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75p

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Author: John Hollis

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Author: John Hollis

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Author: John Hollis

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Author: Ian Andrew

SOFTWARE FOR THE ZX81 WITH 16K RAM

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"...very good..."

"...addictive game!"

(C. & V.G.).

Author: John Hollis

QS DEFENDA

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(Sync.).

Author: Nick Lambert

QS SCRAMBLE

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(PC.W.).

Author: Dave Edwards

QS INVADERS

"...just like the real thing!"

(C. & V.G.).

Author: Dave Edwards

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CROAKA-CRAWLA

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Author: John Field

Author: John Field

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Author: David Shea

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Author: John Edwards

16K or 48K Spectrum

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Features: Menu driven prompts given at all times. Drastic commands — e.g. Clear Text — are automatically questioned. Load/save commands... all text justified, on screen as well as printer.

Author: R. Baker

48K Spectrum

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Author: A. Morgan

ZX81 with 16K RAM

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Fast m/c action, will drive QS sound and character boards, responsive controls, high score tables.

Author: C. K. Tame

ZX81 with 16K RAM

3D BLACK STAR

Arcade action

Features: Fast 3D graphics, fast scoring, four types of target. Eight instrument displays, warp drive, resurging aliens, time limit, 17 levels of progressive difficulty, high score table.

Author: M. Sudworth

ZX81 with 16K RAM

DAMPER & GLOOPER

Arcade action

Features: Fast action, 5 dampers increase to 6 on later phases, 3 lives plus bonus lives, ever increasing speed, high score, stall frame features, spiral clear at end of games, bonus phase worth 5000 pts., high score save and display.

Author: R. Crane

ZX81 with 16K RAM

PIONEER TRAIL

A western adventure

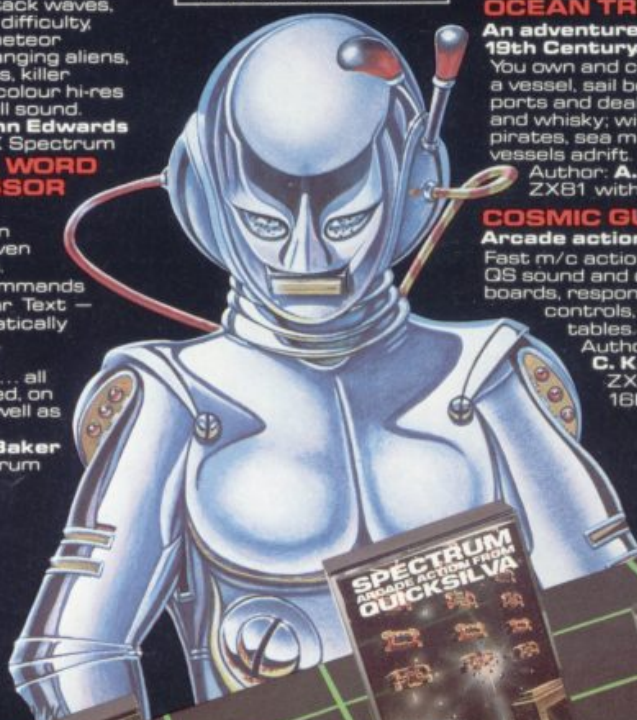
Features: 20 levels of play "Mind Game" plus shooting rifle speed uses all keys and is measured against the players personal average response. This game is based on historical data.

Author: Marion Stubbs.

ZX81 with 16K RAM

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News & Reviews

GAMES NEWS 16

Join in the Dark Crystal adventure, take part in a duel at midnight and reel back in horror at Thorn EMI's latest mutant sea monsters.

VIDEO SCREENS 20

Turn your VCS into a home computer. Phoenix versus Demon Attack, we make our choice. And two brand new games manufacturers exclusively revealed in these pages.

ARCADE ACTION 30

Three ways to notch up extra points in Pengo. Take a flight back into the past with Time Pilot and take Popeye through his spinach-munching adventures.

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Atari Defender is taken through its paces and compared to the arcade original. We also give Imagine's Schizoids a test run on the Spectrum

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Take to the test track in your turbocharged Atom and race away from the opposition in this all-action fast and furious four-wheeled fun-packed game.

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Experience all the ups and downs of slalom ski-ing — but without suffering the bruises and broken bones. Winter-sports for all you Texas T199/4a owners.

NUMBER PATCH 40

Have you got an appetite for numbers? Then this is the game for you. All you need is a snake and a Pet — or maybe a pet snake?



GROW WORM 64

This one wriggled its way out of our Atari 400/800 the other day and we've been trying to get rid of it ever since.

CANYON LANDER 68

What no space games this issue? Of course there's one! Out on a lost planet you are exploring a deep cavern. Cosmic challenge on the Spectrum.

GHOST'S REVENGE 72

Watch out Pacmen! The ghosts are on the loose and after you — and there are no more energy pills left! Fun for your Dragon.



DODGEMS 42

Take up the challenge of a time-trial in your sleek black ZX81. Can you set the fastest time? Watch out for the oil slicks!

DOCTOR VIC 48

This is our contribution to the National Health. You've read all those newspaper stories saying how computer games can make you ill — well this one tells you just how ill you are! For medical students with a Vic-20.

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MAD MAX 56

Motorway madness takes on a whole new meaning with this character in control. 100 mph action all the way on your Sharp.



Crystal clear...

So you want to get a head? Well there's a chance for everyone to win one on page 24 where we set out our Dark Crystal computer competition.

The competition invites you to show your creativity on a computer screen and map out a picture based on the movie.

There's another chance to take advantage of your programming expertise and make your name on television, by entering the BBC's very own young programmer competition.

The details are being outlined on the Get Set series on Saturday April 16th, or they can also be found on page five of this issue.

And the third competition to be associated with this magazine is on Trevor Truran's Puzzling column where Milton Bradley have put up three of their arcade theme board games as prizes.

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ames

'Ere! What's your GAME?

● Turn your programs into gold – with Virgin Games, a new computer software company, part of the Virgin Group and backed by all its resources. Our expertise is in marketing, merchandising and sales – in fact in all the aspects of turning software into cash.

● So, we are searching for exciting, entertaining and original programs (from software houses or individual programmers) for the following home computers – Atari, BBC, Commodore 64 and VIC 20, Dragon, ORIC 1, Sinclair ZX Spectrum and Texas Instruments 99/4A.

● If you have written a games program with good graphics, lots of action and an original concept and you want to be rich and famous – but you don't have the resources to market it properly yourself – send a cassette copy to Nick Alexander, Virgin Games, 61/63 Portobello Road, London W11. We will evaluate it and if we believe that it has good commercial potential, we will offer you a contract for it.

● We are also forming a team of first-class free-lance machine code programmers. If you are interested drop us a line with an example of your work.

● When sending us programs to evaluate, make sure that you enclose your name, full address and phone number, operating instructions and details of the computer it runs on. Make sure you keep a copy of the program yourself.

● We will only be taking on a limited number of programs so don't delay!

● Virgin Games Ltd, 61/63 Portobello Road, London W11. ● Tel: 01-221 7535.



NEXT MONTH!

Dare you look inside our little black box? It will be waiting to reveal all its mysteries within the pages of the next issue of *Computer and Video Games*. We also challenge you to find the promised land in our epic version of The Ten Commandments.

If that's too heavy for you then how about a day at Royal Ascot.

Home video gaming has really taken off in the U.S. and that craze is surging across the Atlantic.

Two exciting new machines, the Colecovision and the Vectrex will be in our shops by June with the long-awaited Atari 5200 following later.

Eugene Lacey has been keeping you up to date with developments in Video Screens, but in June we are adding a 20 page supplement featuring: reviews, interviews, news of the coming software, full colour pictures of the games on screen and a special competition for three video gamers to win five games cartridges of their choice.

When you've tackled Colecovision's own Zaxxon robot, even home computer gamers will take note.

LOOKING FOR SCREEN GEMS

Tune-in to the BBC's Get Set on Saturday April 16th and you will be invited to prove your programming talent.

Those of you who spotted Terry Pratt on the first Get Set on April 2nd will have another chance to see your favourite editor setting out the rules of a competition to find Britain's top young programmer.

If you have developed an original program for your personal microcomputer you should send it in as an entry for the Get Set Computer Program Competition.

All entries must be submitted on a cassette — save the program twice to help avoid loading difficulties. Make sure your full name, age, address and telephone number if you have one, are clearly printed on the cassette and on any documentation you send with it.

Post your entry to: Computer Program Competition, Room 5007, BBC Television, New Broadcasting House, Oxford Road, Manchester M60 1SJ. Not to *Computer & Video Games*, please!

Your program may then be featured on the Get Set series and you can tune in to see what the opposition is like as well. The rules are laid out below, so rush your entries in before the June 17th closing date.

RULES

1. The competition is open to all children residing in the UK who are under 16 years on July 1st 1983.
2. You may enter as many programs as you like but they must be your own

And there was my copy— all covered in garlic



In Transylvania you cannot always make it to the newsagents on the right day. Last 16th of the month, I couldn't get out 'till late and my newsagent had put a cross on his door. Well there hadn't been any plagues around (I talk to rats, I know these things) so I guessed he must be keeping my copy of *Computer & Video Games*.

Sure enough when I flew in the window, I saw my copy all covered in garlic — and it had Haunted House in it too! That's what I get for playing with my VIC all night, instead of terrorising the local peasants.

Anyway I had a little word just under my newsagent's ear and now we get on fine.

Have a word with your newsagent — fill in the form (right).

To my newsagent: Please deliver/ reserve me a copy of *Computer and Video Games* every month. Price 75p.

Name

Address

original work and not copies of any other program.

3. The programs can be for any personal microcomputer currently available in Britain and should be submitted on cassette. Every effort will be made to load all cassettes submitted but should this prove impossible the judges can accept no liability.
4. Prize winners will be announced on 'Get Set'. Winners will also be notified by post.
5. The judges decision will be final in all matters.

SAY GOODBYE TO SUSAN

This is the issue in which we magazine readers should say goodbye to Susan Cameron.

Susan, who has been with us since long before the first issue hit the newsagents and has personally answered more listing queries than any other living human, is not leaving Herbal Hill.

She moves to a new job on the Marketing and Publicity Department and will still be involved with organising competitions and exhibitions for this magazine and many others.

While we will still see a good deal of

Susan around the office, her name will not be appearing on the *C&VG* masthead any more. She will be replaced by Clare Edgeley, and I'm sure Clare will find the *C&VG* readership just as challenging as Susan did.

As a parting note we are offering six of our spare Vulcan Electronics' Hungarian Rings (see Puzzling page) to the six readers who come up with the best thank-you letter for all Susan's contributions over the past 18 months. We will make our selection on May 16th. The judge's decision is final and no relatives of Susan Cameron may enter.

CONFESSIONS OF A BUG

The trouble with being a Bug is that you'll get blamed for everything. Take Logger in the last issue where the end of line 134 was unclear in some copies.

I'm sure we'll get the blame for that, but anyway it should read 56 at the end of that line.

Skyscraper on the Dragon 32 had a problem with line 70. It should read
70 Z\$=INKEY\$:IF BD=0 AND Z\$=" " THEN 100 ELSE IF Z\$="↑" AND RA>0 THEN IF PO>64 THEN PRINT@PO,NP\$:PO=PO-32:RA=RA-1

ANIROG

SOFTWARE



XENO II

An E-XPANDED screen presentation with superb action packed space thriller, written entirely in machine code with four action packed stages. To destroy the power source of Xeno II, you have to fight off waves of robot attack, plasma bombing by the legions of the outer sanctum and finally attack the power source protected by a force field, continuous bombardment by guardians and blockading by wild whirling suicidal space ships. Truly a game for all arcadians.

JS 16K £7.90

CAVERN FIGHTER

All M/C version of SCRAMBLE. Lasers, bombs, continuous scoring and sound effects give all the thrills of arcade game. Pilot your space ship through the tortuous tunnels and caverns destroying enemy missile launchers, fuel dumps and airborne fire saucers. Four ships to complete mission. 10 skill levels.

KB/JS Unexp. £6

CRAWLER

All M/C version of Centipede. Homing spiders, mushroom laying fleas and multidirectional travel makes this game fast and furious, with 10 skill levels.

JS Unexp. £6

PHARAOH'S TOMB

Once you enter, the only way out is with the aid of a key which unlocks the mystery of the Pharaoh's tomb. Beware of the mantraps the ancient Egyptians so painstakingly built. One false move and you will meet the same fate as befell other tomb robbers over thousands of years. A multiscreen big graphical adventure with M/C movements.

KB 16K £6.00

SEVEN PROGRAMS (VOL 1)

Hi-res games for the whole family. Board game Othello plus Bomber, Slalom, Bounce out, Lunar Docker, Memory and Snake.

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DOTMAN

All M/C version of the popular arcade game. Excellent colour graphics and sound effects complete with fruits, tunnels, running and highest score.

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ZOK'S KINGDOM

Your starcruiser badly damaged in a meteor storm is forced to crash land on the planet ruled by ZOK, a time space generated image of Dracula. You are challenged to a battle of wits and endurance as the battle for survival starts in earnest in this big multi screen graphical adventure in hi-res graphics and M/C movements.

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SEVEN PROGRAMS (VOL 2)

Another Hi-res games pack for the family. Graphical Adventure, Goblins Gold, plus Dare Devil, Ghosts, Grand Prix, Breakout, Cobra and Minefield.

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KRAZY KONG

An E-XPANDED screen, large graphics, rolling barrels, hammer, fireballs, lifts, handbags and umbrellas as you try to rescue the damsel Kong has abducted. Spectacular collapse of Kong's lair in the fourth screen. Uses all 21K of your expanded Vic for this 100% M/C thriller. Complete with high score table.

KB/JS 16K £7.90

GALACTIC ABDUCTORS

New arcade game with fully EXPANDED screen. Space hawks are abducting the humanoids and also dropping eggs. A big 16K action packed arcade thriller in 100% machine code, Hi-res graphics and multi skill levels.

JS 16K £7.90

FROGRUN

Popular arcade game. All machine code with brilliant colour graphics and sound effect. Features include snakes, crocodiles, lady frogs, turtles, cars, lorries and logs.

KB/JS Unexp. £6

DRACULA

Count Dracula is asleep somewhere in his castle. He rises at midnight and you must find him and drive a stake through his heart before he rises. A multi-screen graphic adventure.

KB 3K £6

TINY TOT'S SEVEN

Super games pack for younger children with bright colour graphics and sound effects. Everybody's favourite Simon plus Super Snap, O's and X's, Word Jumble, Bomber, Duck Shoot and Mad Drivers.

KB Unexp. £6.00

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We are looking for top class writers to join our growing software team. If you have written a quality game for VIC 20, SPECTRUM, DRAGON 32, ORIC 1 or COM-MODORE 64, then contact us. We pay top royalties for accepted programmes.



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THE WORLD OF PIMANIA

Dear Sir,
I have been playing Pimania and I think I've drawn up a diagram of the system of Pimania! Is the sundial on this planet or is it somewhere in space?

Barry Jones,
Croydon,
Surrey.

Editor's reply: It is possible that your diagram is complete, but we don't think you have yet passed through the Ultimate Gate of Pi, otherwise, the reality of the location of the Golden Sundial would have been revealed to you.

Don't simply travel around the world of Pimania. Talk to the Pi-man and do as many different things as you can think of. Don't be afraid to communicate through your keyboard.

BACK WITH THE DEBATE

Dear Sir,
I hope to add to the Spectrum Vs. BBC debate, and hopefully please both sides.

I believe it is silly for Clive Sinclair, or anyone else for that matter to compare the two machines.

They are entirely different machines aiming at different markets, and should be kept so.

I own a Spectrum and have also used my school's BBC, and I was impressed by both machines.

The Spectrum is the world's best home computer for under £200 and the BBC is the best for over £200, and never the twain shall meet.

M. N. Jackson,
Camberley,
Surrey.



FAMOUS LAST WORDS . . .

Dear Sir,

Hopefully this letter will end the BBC versus Spectrum conflict — which I am sure most people are bored with.

I must agree with many of the points raised by David McKeran in the March issue in comparing the two. However I do not feel that the BBC and the Spectrum can be compared considering the obvious differences between the two machines.

The BBC micro is an excellent machine exceeding the Spectrum in most areas and the buyer is certainly getting his money's worth — but the same can be said of the Spectrum. This is the crunch of the problem. Most people cannot afford a BBC micro. I would certainly like to own the more powerful BBC but have to settle, for the time being, as David McKeran put it, with "the jack-of-all-trades" with which I must add I am completely satisfied!

For all the pros and cons of every computer we should be

grateful for the chance we have in this country to be in the forefront of home computing and the opportunity to purchase an exciting and rewarding hobby.

Stephen Challis,
Exmouth,
Devon

Editor's reply: And with this letter we draw to a close the Spectrum v. BBC debate. 'Nuff said, OK?

PRAISE FROM ATARI FAN

Dear Sir,

I have been the proud owner of an Atari 400 computer for over a year now, and have been thrilled with your magazine. Recently we have had some fantastic programs, such as Submarine Hunter, Wordfind, Air Attack and most recently Over the Orchard Wall. Full marks to you and all these authors!

James L. Campbell,
Bramley,
Surrey.

MORE ON THE ICE VENDOR

Dear Sir,

In your February issue of *Computer and Video Games* a reader complained about a PET/Apple program, Ice Cream Vendor from the November issue.

I was surprised to see that you didn't correct him. Deleting the "VTAB 10" could not possibly work the way it was meant to, because "VTAB 10" on the Apple means (as far as I know) slip 10 lines. So that the Pet version should read: 10 PRINT"/then cursor down/ten cursor right/"**

Njal Fisketj  n
Stavanger,
Norway.

DISAPPOINTED BY GORILLA...

Dear Sir,

I am writing about the C TECH Krazy Kong. When my copy finally arrived — after a month of waiting — I was shocked. The game I got was either terribly bug ridden (which I doubt) or the advert is designed to mislead.

The game is supposed to be for the 16K or the 48K but in actual fact there are two versions. The 16K one is second on the tape and takes about 15 minutes to load because you must run through the 48K version first.

The game is so fast that it is unplayable but only the 48K version has scoring. I was very disappointed and I am going to send it back.

Iain Reddick,
Kirkaldy,
Fife.

SPRITES KEEP SMOOTH

Dear Sir,

Many thanks for your recent listings for the TI 99/4a computer which show the excellence of this underrated machine.

The ability to have 28 independently programmable SPRITES (smoothly moving graphics characters) and a "transport" colour, allowing characters to move across each other, makes the simulation of arcade games a simple matter in TI extended Basic.

The new Commodore 64 proudly boasts only eight SPRITES, whilst the Atari equivalent "player missiles" are notoriously difficult to program.

Keep up the good work!
D. A. Johnson,
Acklam,
Middlesbrough.





NEW SPECTRUM SOFTWARE

48K SPECTRUM Super Spy

An exciting espionage adventure in which you follow the villain's trail through complex puzzles, coded messages and 3-D mazes. With different solutions every game Super Spy will keep you entertained for weeks! Full 'save' routine. **£6.50**

48K SPECTRUM Everest Ascent

Stake your claim to the Top of the World in this gripping vertical adventure in which you aim to conquer the 29,141' summit of the world's highest peak.

Struggle from base camp to base camp in defiance of all the obstacles which man and nature can throw at you! Survive intense cold as you watch out for avalanches, thin ice and, of course, abominable snowmen! Cope with wayward Sherpas and cross bottomless crevasses but remember to watch your oxygen supply! A game of skill, cunning, bravery and daring for those with a head for heights! **£6.50.**

48K SPECTRUM Transylvanian Tower

A spine-chilling adventure with spectacular 3-D graphics. Can you rid the world of Count Dracula before he introduces you to the dark world of the living dead? Horror film addicts will know most of the moves, but we've also added a few of our own! Can you discover the mystery of the turret and escape with its treasures?

Enter via the dungeons and work your way up to the terrifying top! Find objects to help you whilst exploring the 500 rooms – all in exciting 3-D detail – but watch out for the bats.

Give your Spectrum a bite of the action now! Includes full save routine for use during the daylight hours! **£6.50**

Now available from selected branches of W.H. Smith & Son Ltd.



16K SPECTRUM Ship of the Line

An Adventurous Management Game

Command a 17th Century sailing ship... win victories for Britain... juggle your supplies, manpower and ammunition... fearlessly battle your way up the ranks... and finally achieve promotion to First Sea Lord, but beware... it won't be easy! Encounter and engage enemy fleets... survive sunstroke, fever and famine... endure fire, fog and thirst... then... when you think you've done well... rush back to Port for promotion! With full colour, ship graphics and sound... **£4.95**

For credit card orders
please ring 0628 21107.



48K SPECTRUM

Ship of the Line

48K version features the chance to send out boarding parties, to build up prize money, to take intelligence tests and to bribe your way up the admiralty ladder! This greatly extended version of Ship of the Line really makes the most of your extra memory. **£6.50**

16K ZX81

Bargain Bytes Cassette One

Deep Sea Adventure * Bank Account * Underground Adventure * Depthcharge * Hangman * Loan Calculator * Codebreaker * Foreign Currency Calculator. A genuine bargain!

Eight interesting programs for just **£5.00**

16K ZX81

Bargain Bytes Cassette Two

Stock Market Game * Seafaring Adventure * Jackpot * OXO * Financial Model * Ski Run * General Knowledge Quiz * Copycat.

Too many programs to describe for only **£5.00**

Ideal as a ZX81 Starter Pack!

48K SPECTRUM

Multi Function Cash Controller

If you want to make your machine work for you, this is an ideal program...

Cash Controller has four basic functions; it keeps your Bank Account in order, it looks after your Home Budgeting, it calculates loan interest and repayments, and finally it checks your mortgage for you. In addition, it only lets you into the program by means of your own secret password which you personally choose. Once you've allocated budget headings, any transactions you put through the Bank Account will automatically be taken into account on your budgets.

Using a Sinclair printer, hard copy statements can be produced running from any date to any date; much more versatile than your regular bank statement! This program has been carefully crash-proofed to prevent a minor error from scrambling the existing data, and comes with clear on-screen instructions plus full printed notes to help you on your way. Finally, it holds up to 200 bank transactions and fills up most of the memory of your 48K Spectrum. **£10.00**

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MAILBAG



BACK ON THE WARPATH

Dear Sir,
I am having problems with your Warpath program in the Jan/Feb 83 issues of C&VG.

I own the following hardware: TRS-80 Model 1, Level 2 and expansion interface, 48K RAM, one TRS-80 5.5 inch mini-disc-drive with TRSDOS, one TRS-80 line printer VII, one CTR-80 cassette recorder.

Under level 2 your program runs without a hitch but I typed it in with Disc Basic 2.2 loaded and it keeps throwing up out of memory in 760 or 770 when I run it. I think it is a problem with the poke statements in line 190 that seems to be causing the trouble.

Can you please advise me if and how the program can be run under Disc Basic as I would prefer to save my programs on disc instead of tape and the disc manual isn't very informative on changing level 2 to Disc Basic.

I've tried everything I can think of but with no results, I've found that the clear 100 statement at the beginning of 760 and 770 are the problem.

I would appreciate any help you can give me in getting this program to run.
R. J. Evans,
Brize Norton,
Oxfordshire.

Ron Potkin replies: You are right. Line 190 is a way to set the memory size so that you do not have to remember the number each time you run the program. You will see that it is set to 27300 to protect the BIGSCREEN, IBOARD etc, but Disc Basic loads the program starting from location 28672.

This means that there is no memory available and an "Out of Memory" error is encountered in line 770. Ideally the program should be written in such a manner that it will run wherever it is located, but unfortunately shortage of memory made it impossible.

You should make the adjustments shown right. The effect is to move the program 16384 bytes up in memory. Please be careful

with line 860. Part 2 requires a RETURN but the coding following the remark must be introduced for part 3.

It is worth noting why the changes are necessary: You cannot POKE 16526/7 to denote the machine language address in Disc Basic. The DEFUSR command must be used.

This is a great improvement because now we can define all the addresses when the program is initialised.

Most addresses are now greater than 32768 and they must be adjusted by deducting 65536 before they



can be poked. In line 770, I have defined a function which makes this calculation.

Some addresses are within the machine language routines and the DATA must be adjusted.

The coding below up to line 1160 is all that is required to adjust Warpath. However, the DATA only covers parts 1 to 5. There is some more machine language to come and I shall include these changes at a future date.

```
Warpath - Upgrade to Disk Basic
760 CLEAR100:P=-21852:U=16561:GOSUB190
770 CLEAR100:CLS:DEFINTB,I-V,X-Z:DEFSTR$A,C-H:DEFDBLW:RANDOM:DEFEND(R)
190 R=PAND255:POKEU,R:POKEU+1,-256*(P/256)+(P-R)/256:RETURN
390 SP=USR1(NL+0):RETURN
420 SP=USR1(NL+0):RETURN
440 X=FND(PEEK(VARPTR(X*(V))+2)*256+PEEK(VARPTR(X*(V))+1)):RETURN
450 NX=USR4(BL):IFPEEK(S9)>255:THEN$20:ELSEN$=0:RETURN
)=CINT(R/65536*(R/32767))
860 RETURN 'K=1:1:R3=2 'DELETE RETURN AND ' IN PART3
980 RESTORE1L=FND(8HAB98):FORI=1:TO12:READK:GOSUB90:IL=L+2:NEXT
990 L=FND(8HAB8C):FORI=1:TO6:READVF(I):K=VF(I):GOSUB90:IL=L+2:NEXT
1100
M9=FND(8HAC35):B0=FND(8HBB85):S9=FND(8HEF5D):R0=S9+1:RU=R0+12:SK=FND(8HAB8B):SS=SK-5:SB=SK-9:TB=FND(8HAA00)
1130 V=16:GOSUB440:DEFUSR7=X:POKEI,195:U=I+1:P=X+9:GOSUB190:I=I+3
1140 V=1:GOSUB440:DEFUSR1=X:U=X+196:P=RU:GOSUB190:U=U+22:GOSUB190
1150 V=4:GOSUB440:DEFUSR4=X:U=X+36:P=S9+1:GOSUB190
1160 V=3:GOSUB440:DEFUSR3=X:K9=USR3(0)
2500 'DELETE THIS LINE
3007 DATA FD,E5,D1,E1,7C,E6,0F,67,C1,E5,05,21,35,AC,19,EB
3018 DATA 21,17,AC,11,18,AC,01,28,13,36,80,ED,B0,21,B5,BB
3019 DATA 11,B6,BB,0E,63,36,63,ED,B0,21,F9,BE,11,FA,BE,0E
3020 DATA 63,36,63,ED,B0,21,29,EC,06,1E,C5,06,08,36,63,23
4005 CS$="...21611 3810 5825"
```

LETTER FROM AMERICA?

Dear Gentlepeople,
I'm in London on vacation (holiday?) and picked up your magazine out of curiosity as to what was available in programs over here.

Although I found it very informative and of generally high quality, what prompted me to write was your answer to J. Mansfield (March 83, page 9) and some data of which you might not be aware.

I've owned an Apple II now for about three years. In the owner's manual they describe something called a "Eurapple" conversion. As I recall, all it involved was shorting together two pads on one of the circuit boards to convert the machine to 50Hz.

The power supply which was standard when I made my purchase is usable with both 110V ac and 220V ac without the need for a voltage transformer.

The Apple, therefore, can be powered either here or there without costly hardware, or even very much effort.

As to the output, well, the Apple is designed to drive a monitor. To enable it to drive a TV set requires the installation of an RF modulator. Mine was about \$45 when I bought it in 1980 (roughly £30 at today's rate). I can't speak as an authority here, but it seems to me that all one would need to drive a

British set is a different value choke.

Obviously, everything I've said applies only to the Apple, and I am speaking from memory — my Apple owner's manual is about six feet from my typewriter and my typewriter is 8,000 miles away! — but I'm reasonably sure that the facts are as I've stated them.

And, given the reputation of the companies that have recently introduced microcomputers at home (eg DEC and IBM), I would be amazed if there weren't others similarly equipped.

So I'd advise looking around a little. It may not be as hard to find a machine that will work both in Europe and America as it at first appears.

Dan Miller,
San Leandro,
California,
USA

DON'T DROP THE ATOM!

Dear Sir,
Until now, *Computer and Video Games* has always had an Acorn Atom program, most of which I have enjoyed, but the December issue did not! Therefore as the owner of an Atom I would like to know whether this is going to be a regular occurrence — replacing "older" computers with the latest ones.

Please remember that many people have older computers and don't want to see them pushed into the background by newer ones.

Before I renew my subscription I would like to have an idea if I am going to be paying for other programs and not have one for my Atom — although I have modified some others for it.

M. Morrison,
Aberdeen,
Scotland.

Editor's reply: As you have noticed, Mr Morrison, the micro market is becoming very crowded. Current limitations on space for program listings in our magazine will mean that a computer will have to be dropped from time to time. However we do plan to continue to support the Atom, with listings, news and reviews.

missile-panic



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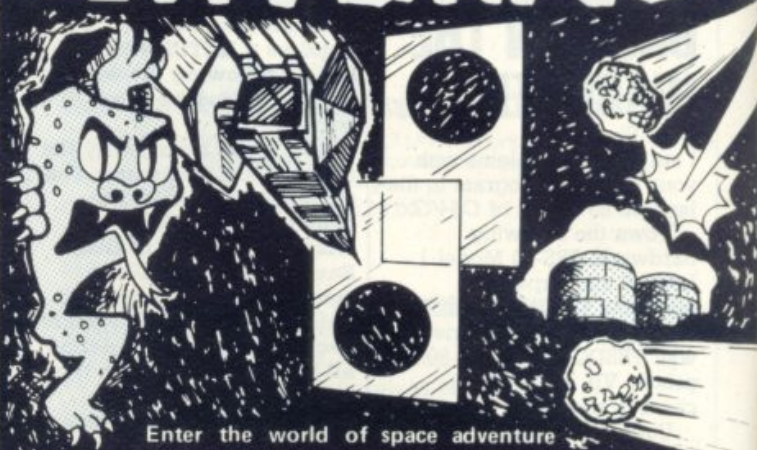
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11

Spectrum

NEWS from SPECTRUM

BBC

Now from SPECTRUM the outstanding BBC 'B' machine plus, Disk Drives & software see ad. opposite for details.

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Now from your local Spectrum dealer -
the famous

BBC Model 'B' MICRO



Yes, this top selling Micro system is now available from your local SPECTRUM dealer - the BBC Model 'B' offering 32K RAM plus a full back-up of peripherals & software too! It's an infinitely expandable machine, ideal for the home or business and is already widely used for educational purposes in schools - so the chances are your children may already be well familiar with its operation, which must make it the ideal choice for the home too! So if you're thinking of buying a micro you must take a look at the BBC at your local SPECTRUM dealer NOW! - but just one word of warning, initially stocks will be limited and demand is bound to be great, so please phone to check the stock position before making a journey.

BBC 'B' with Disk Interface

£470.50

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Wide range of software available

ORIC-1



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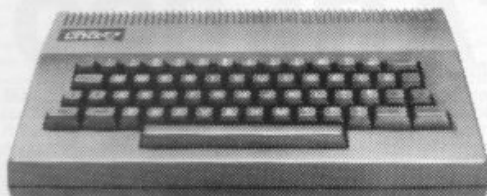
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LYNX



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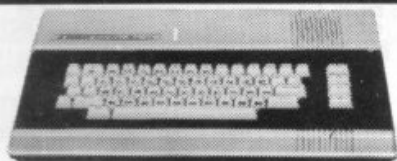
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VISCOUNT - Teach yourself LYNX BASIC £6.95

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Text Screen..... 24x30
High Resolution..... 265x248
Cassette Lead..... Included

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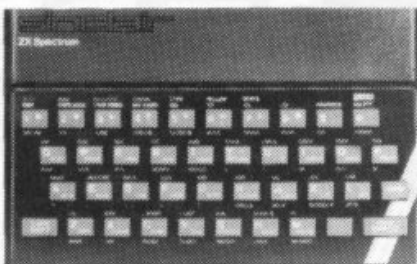
COLOUR GENIE ACCESSORIES

Joysticks..... £49.49
16K RAM..... £38.50
Printer Interface..... £39.95
VISCOUNT Teach yourself Colour Genie Basic..... £6.95

SPECTRUM FACTS

Maximum user RAM..... 14,200 Bytes (approx)
Text screen..... 24x40
High Resolution..... 160x90
Cassette Lead..... Included

SINCLAIR ZX SPECTRUM



Yes, this top selling micro is now available from Spectrum in both 16K and 48K RAM. So now there's no need to send by Mail Order - just call into your local SPECTRUM dealer and pick one up. But just one word of warning: with this added availability advantage, stocks are bound to sell fast - so make it soon!

SINCLAIR ZX SPECTRUM 16K - £125.00
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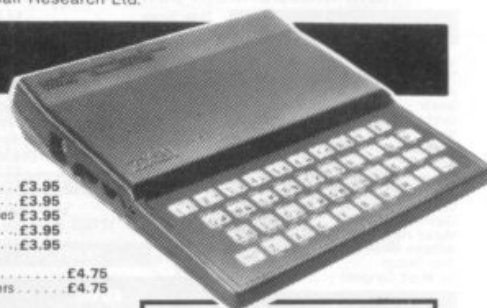
Spectrum Computer Centres have no connection whatsoever with the ZX-Spectrum Computer manufactured by Sinclair Research Ltd.

SINCLAIR ZX-81

SINCLAIR ZX . . . £49.95
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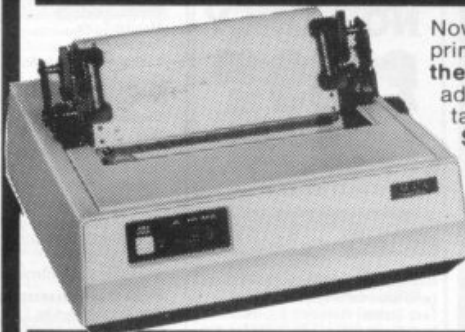
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16K RAM PACK
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OKI MICROLINE Printers



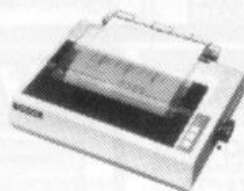
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SPECTRUM FACTS
Maximum user RAM 37,899 Bytes
Text Screen 24 x 40
High Resolution 320 x 192
Cassette Lead Needs own Recorder

ATARI 400 16K RAM



NOW ONLY
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BASIC cartridge extra
£39.99 inc. VAT
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SPECTRUM FACTS

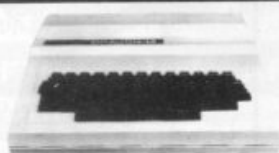
Maximum user RAM 13,323 Bytes
(with basic Cartridge)
Text Screen 24 x 40
High Resolution 320 x 192
Cassette Lead Needs own Recorder

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£299.00 INC. VAT

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Spectrum LOW price **£199.95**

VISCOUNT Teach yourself Dragon Basic. £6.95

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Maximum user RAM 29,679 Bytes
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High Resolution 256x192
Cassette Lead Included

JUPITER ACE



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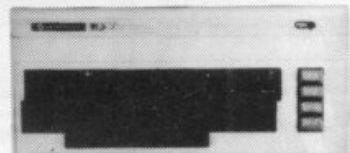
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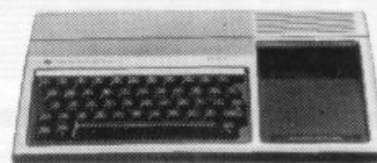
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STAFFORD

NEW PRODUCTS NEW PRODUCTS NEW PRODUCTS NEW PRODUCTS GAMES NEWS

NOW YOUNG BLADES GO FOR IT!

SWORDFIGHT

In days of old when men were bold and problem pages hadn't been invented, men fought to the death for the hand of a fair lady.

Romantic Spectrum owners can now battle it out for the favours of the belle of the local computer club with this latest sword fighting simulation.

The game is for two players at the same time using the left and right hand sides of the keyboard.

Comprehensive sword controls enable you to parry, cut, thrust, and move left or right.

When a fight is over — one of the players will either have died or surrendered — the program gives you an action replay to show the vanquished cavalier where he went wrong.

The dual is fought over a limited time. If nobody is killed in this period the match is drawn.

Swordfight at Midnight runs on Sinclair Spectrum in 16 or 48K and costs £4.95 from Firefly Software plus 35 postage.

Firefly is a new software house set up by four sixth-formers from Foxley Lane, Binfield, Berkshire.

AUTOMATA'S GREATEST 1K HITS!

BEST TASTE

Best Possible Taste is the latest release from the authors of Pimania — the game with the £6,000 prize.

It is a compilation of some of Automata's best known 1K ZX81 games featuring classics like Noah's Ark, Lies, Reagan, Merry Xmas, Royal Flash.

Thirty games in total are featured on this cassette, all for £5. Pimania fans will also be pleased to learn that a sequel is currently under development.

The prize will be a trip to America for two and a meeting with a mystery Hollywood star whose name is hidden some-



where in the game. The person who discovers the identity of the mystery star will be the lucky winner.

Curiously titled My Name is Uncle Groucho, You Win a Fat Cigar, the game will be available towards the end of May.

YOU'LL GO APE OVER KONG...

CRAZY KONG

Cripes! The gorilla's got my goil! What am I gonna do now? He's taken her to the top of the steel fortress!

Pull yourself together you chicken-hearted carpenter. Put down your tools and get up there and rescue your sweetheart!

This little domestic tale is familiar to all arcadesters and a few pubsters too now it can now be witnessed on the screen of your Vic-20.

This latest game from Interceptor Micros takes some of the action from the three screen arcade version of Donkey Kong and puts it all together in a one screen compilation.

Crazy Kong comes complete in a video film style cassette holder and is available from the Hampshire-based firm at £6.

Also new from Interceptor this month is a shoot 'em up space game with a weird and wonderful assortment of aliens called Fantazia, also available at £6.

ATTACK OF THE MUTANT WHAT?

CAMELS

This year's prize for the computer game with the zaniest name has got to go to Llamasoft's new Commodore 64 game Attack of the Mutant Camels.

Cunning aliens, having observed the disastrous attempts of fleets of space-ships to invade Earth, have hatched a more devious plot.

Those normally docile desert beasts, — camels, have been transformed by genetic engineering into 90 foot high, laser spitting, neutronium shielded Death Camels.

Your mission is to rid the desert of these mutants before they build up sufficient numbers to take over the world.

You are armed with a powerful cannon and the long range scanners show you the whereabouts of the camels.

Despite your heavy fire-power you will have to score several direct hits on the camels neutronium shields before they are immobilised. Once this has been achieved you can move in for the kill.

But you'd better be quick, for if any of the camels manage to march to the extreme right of your scanner Earth base will blow your ship to bits by remote control. Failure is punished by death.

Your ship has considerable manoeuvrability which you will need to utilise to the full in order to dodge the camels laser fire and "nasty" bombs.

Attack of the Mutant Camels is available from the Basingstoke-based firm at £8.50. Camels is one of a range of Llamasoft games for the Commodore 64.

FAST FOOD FOR HUNGRY MAZE FANS

GOBBLERS

If you are hungry for a new Atari game then Gobblers and Goblins may be just the game to satisfy your appetite.

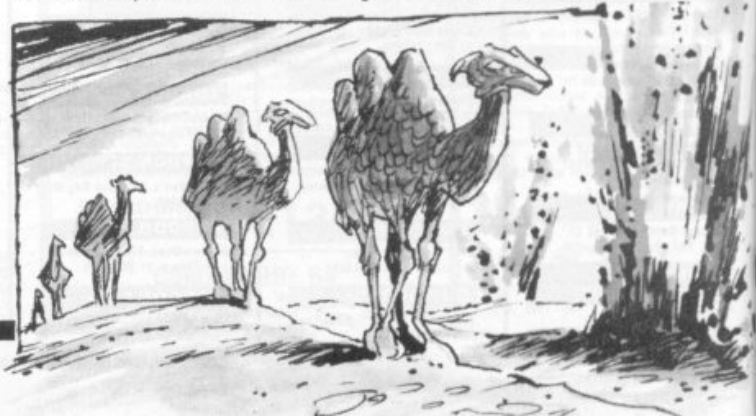
Bananas, cherries, hamburgers and milk-shakes are all presented for consumption by your little gobbler, controlled with a joystick.

A constantly changing maze is created by the appearance of the goblins whom you must avoid at all costs.

If you inadvertently eat one of these goblins you will drop dead on the spot and an ambulance will appear to carry you off screen.

Gobblers and Goblins is the latest game from Allrian software of Hayes.

It runs on the Atari 400 and 800 in 16k and is available from the Middlesex-based firm at £15.50 for cassette, and £18.95 on disc.



NEW PRODUCTS NEW PRODUCTS NEW PRODUCTS NEW GAMES NEWS

STICKING WITH THE WINNERS

QIX

Atari are continuing their policy of launching tried and tested arcade games for the 400 and 800 machines. This month's releases include copies of the two hit games QIX and Donkey Kong.

Donkey Kong with the crazy gorilla, blond starlet, and Mad Mario the carpenter needs no introduction to arcadesters.

Slightly less well known but no less a good game for it is QIX, which was first featured at C&VG's Arcade Champ of the Year last summer. The idea of the game is to capture as much space as possible by drawing shapes on the screen.

Press the fire button to draw and move your marker around the screen avoiding the QIX — a large spark.

When you have filled in 75% of the screen you can move on to the next one or, for really high scores, you can fill in up to 90%. These games are available from your Atari dealer at £29.95.

Other new cartridges for the Atari computers are about to be launched by the English Software Company.

These will be available in May and will feature a new version of Airstrike — the scrolling shoot-out. Airstrike 11 and Venus Voyager are being manufactured in the U.S., although the programming was completed in the U.K. The games will be available in May but no information on price is yet available.

THINGS THAT GO BUMP IN THE MAZE!

MONSTERS

Ghouls, monsters, vampires and a Mad Monk are all featured in this latest Hitchcock style game for the Sinclair Spectrum.

Incorporating some elements of the arcade game Dig-Dug the game challenges you to escape from a maze of corridors and

connecting step ladders and adds some original twists of its own.

You are armed with a magic hammer which enables you to dig holes in the corridors for the monsters that are in hot pursuit to fall into.

Just to give this version its own original twist the monsters are vampire monsters and the setting is hell with the flames burning away beneath you.

You are also only allowed a limited amount of holy power so you have to use your hammer sparingly. Watch out for the Mad Monk and his Ghouls — they are also out to get you.

Monsters in Hell runs on the Sinclair Spectrum in 16 or 48K and is available from London-based Softek at £5.95.

Also new from Softek this month is a version of the popular arcade game Centipede and a deep space shoot 'em up game called Firebirds. These are also available at £5.95 from Softek.

GET YOUR TEETH INTO THIS ONE!

MOLAR MAUL

If you think that using your TV set to play computer games provides an escape from those toothpaste advertisements that keep reminding you of your dental appointment then Molar Maul will put an end to all that!

This new game allows you to take part in the fight against the DK's who are trying to destroy your teeth.

The tooth wreckers come in the apparently harmless guise of Jelly Babies and toffees but, as every dentist will tell you, they can do irreparable damage to your gnashers.

To fight the good fight you are armed with a toothbrush and a tube of Imagico toothpaste.

Move the brush around the mouth which is displayed on the screen using your keyboard controls. Every so often you will need to go to the tube of toothpaste to recharge your brush.

It becomes increasingly difficult to brush away the DK's as the game gets faster and faster.

Molar Maul runs on a Sinclair



Spectrum in 16 or 48k and is the latest release from Imagine Software of Liverpool.

Also new from Imagine this month is a Vic game called Frantic. You are a robot on a mission to mine the precious mineral hidden at the bottom of a deep trench. Your jet pack enables you to fly through the obstacles that will confront such as attacking aliens and uncertain terrain.

Imagine games are available from the Liverpool based firm at £5.50.

FLIGHT OF FANCY IN THE STARS

STARSHIP

Starship Command adds a number of extra flight controls for your Starship as you hurtle through space zapping the aliens.

Your ship can accelerate, decelerate, rotate and fire torpedoes. There is a shield which you can activate to protect your ship from enemy fire and two escape capsules either of which can be launched before your energy banks are drained empty.

On the right of your screen your long and short range scanners show the whereabouts of the alien ships.

Just like Atari Star Raiders you have only a limited amount of fuel to complete your mission and this is eroded each time you fire torpedoes, accelerate to decelerate, use your shields or sustain a direct hit from an alien ship.

At the end of your mission you get an assessment from the Starship Commanders and depending on your performance you will be given another more difficult mission to carry out. Starship Command runs on the BBC model B and costs £9.95 inclusive from Acornsoft of Cambridge.

Also new from Acornsoft this month is a snooker simulation game which lets you become Steve Davis for an afternoon.

The length of the cue you select determines the strength of the shot. You can also instruct the computer to use backspin, topspin for those special trick shots.

Normal snooker rules apply including foul shots and snookers. The only thing this snooker game lacks is a £10,000 jackpot! Snooker runs on a model B at £9.95 inclusive.

CLASSICS FOR THE ORIC OWNER...

AWARI

Two classic games have found their way on to an Oric format to start off the software libraries for owners of this new computer.

Awari, the African pebble game, is reproduced on cassette for £5.50 and Othello should also prove popular at £6.50.

The tapes come from a new software house, run by the Tangerine User Group's Bob Green. It is called Kenema Associates Limited and is based at Worle in Avon.

Two other cassettes are also being released by Kenema for Oric owners: Keytrainer is aimed at giving 6-12 year olds a familiarity with the machine's keyboard, while the Character Design Aid enabling beginners to make good use of the Oric's user definable graphics facility. Both these cassettes cost £5.50 each.

NEW PRODUCTS NEW PRODUCTS NEW PRODUCT GAMESNEWS

OUT COME THE FISHY FREAKS!

SEVEN SEAS

Thorn EMI's latest game has a conservation theme — it contains a warning about the dangers of dumping toxic nuclear waste in the sea.

The guaranteed "safe" canisters have started leaking radioactive substances into the ocean currents.

The creatures of the deep have been transformed into crazed mutant monsters out to take revenge on mankind.

As the captain of a submarine your task is to journey to the bottom of the sea and collect the canisters. Then you have to transport them back to the surface for processing.

But watch out for giant octopi who are hooked on the stuff in the canisters!

Save the Seven Seas runs on the Atari 400 and 800 and is in the shops now.

Also new for the Atari are a sports simulation game called a Major League Hockey and Orc Attack.

The latter game which challenges you to repel an attack of ferocious Orcs who are attempting to storm your castle.

T199/4a owners have also been included in Thorn's spring releases with compatible versions of their TV advertised games, Submarine Commander and River Rescue.

New games for the Vic-20 include Mutant Herd in which you must find and destroy mutant eggs which are hatching into giant man-eating insects.

Dodge falling rocks and avoid the insects as you lay your explosive charges to destroy this threat to mankind.

Fourth Encounter — the second of the Vic-20 releases is a classic shoot 'em up space attack game.

You and your laser base against the aliens. The rest is history.

Thorn EMI cartridges will be in the shops in May and will sell at around £30.



THE FLYING FORTRESS COMES HOME!

ZAXXON

Zaxxon is widely regarded as representing the "state of the art" in graphics for 3D games.

The blue fortress with its ground-to-air missiles and high flying jet fighter needs no introduction to arcadesters.

It's a superb sight — that Zaxxon screen, with missiles blasting up at you from the fortress floor as you zap over walls and electric defences, judging your height by your shadow.

The game was first converted for the home by Colecovision for use on their video games centre which is shortly to go on sale in the UK.

The good news for home computer owners is that the game has now been converted for the Atari 400 and 800.

The game requires ?K and is available from Calisto Computers of Birmingham at £29.99 on disc or cassette.

Also new from Calisto this month is Astro Chase, the new game from Fernando Herrera — the award winning ex-Atari games writer.

The game challenges you to defend the Earth from an invasion of aliens who have thrown a force field around our galaxy. Once they have launched their attack vessels the chase is on.

Astro Chase also runs on the Atari 400 and 800 in ?K and comes on disc or cassette at £26.50.

TAKE TO THE AIR FOR A TUTORIAL

MAP OF UK

Map of UK gives a new meaning to crash courses in geography. It's a game with a strong educational bias for Spectrum owners.

The cassette provides a large scale map of all the United Kingdom plus Eire. The action takes place in an addictive hot-air balloon game, search for a named place, work out the distance between two places, display latitude and longitude and it is also possible to remove names from the map to play "guess the place".

The game comes from Kuma Computers of Maidenhead.

It costs £11.95 and should make geography a lot more fun for those who can follow a course without crashing.

ROOMS OF DOOM FOR ADVENTURERS

TOMBS OF KARNAK

There are fifty rooms to be explored if the intrepid Sharp MZ-80K owner is to find his way 'around the Tombs of Karnak.

This is a classic adventure game where you have to overcome challenges and evil characters in fifty different locations.

The game is available from Solo Software of St Johns in Worcester. It runs on the Sharp MZ-80K and MZ-80 and is available at £7.95.

ENTER THE WORLD OF THE CRYSTAL

DARK CRYSTAL

The lost shard of the crystal is the key to a new graphic adventure game based on the new film, The Dark Crystal.

The flawed crystal is being used by ten evil creatures, the Skeksis, to pervert the way the world is run.

They are opposed by 10 gentle creatures, the Mystics, forces for good on the planet.

An ancient prophecy foretells that the Skeksis rule will be broken by Gelfling hand and the crystal made new again. So the Gelflings were wiped out by the Skeksis' deadly agents many years before and only two, Jen and Kira, survive to make the prophecy come true.

The game is produced in America by Sierra On-line and features some marvellous graphic screens.

In the UK, Apple and Atari versions are being distributed by South-London based SBD Software. A Commodore 64 version is also expected to be released over here shortly. The game comes on disc and although prices have yet to be confirmed, it is expected to sell for around £20.

We are running a Dark Crystal graphics competition on page 24.

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HOT TIME IN THE OLD CASTLE

DRAGONFIRE

Following Imagic's successful Riddle of the Sphinx Adventure game for the Intellivision machine, which had a clutch of cartridges as a prize for the most intrepid explorer, the American firm has just launched a second Intel Adventure.

Dragonfire turns you into a Prince who has been given the task of ridding the kingdom of the dragons who have taken over the castle. Then you must restore the rightful king to the throne.

In order to do this you must first get inside the castle. Using the joystick controller direct the Prince across the bridge, dodging fireballs and the arrows from an archer positioned high on the castle turrets.

Once inside, head for the treasure room to recapture the king's riches.

Now the battle gets tough. You will have to fight it out with a dragon which has varying strength — depending on which difficulty level you select.

Treasure recovered, the Prince must then cross another bridge and face a tougher dragon. Points are awarded for each item of treasure recaptured.

Dragonfire can be played by one or two players and is available from most Intellivision stockists now at £31.45.

Two other new games for the Intellivision feature a version of Donkey Kong called Beauty and the Beast.

Instead of mad Mario and the gorilla this game introduces Horrible Hank, Tiny Mabel, and Bashful Burford.

You play the part of Burford, who is trying to rescue his girlfriend Mabel, from Horrible Hank who has carried her to the top of a sky scraper.

Also new in the shops is the Intel version of the hit Imagic game Demon Attack.

Demon Attack and Beauty and the Beast are available now from your Intellivision stockist at £31.45.



LOOK FOR THE GROND

VANGUARD

Atari's Vanguard is the most original release from the leading video games firm for some time.

This game incorporates several challenging screens.

Like most new games there is a complex story line. You are challenged to fight your way through to the fortress of the evil Grond and destroy him. Not that any of this has anything much to do with the real enjoyment of this game — dodging, and blasting.

The first screen challenges you to shoot your way through a scrolling tunnel. The aliens are coming thick and fast and you will need to utilise your ship's ability to shoot forwards, backwards and up and down to full in order to shoot down enough of them to get through to the next screen.

Screen two provides an interesting twist as you are now scrolling downwards instead of forwards. Your adversaries at

this stage are cute ping-pong ball type characters which bounce across the screen and edge slowly down towards you.

A couple of screens further and the aliens are tracking you up screen.

When you are finally approaching the Gronds fortress you are pursued by serpents and snakes that can immobilise you with poisonous bites.

Vanguard has a useful game play feature which allows you to start your next game where you left off if you press for a repeat game before the indicator reaches zero.

The game play is so fast and furious that Vanguard is guaranteed to give you joystick blisters.

The game also incorporates excellent use of the VCS's colour capabilities. Vanguard will be in the shops in May at £9.95.

BOMBERS GO OFF WITH A BANG!

ASSAULT, ASTROWAR, SPACE ROBOT

One other new VCS manufacturer launching into the UK market for the first time VIA Pancom did not meet with quite as favourable a reaction from our resident Atari expert.

Astrowar from Dimax is a scrolling shoot out which, graphics wise, gives a new meaning to the word basic.

You are challenged to shoot down a belt of meteors that are bombarding your ship. Larger rocks split up making for more difficult targets.

Dotted in and around the meteors are a few sneaking aliens moving at greater speed than the rocks. These must be eliminated at all costs. If they slip past you you are dead.

Slightly more original though still not in the super-game class was Space Robot, also from Dimax.

Not a Berzerk-type game as the title might suggest but a shoot 'em up style game incorporating some of the best elements of Missile Command.

The robots are attacking in threes marching down the screen in neat rows.

You control a gun sight with your joystick which you must position at the centre of a robot. Press the fire button to position a laser blast on the chosen robot.

Assault, Astrowar, and Space Robot are all available at £1.95 from Pancom of Grimsby in compatible PAL format.

The Bomb has dropped! This new games company is launching a major assault on your Atari VCS and has attacked the UK market with a new game called Assault.

This challenges you to blast wave after wave of aliens with your laser base and it owes a lot to the successful Imagic game, Demon Attack.

The screen displays a mother ship which is moving back and forth across the screen — constantly — just out of range of your laser fire.

In order to get a potshot at the mother ship you will have to first shoot your way through several waves of aliens.

One of the most enjoyable aspects of Assault, and certainly that which gives it its main claim to originality, is the ability to fire left and right as well as up screen. You will need this facility as certain of the aliens drop Grabbers which dart across the bottom of the screen towards your laser base. Deft joystick control and a quick finger on the fire button are required to survive this wave.

- 1 Pacman
- 2 Frogger
- 3 Defender
- 4 Space Invaders
- 5 Demon Attack
- 6 Demon Attack
- 7 Starmaster
- 8 Pitfall
- 9 Star Raiders
- 10 Empire Strikes Back

Atari VCS
Atari VCS
Atari VCS
Atari VCS
Imagic Atari VCS
Imagic Intellivision
Atari VCS
Atari VCS
Atari VCS
Atari VCS
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SWINGING TIME IN THE JUNGLE

PITFALL, STAMPEDE

Something is stirring in the jungle — and it's not just the wild beasts. It's Pitfall Harry, the latest video hero.

Harry is the central character of a new game from Activision for the Mattel Intellivision home video system. It features the outstanding audio-visual effects that have become the trademark of the game's creator, award-winner David Crane.

Harry travels through dense jungle and underground passageways in search of gold and silver bars, money bags and diamond rings. Along the way he encounters bottomless tar-pits, deadly snakes, scorpions, fires, crocodile infested lagoons and rolling logs. Pretty tough huh? All this adds up to an exciting and original game.

Activision's second release for the Intellivision is Stampede — a



game mentioned within the pages of C&VG frequently during past issues. Activision say that this is one of their most popular games — it was created originally for the Atari VCS and introduced in 1982.

The theme is the good old Wild West and you are out rounding up stray cattle — which just happen to be rushing around in a panic stricken state.

You have to direct both horse

and rider as you attempt to lasso the stampeding steers. Points pile up as you rope the devious little dogies. Bob Whitehead, who designed Stampede, is also the creator of that other popular game Chopper Command which took the USA by storm.

Pitfall and Stampede should be at your local Activision stockist right now. Pitfall will set you back around £29 and Stampede is slightly cheaper at around £25.

HYBRID FOR VIDEO AND MICRO-FANS

CREATAVISION

If you can't decide whether to buy a computer or a video games system then the new Creatavision may be the solution you are looking for.

Best described as a cross between the two machines, Creatavision will go on sale in April with a range of twenty video games cartridges.

But the machine can do more than just play games as it incorporates a 16K fully programmable computer with a keyboard. The package comes complete with its own Basic cartridge and retails at £99.00.

The computer is fully expandable and all the usual peripherals will be produced later in the year. A compatible cassette recorder, disc drive, printer interface, and expansion cartridges up to 64K are all on the way.

Creatavision are hoping to enlist some of the independent software houses in the UK to write games for their machine. As this will take some time to organise there is likely to be a shortage of the cheaper cassette based software for this machine, than for the cheaper machines, like the Spectrum and Oric.

Cartridges for the Creatavision will range in price from £19 to £25 and include educational and business orientated subjects as well as a range of arcade-style titles.

PRETTY TOUGH OR JUST PRETTY?

Demon Attack and Phoenix give a new meaning to the phrase "pretty tough". Both are shoot 'em up space games — and both are competing for sales in the lucrative Atari VCS market.

The similarities in game format and design have led to a legal battle in the US between Imagic, the manufacturers of Demon Attack, and Atari, the owners of the Phoenix copyright.

Demon Attack has been on sale for nearly twelve months now and was voted top video game of the year at the January Consumer Electronics Fair in Las Vegas — having out sold every other video game in the U.S. last year.

Computer and Video Games' resident VCS expert plugged in both games to see which one gave the toughest fight. First up on the screen was the brand new Atari cartridge Phoenix.

The first two screens were wiped out in seconds as they attacked at an insultingly slow

DEMON ATTACK Vs PHOENIX

pace — like drunken space invaders out of formation.

After the formality of dismissing these first two screens I was pleased to discover a tougher breed of alien on the third screen. These bird-like creatures were quick and elusive, showering me with heavy missile fire.

Tough as these aliens are they are not as tough as their counterparts in Demon Attack and the only real test for the seasoned video gamer comes on the fifth screen when you get to the Phoenix home base.

Now this is impressive and a reasonable simulation of the arcade game's exciting climax. Using skilful movement of the joystick you have to dodge in and lob a missile into the Phoenix fortress whilst dodging their heavy fire.

It may take several hits to erode the aliens' defences be-

fore you can get a clear shot at the centre of the Phoenix.

All the time the great bird-like hulk is edging down the screen towards your laser base.

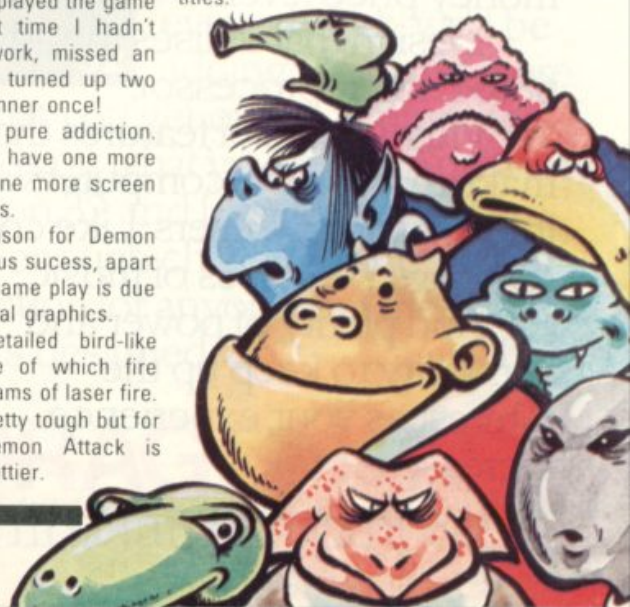
Demon Attack was plugged in with a measure of excitement and slight concern. It was six weeks since I'd played the game and during that time I hadn't been late for work, missed an appointment, or turned up two hours late for dinner once!

The game is pure addiction. You just have to have one more go. Got to see one more screen of different aliens.

The main reason for Demon Attack's enormous success, apart from the tough game play is due to the exceptional graphics.

They are detailed bird-like creatures, some of which fire long snaking beams of laser fire.

Phoenix is pretty tough but for my money Demon Attack is tougher and prettier.



At last. A range of software that's as well designed as the Dragon 32.

Six months ago, most computer users thought a Dragon was something out of an adventure game.

How times change. Nowadays, it's almost impossible to pick up a computer magazine without reading some new tribute to the Dragon 32.

THE FIRST FAMILY COMPUTER

We called it the first family computer. And we believe that much of its success derives from the fact that it has been superbly designed for the job it has to do.

Design that incorporates 32K RAM of memory at a real value-for-money price level.

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Plus a range of features that help make the world of computers accessible to first-time users. Like colour drawings. 5 octaves of music.

And plenty of power and versatility to keep up the interest as your experience increases.

SOFTWARE TO MATCH

Designing a range of software that does justice to the Dragon was a task we approached with as much care as designing the computer itself.

The results are now available - games, educational programs, hints on programming - conceived by some of the best software houses in the world, to help users get even more out of their machines.





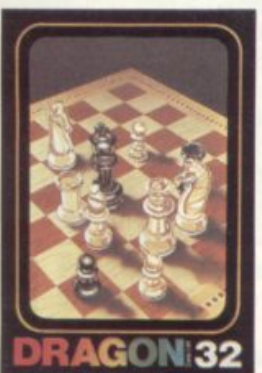
Graphic Animator.
A cassette that makes use of the Dragon's ability to draw on the screen. It shows you how to create simple cartoons - then bring them to life.



Personal Finance.
This cassette allows you to keep track of all the family's finances, from bills to bank statements.



Ghost Attack. On cartridge. You're in a maze, and you must find your way out. But you're not alone - you're pursued by ghosts!



Chess. A great partner to play against again and again - with one major drawback. It's very hard to beat. Test yourself against nine different levels. On cartridge.



Typing Tutor. Only a keyboard as sophisticated as the Dragon's could allow you a program like this. You use the Dragon's own keyboard to learn to type. On cassette.



Cave Hunter.
Finding the hidden gold is hard. But surviving the attacks of malevolent creatures may well prove to be impossible. Cave Hunter is on cartridge.



Dragon Selection.
A cassette of utility programs, allowing you to create your own database. Write your own tunes - or learn other language vocabularies.



Starship Chameleon. A cartridge game. You find yourself under attack by the dreaded Gabolators! Their task is to take your planet - yours is to protect it.



Computavoice.
This cassette actually enables your Dragon to speak to you. These are just some of our titles, and every month, we'll be adding more and more.

What you get out of a computer depends on what you put in. And with a Dragon 32 and Dragon software, there's enough challenge and satisfaction for anyone. But then, that's what it's designed for.

DRAGON 32
The first family computer.

CREATE YOUR OWN VISION FOR AUGHRA

The eccentric Aughra is Keeper of Secrets on the world of the Dark Crystal. She sees the strange life of her planet through a detachable eye and a permanent frown. We are offering her head to the winner of our Dark Crystal Competition!

Muppet producers, Henson Associates are flying a mask of Aughra's head over to the UK to give away as the prize for the best computer picture of a character from the film.

On top of the mask — one of three characters made by an American designer — the best graphical drawing will earn its creator a copy of the beautifully illustrated book about the making of the film plus an LP of the soundtrack.

The film's characters have already featured on a graphical adventure game which is available across a range of three micros — see our Games News pages.

The Dark Crystal features a horde of fascinating characters created by the pen of fantasy artist Brian Froud and then translated into the marvellous Muppet-like costumes and puppets by Jim Henson's team of Muppeteers.

As well as the one-eyed Aughra, there are the 10 evil Skeksis creatures who currently rule the world and the flawed crystal.

These are served by the poor exploited Pod People and a strange species of giant clawed battle fleas, the Garthim.



The gentle Mystics form the side of good and they send the Gelfling, Jen, in search of the missing shard of crystal. In his quest Jen is helped by a girl Gelfling, Kira, her friendly monster Fizzgig and a couple of steeds, the Landstriders — complete with walrus mustaches, floppy ears and giraffe legs.

You can choose any character or



scene from the film on which to base your creation and draw it on any popular microcomputer. We will accept a tape with the program on it or a screen photograph — as long as it is clear. Please send your entries in by 20th May. If you want your tape or photograph returned, please include an S.A.E.

We have included a few pictures of some of our favourite characters from the film, to help you choose which to feature.

The judge's decision is final and no employees of EMAP or Henson Associates or their relatives may enter.



On a recent raiding trip to Matlock in Derbyshire, top space pirate, Nicholas Tacticos has plundered a Colour Genie microcomputer.

Nicholas, who won our opening round of Seventh Empire hostilities, was invited up to Lowe Computers' Matlock head office to test out his prize.

He is pictured with the company's marketing manager, Richard Peat, as the two of them take the Colour Genie through its paces on a game of Skramble.

Back at his London W14 base, Nicholas, who commands the Spartans space tribe, hopes to put his Genie to good use, conjuring up some hot moves for the next reincarnation of the late lamented Seventh Empire.

You can read all about the disaster which brought about the fall of the Seventh Empire on page 95. The Computer and Video Games office is at this moment preparing for an attack by hundreds of unhappy space pirates!

Few riddles have provoked the response our Riddle of the Sphinx competition enjoyed.

Hundreds of you reckoned to have solved the Imagic Atari cartridge's Egyptian challenge and sent in entries both to us and directly to Imagic distributors, Hales Ltd.

Such was the response that Hales managing director and chief judge, Clyde Roberts, has put up extra prizes for second and third places. Alan Mills of City Road, Sheffield, is the outright winner and wins a video games storage centre plus six Imagic cartridges.

Runner-up was Paul Williams of Sprowston, Norwich who wins a Video Command joystick and two cartridges from Imagic's range.

Third place went to Stephen Gordon of Yewtree Road, Beckenham, who can choose any two Imagic cartridges.

Imagic's own Riddle of the Sphinx author has produced a rundown of the solution which we re-print below, upside down, in case you haven't yet discovered it for yourself.

Imagic's team of Egyptologists has deciphered the papyrus scrolls recently discovered in the valley of the kings. The next voice you hear will be that of a common scribe to the Royal Court of Egypt, relayed over 22 centuries. son of Thoth will scribe to Pharaoh's court, may tell now what before has not been known. These secrets of the Valley of the Kings have been revealed to me in a most curious fashion. The royal astrologer, greatest magician in the land, slipped into a deep trance. He shook his head violently, he waved his arms, the sky grew dark. Water in his goblet boiled. Cats howled. Still in a trance, the royal astrologer grew quiet. He opened his eyes — they glittered. In a strange voice, he began to speak. "Young Prince of Wiles hear me, the answers to my clever clues I must give you, risking disavow with the Gods. Still you must know. Offer a key at each of the three pyramids. You will receive a magical tablet, offer the scroll to the flaming Phoenix. The Phoenix will bestow a key upon you. Should your way still be blocked, offer next the Tarnis leaf. At the temple of Isis, receive a key when you offer a crown. It is Isis detains you offer next the jug. Even Anubis gives a gift. Gently offer the Ankh at his temple and he will grudgingly give you a key. He may yet block your path, offer the shield and pass. The inscrutable Sphinx will accept one of the three magical tablets you can have received at each of the three pyramids. You must offer the correct tablet if not, the sphinx may not allow you to proceed. Son of Pharaoh, will you have found that companion you rely and lean upon, yet never think to call friend? The royal astrologer sighed as deep as all the ages. He continued: "Supple warrior Egypt's hope, remember where does the staff of Ra lie hidden, you wonder? Youth has much to learn. Not all journeys follow the shortest course. When your trek begins, move not forward but backward, away from your destination. An oasis will appear drink deeply there. When you touch the oasis the staff of Ra will be yours. Guard it well, guard it well. Guard it! The royal astrologer's chin dropped to his chest. He slept deeply he snored and fell off his stool. I have left him there, and scribbled these words like a man possessed. Will they ever be found? Will the secrets of the Valley of the Kings remain eternally chaste? Such knowledge yields great power. I must practice caution. Wait someone approaches. The Hieroglyphics go no farther. Then end abruptly, followed only by a small Cypher. Penned by another hand. It is the sign of Anubis: Guard these secrets well.

CALLING ALL VIDEO CHAMPS

If you're an arcade ace with a high score or two to your name, then the 1983 Video Games Championships is the place to display your talents.

Taitel Electronics, the firm which introduced Space Invaders to the UK, is helping us to organise these championships with a top personality who also enjoys a trip to the arcades.

Simply take the form below down to your local arcade put the highest scores you can on your three favourite machines. Ask the arcade manager to witness the score and return it to us before June 13th at: Best Arcade Player, Computer & Video Games, Durrant House, 8 Herbal Hill, London EC1R 5JB.

If you achieve a top score while this form is still at home, ask the arcade owner if he has any 1983 Video Games Championships forms. We are despatching forms to all the top arcades for use by their best players.

An arcade machine of your very own is the prize if you become our champion at a grand final which will be held this summer and all the finalists will get an expenses paid trip down to London to take part.

Please enter the following scores in your 1983 Video Games Championships

My high score is:

It was scored on a:

machine

Date:

The manager of the pub/ arcade who witnessed my score is:

His signature:

Name & address of pub/ arcade:

My name is:

Address:

My high score is:

It was scored on a:

machine

Date:

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It was scored on a:

machine

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CHESS



This year the fourth World Computer Chess Championship will be held in New York from October 2-25, 1983, at the annual meeting of the Association for Computing Machinery (ACM).

The championship is being organised by the International Computer Chess Association (ICCA) which was formed at the second World Championship in Toronto in 1977 and has since grown considerably in stature and influence.

ACM has allocated \$20,000 to cover the major tournament expenses and ICCA is now canvassing for further funds to enable it to bring noted chess players and computer scientists together at the tournament.

It is an indication of the growing respectability of computer chess that there will also be a special session devoted to the subject at the annual ACM conference which will be at the same site as the tournament.

BELLE OF THE BOARDS

If the fourth championship follows the same pattern as the first three, which is likely, it will be a four-round Swiss-style tournament amongst approximately 16 programs.

Four rounds is barely adequate for a tournament of that size, but any increase would impose serious problems for competitors whose programs reside on mainframe computers, possibly on the other side of the world, accessed from a terminal over the telephone network.

Arranging hours of dial-up access, free of computer faults (or routine shutdowns) and hours of international phone calls without interference or accidental disconnection is hardly the easiest of tasks.

For this reason, amongst others, it is likely that microcomputers will take part in the tournament in greater numbers than before.

Although strictly a special purpose chess machine rather than a microcomputer, one contestant that will not have to rely on telephone lines and mainframe computer operators will be Ken Thompson's BELLE which has been described several times in previous articles.

BELLE finished equal first with CHAOS (also of the USA) at the Third World Championship at Linz, Austria, three years ago. Each program finished with 3½ points out of 4 and a play off game resulted in a powerful win for BELLE.

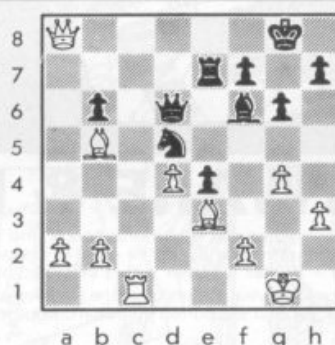
It is difficult to imagine BELLE failing to retain the championship in New York, but a short tournament naturally puts far more pressure on the best competitors than a long one. Even one mistake or machine breakdown can result in an irredeemable loss.

Barring breakdown or human operator error, the outcome of a computer tournament is completely predetermined before the first move is made, but this is not likely to deter a sizeable audience from attending the playing sessions.

World Championship Tournaments are held every three years at present — beginning at Stockholm in 1974 where the first championship was won by the Russian program Kaissa.

At that time Kaissa seemed unbeatable, but it lost heavily in the first round of the Second World Championship at Toronto in 1977.

This was the decisive position



Dutchess (White) has just played 34. Q/R8ch. Kaissa (Black) surprised the entire audience, which included Mikhail Botvinnik, Edward Lasker, Hans Berliner and Canadian International master Leon Piasetski by playing 34... R-K1, which places a Rook *en prise*.

Dutchess replied 35. QXRch and won a few moves later.

The immediate problem for Kaissa's programmers was to discover what subtle programming error could have led to this disastrous blunder. I will reveal the answer next month.

With Kaissa unexpectedly beaten in the first round, the American program Chess 4.6 took the lead and went on to win the Toronto Championship with 4/4.

This turned out to be the high point of the career of the "Chess" series of programs written by David Slate and Larry Atkin.

The successor of Chess 4.6, Chess 4.9, only scored 2½/4 at Linz in 1980, a full point behind BELLE.

Here is the first round game from Toronto in which Chess 4.6 beat BCP, a

British competitor which is also likely to be competing at the fourth World Computer Chess Championship in New York this autumn.

Chess 4.6 (White) v BCP (Black)

1. P-K4, P-K4;
2. N-KB3, N-QB3;
3. P-Q4, P-P;
4. P-B3

The Goring Gambit which Chess 4.6 played regularly as White and which presumably occupied a large proportion of its 5,600 position opening "book".

However, very few of its opponents ever seemed to take the trouble to prepare for the gambit.

In this case, because of technical problems BCP was playing without its usual 1,000 position "book", but finds an unusual continuation which took Chess 4.6 out of its "book" and into a probably inferior reply.

- 4... Q-K2;
5. PxP, QXPch;
6. B-K2, P-Q4;
7. N-QB3, B-QN5;
8. O-O, BxN;
9. B-Q5!

Now BCP plays very weakly.

- 9... Q/K2;
10. PxP, N-B3;
11. Q/N3, N-K5;
12. R-K1, Q/K3;
13. N-KN5! Q/Q2;
14. P-KB3, P-KB4
15. PxN, BPxP;
16. BxP! PxB;
17. RxP ch



- 17... N-K2;
18. Q/B7ch, K/Q1;
19. QXP, Q/K1;
20. N-B7ch, K/Q2;
21. NxR, K/Q3
22. RxN, QXR
23. B-R3ch, K/B3;
24. QXQ, P-KR4
25. Q-B5ch, K/Q2;
26. R-K1, P-R3;
27. Q-Q5 mate.

BY MAX BRAMER

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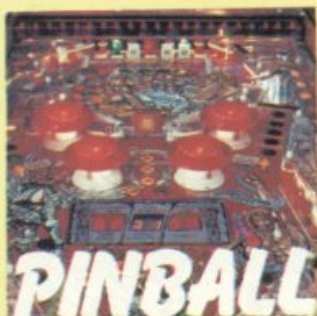
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(CVG 0583) Computer & Video Games May 1983





You've all been reading about those top scoring video-gamsters in these pages for some months now. How about letting us know about some of your pinball top scores?

It appears that more video-fans are sampling the delights of pinball. I recently heard about one such video freak who found his favourite screen machine occupied by another addict and was looking around for something to play to pass the time until he could get in on the video act when he spotted a pinball lurking in the corner of the arcade.

He wandered over, slipped a coin and began playing — and now, like many other people before him, he's totally hooked!

If you have been won over by a pin just let us know your high score, what machine you clocked it up on, your address and what arcade or pub your pin can be found in and we'll attempt to draw up a list of our top ten players.

STAY COOL AND BEAT THE STING

PENGO TIPS

Sno-bees are wary little creatures, not unduly malicious they seem to kill Pengo almost by accident. However the little devils know an ambush when they spot one.

In Pengo the player is a lone penguin up against a swarm of the creatures which try to run him to ground in a maze of blue ice blocks.

The bees possess a deadly sting which send Pengo sprawling onto his back and looking decidedly dizzy.

Pengo has two methods of fighting back. He can squash the bees behind a speeding ice block or "peck" the surrounding wall of the screen, stunning any Sno-bee who happens to be in contact with it.

Like all maze games, Pengo is a battle for survival and a lesson in the art of ambush, and Sno-bees know all the tricks!

The scoring though depends on more than just surviving.

There are three ways to make the most of each Pengo screen in terms of points and a good player will decide early on which method best suits each particular maze.



The way most beginners start to score is by squashing individual bees and eventually clearing the screen.

Squashed Sno-bees are worth 480 points each when tackled individually.

But come the end of the screen, when the last bee dithers and then dashes headlong into a corner to disappear, the bonus score based on time taken to clear the screen is often miserly.

To clear the screen quickly can boost a score. One way is to note each of the flashing ice blocks which will later turn into Sno-bees and peck them to disintegration before that change can happen.

Don't spend time planning an ambush for a wandering bee — they usually avoid them, especially at close quarters — but take your chances when they come. Learn to recognise pat-

terns of bee movement: when one starts melting a chain of blocks, it is a safe bet to wait behind the last one and squash him.

The second way to achieve a big score is to squash multiple bees with one block. Like eating Pacman ghosts, taking two bees with one shot earns bigger scores, of 1,600.

It is a legitimate tactic to aim for as the bees have a habit of following one another up a corridor of the game.

Making bees dizzy along the side of the screen can also leave them open to this tactic.

The third way to collect points is to push the three permanent ice blocks together. This tactic must be practised to appreciate the right way of approaching the uniting of the blocks.

It is often most practical to achieve this along an edge of the screen. Just getting two of the blocks together adds a bonus but the big score is achieved by linking all three.

Don't leave this tactic until the last Sno-bee is about to dive off-screen as it will probably be too late, but look for opportunities to work the permanent blocks into good positions during the course of the screen battle.

Remember that the bees can't destroy those blocks either and they can therefore make useful hiding places for Pengo when he needs a break!

WHAT'S BUGGING YOU NOW — MORE INSECTS!

The bugs are back with a vengeance! Just when you were conquering the nasties of Centipede, the horrors of Millipede have arrived.

Like its predecessor, the Millipede starts at the top of the screen, snaking its way through the giant mushroom forest and splitting whenever it is hit by an arrow.

A released tail segment will turn into a new head, a Millipede reaching the bottom will produce new heads, entering from the side of the screen.

The spider still features, jumping up and down in a random pattern across the screen, but there's a host of new creatures too. The bee bombards the player much as the flea used to but a first hit only serves to make them dash around the screen that much faster!

The dragonflies do a similar job, depositing mushrooms on their zig-zag downwards path. Mosquitos fly diagonally across the screen. If hit by the player,

MILLIPEDE

the playfield scrolls up one row.

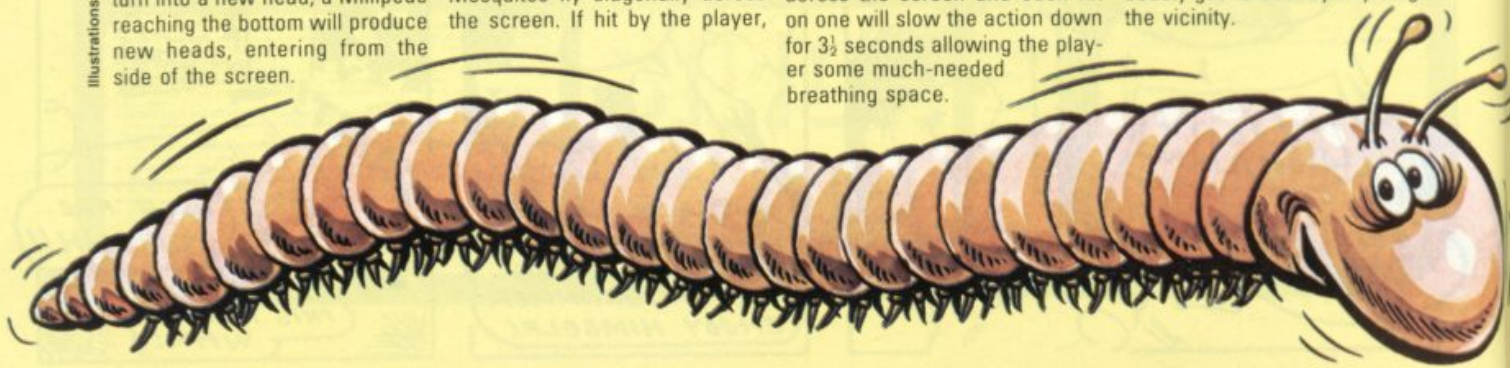
Earwigs glide across the upper portion of the playfield poisoning any mushrooms they touch, as the scorpion used to. Beetles turn any mushroom they touch into an indestructible flower. A hit on the beetles will scroll the screen down one row.

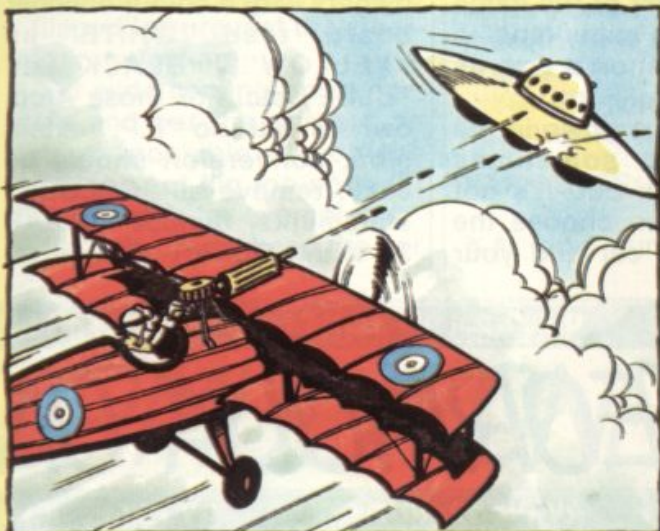
The inchworms crawl slowly across the screen and each hit on one will slow the action down for 3½ seconds allowing the player some much-needed breathing space.

At certain play levels a destroyed Millipede will result in a bombing run of bees, dragonflies and mosquitos.

The player does have one other weapon to help with this invasion.

Four DDT bombs are placed on each screen and can be blown up by an arrow releasing their deadly gas to destroy anything in the vicinity.





FLIGHTS OF FANTASY

A flight through the five ages of man's domination of the air takes place in Time Plot.

The player steps into the cockpit of a modern-day jet and instantly finds himself transported back in time to the era of the bi-plane, circa 1910.

The bi-planes, tackled singly, are no match for the jet but there are a lot of them and they keep up a persistent hail of bullets. Their mothership takes the shape of a large balloon and it must be hit seven times to allow the player to timewarp into the next age.

He rematerialises in the Second World War, 1940, where monoplanes fill the skies.

Still, he holds an advantage but must use it wisely to counter the threat of the fighters and bombers.

TIME PILOT

Off into the seventies as jet-range helicopters armed with deadly homing missiles take on the player's jet. The helicopters are far more manoeuvrable, appearing out of the clouds, all around the player's jet. A large copter with two sets of blades, takes on the roll of mothership.

The fourth age of flight, takes the jet into the present with modern-day planes like itself.

The fifth age is the future with UFOs and flying saucers providing the ultimate challenge. Their technology far outstrips that of the player's jet and they are armed with powerful weapons.

More points can be accrued by catching and rescuing parachuting pilots.

PACKING A PUNCH!

The cartoon character who made a Spinach Marketing Board redundant long before such things were fashionable, has now punched his way into the arcades.

Popeye and the entire team of unlikely characters which made up his cartoon series are battling arch villain Brutus.

Very much in the "cute" mould with three screens all featuring levels and ladders, the player controls Popeye catching hearts, musical notes and lettering as they drift down the screen after being carelessly scattered by Olive Oyl.

Our seafaring hero starts at the top of the harbour scene running up and down ladders in an effort to dodge Brutus but still be sure of not letting a single heart fall.

Brutus will lunge and punch through the levels as well as being a threat on the same level. He and a Sea Hag character also pose another threat by hurling bottles at Popeye.

Popeye can punch his way out of this kind of danger but the timing of that punch is critical.

Once Popeye's house is covered in captured hearts he can move onto the next challenge. The action takes place in a warehouse this time with Popeye catching falling musical notes from Olive's flute. Sweet Pea is at the top of the screen filling in a score for each note caught.

Wimpy munches hamburgers

POPEYE

and waits for Popeye to jump on his see-saw. A completed musical score sees the action move to a third challenge on board ship. Ms Oyl is trapped at the top of the mast and calls "HELP", the letters drifting critically seawards. Joining in the fray here is a vulture who swoops down on Popeye.

And the spinach? That turns up in cans which turn Popeye pink with vitality and allow him to hit back at Brutus for as long as his theme tune sounds.



SPLIT SCREEN HERO

Battle was joined on the Robotron scene with a rush of scores finishing with Spencer May narrowly pipping the rest with a phenomenal 3,576,800 score.

Danish reader Michael Panayotis starts us off on Space Dungeon and Greg Parsons gives us a top Zaxxon score.

Greg also tells us about a local arcade hero in Worthing who has "split the screen" on Pac-man.

This is achieved by going beyond the 240th "key" screen which causes the screen to split and the right-hand-side to be covered in coding.

This has been achieved several times in the States but I have not heard of anyone else managing it in Britain.

If Mun-Chi Yip would like to get in touch he should find a secure place in our Record Breakers charts.

All you record breakers should be rushing to your local arcades with the form to be found on page 11 of this magazine where you'll find details of our search for a new champion.

Final note: Martin Stone has also beaten my own transitory record on Pengo... but I'll be back!

GORF
1,511,650
Greg Parsons

PENGO
374,950
Martin Stone

ROBOTRON
3,576,800
Spencer May

FROGGER
137,200
B. Nesbit

MOUSETRAP
621,700
Richard Elliott

SPACE DUNGEON
154,865
Michael Panayotis

MILLPEDE
143,731
David Ross

DONKEY KONG
604,700
P. Eason

HYPERBALL
2,224,200
Nick Starkings

ZAXXON
713,950
Greg Parsons

TEMPEST
1,080,260
Paul Mitchell

AMIDAR
782,010
Adrian Eyre

It's a big day for the new Formula One world champion. His team are testing the new car which they plan to use to defend their championship title in the new season — just a few short weeks away. Today is the day when the champ gets behind the wheel of the new car for the first time. Will he be able to match his world-beating performance and defeat the fastest times of his four-wheeled opponents?

Your aim is to see how long he can survive on a rigorous test circuit. Sounds easy, but there is oil on the track and the cars handling is not good. The object of the game is to survive as many laps as possible in as short a time as possible.

The car slows down in the oil patch and sometimes skids. So watch out! It's not all bad, you can choose the colour of your car and your

testing race circuit.

The program has been written for an Atom with floating point ROM and no colour encoder board. For those Atom owners with a colour encoder board, read "WHITE" as "YELLOW", "BLACK" as "BLUE" etc. For those Atom owners with no "F.P." extension, conversion should be easy: remove all "COLOUR" statements, replace "CLEAR 3" with "CLEAR 2", and re-

RUNS ON AN ATOM IN 12K WITH F.P. ROM

RUNS ON AN ATOM IN 12K WITH F.P. ROM

FORMULA ONE · FORMULA ONE

BY CHRIS JOHNSON

BY CHRIS JOHNSON

BY CHRIS JOHNSON

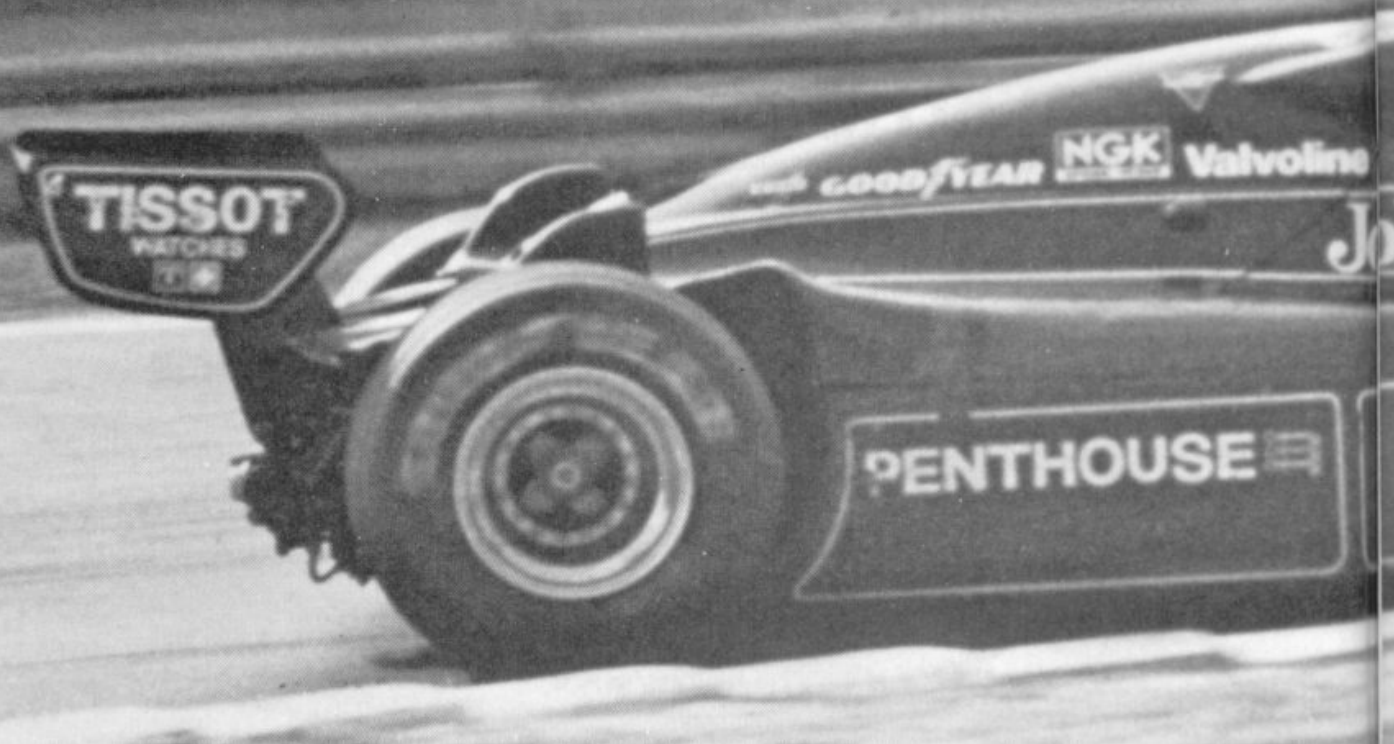
BY CHRIS JOHNSON

```

1 XA=0;XB=0;REM FORMULA ONE by C.G. Johnston
2 P.$12"now the game you've been waitin'"
3 P."for""FROM cj products..." ;B=0
4 F.B=0 TO 120;WAIT;N.;B=0
5 DOB=B+1;P.$7"***FORMULA*one***";U.B=24
6 F.B=1 TO 50;WAIT;N.;P.
  $12"      instructions"
7 P. " YOU ARE DRIVING A CAR ROUND
  A RACING TRACK."
8 P. " THE OBJECT OF THE GAME IS
  TO""SURVIVE THE MOST "
9 P. "NO. OF LAPS."
10 P. " " 'SHIFT'
   =LEFT"" 'REPT.'=RIGHT""
11 IN."COLOUR OF CAR:WHITE:1;BLACK:2"T
  
```

```

12 IF T=1 R=2
13 IF T=2 R=1
14 P."PRESS 'SHIFT' WHEN YOU'VE FOUND
  THE CIRCUIT YOU WANT"
15 P. " ; THEN PRESS SPACE TO START RACE."
18 P. "press return";LI.#FFE3
19 DO
20 CLEAR3
21 Q=0;S=1;O=0
25 COLOUR(R)
30 REM the course
50 H=A.R.%(65-40)+40;I=A.R.%(30-3)+3;
  J=A.R.%(94-70)+70
52 K=A.R.%(110-(I+70))+(I+70);
  L=A.R.%(60-20)+20
60 MOVE 1,1
  
```



place "%A" and "%B" with an array.

The car does not flip round immediately, but moves diagonally and then flips. Release the key once you have "flipped" to prevent the steering from locking.

Go wide coming up to corners and cut the corners as fine as possible. Watch the car does not flip too soon (in the oil patch for example).

For a fast time keep the car

following the best racing line to snatch the quickest time around the track for the maximum possible time. Remember it is the maximum number of laps and then the quickest time in that lap zone which counts.

"SHIFT" moves the car left and "REPT" moves it right.

VARIABLES:

%A: most number of laps

%B: quickest time in zone

A: If A = 1 blank car

B, C: key press counters

D: counter

E, F, G, N: values in keypress

H, I, J, K, L: RND course values

O: time

Q: number of laps

R: colour of circuit

S: lap counter

T: colour of car

U, V, W, Z — "PLOT" function

X, Y: co-ordinates of car

RUNS ON AN ATOM IN 12K WITH F.P. ROM

RUNS ON AN ATOM IN 12K WITH F.P. ROM

FORMULA ONE · FORMULA ONE

BY CHRIS JOHNSON

BY CHRIS JOHNSON

BY CHRIS JOHNSON

BY CHRIS JOHNSON

```
70 DRAW 1,H;DRAW I,H;DRAWI,J
72 DRAW K,J;DRAW K,(H+5);DRAW 125,(H+5)
73 DRAW 125,10;DRAW L,10;DRAWL,1;DRAW1,1
74 REM inside boundary
75 MOVE 16,23
77 DRAW 16,(H-17);DRAW(I+16),(H-17)
79 DRAW(I+16),(J-17);DRAW(K-17),(J-17)
81 DRAW(K-17),(H-7);DRAW 108,(H-7)
83 DRAW108,27;DRAW(L+27),27
85 DRAW(L+27),23
87 DRAW 16,23
89 REM start line
90 GOS.t
93 X=(K-50);Y=(J-8)
95 REM oil slick
```

```
96 GOS.a
101 COLOUR (T)
145 F.U=0 TO 30;WAIT;N.
150 U.?#B001&#80=0
200 LINK#FFE3
299 REM"left + right" movement
300 Z=13;U=12;V=5;W=15;A=1;B=1;C=1;
E=#B001;F=#B002;G=#40
301 N=#80
350aPLOTU,(X-2),(Y+2);PLOTV,(X-2),
(Y-2);PLOTU,(X-1),(Y+3)
360 PLOTV,(X-1),(Y-3);PLOTU,X,(Y+1);
PLOTV,X,(Y-1)
370 PLOTU,(X+1),(Y+2);PLOTV,(X+1),(Y-2);
PLOTU,(X+2),(Y+1)
```





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500 IF?F&G=0;Y=Y-2;X=X+2;B=B+1;C=2
510 IF?E&N=0;Y=Y+2;X=X+2;C=C+1;B=2
515 IF?F&G()0 AND ?E&N()0;X=X+4;C=1;B=1
520 IF B=6 G. b
530 IF C=6 G. c
550 G. a
600 REM "top → bottom" movement
610b PLOTU, (X-2), (Y+3); PLOTV, (X+2), (Y+3);
PLOTU, (X-3), (Y+2)
620 PLOTV, (X+3), (Y+2); PLOTU, (X-1), (Y+1);
PLOTV, (X+1), (Y+1)
630 PLOTU, (X-1), Y; PLOTV, (X+1), Y; PLOTW, X, Y
640 PLOTU, (X-2), (Y-1); PLOTV, (X+2), (Y-1);
PLOTU, (X-1), (Y-2)
650 PLOTV, (X+1), (Y-2)
655 GOS. z
660 IFA=1 A=2;Z=15;V=7;G. b
670 IFA=2 A=1;Z=13;V=5
700 IF?F&G=0;Y=Y-2;X=X-2;B=B+1;C=2
710 IF?E&N=0;Y=Y-2;X=X+2;C=C+1;B=2
720 IF?F&G()0 AND ?E&N()0;Y=Y-4;C=1;B=1
730 IFB=6 G. d
740 IFC=6 G. a
750 G. b
800 REM "bottom → top" movement
810c PLOTU, (X-2), (Y-3); PLOTV, (X+2), (Y-3);
PLOTU, (X-3), (Y-2)
820 PLOTV, (X+3), (Y-2); PLOTU, (X-1), (Y-1);
PLOTV, (X+1), (Y-1)
830 PLOTU, (X-1), Y; PLOTV, (X+1), Y; PLOTW, X, Y
840 PLOTU, (X-2), (Y+1); PLOTV, (X+2), (Y+1);
PLOTU, (X-1), (Y+2)
850 PLOTV, (X+1), (Y+2)
855 GOS. z
860 IFA=1 A=2;Z=15;V=7;G. c
870 IFA=2 A=1;Z=13;V=5
880 IF?F&G=0;Y=Y+2;X=X+2;B=B+1;C=2
885 IF?E&N=0;Y=Y+2;X=X-2;C=C+1;B=2
890 IF?F&G()0 AND ?E&N()0;Y=Y+4;C=1;B=1
895 IFC=6 G. d
897 IFB=6 G. a
898 G. c
900 REM "right → left" movement
950d PLOTU, (X+2), (Y+2); PLOTV, (X+2), (Y-2);
PLOTU, (X+1), (Y+3)
960 PLOTV, (X+1), (Y-3); PLOTU, X, (Y+1);
PLOTV, X, (Y-1)
970 PLOTU, (X-1), (Y+2); PLOTV, (X-1),
(Y-2); PLOTU, (X-2), (Y+1)
980 PLOTV, (X-2), (Y-1); PLOTW, X, Y
994 GOS. z
995 IFA=1 A=2;Z=15;V=7;G. d
997 IFA=2 A=1;Z=13;V=5
1000 IF?F&G=0;Y=Y+2;X=X-2;B=B+1;C=2
1010 IF?E&N=0;Y=Y-2;X=X-2;C=C+1;B=2
1015 IF?F&G()0 AND ?E&N()0;X=X-4;C=1;B=1
1020 IFB=6 G. c
1030 IFC=6 G. b
1040 G. d
2000z REM crash ???
2010 IFX<5 G. y
2020 IF X<(L-2) AND Y<(4G. y
2040 IFY<(J-4) G. y
2050 IF Y<(H+3) AND X<(K-3) G. y

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2055 IFY<(H+3) AND X<(K+2) G. y
2060 IF X<121 G. y
2081 IF Y<5 G. y
2082 IF Y<(H-3) AND X<(I+4) G. y
2085 IF((X<(K-15))&(X<(K+3))&(Y<(H+6))&(Y<(H-10)))G. r
2090 G. x
2095m F.D=1 TO 6;?F=?F&3100;4;N.;0=0+1
2096 IF((X<16)&(Y<(J-18))&(S=0))Q=Q+1;S=1
2097 IF((X<16)&(S=1)&(Y<23))S=0
2099 R.
2200x REM "inside" check
2201 IF((X<(I+13))&(X<(K-13))&(Y<(J-12))&(Y<25))G. y
2204 IFX<110 G. m
2205 IF((X<112)&(X<(K-19))&(Y<(H-3))&(Y<23))G. y
2210 IF Y<(J-14) G. m
2220 IF X<14 G. m
2230 IF X<(K-17) AND Y<(H-5) G. m
2240 IF X<105 G. m
2250 IF X<(L+30) AND Y<25 G. m
2260 IF X<(I+16) AND Y<(H-17) G. m
2270 IF Y<20 G. m
2280 IF Y<(H-14) AND X<(I+14) G. m
2999 REM explosion
3000y COLOUR(R)
3001 F.D=1 TO 15;?F=?F&RND;4;N.
3030 MOVE X, Y
3040 DRAW (X-3), (Y-3); MOVE X, Y; DRAW (X+3),
(Y-3); MOVE X, Y
3050 DRAW(X+3), (Y+3); MOVE X, Y;
DRAW(X-3), (Y+3)
3060 MOVE X, Y; DRAW(X+4), (Y+5)
3065 F.D=1 TO 20;?F=?F&RND;4;N.
3070 MOVE X, Y; DRAW (X-6), (Y+5)
3080 MOVE X, Y; DRAW(X+6), (Y-3)
3090 F.D=1 TO 90;?F=?F&RND;4;N.
3999 REM time, most laps
4000 P. #12;Q=0
4010 P. "TIME = "Q"
4020 P. "NUMBER OF LAPS = "Q"
4028 FIFQ=%A;FIFXB)0;%B=0;G. 4040
4029 FIFQ=%A G. 4040
4030 FIFQ(%A G. 4040
4031 %A=0
4032 %B=0
4040 P. "MOST NUMBER OF LAPS = "%A" IN "%B"
4050 P. "PRESS RETURN TO START AGAIN";
LI. #FFE3;G. 19
5000a REM oil slick
5005 GOS. t; REM re-draw start line
5010 COLOUR 2
5020 F. P=(H+8) TO (H-7) S.-1
5030 MOVEK, P; DRAW(K-17), P
5040 N. P; COLOUR(T); R.
5999 REM skid
6000r GOS. a; IFX<(K-4) G. 2090
6005 IFR. %8=0 GOS. s
6010 G. 2090
6050s F.D=0 TO 180;?F=?F&R. 4;N.
6060 X=X+(A.R. %10); Y=Y+(R. %4); R.
7000t REM start line
7010 COLOUR(T); MOVE(K-50), J; F. M=(J-17)
TO (J) S. 2
7020 PLOT13, (K-50), M; N. M; R.

```



Photograph courtesy of John Player Special

For the best hardware, the best software.

The BBC Microcomputer system is generally regarded to be the best micro in its price range you can lay your hands on. So, if you're thinking of buying one or already own one, you'll want to know about the software that's been specially designed for it.

Not surprisingly, it's made by Acornsoft, the software division of Acorn Computers Ltd., who designed and built the BBC Microcomputer. So naturally you can expect the highest quality software with the built-in ingenuity to fully exploit the BBC Micro's potential.

Further education for everyone.

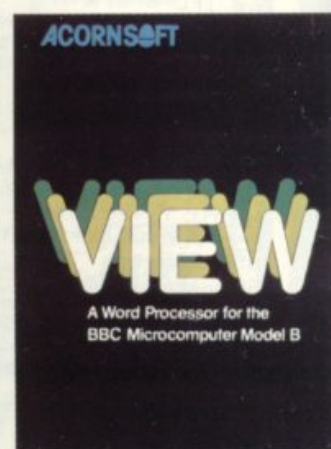
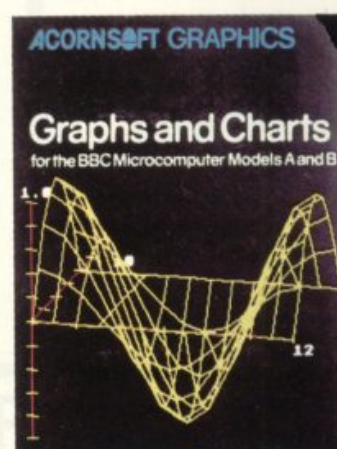
Tree of Knowledge (£9.95) is an interactive program for children of all ages teaching categorisation. It illustrates some of the more practical aspects of computing in that the pupil first educates the computer, building up a database by answering the computer's questions, and the database is then used to play games of deduction and logic.

Word Hunt (£11.90) is a set of four programs, each containing a list of nine words. The object of the exercise is to select one word and then try to create as many smaller words as

possible from the selected word.

Increase your business acumen.

Graphs and Charts (price £17.45) which includes the book 'Graphs and Charts on the BBC Microcomputer' contains a set of programs

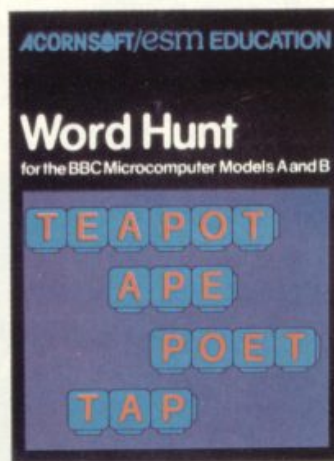
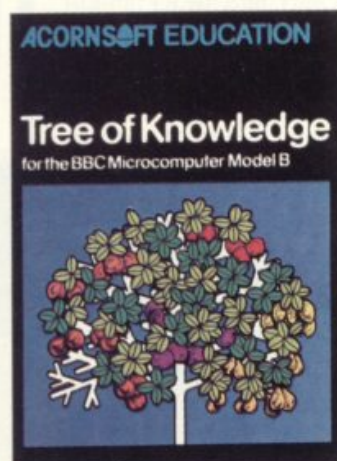


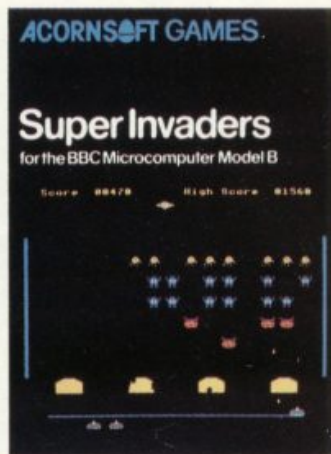
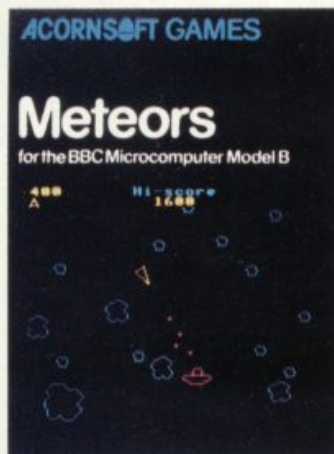
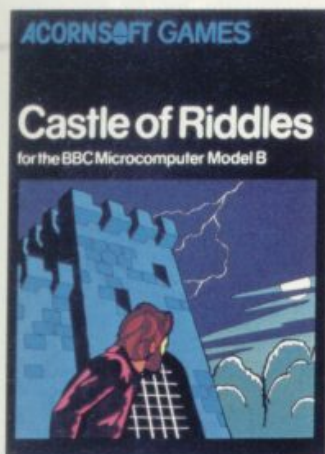
to present data graphically in a wide range of applications. The graphs include automatic scaling, labelling of axes and use of colours.

And VIEW (price £59.80) a program that enables your machine, together with a printer, to operate as a fully operational word processor. For convenience the program is in ROM so that it can become a permanent feature of your machine. (It can easily be fitted by your local dealer). You'll find out more by going to your dealer or by sending for the free catalogue.

Mind-boggling games.

Castle of Riddles (price £9.95) is a magical adventure, with wizardry and hocus pocus of all kinds; booby traps and fiendish riddles to be unravelled along the tortuous route to the Magic Ring of Power. Your reward is to keep the





How to get Acornsoft programs.

If you're a credit card holder and would like to buy cassettes of the programs shown in this advertisement, or if you would like to know the address of your nearest stockist, just phone 01-200 0200.

Alternatively, you

treasure you find along the way.

Meteors (price £9.95) is a game where you have to manoeuvre your laser-ship through a hail of meteors, smashing them with your laser bolts as they hurtle towards you on all sides. Complete with sound effects and table of Hi-Scores.

Super Invaders (price £9.95) is a fight against invading aliens. The only way to resist and avoid subsequent annihilation is to destroy the aliens before they land. You have three mobile launchers whose hyper-velocity missiles will instantly vaporise their target on impact. This game includes high-score, and is fully compatible with either keyboard or joysticks.


Understanding computers.

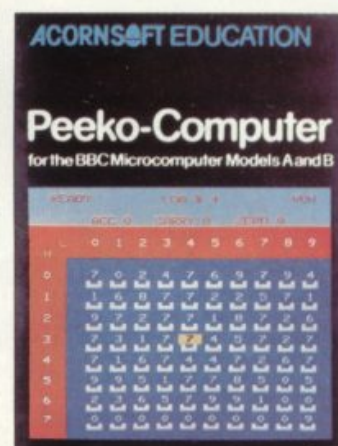
Peeko-Computer (price £9.95) simulates the operation of a simplified microcomputer in order to teach the fundamentals of machine-code programming. It comes complete with a 16 page instruction manual including exercises and examples, and the cassette features five demonstration Peeko-Computer programs.

can buy the cassettes directly by sending off the order form below to: Acornsoft, c/o Vector Marketing, Denington Estate, Wellingborough, Northants NN8 2RL.

Also use this form if you would like to receive the current free Acornsoft catalogue.

Please allow 28 days for delivery.

 Credit Card Holders. Telephone 01-200 0200.



To: Acornsoft, c/o Vector Marketing, Denington Estate, Wellingborough, Northants NN8 2RL.

Please send me the following:-

PROGRAM	PRICE	QUANTITY	TOTAL	(Code Acornsoft use only)
Tree of Knowledge	£9.95			SBE04
Word Hunt	£11.90			SBE05
Graphs & Charts	£17.45			SBN02/SBD02
Castle of Riddles	£9.95			SBG17
Meteors	£9.95			SBG13
Super Invaders	£9.95			SBG16
Peeko-Computer	£9.95			SBE02

TOTAL

I enclose PO/cheque payable to Acornsoft Ltd. Or charge my credit card.

Card Number

(Amex/Diners/Visa/Access (Delete))

Please send me the Acornsoft brochure ☐

Please send me the VIEW catalogue ☐

Name

Address

Postcode

Signature

Registered No. 1524763

CVG5

VAT No. 215 8123 85

ACORNSOFT

[illegible][illegible]

Have you got an appetite for numbers? Then this is the game for you — or rather for your snake. You haven't got a snake? Never fear — you'll find one in the Number Patch. You control a snake with a big appetite. For numbers. But only the right numbers. He's a bit of a gourmet this snake, he'll only eat the numbers 0, 1, 2, 3, 4, 5 and 6. If he eats a 7, 8 or 9 then he'll suffer a fatal case of food poisoning. You'll also come to a sticky end if you run into the wall of the number patch — or if you start eating your own tail!

Full instructions are included in the program as an aid to your eating habits. We hope it all adds up to a good game! Bon Appetite!

```

100 PRINT "Q: GOSUB880:HI=0
110 REM ***** SET UP VARIABLES *****
120 K=18:SC=0:LV=0
130 N=0:A1=0:A2=0:A3=0:A4=0:A5=0:A6=0:J=(K/3)*2
140 GOSUB580
150 REM ***** MOVEMENT *****
160 A=32768+540*X=251
170 POKER,X:POKER1,81
180 IFPEEK(166)=28THENN=40:V=236
190 IFPEEK(166)=36THENN=40:V=254
190 IFPEEK(166)=24THENN=1:X=236
200 IFPEEK(166)=32THENN=-1:X=251
210 IFPEEK(166)=32THENN=1:X=251
220 IFN=0THENGOTO170
230 Z=PEEK(A+N)
240 IFZ<320RZ>54THENGOTO290
250 IFZ<47ANDZ<55THENGOSUB480
260 A6=A5:A5=A4:A4=A3:A3=A2:A2=A1:A1=A:A=A+N
270 POKER6,32:GOTO170
280 REM ***** DEATH SCENE *****
290 M=0:IFSC=HITTHENHI=SC:M=1
300 PRINT "YOU JUST KILLED YOURSELF. TUIT !!!"
310 IFZ=91THENGOSUB1130
320 IFZ=102THENGOSUB1160
330 IFZ<54ANDZ<58THENGOSUB1190
340 PRINT "*****YOUR SCORE IS*****"
350 PRINT "*****HIGH SCORE IS*****"
360 IFM=1THENGOTO400
370 PRINT "HARD LUCK. YOU DIDN'T BEAT THE HIGH"
380 PRINT "SCORE !!! BUT THIS DOESN'T MEAN YOU'RE"
390 PRINT "A TOTAL FAILURE !!!"GOTO410
400 PRINT "WELL DONE, YOU GOT THE HIGH SCORE !!!"
410 PRINT "PRESS 1 TO SEE THE INSTRUCTIONS AGAIN !!!"
420 PRINT "PLAY THE ACTUAL GAME AGAIN (Y/N)"
430 GETA:IF A="Y"THENPRINT "Q: GOTO120"
440 IF A="N"THENEND
450 IF A="N"THENEND
460 GOTO430

```

RUNS ON A PET IN 4K

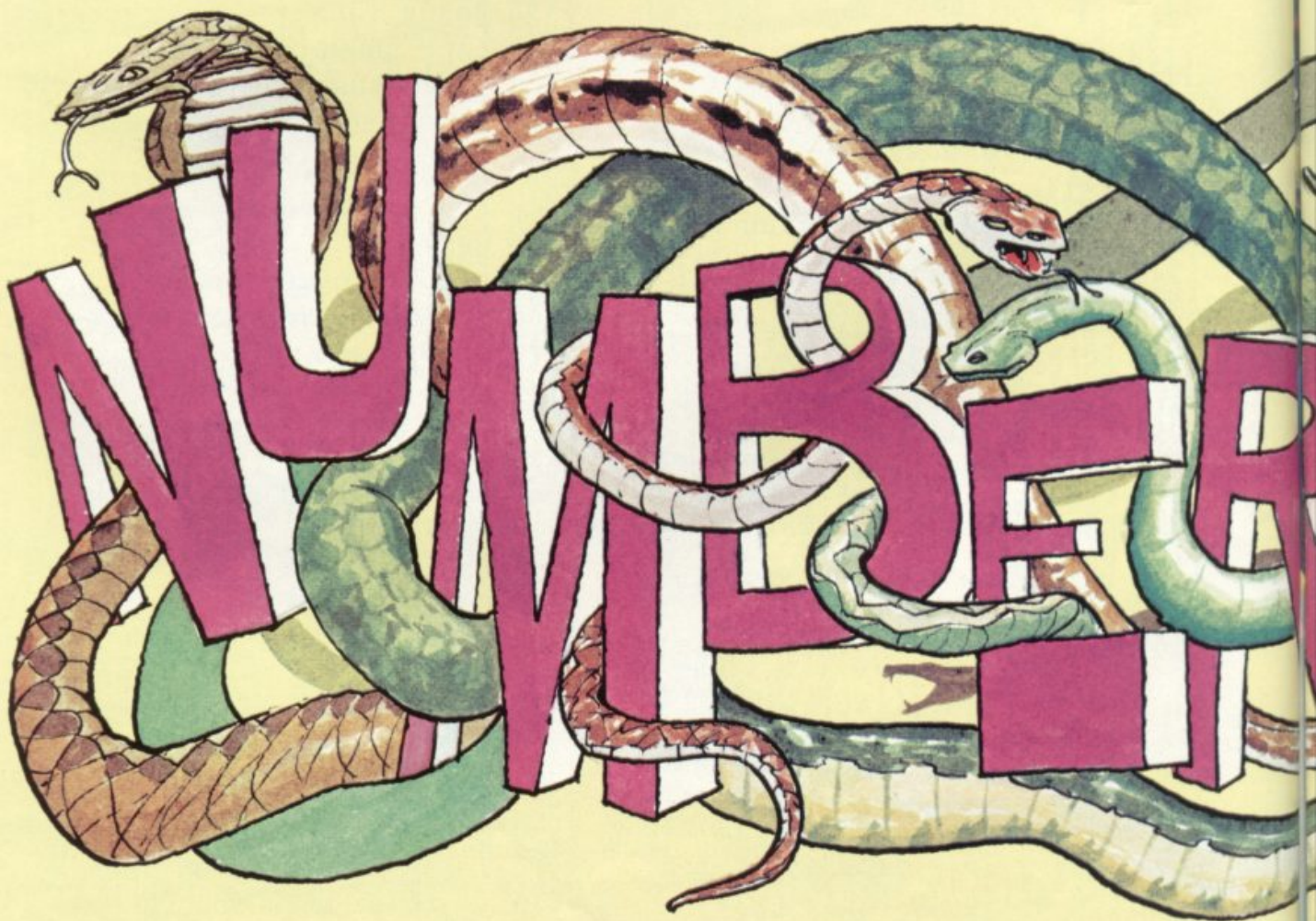


Illustration: Jon Davis


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470 REM ***** SCORING *****
480 I=1:IF I=0 THEN GOTO 520
490 SC=SC+(Z-48)*PRINT"83 SCORE =" : SC
500 RETURN
510 REM ***** ONTO NEXT LEVEL *****
520 PRINT"CONGRATULATIONS. YOU'VE GRADUATED ONTO"
530 PRINT"THE NEXT LEVEL. I#1#2!"
540 FOR I=1 TO 1000:NEXT I:LV=LV+1
550 IF LV=5 THEN LV=0:K=K+12:SC=SC+200
560 GOSUB 8740:GOTO 130
570 REM ***** DRAW SCREEN *****
580 FOR I=1 TO 40
590 POKE 32767+I,102:POKE 33767-40+I,102
600 NEXT I
610 FOR I=32768 TO 33767 STEP 40:POKE I,102:POKE I+39,102:NEXT I
620 FOR I=1 TO J
630 P=INT(7*RND(1))+48
640 Q=INT(1000*RND(1))+32768:IF Q=32768+540 THEN 610
650 IF PEEK(Q) < 32 THEN 690
660 POKE Q,P:NEXT I
670 FOR I=1 TO K/3
680 P=INT(3*RND(1))+55
690 Q=INT(1000*RND(1))+32768:IF Q=32768+540 THEN 690
700 IF PEEK(Q) < 32 THEN 690
710 POKE Q,P:NEXT I
720 PRINT"83 SCORE =" : SC:RETURN
730 REM ***** SET UP LEVELS *****
740 PRINT"J" : FOR Q=0 TO LV
750 Q=Q+1:GOSUB 8770:790:820:840
760 NEXT Q:SC=SC+(25*LV):K=K+6:RETURN
770 PRINT"J" : FOR I=32787 TO 32968 STEP 40:POKE I,102:NEXT I
780 FOR I=33747 TO 33957 STEP 40:POKE I,102:NEXT I:RETURN
790 FOR I=1 TO 10
800 POKE 33247+I,102
810 POKE 33276+I,102:NEXT I:RETURN
820 FOR I=0 TO 10:POKE 33262+I,102:NEXT I
830 FOR I=33067 TO 33467 STEP 40:POKE I,102:NEXT I:RETURN
840 FOR I=1 TO 20

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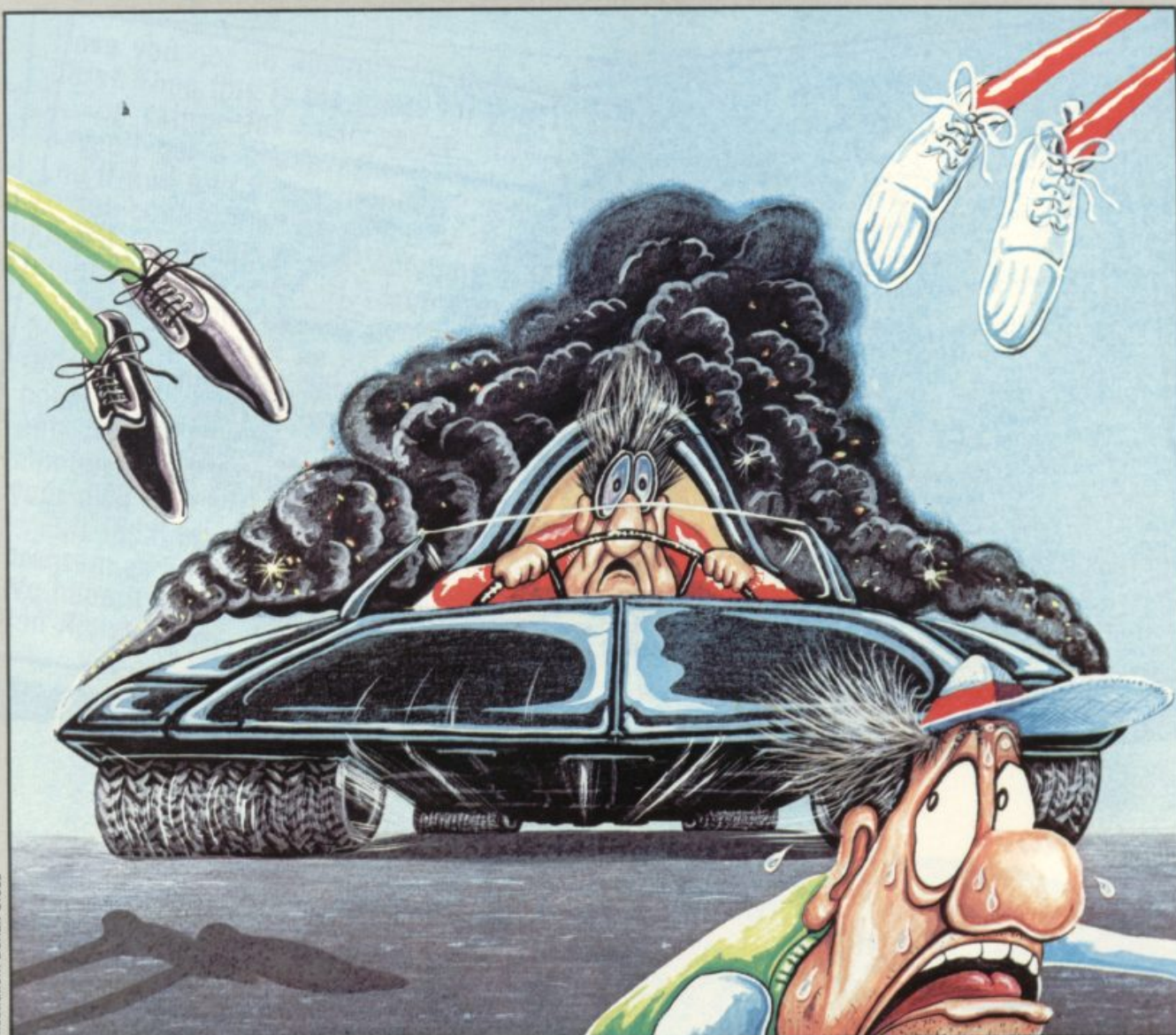
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950 Q=INT(1000*RND(1))+32768
960 POKE Q,102:NEXT I:RETURN
970 REM ***** INSTRUCTIONS *****
980 PRINT"NUMBER PATCH...BY L.D.NICHOLS"
990 PRINT"
1000 PRINT"YOU ARE A SNAKE!! TO KEEP ALIVE YOU MUST"
1010 PRINT"EAT NUMBERS. BUT THE RIGHT NUMBERS ARE 0,1,2,3,4,5 AND 6"
1020 PRINT"AND THE WRONG NUMBERS ARE 7,8 AND 9!!"
1030 PRINT"IF YOU EAT A RIGHT NUMBER IT WILL BE"
1040 PRINT"ADDED TO YOUR SCORE. IF YOU EAT A WRONG"
1050 PRINT"NUMBER, YOU WILL DIE (THEY DO SOMETHING"
1060 PRINT"TO YOUR DIGESTIVE SYSTEM). YOU WILL ALSO"
1070 PRINT"DIE IF YOU HIT THE WALL OR IF YOU TRY TO"
1080 PRINT"EAT YOURSELF !!!"
1090 PRINT"PRESS THE SPACE BAR TO CONTINUE"
1100 WAIT 59410.4,4
1110 PRINT"THE SYMBOLS ARE -"
1120 PRINT"X = PIECE OF WALL"
1130 PRINT"X = YOUR HEAD + A PIECE OF YOUR BODY"
1140 PRINT"X = A NUMBER !!!"
1150 PRINT"AND A NUMBER IS A NUMBER !!!"
1160 PRINT"TO CONTROL YOURSELF -"
1170 PRINT"
1180 PRINT"
1190 PRINT"(LEFT) 2 (RIGHT) 2
1200 PRINT"
1210 PRINT"PRESS THE SPACE BAR TO PLAY THE GAME"
1220 PRINT"
1230 PRINT"
1240 PRINT"
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10000 PRINT"

```

BY L. D. NICHOLS





```

5 LET X$=""
6 LET T=0
7 GOSUB 4000
10 CLS
11 PRINT "
20 PRINT "
30 PRINT "
40 PRINT "
50 PRINT "
60 PRINT "
70 PRINT "
80 PRINT "
90 PRINT "
100 PRINT "
110 PRINT "
120 PRINT "
130 PRINT "
140 PRINT "
150 PRINT "
160 PRINT "
170 PRINT "
180 PRINT "
190 PRINT "
200 PRINT "
210 PRINT "
220 PRINT "
230 LET A=PEEK 16396+256*PEEK 1
6397+1
235 IF LEV=2 THEN GOSUB 5000
240 LET A=A+641
250 LET T$=INKEY$
251 IF T$<>" " AND T$<>"0" AND T
$<>"9" THEN LET X$=T$
255 POKE A,0
260 IF X$="6" THEN LET A=A+1
270 IF X$="7" THEN LET A=A-33
280 IF X$="8" THEN LET A=A+33
290 IF X$="5" THEN LET A=A-1
300 IF PEEK A=134 THEN GOTO 200
0
305 LET T=T+1
310 IF PEEK A=128 THEN GOTO 700
315 IF PEEK A=8 THEN GOTO 6000
320 IF X$="7" OR X$="6" THEN PO
KE A,45
322 IF X$="8" OR X$="5" THEN PO
KE A,46
325 IF INKEY$="P" THEN LET X$="
326 IF X$="" THEN POKE A,46

```


PROGRAM NOTES:

11-220: Print track
250-330: Main loop
700-880: Crash display
890-930: Prompt user with "Another go?"
1000-1260: Spectacular start display
1220: Makes the computer pause
2000-2140: Finish the course alive display
3000-3060: Prints "CHEAT" if user goes backwards over the start line
4000-4250: Prompt user with "Enter Level"
5000-5040: Print random oil slicks on the track (level 2 only)
6000-6140: Print "SKID" if you hit an oil slick
9000-9020: Save the program so that it can run automatically on loading.

VARIABLES:

XS — Direction car is travelling (5, 6, 7 or 8)
T — Time
A — Position of car in D-FILE
LEV — Level (1 or 2)
TS — Key being pressed
X — Multi purpose variable used all through the program
G — Pause (only used in line 870)
Y — COS (32/X) — used as a pause
Z1 — Random position of oil slick (Z1 + D-FILE)
Z — Number of oil slicks (line 5000 — FOR/NEXT loop)
SS — "DODGEM". Print SS would give "DODGE", because it is used for SAVEing the program.

Rev-up your sleek black racer for a challenging time-trial. All you have to do is guide your car around the circuit in the fastest possible time.

To make the challenge harder the author has built in two skill levels.

The first simply asks you to negotiate the twists and turns of the circuit, but the second introduces an oil slick hazard, which you must avoid at all costs!

The slicks appear at random positions on the screen and if you hit one the computer will

flash up a SKID! message.

Your car is represented by an 'T' when it is going left or right, and an 'H' going up or down. Control keys are '5'-left, '6'-down, '7'-up, '8'-right and '0'-stop. When the car is moving it will continue in that

direction until another key is pressed.

When this program has been entered, to save it on to cassette, type 'GOTO 9000'. This way it will run automatically on loading, and will print out the spectacular starting display.

RUNS ON A SINCLAIR ZX81 IN 4K

DODGEMS

BY MATTHEW WILKES

```
330 GOTO 250
700 PRINT AT 0,0;
705 FAST
710 FOR X=0 TO 6
720 PRINT AT X,15;" "
730 PRINT AT X,(X+2);" "
740 PRINT AT X,(29-X);" "
750 NEXT X
760 PRINT
770 PRINT TAB 4;" "
780 PRINT TAB 4;" "
790 PRINT TAB 4;" "
800 PRINT TAB 7;" "
810 PRINT TAB 4;" "
820 FOR X=14 TO 21
830 PRINT AT X,15;" "
840 PRINT AT X,(22-X);" "
850 PRINT AT X,(X+9);" "
860 NEXT X
865 SLOW
867 POKE A,CODE " "
870 FOR G=1 TO 100
880 NEXT G
890 PRINT AT 21,0;"DO YOU WANT
ANOTHER GO?"
900 IF INKEY$="" THEN GOTO 910
910 IF INKEY$="Y" THEN RUN
915 IF INKEY$="N" THEN GOTO 940
920 LET X$=""
930 GOTO 910
940 CLS
```

```
950 PRINT AT 10,10;"STOPPED"
960 STOP
1000 CLS
1010 PRINT " "
1020 PRINT " "
1030 PRINT " "
1035 PRINT " "
1040 PRINT " "
1050 PRINT " "
1060 PRINT " "
1070 PRINT " "
1080 PRINT " "
1090 PRINT " "
1100 PRINT " "
1110 PRINT " "
1120 PRINT " "
1130 PRINT " "
1140 PRINT " "
1150 PRINT " "
1155 PRINT " "
1160 PRINT " "
1165 PRINT " "
1170 PRINT " "
1180 PRINT " "
1185 FOR X=1 TO 5
1186 NEXT X
1190 LET A$="NEWLINE"
1200 FOR X=1 TO 7
```




```

1205 IF INKEY$=CHR$ 118 THEN RUN
1210 PRINT AT 21,6+X;A$(X)
1220 LET Y=INT (COS (32/X))
1225 NEXT X
1230 PRINT AT 21,7;"REELINE"
1240 FOR X=1 TO 10
1245 IF INKEY$=CHR$ 118 THEN RUN

1250 NEXT X
1255 PRINT AT 21,7;"
1256 FOR X=1 TO 5
1257 NEXT X
1260 GOTO 1190
2000 IF X$<>"5" THEN GOTO 3000
2010 CLS
2020 PRINT " 000 0 0 0 0 0"
2030 PRINT "0 0 0 0 0 0 0"
2040 PRINT "0 0 0 0 0 0 0"
2050 PRINT "0 0 0 0 0 0 0"
2060 PRINT "0 0 0 0 0 0 0"
2070 PRINT "0 0 0 0 0 0 0"
2080 PRINT " 000 0 0 0 0 0"
2090 PRINT
2100 PRINT "YOU MADE IT ALIVE,"
2110 PRINT "I AM SUPRISED."
2120 PRINT
2130 PRINT "YOUR TIME = ";T
2140 GOTO 890
3000 PRINT AT 0,0;
3010 PRINT "CCCC H H EEEEE"
AAA TTTT "0" H H E A
3020 PRINT "C H H E A
A T "0" HHHH EEE A
3030 PRINT "C H H E A
AAAA T "0" H H E A
3040 PRINT "C CCCC H H EEEEE A
A T "0"
3050 PRINT "CCCC H H EEEEE A
A T "0"
3060 GOTO 890
4000 CLS
4010 PRINT "EEEEEE N N TTTT EE
EEE RRRR"
4020 PRINT "E NN N T E
R R"
4030 PRINT "EEE N N N T EE
E RRRR"
4040 PRINT "E N NN T E
R R"
4050 PRINT "E N N T E
R R"
4060 PRINT "EEEEEE N N T EE
EEE R R"
4070 PRINT
4075 PRINT
4080 PRINT "L EEEEE U U EE
EEE L"

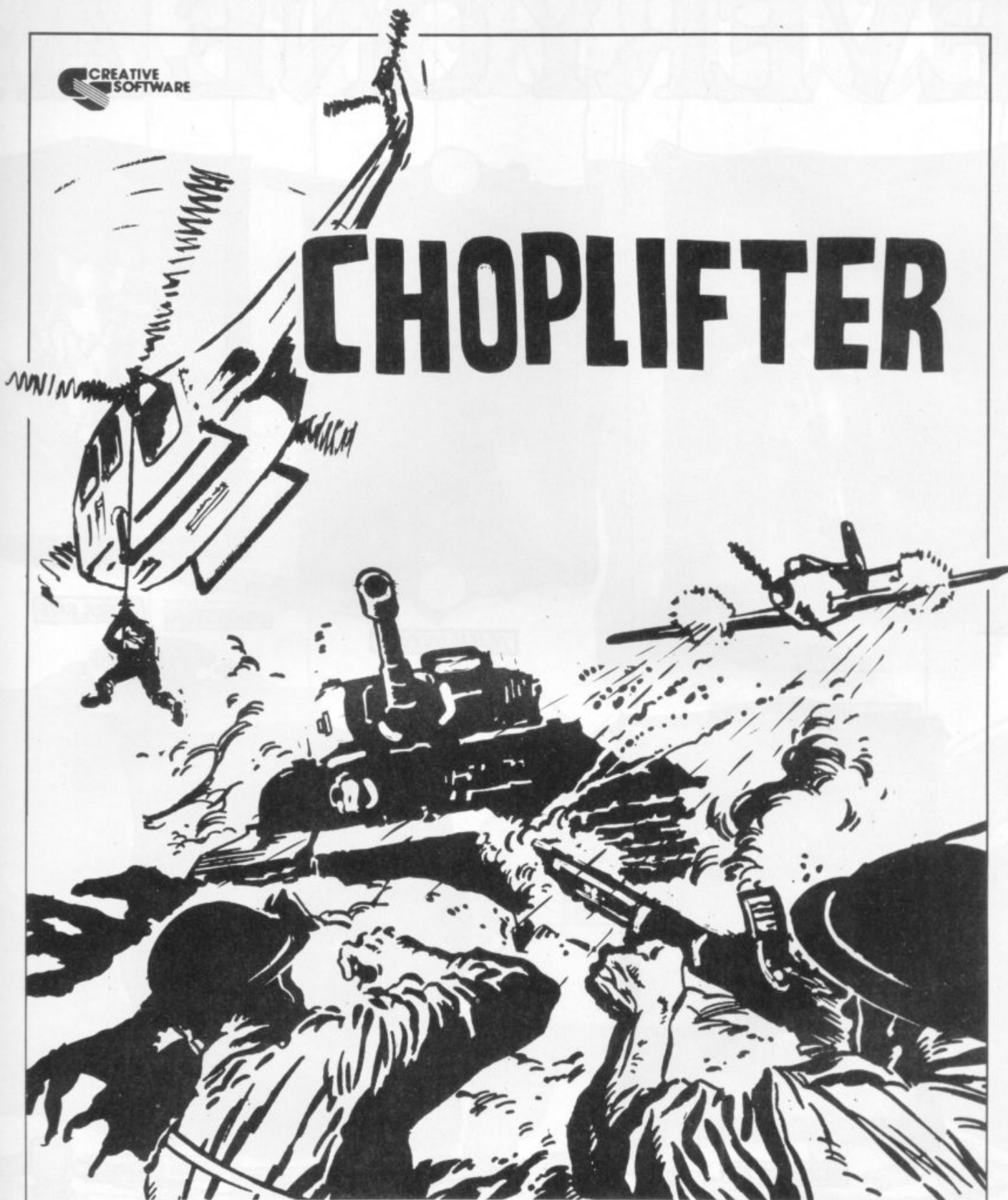
```

```

4090 PRINT "L E U U E
L"
4100 PRINT "L EEE U U EE
E L"
4110 PRINT "L E U U E
L"
4120 PRINT "L E U E
L"
4130 PRINT "LLLLL EEEEE U EE
EEE LLLLL"
4140 PRINT
4150 PRINT "1 = NORMAL TRACK,"
4160 PRINT
4170 PRINT "2 = OIL SLICKS."
4180 PRINT
4190 PRINT "LEVEL = ";
4200 INPUT LEV
4205 IF LEV<>1 AND LEV<>2 THEN G
OTO 4000
4210 PRINT LEV
4220 PRINT
4230 PRINT "PRESS ANY KEY TO STA
RT GAME."
4240 IF INKEY$="" THEN GOTO 4240
4250 RETURN
5000 FOR Z=1 TO INT (AND*10)+10
5010 LET Z1=INT (AND*700)
5020 IF PEEK (A+Z1)=0 THEN POKE
A+Z1,8
5030 NEXT Z
5040 RETURN
6000 CLS
6010 PRINT " SSS K K IIIII DO
"
6020 PRINT "S K K I D
D"
6030 PRINT "S K K I D
D"
6040 PRINT " SSS KK I D
D"
6050 PRINT " S K K I D
D"
6060 PRINT "S S K K I D
D"
6070 PRINT " SSS K K IIIII DO
"
6080 PRINT
6090 PRINT
6100 PRINT
6110 PRINT "OIL SLICKS"
6120 PRINT
6130 PRINT
6140 GOTO 890
9000 LET S$="DODGEM"
9010 SAVE S$
9020 RUN 1000

```


CHOPLIFTER



The game that is taking the States by storm is now available for the VIC-20. CHOPLIFTER. Another fine game distributed by Audiogenic.

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I know we've had some weird and wonderful games tucked away within the pages of Computer and Video Games — but this one just about tops the lot.

It's the ideal pastime for those of you who like talking about your illnesses, or trips to hospital, or visits to the doctor... that sort of stuff. In fact you could call this C&VG's contribution to the health of the nation.

You may not believe it, but here's a brief rundown of what you'll get if you feed this into your Vic. Are you sitting comfortably? Then I'll begin. You are sitting in a doctor's

```

1 PRINT "WELCOME TO DR. VIC'S SURGERY. PLEASE MAKE YOURSELF COMFORTABLE"
2 PRINT "AND TELL HIM YOUR PROBLEM!"
3 POKE 36878, 15: V9=36876
5 GOSUB 380
10 L$=H$: B$="" : PRINT "Q1";
40 GETH$: IF H$="" THEN POKE V9, 0: GOTO 40
50 V=ASC(H$): IF (V=13 OR V=20) AND B$="" THEN 40
55 POKE V9, INT(RND(0)*80)+131
60 IF V=13 THEN PRINT "Q2": GOTO 110
70 PRINT H$: IF V=20 THEN B$=LEFT$(B$, LEN(B$)-1): GOTO 40
80 IF V=44 THEN H$=""
90 IF V<39 THEN B$=B$+H$
100 GOTO 40
110 H$=B$+" ": L=LEN(H$): POKE V9, 0: IF TI#<"000250" GOTO 130
120 PRINT "TIME UP!!"
125 GOTO 1000
130 IF L>30 THEN PRINT "DON'T YOU SAY LONG SENTENCES!": PRINT "PLEASE EXPLAIN!": GOTO 30
140 IF H$=L$ THEN PRINT "WHY ARE YOU REPEATING YOURSELF?": GOTO 30
160 FOR J=1 TO L: T$(J)="": NEXT J: X=0: Z=1: FOR J=1 TO L
170 IF MID$(H$, J, 1)=" " THEN X=X+1: T$(X)=MID$(H$, Z, J-Z): Z=J+1
180 NEXT J
190 FOR J=1 TO X: K$=K$(J1): FOR J=1 TO X: T$=T$(J)
200 IF K$=T$+T$(J+1) THEN K$=J1: J=X: J1=A: GOTO 220
210 IF K$=T$ THEN K$=J1: J=X: J1=A: GOTO 220
215 POKE V9, INT(RND(0)*100)+155
220 IF RIGHT$(T$(X), 3)="BYE" THEN SD=1
225 NEXT J, J1
230 POKE V9, 0
240 IF K$=0 THEN PRINT "I UNDERSTAND": PRINT "PLEASE CONTINUE": GOTO 360
250 PRINT T$(K)
260 IF SD=1 THEN POKE V9, 0: GOTO 1000
360 K=0: GOTO 30

```

Dr. Vic

RUNS ON AN UNEXPANDED VIC-20

BY L. BRAIN





surgery. Let's call our friendly GP Doctor Vic.

All you have to do is tell the good doctor your problems. Then the doctor will tell you what's wrong with you.

If you've programmed this in I've got a good idea what's wrong — but we don't want to lose any readers so I won't say anything!

And that's about it really—except you'll probably die laughing at the dear doctor's diagnosis! If you are feeling down in the dumps then the C&VG doctor will soon have you in stitches...

Program notes:

Lines; 1-400: main loop.
480-500: key words the computer responds to.
600-760: responses to your sentences.
1000-1060: end of program routine and diagnosis.

Illustrations: Terry Rogers

```

380 A=40:B=40:DIMK$(A),R$(B):TI$="000000"
390 FORJ=1TOA:READK$(J):NEXT
395 FORJ=1TOR:READR$(J):NEXT
400 RETURN
480 DATA IM,IAM,ICANT,INONT,IDONT,WANTA,WANTTO,IFEEL,CANI,CANTI,CANYOU,DONTYOU,
APEYOU
490 DATA WHO,HOW,WHAT,WHERE,WHEN,WHY,YOURE,YOURE,YOUR,YOU,MY,SORRY,YES,NO,HATE
LOVE
500 DATA THINK,GOOD,FRIEND,MONEY,IF,GREAT,COMPUTER,FOOD,SHUTUP,GOODBYE,BYE
500 DATA DID YOU THINK I'D BE SHOCKED TO HEAR THAT?,HOW LONG HAVE YOU BEEN LIVE
THAT?
510 DATA ONE NEVER KNOWS UNLESS ONE TRIES!,IS THAT WHY YOU WANT MY HELP?
520 DATA DO YOU WISH YOU COULD?,BUT WHAT IF YOU NEVER GOT IT?,WHY DO YOU WANT I
DO IT?
530 DATA WHAT DO THESE FEELINGS SUGGEST TO YOU?,DO YOU REALLY WANT TO DO IT?
540 DATA WOULD IT HELP IF YOU COULD,WOULD IT HELP YOU?
550 DATA WHY ARE YOU CURIOUS TO KNOW IF I DO?,CAN YOU EXPLAIN WHY YOU ASKED
THAT?
560 DATA WHY DO YOU ASK THAT?,IS THAT OF INTEREST TO YOU?,PLEASE EXPLAIN!
565 DATA CAN YOU EXPLAIN WHY YOU ASKED THAT?,DO YOU REALLY WANT TO KNOW?
570 DATA CAN YOU CLARIFY THAT QUESTION?,WHY BRING ME INTO IT?
575 DATA PERHAPS IT'S ONLY IN YOUR IMAGINATION?
580 DATA "I THINK YOU ARE SUBCONSCIOUSLY TALKING ABOUT YOURSELF"
585 DATA HAVE YOU DEVELOPED AN INFATUATION FOR ME?,REALLY!?
590 DATA WHY ARE YOU APOLOGIZING?,WHAT MAKES YOU SAY YES?
700 DATA I THINK YOU REALLY WANTED TO SAY YES!,HAVE YOU ALWAYS HAD THIS HA
TE
710 DATA HOW REAL IS THIS LOVE?,YOU DON'T SEEM SURE!
720 DATA CAN YOU ELABORATE ON THAT?,DOES THE SUBJECT OF FRIENDS DISTURB YOU?
730 DATA WHY IS MONEY IMPORTANT TO YOU?,YOU DON'T SEEM SURE!
740 DATA WHAT DO YOU MEAN BY GREAT?,WHY DO COMPUTERS COME TO MIND?
750 DATA WHAT FOOD DO YOU LIKE MOST?,WHY DO YOU WANT ME TO SHUTUP?
760 DATA THAT WILL BE TEN FOUND,PLEASE, THANK YOU FOR TALKING TO ME
1000 DATA FARRANOID,AGNOSTIC,A BARRATOR,A GLUTON,A BIT SENTENTIOUS,A SCOTOPHAG
US
1010 FORV=1TO6:READV$(V):NEXT
1020 LETO=INT(RND(0)*6)+1
1030 PRINT"MY DIAGNOSIS IS YOU ARE"
1040 PRINT"*****"$(Q)
1045 CLR
1050 PRINT"NEXT PATIENT PLEASE"
1060 GOTO2

```


1090 REM
1100 REM The routine at lines 2440-2540
BBC User Guide

were found on page 432 of the

```

1110 REM
1120 ON ERROR GOTO 2550
1130 *TV255
1140 MODE 1
1150 VDU 19,2,6,0,0,0
1160 VDU 19,3,2,0,0,0
1170 VDU 23,230,16,16,146,254,254,254,130
1180 VDU 23,231,1,18,52,120,254,60,24,16
1190 VDU 23,232,252,120,120,127,120,120,252,0
1200 VDU 23,233,16,24,60,254,120,52,18,1
1210 VDU 23,234,65,127,127,127,127,73,8,8
1220 VDU 23,235,8,24,60,127,30,44,72,128
1230 VDU 23,236,0,63,30,30,254,30,30,63
1240 VDU 23,237,128,72,44,30,127,60,24,8
1250 VDU 23,238,0,60,66,90,90,66,60,0
1260 VDU 23,239,0,0,0,8,0,0,0,0
1270 PRINT:PRINT:COLOUR 1
1280 PRINT"
1290 PRINT:PRINT"The object of the game is to blow up your opponents tank"
1300 COLOUR 3
1310 PRINT:PRINT"The control keys are:"
1320 PRINT:COLOUR 1
1330 PRINT"          ";CHR$(230);
1340 COLOUR 2:PRINT"          ";CHR$(230);
1350 COLOUR 3
1360 PRINT
1370 PRINT"Clockwise          D          : "
1380 PRINT"Anti clockwise      A          L "
1390 PRINT"Forward              S          ; "
1400 PRINT"Fire                    W          P "
1410 PRINT:PRINT"Good luck"
1420 PRINT:PRINT"Hit "
1430 COLOUR 1:PRINT"RETURN"
1440 INPUT V$
1450 COLOUR 3.
1460 CLS
1470 PRINT:PRINT:PRINT
1480 PRINT"Enter number of trees.(1-200)"
1490 INPUT NT
1500 IF NT>201 THEN GOTO 1480
1510 PRINT"Enter '1' for curvey shells"
1520 INPUT CX
1530 PRINT "Enter '1' to be able to blow up trees."
1540 INPUT DX
1550 CLS
1560 VDU 23:8202;0;0;0
1570 COLOUR 3
1580 FOR N=0 TO 39
1590 VDU 31,N,0:PRINTCHR$(238)
1600 VDU 31,N,29:PRINTCHR$(238)
1610 NEXT
1620 FOR N=0 TO 29
1630 VDU 31,0,N:PRINTCHR$(238)
1640 VDU 31,39,N:PRINTCHR$(238)
1650 NEXT
1660 FOR N=1 TO NT
1670 X=RND(39):Y=RND(29)
1680 A$=FNREADCH(X,Y)
1690 IF A$<>" " THEN GOTO 1670
1700 VDU 31,X,Y:PRINTCHR$(238)
1710 NEXT
1720 DIM C$(2):DIM A$(2):DIM F$(2):DIM S$(2):DIM X(2):DIM Y(2):DIM XX(2):DIM YY(2)
:DIM P(2):DIM U(2):DIM Q(8):DIM R(8)
1730 C$(1)="D":A$(1)="A":F$(1)="S":S$(1)="W"
1740 C$(2)="":A$(2)="L":F$(2)="":S$(2)="P":X(1)=5:Y(1)=25:Y(2)=5:X(2)=35:XX(1)
)=0:XX(2)=0:P(1)=1:P(2)=5:Q(1)=0:Q(2)=1:Q(3)=1:Q(4)=1:Q(5)=0:Q(6)=1:Q(7)=-1:Q(8)
)=-1
1750 R(1)=-1:R(2)=-1:R(3)=0:R(4)=1:R(5)=1:R(6)=1:R(7)=0:R(8)=-1:PP=0
1760 SOUND 1,0,5,2
1770 FOR N=1 TO 2
1780 COLOUR N
1790 VDU 31,X(N),Y(N):PRINTCHR$(229+P(N))
1800 NEXT N
1810 REM
1820 T$=INKEY$(0)
1830 *FX15,1
1840 FOR N=1 TO 2
1850 IF N=1 THEN M=2 ELSE M=1
1860 COLOUR N
1870 IF T$<>C$(N) THEN GOTO 1910
1880 P(N)=P(N)+1:SOUND N+1,-6,20+N*2,3
1890 IF P(N)=9 THEN P(N)=1
1900 VDU 31,X(N),Y(N):PRINTCHR$(229+P(N)):GOTO 2030
1910 IF T$<>A$(N) THEN GOTO 1950
1920 P(N)=P(N)-1:SOUND N+1,-6,25+N*2,3
1930 IF P(N)=0 THEN LET P(N)=8
1940 VDU 31,X(N),Y(N):PRINTCHR$(229+P(N)):GOTO 2030
1950 IF T$<>F$(N) THEN GOTO 2030
1960 SOUND N+1,-10,N+1,3
1970 VDU 31 X(N),Y(N):PRINT" "
1980 D=P(N)
1990 X(N)=X(N)+Q(D):Y(N)=Y(N)+R(D)
2000 J$=FNREADCH(X(N),Y(N))
2010 IF J$<>" " THEN GOTO 2230
2020 VDU 31 X(N),Y(N):PRINTCHR$(229+P(N))
2030 IF T$=S$(N) AND XX(N)=0 THEN XX(N)=X(N)+Q(P(N)):YY(N)=Y(N)+R(P(N)):U(N)=P
(N):PP=1:SOUND 0,-15,4,1:SOUND 0,-15,6,2

```

Illustration: Jon Davis



TANK

RUNS ON A BBC MODEL B

Sherman, Panzer, Churchill, Tiger — everyone's playing Tank Battle! Start making tracks to the battlefield by programming in this all-action war-game simulation. But don't get your turret in a twist otherwise you'll be suffering from shell-shock!



TANK BATTLE

B IN 32K FOR TWO PLAYERS

BY J. WHITING

This is a version of that well known arcade armour-battle — one of the very first video games.

The object of the game is to destroy your opponents' tank — which is prowling the battlefield looking out for a chance to do the same to you!

You can alter the appearance of the battlefield each time you play by selecting the number of trees you want, from 1-200, and you can also introduce a new twist — or more accurately a curve — into the game.

By selecting the option at the start of each game

you can add a nice curve to the path of your shells fired at the enemy.

Another option available to tank commanders is the exploding tree feature! Well, all that really happens is that trees blow up should a shell hit them...

What makes this game

a testing challenge is that you can take on an opponent on equal terms and not have to battle with the superior intelligence of the computer.

Full instructions are included in the program, which provides a real challenge to would-be Field-M Marshals.

The thinking magazine for adventure gamers is here.

From a minor hobby, adventure gaming in Britain has now grown into a major enthusiast activity with players of all ages enjoying the drama, excitement and interest that it provides.

Launching this month, the new **IMAGINE™** magazine will provide not only a comprehensive reference point but also a dynamic introduction to the adventure gaming world.

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```

2040 J$=FNREADCH(XX(N),YY(N))
2050 IF PP=1 AND J$=CHR$(238) THEN XX(N)=0
2060 PP=0
2070 IF XX(N)<>0 THEN GOSUB 2100
2080 NEXT N
2090 GOTO 1810
2100 FOR L= 1 TO 2
2110 IFC%=1 THEN U(N)=P(N)
2120 VDU 31,XX(N),YY(N):PRINT" "
2130 XX(N)=XX(N)+Q(U(N)):YY(N)=YY(N)+R(U(N))
2140 J$=FNREADCH(XX(N),YY(N))
2150 IF XX(N)=X(M) AND YY(N)=Y(M) THEN GOTO 2230
2160 IF XX(N)=X(M) AND YY(N)=Y(M) THEN N=M :GOTO 2230
2170 IF J$<>CHR$(238) THEN GOTO 2200
2180 IF D%=1 AND XX(N)<>0 AND XX(N)<>39 AND YY(N)<>0
AND YY(N)<>29 THEN VDU 31,
XX(N),YY(N):PRINT" ":SOUND 2,-14,4,3
2190 XX(N)=0:SOUND 2,-14,4,3:RETURN
2200 VDU 31,XX(N),YY(N):PRINTCHR$(239)
2210 NEXT L
2220 RETURN
2230 SOUND 1,-13,50,1
2235 COLOUR N
2240 SOUND 0,-15,6,2
2250 SOUND 0,-12,6,2
2260 SOUND 0,-9,6,2
2270 SOUND 0,-7,6,1
2280 FOR NN=1 TO 15
2290 FOR LL=230 TO 237
2300 VDU 31,X(N),Y(N)
2310 PRINTCHR$(LL)

```

```

2320 NEXT LL
2330 NEXT NN
2340 FOR N=1 TO 3000:NEXT N
2350 VDU 31,1,30
2360 FOR N=1 TO 33:FOR NN=1 TO 30:NEXT NN:PRINT:NEXT N
2370 CLS
2380 PRINT:PRINT:PRINT"Do you want another game.(Y/N)"
2390 *FX15,0
2400 A$=GET$
2410 IF A$="Y" THEN RUN
2420 IF A$="N" THEN PRINT"See you later!":END
2430 GOTO 2390
2440 DEF FNREADCH(X,Y)
2450 LOCAL AX, LASTX, LASTY, C
2460 LASTX=POS
2470 LASTY=VPOS
2480 VDU 31,X,Y
2490 AX=135
2500 C=USR(&FFF4)
2510 C=C AND &FFFF
2520 C=C DIV &100
2530 VDU 31, LASTX, LASTY
2540 = CHR$(C)
2550 RUN
>P.

```

>P.LISTING COURTESY OF KING EDWARD VI SCHOOL

BBC, DRAGON & ATARI GAMES FROM QUICKSILVA

DRAGON MINED-OUT

On Screen Features:

Tricky Mines, Damsels in distress, Mine detection indicator, 9 levels of minefield, Safe area, Progressive difficulty, Scoring, High score feature, Full instructions.

Controls: Up-Down-Left-Right.

Special Features: Bill the Worm, Bugs (mines with legs), Mine Spreaders, Action Replay.

Author: **Ian Andrew**

ATARI 400/800 MAGIC WINDOW

Define characters on 8x8 grid. Save to tape. Load from tape. Freely merges character sets into existing programs. Hex & Dec. O/Ps. Character manipulation: Mirror, rotate, invert, left, right, up, down, hold, wipe, cancel. Redefine whole character set. Also works in colour mode. Excellent examples supplied. 16K RAM or more.

Author: **M. Walker**

As part of the plan to expand their range to cover all the most popular personal computers QUICKSILVA are proud to introduce 3 new programs for the BBC Computer, plus a version of their popular "MINED-OUT" game for the Dragon and also a character generating program for the Atari 400/800 "MAGIC WINDOW".

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Exploits your BBC music potential to its limits.

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Author: **Andy Williams**
For model A or B

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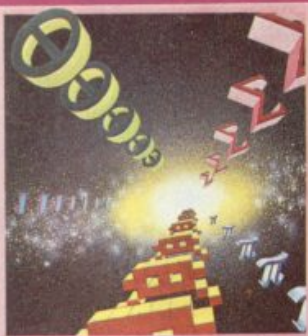
For the model B with 16K + Joystick.
Author: **Andy Green**

WIZARD

The lands most beautiful maidens are being sacrificed by an evil King. Can you be their saviour, fighting off hordes of evil demons armed only with your wand and magical powers. A most compulsive and original game with hi-res colour graphics and full sound.

Author: **A. R. Buckley**
For the model B with 32K

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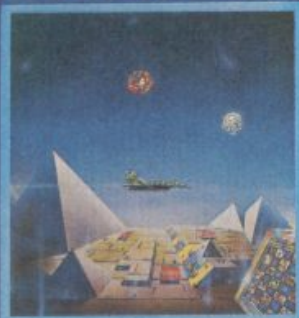
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VIC20 GAMES FROM QUICKSILVA

TORNADO VIC20 GAMES FROM QUICKSILVA



VIC20
+ JOYSTICK

TORNADO: In the midst of the Colony Wars ships are attacking you from the air, you have three types of ground base to bomb. Features: Full Colour, Hi-Res Graphics, Sound, Increasing Speed, High Score, Progressive Difficulty, Random Landscape, Explosions. By Chartec for the unexpanded VIC20 + Joystick.

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SKYHAWK: Features Multi-colour, Hi-res 3-D Effect Graphics, Realistic Scrolling Landscape, Aircraft Landing and Refueling, Radar and Aircraft Status Displays, High Score Save, Full Sound Effects, Varying Formations of Attacking Aircraft, Extra Life at 3000 pts, Fuel Low Warning, Realistic Explosions. For the VIC20+3K or 8K expansion + Joystick.

PIXEL POWER



VIC20 8 OR 16K
To create user-definable characters
in your own programs.

PIXEL

PIXEL POWER

A graphics workshop packed with useful features such as Create, Amend, Save and View Set. For the VIC20 with 8K or more added RAM.

SUBSPACE STRIKER & ZOR

It comes from out of nowhere and then vanishes back into the ether. With your deadly antimat torpedoes, you unleash havoc in the Federation's Spacelanes.

For the
VIC20 +
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HARVESTER



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A Cut-Throat game of Strategy & Fun
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RAM.



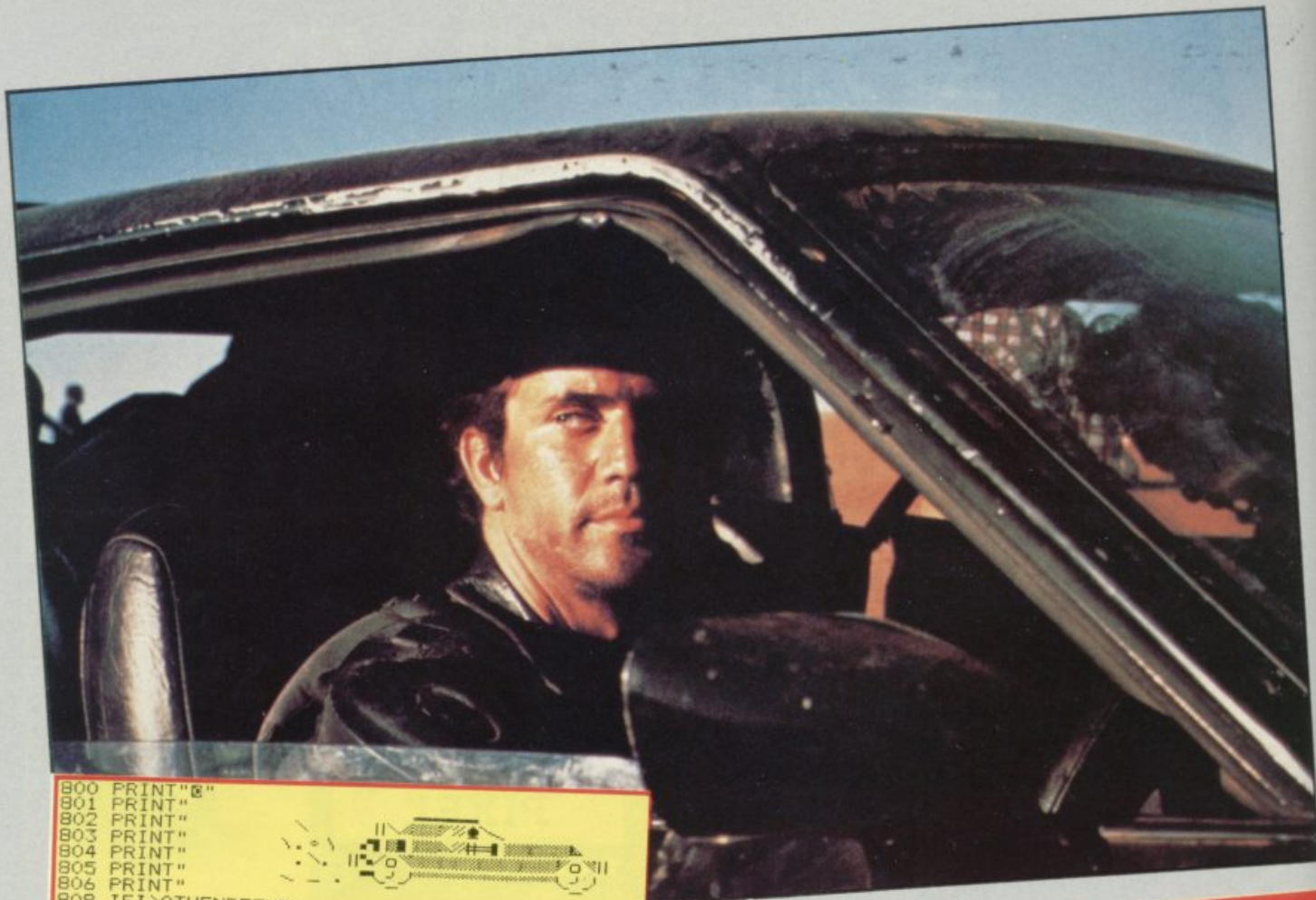
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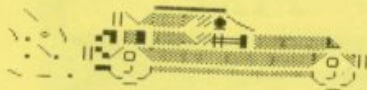
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```

800 PRINT"&"
801 PRINT"
802 PRINT"
803 PRINT"
804 PRINT"
805 PRINT"
806 PRINT"
808 IF I>0 THEN RETURN
810 PRINT"
812 PRINT"
814 PRINT"
816 PRINT"
818 PRINT"
820 PRINT"
822 PRINT"
824 PRINT"
826 PRINT"
828 PRINT"
830 PRINT"
832 PRINT"
834 PRINT"
836 PRINT"
838 PRINT"
840 PRINT"
842 PRINT"
850 RETURN

```



**MAD
MAX**

RUNS ON A SHARP MZ-80K

BY BASIL ZIMMO

Motorway-madness takes on a whole new meaning in the world of Mad Max. The apocalypse has been and gone — and Max is king of the roads. Petrol has replaced gold as the most valuable commodity — and Max is out to corner the market. He needs fuel to maintain his position as a self-appointed 21st century traffic-warden, tracking down drivers who break the rules of the road — the kingdom of Mad Max.

You can become Max in this riotous road race. You receive a message that there is a petrol station which has managed to hang on to a stockpile of fuel. You leap into your supercharged vehicle and roar off through the

bleak countryside. You race through deserted suburbs, over a bridge, through a farm, a barren forest and past a city before the petrol station comes into view.

If you hit anything along the way — obstacles include the wrecks of cars that have attempted to reach the fuel, or if you go off the road, the game will end. The further along the road you get, the more points you collect. If you manage to reach the petrol and claim the fuel you'll get 5,000 points.

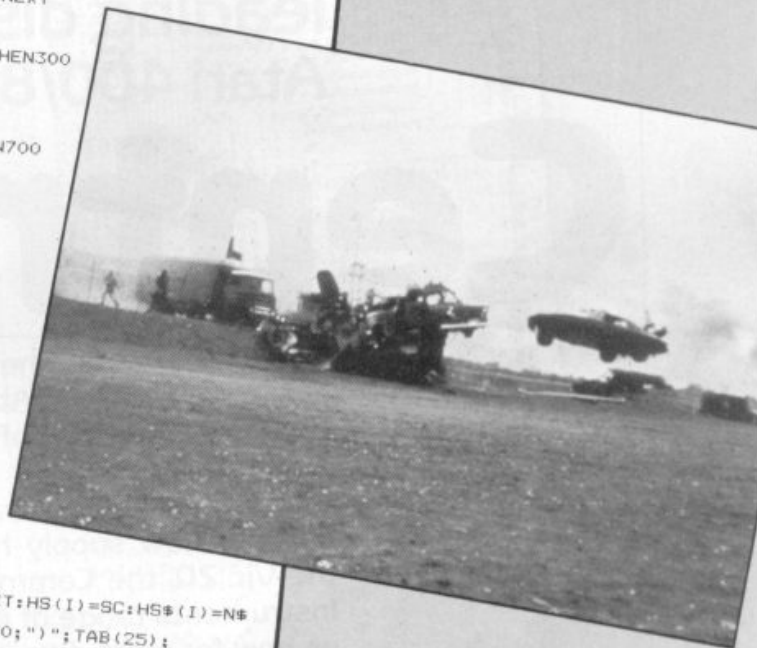
Keys A, D, W, and X control the action. If you want to make the game even more difficult try using the X key to move forward. That way less of the road is visible!

We know it's a long program to key in — but the game is extremely addictive and well worth all the effort!


```

1 REM * MAD MAX
2 REM * Copyright 1982
3 REM * BASIL ZIMMO
4
5 GOSUB800
10 DIMR$(255),P$(7):FORI=0TO255:READR$(I):NEXT:FORI=1TO7:READP$(I):NEXT
20 DIMHS(20),HS$(20):PL=0:PRINT"***** MAD MAX *****"
21 PRINT:PRINT:GOSUB801
22 PRINT"SCORES":PRINT"X" W":PRINT" A+":CHR$(98):">D"
23 INPUT"ENTER NUMBER OF PLAYERS ?":N
24 NU=0:PL=PL+1:IFPL>NTHEN 510
45 PRINT"PLAYER":PL:" TO MAKE A RUN":FORI=1TO2000:NEXT
50 X=53828:R=24:PRINT"X":M=201:XS=1:SC=0
60 FORI=0TO23:PRINTTAB(8):R$(I):NEXT
65 FORI=1TO500:NEXT:POKEX,M
100 POKE4514,240:USR(68):POKE17828,0:GETA$:IFA$=""THEN300
110 IFA$="A"THENA=-1:GOTO150
120 IFA$="D"THENA=1:GOTO150
130 IF(A$="X")*(X<54128)THENA=40:XS=XS+1:GOTO150
135 IF(A$="W")*(X>53847)THENA=-40:XS=XS-1:GOTO150
140 GOTO300
150 POKE4514,250:USR(68):IF(PEEK(X+A)=46)*(PT=1)THEN700
151 IFPEEK(X+A)=46THEN170
155 IFPEEK(X+A)<>79THEN403
170 POKEX,79:X=A:POKEX,M
300 R=R*(R):IFUNTHENR=P$(UN)
305 RD=INT(RND(1)*26+1):IFRD>13THENUSR(71)
310 IFMID$(R$,RD,1)="":THEN320
315 GOTO330
320 R$=LEFT$(R$,RD-1)+CHR$(97)+MID$(R$,RD+1,27)
330 PRINTTAB(8):R$:IFPEEK(X)<>79THEN400
335 POKEX-40,79:POKEX,X:R=R+1
340 IFUNTHENUN=UN+1:IFUN=8THENUN=0:R=1:GOTO350
350 SC=SC+10*XS:GOTO100
400 IF(PEEK(X)=46)*(PT=0)THEN335
401 IF(PEEK(X)=46)*(PT=1)THEN700
402 IFPEEK(X)=MTHEN335
403 FORJ=1TO3
405 POKE4514,130:USR(68):C=67:GOSUB500
410 POKE4514,160:USR(68):C=71:GOSUB500
420 POKE4514,100:USR(68):C=46:GOSUB500
421 POKE4514,140:USR(68):C=46:GOSUB500
425 NEXTJ
430 POKE4514,90:USR(68):C=0:GOSUB500
440 USR(71):PRINT"PLAYER":PL
445 PRINT"SCORE":SC:IFHS(20)>SCTHEN475
450 PRINT"YOU HAVE GOT ONE OF THE HIGH SCORES"
455 INPUT"ENTER YOUR NAME":N$
456 N$=LEFT$(N$,6)
460 FORI=1TO20:IFHS(I)>SCTHEN 490
470 FORJ=19TO1STEP-1:HS(J+1)=HS(J):HS$(J+1)=HS$(J):NEXT:HS(I)=SC:HS$(I)=N$
480 PRINT"HIGH SCORES":FORI=1TO10
485 PRINTHS(I+10):TAB(4):HS(I):TAB(12):HS$(I):TAB(20):I+10:"":TAB(25);
490 NEXTI:USR(62)
492 HS=HS(1):D$=HS$(1)
494 PRINT"Press any key when ready"
495 GETA$:IFA$=""THEN495
496 GOTO40
500 POKEX,C:POKEX-1,C:POKEX+1,C:POKEX-40,C:POKEX+40,C
505 FORI=1TO100:NEXT:RETURN
510 PRINT"GAME OVER"
515 PRINT"HIGH SCORE":HS":HELD BY":N$
520 PRINT"PRESS P TO PLAY AGAIN"
530 GETA$:IFA$=""THEN530
540 IFA$="P"THEN20
550 END
700 POKEX,79:X=X+A:POKEX,M
705 PRINT"YOU MADE":PRINT"IT TO":PRINT"THE"
710 PRINT"PETROL":PRINT"STATION":PRINT"5000":PRINT"POINTS"
720 FORI=1TO4000:NEXT:SC=SC+5000:PT=0:POKE4466,24:GOTO300

```



1000	DATA	"***** MAD MAX *****"
1005	DATA	"***** MAD MAX *****"
1010	DATA	"***** MAD MAX *****"
1012	DATA	"***** MAD MAX *****"
1014	DATA	"***** MAD MAX *****"
1016	DATA	"***** MAD MAX *****"
1018	DATA	"***** MAD MAX *****"
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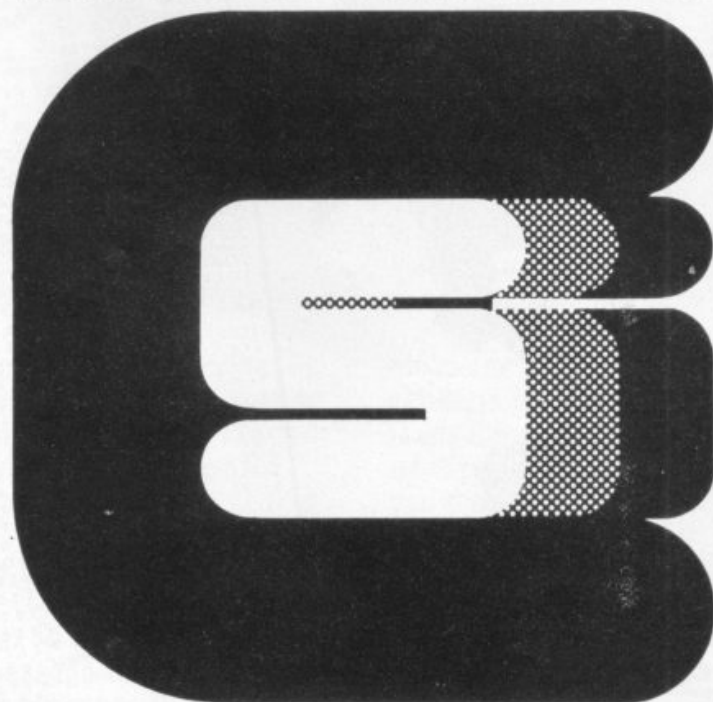
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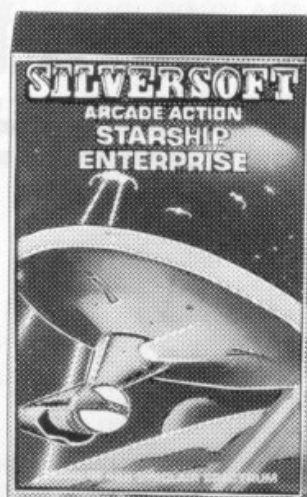
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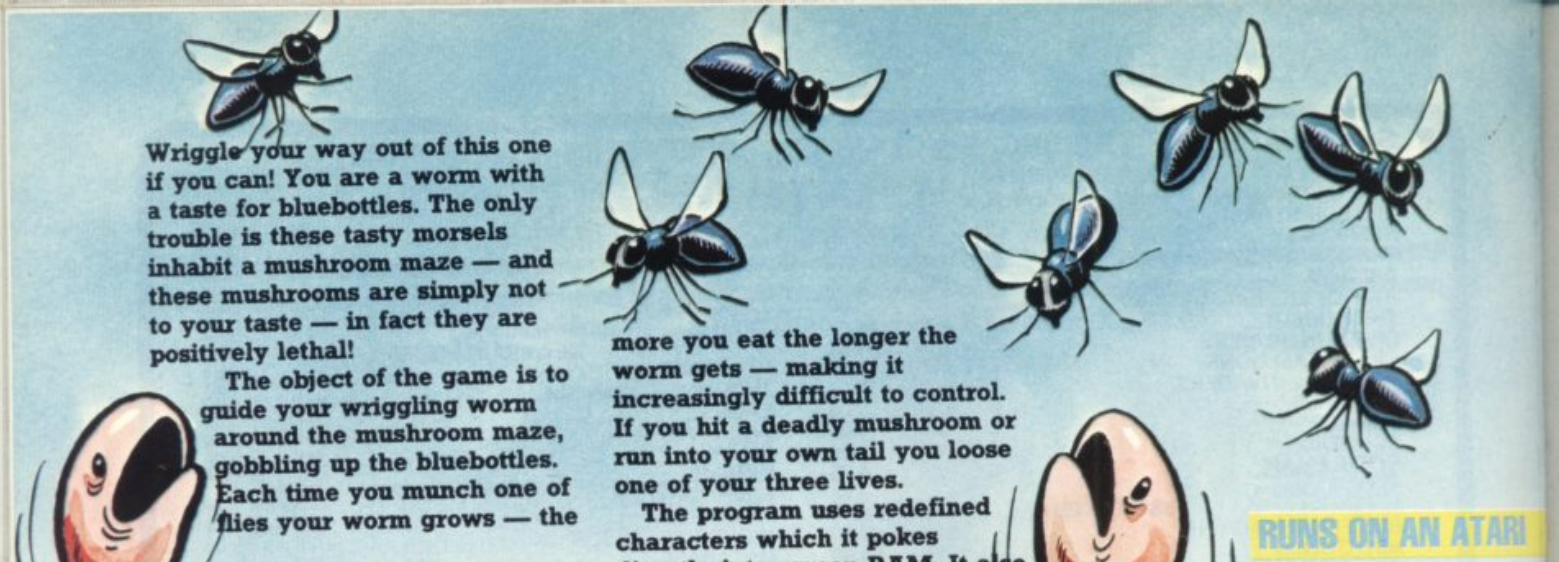
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Wriggle your way out of this one if you can! You are a worm with a taste for bluebottles. The only trouble is these tasty morsels inhabit a mushroom maze — and these mushrooms are simply not to your taste — in fact they are positively lethal!

The object of the game is to guide your wriggling worm around the mushroom maze, gobbling up the bluebottles. Each time you munch one of flies your worm grows — the

more you eat the longer the worm gets — making it increasingly difficult to control. If you hit a deadly mushroom or run into your own tail you loose one of your three lives.

The program uses redefined characters which it pokes directly into screen RAM. It also uses display list interrupts to give a striped effect to the background.

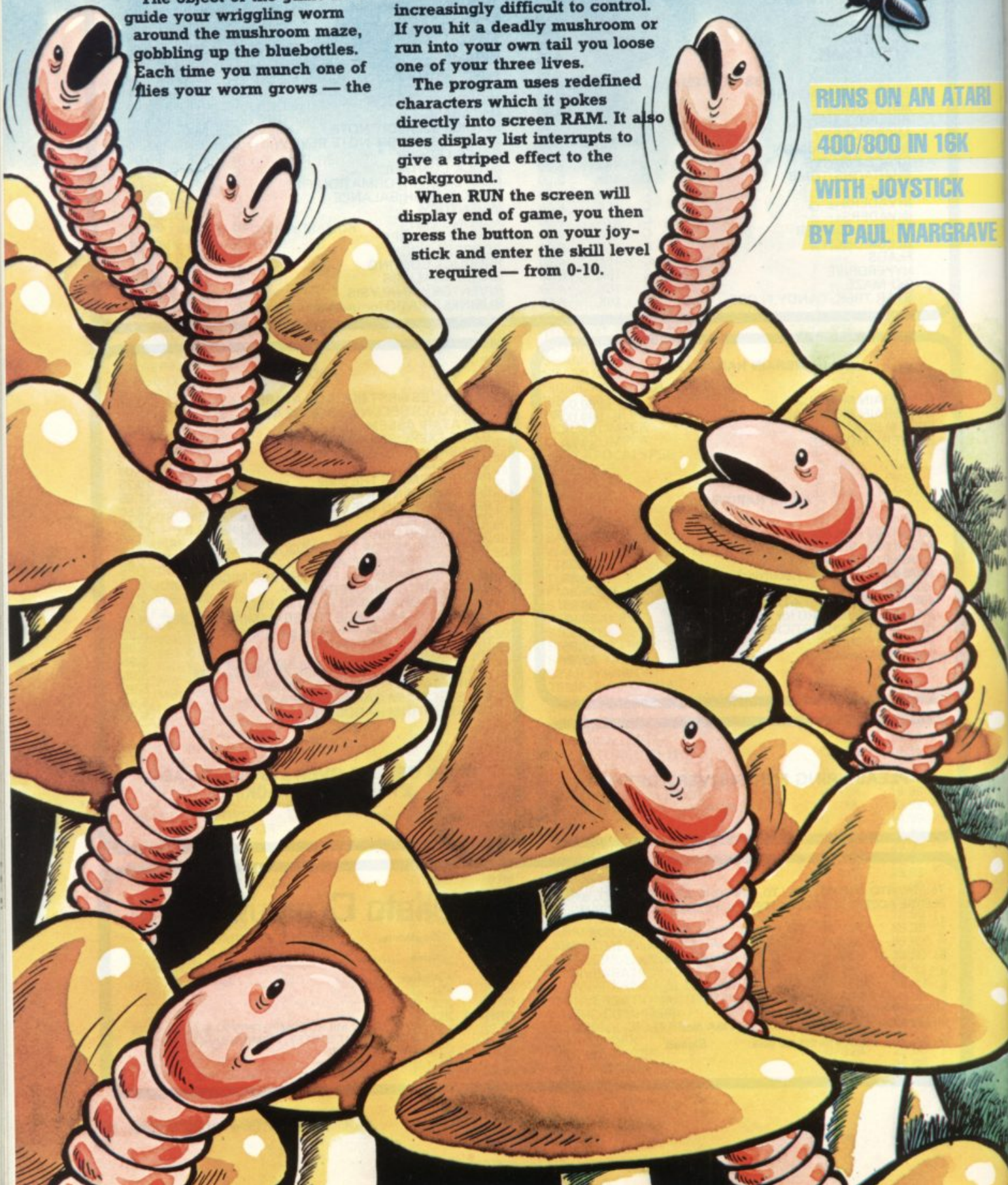
When RUN the screen will display end of game, you then press the button on your joystick and enter the skill level required — from 0-10.

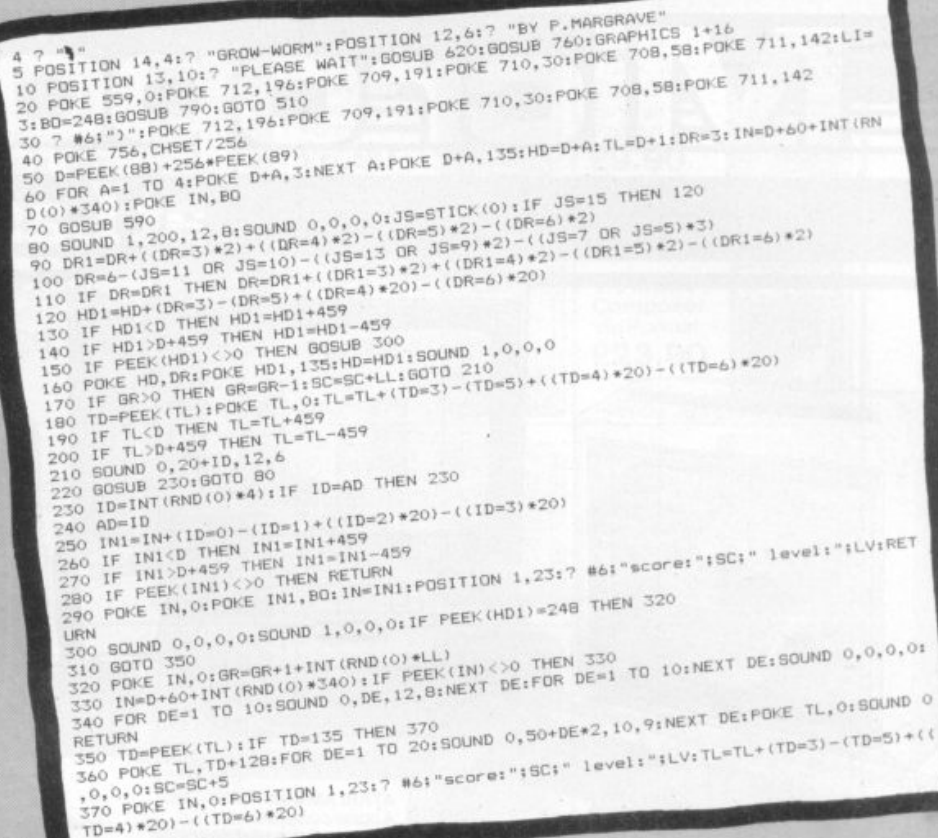
RUNS ON AN ATARI

400/800 IN 16K

WITH JOYSTICK

BY PAUL MARGRAVE



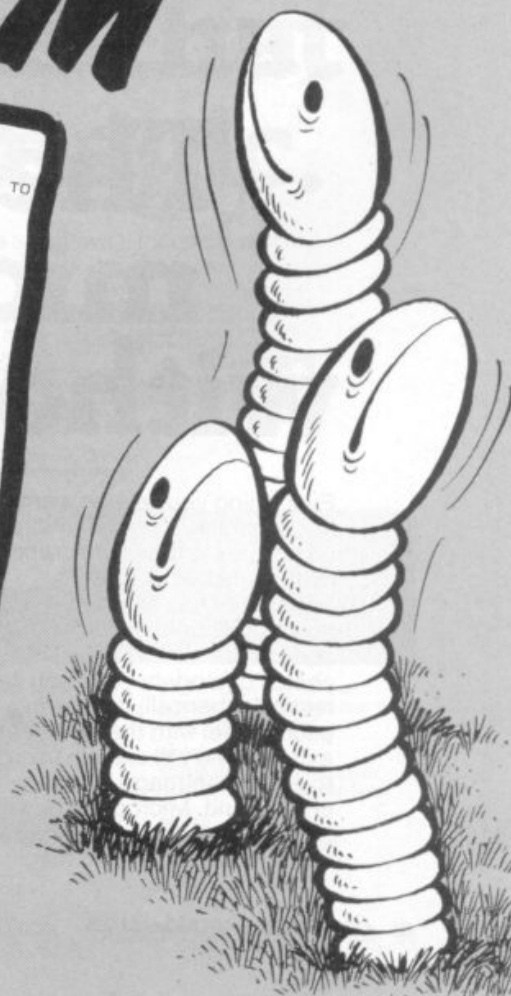


GROW WORM

```

380 IF TL<D THEN TL=TL+459
390 IF TL>D+459 THEN TL=TL-459
400 IF TD<>135 THEN 350
410 HD1=HD-20:POKE HD,135:FOR DE=1 TO 10:SOUND 0,20+DE,12,8:NEXT DE:FOR DE=1 TO
10:NEXT DE
420 POKE HD,0:SOUND 0,0,0,0:IF HD1<D THEN 440
430 HD=HD1:GOTO 410
440 IF LI=I THEN 510
450 LI=LI-1:POSITION 2,0:? #6:LI;" I":IF LI>1 THEN ? #6:"ves":GOTO 470
460 ? #6:"fe";
470 ? #6:" left."
480 IF STRIG(0)=1 THEN 480
490 POSITION 0,0:? #6;"
500 GR=0:GOTO 30
510 POKE 756,CHSET/256:POSITION 2,0:? #6:"END OF GAME.":IF SC>HSC THEN HSC=SC
520 D=PEEK(88)+256*PEEK(89):POSITION 2,10:? #6:"high score.":HSC
530 IN=D+60+INT(RND(0)*340)
540 POKE 77,0:IF STRIG(0)=1 THEN GOSUB 230:GOTO 540
550 SC=0:LI=3:POSITION 2,0:? #6:"which level."
560 OPEN #1,4,0,"K":GET #1,A:CLOSE #1
570 A#A-48:IF A<0 OR A>9 THEN 560
580 LL=L+A+(A<0)*8:GR=0:LVA=A:GOTO 30
590 FOR C=1 TO LL:X=INT(RND(0)*18)+1:Y=INT(RND(0)*18)+1
600 X=INT(RND(0)*16)+2:Y=INT(RND(0)*19)+2:LOCATE X,Y,PD:IF PD<>32 THEN 600
610 POSITION X,Y:? #6:"z":NEXT C:RETURN
620 DIM C$(20)
630 C$=""###XZ"
640 CHSET=(PEEK(106)-8)*256:CHORG=57344
650 FOR I=0 TO 511:POKE CHSET+I,PEEK(CHORG+I):NEXT I
660 FOR I=1 TO LEN(C$):CHPOS=CHSET+(ASC(C$(I))-32)*8
670 FOR J=0 TO 7:READ A:POKE CHPOS+J,A:NEXT J:NEXT I
680 RETURN
690 DATA 60,126,255,255,255,255,255,126,60,60,126,255,255,255,126,60,60,126,255,
255,255,126,60
700 DATA 60,126,255,255,255,255,126,60,60,126,255,255,255,126,60,60,126,255,
62,24,24,0
710 DATA 60,153,126,60,126,189,36,66
720 DATA 72,138,72,238,80,6,174,80,6,189,31,6,141,10,212,141,26,208,224,24,208,5
,169,0,141,80,6,104,170,104,64
730 DATA 196,196,196,196,194,194,194,194,196,196,196,194,194,196,196,196,194,194,194,
196,196,196,194,194,34,194
740 FOR A=1 TO 56:READ B:POKE 1535+A,B:NEXT A:RETURN
750 D=PEEK(560)+256*PEEK(561)
800 POKE D+3,198:FOR A=1 TO 23:POKE D+5+A,134:NEXT A
810 POKE 512,0:POKE 513,6:POKE 1616,0:POKE 54286,192:POKE 559,34
920 RETURN

```



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The object of this game is to fly a spacecraft into a deep, steep-sided cavern and land it at the bottom. Stray spaceships and rugged rocks will get in your way, and you only have a limited amount of fuel. But this can be replenished by docking with the red fuel dumps you come across on your way down into the pit. The controls are simple. 'I' to move left and 'O' to go right. Happy landings!

BY M. WISEMAN



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For all home micro-users who don't live near one of the larger city branches of Boots or W. H. Smith, and who find difficulty in purchasing the very latest, best-selling software – here is the answer!

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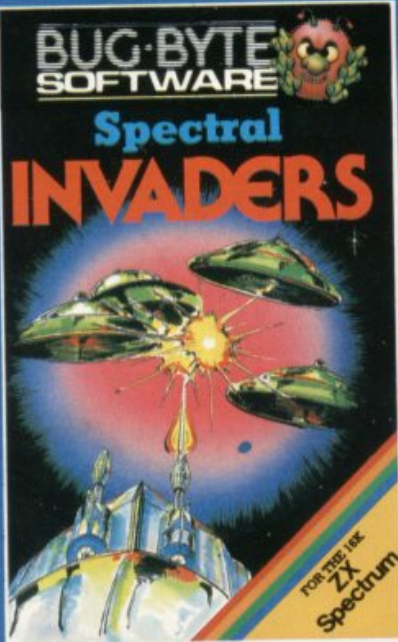
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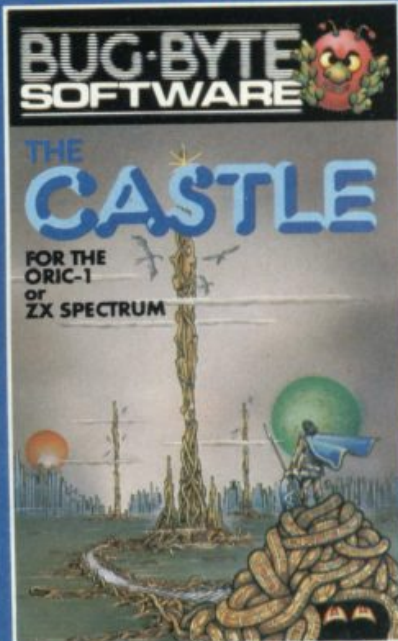
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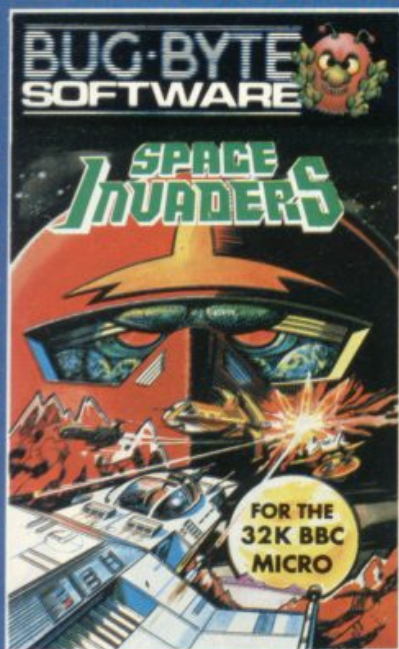
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VIC Cosmiads – £7. Another VIC in the Wall – £7.
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All programs are for the unexpanded VIC 20,
with the exception of Chess (16K) and
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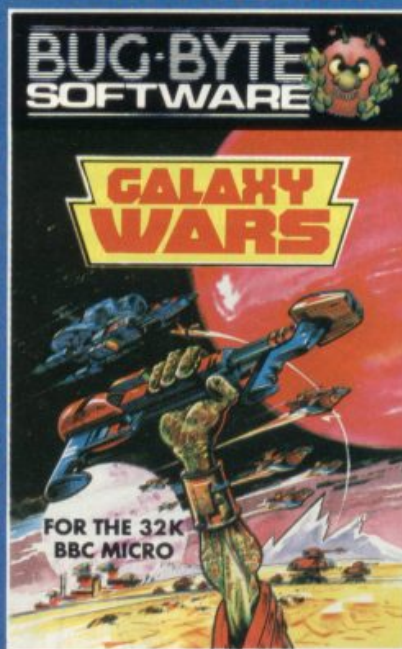
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GHOSTS REVENGE

Ghosts of the world unite! You have nothing to lose but your Pacman! We've put up with that horrible little creature for long enough. It's time we fought back — and I've got a plan to beat him. All we have to do is get rid of those sneaky little power pills in the corners of our maze that will fix the little blighter. OK lads, let's get to it!

This just had to happen. A poor little Pacman trapped in the maze with a ravenous ghost chasing him — and not a power pill in sight! This is a joystick controlled game for two players. One takes the part of the poor little Pacman, the other becomes the hungry ghost out for a quick snack.

RUNS ON A DRAGON IN 32K

BY GARETH JONES

The Pacman is represented by the red square, which moves around the maze gobbling up dots for points. Meanwhile the ghost chases after him — represented by a black square. The difficulty of the game depends on the skill of your opponent!

The Main variable are:

A: The position of the black square

B: The position of the red square

S: Score

U: Last score

MS: A blue square that makes up the maze walls

TS: A white square that makes up the maze passages

I have poked the moving graphics on the screen instead of using print @. The addresses are in the range of 1024 to 1535





....Introducing the **A.G.F.** **JOYSTICK** INTERFACE II for

sinclair ZX Spectrum 81

ABOUT OUR JOYSTICK INTERFACE

Following in the footsteps of our extremely popular original interface, which has sold over 1,000 worldwide since October last year, we have improved its performance.

The Interface Module II has been specially designed to plug on to the rear connector of your ZX Spectrum or ZX81 and allow you to connect any standard Atari type digital Joysticks. All of the computer's connections are duplicated on an extension connector so that you can still use any other devices intended for use with your computer.

The Interface Module II resides in the same memory space as the keyboard, which remains fully functional at all times, therefore it will not interfere with anything else connected.

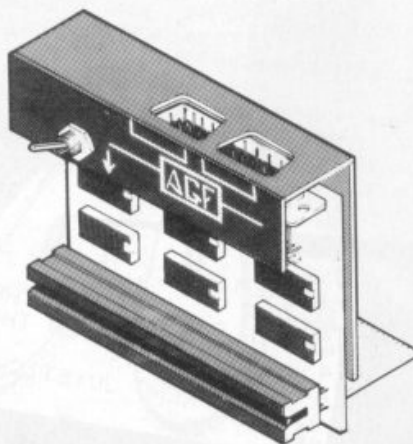
When a suitable joystick is plugged into 'Player 1' socket its action will mimic pressing the cursor keys, up "7", left "5" and so on. The firing button will simulate key ϕ . This unique feature guarantees the best software support.

Take a look at the selection of compatible games we have listed. More are being added all the time as a result of our contact with the various software companies.

A second Joystick may be connected in the 'Player 2' position which simulates in a parallel fashion keys T-Y-U-I-P. This will allow you to play a whole new generation of two player games.

An added advantage of using our Joystick Interface is that you relieve your keyboard of the key-thumping strain of game playing whilst increasing the enjoyment.

Using joystick control in your own programs is as easy as reading keys. Eight directions and Fire are all read by simple BASIC. With every order there comes a free demonstration program called 'Video Graffiti' plus a full set of instructions.



KEY FEATURES

- * Proven cursor key simulation for maximum software support
- * Accepts Atari, Competition Pro, Wico, Starfighter, Le Stick, etc Joysticks
- * Second Joystick facility
- * Eight directions programmed in simple BASIC
- * Rear extension connector for all other add-ons
- * Free demo program, 'Video Graffiti' + full instructions

A SELECTION OF COMPATIBLE SOFTWARE

ZX SPECTRUM

Abersoft
Axis
Campbell Ststems
DK Tronics

ICL
New Generation
Software
Psion

Silversoft

ZX81

Artic
J.K. Greye
P.S.S.

Silversoft

NB ☐ Available from us, please tick
* Not suitable for original interface

Mazeman
Labyrinth
Gulpman
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Meteroids
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Galaxians
3D Monster Maze
Krazy Kong
Ghost Hunt
Maze Drag Race
Asteroids

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	INTERFACE MODULE II	20.95	
	JOYSTICK(S)	7.54	
	SOFTWARE AS TICKED ON LIST		
	SOFTWARE AS TICKED ON LIST		
ZX81 <input type="checkbox"/> ZX SPECTRUM <input type="checkbox"/> Please tick		FINAL TOTAL	

DEALER ENQUIRIES WELCOME

EXPORT PRICES ON APPLICATION

GRAPHICS

By Garry Marshall

TALK TO ME IN 3D!

The importance of graphics is being realised in more and more areas. And the need for good graphics utilities which make their creation comparatively simple is being met.

The graphics commands that are included in many micro-computer dialects of Basic do allow any graphics display to be created.

But just as no businessman would be advised to write his own stock control program in Basic, so he would not be advised to write his own graphics programs using the graphics commands available in Basic.

In the same way as general-purpose stock control programs can be purchased, so general-purpose graphics utilities are beginning to become readily available.

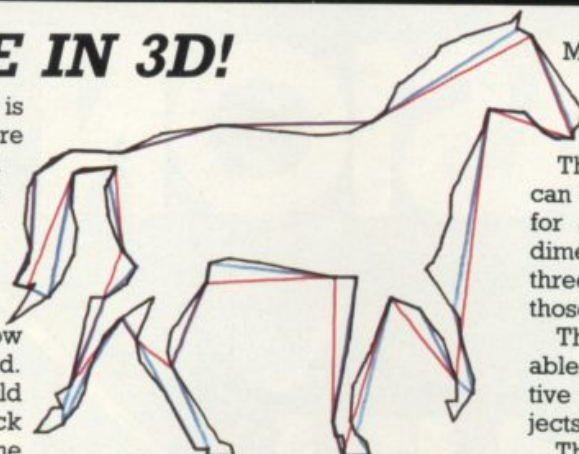
Having purchased a commercial package, for whatever purpose, the user has only to learn how to use that package, as opposed to learning all the skills that are needed for programming.

Additional advantages include the provision of good documentation and the support that is provided with professionally produced software.

A prime example of the increasing importance being attached to the provision of graphics utilities is provided by the new Apple LISA.

This machine provides its user with a suite of programs, including a word processor and a database.

The user can use any program in the suite with equal ease, and can



swap from one to another at will.

However, what is particularly interesting is that the suite contains not one, but *two* graphics programs.

This demonstrates clearly how important the role of graphics on such a system is considered.

The graphics programs can be used to generate charts and graphs of various kinds using data held by any program in the suite.

Special-purpose graphics languages have been used for a long time with mainframe computers.

They provide systematic ways of generating particular types of graphics that are simple to use.

They also provide some portability for graphics programs, in total contrast to the situation in micro-computer graphics where graphics programs written for one micro will seldom if ever run on another machine.

One graphics package that was originally developed for use on mainframe computers and which is now available for micros is GINO-F. It can be used with the Research

Machines' RM380Z. It is, in fact, a library of sub-routines, with each sub-routine providing some graphics capability.

The capabilities that it provides can be grouped broadly into those for administration, those for two-dimensional drawing, those for three-dimensional drawing and those for interaction.

This package is particularly valuable for the production of perspective views of three-dimensional objects.

The three-dimensional drawing commands are natural generalisations of the two-dimensional commands that are familiar to everyone. This makes the programming of perspective views particularly easy, and removes the need for any mathematical knowledge.

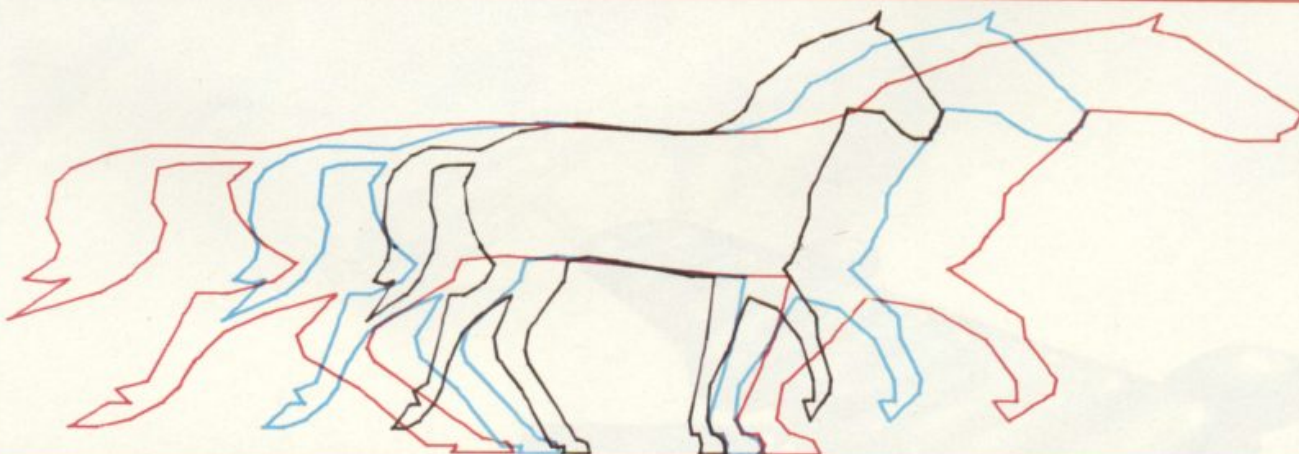
The accompanying illustrations show what can be accomplished with the aid of a suitable package with very short programs.

The package is called PICASO. It is not available for micros, although there is no reason why it should not be.

PICASO was developed by John Vince at Middlesex Polytechnic. It is intended for users with a minimum of programming skill, and was originally intended for use by artists and designers.

It provides a library of shapes and a variety of means for manipulating them.

The illustrations produced by PICASO reproduced here illustrate the point that a good graphics utility can be a remarkably good aid to any kind of graphics programming.



THE INVASION HAS BEGUN

The assault on your senses has begun with a great choice of games that have been created to give you a real challenge!

ARCADIA

SCHIZOID

..the name
of the game

the name of the game especially created to be the most addictive shoot 'em up you've ever desired. Wow, what a loathsome and deadly opponent! But then you hear about an Ion Thruster...

2X SP-TP
100% more
in 100% less
time

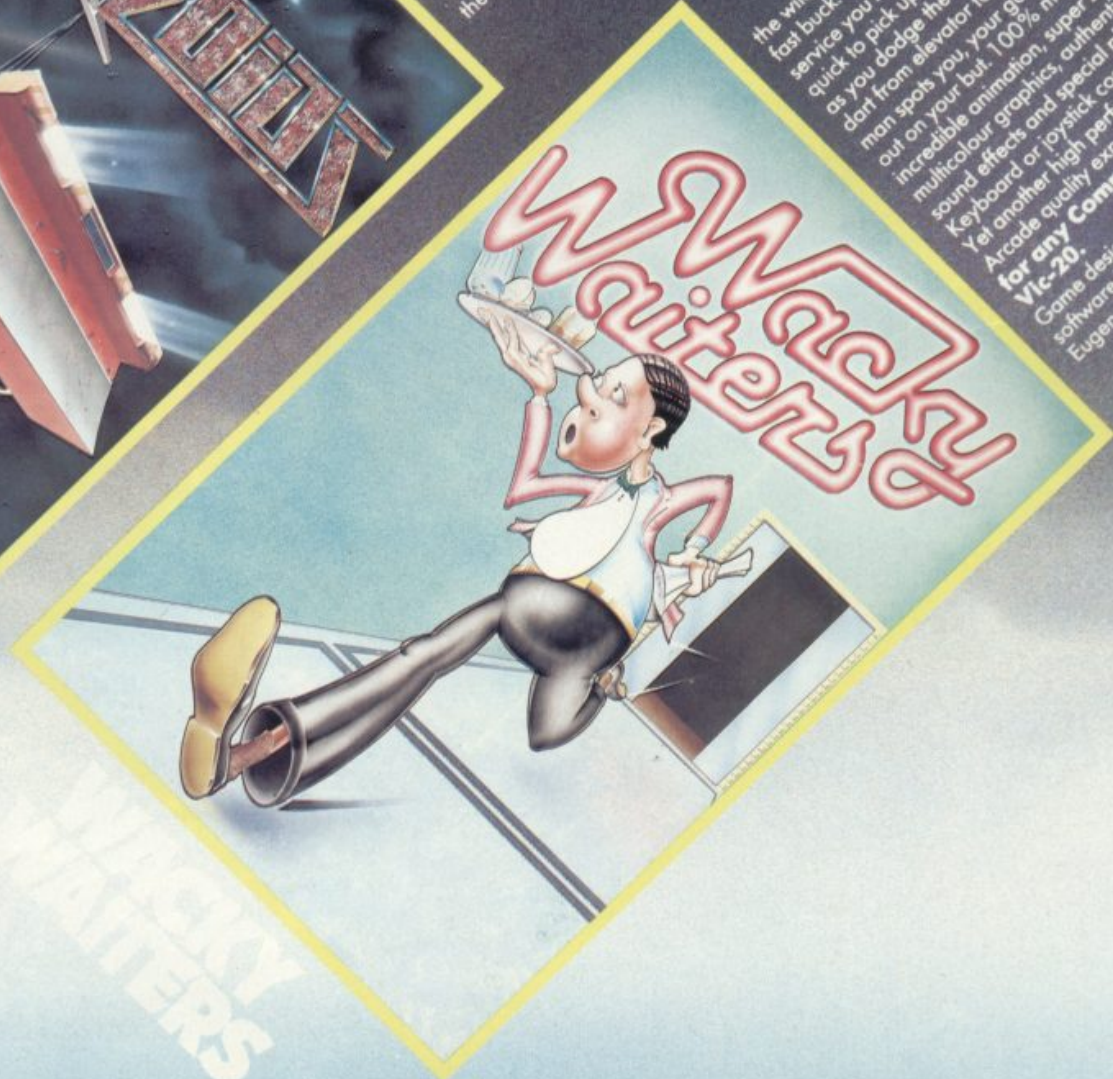
the fastest, meanest, em up Commodore Wave after wave of the most deadly alien types, you have dual Plasma Disruptors and a Thrust Force haven't you?

ZX SPECTRUM (16K or 48K)
100% machine code with 12 different alien types, incredible animation and explosive effects, sound and the fastest, smoothest hi-res graphics ever!

VIC-20 (any memory size)
100% machine code with eight different alien types, smooth hi-res multicolour graphics and animation, narrow playfield and sensational sound effects.
Keyboard or joystick.
Game design and software by D. H. Lawson.

for any ZX SPECTRUM.
It's my own fault, I even volunteered. I thought that with the space-dozzer and its shovel and skyhook it would be easy shifting the galaxy's rubbish. Childs play. HUH! They warned me of the weird packaging, the trays, the rods, and all the rest. But they didn't say I'd have to stop and control not just one but two or even more garbage pods. Then prod them, push them, toward that black hole, and oh, it's so very, very black, and so lonely, so empty. Panic, mustn't panic, but they won't stop twirling and spinning and turning, always turning, towards me, against me, at me. And I'm alone.
No way out, nowhere to hide, on my own, my own... own...
SCHIZOIDS: NOT JUST A GAME, BUT A STATE OF MIND.
breath-taking visual experience, plus sound and all those arcade features you'd expect from IMAGINE.
Game design and Software by Peter Paranoid and the Yid Kids. (D.H.L.)

the wildest, zaniest way of earning a fast buck. With crazy guests screaming for service you're gonna have to be quick to pick up the tips, don't slop the drinks, as you dodge the drunks and dart from elevator to elevator, coz if the Boss man spots you, your gonna be out on your butt. 100% machine code, incredible animation, super smooth hi-res multicolour graphics, authentic sound effects and special playfield. Keyboard or joystick control. Yet another high performance Arcade quality experience
for any Commodore VIC-20.
Game design and software by Eugene Evans.



WACKY WAITERS

WATCH OUT FOR THEM...

catcha snatcha



Barney
boothace
had never had
it so bad, demoted
from ace detective to the
level of a mere store
detective he wanders his
now well worn beat around the
jewellery and watch counters, so
considering his predicament, right
life for the hardened criminal
he has to look after his
valuable umbrellas. Of
lost property officers
expect the occasional
or a plant.
excitement
CAITIE
Tire
cho



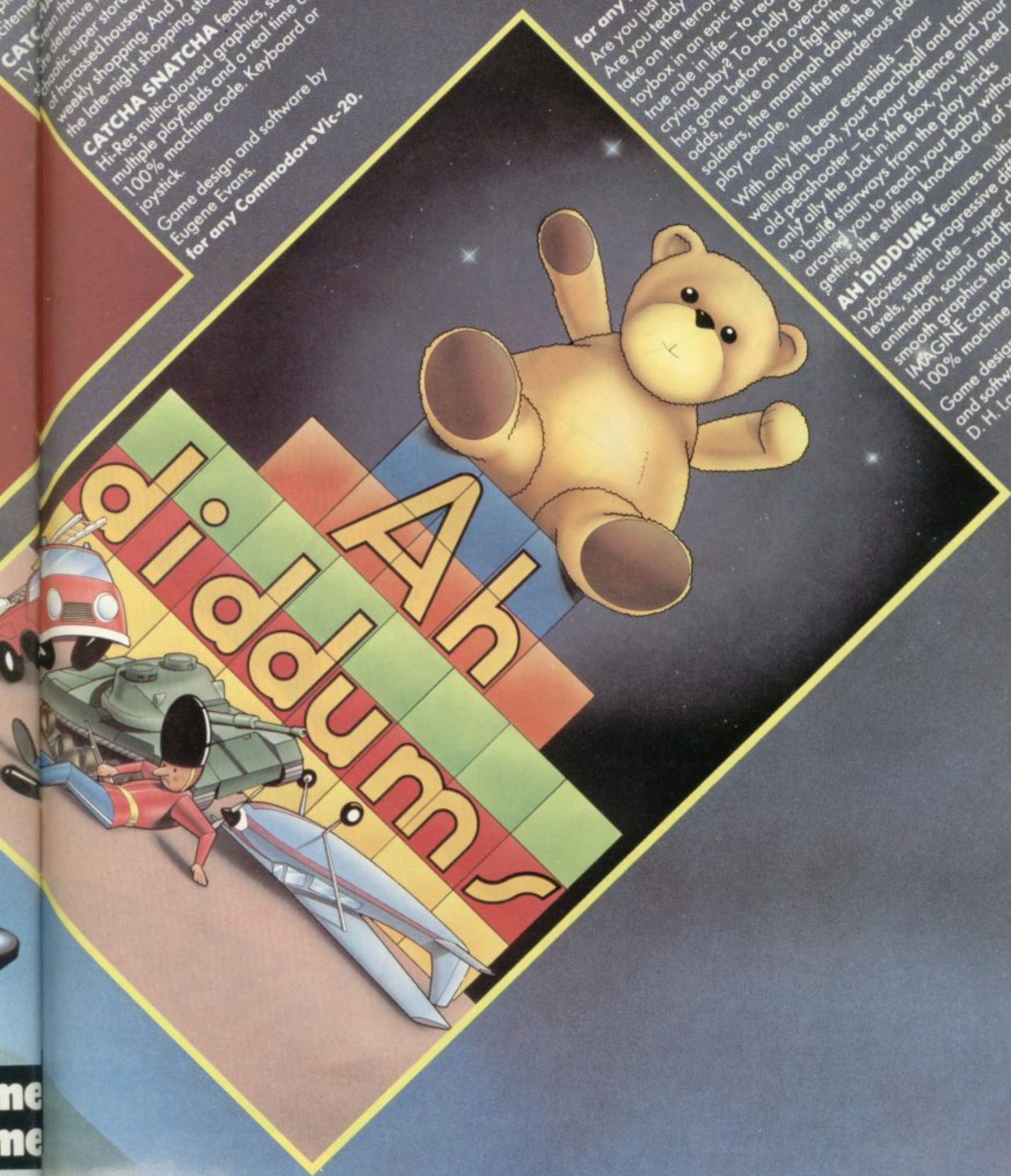
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of the game

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of harass
weekly
the late-
CATCH
Hi-Res
multiple
100% ma
joystick.
Game de
Eugene
for any

SNATCHA brings to your
mad, mad world of the
super store ever built with hordes
of harassed housewives doing their
late-night shopping starts.
SNATCHA features smooth
Hi-Res multicoloured graphics, sound,
multiple playfields and a real time clock.
100% machine code. Keyboard or
joystick.
Game design and software by
Eugene Evans.
for any **Commodore Vic-20**.

for any ZX SPECTRUM.
Are you just the average teddy.
Are you teddy enough to
take on the terrors of the
toybox in an epic struggle to fulfill your
true role in life — to reach and comfort your
crying baby? To boldly go where no teddy
has gone before. To overcome incredible
odds, to take on and fight the clockwork
soldiers, the mammoth dolls, the train set, the
play people, and the murderous plastercine.

With only the bear essentials — your
wellingington boot, your beachball and faithful
old peashooter — for your defence and your
only ally the Jack in the Box, you will need
to build stairways from the play bricks
around you to reach your baby without
getting the stuffing knocked out of you.
AN DIDDUMS features multiple
toyboxes with progressive difficulty
levels, super cute — super detailed
animation, sound and those fast
smooth graphics that only
IMAGINE can produce.
100% machine code.
Game design
and software by
D.H. Lawson.



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MISSION: To excavate and mine the many moons of Spectrum. To research and destroy the many alien life forms present.
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Your visor shows a visually breathtaking view, a near blur of speed as you are pulled through the centre of the planet with only a standard gravity.
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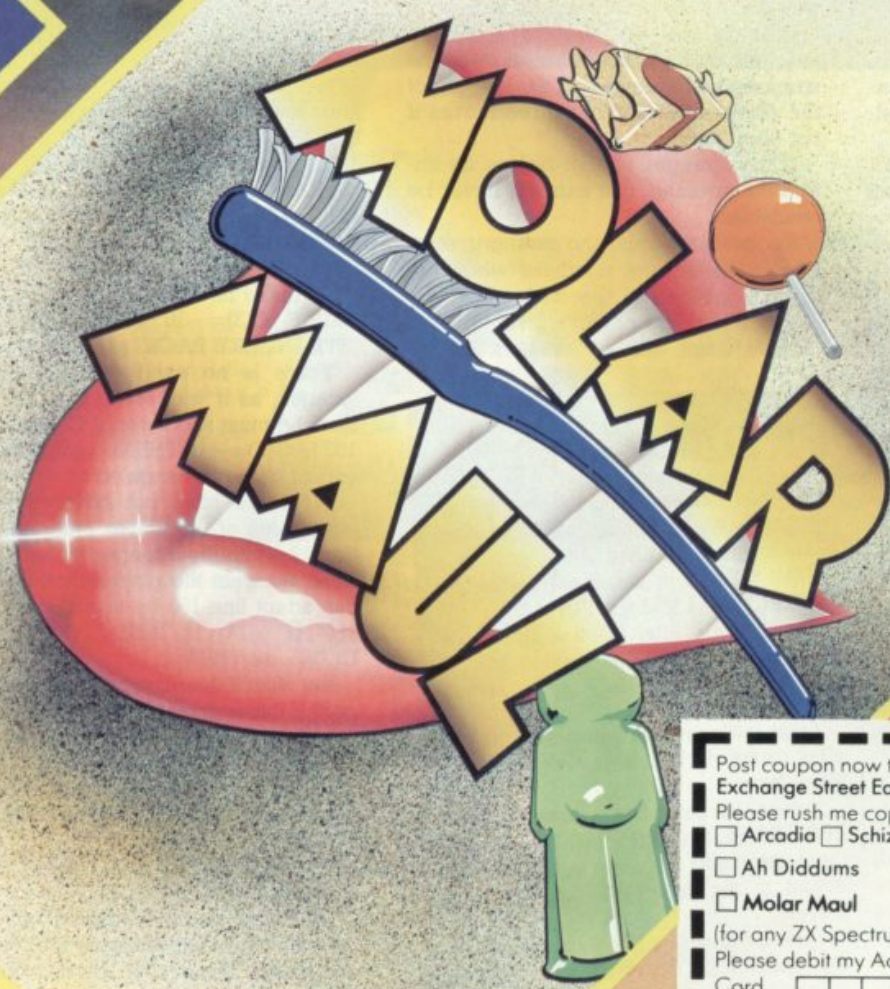
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SECRETS OF THE SPIES

An Adventure can cover almost any storyline providing there is excitement.

This is where the use of "special condition" lines can be used.

Supposing our theme is a spy story and, briefly, part of the plot runs like this: The player has obtained some microfilm from a dead-letter box unknowingly watched by the opposition.

His next hurdle is to flee the country, but must first get hold of his passport, taken from him during an earlier encounter with the opposition. The position of the player is:

Inventory: REVOLVER — object no.1
i.e. P(1)=50 MICROFILM— object no.2
i.e. P(2)=50

Location: DARK ALLEY — loc'n no.10 i.e. LN=10

Exits: EAST. Destination = DIM BACK STREET (loc'n no.9) WEST. Destination = GUARDED WALL (loc'n no.11)

BY KEITH CAMPBELL

Therefore E\$(10)="EW" and D\$(10)="x911"

The story line of our sub-plot is to go like this: If carrying the microfilm in location 9 the player will see a suspicious stranger lurking (object no.3).

After five moves in this location the stranger will disappear into an unseen opening leading to location 12, which was not visible or accessible before.

If he follows, the player will get killed. But after three more moves, the stranger will re-appear. He will shoot the player after another three moves if not shot first.

If the stranger is shot before he enters the opening, that exit will never be available.

To program this, the stranger must appear as if from nowhere when the current location is the dark alley and object 2 is in the player's inventory.

"Nowhere" will be created by in-

itialising the location of object 3 as a 88, a non-existent location.

Let us set up a count of visits to the location using the stranger's flag, C(3) which for reasons to be explained later will always be negative, initially -2. Therefore we must count negatively:

110 IF P(2)=50 AND LN=9 THEN LET C(3)=C(3)-1 : LET P(3)=9

Now we must count five moves in this location before he disappears into the opening for three moves. This will be when C(3)=-7, -8, or -9:

120 IF C(3)<-6 AND C(3)>-10 THEN LET P(3)=12

We must comment on his disappearance and open up the new exit to location 12:

130 IF C(3)=-7 THEN LET Q2\$="STRANGER HAS DISAPPEARED": LET L\$(9)=L\$(9)+" NARROW OPENING IN WALL": LET E\$(9)=E\$(9)+"0": LET D\$(9)=D\$(9)+"12"

To make him re-appear:
140 IF C(3)=-10 THEN LET Q2\$="STRANGER'S BACK": LET P(3)=9

There is no need to re-assign his location, as it was set at 9 in line 110. Now he must shoot you if C(3)=-12:
150 IF C(3)=-12 THEN .(go to suitable end of game message)

What we have not covered is the eventuality of the player entering location 12 while the stranger is there. Suppose we want the player shot, then we can adapt line 150 by inserting:

150 IF (LN=12 AND P(3)=12) OR C(3)=-12 THEN . . .

But what if the player shoots the stranger? If this is done before he reveals the opening, he must be made to disappear forever in our SHOOT verb routine, to say location 99. Remembering that he started life at location 88, we must now amend line 110 to read:

110 IF P(2)=50 AND LN=9 AND P(3)<99 THEN . . .

Thus our count of moves will only operate whilst the stranger is alive, and the player is carrying the microfilm in location 9.

A final extra touch might be to provide for dropping the microfilm in location 9, when the stranger will snatch it and disappear. Using the above conventions and variables, see if you can write the necessary line!

THE MAGIC OF FROBOZZ . . .

Two adventuring colleagues of mine who have access to a PDP-11 have been playing Dungeon from DECUS during their lunch breaks for the past 9 months.

They invited me over to join in, but I could see there was no chance I'd be allowed to lay a finger on the keyboard!

Before them lay a map almost a metre square, painstakingly built up during their exploration of this very large adventure-land.

They told me they had recently discovered how to operate the sluice gates, and successfully drain a reservoir. They were currently at the bottom of a dry well and the problem under discussion was how they might get out upwards, for they were sure there must be an exit that way.

"It's a magic well, so we must be able to do something pretty useful here. The most useful thing for us right now is to go up," explained Ian.

How did they know it was magic? "It's a FROBOZZ well, and all FROBOZZ products are magic", he replied. Well, of course!

Suddenly their concentration went back to the screen. A lean and hungry

gentleman had just entered their vicinity, and without care on their part was likely to rob them blind.

I left them to it, wondering enviously whether I could afford a PDP-11.

Some weeks later I had a disc drive fitted to my TRS-80 and looking around for a disc Adventure, came across Zork.

I was intrigued and amused by the replies, some of which were over a screenful of text.

Indeed, the game has commands VERBOSE BRIEF and SUPERBRIEF to limit these screenfuls if you are going through a part of the game you have already played.

Zork turns out to be Dungeon. It is available for 32k Atari from Calisto Computers, and 32k TRS-80 from Tandy. Both machines must have at least one drive.

I haven't yet drained a reservoir, or even found the magic well, but I've been places that my friends haven't even heard of. That's how big it is!

I wonder how many readers are currently playing this game in one of its forms?

THE MEN WHO INVENTED ME WERE
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Richard Altwasser and Steven Vickers are the men who invented the Jupiter Ace.

After years of designing microcomputers that use BASIC (both men played a major role in creating the ZX Spectrum), they abandoned it in favour of FORTH.

FORTH is just as easy to learn as BASIC. Yet it's a faster, more compact and more structured language that educationalists and professional programmers alike prefer.

So the Jupiter Ace is the only microcomputer you can buy that is designed around FORTH.

Using it, there's little fear of accidentally 'crashing' programs halfway through and having to start all over again (a common fault with BASIC). The Jupiter Ace's comprehensive error checking sees to that.

The Jupiter Ace has a full-size keyboard, high resolution graphics, sound, floating point arithmetic, a fast, reliable cassette interface, 3K of RAM and a full 12 month warranty.

You get all that for £89.95. Plus a mains adaptor, all the leads needed to connect most cassette recorders and TV's, a software catalogue (35 cassettes available, soon to be 50), the Jupiter Ace manual and a free demonstration cassette of 5 programs.

The Jupiter Ace manual is a complete introduction to personal computing and a simple-to-follow course in FORTH, from first principles to confident programming.

Plug-on 16K and 48K memory expansions are also available, at very competitive prices. (There'll be a plug-on printer interface available soon, too.)

It'll take you no time at all to realise how clever Richard and Steven were to design the Jupiter Ace around FORTH. And even less time to realise what a silly price £89.95 is to charge for it.



Technical Information

Hardware

Z80A; 8K ROM; 3K RAM.

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Screen

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Shooting through space you are ambushed by a fleet of Space Zombies flying at you in formation, swooping and diving at you. Destroy them, if you can! But in destroying them, you attract more to the area, and the game gets progressively harder.

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Return to Earth Having escaped from your previous dilemmas, you reach Earth Station 1, but fail to make radio contact. You effect a safe if harrowing manual docking. On entry you find it deserted, and the control room destroyed. You must explore the station and find some way to alert Earth of your predicament, but beware, many of the rooms are identical, there is extensive damage, and signs of alien intruders.

(16K) Text Adventure



Graphic Adventure (48K)

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£6.95



Poor little Henry is the hen-pecked hero of this domestic tale. One night he can take no more. He steals his wages from his wife's purse, sneaks out of the house being careful not to wake the baby or trip over the cat, and heads for the bright lights to have some fun. Trouble is he runs out of money. His only way to raise some cash is to gamble his few remaining pounds on the spinning wheel of the roulette table. Just as Henry is getting into his evening his wife — Mad Martha — has noticed his absence. Realising Henry has absconded with the housekeeping she sets out after him with an axe. Guess what part you play in this happy tale? That's right, you're Henry. Watch out for that axe!



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HIRE AND FIRE!

In our quest for the cheaper way to play we found that rental prices vary tremendously — but an average price to aim for is around 50p-a-day for a top-of-the range game like Star Raiders or Pacman.

Hardware units are also offered for hire by some of the high street television rental shops.

Radio Rentals were the first people to start hiring video games a year ago when they offered the Intellivision for hire. You can get one for £5.95 a month, or £4.95 if you already rent a television from Radio Rentals. For the price you get the Master Component and a soccer cartridge, plus one other cartridge of your choice.

Radio Rentals policy on the games cartridges themselves has always been to sell rather than hire — but this is likely to change if a scheme currently being tried out in the North West proves successful. In certain shops in the region the firm is hiring out the Mattel range of games on a weekly or daily basis.

If you don't have a Radio Rentals shop near you then you may also be able to rent games from your local video-films hire shop. Almost every high street now has a video shop and many newsagents stock them as well.



A typical scheme is operated by Easy Video Limited at their three shops in the London area. You can hire a top of the range game for 50p a day. Games which are cheaper to buy are also cheaper to hire. These go down to about 20p a day.

Hardware units come considerably dearer at between £5 and £7 a week.

Soni Dosaj of Easy Video said the main advantage of hiring a cartridge was that it gave you an opportunity to give the game a thorough testing in your own home before you decide to buy. There must be at least one game in your collection which seemed like a good buy at the time but after the first couple of weeks hardly ever gets played. Hiring should enable you to tell whether a game stands up to the two-week test.

Your local public library may also soon be stocking video games for hire. Surrey Library Department now has video games for hire in seven of its branches. They offer the complete range of Atari VCS cartridges, with Imagic and Activision titles shortly to be added to the list.

During the 18 months the scheme has been running it has been an enormous success. The demand for games has



Blowing up video aliens is great fun — but it can cost a bomb to save the universe!

With the best new games retailing at anything up to £30 Computer and Video Games decided to take a look at a cheaper way of playing video games. And we found that the key to cost cutting may be found at your local video hire shops, where among the films you may find video cartridges available for rent.

been so great that the proceeds have recouped the initial outlay and the scheme is now self-financing.

The chief librarian of Surrey Library Services Mr Douglas Betts, told *C&VG* that people often queue up to wait for games to be returned so that they can hire them.

Surrey charge 50p per week and you can hire up to four games at a time using your library tickets in the same way as you would to borrow books.

There has been some criticism of video games in the library, although Mr Betts says he has been able to counter this with the many advantages of the scheme.

The games attract young people into the library and they may learn to appreciate the other services offered.

It also provides a small revenue for the library, and is the first step towards the "library of the future" which will provide educational and instructional software not only for video games units, but also for home computers and video recorders.

Technology is also cutting the costs of playing games.

In the US you can play a game using a telephone link in a similar way that microcomputer owners can get access to games, via Prestel, and the new Micronet 800 system in the UK.

The American system is based on a

BY EUGENE LACEY

special adaptor which is supplied by the telephone company. This takes a signal down the telephone cable to your home which is then converted into a games program for your Atari VCS or Intellivision.

The charge for the game is then made at the end of the month when you receive your telephone bill.

Although hire is not as popular in the U.S. as it is here, one nationwide hotel chain is offering its guests a Colecovision and cartridges to hire for the duration of their stay.

If your local library doesn't stock video games and you don't have a local video films hire shop, there are a number of hire by mail firms now offering competitive schemes on video games.

Just £10 will buy you a life membership of the hire club run by E&E



Enterprises of Cornwall.

You then pay 25p a day hire and there is no extra charge for postage and packing.

E&E stock the entire range of games for the Atari VCS, Mattel Intellivision, Acetronic, and Philips G7000 machines. They buy their games direct from the wholesaler so that as soon as the games are in the shops they are also available for hire from E&E.

As official buyers for the Video Traders Association, Easy Video are also offering a hire service to individual shops who can then hire the games out to their customers.

Games Galore, a Slough based firm, offers a range of games for the Atari.

An annual fee of £40 enables you to borrow the games at no extra charge.

So if you want to play all the latest video games without breaking the bank the best advice *C&VG* can give is hire and fire folks!

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STRATEGIC COMMAND

by Alan J. Ovens

For the Dragon Computer.

As the name suggests Strategic Command is a game of strategy for two players, the object of which is to overrun the opponents capital. Each player has a capital that contains: 2 battleships, 3 destroyers, 1 aircraft carrier, 2 cruisers, 1 heavy artillery gun, 2 light tanks, 2 main battle tanks, 1 mechanised infantry unit. Each player also has a naval base with: 1 battleship, 2 destroyers, 1 aircraft carrier, 1 mine layer, 2 mine sweepers, 2 submarines, 3 patrol boats, 3 cruisers. Each player also has an army base with: 1 mine layer, 2 light artillery guns, 2 mine sweepers, 1 main battle tank, 3 mechanised infantry units, 2 light tanks, 1 heavy artillery gun, 3 reconnaissance units. Each player can create up to ten task forces, of up to three units at any one time, mine fields can be laid, and swept, naval forces can engage, or be engaged by land forces if they come close enough, and up to three task forces from each side can engage each other in battle. There is also an air reconnaissance facility. The game takes a few minutes to learn, but can take anything from a few minutes, to several hours to play, depending on the skill of the players.

MULTISOUND SYNTHESISER

by Darren Hall

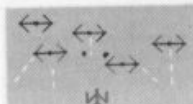
For the unexpanded VIC 20 (in machine code of course) the synthesiser is split into four main sections. 1, normal; 2, normal with drum; 3, programmable background music; 4, white noise. Each section is accessed by pressing one of the four function keys. Music can be played like a normal organ or synthesiser by using the 2 rows of keys "Q" to "Z" & "A" to "M". By pressing certain keys, different harmonics and sound effects may be created. Up to 4 tunes of up to 255 notes each can be created as background music, and can be saved to tape for reloading at a later date. A background tune plus the drum beat (choice of 6) can be played together, and at the same time you can play another tune over the top, the rhythm can be speeded up or slowed down, etc., etc., etc.

SPACE ATTACK

by Cliff Ramshaw

For the unexpanded VIC 20.

Space Attack is a machine code arcade quality game with extremely good graphics, and 3 starting skill levels. There are four different waves of different alien space ships, which attack you (as the pilot of an inter galactic battleship) with increasing speed and ferocity, each wave coming faster than the last, and shoot in up to three different directions as they attack, making dodging them extremely difficult, you more or less have to keep firing and moving all the time.



SPACE FORTRESS

by Darren Hall

For the unexpanded VIC 20, available early February. Space Fortress is a machine code arcade quality game with brilliant action and clean very attractive graphics, and absolutely amazing sound effects and probably the best game for the VIC 20 from any manufacturer to date. There are 20 skill levels, but you always start at skill level one, first of all you are attacked by 3 waves of the suicide squad, then 3 waves of sidewinders then 3 waves of astorian swoopers. Finally you are attacked by the purple avengers. All these different deadly defence forces attack you using different methods of attack. After you have destroyed the last wave of purple avengers, the Space Fortress appears, this you have to shoot down before it puts up its defence shields and disappears into hyperspace. If you shoot it down you advance to the next skill level. If you fail, you go back to the skill level that you were on. Each time you destroy the fortress you gain an additional life (you start with 5).

SUPER NINE

by Ian Morrison and David Anderson
for the unexpanded ZX81

Altogether there are nine machine code games, all on the one tape. CANYON: you have to guide your space ship along a canyon which gets progressively narrower. 50 skill levels and 50 speed levels. ASTEROIDS: You have to guide your ship across the screen, avoiding the asteroids. 10 skill levels. 50 speed levels. ASTRO BLASTER: The object of the game is to shoot down the fireballs, asteroids, and enemy craft. DEFENDER: The object of the game is to shoot down the enemy craft and save the humanoids. SQUASH: A two player game of squash, both players being able to move simultaneously, the loser being the first one to miss the ball 3 times. SCRAMBLE: You have to avoid the mountainous landscape, shoot down the rockets and blast the ammunition dumps. SKETCH: Create your own pictures on your TV screen, with rub out facility, also you can copy your artwork to the ZX printer. COSMIC RAIDER: You must shoot down the aliens whilst avoiding the clouds and mountains. FOUR THOUGHT: A two player game, the object of which is to get four counters of your own in a row, horizontally, vertically, or diagonally.

MARTIAN RAIDER

by Cliff Ramshaw

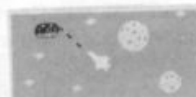
Our top selling game for the unexpanded VIC 20, Martian Raider is a machine code, arcade quality game. You are the pilot of an intergalactic battle ship, your mission is to bomb the cities, ammunition dumps, and ground to air missiles of the evil Martian overlords. Attacking you are the U.F.O.s, meteorite storms, and the ground to air missiles. All of which (if you are quick enough), you can shoot down. You have a limited time to complete your mission. But this time is extended each time you hit an ammunition dump. If you lose one of your three lives (a bonus life is awarded at 10,000 points) you will get additional time with the new life. There are several different screens which advance automatically during play, superb graphics and action. Uses joystick, or easy to use keyboard controls.



MOONS OF JUPITER

by Dave Byrden

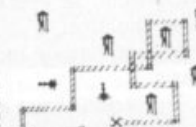
For the expanded VIC 20. Will run in 3K and/or 8K and/or 16K. Moons of Jupiter is a machine code arcade quality game with absolutely brilliant actions and graphics, with 3 skill levels. The game is similar in concept to asteroids, but with better action and graphics: you have to shoot the moons which then break up into smaller fragments, which you also have to shoot and yet again they will break up, all the time coming at you from different directions and at different speeds. Watch out for the U.F.O.s, but even more deadly are the Gologs, these you cannot shoot, you have to lure them into the moons to destroy them. You start with 5 lives and gain one additional life each time you clear the screen. Uses joystick or easy to use keyboard controls.



SHARK ATTACK

by Cliff Ramshaw

For the unexpanded VIC 20. Shark Attack is a machine code, arcade quality game. You have only three lives. You are in shark infested waters after being thrown overboard from a pirate ship. Your only protection being an atomic net which you trail behind you. Trying to trap the sharks (hopefully all together) and proceed to fill the screen with the net. If you stop, or cover your tracks for too long the sharks will escape and come after you. Each time you fill the screen with your net. The screen will clear, two octopuses will appear, and the sharks will increase their ferocity of attack. Each additional time that you fill the screen, two extra octopuses will appear, and the sharks will grow more ferocious. Uses joystick, or easy keyboard controls.



SEA INVASION

by Cliff Ramshaw

Sea Invasion is a machine code, arcade quality game, similar in concept to "Space Invaders" but much better in many respects. There are five skill levels; 1, beginner; 2, trainee; 3, semi-professional; 4, professional; 5, ace: so no matter how fast or slow your reflexes are, there is a speed to match your skill. Unlike Space Invaders, the creatures do not move left then right, etc., but move off the right of the screen, and come back from the left, so there is no safe place to hide. Uses joystick, or easy keyboard controls.



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PULLING

TRY THIS TRICK SWITCH

Visitors to Matilda the witch's house, after negotiating the tricky landing among the chimney stacks and finding a safe pot to drop in by, find life inside just as complicated.

Matilda is always trying to rearrange her cumbersome furniture — so large that only one item at a time will fit into each tiny room.

Spells are of no help — in fact they led to the present disorder. What is needed is a solid spot of weightlifting.

Only one object can be moved at a time into the only empty room. Each room is connected to the room next door on the same level and, by stairs, to the room immediately above or below it.

The problem is that the clock must change rooms with the book and the cauldron needs to be where the bed is and *vice versa*. The settee is already in the right place.

What is the least number of times the objects must be moved to achieve Matilda's aim?

Labelled counters or paper squares can be placed on our picture and pushed around to simulate the removal men.

You can record your effort by noting the one empty room after each move is made.

MELTING POT

Matilda, the wicked witch has, without any great originality, called her house The Cauldrons. As most of her visitors travel by broomstick, the house name is painted, rather decoratively, on the roof.

If you can move from tile to adjacent tile — either straight down or diagonally, just how many different ways are there to spell CAULDRONS?

You can spend most of your holiday trying to count them but there is a much easier way of finding the answer — and perhaps the rest of the tiles on her roof may be of help!

ARCADE GAME ON BOARD

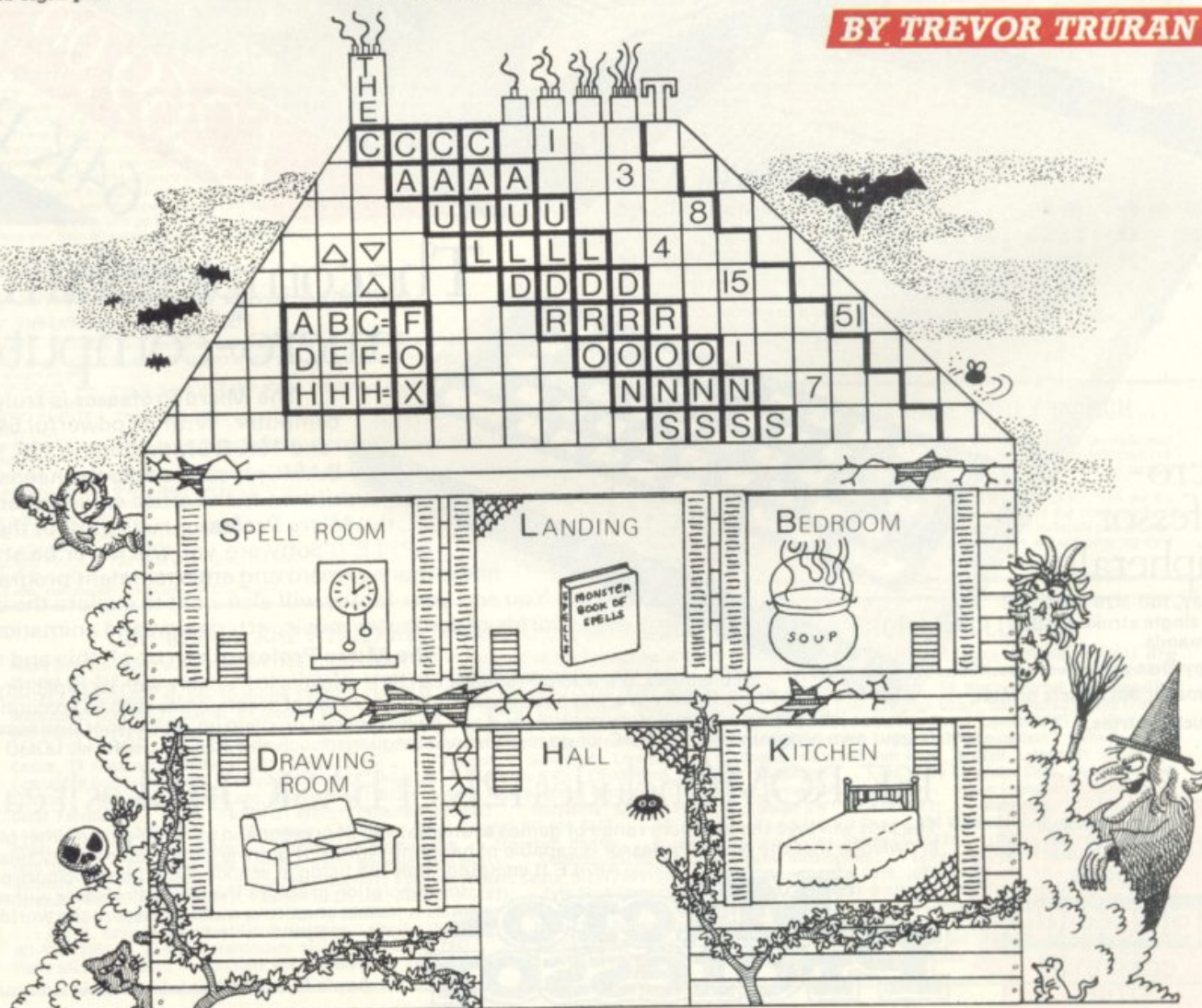
The ACME Spaghetti, Bedding Plants and Interplanetary Travel Co, not being in quite the same league as NASA and the Russians has entered the space race on a microchip scale.

So slow is their first Delta rocket that time, even in zero G, hangs heavy on the hands of the crew. To pass the dayless months away they have taken the headline of the last newspaper the saw before leaving Earth and are attempting to form new words from it.

On each new line one letter must be dropped from those used in the line above and those left must form a new word or words. A word, to be valid, must be of three letters or more and must be a bold type entry from *Chambers Twentieth Century Dictionary*, (revised ed.).

Words must not overlap along the line and must be separated by a bar. A word once used must not be repeated.

BY TREVOR TRURAN



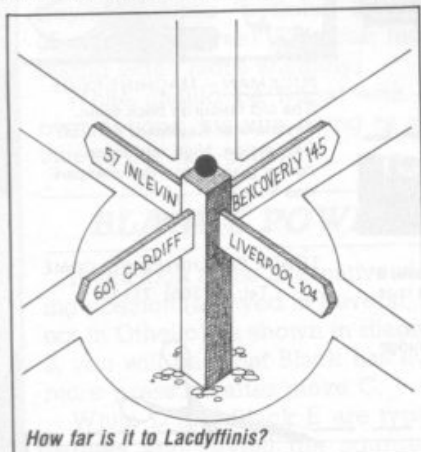
Each line scores the total of all the letter values which appear in it. These values are shown above the top line, so hanging on to your J or your F might be a good idea.

Before finding the grand total by adding up the scores for each line, bonuses can be gained for each word which is of five or more letters. The bonus is one point for each letter in the word; a five-letter word gains five points, a six-letter word six points and so on.

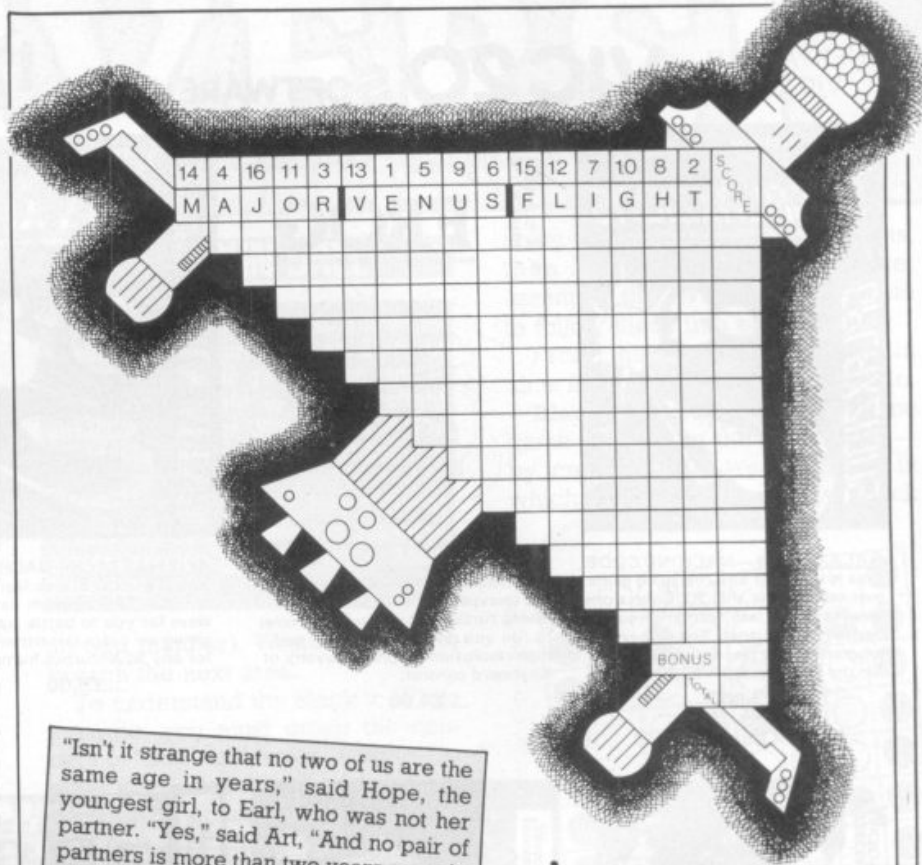
ACME ground control reports that the navigator aboard the spaceship had just recorded a splendid new high score and was about to give the details when the telephone line linking them to Earth finally broke.

The company has therefore decided to extend an invitation to the readers of this magazine to submit their best efforts and has coerced **Milton Bradley** into donating three of their range of six arcade board games. The range includes Pacman, Frogger, Donkey Kong, Defender, Berzerk and Zaxxon. To enter, send in the diagram, or a copy of it, with your words, score for each row, bonuses claimed and final total to reach us by May 12.

The first three prizewinners highest scoring entries will each receive a prize — provided they remembered to include their name and address! Usual competition rules apply.



WITCH SWITCH
18 moves. As in this sample, shown by the initial letter of the empty room: L, B, K, H, L, S, D, H, K, B, L, H, D, S, L, B, K, H.
HOW FAR? 452 miles. In each word the distance is equal to the sum of the roman numbers which are included within it.
Thus LIVERPOOL = L + IV + L = 104, Cardiff = 100 + 500 + 1 = 601, Lacydftinis = 50 + 400 + 1 + 1 = 452.
NOTE: CD = 400 not 100 + 500 just as the IV in Liverpool equals 4 and not 1 + 5; i.e. numbers are read in conventional terms.)



"Isn't it strange that no two of us are the same age in years," said Hope, the youngest girl, to Earl, who was not her partner. "Yes," said Art, "And no pair of partners is more than two years apart in age". Bob is two years older than Hope's partner.

Pluto's partner and Earl are two years apart in age. Charlotte is one year older than Ida. Pluto, while three years older than Hope's partner, is younger than Ida.

Fran's partner and Pluto are four years apart in age. Fran and Bob are four years apart in age.

When you know that Fran is 25-years-old, you can work out the age of Earl, can't you?

By Paul McLendon

Farmer Nure's Blooming Problem in March proved that we don't number many horticulturists among our readership.

Trevor Truran finally managed to outsmart most of you by the convoluted thinking and only two readers entered a correct solution.

Mrs M. Barker of Aireville Close, Keighley in Yorkshire and Alan Northcott of Reading Road, Winnersh, Wokingham discovered the secret of the red, white and blue blooms.

Their reward is a Vulcan Electronics Hungarian Ring to puzzle over. The other eight rings we will hold back for a future competition. Our commiserations go out to all the rest of you who sweated over the problem with a ball-point pen poised.

SOLUTIONS

main letters ABC = F A = 1, B = 2 ... and A further clue is given to the left of the 1 + 9 + 45 + 157.

By completing this table of answers the total can be found by adding together the four numbers in the final row:

1	1	1	1
3	2	3	3
6	8	10	47

From filling in the top few lines it will be apparent that each number is the sum of the three numbers in the row above, diagonally to the left:

CAUDRONS 212. The number of ways of spelling C, CA, CAU ... starting from each C in turn can be entered onto the tile spaces on the right. Some of the answers have been filled in as clues.

Pluto (22) and Charlotte (24).
Bob (21) and Ida (23).
Earl (26) and Fran (25).
Art (19) and Hope (20).
their ages are:

Earl is 26 years old. The partners and CRYPTIC COUPLES

word, gives a general solution.

Where N is the number of letters in the word, gives a general solution.

$$\frac{31}{(N+1)(N+2)(N+3) - (N-1)}$$

formula
4, 9, 18, 32 and work out that the totals for spelling C, CA, CAU, CAUL are deduce the result by noting that the Those mathematically minded may les further suggest "three".
1 + 2 + 3 = 6 and so on. (The three triang-

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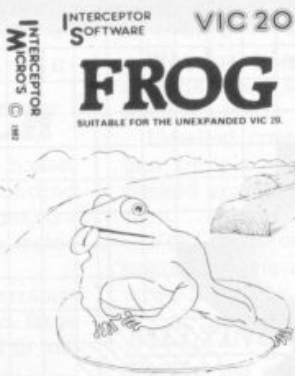
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REVERSI

ODD AND EVEN PREJUDICE

Understanding this controversy will improve your, or your computer's, skill. Black seems to have an advantage in the opening, though why is difficult to explain.

Black's first move is forced by symmetry, as A in diagram 1, but all of White's replies (B's) allow Black to play good moves, as defined in the previous article on openings. From then on White has to tread very warily.

Black seems to have more opportunity to remove "safe" moves from White. The end result is that White should be under pressure throughout the game.

Black should try to capitalise on opening gains by aggressively destroying White's "options" (choices of sensible moves). This can mean taking sides more willingly.

White should be frugal with his own options, his aim being to survive to the end-game.

BLACK'S POWER

If you look at the alternative starting position (allowed in Reversi, but not in Othello) as shown in diagram 2, you will find that Black has even more pressure after move C.

White D and Black E are typical replies and reveal the source of Black's power — the odd number of squares in the inner corners (i.e. C, D and E are three squares which is

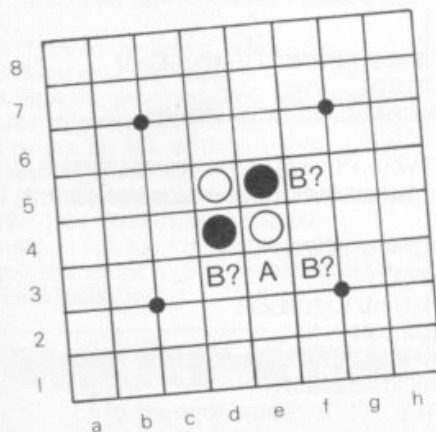


Fig. 1

BY JOHN BALL

When playing Othello, also known as Reversi, do you prefer to be Black or White? In all logic games, one side is commonly thought to have a slight advantage, such as White in chess. The world-wide preference for Othello is Black.

According to the international Grapevine, top American and Japanese players are now favouring White. About time, too!

an odd number). White then has to breach the next area.

To understand the Black v. White struggle, you must grasp the concept of "odd" and "even" areas — in other words areas with odd or even numbers of spaces.

SUBTLE DOUBLETS

After the opening, Black comes up against even areas, and has to use his ingenuity to create odd areas.

White on the other hand is happy

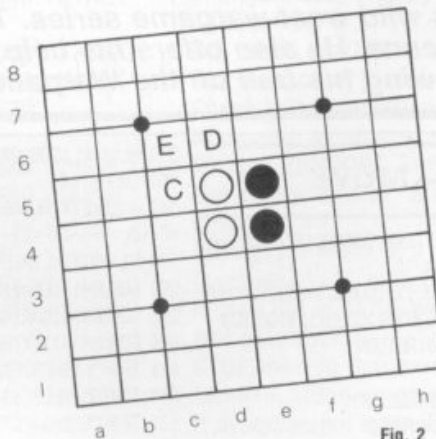


Fig. 2

to have even play, due to doublets in the end-game.

These "doublets" are really the final even groups of spaces split up into pairs. Examples are FF, GG and HH shown in diagram 3.

To play in one space would invite your opponent to play in the other paired space.

It is an advantage to be the second player, as it wins you corners or sides. Indeed throughout the game, there are more subtle "doublets".

As Black started, if the end-game

splits up into a series of doublets, then Black will lose each one, assuming that White has the sense to follow Black into each doublet.

From this, a big difference in aims is raised for Black and White.

Black's purpose throughout the game is to make the game odd — by creating odd areas, ideally in which only Black can play. Black

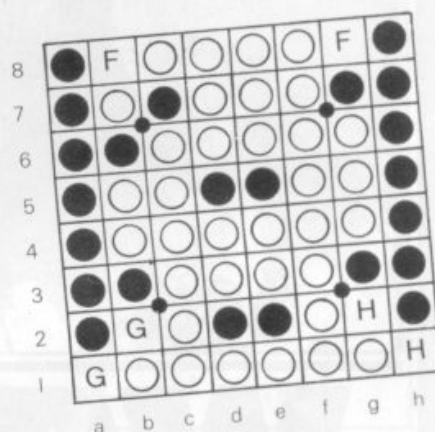


Fig. 3

then avoids odd areas unless there are an even number of them. This puts White in doublet trouble.

White's purpose throughout the game is to make the game even, by creating even areas, forcing Black into doublet trouble.

Usually the best Black can do is stave off the doublet trouble until the last two or four spaces. If he can keep it odd to the end — a rare event — he has usually won.

So if you are good at surviving early on, you should have more chance of winning as White, now that you know about the even and odd doublet battle.

For four years now, former British champion John Parker and myself have spoken out in favour of White as giving the best opportunities.

According to the international grapevine, top American and the brilliant Japanese players are now switching their allegiance to White as well. And about time too.

Unlike chess, where the large number of opening moves means that the first mover can dictate the way the game develops initially, the first mover in Othello is limited to just four, all causing identical positions.



Welcome back partners! Hope you all are ready to git back on the trail agin!

This time our trail-boss Ron Potkin is looking at the input routine. But first here's a few words about moving about in the wild western world of Warpath.

Movement Phase — Other options: **STOP** — To stop a piece before all moves are spent, press "S". **HOLD** — The pieces flicker in a predetermined order. If you wish to hold a piece until the other pieces have moved, press "H". This helps when a portion of the board is congested. The piece will flicker when the other pieces have moved.

CHANGE SIDES — If you decide that all movement is complete even though some pieces have not moved, press "C". This will cause the TRS-80 to prompt for any pieces on "HOLD" and then move into the attack sequence.

LEAVE THE FLAG — The piece in the hex containing the Flag will always move the Flag as it moves. If you wish to move the piece without the Flag, press "L".

WARPATH

Part five of Ron Potkin's wild west wargame series. This month Ron gets things moving in the right sequence. He also offers his help to anyone having problems following his trail on the Warpath so far.

WARPATH Part 5 — MOVE

```

70 PRINT@0,CHR$(30);:PRINT@0,I$(BOW)"SV(1)I$(TOM)"SV(2)"HORSEM
EN"SV(3)T$SV(4);:IFSV(5)THENPRINT"+ GENERAL";
80 IFSV(1)+SV(2)+SV(3)>0THENRETURNELSEGOSUB430;GOSUB340;GOSUB340
:PRINT"ALL "I$S"E(2)T$ WIN";GOSUB340;GOSUB340;GOSUB120;GOTO70
100 IFPLTHENT=1:T1=25;RETURNELSET=26:T1=50;RETURN
120 IFINKEY$=""THENRETURNELSERUN
160 Q9=0;FL=H(TP);IFBL=SFTHENQ9=1;RETURNELSERETURN
270 PRINT@SP," ";:GOSUB430;PRINT"H.Q. CAPTURED "I$S WIN....
,"";:GOSUB510;PRINT@SP,FL;:GOSUB510;GOSUB120;GOTO270
310 IFBL<SFTHENRETURNELSES=SP+VF(X)+3;PRINT@S,CHR$(186);:GOSUB4
30;PRINTI$S CAPTURE FLAG!";PRINT@S," ";:GOSUB120;GOTO310
330 IFQ9=0THENRETURNELSESF=BL;IFSF<701THENRETURNELSEPRINT@SP,D;
" ";:GOSUB400;BL=SF;GOSUB410;PRINT@SP,FL;A1;:GOSUB430;PRINT"FLAG
IS HOME!"T$ WIN";GOSUB120;GOTO330
340 FORI=1TOW2:NEXT;RETURN
450 NX=USR(BL);IFPEEK(S9)>255THEN520ELSENX=0;RETURN
460 A=INKEY$;IFA=""THENGOSUB470;GOTO460ELSEX=VAL(A);IFX<7THENRET
URNELSE460
470 GOSUB510;PRINT@SP,G;:GOSUB510;PRINT@SP,FL;:RETURN
480 FORI=1TO9;GOSUB470;NEXT;RETURN
490 G="HOW";GOTO480
510 FORJ=1TO20:NEXT;RETURN
520 NA=0;IFNX>500R(NX<26)=(T<26)THENRETURNELSENA=1;RETURN
530 S=SP+VF(X);PRINT@SP,D;:PRINT@S,FL;:IFR2THENRETURNELSEIFBL=SF
THENPRINT@S+3,A1;:PRINT@SP+3,CHR$(128);:RETURNELSERETURN

```

```

540 FL=1-FL;GOSUB70
550 GOSUB100
560 A=INKEY$;BL=ABS(PC(T,0));IFBL=0THEN720ELSETP=PC(T,1);KH=0;MV
=3-(BL=SF)-(TP=2)-(TP=5)-3*(TP=3)
570 K1=MV;IFKLTHENIFPC(T,0)>0THEN720ELSEPC(T,0)=BL;KD=KD-1
580 GOSUB410;LF=0;R2=0
590 GOSUB160;G=RIGHT$(STR$(MV))+ " ",3)
600 GOSUB460;IFXTHEN640ELSEIFLFTHEN600
610 IFA="L"THENIFSF=BLTHENQ9=0;LF=1;GOSUB430;PRINT"LEAVE THE FLA
G!";:GOTO590ELSE630
620 IFA="S"ORA="C"THEN680ELSEIFA="H"ANDK1=MVTHENPC(T,0)=-PC(T,0)
;KD=KD+1;GOTO720
630 GOSUB490;GOTO590
640 GOSUB500;IFPLAND(NB=822)THEN270ELSEIFNX<>ZTHEN630
650 BL=NB;IFLF=0THENGOSUB330
660 PC(T,0)=BL;POKEV3,Z;POKEV2,T;GOSUB530;GOSUB400
670 IFPLTHENGOSUB310
680 IF(TP=2)AND(MV<1)AND(A<"C")AND(A<"S")THEN700ELSEPOKEV3,6
690 GOSUB450;IFNXTHENIFNATHENGOSUB410;G="xxx";GOSUB480;GOTO720EL
SE690
700 IFA="C"THEN730ELSEIFA="S"THEN720
710 MV=MV-1;IFMV>0THEN580
720 IFA<"C"THENLF=0;T=T+1;IFT<=T1THEN560
730 KL=0;IFKDTHENKL=1;GOTO550
740 GOSUB430;GOSUB100;FORI=1TO50;PC(I,2)=0;NEXT;FORK=1TOT1;BL=AB
S(PC(K,0));IFBLTHENPRINTK;:GOSUB1230
750 GOSUB430;NEXT;RETURN
1230 RETURN 'STUB

```


Are you finding the coding tough? It is always difficult to follow someone else's program, let alone one that has been written on a computer other than your own. The Editor and I are anxious to provide assistance to help you, so if there are any difficult points, please write and let us know.

Machine code is a challenge to convert and, as one reader has pointed out, could mean a complete rewrite.

You will find it helpful to study Ted Ball's series of articles on machine language in this magazine because this compares the code for all the popular chips. Remember, however difficult it may appear, don't give up in despair! Write in and tell us the problem.

I told you in my last article that we had completed a module which would enable you to write several wargames. We must now start to concentrate on the detailed programming for WARPETH and this month I intend explaining the input routine.

Now that the SEARCH routine is included, we can now look at the coding required to move a piece. Intertwined is a routine to test for pieces on HOLD.

You will also see that flags are needed to provide for a man in the FLAG hex and for the man who wants to move without the FLAG.

To assist you, figure 1 is an explanation of every line from 540 to 750. Line 840 controls the whole program.

The main input handling routine is handled by lines 460/470 which will accept any number from 1 to 6 or a character.

Fortunately, the VALUE of a character is zero which is very convenient. Line 480 handles errors; instead of the number of moves, it flickers "HOW".

Line 1230 is a STUB. This leads into the COMBAT routines which we will start work on next month.

Once you have entered this month's listing, there will not be room for the remainder of the program.

An inspection of the program shows that the DATA statements take up a great deal of space, and as you by now appreciate, these are superfluous once the information is loaded into the strings. I suggest that you work in the following manner:

1. Load your tape containing parts 1 to 4.
2. Type in the listing below.
3. Save on a new tape.
4. Run the program. You will now be able to move the pieces on the map. Try out all the options given in the rules.
5. Once you are satisfied, delete lines 791, 1084, 3000-3150, 5198-5400.

Once you have made these changes you will notice a great improvement in the initialisation.

WARPETH

to be continued
next month

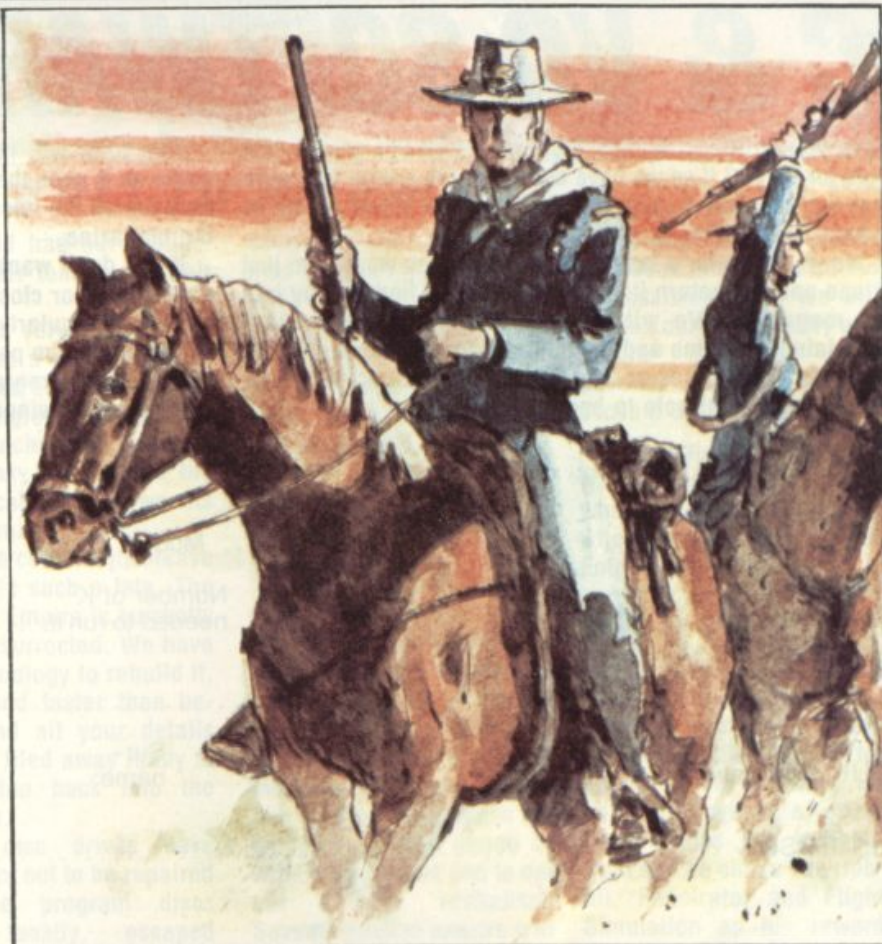


Figure 1

- | | | |
|-----|----------|---|
| 540 | START | : Change sides, display number of pieces, check win by elimination. |
| 550 | PRANGE | : Get range of PTABLE index for that side. |
| 560 | INDEX | : Get location of piece, its type and moves. |
| 570 | | : Check HOLD condition — if location is negative, decrease KD — the number of pieces on HOLD. |
| 580 | DISPLAY | : Display WINDOW, Clear "FLAG" flags. |
| 590 | INPUT | : Get character and "Man in FLAG hex" flag. Prepare MV string. |
| 600 | | : Prompt for input. If a number, it's a MOVE, else if previous input was "L", goto INPUT. |
| 610 | A="L" | : If man not in FLAG hex, goto ERROR. Set LF flag, message and goto INDEX. |
| 620 | A="S" | : STOP moving that man — goto FINISH. |
| | A="C" | : CHANGE sides — goto FINISH. |
| | A="H" | : If man has not moved, negate index 0 and increase KD, number of pieces on HOLD — goto NEXT. |
| 630 | ERROR | : Print "HOW" — goto INPUT. |
| 640 | MOVE | : Is hex vacant? If HQ captured, END game. If Hex is not empty, goto ERROR. |
| 650 | UPDATE | : If FLAG has reached fort, END game. |
| 660 | | : Update IBOARD, WINDOW, BIGSCREEN and PTABLE. |
| 670 | | : If indians have captured FLAG, END game. |
| 680 | FINISH | : Is man a tomahawk? Not required to stop. |
| 690 | | : Test surrounding hex for opponents. |
| 700 | If A="C" | : Movement complete but check for HOLD. |
| | If A="S" | : Goto next piece. |
| 710 | | : Decrease MV. If moves still available, goto DISPLAY. |
| 720 | NEXT | : Increase piece index. If more pieces to move, goto INDEX. |
| 730 | | : Check for HOLD. If KD greater than zero, goto PRANGE. |
| 740 | | : Combat sequence. |
| 750 | | : Return to line 840. |

C & VG SOFTWARE FORM

Have you written a games program which you feel is just right for C&VG? If so we have come up with a form to ensure that we can test it out and give you our views on it, as quickly as possible.

We would prefer a tape and listing but can work from just a tape and will return it to you if it doesn't find its way into the magazine. We will also need an additional sheet explaining the game and its theme. And any documentation like lists of variables or how certain routines are working, would be of great help to beginners.

This form will merely help us to keep a check on your game as it goes through our testing process and make sure we have all the information we need to present it properly in the magazine.

If you don't want to cut up the magazine, we will accept photocopies or close copies of this page. This form will be appearing regularly in C&VG issues from now on.

Remember we pay £10 for each listing published and you could win our Programmer of the Year Contest where we will try to turn the winner into a best-selling games author.

Program name:

Machine make: Model

Other models it should run on: Number of K needed to run it:

Other equipment (joysticks, Extended Basic, add ons, etc.) needed to run it:

Author's name: Christian name: Sur-name:

Address:

Tel: Date:

Type of game: (If original please say so)

Loading instructions:

Game instructions: (If not included in the listing)

Office use only

Date received:

Acknowledgement sent: ☐

Name of evaluator:

Date sent out:

Date due back:

Needs to be returned to author for alterations: ☐ Date sent:

Due to be published in issue of magazine.

Evaluator's comments

Good enough to publish ☐

Needs some tidying up ☐

Not worth publishing ☐

Same game already published on this micro ☐

Wouldn't load ☐



SEVENTH EMPIRE

THE Seventh Empire is dead. Long live the Seventh Empire! By way of an apology to readers who were planning out their next moves, we have to admit that we have had a technical hitch beyond even the Bugs' wildest imaginings.

A combination of a disc-drive error which did not back up our data properly and a power cut which scratched out our current data disc meant that our files on the game are now hopelessly out of date.

Although we can laugh about it now, coming in on press day to find the mess that used to be a flourishing galaxy winking out error messages when it should have been neatly processed and ready to print out the results, almost reduced a half-grown staff-writer to

THE FALL OF AN EMPIRE

tears and had our production editor tearing his hair out.

It was very tempting to write that a previously unmentioned black hole which Mike Singleton had placed in an uncharted region of the Galaxy had sucked the whole caboodle down its eternal maw.

But we couldn't just leave you all to such a fate. The Seventh Empire is currently being resurrected. We have the technology to rebuild it, better and faster than before. And all your details are still filed away ready to be written back into the program.

The disc drives have been sent out to be repaired and the program discs have, luckily, escaped damage. So we are currently trying to ensure that the

Seventh Empire will rise from the ashes of its former self.

It will mean that we'll have to send out new fleet positions, but we hope that you'll bear with us, put the first three turns down to experience and join in the triumphant re-launch of the Seventh Empire in our next available issue.

A final note: I know a couple of people have phoned up saying that for one reason or another they have had to give up the Seventh Empire commitment. We do have a lot of other readers who would like to take your place in the game, so please phone or write if you would like to opt out of the revitalised Seventh Empire and we will put a new reader into that slot.

A special apology goes out to our last top 10 players in April who were pulling ahead in the race for the Colecovision prize. We will scratch our heads to try and ensure that the new Seventh Empire takes account of their scores.

But on the positive side, we have learnt a lot about what we were taking on when we launched Seventh Empire and although it is currently a dirty word in the office, the resurrected game will benefit from that knowledge.

Our thanks go to Psion and Melbourne House for providing the software for our April winner's prize. David Jones has a Spectrum and he chose The Hobbit, Penetrator and Flight Simulation as his reward for trading his way to our top April score.

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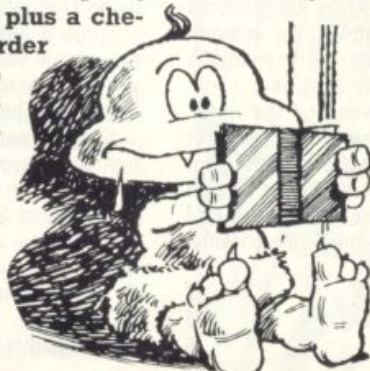
BACK ISSUES

Look what you've been missing! Games programs for your favourite machine, news and reviews of those games tapes you've always wanted to know about, plus special features on the latest trends in the exciting world of computers and gaming.

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WARE SOFTWARE SOFTWARE SOFTWARE REVIEWS

MIGHTY KONG BEATS OFF ANNOYING BUGS

KRAZY KONG

Take an ape, a blonde starlet and a cute little carpenter called Mario and you've got the three vital ingredients of Donkey Kong one of the latest hit arcade games.

Most video games players will know the format backwards but for the uninitiated the plot is a simple one. The ape has grabbed your girl and taken her to the top of a steel fortress. You must climb the fortress and rescue her, avoiding barrels which the great hairy beast is showering you with from above.

After the first few attempts at playing Interceptor Micros version for the unexpanded Vic-20 this game appeared to have more bugs than a flea-bitten old moggy. It took me quite a few games to learn how to get started.

All the action takes place on one screen — as opposed to the three screens of the Nintendo original.

I was disappointed that the ape cannot be made to crash to the ground as he does in the arcade version when you reach the top level. When you get to the top you simply kiss the girl to rescue her, clock up a few bonus points, and then you must start all over again — but at a faster pace.

The bugs mentioned above occur mainly at the beginning of the game. To get started you must jump onto an elevator which takes you to the bottom of the steel fortress.

If you jump at the wrong moment you may find half of your body left behind. Or, when you do get to the bottom of the fortress having jumped off the elevator safely you may find yourself wading through the first level instead of walking along it.

Another thing that could have been improved was the long delay after being hit by one of the barrels. I found myself constantly bashing the repeat button in sheer frustration.

On the graphics side Krazy Kong scores highly for the unexpanded Vic. The ape and girl were both believable representations even if Mario was a little stick-like.

Converting Donkey Kong to the unexpanded Vic was an ambitious project which many other software houses have not attempted. Interceptor Micros version plays a reasonable game despite the odd bug. It is available from the Tadley, Hants. based firm at **£6.95**.

- Getting started
- Value
- Playability

9
6
6



GIVE THESE GUARDS THE BRUSH OFF! SUPER GLOOPER

Paint the numerous corridors of a maze and dodge the aliens. This is the challenge you face in the new ZX81 game from Psion called Super Gloopier.

There are five different mazes to choose from, and unlike the numerous Pacman-type games now on sale, you do not have to gobble dots, but colour the maze in as you move the Gloopier around.

To make things a little bit more difficult there are four guards, represented by inverse 'A's, who try to catch you.

To help you deal with the guards there are four shields — represented as 'X's in the four corners of the maze. When you paint over these they turn the guards into inverse 'X's and you can then kill them off.

On the B-side of Super Gloopier is a bonus game based on the popular arcade game Frogger.

Frogs is based on the second stage of the arcade version in which you must get your frog across a river by hopping from log to log. There are nine levels of play.

Super Gloopier and Frogs are available from most large branches of W.H. Smith at **£4.95**, running on the ZX81 with 16K RAM.

Two good quality machine code games have got to make this cassette another winner for Psion.

- Getting started
- Value
- Playability

8
9
9

Illustration: Jon Davis

SOFTWARE SOFTWARE SOFTWARE SOFT REVIEWS

A SMART, BUT EXPENSIVE, BUNCH OF ALIENS

DEFENDER

If there is one game that sorts the men out from the boys in the video games talent stakes it is Defender.

When it first hit the arcades in the late seventies many a Space Invaders star could be seen walking away from the machine seconds after inserting the coins muttering something like "Too tough for me" or "Perhaps it's time to hang up my joystick and get an allotment".

Many video games enthusiasts didn't even bother to give Defender a try at first, being frightened off by the numerous controls.

If you were one of those people then you now have a second chance to master this classic game as it has just been converted for the Atari 400 and 800 home computers.

Your mission is to rescue the humanoids from the aliens who are swarming down to abduct them.

Five types of aliens have to be dealt with in this fast action shoot-out. The Landers are the first to appear and attempt to kidnap the humanoids. If they succeed and take the humanoids to the top of the screen they turn into extremely dangerous Mutants.

Swarmer track you closely and must be destroyed at the first available opportunity. Still nastier are the Pods which, when destroyed, release several Swarmer.

Bombers lay mines to trap you — which cannot be shot. Baiters are saucer like ships which appear if you are judged to take too long in eliminating all the aliens in a particular sector.

Your Defender ship is armed with a powerful laser which is most effectively used by keeping a close eye on the radar which shows you where to fire to pick off the oncoming aliens.

Two more controls are at your disposal if things are getting a little bit hectic. The hyperspace button, which in this case is the Atari's keyboard space bar, makes you momentarily disappear and replaces you at random on the screen.

Slightly safer than hyperspace is the Smart bomb button which you can utilise by pressing any individual letter key. This will wipe out all the aliens on the screen when detonated.

Be warned about smart bombs. You only have three of them and the skilled Defender player uses them carefully and selectively.

All ship movements and the laser are controlled with the joystick making this

home version considerably easier to master than the arcade game.

Graphics-wise the Atari Defender is fair, although not outstanding. It was not always clear when you had been hit, making you pause for a some times fatal split second.

Other gripes were with the Smart bombs. It is sometimes difficult to find a spare finger to depress the space bar as you need two hands to hold Atari joysticks. The same goes for the hyperspace buttons.

This is a reasonable conversion of a complex arcade game, although for £29.95 you may be able to buy two equally, or even more playable games for the money.

Cross-computer comparisons must be made carefully as they can quite often be erroneous.

You must compare like with like in terms of price and also in terms of the claims made for the machines by the manufacturers. A useful conclusion can therefore be drawn in the wake of this Defender review between the Atari 800 and BBC model B and that is that for the games player, software for the BBC machine is both cheaper and of a better quality despite the fact that both computers fall into the same price band.

- Getting started 9
- Value 6
- Playability 6



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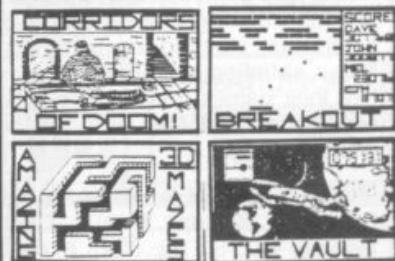
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E SOFTWARE SOFTWARE SOFTWARE REVIEWS

WELL, IT'S A VERY GOOD IDEA, BUT...

SCHIZOIDS

Spectrum Schizoids is one of the best ideas for a game to arrive on the C&VG reviews desk for several weeks.

You are at the wheel of an intergalactic Space-Dozer charged with the unfortunate task of having to bulldoze refuse from all over the galaxy into a black hole.

Your dozer can be made to thrust forward, rotate left and right and 'flip' — which has the effect of turning the machine instantly through 180 degrees to face in the opposite direction.

The controls for the dozer are very much in the style of asteroids — and indeed the space refuse comes at you from all four corners of the screen in Asteroids-fashion.

The space debris spirals towards you in three dimensional geometric shapes. There are cubes, diamond shapes, hexagons, rectangles and bars and all in different shapes and sizes.

One of the strongest features of Schizoids is the three dimensional movement of the shapes.

The dozer itself is quite difficult to manoeuvre and will take you a lot of practice to master it.

As you drift around the screen, drift because the dozer has inertia, you must be careful not to tumble into the black hole yourself.

The black hole has a slight gravitational pull and can suck you down even if you don't make contact with any of its spike edges.

The secret of shunting the shapes towards the hole is to make sure you catch them head on with your shovel. If they touch the side of your vehicle they will explode it.



Despite an excellent idea and clever programming with good graphics, I did feel that the playability of the game left a little to be desired.

It is very difficult to move the pieces of debris and control the dozer at the same time. Furthermore, the debris has a tendency to stick to the dozer's shovel, or get entangled in the skyhook at the rear. With a little bit more care a good idea could have been turned into a really good game. What we are left with is an average game but not quite up to the standard of Arcadia, and not up to the high standard we have come to expect from Imagine software.

The game runs on a Spectrum in 16 or 48k and is available at £5.50 from the Liverpool-based firm.

● Getting started	9
● Value	6
● Playability	6

RAPID RODENTS WILL RUN YOU RAGGED!

CYBER RATS

Rats, rats, rats! Yes, there will be a lot of cursing in Spectrum owning households once they get their hands on Silversoft's latest release — called Cyber Rats.

You are presented with a field full of the "meanest metallic menaces" ever let loose to plague mankind. They dash around the screen swarming down at your exterminator. They can hide behind clumps of grass which block your fire as they rush down at you. There's also the deadly purple rats which head downwards faster.

Once you finish off one wave of the rapid rodents another bunch spring out to do battle. If one catches you at the bottom of the screen its' bite will finish you off.

You can move up and down the screen to fight off the approaching rats as well as left and right — but watch out for sneaky rats catching you unawares in the maze-like grass clumps.

This reviewer had to make do with the keyboard control option to play the game but it is also joystick compatible.

The tape loaded first time and comes with a good set of instructions — the only thing that baffled me for about five minutes was the fact that the instructions didn't say which key to use as the "fire" button.

I'm sure that the game would be even better with a joystick.

Cyber Rats comes from Silversoft of London and sells at around £5.

● Getting Started	9
● Value	8
● Playability	8

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CVG5/83

MACHINE CODE

TERMINOLOGY PROCESSORS

The three processors, 6502, 6809 and Z80 have some addressing modes in common, but the terminology differs, and each has some addressing modes that are not available on the others.

6502 Addressing Modes

Implied Addressing: The operand is implicitly specified in the instruction, for example, CLC — clear the carry flag, or INX, — increment the number in the X register.

Immediate Addressing. The operand is contained in the instruction, for example LDX # 0 — load the X register with the number 0, or ADC # 2 — add the number in the accumulator, the number 2, and the carry, leaving the answer in the accumulator.

Because all the registers in the 6502 are 8-bits long an immediate operand must be an 8-bit number, 0 to 255 decimal, or 0 to FF hex.

Absolute Addressing: The 16-bit address of the operand is contained in the instruction, for example INC \$1234 — increment the number in memory location \$1234, or STA \$1234 — put the number in the accumulator into memory location \$1234.

Zero Page Addressing: The operand contained in the instruction is an 8-bit address which is an abbreviation for a 16-bit address in the range \$0000 to \$00FF, i.e. an address with high byte 0.

For example, INC \$70 — increment the number in memory location \$0070, or STA \$70 — put the number in the accumulator into memory location \$0070. Zero Page instructions occupy two bytes instead of the three bytes required in absolute addressing and take less time to execute, so by using addresses in Page Zero to store frequently used variables a program can be made significantly shorter and faster.

Accumulator Addressing: The operand is the accumulator, A. This addressing mode is only available with the four instructions ROL A, ROR A, ASL A, LSR A.

Relative Addressing: This is only used with the conditional branch instructions. The operand is a signed 8-bit number which is added to the current address to give the destination address when the branch takes place.

Absolute Indirect Addressing: This may be used only with the jump instruction JMP, and in assembly language this addressing mode is indicated by plac-

An assembly language instruction generally consists of two parts, the operation code (opcode for short), and the operand.

We have looked at several types of instruction, but so far we have been more concerned with what the instructions do (the opcode) than with how the processor obtains the numbers to operate on (the operand).

The various forms, by which an operand may be specified are called *addressing modes*, and writing efficient machine code programs requires an understanding of all the addressing modes and the circumstances in which to use them.

Here I explain the workings of the addressing modes of the 6502, 6809 and Z80.

ing brackets around the address.

The instruction contains a 16-bit address, and the effective address is contained in the memory location indicated in the instruction and the next higher memory location.

For example, suppose we have \$00 in memory location \$1234 and \$10 in memory location \$1235.

The instruction JMP (\$1234) would then cause the processor to continue execution from address \$1000. Note that, as with all 16-bit addresses on the 6502, the address is stored with the low byte before the high byte.

READING IN MEMORY

Indexed Absolute Addressing: The operand in the instruction is a 16-bit address, and the effective address is obtained by adding the contents of the X or Y register to the address in the instruction.

The assembly language form for the operand is *address, X* or *address, Y*.

For example, if the X register contains \$20 the instruction LDA \$1234, X will load the accumulator with the contents of memory location $\$1234 + \$20 = \$1254$, and if the Y register contains \$E0 the instruction STA \$1234, Y will put the contents of the accumulator into memory location $\$1234 + \$E0 = \$1314$.

This addressing mode allows us to read tables stored in memory by giving the start address for the table in the instruction and varying the X or Y register to access different entries in the table.

Indexed Zero Page Addressing: This works in a similar way to Indexed Abso-

lute Addressing, but requires only an 8-bit Zero Page address.

However, the effective address is always in Page Zero. For example, if the X register contains \$E0 the instruction LDA \$40, X will load the accumulator with the contents of memory location \$0020, not \$0120.

Although Zero Page, X addressing may be used with several instructions, Zero Page, Y addressing can be used only with the opcodes STX and LDX.

Indexed Indirect Addressing (pre-indexing): This can be used only with the X register. The instruction contains a Page Zero address, and the contents of the X register are added to this Page Zero Address (ignoring any carry, so the result is always a Page Zero address), and the effective address is the contents of this new Page Zero address and the next higher address.

The assembly language form for the operand is (address, X). For example, if the X register contains \$E0, address \$0020 contains \$00, and address \$0021 contains \$10, the instruction STA (\$40, X) will store the contents of the accumulator in address \$1000.



Indirect Indexed Addressing (post-indexing): This can be used only with the Y register. The instruction contains a Page Zero address and the effective address is obtained by adding the contents of the Y register to the 16-bit address contained in the specified Page Zero address and the next higher address.

The assembly language form for the operand is (address), Y. For example, if the Y register contains \$E0, address \$0020 contains \$34 and address \$0021 contains \$12, the instruction LDA (\$20), Y will load the accumulator with the contents of memory location $\$1234 + \$E0 = \$1314$.

Note the difference between the last two addressing modes. In indexed indirect addressing the indexing is performed first, and then the indirection; while in indirect indexing the indirection is performed first, and then the indexing.

BY TED BALL

ADDRESSING THE 6809 CHIP

6809 Addressing Modes

Inherent Addressing. The operand is implicitly specified in the opcode, for example, CLRA — set the contents of accumulator A to zero, or ABX — add contents of accumulator B to contents of Index Register X, leaving the result in X.

Immediate Addressing: The operand is included in the instruction. There are two types of immediate addressing.

In the first type the operand is a constant, for example, ADDA #\$20 — add the constant 20 hex to the contents of accumulator A, leaving the result in A, or LDU #\$1234 — load User Stack Pointer U with the constant 1234 hex.

The constant must be of the same length as the register specified in the opcode — 8 bits for an 8-bit register or 16-bits for a 16-bit register.

In the second type of immediate addressing the operand is one or more registers, for example, TFR A, B — transfer the contents of accumulator A to accumulator B, or EXG X, Y — exchange the contents of Index Register X with the contents of Index Register Y.

Extended Addressing: The 16-bit address of the operand is included in the instruction. For example, LDB \$1234 — load accumulator B with the contents of memory location 1234 hex, or STX \$1234 — store the contents of Index Register X in memory locations 1234 hex and 1235 hex. 16-bit addresses and data are stored in memory with the high byte first, followed by the low byte, so in the previous example, if X contained \$1000, \$10 would go into address \$1234 and \$00 would go into address \$1235.

Direct Addressing: The low byte of the address of the operand is included in the instruction, and the high byte of the address of the operand is provided from the Direct Page Register, DP.

For example, if DP contains \$00 the instruction LDA \$34, will load accumulator A with the contents of address \$0034, while if DP contains \$12, LDA \$34 will load A with the contents of address \$1234.

A standard 6809 assembler will normally assume that DP contains zero, but this can be changed by using the directive SETDP, which takes an immediate operand.

SETDP does not generate a machine code instruction; it is an instruction to the assembler to use direct addressing whenever the high byte of an extended

address is equal to the value given in the SETDP directive.

Thus, if we include SETDP \$12 in an assembly language program, and later have the instruction LDA \$1234, the assembler will provide the two byte direct page form of the instruction instead of the three byte extended form.

Instead of using SETDP we can cause the assembler to provide a direct page instruction by writing < in front of the operand.

Thus, LDA <\$1234 will produce the two byte direct page instruction. Similarly, writing > in front of the operand will cause the assembler to produce the three byte extended form of the instruction.

Thus, if we have not used a SETDP directive, LDA >\$34 will produce a three byte machine code instruction equivalent to LDA \$0034, while if we previously had a directive SETDP \$F0, LDA >\$34 will produce a three byte machine code instruction equivalent to LDA \$F034.

In order to get a specified value into the Direct Page register we have to use a TFR or EXG instruction: there is no straightforward load instruction for DP. For example we could write:

```
LDA#$12orLDA#$12
TFR A,DP    EXG A,DP
```

Table 1: 6809 Indexed and Indirect Addressing Modes

Type	Form	Non-indirect		Cycles +	Bytes +	Indirect		Cycles +	Bytes +
		Assembler Form	Post-Byte Op-code			Assembler Form	Post-Byte Op-code		
Constant Offset from R	No Offset	,R	1RR00100	0	0	(,R)	1RR10100	3	0
	5-Bit Offset	n,R	0RRnnnnn	1	0		Defaults to 8-bit		
	8-Bit Offset	nn,R	1RR01000	1	1	(nn,R)	1RR10000	4	1
	16-Bit Offset	mmnn,R	1RR01001	4	2	(mmnn,R)	1RR11001	7	2
Accumulator Offset from R	A — Register Offset	A,R	1RR00110	1	0	(A,R)	1RR10110	4	0
	B — Register Offset	B,R	1RR00101	1	0	(B,R)	1RR10101	4	0
	D — Register Offset	D,R	1RR01011	4	0	(D,R)	1RR11011	7	0
Auto increment/Decrement R	Increment by 1	,R+	1RR00000	2	0		Not allowed		
	Increment by 2	,R++	1RR00001	3	0	(,R++)	1RR10001	6	0
	Decrement by 1	,-R	1RR00010	2	0		Not allowed		
	Decrement by 2	,--R	1RR00011	3	0	(,--R)	1RR10011	6	0
Constant Offset from PC	8-Bit Offset	label, PCR	1XX01100	1	1	(label, PCR)	1XX11100	4	1
	16-Bit Offset	label, PCR	1XX01101	5	2	(label, PCR)	1XX11101	8	2
Extended Indirect	16-Bit Address	—	—	—	—	(mmnn)	10011111	5	2

R = X, Y, U, or S
XX = Don't Care

RR 00 = X 10 = U
01 = Y 11 = S



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THE CORRECT DESTINATION

Relative Addressing: This is used with the branch instructions. The operand is a signed number (8-bits with the short branch instructions BRA, BRN, BHI, etc, and 16-bits with the corresponding long branch instructions LBRA, LBRN, LBHI, etc) which is added to the current address to give the destination address when the branch takes place.

With a short branch the destination must be between -128 and +127 bytes from the address immediately following the branch instruction, but the destination of a long branch instruction may be anywhere in the 64k address space.

Indexed and Indirect Addressing Modes: The 6809 has an extensive set of indexed and indirect addressing modes, summarised in table 1. Instead of giving a full explanation and examples for each one I will just give a general outline here, and we will look at these addressing modes in detail later when we come to real example programs.

The machine code form of indexed and indirect instructions consists of the opcode, followed by a post-byte (which specifies the actual addressing mode), and in some cases there is one or two additional bytes which contain a constant offset.

In assembly language the general form of an indexed operand is Q,R where R is a register name and Q is a specification for an offset. The effective address is calculated by adding the offset to the contents of the base register R.

In all cases the offset is taken as a two's complement signed binary number. Where an 8-bit operand is required the memory location indicated by the effective address is used; where a 16-bit operand is required, two consecutive memory locations are used, the first being the one indicated by the effective address.

With indirect addressing there is a further step in the calculation of the effective address. The offset is added to the contents of the base register, and the result of this addition is taken as the address of the first of two bytes whose contents form the effective address.

LESS USEFUL CONCEPTS...

Z80 Addressing Modes

The concept of addressing modes is less useful on the Z80 than it is on the 6502 and 6809. Although the Z80 has some addressing modes with fairly general application, there are several forms of operand specification which can be used with only a small group of opcodes.

There is no generally accepted terminology or grouping and you will find different books using different names for the Z80 addressing modes and grouping the addressing modes differently.

Many Z80 instructions take an operand of the form *destination, source* and we have seen examples of this in earlier parts of the series.

The index registers IX and IY can be used in instructions which take this form of operand. In general, we can use an

index register wherever we can use the register pair HL, although there are some instructions which allow HL in the operand but do not have a corresponding form with IX and IY.

Where HL appears in the operand the corresponding index register instructions replace HL by IX or IY, for example, instead of LD HL, 1000H we can write LD IX, 1000H and LD IY, 1000H or instead of LD HL, (1234H) we can write LD IX, (1234H) and LD IY, (1234H).

Where (HL) appears in the operand the corresponding index register instructions have (IX+displacement) or (IY+displacement). Instead of using the register contents as an address, a constant is added first and the result used as an address.

For example, if IX contained 1000H, the instruction LD A, (IX+10H) would lead the accumulator with the contents of memory location 1010H.

EXCEPTION TO THE RULES

There is one exception to the rule that (IX+displacement) or (IY+displacement) corresponds to (HL), and this is with the jump instruction. Corresponding with JP (HL) we have JP (IX and JP (IY).

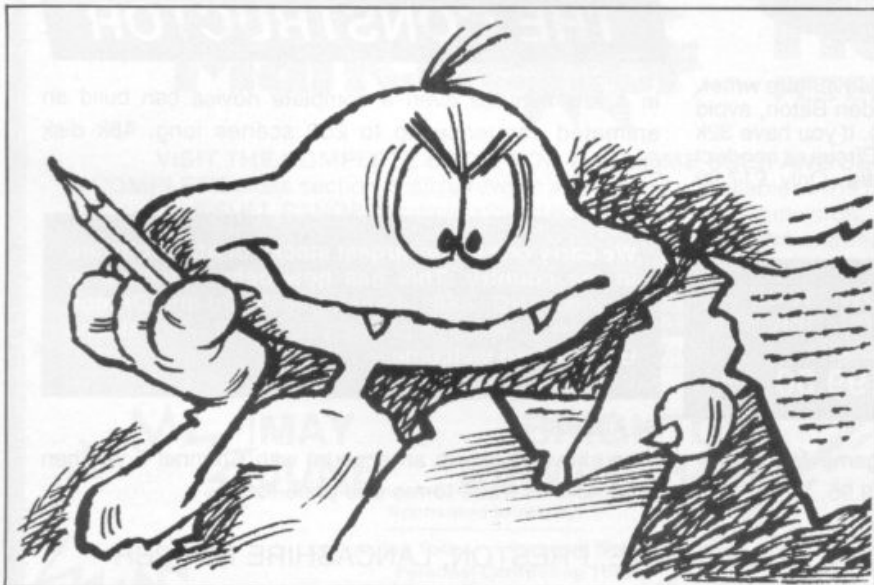
There are some exceptions to the *destination, source* form of operand. For example we have ADD A, data; ADD A, register; ADD A, (HL); ADD A, (IX+d); ADD A, (IY+d), but SUB data; SUB register; SUB (HL); SUB (IX+d); SUB (IY+d).

The assembly language requires that we specify A as the destination with an ADD instruction because we can use ADD with other registers, ADD HL, register pair; ADD IX, register pair; ADD IY, register pair; while all forms of SUB use A as the destination.

If you have any problems relating to Ted Ball's Machine Code articles, questions about machine code programming or assembly language, then please don't hesitate to drop us a line and we'll pass on your questions to our expert.

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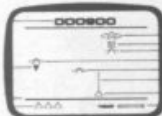
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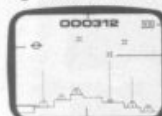
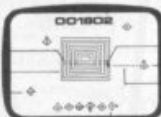
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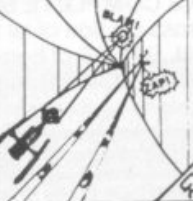
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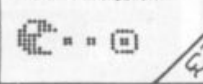
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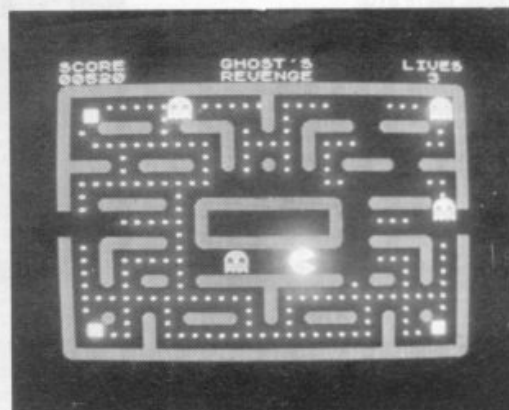
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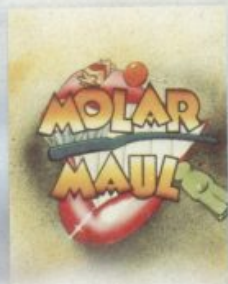
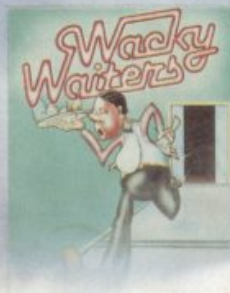
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