth getting to each new level just to have a look at the scenery.

The killer snowballs perpetrate an attack on Level Four.

JUDGEMENT

A reasonable chop-em-up which has the distinction of horse-riding heroes, enough original elements and is bound together with a certain slick style. Once it's finished – which shouldn't take long – it's unlikely you'll ever play *Dynasty Wars* again. But while you're still trying to top the big nasty who ruined the Han Clan, *Dynasty Wars* should prove an enjoyable diversion.

An evil general gets wicked at the expense of Liu Beh.

GRAPHICS	8
SOUND	5
INTELLECT	2
ADDICTION	6
OVERALL	**69%**
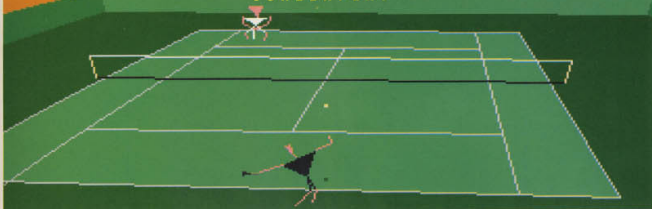
Serving is automatic on the easier levels, so at least you're not going to give games away double faulting.

INTERNATIONAL 3D TENNIS

PALACE £24.99 ■ Joystick

Just as art can occasionally attempt to imitate life, so computer games programmers attempt to do the same thing, but usually with very differing results. One of the biggest hurdles the programmers have to jump is getting human-like figures into games and then getting them to move with human smoothness and fluidity. That's why Palace and Sensible Software have spent nine months developing this 3D tennis game.

There are three distinct sections to the game: single match, Tournament and Season. The single match is obvious enough; you play against either a friend or the computer for a defined number of sets. The Tournament is slightly more complicated, in that there are 72 tournaments to pick from, each with a different amount of prize money to be won, and again the number of sets can be defined. Then there's the Season, which allows you to make a living by playing in various tournaments

throughout the year.

There are several skill levels, but the one you'll want to get some practice in on is the 'Amateur' level. Here the computer takes serves for you, moves your character around the court to get him in the best position to return the ball and then flashes your character to inform you that he's in range to return a shot. You can influence things slightly by moving your man closer to or further away from the net if you wish and also by holding the joystick in any one of nine positions after you've made a hit, which will influence the direction of your return.

Step up a skill level and you can then start directing serves, but you still get the flashing. Go up another skill level and the flashing disappears. Go to the top level ('Ace') and you can then start adding spin (top and back) to the ball by hitting the firebutton again and moving the joystick forwards or backwards. *Andy Smith*

GRAPHICS AND SOUND
The sound effects, including a digitised score keeper and umpire, are excellent, giving real atmosphere to the game - atmosphere which the graphics unfortunately take away. The programmers have substituted reality for triangular racquets and triangular players in the search for speed and fluid movement. This works to some degree. If you don't like the viewing angle of the matches you have a choice of nine others and there's even one that allows you to position the camera just where you want it
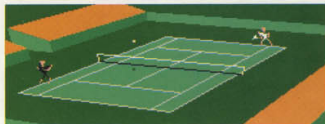
A long distance view of the game.

It's not all lawn stuff, here you're on cement.

LASTING INTEREST
The graduation of skill levels has been well judged and although it still takes a while to get to grips with amateur level, once you have you'll be wanting more control so can step up a level (the computer players get better as you step up the levels too). One to keep you coming back whenever you fancy a game.

JUDGEMENT
It's got some hot competition from the likes of Ubi Soft's *Pro Tennis Tour* which, it has to be

said, is altogether a better game. *International 3D Tennis* is good, but the graphics let it down and, although it plays well, it doesn't play as well as Ubi Soft's game. A nice attempt but not good enough to steal *Pro Tennis Tour*'s crown.

Your races across to return a shot. *Inset:* next stop Auckland.

GRAPHICS	5
SOUND	8
INTELLECT	5
ADDICTION	7
OVERALL	79%

The Vector player has made a mistake and put the projectile into his own goal in the Frantic Zone (this is a regular occurence for all teams!) The last opposing team to touch the projectile will be credited with the goal.

After every match the league table is updated. After three matches the Terminators are bottom of the league, so it must be time to stop messing around and start playing!

Collecting that 'F' symbol would be a good idea as it instantly freezes the other two players for 10 seconds which is plenty enough time for a skilled Projectile player to get the thing away from his tunnel entrance and into one of the oppositions'. If someone gets there before you, though, you're in big trouble!

ABOVE: If the blue (Manic Moose) player can get to the 'DOSH' symbol he'll be able to spend the money on improving his team's statistics. BELOW: Kick-off at home to the Vectors. You start the game defending the goal on the right. Next set you'll defend the left and then the top. This also applies to goals in the Frantic Zone.

Most ball games are complicated enough. Football, basketball, hockey and the rest all have their own pecular rules which can have even an aficionado scratching his head at times. And these games are all played on one single pitch – just imagine what a game that was played on five pitches would be like!

This game of three players, three halves and five square pitches is surprisingly simple: eight teams, each of eight players, make up a league. One, two or three human players take control of a team each and during a match attempt to score goals in either of the two opponents' goals. The team with the most goals at the end of the three periods wins.

The five pitches are all linked by tunnels, through which no players can pass. The centre pitch is where the kick-off takes place and on each wall there is a tunnel entrance leading to another pitch. Three of the four entrances are colour-coded to show that the pitch on the other side contains a goal belonging to the team with that colour. Send the ball – or projectyle as it's known in the game – through the tunnel and it emerges onto another pitch that has that team's goal on the opposite wall.

The tunnel on the fourth wall however, which is the one always at the bottom, leads somewhere a bit special – the Frantic Zone. On this pitch there are three goals, one for each team.

The rules of the game are terribly easy – anything goes! This means you can bump, bash and smash into the opposition as often as you like in your attempt to get to the ball and knock it around to keep it out of your pitch, then get it onto an opponent's where there's a goal.

Once a goal is scored the scoring team is credited and play begins again from the centre pitch (if an own goal is scored – which happens very often, especially in the Frantic Zone – the opposing player who touched the ball last is credited with the goal.

The match then continues in this fashion until the end of a set, at which point all the teams move one place to the right. Suppose your goal was on the top pitch for the first set: once the second set starts, your goal will be on the right-hand pitch. No-one ever gets the bottom pitch because that's always the Frantic Zone. After three sets (about six minutes of real time) the match is over, the scores are logged and the points are dished out.

The players each have peculiar attributes and all remain in the same pitch that they start the

With training mode selected the player is given the opportunity to improve his side by spending money collected during the game.

The first match of the season, away to the Jovian Jello Juggernauts and the Devils. The Juggers are the purple guys nearest the Projectyle and you're the pink guy near the extra stamina benefit.

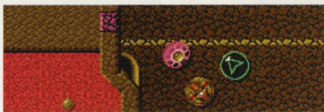# PROJECTYLE

Electronic Arts £24.99 Joystick

game in, so it's well worth checking out their stats before deciding where they should play – a fast chap on the start pitch is a must.

Before a match the players can be trained, and their attributes increased: however, not only do they then run the risk of injury but training costs money and the only way to get any money is to pick up the dosh symbols that appear on the pitch at random. These benefits appear regularly throughout the match on all the pitches and can be collected by the first player to slide over them. The money can be used to finance your training program while all the other benefits – such as 'freeze opponents' or 'block exits' – only last on the pitch they were picked up on and only for a maximum of 10 seconds.

The closest the gameplay comes to a game in the real world is ice hockey. The players slide all over the shop in pursuit of the pro-jectyle (your players automatically turn to face the ball wherever it moves) and you're able to move the player using the joystick with the fire button acting as the accelerator. *Andy Smith*

GRAPHICS AND SOUND
The perspective, viewing from directly above, works very well and everything is smoothly animated. The effects are fine and so is the music – and you can toggle between the two at will. Games are played on different pitches belonging to different teams, which makes a welcome change during the game not only from the aesthetic viewpoint, but also because the different playing surfaces change the way the game's played. Looks great.

LASTING INTEREST
Bags of it. The shortest league season requires you to play 18 matches, so get ready for some long playing sessions. The multi-player option and multiple skill levels mean you won't burn this out for a very considerable while: and fortunately there's always the save game option to fall back on.

JUDGEMENT
The action is fast and furious – especially with a couple of friends – and though at first it seems as if too much of the gameplay is left to luck, a few hours of play will convince you that it is in fact very skilful. You need to use some sound tactics to beat the better of the computer-controlled teams. Cracking stuff that can be as exciting as *Kick Off* when you've got a few mates round.

GRAPHICS	9
SOUND	7
INTELLECT	5
ADDICTION	8
OVERALL	**90%**

Away to the Devils and it's a tense moment as the projectyle leaves the start pitch and goes through the tunnel towards your goal pitch.

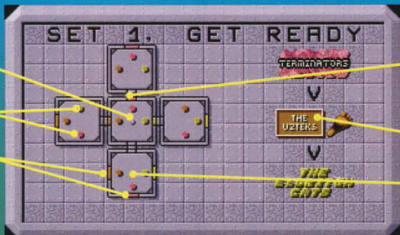## A GAME OF THREE HALVES...

START PITCH. The game re-starts here after every goal and at the beginning of each set

TEAM PLAYERS. One player per pitch: the players are unable to move through the tunnels

GOAL MOUTHS. One per pitch (except in the Frantic Zone)

CONNECTING TUNNELS join all the pitches together. Only the projectyle is allowed to pass through

TEAM EMBLEMS Show who's playing who. The top emblem indicates the match will be played on their home pitch

THE FRANTIC ZONE in which all three teams have a goal-mouth to protect

Snakes and bats attack our muscle-bound hero under a thunderous sky.

Don't miss the lift, but watch out for those deadly rising bubbles.

THE PLAGUE

SOFTWARE BUSINESS £19.99 ■ Joystick

A s Earth wars become more and more dangerous, costing the lives of an incredible number of people, scientists begin research into the development of 'enhanced' animal species capable of surviving nuclear attacks, thus eliminating the fear imposed by enemy warheads.

Reasearch has been going well for a number of years – so well, in fact, that nuclear war has been discarded altogether and the governments are returning to traditional and arguably less devastating) battlefield combat.

Unfortunately, as is the way with genetic experimentation, a biological demon has been found in our midst. Within the genetic breeding ground a deadly plague has broken out. The virus spreads quickly, affecting the bodies and minds of all its victims.

Once peaceful 'super-humans' have been transformed into evil, mutated warriors, hell-bent on causing death and destruction across the scientific complex. Some of the scientists are trapped within the complex, suffering from early symptoms of the disease.

You play a mighty soldier, your body adapted by laser surgery to protect you from the virulent

Megadeath-dealing caterpillar on the loose! Where's the 'Raid'?

Launch that beam skywards and take out those jet-pack flyers.

illness. Armed with the latest laser weaponry you must infiltrate the now-ruined complex and wipe out the mutants, rescuing any survivors who may yet still be saved by precision surgery. At the beginning of the game you are armed

with a laser rifle that can be powered to release a dangerous 'mega-blast' beam, destroying all in its path. Attackers may swoop in from all directions, however, so picking up extra weapons may come in useful for picking off jet-attackers and the more heavily armoured amongst the foe.

At the end of each stage is a grotesquely mutated being that will soak up a number of shots before it explodes, allowing you to gain access into the deeper regions where the effects of the plague are even more apparent. Just remember – they were all human once! **Maff Evans**

GRAPHICS AND SOUND

The Plague has some extremely nice graphics, with well drawn and colourful backgrounds scrolling smoothly behind the impressively sized sprites – the animation could have been a touch more interesting, though. The real problem is the sound. The music sounds thin and incredibly dated and the sound effects are just too weak to be true. The powerful image invoked by the graphics is completely lost when the game is played with the volume on anything but 'off'.

Oh, look! How nice! Someone is keeping their eye out for you!

LASTING INTEREST

The levels themselves aren't really that difficult to master. All that has to be learnt to romp straight through is the order in which the aliens appear. The difficulty starts when the end-of-level gaurdian is reached. A combination of vibrating trigger finger, luck and telepathy is needed to judge the timing of jumping and ducking while still piling the shots in. After dying a dozen times at the hands of the same alien, frustration and broken joysticks are a formality.

JUDGEMENT

Despite the nice appearance, *The Plague* is nothing more than a run-jump-blast shoot-em-up in the mould of many arcade games circa 1985. Very little has been done to bring the game up to the level of gameplay expected in the Nineties.

GRAPHICS	8
SOUND	4
INTELLECT	2
ADDICTION	4
OVERALL	**61%**
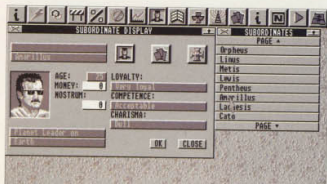
There's a large number of subordinates you can call on to run newly-conquered planets, or to head space fleets, but picking the right man for the job requires some thought.

News reports come in at the start of each turn and by reading these you can catch up on galactic events and discover if any of the aliens are becoming a bit too ambitious.

For some of us, owning the world is just not enough. What we want is the whole galaxy. Fortunately for the rest of the galaxy, none of us will ever be able to achieve our ambition for real so we have to content ourselves with computer simulations.

Imperium is one such simulation, allowing a player to take command of an imaginary galactic power based on a planet called Earth (now there's someone using their imagination!) and, by skilful use of diplomacy, economics and military might, conquer and populate a small galaxy containing around 30 star systems.

Then again, if you're the more passive type and don't go in for this glory lark you can always try to win by just keeping your empire going and survive as leader for 1,000 years. How long! Yup, 1,000 years. Achieving that, though, will still require careful juggling of your empire and skilful manipulation of the other galactic inhabitants – the aliens.

Several other computer-controlled empires are also trying to expand their horizons and do much the same as you (though they're much more into conquering things rather than keeping their tentacles to themselves).

The game is completely menu-controlled, so all your decisions are made by selecting icons at the top of the screen which cause menus to appear. Then you can make decisions on what to do from the menus. The game is played in yearly cycles (the number of years being user defined), then once you've done enough for one year you simply click on 'next turn' and the game advances.

So what keeps you playing? Why not just skip a number of years and outlast the game? For a start, no-one lives for 1,000 years without taking steady quantities of the life-preserving drug Nostrum. Nostrum can be found throughout the galaxy and can be refined from the planets on which it occurs.

Taken in moderate doses it enables you and your subordinates to remain alive for a lot longer.

Of course, you first have to find the stuff, so you have to start thinking about moving beyond your own star system. And this is where you come to the crux of the game – economics. Money has to be generated through developing your planets, producing commodities (over 20 of them) which you can use to build ships or use to trade with the aliens. You can also buy things you can't produce from the aliens and to make things interesting you can set import and export taxes, put trade embargoes on certain items and all manner of other things.

Colonising other planets not only expands your empire, but also makes you popular with the electorate who go to the polls every 50 years to decide on the next leader (if it's not you, then it's game over). And as all good politicians know, money talks. A good deal of cash has to be stored as the years go past which can be called upon when you come to campaign for re-election.

There are loads of planets to discover and dealing with the aliens can be a very tricky business. Keep things ticking over, let the computer handle the economics and/or the diplomacy to start with while you concentrate on the military side of things until you become familiar with the game and gradually start taking things over yourself once you understand just how different things affect the game.

Don't be afraid to experiment, push taxes way up and see how it affects things, start censoring the press and see how it affects your popularity. Play around and after a few games you may find you have just the sort of qualities a galactic leader needs. You may even start calling yourself Emperor Ming... *Andy 'Not tonight Josephine, I've got an empire to run' Smith*
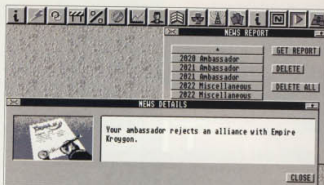
IMPER

ELECTRONIC ARTS £24.99

WEALTH
POPULATION
ANTENNA
DEFENCES
GARRISON
SHIP POOL SIZE
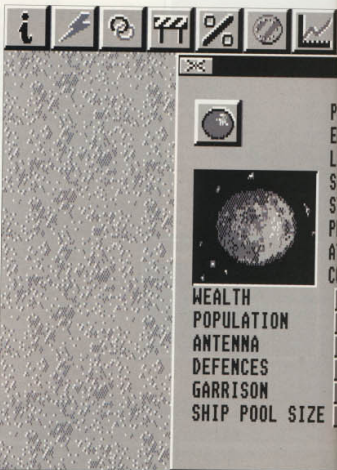
The planet menu gives you a whole list of statistics for each planet. You decide whether to help the planet or start creaming off some of its wealth.
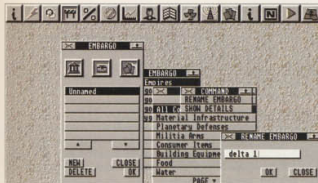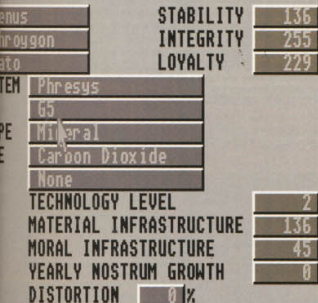
As you can see, doing a simple thing like placing a trade embargo on all commodities to aliens can become quite a complicated matter. Thankfully the system works much easier than the picture suggests.
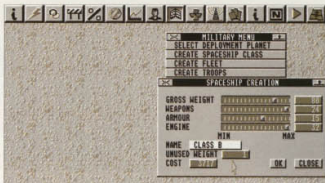
When you've got some money together it's time to start thinking about building up a fleet. Up to 20 spacecraft can be designed. The one above is a heavy attack craft.

UM

Mouse

A quick look at how the economy has been going for the last few years gives a good indication of how sound your economic policies have been.

Ark Ships are used to shift people to a new planet and get it running for you. Evolution? Who needs it?

ANETARY REPORT

enus	STABILITY	130
nroygon	INTEGRITY	255
ato	LOYALTY	229

TEM Phresys
    65
    Mineral
    Carbon Dioxide
    None

TECHNOLOGY LEVEL   2
MATERIAL INFRASTRUCTURE   130
MORAL INFRASTRUCTURE   45
YEARLY NOSTRUM GROWTH   0
DISTORTION   0 %

DECOLONISE   CLOSE

GRAPHICS AND SOUND
There are a few sound effects, usually short bursts of music, which are fine but not special. The graphics of the game are also quite reasonable. Bear in mind that this is not meant to be a graphic stunner; it's a thinking person's game. That said, all the menus are nicely presented and are very clear.

LASTING INTEREST
This is the game's strong point. It takes a long while to play a single game and it also requires a lot of concentration, but the nature of the game is such that it's easy to get caught up in the action and spend many an hour at the keyboard without getting bored. It's by no means the first of its type, but it has a lot more depth than some similar games.

JUDGEMENT
Imperium is very well put together and the whole game interlinks with itself intricately, which makes it great fun to play. The aliens are an intelligent bunch, which makes for good interacting opportunities, and it's a game that also rewards smart thinking and punishes rash or ill thought out actions. Definitely a game for the solo player who likes reams of statistics to ponder over and who likes to juggle limited resources making them work to their best advantage.

GRAPHICS	6
SOUND	4
INTELLECT	7
ADDICTION	7
OVERALL	**86%**

Half past five on the 22nd and the Zulus make their first attack on the south wall. With 18 men on guard the situation is in hand.

The ordering menu. Private No 88 has been ordered to shoot.

LASTING INTEREST

The game takes ages to play, so prepare yourself for some long games – there is a save option. Unfortunately the ability to play only one side and one scenario limits the game's lasting interest because once you've achieved the victory conditions (which shouldn't take a dedicated and competent player too long) it's doubtful you'll want to go through the whole thing all over again.

RORKE'S DRIFT

IMPRESSIONS £19.99 ■ Mouse

After every shot a report tells you if you hit or missed the target (corpses are instantly removed from the battlefield).

Most computer wargames are based on the board wargame principle, with the computer handling all the mundane tasks and getting rid of the need for all those precariously-balanced cardboard counters.

There is another school of wargamers, though: the miniature wargamers. No, they're not really terribly small people; they're so called because they fight wargames on large table-tops using miniature soldiers to represent the forces of the battle. *Rorke's Drift* is Impression's attempt at recreating a table-top wargame on a computer.

If you're unfamiliar with the scenario (surely you must have seen the Stanley Baker movie *Zulu*?) it's the battle between 137 British soldiers and about 4,000 Zulu warriors during the period January 22-23 1879. The British are camped at a small group of buildings and have secured the area with biscuit boxes and mealie bags. As the commander of the British forces it's up to you to hold out against massive odds.

The game is played in two phases: orders and combat. Both are time based (in game time, that is). In the attempt to keep the game feeling as much like a table-top game as possible the ordering system means you have complete control of each and every man. That includes deciding the facing position of the man, whether he should walk, run or charge to a certain place, when to load and aim his rifle and when to rest.

Orders are issued to each man (there is a repeat order option which comes in handy when ordering a large number of men to do the same thing) and then by selecting exit you enter the battle mode and each man follows his orders until either they fulfil them or you interrupt and re-issue orders again.

Controlling the play is the game clock. During the orders phase, the game clock stops and as soon as you enter battle mode the clock starts again. The victory conditions are simple enough – the British commander just has to survive through to the next day.

As the game progresses, survival involves re-issuing ammunition to your men, using the medics to tend to the wounded and various other, ancillary operations. With the odds stacked against you the simple fact that you have rifles and the Zulu's don't is not going to save your skin. The ability to use your limited forces to their greatest advantage is of paramount importance. *Andy Smith*

GRAPHICS AND SOUND

Forget the sound; there's only a short burst of Men of Harlech at the start and that's your lot. The graphics are much better using a good, if forced, 3D perspective. All the characters are well drawn and though the animation isn't the smoothest it doesn't impede the gameplay.

The report screen keeps a total of the sides' losses and injuries. Things look OK for the Brits.

JUDGEMENT

Impressions have really stuck to the rules in order to get this as much like a table-top game as possible. This doesn't always work to its advantage. The ordering system is unwieldy and awkward and can be very frustrating – it's so annoying to watch two soldiers walk into each other to reach different objectives and then both just keep colliding with each other until you interrupt and send them different ways.

Simple problems like this mean you often have to adopt unrealistic ordering sequences which just makes things unnecessarily tedious. It's tedious enough when you have to fire every man's rifle for him (especially when you have a line of 100 men and have to pick the target and fire for each one, every single time). It's the sum total of all these niggles that break the game and turn it into more of a chore than a pleasure for the average player.

Miniature fans and wargamers with a particular liking for the scenario only need apply for this one.

The game area. Arrows indicate areas where the action's at.

The north wall. Things are hotting up as the Zulus start sending larger waves against the British.

GRAPHICS	7
SOUND	2
INTELLECT	6
ADDICTION	5
OVERALL	**62%**

Collect the extra power ups as you drop into the complex.

TURRICAN

RAINBOW ARTS £19.95 ■ Joystick

Turrican is pursued by bouncing bombs as he jumps a robot.

Everyone has nightmares at some time. But where do they come from? Legend tells of a creature with a highly-developed psyche, due to his three-headed mutant form. His influence was so powerful that everyone on Earth was touched by his evil thoughts. The human race was gripped with fear and worry and terrible nightmares made the dark a cold and frightening place. This creature was named Morgul.

A heroic warrior named Devolon managed to battle him and banish him to a hidden dimension inhabited by strange creatures incapable of emotion and therefore immune to the fears and dreams he instilled in mankind. Years have passed since this age, with humans still occasionally troubled by nightmares and worry. Even though Morgul has been trapped, his influence still breaks through.

However, mankind has once again begun to experience horrific dreams, worse than ever before. No-one will venture out onto the streets during the hours of darkness. One terrifying thought is lurking at the back of everyone's mind – Morgul has returned.

You are Turrican – one of the few remaining people who have not lost all sense of courage. You have been kitted out with the latest state-of-the-art firepower ready for the mission ahead – to find Morgul and kill him.

You must travel through five areas of the realm that Morgul has created for himself, fighting off the
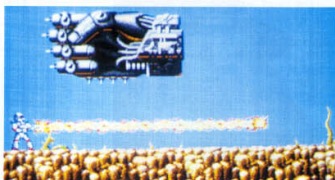
This one is a well mean mother. Get the beam on him!

creatures that he has warped to obey him. To begin with you are armed with a rapid-firing pulse rifle and a flash-beam which can project a directable stream of lightning to take out enemies at a distance. Extra energy packs can be picked up around Morgul's fortress and converted into weapons such as lasers, spray

rifle packs and energy shields. Some are freely available, but others are hidden and have to be carefully searched out before they can be collected.

At the end of the last area is the evil Morgul. Can you use the weaponry available to destroy him? Who knows... but it could give you dreams for a while! **Maff Evans**
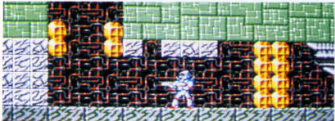
Ooh, look at all those lovely diamonds. Give them here...

LASTING INTEREST

The feel of the weapons is easy to get to grips with and to begin with it's fairly easy to blast the living daylights out of all the attacking creatures. Things do get a lot tougher though, despite the extra pick-ups to help you on your way. A lot of playing practice will have to be put in before you get any distance into the game and it will be quite a while before all the levels have been conquered.

Launch your flash-weapon to kill that evil 'orrible flying robot.

GRAPHICS	8
SOUND	8
INTELLECT	3
ADDICTION	8
OVERALL	**88%**

Reflections on the ethics of chopping up living beings...

The healer can patch you up – but will only do it for a price!

HERO'S QUEST

SIERRA ONLINE/ACTIVISION £34.99
■ **Keyboard and Mouse**

The people of Spielburg valley need a hero. A true champion of the weak, who is valiant in battle. Reckon you fit the bill?

Hero's Quest begins with a decision as to what sort of hero you want to be. Fighters are stereotypes with broadsword, shield and brain damage. Magic users are the intellectual types – they start off as wimps but build up a decent collection of spells and can swagger with confidence. Thieves are devious, skulking about shadows with a lockpick at the ready...

Rather than your Amiga randomly deciding the character's abilities – strength, intelligence, agility etc – you assign a meagre collection of points onto a standard profile (so fighters are always better than average in close combat, but you can stick some extra points on for overkill). This makes hero design much more challenging: custom heroes!

Getting into the game is easy. Spielburg is located in Spielburg valley, a large playing area with plenty of spooky woods, caves and inhabitants. You move around the three dimensional on-screen scenery; press the key or move the mouse and your hero stomps off in that direction until an obstacle gets in the way.

Remember text adventure games? The computer gives a description, asks "What now?" and then you type in your responses. Hero's Quest lets you type in commands at any time, which
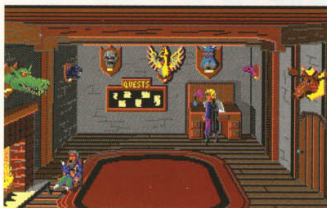
Want information? Check out your local Adventurer's Guild

freezes anything that's happening on the screen – even combat.

Therefore, you can stroll up to anyone or anything you see and try to start up a conversation. There's no need to hack everything you meet into quivering little lumps, unlike such games as Bard's Tale.

Monsters are classified into four categories: the Humanoids, the Inhumanoids, the Undead and the Unknown. The handbook lists a few little pointers that indicate it's a monster you're facing: if it oozes green ichor, eats people, collects half-eaten corpses, drools, gibbers or slavers, attacks without provocation, twitches tentacles or will not eat spinach – it's a monster!

The combat is simple in principle, but difficult to master. A view appears, from over your hero's shoulder. Depending whether the monster is at close range or distance you have six manoeuvres to choose from: thrust, swing, duck, dodge, shield block and parry.

Whenever the pointer symbol on the screen flashes, you must press the relevant key for the action you want. This introduces thought into combat, as you have to see what your opponent is doing before making your move. Blast-em-up fans like to hammer on all the buttons, and get confused when they end up dead. You have to think more about this combat system.

Combat is only a part of the game. At first, the player explores as much as possible, talks to people, meets the odd Dryad (that's a good bit) and can even take a job at a stables. Later, the quests have to be solved, adventures have to be completed – life in Spielburg valley is complicated.

Pat McDonald

GRAPHICS AND SOUND
The 3D locations look good. It's not just the quality; the number of scenes to explore is enormous. A few more frames of animation, in places, would have been the icing on the cake. Sound is used more subtly, with birds twittering away, a couple of musical themes and the occasional din of battle – bit of a let down there but not enough to make the game less enjoyable.

Combat is sometimes simply unavoidable, but always fun.

LASTING INTEREST
Loads of disk swapping is the only hassle. To see a world come to life is amazing: to play only a part of it and try to overcome all the problems and share the triumphs of becoming a hero is a long-term (and fun) way of spending time. Lots of puzzles, an adrenalin rush when a monster appears and a definite goal are what real adventurers need.

One kill-crazy hero who is just about ready for a quest.

JUDGEMENT
Just to call this a game is inadequate: it's a five-disk work of art, brimming with imagination, humour and thought. Shame about the price, but for once it genuinely reflects the amount of effort that's gone into it. A lovely game.

GRAPHICS	8
SOUND	6
INTELLECT	7
ADDICTION	9
OVERALL	**92%**

A later level – it looks easy, but one mistake can make the whole thing impossible.

TURN IT

KINGSOFT/ THE SOFTWARE BUSINESS £19.99 ■ Mouse

The next level. A toughie this one – things can go very well for a while, but it's easy to get stuck and end up with a small group on the left and a small group on the right.

All the useful things in the world today were probably invented thousands of years ago by the Chinese – like gunpowder, chopsticks, bicycles and those little water bottles that fix on the side of hamsters' cages. They were also pretty adept at keeping themselves amused during those long, dark nights and invented almost all types of Patience and Solitaire including, erm... well, probably quite a few.

Another game they invented was Mah Jong, normally a two or more player tile game that's a weird cross between Dominoes and Rummy. They even managed to create a game of patience using the Mah Jong tiles – often

called *Shanghai* – and *Turn It* is a straightforward variation of that.

Turn It is a much simplified version that involves looking at a screen full of face-up tiles and then selecting identical tiles to remove them from the board. There are a couple of rules, however. First, you have a time limit for each screen (the length of time can be altered by selecting a different skill level at the start of the game).

Then you must remember that the two tiles in a pair must be connected by a line which is drawn along the edge of the playfield and/or across tiles that have already been turned. Life at this stage would be bearable, but what really makes it tough is the rule

stating that the line connecting the two tiles to be turned can turn no more that twice (every turn of the line is through 90 degrees).

There are 50 levels to the game (a password is given after every 10 levels) and the levels increase in difficulty in a variety of ways. Usually the number and the complexity of the tiles increases, so you have more to manoeuvre around, but sometimes you're up against a crippling time limit. There are occasional pairs that can either be a help or a hindrance once they're turned, like the diamond tiles that give you an extra 10 seconds or the skulls that deduct points if you do have to turn them. **Andy Smith**

GRAPHICS AND SOUND

Neither is outstanding, though the music is all right and the sound effects are fine. The tiles have all been well drawn and everything looks about as good as you would expect.

LASTING INTEREST

The difficulty tuning on the screens has been set well and with 50 levels to complete this will keep you going for some time. The only disadvantage is that once you know a level you'll complete it every time.

JUDGEMENT

A very nice game that's been well done and will entertain whenever you have a few minutes to yourself. This is a good variation of the classic, so if you don't own at least one already this is as worthy of consideration as the rest.

GRAPHICS	6
SOUND	4
INTELLECT	6
ADDICTION	7
OVERALL	**83%**

THE ALL-IMPORTANT PATTERN OF PLAY

The easy first level. The tiles are simple and it's easy to recognise pairs.

Things are going well and here's another pair of tiles to turn – just click with the left button.

Near the end of this layout, now. Just turn this pair of faces for an extra four points.

The brave Earth Commando takes a plunge back in time through the warp tunnel

TIME SOLDIER

ELECTROCOIN £24.99 ■ Joystick

The Earth is in danger. The seven Earth Commandos responsible for the protection of the planet have been captured on a mission to attack the evil Gylend. Five of the Commandos have been enslaved and sent into the voids of time with little hope of rescue.

Only two of the commandos survived – Yohan and Ben – who must now battle through various time zones, from the Primitive Era through Medieval Japan to Future World, fighting off all manner of historic creatures and warriors in an attempt to rescue their captured comrades. All the commandos must be freed before they can travel to Gylend's domain and put the tyrant to rest once and for all.

You control one of the Commandos on his perilous quest through time, starting off with a limited energy supply and a measly single-shot weapon.

Along the way you may find additional items such as speed-up devices, three-way cannons, missile launchers and laser weapons. You must use these items to blast your way through Gylend's defences and rescue your friends. But take care, since once your energy runs out it's time for you to disappear off to the great big time machine in the sky.

Maff Evans

GRAPHICS	4
SOUND	3
INTELLECT	1
ADDICTION	3
OVERALL	49%
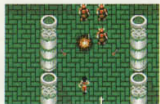
Gladiators come marching down to attack you when your guns are at their least powerful.

Let those Romans have it while their backs are turned and they present their 'vulnerable' side.

Don't stop to admire that pretty floor, because this dragon is a tough opponent!

GRAPHICS AND SOUND
Despite being based on a well-presented coin-op, the Amiga version of Time Soldier is rather unimpressive in both graphics and sound departments. The scrolling is slow, the sprites small and scrappily animated and the sound is weak to say the least. If an arcade conversion is to be a hit nowadays, these are the things that most care has to be taken over, but Electrocoin have simply 'made do' with a rough interpretaion of the original.

LASTING INTEREST
From the outset Time Soldier is a difficult and frustrating game to play, but even if you do manage to get any significant distance into the game, the gameplay doesn't alter to any extent. This goes to make a game which is annoying and repetitive, which will undoubtedly cause even the most dedicated coin-op fans to give up in short order.

JUDGEMENT
Time Soldier seems to be a throwback to the days when coin-op conversions first began to appear on home computers. Fans would simply go out and buy the game just for the name, regardless of the quality. However in this day and age of superb graphics, first-rate conversions and brilliant original games, a real effort has to be made to ensure that the translation stands up well as a game in its own right. Unfortunately Time Soldier doesn't really manage this, seeming much like a case of "let's get the name out, quick". Even if you are a fan of the original don't leap straight in, because this is a below-par implementation of a rather forgettable coin-op.

GRID RUNNER

LLAMASOFT £10.95 ■ Mouse

Psychedelic mayhem in Minter's latest blast-em-up.

Anybody who missed out on Jeff Minter's 'alternative' games on 8-bit can try his psychedelic delights in Grid Runner.

The idea of the game is simple; you control a ship with detachable nose-cone. Holding down the right button drags the nose-cone around, otherwise it sits where it is and splits your shots into three bullets, dealing mayhem to swooping invaders. And what do you have to do? Avoid the railgun's shots from the sides of the grid, pick up the bonus tokens and blast the Bejesus out of everything else. Simple.

The flashing, cycling and pulsating psychedelic colours are the main feature of most, if not all, of Jeff's games and indeed Grid Runner has cycling and pulsating colours at every opportunity. The effect is pretty – if a little disorientating – and provide a suitably ethereal backdrop to the gameplay.

The action itself is fast and frantic, so despite its age Grid Runner provides an enjoyable couple of days' blasting. The only fault is the sound. There is no music to speak of, and the effects are just obligatory beeps, whizzes and crunches. Not too good considering the power of the machine. Whinge aside, the game is – as pop hero Alan Freeman would say – 'A classic blast from the past, pop-pickers!' **Maff Evans**

GRAPHICS 5 / SOUND 3 / INTELLECT 2 / ADDICTION 6 / OVERALL 71%

GRAPHICS AND SOUND

Given the time that Elite had to bring out this conversion, it's not surprising that the game is extremely close to the arcade original. In fact the only difference is that you aren't asked to put any money in! All the introduction and intermission scenes have been included, from the abduction of Sir Arthur's love to the map of the game before play. One thing that was missing from previous conversions was the grave spirit that emerges to turn Arthur into a frog, but a few blasts into a gravestone on the Amiga version and hey presto! Out comes the spirit! A lot of care has been taken over both sound and graphics to recreate the feel of the coin-op, and it certainly shows. Both are superb.

LASTING INTEREST

Anyone who has played the arcade version to any extent will be able to quite easily get into the action, but this also means that they may complete it fairly quickly. However, even if you do get to the end, it's still great fun to pick up and have a bash at every now and then.

Killing these monsters is easy! YIKES! Where's me trousers?

GHOSTS 'N' GOBLINS

ELITE £19.99 ■ Joystick

After the success of US Gold's *Ghouls 'N' Ghosts* conversion, which received a Format Gold in these hallowed pages, it was inevitable that its predecessor would make its way to the 16-bit machines.

For the six people that have just landed from Mars and don't know anything about the game, the plot tells of brave Sir Arthur, valiant knight and bold warrior. While resting with his girlfriend after a particularly tough quest, an evil demon swooped down and swept away the fair maid to a dark and dangerous hiding place deep within a mountain.

Arthur quickly dons his magic armour and sets off to the rescue, passing through the various creature-infested sections of the demonic realm. He must fight off
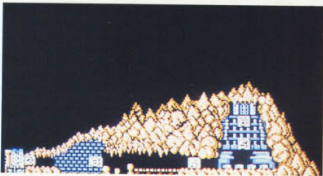
The map shows your objective – the demon's castle!

zombies in the graveyard, ghostly flying monks in the forest, tattooed ogres in the ghost town and bats in the caves.

Initially Arthur is armed with an endless supply of sawn-off lances to throw at foes, but occasionally a creature carries a pot containing

treasure or new weapons, such as torches, axes or daggers. If one of the creatures manages to land a hit on poor Sir Arthur he will lose the protection of his magic armour – one more hit and the brave hero turns into a bag of bones for the vultures to pick at. *Maff Evans*

That's a very strange creature. I wonder what he does...

Ah! That's what he does. Oh well... gribbit, gribbit.

JUDGEMENT

Despite its age, *Ghosts 'N' Goblins* is well presented, highly playable and an enjoyable romp. Techno-snobs shouldn't be put off simply because the follow-up is available, since the prequel has a feel and charm that *Ghouls 'N' Ghosts* somehow lacks. Veterans of the coin-op should get hold of a copy, even if it's just for nostalgia's sake, and newcomers to the tales of Arthur and his foes could do a lot worse than take a brief visit to this weird and wonderful world.
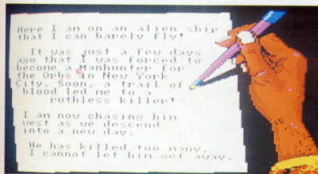

Arthur is chased around in his underwear by ghostly monks.

Arthur gets his tin trews back.

GRAPHICS	8
SOUND	7
INTELLECT	2
ADDICTION	7
OVERALL	**80%**

> Here I am on an alien ship that I can barely fly!
>
> It was just a few days ago that I was forced to become a Manhunter for the Orbs in New York City. Soon, a trail of blood led me to a ruthless killer!
>
> I am now chasing him west as we descend into a new day.
>
> He has killed too many. I cannot let him get away.

The start of the search. Forced by the Orbs to become a Manhunter, you set off into the streets of San Francisco.

MANHUNTER 2

Is it a good idea to peer under the pier while strange dudes in wierd duds are strolling around?

SIERRA ON-LINE/ACTIVISION £29.99

■ Mouse/Keys

I t was one of those days. One minute you're minding your own business and the next, your home town is invaded by aliens. Everyone is forced into wearing rather fetching brown robes and you're offered the chance to be a Manhunter: an 'esteemed human'. As such, your aim in life is simple: find the villains, then kill them. What more could one ask?

Manhunter 2 – San Francisco begins where Manhunter – New York left off. You're on the hunt for a human murderer called Phil who has escaped into the heart of San Fransisco. So your task is set. Unfortunately this task isn't as simple as it first seems. The more you investigate the more you uncover, from Genetic Engineering to major corruption, and your initial plans are changed as a more comprehensive understanding of the situation develops.

An interesting feature of the game is the inclusion of 'exciting arcade sequences'. Unfortunately, this adventurous gambit hasn't really come off. You are offered three skill levels which are tantamount to the same, with little if any difference. One such sequence near the beginning of the game is just about impossible. The aim is to get through the tunnel by kicking rats and punching bats – which would be quite a pleasant break from wandering the streets, but the slow keyboard responses and the random nature of any attack lowers the chance of survival to around zero.

Of course you'll persist, against your better judgement, just to get into the game somehow. Toughness based on luck rather than skill really does rile you, especially when you wish to

get into the game proper rather than pussy-foot around in some amateurish arcade sequence.
Nick Walkland

Do you really want that flask?

GRAPHICS AND SOUND

Graphically Manhunter 2 is adequate, although the images are often rather crude and basic; the staggered and gaudy coloured graphics are more reminiscent of early Commodore 64 software than a game for the Amiga in the Nineties. The animation is tediously slow and jerky, so they become something to endure rather than enjoy.

Sound effects and music are best left unmentioned, which should give an idea of their quality. You can always turn it off. All of which is disappointing from a software house that was getting much better at effects.

JUDGEMENT

All-in-all Manhunter 2 is a let-down. Especially after the success of Manhunter in the States, you'd expect something better. The adventure has so much potential, and it does have quite a gripping storyline – but the slow gameplay holds it back.

Big problem is the arcade games. Frankly, these are no joke. I'm sorry, but I haven't played such poor arcade games since BASIC Invaders! Why they bothered with the arcade parts of the game, when all they do is distract and irritate, is beyond me. Experimenting too much into mixing various forms of games, Sierra got themselves swamped – lets hope they can pull themselves out and produce more of the games for which they are rightly famous.

It's hot out on those streets.

One of the most impressive options of the game is the use of a personal computer to track city occupants, a nice touch which lets the player get more into the game via a realistic street map. The game is totally mouse-operated – there is absolutely no need to type in anything – but keyboard control of the arcade sequences and quick decisions can be made via function keys.

Looking for clues...

GRAPHICS	5
SOUND	2
INTELLECT	7
ADDICTION	4
OVERALL	**54%**

LASTING INTEREST

Manhunter 2 can be quite thrilling, especially thanks to its macabre style and relatively witty presentation. Unfortunately the puzzles are either blatant or painfully awkward, a constantly recurring problem being that you find objects without getting full details on what they are. This may be fine every now and again, but when it crops up with almost all objects throughout the game it does become a pain.

An adventure which decides the route for you and shows you the scenes it wants you to play hardly inspires any particular interest. However, once you get the feel of the thing the atmosphere rises, and you can begin to enjoy yourself. The game then presents its main problem; the sheer stop and start quality, with hardly any smooth flow.

"Armed guards alone aren't enough to stop the Defenders of the Earth!" Bigmouth strikes again just as the hover guards swoop in for the kill.

DEFENDERS OF THE EARTH

ENIGMA VARIATIONS £19.99 ■ Joystick

If you're the kind of person that never sees Saturday mornings, never mind Saturday morning television, then you may not have caught the 'all-new' *Flash Gordon* adventures in the form of *Defenders of the Earth*. It's the usual American cartoon tat, with 'classic' heroes teaming up with a bunch of right-on youngsters amid a hail of spaceships and laser-blasts, as the evil villain attempts to take over the world.

In Enigma Variations' new computer implementation of the cartoon you play Flash himself, romping through Ming the Merciless's fortress fighting off his minions until the evil ruler is tracked down in the Throne Room.

Flash starts out armed with four shield-packs and an automatic weapon. Hits from guards and other defence systems reduce Flash's shield strength, but extra energy packs can be picked up along the way to top up the diminishing supply. Also scattered around the fortress are extra weapons, such as laser blasters and high-speed magazines.

At various points, Flash may come across an obstacle such as a gap in the floor, a locked door or an electric field. By activating a call signal, Flash can ask one of the other Defenders to help him pass the obstacle – for example, Mandrake can magically create bridges, the Phantom can kick doors and Lothar can break locks.

If all Flash's energy packs run out, Dynak-X transports him back to safety all ready to go back and fight another time. *Maff Evans*

Watch out! That humpety-backed guard's coming to sort you out.

Attack of the blue robots! That evil snake doesn't help, either.

GRAPHICS AND SOUND

The intro music to *Defenders of the Earth* has been faithfully converted to the Amiga: in other words, the game's theme is the usual tacky Saturday matinee 'anthem' that kids can sing as they leap around re-enacting their favourite characters' antics. The graphics have a colourful cartoon-like appearance, but the animation on all characters is simplistic to say the least. This is one of the most important things to consider when converting a cartoon to computer, but Enigma Variations' design unfortunately doesn't quite capture the feel of an action cartoon.

He looks nasty. Should have taken more care on the terminal!

LASTING INTEREST

The gameplay is fairly basic, and each level is pretty similar to the last with the exception of a few more robots and guards to encounter. To add to this, the going is frustratingly difficult, which will have even dedicated shoot-em-up fans turning the air blue with profanities and threatening dangerous (and probably illegal) action against the computer before throwing the joystick down and leaving the room.

JUDGEMENT

It's rather poetic that such a run-of-the-mill cartoon has been turned into a run-of-the-mill shoot-em-up. The graphics and sound do the job, but the gameplay, unfortunately, is lacking in originality, excitement and variety – all things that a shoot-em-up needs to be impressive in the Nineties. It's fun for a couple of games, but frustration sets in soon after, discouraging budding Defenders from struggling through, no matter how big a threat Ming is to the universe.

GRAPHICS	7
SOUND	4
INTELLECT	2
ADDICTION	4
OVERALL	58%

Now's the time to put your knight on king 5 where your mouth is. The ability to test your grading is a definite challenge in itself.

LASTING INTEREST

It's chess innit? Lasting interest? There's thousands of years of it, bit of a silly question really. As for the software, the options to keep your own booked openings, continually assess your grading and the different levels which are included should make *Chess Champion 2175* last until the next version comes along. The fact that it can be moulded to your tastes and playing ability (though not yet to your style or imagination) gives it a fair edge over challengers in the micro-chip Kasparov stakes. Unless you're Nigel Short or plain irritatingly good then *Chess Champion* will keep doing no end of good for your game for a long time to come.

CHESS CHAMPION 2175

OXFORD SOFTWORKS £29.95 ■ Mouse

Put an Ottoman Emperor and a Russian (or Georgian or Lithuanian) peasant in the same room and they wouldn't know how to communicate. Then introduce a chessboard and – bingo! – they will be on the same wavelength for as long as you let them play. That's one of the beauties of chess. In this country, the game has had a 'snob intellectual' value attached to it; this is slowly being broken down and one of the prime movers in this noble war of attrition is the home computer chess game.

Chess Champ comes with all the standards which we have come to expect; a 3-D board, 'take back' moves, booked openings and saved games. Unlike its predecessor, Chess Champion 2150, little brother comes with no speech support. The reason for this is that a bigger opening libraryhas been added, the search extended and a 'Chess Engine' – the brains behind the beast – of 100k incorporated.

Once booted up – for some reason the screen shows a 2-D board where the pieces change into toys and animals, but at least it keeps you interested – you have to negotiate the 'what does word 123 in paragraph 23 on page 2' protection. Then you are taken straight to the flat board display with the clocks ticking. Default games have you playing white. Click on the left mouse button, with the pointer off the board, and

a series of menu options are shown at the top of the screen.

Before getting into a game, it's an idea to test your grade. This function gives you 24 set-pieces to negotiate. Once you've completed the lot you are given a rough idea of your place in the international pantheon of chess players. Nice idea, but it can be a tad punishing on the ego.

Just because you are defaulted to play white, doesn't mean it has to be that way. As with all computer chess it is a wise idea to suss the machine's ability to play white and – this is normally a good one – see how it reacts to castleing Queen-side. Chess Champ copes well with both options with some style, but options to stuff it with a Queen/knight check was also handled with great aplomb – that normally nails 'em too.

One impressive point about the game, although it smacked of playing a crusty old pro trying to impress by dropping in chess technicalities – is that names of openings are displayed on screen as soon as the software recognises them. Queen's Gambit slaps on the screen early, but such lovelies as the Nimzo-Indian Defence take their time – and rightly so. It plays like a crusty old pro' as well: more's the pity for the chess smart-arse or naive beginner

Tim Smith

GRAPHICS AND SOUND

We'll get the sound question over with right now. Save for the occasional bleep to signify a move, there isn't any. A good thing too, the last thing you want when training to win a £10 bet with 'Arry the chess shark down at the Rook and Ferret, is Adamski-international-Beat'S'Express blaring out to announce a check.

Graphically, it's a little on the ragged side. This is probably because looks are sacrificed to playability, another good point in my mind. Movement comes with a number of options which range from an irritating 'slide' to a zappy 'Fast Move' variation.

You do get the chance to alter the board and piece colours, so why quibble. The real chess afficionado will have a true board to hand anyway – you can't really play chess without some tactile sense. Basically the job is done in an unintrusive manner. Oh, and if anyone ever does make use of the 3-D option, that's fairly neat too.

Before 'pawning off' (an internationally unrecognised term for starting a game) you should make use of the numerous pull-down menus

JUDGEMENT

Until a computer chess partner comes along which can bring hypnotists, telepaths and rowdy fan club members to freak you out ; until the Amiga develops the ability to chuck the pieces across the screen in a fit of pique when it loses and then blame the loss on the weather or FIDE, it'll be nothing to beat human contact. However, *Chess Champion* stands up well and provides and excellent game for beginner and experienced

amateur alike. It comes with a 300,000 byte library, is obviously well thought out and enthusiastically programmed and all this makes it almost a pleasure to be beaten by it. It's definitely a pleasure to beat it.

Get out of that you computer pretender...it probably will 'un all

Where to go from here? The knight's are drawing in or what!

GRAPHICS	5
SOUND	N/A
INTELLECT	9
ADDICTION	7
OVERALL	**77%**

The exit! Now where's the key? Oh no! Back to the start.

LASTING INTEREST

Each screen of *Fire and Brimstone* is a puzzle in itself, requiring thought and dexterity to complete. Reaching the end of the level is one thing, but successfully finding all the sections of the key and escaping is another matter. Fail and it's back to the beginning again. Spread this over nine worlds and you have weeks of compulsive and addictive playing ahead.

Where can that platform have come from? A little magic, perhaps...

FIRE AND BRIMSTONE

MICROPROSE £24.99 ■ Joystick

Electronic Arts gave a hint of what it might be like to act as a deity with their God-simulator *Populous*, but what of the hellfire and mayhem that the Norse gods enjoyed? Microprose have stepped in to allow you to enter the raucous and violent world of Thor, God of thunder, law and order – a strange combination, but in legend anything can happen.

The land of the Norse gods consists of nine realms – from the worlds of Asgard, home of the gods, through Midgard (our Earth) to the dark realms of Muspell, home of the Dark Elves. Deeper down than this abominable world is Niflheim, home of the evil goddess Hel, controller of all the world's most evil monsters.

For generations Hel has been a nuisance, causing mayhem and disorder in the lower realms, but recently her powers have been spreading further and further afield. The people of Midgard are being made to suffer at the hands of her demons as she grasps for more and more power. The gods have decided – it must stop.

You take the role of Thor in his quest as nominated adventurer in the battle to defeat Hel. Your quest begins in Alfheim, where witches and ogres under the power of Hel will attack you. To gain access to Vanaheim, and

Oooh! Ah! Hee! Ouch! That's a tad on the warm side!

GRAPHICS AND SOUND

The graphics are very colourful, and have been designed with tongue firmly in cheek. Thor, instead of being a huge strapping warrior, is a dinky little fellow with a bright red beard! The other creatures have a similarly cute appearance, and combined with the detailed and atmospheric scenery give the game a very polished appearance. The sound is of a slightly lower standard, however – consisting of a racy, but inappropriate tune and a few thin and weak spot effects. Where are the grunts of battle and the cataclysmic sound of magic spell being cast? Not here, I'm afraid.

There's a piece of key. Oops! An ogre. I wonder if he's seen Thor...

thence the other levels, you must find the sections of key that Hel has hidden in an attempt to protect herself. Once the key is complete you can battle through

the realm until you reach the exit, which is on the right-hand side.

Hel likes nothing more than a battle, so to taunt Thor she has placed magic potion bottles throughout the realm which are uncovered by killing various creatures on your path. Spells such as lightning and bridge-building will come in useful when the odds looked stacked against you. If you fight well enough, you will reach the realm of Niflheim, where Hel herself is waiting. **Maff Evans**

JUDGEMENT

Capcom's *Ghosts 'n' Goblins* made it credible to portray mystical worlds in a 'cute' manner without being laughed out of the software market. *Fire and Brimstone* follows this structure well, managing to recreate the feel of Capcom's classic but without ripping off the game so that it can be dismissed out of hand as a simple arcade clone. Thor's quests are portrayed in an amusing and enjoyable way that should appeal greatly to those with a love for the mystical and a sense of humour.

A nice farmhouse. This is the last friendly place that Thor will see for a good long while.

GRAPHICS	8
SOUND	5
INTELLECT	4
ADDICTION	7
OVERALL	81%

disk EXTRA

A marvellous playable demo of the Bitmap Brothers' latest, *Cadaver*, heads up this month's high-quality assortment of software at a price that's right for your pocket. There's so much more than TV times on this month's *Amiga Format* Coverdisk!


He may look like Noggin the Nog, but our little fellow is one hard case of a hero and is quite capable of handling himself.

CADAVER
PROGRAM: IMAGEWORKS
FILES: CADAVER,
CADAVER.DOC

Wulf castle stands alone in the dense swamps that surround it. Once the power-base of the Wulf dynasty, it now lies deserted except for one person: Dianos the Necromancer. Many legends pervade the old ruin: tales of fallen knights, an exiled brother and a treacherous chancellor.

Hired as a bounty hunter by the captains of the murdered Lord Carolus, you are asked to enter the castle and destroy his assassin, the insane Chancellor Dianos. Many rooms lie between you and the upper chambers where Dianos has taken up residence and,
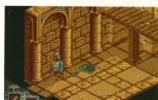
Arms and the man – a spear!
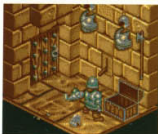
Checking in chests could be a good way of tracing treasure...

considering the recent struggles that have taken place, there will be lethal traps waiting around every corner. Monsters of many kinds have taken up residence with the evil Necromancer and others have been summoned from their ethereal planes to serve his every wish without question.

Looming in the darkness, the evil of Wulf Castle awaits you. Go forward, brave knight, and rid the land of Dianos' tyranny. Oh, and don't forget to switch off all the lights and put the cat out before you leave.

The Demo
Anyone remember those classic 3D isometric games that were so popular on the 8-bit machines a few years back? *Cadaver* continues the tradition while still managing to add a healthy smidgeon of that magic that only the Bitmap Brothers and the Amiga can deliver. *Cadaver* is played using a joystick and occasional key presses, so have your joystick plugged in and you'll be ready to rock and roll.

The small level on this playable demo of *Cadaver* was specially created for *Amiga Format*. It is not a part of the finished game as the Bitmap Brothers felt that revealing any of the challenges before the release of the product would mar future players enjoyment. The action is

AMIGA FORMAT

DISK EXTRA

set within the gatehouse as a prelude to the castle itself.

Players will find a selection of puzzles, spells, potions and one monster type in order to practice those skills necessary for playing the full game. Not all items that are found littering the building will be of use, but most are worth investigating. It is not necessary to solve all the puzzles to complete the game, but many will provide bonuses of gold or experience.

Getting Going

Can't wait to get started? Then turn on your Amiga with the Coverdisk in the internal drive and you're half-way there already. When our scrolly message screen pops up, just click the left mouse-button and the game will automatically load. If you get a vertical black line through the centre of the screen after the game has loaded, reload the demo again by turning your machine off then on again (this clears the memory completely). Do not touch the mouse while the game is loading.
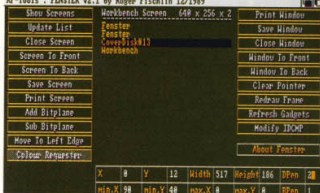
FENSTER

PROGRAM: ROGER FISHLIN
FILES: FENSTER, FENSTER.DOC, ARP.LIBRARY

Here it is, the definitive Intuition screen and window management program. Forget Snapshot, forget ScreenX, forget the rest, Fenster has no competition. Within this single program, you'll find every tool that you could ever wish for to help you keep all those windows and screens on the leash. With Fenster you can:

• Close any window or screen without the program that generated it ever having to know...
• Save a screen, or even a window, as an IFF compatible file that can be loaded into any Amiga

ZAP

PROGRAM:
FILES: ZAP, ZAP.DOC

Zap, as the name doesn't suggest at all, is a binary file editing program. You can examine and modify the file in both hexadecimal form and in ASCII.

Unlike other programs we could mention, Zap keeps the file in memory, so moving around the file and searching for chunks is very fast. That said, keep your eye on the memory meter, because Zap can gobble up the memory when editing large binary files.

What sets Zap apart from that other great binary file editor, NewZap, are it's multi-tasking capabilities and lightning fast operational speed. Instead of hogging the entire screen display like NewZap always used to do, the Zap window can be re-sized and pushed around the screen without a single complaint.
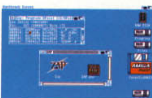
Getting Started

Zap can be started either from CLI or Workbench. When starting from CLI, the file name can be given as a command line parameter. If the name contains spaces it can be enclosed in double quotes.

When starting Zap from Workbench, a file can be selected by first clicking the Zap icon and then holding down the shift-key and double-clicking the icon of the file you want to edit.

If you don't specify a file name when starting up the program, you can always use the Load menu option to pull a file into Zap.

paint package to be touched up...
• Dump any screen to printer without having to mess around with the crummy Workbench screendump utility...
• Change the attributes of any screen or window without having to mess around with binary file editors. You can change a windows size, change its IDCMP flags, refresh any gadgets...

Getting Started

Before you can use Fenster, you will first have to install arp.library onto the boot disk of your Workbench disk.

This can be achieved by double-clicking on the Install_Arp program that can be found within the LHArcA drawer (not the Fenster drawer). This may involve some disk swapping, but once it's complete you're ready to go.

Double-click on the Fenster icon and this power-packed, super dooper little utility will spring to life. OK, a little window will open. This is Fenster in sleep mode. If you now activate the Fenster window by clicking on it and then press the right mouse button, Fenster will show you everything it

has to offer by opening a custom screen containing loads of useful gadgets. For more info on how to actually use the power now at your disposal, check out the documentation file, FENSTER.DOC.

POPUPMENU

PROGRAM:
FILES: POPUPMENU, POPUPMENU.DOC

Pull-down menus are old hat. Improve your Workbench with PopUpMenu, a handy little utility that rids Workbench (and any programs that are run after installing PopUpMenu) of the menu strip and those pull-down menus.

What's wrong with pull-down menus?, I hear you ask. Simply, every time you wish to access a menu you have to move the mouse pointer out of the window that you are working in and move it up to the top left-hand corner of the screen. With PopUpMenu, press the right mouse button and those menus appear instantly anywhere on the screen. Pretty clever stuff, I'm sure you'll agree!

Getting Started

Double-click on the PopUpMenu icon and that's it – from now on, every program that uses Intuition menus will work perfectly well with PopUpMenu (just check out the screenshot on the bottom of this page for proof positive). Instructions (you need instructions?) are in the usual place.

LHARCA

PROGRAM:

FILES: LHARCA,
LHARCA.DOC, ARP.LIBRARY,
INSTALL.ARP

Calling all you communications fanatics! Have we got a little scorcher for you! LHArcA is an archiving tool that has two features to recommended it. First, it's fully Intuition-based so you don't have to learn a massive list of dreaded command line arguments before you can even run the program. Secondly, it's pretty darned fast.

Although this is only a pre-release version, LHArcA is one mean mother in the speed department - If LHArcA is the Ferrari of compression utilities, then the rest are nothing more than Reliant Robins. So that you don't have to re-do all your old archives, LHArcA is 100% compatible with LHArc on the PC and most Arc utilities on the Amiga.

But why do I need an archiving program? I hear you ask. The answer is simple. Most bulletin boards include file sections that are packed with useful programs for your Amiga, all of which are (usually) freely available to be downloaded at your whim.

To save disk space, however, most (if not all) will be compressed in some form. The most common method of compression is 'arcing' (pronounced 'arking'). With LHArcA, you can download all those programs and decompress them with ease.
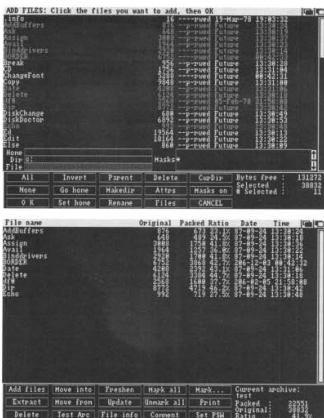
Getting Started

What can I say that you don't already know? Just double-click on the LHArcA icon and you're away. As always, full instructions are included within the same directory. However, if you've ever used an archiving utility before, then you probably won't need these at all – LHArcA really is that easy to use.

As LHArcA makes extensive use of MicroSmith's Arp library, this will have to be copied to the LIBS: directory of your boot disk. This can be achieved by double-clicking on the Install_Arp program that can be found within the LHArcA drawer. This may involve some disk swapping, but once it is complete, you're ready to go.

COPPER TUTORIAL

PROGRAM: BY PAUL
ANDREAS OVERAA

FILES: COPPERTEST,
COPPERTEST.C, CDSD

So you've already learned how being a good community policeman, how to help old grannies across the road and nick burglars before they get a chance to get up to no good. We've seen how, if you're a good bobby, they'll let you do the highway patrol and drive one of those really fast Cosworths that have those really neat flashing lights and sirens that go dee-derr, dee-derr and chase boy racers at such high speeds that the front of the cars start to glow...

Hang on a minute, something's up here – you'd never be able to get a whole Cosworth onto the Amiga Format Coverdisk...

Getting Started

Seriously though, there are two files to accompany the article to be found elsewhere within this issue of Format. CopperTest is a demo that shows how to construct simple copper colour bars from C and CopperTest.c is (obviously) the C source code for that very same demonstration program.

MENACE SOURCE

PROGRAM: DAVE JONES

FILES: ALIENS, BONUS.S,
GUARDIAN, MENACE,
MENACE.S, MINE.S,
PATHS.S, SHIPS.S

Everyone's favourite programmer, Dave Jones, the man everyone is calling, er, Dave Jones, returns again this month with another revealing chunk of source from Dave's monolithic Menace. This month, Dave has added the

'orrible tentacled end-of-level guardian that caused so many gameplayers to shout 'Eeek', look at that end-of-level guardian'.
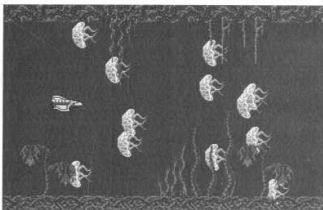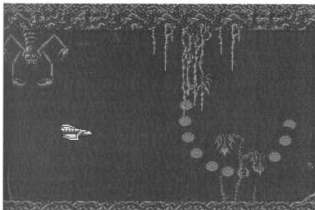
Some of you may have also noticed that the last lot of source code published for this article was incomplete. There should have been an extra file called ALIENS which somehow didn't (as such) make it to Coverdisk city. The good news is that we've bunged

the little fellow on as well, so your source code collection is now virtually complete and ready to go.

Getting Started

Dave's offering is starting to get rather large (ooer, missus!), so 512K Amiga owners may start to experience problems getting the executable to run from Workbench. To assure success every time, make sure that the

Menace executable is the first thing you load and that as many Workbench windows are closed as possible. Better still, drag the Menace icon out onto the Workbench screen, close the Menace window and then double-click on the Menace icon. If you still have problems loading the demo (ie, it won't), then turn off your machine for a while and then reload Workbench.

MIND YOUR
Language

In days long past, when 8-bits ruled the earth, the two languages in common use were BASIC and assembler. Even these split into many varied dialects, but BASIC was far the most popular. For better or worse, those days have gone.

The arrival of the Amiga has seen a new generation of languages sneaked into the home environment, some of which were previously unseen outside universities or scientific institutes, most of which were unable to run without the sheer processing muscle of yesterday's mainframes. Even familiar titles like BASIC have silently undergone a complete revamp to rival more accepted languages in terms of power, complexity and performance.

Scale of the Problem

The problem, if it is a problem, was and still is this: most home computer programmers are unfamiliar with doing anything on a large scale. Previously the vast majority of home computers were limited in terms of memory size and general complexity.

Few people outside industry or research institutes had any idea what multitasking was; let alone how to program in such an environment. Their minds were very firmly fixed with the idea of one computer, one job. Even the chosen few had only dabbled with simple interrupts afforded by processors like the 6502 and Z80. Now they were faced with a computer capable of handling many tasks at once without so much as blinking.

For many, the very idea of an operating system interfacing between them and the hardware was alien. Many had come from machines like the Spectrum where the operating system was just a part of the BASIC ROM.

Even those familiar with the idea of a separate operating system – ROM based or not – were flummoxed by the sheer size of the Amiga's. At 256K it was 16 times the size of the one employed by the once all-powerful Acorn BBC Micro. And WIMP interfaces? The whole suggestion of point, shoot, and let the computer get on with it was almost obscene.

Mind Your Language

When faced with a machine as complex and comprehensive as the Amiga one question is nearly always raised; "Do you use high-level or low-level languages?" This is an area where the user is spoilt for choice.

At the lowest level, the machine features a set of very complex custom chips which MUST be treated with respect. A programming bug here will not cause the machine to catch fire – as used to be rumoured with an ancient Commodore micro – but it can cause subtle bugs.

Moreover, subtle bugs can occur on seemingly identical machines – more than one game has come to grief

Illustration: Sally Gaden

There are so many programming languages around, that it's hard to know which is the one for you. **MARK SMIDDY** sorts it all out.

by working fine on 90% of Amigas but failing on the other 10%. This problem is further expounded by the ever expanding variety and configurations of machines available. Not only in terms of memory, but extra and faster processors, new system ROMs just around the corner with a completely new version of Intuition and a revised set of custom chips.

At higher level, when programming applications, for instance, there are even more things to consider. Not least, all good Amiga applications should be capable of interacting correctly with the rest of the machine. At the very least this means "hitting the metal" (directly accessing the hardware) – a common practice on 8-bits – is right out.

Moreover, a correctly written Amiga program MUST be able to co-exist with anything else that happens to be running in the machine. This has some major implications for the programmer. Not only must he consider the need of his own programs but also correctly arbitrate for use of any hardware (or virtual hardware, like screens) the program may require.

BASIC has become synonymous with home computing and, despite the efforts of many computer professionals, has managed to gain a foothold and a huge following that simply won't go away. It was intended as a gentle introduction to programming; indeed, the acronym BASIC means Beginners All-purpose Symbolic Instruction Code, but of course you already knew that.

The idea of BASIC is to remove the complexities of conventional computer programming by providing an environment devoid of almost any form or structure; which is, according to experts, where it falls down.

This is, of course, the very feature which has endeared it to so many over the years. It is friendly, easy to learn, simple to program and invariably simple to debug. BASIC listings tend to be easy to read and understand. Also, the extensive error checking provided by most interpreters (later, compilers) mean it is the language least likely to crash the machine.

For the reasons outlined here, the Amiga is very well served with versions of BASIC varying in quality from the sublime to the downright appalling. There are so many BASICs there isn't room to fit them all in here; this is a selection of the more common ones.

PROGRAMMING LANGUAGES BASICS

AMIGA BASIC
Free with the Amiga

Fits, regrettably, into the latter category – appalling. Regrettably because it is the one supplied with the machine and, therefore, many people's first impression of programming the machine. It has a slightly chequered history; suffice to say the version on release at the moment is based on the industry-standard Microsoft BASIC. For "industry standard", read easily convertible but crude.

For openers, the authors have chosen to use Intuition's GIMMEZEROZERO windows. This bit of Amiga mumbo-jumbo means in effect the cartesian (geometric) 0,0 co-ordinate starts at the top right-hand corner of each window's drawing area. Normally, programmers have to correct for this in software. Since Intuition does this automatically, the net result leaves window updates VERY slow.

Next up, AmigaBASIC lacks any form of decent file request. The poor beginner is left instead to cope with a simple Intuition string gadget. Taking nothing away from Intuition, this would be fine – apart from the fact that it leaves beginners floundering with the complexities of AmigaDOS.
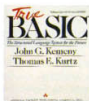
As a final nail in AmigaBASIC's pine overcoat (with optional silk trimmings and polished brass accompaniment) it is slow – very slow. True, by comparison to other interpreted BASICs it is reasonably fast – but in terms of pure performance it makes the Amiga – in every other way, a very powerful machine – seem tedious.

TOP: This nice HiSoft BASIC demo came to grief when subjected to the editor!

ABOVE: Even this AmigaBASIC demo looks paltry when you consider the machine's potential.

LEFT: Oops! This lissajous figure in True BASIC looked great on my screen!

True BASIC
Addison-Wesley, Price N/A

Comes from Kemeny and Kurtz – the inventors of BASIC, no less. After they had seen their language called every rude name possible and criticised for lacking structure (even though real structured programming was not "in" when BASIC was created) they sat down and redefined the language to bring it more up to date.

The result of this effort is True BASIC, and a very nice job it is too. While it retains the feeling of the BASIC language and remains easy to learn, it is capable enough to produce large applications and still easy to learn. True BASIC is compiler-based which means syntactic buggettes – like typing errors – are caught long before the program is run properly. The same is true of all compilers here, incidentally: this is not a unique feature of True BASIC.

True BASIC is supplied in typical Addison-Wesley style – on two disks with two voluminous manuals, all packed in a giant box. One manual explains True BASIC Amiga in depth, the other is a reference guide. Both use a large font which is kind to the myopic. Kemeny and Kurtz call it "The Structured Language System for the Future." How true this is in practise remains to be seen – but judging from documentation alone, it is the logical progression from those first BASICs.

HiSoft BASIC
HiSoft,
Compiler £79.95
Extend £19.95

Comes as some salvation to AmigaBASIC users because it is largely compatible with it, also borrowing some features from Microsoft's PC Quick BASIC. The main difference is HiSoft BASIC is compiled, resulting in

programs which run up to (it is claimed) 50 times faster than they would in standard Amiga BASIC.

Hampered by the compatibility with AmigaBASIC, HiSoft looks sluggish when compared on paper to its main competitors, but overall manages quite a reasonable speed. The main cavil with the system is the lack of an interpreter: programs must be tokenised and compiled before they can be tested. This adds unnecessarily to the development time.

Like most modern BASICs, HiSoft lacks line numbers, but the formatting of loops and so on is up to the programmer. Some editors do this automatically; it's all a matter of taste. The excellent editor is borrowed from Devpac – or is that the other way round? Although only offering single-file, single-window editing, it manages to be fast and effective. The curious system of using function keys for block marking could be better, though.

Unlike GFA BASIC (below) it features a simple interface to Intuition, although this must be criticised for lacking anything more useful than screens, windows and menus. This might seem useful enough, but in practical applications it can hamper the programmer and, inevitably, the user! To be fair, HiSoft have tried to remedy this by offering an extension to the language – called Extend. What they forgot to add was support for the ever-useful proportional gadgets. Their absence crop up everywhere, from DPaint, to Sonix – even Sleepy 3! Their absence is definitely a mistake.

GFA BASIC
GFA, Price varies

Definitely not compatible with anything other than GFA BASIC. When Version 3.0 first appeared, it was so full of holes it was a wonder it managed to survive the furious press critiques it received. Nonetheless survive it did, and GFA finally have a solid product.

Unlike several other third-party BASICs mentioned here, GFA BASIC is interpreted: those wanting a compiler have to pay another thirty quid for the privilege. The suggestion GFA is interpreted should not be taken as meaning it slow – far from it. With this release, GFA have demonstrated just what can be done with a "mere" interpreter and extracted performance previously unseen from the language.

Compiled programs come in useful and very faaaaast! The compiler documentation even features a section on optimising raw BASIC code to make it even faster still. However, despite of what GFA might suggest, this section does require at least a rudimentary understanding of 68000 machine code to exploit the compiler to its fullest.

GFA's editor is a strange, though powerful beast and the language itself

has an unusual but well thought-out syntax. Notably line numbers have gone, as have multi-statement lines. This, coupled to the automatic indenting of loops and so on, forces programmers to produce clear, readable and logical code.

More unusual still, GFA supplies a complete interface to all the library functions found in the ROM. Common functions like opening Intuition windows and screens have their own calls, simplified for the beginner but powerful enough for the expert. From a programmer's angle it is difficult to see how long C compilers will remain in favour, since even complex programs would be easier to produce in BASIC's protective and friendly environment.

AMOS
Mandarin, £49.95

From Mandarin Software comes the long-awaited follow-up to their hugely successful STOS for the ST. AMOS is so new it deserved the full review now showing on Page 75 of this issue.

COMPILERS
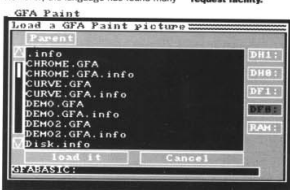### PROGRAMMING LANGUAGES

C
**Lattice C, HiSoft, £229
Manx C, £160
Lattice C++, HiSoft, £299**

Devised by Brian Kernighan and Dennis Ritchie (from B, would you believe!) with the sole intent of writing operating systems – something which it is very good at. UNIX, GEM, Kickstart and many others were developed using C. However, the language has found many

BELOW: GFA Basic shows off its customised file request facility.


```
GFA Paint
Load a GFA Paint picture
  Parent
  .info                              DH1:
  CHROME.GFA
  CHROME.GFA.info                    DH0:
  CURVE.GFA
  CURVE.GFA.info                     DF1:
  DEMO.GFA
  DEMO.GFA.info                      DF0:
  DEMO2.GFA
  DEMO2.GFA.info                     RAM:
  Disk.info
      Load it         Cancel
GFABASIC:
```

more uses than the one for which it was originally devised. This is the case with many languages once they become accepted – the few which have fallen by the wayside have done so for good reason, and remain unnamed.

The main advantage of C – as defined by its lovers – is its portability. In theory at least, a C program can be written on one machine and easily converted to run on another. This advantage has been whittled away somewhat, recently, with the advent of Modula 2 which is also extremely portable; and also, of course, has been reduced by WIMP systems. By definition, WIMP-based systems tend to be very machine specific, hence reducing the portability of software.

There are two main C compilers available for the Amiga: Lattice and Manx. Of the two Manx – being the cheaper – has the larger (or is that louder?) following, but Lattice appears to have the better back-up.

As main distributor HiSoft was keen to point out, Lattice is ANSI compatible and can produce code running more than 60% faster than Manx. But what's a few benchmark results among friends?

Pascal
MCC Pascal, Metacomco, Price N/A

Invented by Professor Nicholas Wirth as a teaching language and named after the French philosopher, mathematician and physicist Blaise Pascal. The only Amiga version of Pascal has become, sadly, something of a rarity since the demise of Metacomco. Unless someone else picks up the baton, Amiga Pascal will become a thing of the past when existing supplies dry up. Those wanting to try this fascinating language should act now.

Modula 2
Benchmark Modula 2, Price N/A

Another invention of Nicholaus Wirth, Modula 2 shares many of the features first devised for PASCAL but without some of the drudgery of type checking and exacting syntactic specification. Modula is a logical progression from PASCAL and is seen by many as been the first in a new generation of computer languages.

Proof of this new-found usefulness comes in the form of Gold Disk's excellent Advantage spreadsheet which was developed in Modula, as opposed to the more usual use of C.

In order to gain the greatest speed from any computer, there is no option but to resort to the complex world of assembly language; and on the Amiga this means the 680x0 series.

At first glance assembler looks complex – because it is. More to the point assembler is long-winded and very prone to subtle bugs which cause spectacular crashes. A good 68000 development system MUST feature a debugger – machine code programming without one is like playing Russian Roulette with six bullets.

Devpac 2
**Devpac Amiga, HiSoft,
£59.95
Devpac Developer (1Mb+),
HiSoft, from £199**

From HiSoft comes the sibling to the hugely successful Devpac development system widely used by professional games programmers which should be a recommendation in itself. Many regard it as being the de facto standard by which all others must be judged – surprisingly there are a few pretenders to Devpac's crown. The system is supplied in three parts – Editor, Assembler and Monitor – and comes on two disks with an excellent manual.

The most impressive feature of Devpac 2 is the way the whole thing has been thought out. From within the editor (a good value package in its own right) it is possible to assemble the code to memory and immediately test it either at full speed or from the debugger. This reduces development time enormously over the over more conventional systems of edit, then assemble, (link), debug – where each part of the system is a separate entity.

For those wishing to use Devpac as part of a larger development system, it can produce linkable code which could be joined in a modular form to

compiled C, Modula 2, or even other assembly language modules. At around 70,000 lines per minute the assembler may not be the fastest, but considering Devpac has probably the best multitasking debugger available for the Amiga (and a massive following) it represents unequalled value for money.

ArgAsm
Argonaut, £79.95

Comes from Argonaut Software, the home of *Starglider* and an impressive stable which can be expected to produce something special. Which is precisely what ArgAsm is, boasting a multiwindowed editor and claimed assembly speed of 250,000 lines per minute. It should have taken the programming world by storm, knocking Devpac straight off its perch.

The multi-windowed, multi-file editor is a joy to use – far better than Devpac's. Scrolling text in windows moves at blistering pace, giving some credence to the claims and showing it was written by people who consider speed of paramount importance. Also, like Devpac, ArgAsm can produce linkable code to use with other languages.

As a pure assembler, ArgAsm knocks spots off the competition in terms of performance alone; by no means enough to endear it to the buying public. The complete lack of any debugging facilities and heavy memory requirements (above 1Mb) are serious mistakes; even the dated K-Seka has a debugger. Argonaut use their own debugger in-house but refuse to release it on the grounds that its advanced facilities would only serve the needs of pirates. Fair comment, certainly – and a sad sign of the times.

Argonaut would have been better advised to think less about fancy features – like compatibility – and more

about releasing a product that worked. Yes, it's bugged: it sometimes fails to produce runnable code at all. ArgAsm could have been a masterpiece. It isn't.

K-Seka
Kuma, Price around £50

Mentioned here for the sake of completeness – even though Abacus' Assempro and Cape were not available. Seka is getting long in the tooth, but nevertheless a sizable number of programmers still swear by it – and at it too. It is capable enough – the ST and Amiga versions of *Wizball* (remember *Wizball?*) were written using it. The problem with Seka is it looks dated and the author has refused to update it, discouraged no doubt by the excellent competition. Even so, Seka wins hands down on price alone and it does have a debugger (of sorts).

The most notable features of the package include the weird editor – reminiscent of Ed, and the curious command structure! Assembly is very fast BUT this is definitely not a package for producing applications since no INCLUDE libraries are supplied. This means every LVO (Library Variable Offset) must be looked up in the reference manuals. A tedious operation even on a simple system like an ST, on the Amiga this is incomprehensible. Similarly, the documentation is rarefied in typical early Kuma style.

Assem
Metacomco, Price N/A

Not unlike Kuma, the recently-demised Metacomco were one of the first to produce an assembler for the Amiga; like Seka, it looks crude in comparison to today's offerings. In its favour, Assem does use standard macros and can include files. From here it's downhill all the way. The editor supplied is Ed: suffice to leave that alone, Cygnus Ed 2.0 is a better bet altogether. There is no debugger and the program only produces linkable files. Worst of all, Assem is supplied with ALink – this should also be replaced with BLink. Or better still, buy something else instead.

RIGHT: In Devpac2 MonAm (the monitor) has a full five functional windows...
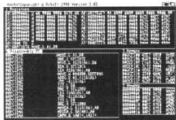
BELOW: ArgEd is ready to assemble – loadsaoptions!

FORTRAN
AC FORTRAN, £295

The great grandfather of high-level languages and arguably the precursor to BASIC. Certainly much of the structure of FORTRAN can be found in today's

BASIC. The name is an acronym for FORmula TRANslation language which describes it very well. FORTRAN appeared very early on because it was devised for scientists who needed to be able to write programs which expressed their formulae in (more or less) simple English, something which was impossible in other languages around at the time.

Although FORTRAN is still regarded very much as a scientific language – the stuff of minis and mainframes – at least one software house has seen fit to produce a version for the Amiga. AC FORTRAN is available from HB Marketing. It looks very promising indeed.

APL
MicroAPL, £99.95
basic version, £299.95
with 68881/68882 support
and faster libraries

Must rank as one of the most peculiar languages around, since the major body of its definition relies on a super-set of special symbols unique to it. The name APL comes from 'A Programming Language', probably because its inventor, Dr Kenneth Iverson, couldn't think of a better way to describe listings which amount to little more than runic diagrams. Perhaps the ancient Egyptians invented computing after all?

Like many fringe languages though, APL has a fiendishly dedicated band of followers – some of whom are responsible for bringing this ISO standard implementation to the Amiga.

REXX

Is a relative newcomer to the computing scene since it appeared as recently as 1985. It should be made clear from the outset ARexx (William Hawes' Amiga implementation of REXX) has not been accepted as a language in its own right, but adopted as a script language for controlling other applications. However, this should not be seen as taking anything away from ARexx, since it is without doubt a very powerful language, and quite capable of producing stand-alone programs.

Very briefly, the language is not

entirely dissimilar to BASIC – although this may be doing it some injustice. It comes on a single disk with a clearly written manual explaining the implementation and the differences between Amiga REXX and Colishaw's original specification. Beginners are advised to refer to this for a better explanation. ARexx programs use a resident process – that is, a program sitting in the background which applications use to communicate with ARexx. ARexx programs themselves are interpreted at run time in much the same way as one might start a CLI program.

Bluntly, ARexx is best viewed as a means to an end: that is to customise other software packages and produce, in effect, meta-applications based around them. Typical examples of software supporting ARexx interfaces are Superbase Professional (database), Cygnus Ed (text editor), SuperPlan and Advantage (spreadsheets). Since Commodore have been far-sighted enough to include ARexx with Workbench 2.0, this list should get longer; but only time will tell.

LOGO
Commodore £49.95,
included in 'Class Of The 90's' bundle

Quite where the name LOGO comes from is unclear. Inventor Seymore Papert designed it – like PASCAL – primarily for teaching purposes. LOGO's syntax is meant to encourage clear, logical thinking which should be present in anyone wishing to engage computing as a profession.

LOGO is best known for its "turtle graphics", a technique for creating a solid idea a child's mind can key on. It gives the teacher and child a common ground to communicate on. Giving movement commands to a turtle is something the child can envisage more easily than a graphics cursor. The idea of the poor turtle having a pen shoved through its shell has something psychologically doubtful about it. Moreover, with the current fad, "Teenage Mutant Ninja Turtles – Heroes In A Half-Shell" what next – "LOGO Turtles – Heroes Impaled On A Ball-Point"?

FORTH
Helios FORTH,
HB Marketing, £49.95

Invented by Charles Moore and Elizabeth Rather in the early '70s as a control language for radio telescopes, no less. Its name derives from the

Thanks to the following for their kind support:

GFA: 0734 794941 (GFA BASIC)
HB Marketing: 0753 686000 (FORTH, FORTRAN)
HiSoft: 0525 718181 (Hisoft BASIC + Extend, Devpac, Lattice Cv5)
Kuma Computers: 0734 844335 (K-Seka)
Mandarin Software: 0625 859333 (AMOS)
Micro APL: 071 922 8866 (APL 68000)
Precision Software: 081 330 7166 (ARexx)

For lack of space, faulty disks, problems with suppliers etc. the following have not being included: AC BASIC, F-BASIC, Power BASIC, AiRT, Manx C, Lattice C++, Cape 68K. Freeeow! The following may also be available, but Amiga Format could not find any suppliers: LISP and ALGOL.

inventors' belief it was a fourth-generation language. Unfortunately, the machine used to develop early compilers only allowed five-letter filenames – so the "u" was dropped, and the language was named.

Since then, FORTH has been adopted and evolved beyond the imagination of its inventors. At least two major support groups exist, The FORTH standards team and the FORTH Interest Group (FIG) each defining their own specification for how the language should behave. However, due to the design concept of FORTH, its is difficult to define a standard as such; only to define what words should exist. FORTH is an almost unique language in that it is completely defined in terms of itself.
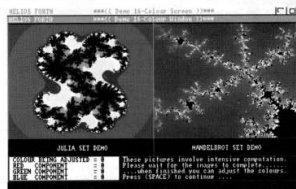
A FORTH program is no less than an extension of the language. Indeed, this has been further extended by advanced FORTH programmers who have used this concept to invent new, FORTH-like languages. At the time of writing HB Marketing, the only company known to be working on an Amiga FORTH, were unable to advise Format of a release date; expect it soonish, rather than later – watch this space...

■ Next month MARK SMIDDY examines more of the tools that programmers use to create

RIGHT: AREXX in action, using Cygnus Ed which supports it.

BELOW: This turtle has built himself a proper LOGO house...

BOTTOM: Helios FORTH shakes its funky stuff.

TRICKS WITH
Coppers

Here's your chance to find out a bit about multi-colour background shading – **PAUL OVERAA** looks at some of the underlying ideas!
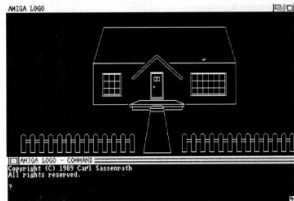
Intuition contains a wealth of tools for helping the programmer create good-looking and effective programs, so with a bit of care you can build programs which easily compete with the professional offerings! Gadgets, menus, requesters and their ilk look most effective if they are set against an appropriate background – so it's worth spending a bit of time experimenting in this area.

There are three basic approaches that can be used to provide a display background. Firstly you can 'draw' a picture using a program like DPaint and then read the resulting IFF file into your program to provide the necessary details. With this approach the single background picture can hold any information (program name, user instructions etc) which, in the final display, will not need to change.

Secondly, you can use graphics routines to build up a suitable background by writing directly into the display memory. And thirdly you can use the Amiga's co-processor, the 'Copper', to do the job.

This latter approach is used in hundreds of demos and in quite a few commercial programs as well. Many of them opt for a simple but effective horizontal background shading. To be honest I could give you half a dozen lines of C or assembler code and say this is how you can do it.

I could... but that approach is really only any use if you know what the hardware does and know how to generate the colour values anyway. I'll assume that since you're reading this article you don't know about such things and, because it's not going to be that obvious how the final C code works, I'll tackle the explanations right from first principles.

From the Top

The main problem has little to do with the Copper or the Amiga at all – it's to do with working out how best to generate series of cycling numbers. Admitedly these numbers, at the end of the day, will be jammed into colour registers – but as far as the underlying principles of the thing go that's neither here nor there.

Essentially we need to step through the lines of the display and change the colour as we go, using a scheme like this...

```
for ( i = 0; i<SCREENLINES; i=i+1 )
    {
    Identify new colour 'j' to be used
    Set line 'i' to colour 'j'
    }
```

The variable j must be kept within the range of colour numbers suitable for the screen. The obvious choice is to combine the changing value of i with a modulus function so that we generate a value of j which will always stay within the chosen limits.

```
for ( i = 0; i<SCREENLINES; i=i+1 )
    {
    j = i % n
    Set line 'i' to colour 'j'
    }
```

If n is set to 5 then j will take values from 0 to 4 and the colours used down the screen will follow this pattern... '0 1 2 3 4 0 1 2 3 4 0 1 2 3 4' and so on. In practise it's usually better to produce an oscillating sequence rather than a direct cycling sequence and so instead of generating the above pattern we'd opt for one based on a '0 1 2 3 4 3 2 1 0 1 2' type of arrangement. To do this we have to modify the generating function slightly. Here's one form which does the trick...

```
for (i=0; i<SCREENLINES; i=i+1)
    {
    if ((i/4) %2 == 0 ) { j=j+1; }
    else { j=j-1; }
    Set line 'i' to colour 'j'
    }
```

This code does produce the required result, but most programmers would use C's increment/decrement operators combined with an 'implied' test, so they'd write the loop like this...

```
for (i=0; i<SCREENLINES; i++)
    {
    if ((i/4) % 2) j—; else j++;
    Set line 'i' to colour 'j'
    }
```

Even this form can be improved by using the ternary operator ? to select the operation performed on j...

```
for (i=0;i<SCREENLINES;i++)
    {
    ((i/4) % 2) ?j— : j++;
    Set line 'i' to colour 'j'
    }
```

That's dealt with the calculation of the colour values, so now all we need to worry about is how to set a screen line to a particular colour.

One way of doing it would be to use a standard line drawing function, so we could use the graphics function SetAPen() to set the pen colour for
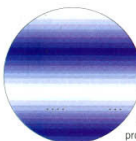
drawing, then use Move() to position the pen at the start of a screen line, and finally use the Draw() function to perform the actual line filling operation. If we added this type of code to our existing loop we'd end up with a typical shading routine – this example uses a screen's rastport pointer to completely fill a screen display with an oscillating colour pattern...

```
for (i=0;i<SCREENLINES;i++)
    {
    (i/4) % 2 ? - : i++;
    /* j selects the colour register */
    SetAPen(rastport_p,j);
    /* set APen to the selected colour */
    Move(rastport_p, 0, i);
    /* move to the start of the line */
    Draw(rastport_p, SCREENWIDTH, i);
    /* draw the line */
    }
```
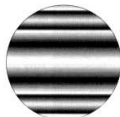
You can of course modify the amplitude of the oscillation range – the expression (i/n) % 2 ? - : i++; will oscillate between 0 and n inclusive. Secondly, you can add a fixed amount to the final i value produced – so that any given oscillating function can be made to select any chosen range of colour numbers.

Making the Most of the Amiga Hardware

On the Amiga we don't have to use routines like Move() and Draw() at all because we can use the Copper to jam colour values into the appropriate colour registers as the video beam moves down the screen.

To do this we have to build a list of copper instructions and then link this list into the screen's viewport. As you probably know the Copper has three instructions: WAIT, MOVE and SKIP. We'll be using WAIT, to wait for the video beam to reach a particular

screen line, and MOVE to force a colour value into a colour register. Where do we get the colour value? Well, since I've spent half this article talking about loops that can generate a suitable series of numbers we might as well use this approach to calculate our colours !

So, how do we actually do it? Here's a step-by-step account of the things that have to be done (I've skipped details of variable declarations etc., because you'll find all that on the disk example).

First we need space for a list of copper instructions. In the disk example I've used an AllocMem() call...

```
c=AllocMem(12L,MEMF_CHIPIMEMF_
PUBLICIMEMF_CLEAR);
```

Next, we make use of a system macro called CINIT to initialize our copper list memory...

```
CINIT(c,800L);
```

Now all that's needed are the Copper instructions themselves: I'm using a loop which works out the necessary instructions for each screenline, calculating the colour with a function similar to the oscillating lines we discussed earlier.

The CWAIT system macro creates copper instructions which say 'wait for the video beam position to reach co-ordinates (i,0)'. The CMOVE macro produces the instructions which jam the colour I've calculated into the background colour register (register 0).

The result of the following loop, therefore, is a list of Copper instructions which continually change the value of colour register 0 in the split seconds as the electron beam moves down the screen...

```
for (j=0;j<SCREENHEIGHT;j++)
    {
    (j/15) % 2 ? Blue-- : Blue++;
    CWAIT(c,j,0L);
    CMOVE(c,custom.color[0],Blue);
    }
```

Finally we terminate the Copper list with an impossible wait instruction (that's what the CEND system macro does), link our newly created Copper list into the viewport, and remake the display like this...

```
CEND(c);

global_viewport_p->UCopIns=c;

MakeScreen(global_screen_p);
RethinkDisplay();
```

So that's it: Grab some memory (or create a static list if you like), initialize it, use a loop to generate some 'wait and jam a colour into a register' instructions, link the list into the viewport, and then remake the display.

Once you know what you're doing you can squash the whole 'Copper list generation' thing into three or four lines of C code... so don't let anyone kid you that it's difficult!

You'll find a short C demo, called Coppertest, on the Coverdisk: The source code is called 'coppertest.c'. I've kept the code to the bare minimum... it just opens the required system resources, installs a copper list which modifies the background screen colour, and then hands back the resources it used and quits. ∎

JUST SOME OF THAT CODE!!!

```
/* *********** GENERAL CONSTANT DEFINITION STATEMENTS *********** */

#define INTUITION_VERSION 1 /* Zeros mean ANY library versions */
#define GRAPHICS_VERSION 0
#define SCREENFLAGS 4       /* Here we prepare to set up a high */
#define SCREENWIDTH 640     /* resolution Non-Interlaced screen */
#define SCREENHEIGHT 240    /* with 240 lines and 4 bitplanes */

/* ************* INCLUDE FILES ******************** */

#include <exec/types.h>
#include <exec/memory.h>
#include <intuition/intuition.h>
#include <graphics/gfxmacros.h>
#include <graphics/copper.h>
#include <hardware/custom.h>

/* *********** STRUCTURES FOR SCREEN AND WINDOW **************** */

struct NewScreen NewScreen = {
    0,0,                    /* top left */
    SCREENWIDTH,SCREENHEIGHT, /* width and height */
    SCREENPLANES,           /* depth, i.e. the number of bitplanes */
    1,0,                    /* detail and block pens */
    HIRES,                  /* ViewModes */
    CUSTOMSCREEN,
    NULL,                   /* Accept Default Font */
    NULL,                   /* No Title */
    NULL,                   /* No Gadgets */
    NULL,                   /* Pointer to the bitmap structure */
};

struct NewWindow NewWindow = {
    0,0,                    /* window XY origin relative to TopLeft of screen */
    SCREENWIDTH,SCREENHEIGHT, /* window width and height */
    -1,-1,                  /* detail and block pens same as screen */
    NULL,                   /* IDCMP flags */
    BORDERLESS,             /* other window flags */
    NULL,                   /* first gadget in gadget list */
    NULL,                   /* custom CHECKMARK imagery */
```

```
    NULL,                   /* window title */
    NULL,                   /* custom screen */
    NULL,                   /* custom bitmap */
    SCREENWIDTH,SCREENHEIGHT, /* minimum width and height */
    SCREENWIDTH,SCREENHEIGHT, /* maximum width and height */
    CUSTOMSCREEN
};

/* allocate and initialize some memory for a user copper list. I'll
assume, for this example, that the allocation won't fail... */

c=AllocMem(12L,MEMF_CHIP|MEMF_PUBLIC|MEMF_CLEAR); CINIT(c,800L);

/* here's the loop which sets up the user copper list... */

for (j=0;j<SCREENHEIGHT;j++)
    {
    (j/15) % 2 ? Blue-- : Blue++;
    CWAIT(c,j,0L);
    CMOVE(c,custom.color[0],Blue);
    }

CEND(c); global_viewport_p->UCopIns=c;

/* we now redo the display so the copper list comes into effect... */

MakeScreen(global_screen_p); RethinkDisplay();

/* finally we quit after a delay of about 5 seconds */

Delay(250L);

end_block();

exit(TRUE); /* Logical end of the program */
```
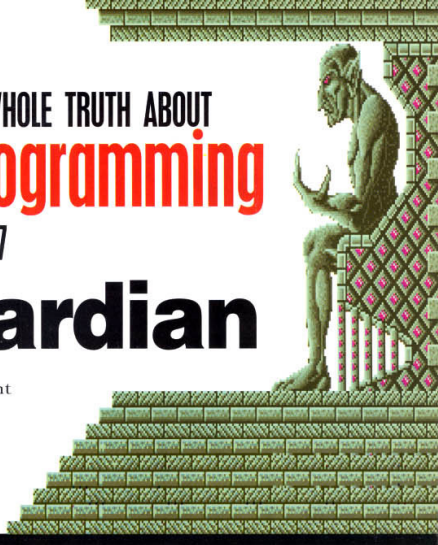
games programming

The **Guardian**

Here it is – the last instalment of *Menace, the game*! This month's source contains the addition of the guardian graphics and code.

T he guardian is simply made up of a few normal aliens, as described last month. It is not normally feasible to have a huge animated end guardian as it would require vast amounts of memory. The usual sacrifice is to have the main bulk of the guardian as a single bitmap, with bobs or sprites overlayed on top for the animating sections.

The classic *R-Type* did this in the end of Level One guardian where only the tail and a small part of the stomach were actually animated, but it was still pretty impressive. *Menace* is not that impressive, but it does demonstrate the usual technique.

Big Bad Boys

The pictures above and right show the guardians from Levels One and Five respectively. These are the *DPaint* screens. All guardians are 256 x 192 pixels in size. They are drawn on the right-hand edge of the screen in strips of 16 pixels, just as the map was. Rather than store them as a simple bitmap image (3 planes x 192 high x 32 bytes wide = 18432 bytes) a simple compression was used in order to save memory.

Each strip of 16 pixels was compressed by noting where all the zero words occurred and only storing the actual non-zero data. This was done by looking at the words from

> **"Then the 'death' path is initiated which ensures nobody takes a leisurely attitude when dealing with the guardian!"**

each plane of the image in succession from the top of a strip down to the bottom. If all three planes held no data (this happens a lot, as you can see from the figures) a single bit
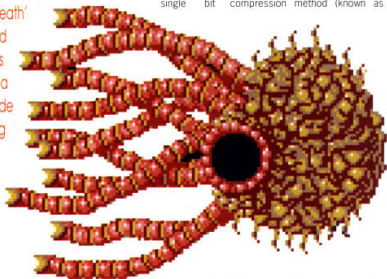
was stored to flag this, and no data was stored in the compressed file.

If any of the planes did contain data then this was flagged by a single bit, and the three words of data were copied to the compressed file. At the end of the strip (192 lines high) we will have only copied the non-zero

data to the compressed file, and will have 192 bits of data (24 bytes) to signify which line of the bitmap this particular data came from. This is a very simple but relatively quick compression method (known as a

'bitmap header', as we produce a map of bits to represent the data). It usually halves the size of the guardian data for each level.

Eye Holes

You can see in the picture above the 'hole' for the eye in the Level One guardian. The eye is simply a normal

alien following a standard path. The game knows when a level has been completed when this alien is destroyed. All aliens have a unique number so this is very easy to check.

The guardian bitmap image is drawn in the front playfield so all the aliens appear behind the image as with the foreground scenery. This allows aliens to 'appear' anywhere on the screen, but as long as they are behind the guardian it will not be noticeable. This is how the small 'tadpoles' on Level One guardian are repeated. Their path data simply makes them appear under one of the guardian tentacles, then swim left till they are offscreen, then go back to the tentacle; and so on. Nice and simple, but it works.

The guardian path is repeated for about 30 seconds, which should be enough time to kill the guardian. If it has not been killed in this time then the 'death' path is initiated in which case all the aliens are substituted for homing mines that cannot be destroyed. This ensures nobody takes a leisurely attitude when dealing with the guardian!

Death by Explosion

When you finally kill the guardian another alien path is started. This one, though, is not deadly, but is simply a collection of explosions all around the guardian body to give the effect of it exploding. This is no different from any other path data and shows that a flexible routine can be used in many places in a game, saving the task of writing more code for some effects.

And that is basically all the game ingredients covered. I have not presented all the 'extras' that go into a game as many are quite simple and others have been the result of many months' work and cannot be published, but I'll run over some of the main ones.

Disk Routines

Hmmm, the main reason for many sleepless nights for Amiga programmers! There are three basic levels to using the disk drives on the Amiga for reading/writing your data. AmigaDOS is by far the simplest, and is frequently used for development tools.

To use the DOS routines for a game requires that the operating system is fully intact. This causes severe performance and memory loss. The performance loss can be solved by using the framework given in the first article to disable then re-enable the system when you wish to use a DOS routine.

The memory loss due to the operating system, though, cannot be solved. You will typically lose 100 KBytes if you want to use DOS. This is a lot of memory to a programmer so the DOS route is not usually taken.

The trackdisk device is a set of Amiga system routines that allow you to access the disk as individual sectors. It is quite fast and can run with the minimum of the operating system being intact. Memory loss is still a problem, though, at around 50 KBytes, and once again you have to enable the system to use the track-disk routines. Providing you can work with this it is a useable alternative to the real hardware nitty gritty.

Getting right down to hardware register level is the lowest we can go. Come down to this level and you have complete control of the system and ALL the memory. Be warned though, MFM encoding, Precomp, SYNC words etc. are all tricky issues. In their individual ways they are quite straightforward, but the difficulty is in testing them all together.
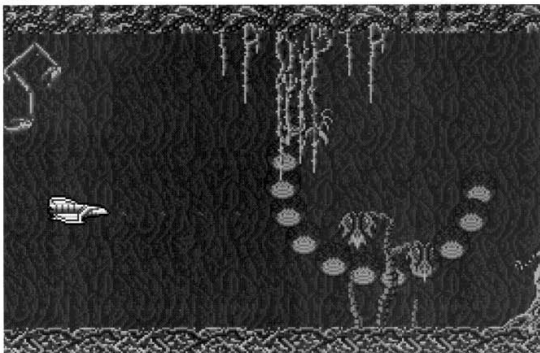
You cannot use a monitor such as Monam2 to debug, as this would require the system to be running, which would interfere with the code you are trying to test. The ideal situation is remote debugging (connecting two Amigas via the parallel port, as Devpac Professional allows) but this is quite expensive.

The method I used when first writing the disk routines was simple trial and error and many late nights. Luckily they only have to be written once. Once they are working simple refinements are all that is required. The Abacus book 'Amiga Disk Drives Inside and Out' has recently appeared on the market, which should prove to be a big help.

This is the only method to use if you want the full memory and complete control so it is well worth spending time writing some reliable disk routines for your game.

Music And Sound Effects

The music and sound effects for Menace were written by Dave Whittaker. His name is fairly well known for Amiga game music (other titles include Shadow Of The Beast and Xenon II). The ideal situation is to get the music written by someone like Dave, who does this for a living.

At the end of the day what you get for your money is the music and sound effects, for basically any machine you require, along with the code to play them, all supplied in a single module of data.

You simply call one of his routines from within your code, and off goes the music or sound effects etc. This makes life very simple for the game programmer, the music and effects usually only taking one day to be added to the game.

The Amiga, though, is well catered for in the music department. You may decide to write the music yourself with one of the standard packages such as SoundTracker or SoundFX. These popular programs have source code available to play the music that you create. You can therefore save some money by having a friend with a little musical ability, compose a track on one of these packages, then spend a little time on getting the player working in your own code.

These packages do not, however, cater for the playing of sound effects over the top of the music. A simple

> "a flexible routine can be used in many places in a game, saving the task of writing more code for some effects"

sample player is all that is really required to generate some effects, so the simple solution is to allow the game to have music or sound effects going, but maybe not both at once.

The main minus point about using a standard Amiga package is simply one of portability of the music. If, for instance, an ST version of the game is required then ideally the music writer and player you use on the Amiga should also be available on the ST. I believe that there is now a *SoundTracker* file player for the ST, so if you use that program this would solve your portability problem.
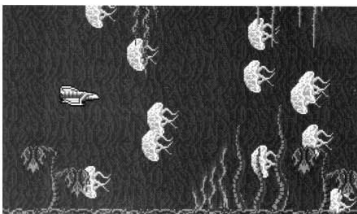
Memory wise, you should leave aside about 100 Kbytes for a decent soundtrack. It is possible to have a soundtrack that does not use samples, but generated instruments as used on the C64. Soundtracks that use this technique will quite easily fit within 10 Kbytes, but you obviously lose a little of the effect of good Amiga samples.

One point to bear in mind on the music front is one of playback speed. Most of the player routines are patched into the vertical blank routine, so on PAL machines the music is updated 50 times per second. This seems fine, but remember that the NTSC standard, as used in the States, updates 60 times per second. This means that the music will be 20% faster over there than over here. This can turn a good soundtrack into one that sounds a bit naff because it is too fast.

Your game should either use a timer to generate a 1/50th of a second interrupt, which will be the same on any machine, or detect which type of machine you are on (PAL/NTSC) and slow down the music accordingly. This is simply done by not calling the music routine every 6th vertical blank on an NTSC machine. Remember also that you have 20% LESS processor

time per frame on an NTSC machine. This can cause havoc if you write a game, designed to run in a single frame, that has not taken into account this loss of processor time.

All new Amigas with the fatter AGNUS chips now have the capability to be switched into 60 Hz mode. Monitors (and some TVs) can handle this, and ideally you should try to get access to one to test out your code on in 60 Hz mode. All Amiga games should also now start to accommodate this 60 Hz switch capability on a key press in a game.

Running your game in 60 Hz mode will result in the game playing 20% faster, and also filling the entire PAL display (even though the graphics may look a little stretched). PAL owners have always had this capability, and it is a nice feature to include in a game.

Intro Sequence

A nice rolling intro for the game can do wonders for its appeal. They add nothing to the game, but add a little variety to the package. A good intro to a game should be a piece of code that is technically and visually excellent, the sort of thing that is not really possible to implement in a game itself, but shows of some of the capabilities of the Amiga.

This sort of effect should also be added to the game should anyone eventually complete the game. It is a real letdown when you spend months playing a game, finally manage to finish it, and up pops a bit of text saying 'Well Done'. Programmers who do this should be shot (there is an animated sequence at the end of *Menace* and one after *Blood Money*, by the way, so I'm safe from the assassins for now!)

AND FINALLY...

TEXT ROUTINE

Try to design an impressive character set, maybe incorporating some copter tricks to jazz the text screens up a bit. If you are working on a monitor then keep in mind the TV users and don't have a small character set, they will probably not be able to read it.

HIGH SCORE TABLE

Most arcade style games need a high score table. They are usually pretty boring to write (this is usually the first routine to get delegated to new programmers!) A 'save to disk' option is usually a must.

DEMO MODE

Any game that has a self-play demo mode is much more likely to be loaded and displayed in a shop. It will also help when the game is shown at the multitude of computer shows throughout the year.

SERIAL/PARALLEL LINK

Many games are now incorporating these types of link for head-to-head action. Games like *Populous* and *Stunt Car Racer* really come into their own in this mode – they have cost us many a day's work! It really depends on if the game is suited to a two-player head-to-head, of course, shoot-em-ups generally are not, but there is always a first time for everything...

PROTECTION

Most programmers tend to implement various protection schemes of their own, although the disk duplicators can often offer their own techniques also. In my belief it is not possible to protect a disk 100% from being copied. The main aim is to DELAY as much as possible the inevitable 'cracked' copy appearing.

Most games tend to sell their strongest in the first month. Over a period of two years, 80% of the sales may well have happened in this first month. If you can therefore stall the pirates for as long as possible, people have a much better chance of seeing the game in their local shop, than suddenly appearing in the post from friends.

Adding protection can be a long and tiresome process. It is sad that it has to be done, but that is a topic we are all familiar with...

> *"Games like Populous and Stunt Car Racer really come into their own in head-to-head mode – they have cost us many a day's work!"*

On that sombre note I'll wrap up this series. I hope many of you have a go at some programming. It is possible to write games in your spare time as a hobby. You never know, it could lead to a full-time job. And as the old saying goes, "A man whose hobby is his job, is a very happy man" (circa. 1990 Dave Jones, DMA Design).

CHAMPIONS OF KRYNN

You've donned your armour, given yourself a ridiculous *nom-de-plume* and sat yourself down in front of your Amiga to set forth on your quest, only to fall foul of the first creature you meet. Don't despair – here are some hints along with a couple of lovely maps to help you on your way.

CHARACTERS

To achieve any level of success you really need to operate as a knight. The best combination of characters is usually Fighter, Knight, Ranger, Cleric, Red Mage and White Mage. When you first create a character choose the best character class, as all the other attributes can be modified on the main screen, including hit points.

THROTL TOWN

The Commandant at the outpost will request you to go to Throtl to save Camaron. Go to the town and head towards number (1) on the map, which is where Camaron is to be found. Beware of the first person you meet, since he's a spy. When he asks to join your band, show him the respect he deserves and attack him. Once he is out of the way you can head off towards Camaron, allowing anyone else who wishes to join to tag along.

When you find Camaron, he will tell you that you need to get a key, which is found at position (2). Once you have found the map, head up the main passage until you find the 'secret' passage. Go through and head for the temple located at position (3). Take out any hostile creatures you may encounter and head towards position (4) which is where you will find the stairs to the second level.

THE OGRE'S BASE

As soon as you enter the tomb, turn right and enter the first door on the right. Here you will receive some useful information. Always

GAME Busters

The summer months are upon us! Pop festivals are coming, the sea is calling and that weather is far too nice to ignore. But this last level is causing so many problems... Never mind! **MAFF EVANS**, the man with a map and a smile for every honest gameplayer, has a hatful of tips for all you despairing people.

try to be polite and greet any ogres you meet. The first few will attack you anyway, but don't get disheartened, as all the ogres will greet you afterwards.

Explore the camp thoroughly using the map and once you've checked everywhere go to the ogres' meeting at position (1). When they ask you, tell them about the assassins.
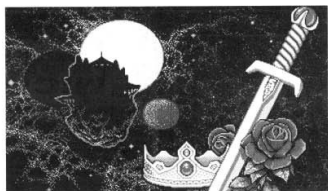
The letter you should have will corroborate your story, so they will consider you allies and join you for the big fight. Shouldn't do any harm to have such weight behind your ranks!

CARAVAN

Buy and ready the weapons you need and set off. Head towards Throtl and you will come across a caravan that is under attack from Draconions. Attack the marauders using magic whenever possible.

Once you have achieved a stunning victory, you will be asked to escort the woman back to the outpost. Agree to the task and once inside the outpost visit the hall to train your characters. Once

---

The Town of THROTL

STAIRS TO NEXT LEVEL

1 – Camaron's location

2 – Magical Key

3 – Temple, where main battle takes place

4 – Stairs to upper level

ENTRANCE
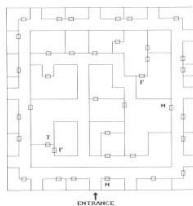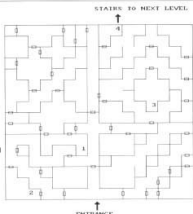
OGRE'S BASE

T – Treasure and experience points

F – Encounter with hostiles

N – Ogre's meeting for Main battle

M – Places that MUST be visited

ENTRANCE

your team has worked up enough of a sweat, it is time to go and visit the Commandant.

THE TOMB

Once all the training has been done and you've seen the Commandant, leave the outpost and head North-West where you will find the tomb.

Enter the tomb and undertake the tests of honour, fear and battle. Once you have completed the final test, you can leave the tomb. Watch out though, as you will meet and have to do battle with some Draconicons.
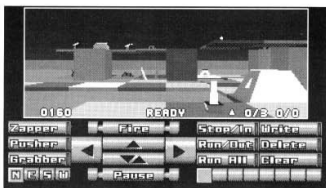
The hardest test you will be confronted with is the battle test. Always save the Knight for the tests and act as a true Knight does, taking the honourable option every time. For example, when you find the treasure room, don't try to steal anything!

The test of fear is simple. All you have to do is walk into the fire-rings. Don't worry even if your hit points are down to one, as you will be healed after the test.

Maps and hints sent in by Gandalf and Waz (?), Ringwood, Hampshire

TOWER OF BABEL

COVERDISK DEMO

Talk about being thrown in at the deep end (Okay – being thrown in at the deep end is an interesting expression, meaning either placed instantly in a difficult situation, or alternatively, taking it's more literal connotations... OH SHUT UP!), the Coverdisk demo of Microprose's superb 3D puzzle game was a tad on the difficult side. Oh all right it


```
0160        READY     0/3  0/0
Zapper    Fire      Stop/In  Write
Pusher    ▲ ▲       Run/Out  Delete
Grabber   ◄ ▼ ►     Run All  Clear
☐ M S ☐   Pause
```

was damned difficult! However it is possible, and we have the solution to prove it! Just follow these instructions along with the map to achieve success.

Move Zapper North one space to square G1.

Jump to Pusher and move forward two squares to H6 and press fire. The mine will now move to H4, where it can explode safely.

Turn Pusher to face North and press fire. The block in front of you will move forward to block the laser turret on square F8.

GROUND FLOOR

```
  1 2 3 4 5 6 7 8
A MP    K   H ⊙ ⊙
B       K
C      C
D       L
E    L
F      B B
G Z          L
H          B   L
```

Legend:
- Z / Zapper
- M / Mine
- K / Converter
- K / Klondike
- L / Lift
- Pusher
- LA / Laser
- B / Block
- H / Hopper
- MP / Mechanical Pusher

TOP FLOOR

```
  1 2 3 4 5 6 7 8
A MP  CB    LA
B         K L   K
C                LA
D              K
E    L
F
G
H
```

Legend:
- Grabber
- CB / Clear/Glass Block
- Platform/Tile
- Pillar
- Space (No Tile)

Tower of Babel demo – A Bad Day at the Office

Go back to Zapper and move North one space to F1.

Turn Pusher right to face East and move forward one space. Turn left to face North again and press fire. When the block stops sliding, press fire again to move it one square further, so that it protects Zapper by blocking off the next laser turret.

Move Zapper North again and turn right so that it faces East. Move forward five spaces to square E6. Go North one space, then East one space so that you

are on the lift at square D7. Press the up/down button (the one above pause) to ascend on the lift. Turn to the West and press fire to blast the laser turret into pieces.
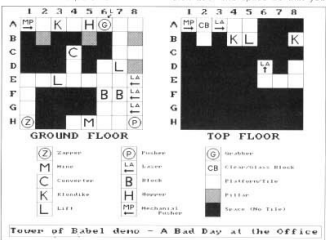
Switch control to Pusher and move to square H4. Turn to face North and wait for Hopper to bounce into view on the far side of the arena. Fire through the converter on square C4, which will change the push shot to a zap shot to destroy the Hopper.

Switch to Zapper and move to the lift on square E3. Go up the lift and face North. You will see a laser turret in front of you, but DON'T blast it just yet.

Go to Grabber and press the up/down button to go up on the lift. As soon as Grabber starts to rise, switch control to Zapper and press fire to send the turret into a mass of particles. As soon as you've loosed off a shot, switch back to Grabber (who should now be at the top of the lift) and quickly move one space to the West. You see a glass block moving towards you, but don't worry – it will stop before it crushes you! Turn to face West and press fire to grab the Klondike in front of you. Make an about face to look East and fire to grab another one. Hit the up/down button to descend on the lift and move North one square. Turn to the West and hit fire to grab the last Klondike. And there you have it – the level is complete.

If you have enjoyed this puzzle experience then Tower of Babel is now avai...STOP! That's quite enough of that, thank you VERY much!

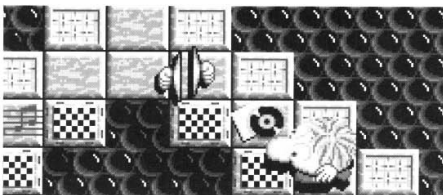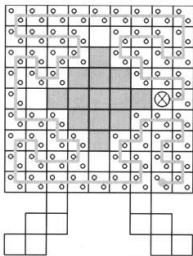**Robert Baker,
South Chailey, East Sussex**

SUPER CARS

Don't slimy car salesmen get up your nose? Ooh they think they're sooo clever! Super Cars has a slimy salesman, and he's particularly obnoxious. To deal with him you have to say the right thing at the right time. Stap me vitals! There's a coincidence! We just happen to have a list of all the responses you need to use! What a piece of luck!

Are you a scruffy piece of string?
Are you trying to take me for a sucker?
Are you trying to rip me off?

Can't we compromise?
Come on, we're both businessmen.
Could you reduce the price please?

Does it come with a guarantee?
Does it have a petrol tank?
Does it run on nuclear power?
Does it run on unleaded?
Does the imredifuidator work?
Don't be daft, frog face.
Don't make me laugh. *
Don't push me.

Go ahead punk, make my day.

Has the car got rust?
Have you got the time? *
Heads or tails? *
Hey, I'm paying cash you know.
Hmmm...I did want some extras also.
How about a round of golf?
How's the sub-frame?

I can't really find that much.
I could MURDER a curry.
I think it's started to rain.
I need a second mortgage.
I ought to knock your lights out.
I used to know your mother.
I'm a lumberjack.
Is it fitted with CAT?
Is that a wig you're wearing?
Is the car insured?
I've got a cat called Garfield.
I've got a garage.

Make me a better deal than that.

Not for a rustbucket like that.

That's a disgusting suit.
That's a fair profit margin.
This parrot is dead.

You got moths in your wallet?
You know you ain't half mean.
You're asking for a bunch of fives.

Ullo John, got a new motor?

What is the airspeed of a swallow?
Won't you take less?

Those responses that have an asterisk next to them are a bit iffy, and only work sometimes. If you do use them, cross your fingers and hope!

**Adam Powell,
Crowborough, East Sussex**

STUNT CAR RACER

Here are some tips on coping with various tracks for all you demon drivers out there!

LITTLE RAMP
Take the first corner at full belt and tackle the ramp at 150 mph.

HUMPBACK
Accelerate around to the hump, so that you reach 200 mph by the time you are half way up. At this speed you should have a fair jump and landing.

On the other ramps, keep either below 130 mph or over 180 mph. Anything between these speeds will result in heft damage. The rest of the track should be taken at a speed of something around 170 mph.

BIG RAMP
Take the first two small ramps at 170 mph, then get up to 210 mph for the main ramp. The rest of the course should be a doddle.

STEPPING STONES
Head down the starting straight at 110 mph and take the second gap at 100 mph. When you get to the steps, push up to 140 mph and nudge the speed up if it falls below 110 mph.

HIGH JUMP
Get up to 210 mph from the start

to clear the jump and keep under 200 mph for the small jump. You can tackle the slanted road in two ways – either keep at the top and keep the speed up, or give the car a nudge to the right every now and then. If you slip off, push fire and push forward and right instantly.

ROLLERCOASTER
Keep under 110 mph on the first hill, and you should take the bumps fairly easily. Remember – don't push too hard!

SKI JUMP
Keep below 100 mph up the first

F-29 RETALIATOR

There's nothing worse than finding yourself stranded in mid-mission with no weapons! To avoid this, simply enter your name on the enrolment screen as CIARAN, then load up your pilot's log.

The name should now read OCEAN OK. Now you can fly any mission with the benefit of infinite missiles and cannons.

**Bryn, Winston,
Bardsley, Oldham**

hill and on the second keep to around 140 mph, slowing down after the jump. For the big jump, get to 220 mph, but if you can't manage it just crawl around and you'll live.

DRAWBRIDGE
At the drawbridge, put the pedal to the floor when the bridge has gone down about halfway.

Tackle all the hills to the next ramp at 140 mph, then on the bumpy section head down the middle of the track at 170 mph. Lastly, get up to top speed for the down hill jump.

GENERAL HINTS
If you get stuck in a hole, drive slowly to the wall and accelerate with boost. You should hit the track or drive off the edge, minimising damage.

At the beginning of a race, accelerate and then pull left to block off the other driver – you may even manage to run him off the track completely.

**David Norfolk,
Watford, Hertfordshire**

CONQUEROR

Imagine the headlines... MEGA-WEAPON PACKING TANKS ARE DESTROYED BY MERE DUMMY COMPUTER ENEMIES. A bit on the embarrassing side, what? Well, to stop this from happening in Rainbow Arts' superb tank-battle simulator we have a shuftie at these official hints from the developers themselves (nothing but the best for Amiga Format readers, doncha know).

German tanks have a worse hill climbing ability than both American and Russian tanks. This point determines strengths for both divisions – if you're playing as the Germans, a good tactic is to wait at the top of hills and rush down at the enemy when they approach, whereas if you take control of the allies, then it's a good idea to escape by heading up the steepest hill, so as to slow down any tanks that are in pursuit.

The program actually works out the angle of incidence of any shot, and uses the data to calculate the most effective use of armour. Therefore an oblique shot on a tank will have more armour to penetrate than a 'square on' blast. So if you are under attack, try to make sure that the enemy have to fire angled shots, but if you are attacking, then try to get a good, straight (that is 90 degrees) shot to do the most damage.

Front armour is the best defence on all tanks, so always try to face the enemy straight on so as to present the toughest face for this reason, you should also try to attack enemy tanks' flank or rear where they are less protected.

One of the most sensible tactics to use (the computer player employs this) is to form the heavy tanks into groups and leave the light tanks to reconnoitre. This means that the lighter, faster tanks can act as your 'eyes', giving advance warning of enemy manoeuvres – they can also run away quickly! The tactic they use when under the auto-driver, is to run away from anything they can't shoot, reporting the sightings to your force. You can then move the heavy boys in tackle the situation.

When using map firing, always remember that any shells fired will take about 30 seconds to hit the ground, so try to judge where the enemy tanks will be when the missiles strike and aim your guns there. Be warned, however, that computer-controlled tanks don't look for map firing, so keep clear of the area until all the shells have landed.

Don't go for a whole bunch of heavy guns, instead try to build a balanced tank-force. Light tanks are useful for reconnaissance and also as an emergency reserve, whereas heavy tanks are good for straight head-to-head battles. Medium tanks combine the advantages of both light and heavy vehicles, but lack the speed and firepower of the others.

Don't forget to use your drone tanks! Direct one to hold an enemy tank's attention while driving your tank to their rear from where you can unleash a powerful attack. Watch out when doing this though, as the computer tank has two objectives – to both defend itself and attack any player tanks. Thus it will turn it's strongest armour towards the most powerful gun and take out the lightest enemy tanks.

THE TANKS

Different tanks are useful for different things, and experienced players will be able to utilise the individual strengths of each. Here are some notes on the strengths of some different tanks:

CHAFFEE – very fast and cheap.
M36 GMC – Also very fast and has a good gun, but does suffer from fairly weak armour.
SHERMAN FIREFLY – Good gun, medium speed capacity and quite adequate armour.
PERSHING – Has the same gun as the M36 with medium speed, but does have the advantage of good armour.

PANZER III – Very cheap, but not particularly good at any one thing.
PANTHER – Excellent front armour, but the side and rear armour are both on the weak side.

TIGER 1 – Excellent all-round armour and good gun.
KING TIGER – Best armour and gun of any tank, but travels slowly.

T34/76 – Good all-round armour (as with the other Russian tanks), good gun but has average speed.
KV1S – Better armour than the T34/76, but has the same gun.
KV85 – Is blessed with a better gun than the KV1S has.
JSII – Excellent armour and gun and has good mobility.

Thanks very much to those friendly folks at Rainbow Arts for these helpful bits of advice.
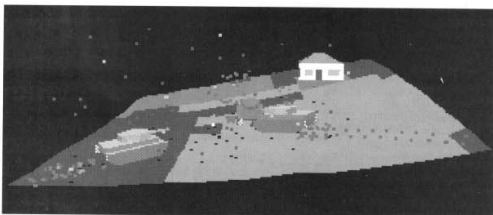
WINNERS!!

This month, prizes go out to Gandalf and his mate Waz for their *Champions of Krynn* stuff, and Robert Baker for his mega-useful *Tower of Babel* instructions (it made sure I could stop playing enough to get some sleep anyway!)

Being techno whizzes here at *Amiga Format*, we can stick IFF pictures straight from the Amiga into our Macs. So if anyone out there want's to send in maps drawn on *DeluxePaint*, then they may well find their works of art winning some dosh! Send any maps and tips to GAMEBUSTERS, *Amiga Format*, 30 Monmouth Street, Bath BA1 2AP. Oh and PLEASE include a phone number wherever possible – we may need to get in touch with you!

NINJA SPIRIT

Wails of frustration and keyboard bashing brought about this major cheat discovery. After losing badly, these poor readers tried to smash hell out of their Amiga, and happened upon this helpful item. Press F9 to pause and then press all the lettered keys in one go. The game will now restart without you having to press F10, but with the added bonuses of invincibility and infinite time. Can't be bad...unless you've got small hands and can't reach all the keys!

**R and T Parkhouse,
Basingstoke, Hampshire**
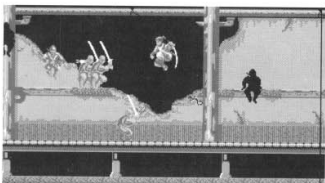
APB

Bored of pounding the same beat over and over again? Well if you push the firebutton and push forward on the joystick while the music is playing, you can select to start playing on any of the 16 levels. Now hit them streets, Officer Bob, and the best of luck ("mmmm-rrnnuurr... Thank you very much well done").

Matthew Gare, St Ouen, Jersey