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December 1984

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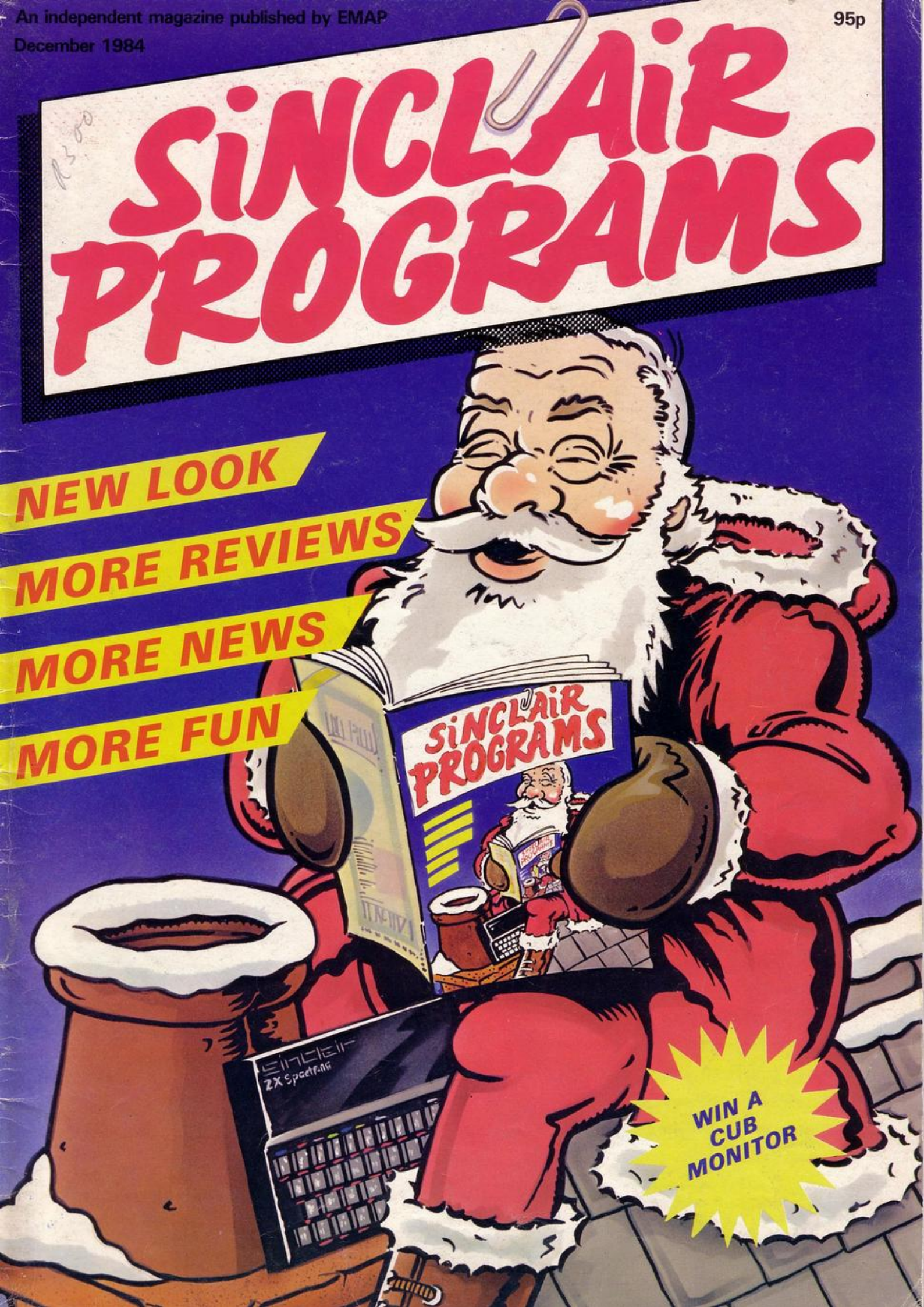
MORE REVIEWS

MORE NEWS

MORE FUN



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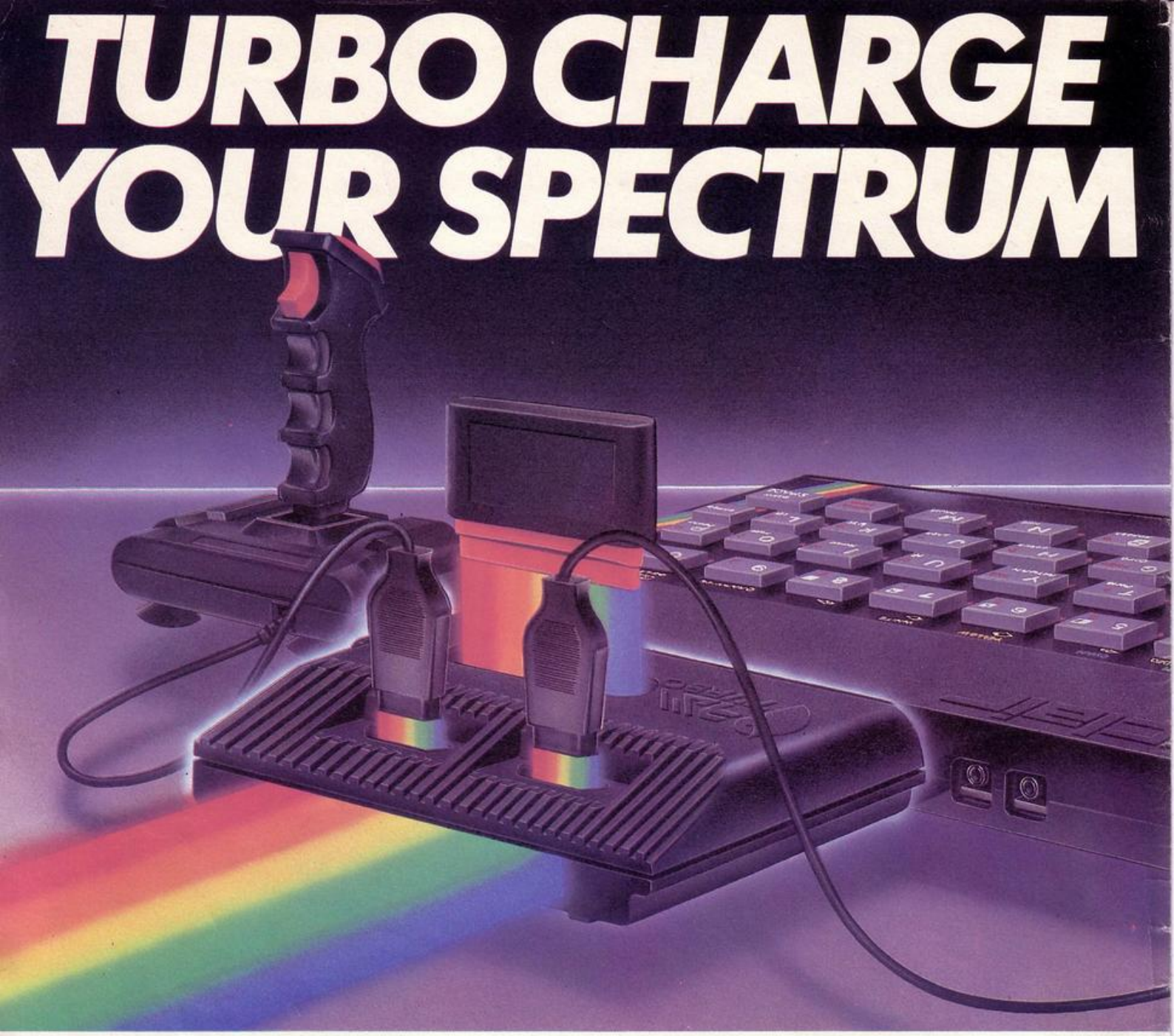

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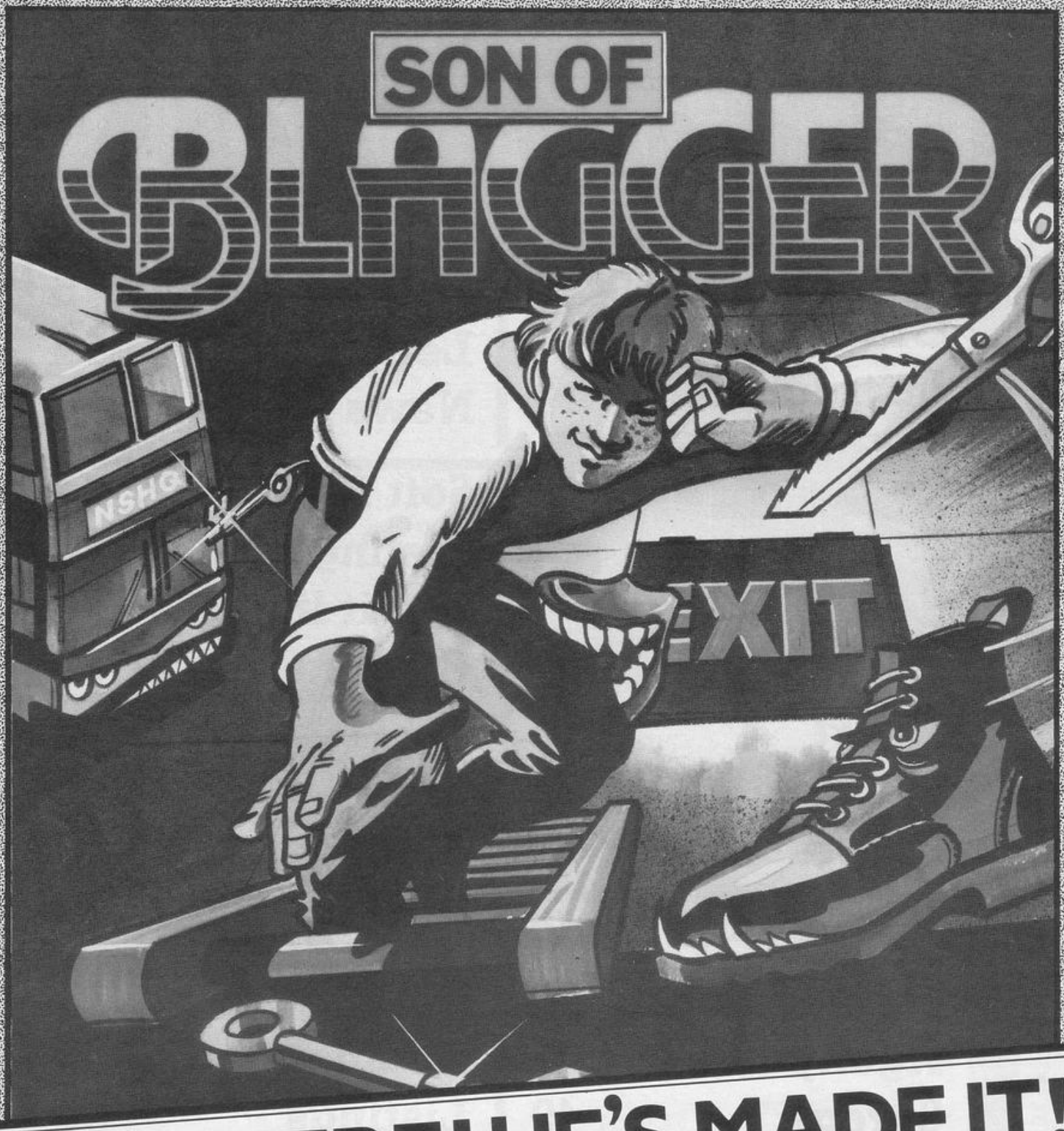

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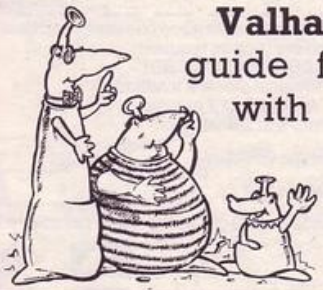
WELCOME to the new-look *Sinclair Programs*. With more reviews, more features and excellent listings we hope that *Sinclair Programs* will be more useful than ever before to Sinclair owners.

To mark the changes we have decided to raise the prices for contributions. In future we will pay £25 for listings published, £10 for listings published on the beginners' pages, £2 for letters, and £2 for tips printed in **Got it licked.**

Our competition this month offers a Microvitec cub monitor as first prize. Those of you suffering from dodgy vertical hold, shimmering colours and sore eyes should turn to the competition without delay. Runners up will receive games software from top companies Mikrogen and Digital integration.

For beginners who find long programs confusing, we have extended our **Beginners' section.** This month we explain how to correct simple programming errors, how a short program works, and include several short programs which can be entered quickly and easily.

Adventure enthusiasts will welcome our new **Questline** feature which, this month, includes that long-awaited object, a map of **Valhalla.** Also featured are a guide for those still struggling with the **Lords of Midnight,** and the first part of our new Questline service.



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If you would like your original programs to be published in Sinclair Programs, please send your contributions, which must not have appeared elsewhere, to:
Sinclair Programs,
EMAP,
67 Clerkenwell Road,
London EC1R 5BH

Programs should be on cassette. We cannot undertake to return them unless a stamped, addressed envelope is included. We pay £25 for the copyright of listings published and £10 for the copyright of listings published in the Beginners' section.

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Cover Design—Ivan Hissey

Instructions for graphics characters are printed in lower-case letters in our listings. They are enclosed by brackets and separated by colons to distinguish them and the brackets and colons should not be entered.

Inverse characters are represented by the letter "i" and graphics characters by "g". Thus an inverse W would be represented by "iw", a graphics W by "gw", and an inverse graphics W by "igw".

Spaces are represented by "sp" and inverse spaces by "isp". Whenever any character is to be used more than once, the number of times it is to be used is shown before it, together with a multiplication sign. Thus "6*isp" means six inverse spaces and "(g4:4*i4:g3)" would be entered as a graphic four, followed by an inverse four repeated four times, followed by a graphics three.

Where whole words are to be written in inverse letters they appear in the listings as lower-case letters. Letters to be entered in graphics mode on the Spectrum are underlined.

Inverse characters may be entered on the ZX-81 by changing to graphics mode and then typing the appropriate characters and on the Spectrum by changing to inverse video and typing the appropriate letters. Graphics characters may be entered on the ZX-81 by changing to graphics mode and then pressing symbol shift while the appropriate characters are entered. On the Spectrum graphics characters may be obtained by changing to graphics mode and then pressing the appropriate character. User-defined graphics will appear as normal letters until the program has been RUN.

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Pixel scrolling of window or entire screen	●		●	
Merge pictures	●			
U.D.G. creation	●	●	●	●
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Separate screen and colour editing.	●	●		

The table demonstrates the capabilities of LEONARDO against the best selling similar packages. LEONARDO'S facilities do not stop there however. In fact over 50 commands are available making this the most advanced and useful graphics package yet produced for the SPECTRUM 48K.

- Compatible with all leading joysticks.
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LETTERS

Send your thoughts to us at Letters, Sinclair Programs, 67 Clerkenwell Road, London EC1R 5BH. We pay £2 for every letter published.

Sabre man survives

I HAVE been buying your magazine for some time, and I think it is very good. I am writing to tell you that I have found an endless lives code for **Sabre Wulf.** It goes as follows.

Load the program using MERGE "". Then add POKE 23755,10: POKE 23756,10 and ENTER. Then press CAPS SHIFT and 1 to edit, and a line will be printed at the bottom of the screen. Use CAPS SHIFT and 8 to reach the final line of this. After the POKE USR statement add POKE 43575,244 then ENTER. Finish by pressing RUN to complete loading.

I have completed Sabre Wulf 27 times without the endless lives code. My highest percentage is 81 and my highest score is 132 465. The next Ultimate game will be the **Underwurlde.**

Alistair Scott, aged 13,
Edinburgh.

Binary Christmas

COMPUTER programmers find their lives made more easy if they understand the binary number system. However, this almost always entails converting numbers from denary to binary. How much simpler it would be if we were all so used to binary that we could understand it instantly.

I suggest converting all well-known songs and sayings containing numbers to binary. Memorising binary numbers in this form would provide a painless introduction for potential programmers.

The **Twleve Days of Christmas** would thus run like this:

On the 1100th day of Christmas, my true love sent to me:
1100 lords a-leaping,
1011 ladies dancing,
1010 drummers drumming,
1001 pipers piping,
1000 maids a-milking,
111 swans a-swimming,
110 geese a-laying,
101 gold rings,
100 calling birds,
11 French hens,
10 turtle doves,
and a partridge in a pear tree.

I suggest that all Spectrum owners use this version this Christmas, in order to help people owning computers for the first time to understand the new world they have entered.

Katy Tingey,
Orpington, Kent.

• *This should certainly be the computerised carol this December 11001. Are there any more binary songs and sayings out there?*

Computer penfriend

I AM nearly 13 years of age, I own a 48K Spectrum, and live in Petts Wood near Orpington. I am a regular buyer of *Sinclair Programs.* I enjoy the programs and letters page. I use my Spectrum mostly for software. My favourite games are: adventure games, **The Hobbit;** arcade games, **Chuckie Egg.**

I have studied Basic programming for a year at school in my Computer Studies lessons. I wonder if anyone can be my penfriend. Please write to the address below.

Robert Newby,
1 Nightingale Road,
Petts Wood,
Kent.

ZX-81 penfriend

I AM 13 years old and have a 16K ZX-81 with ZX printer. I am looking for a penfriend, with whom to exchange tips, news, advice and programs.

If anyone is interested, please write to me at the address below.

Derek Chambers,
19 Pages Lane,
Muswell Hill,
London NW10.

Contacts wanted

MY UNCLE bought me a 16K Spectrum for Christmas last year. Since then I have been buying *Sinclair Programs.* It is very good, but I wish you would print more advertisements.

I would like to know whether anyone is interested in contacting me so that I could swap ideas and programs with them.

Jamie Hughes,
2 Magnolia Drive,
Lutterworth,
Leicestershire.

Help wanted

WE ARE Tamatha and Alannah Ruthen, aged 13 and 15. We are looking for pen-pals with Spectrum computers. As we are beginners we do not know very much about programming, so we would be grateful for any help in that direction. If you are interested, please write to us at the address below.

T & A Ruthen,
48 Titchfield Park Road,
Titchfield, Fareham,
Hampshire.

• *If anyone would like to find a computer penpal through* Sinclair Programs *write in, giving details of your computer interests, and we will try to print your letter.*

I WISH to complain about your QL computer competition. I have a ZX-81 and was very unhappy to find there were no prizes for ZX-81 owners.

This makes us feel very inferior. We buy your magazine and feel there should be prizes for all, not just Spectrum owners. We do not want to switch to another magazine, as there are not as many programs in any other one.

I hope you can help ZX-81 owners.

Shaun Newcombe,
aged 14 years,
Abington, Northampton.

tír na nòg

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Tír Na Nòg – the land of youth, the other world.

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NEWS

Imagine . . .

IMAGINE Software is still making news although the company has been in compulsory liquidation since July 1984. The rights to BANDERSNATCH, the first megagame from the defunct software company, have been acquired by Sinclair Research. Sinclair also have the option to purchase megagames from a software house made up of ex-Imagine employees, Dave Lawson and Ian Hetherington and they also plan to make the megagames available for the QL in 1985.

A team of six programmers, including former Imagine Software employees Ian Weatherburn and John Gibson, and going under the name of Denton Designs, has been taken on by Beyond Software to write a graphic adventure that has the working title of the **Shadow Squad.** The player controls six characters with varying qualities sent on a diplomatic mission. Shadow Squad will be available in the new year and will sell for between £8 and £10.

Imagine's name, logo and trading style as well as some completed programs have been purchased by Ocean Software after negotiations with the liquidators. Eight ex-Imagine employees have been taken on by Ocean on a contract basis. They are working on an animated strategy game, due for release by Ocean at the end of November.

NAME THAT TAPE

MOST home computer users will agree that their cassette tapes are a very important and necessary part of their programming equipment. Tape Tabs Limited have launched a range of accessories to enable you to personalise your home recordings. Tape Tabs are cassette inlay cards and in each pack the cards are easily recognisable. The cards are index-ruled and colour coded and have pictures on the front.

For a sample pack write to Tape Tabs Limited, PO Box 157, London SW11 3NT enclosing an S.A.E. size 108 × 219 mm.

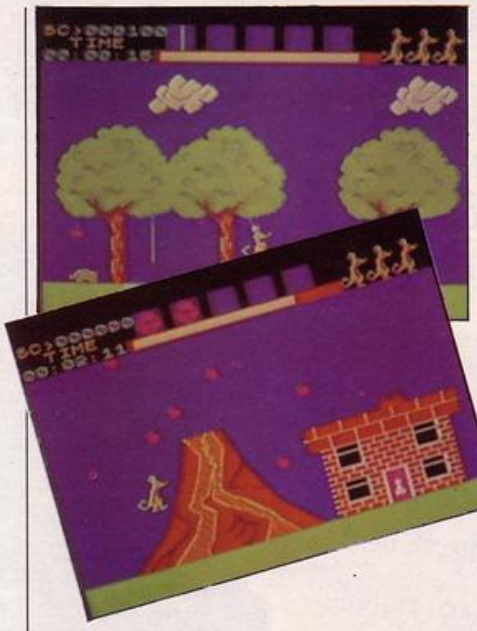
Intrigue at the Ritz

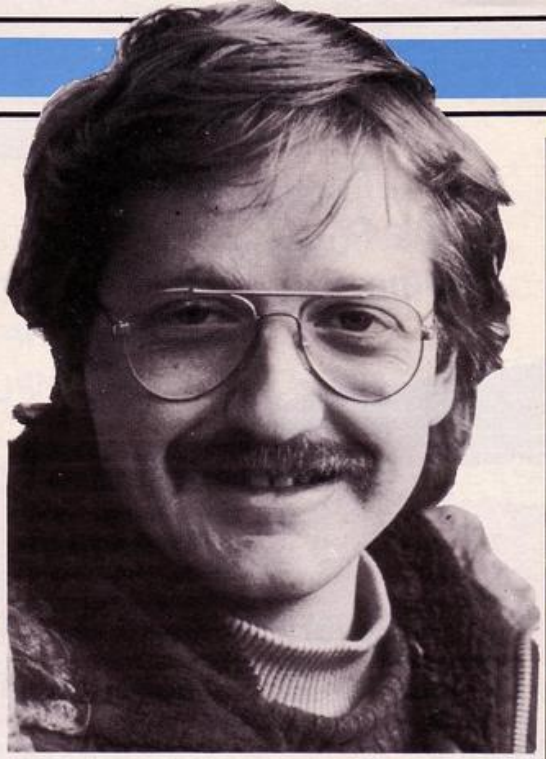
THE 1984 Cambridge Award trophy was recently presented to John Sherry, prize-winning author of **The Prince.** Sherry named his game after Machiavelli's book and the player needs "a truly machiavellian mind to succeed". The award was presented to Sherry at the Ritz Hotel by Nigel Searle, Managing Director of Sinclair Research. According to Bill Scolding, editor of *Sinclair User,* The Prince is "set to spark off a new generation of adventure games" and is the first interactive role-playing game for four players.

Soft spinach

POPEYE, Minder and Hagar the Horrible are to be the themes of three games from dk'tronics, due to be released within the next 3-6 months. The exclusive contracts have been secured after five months of careful negotiations with Thames and King Features Syndicate of America.

Managing Director of dk'tronics, David Heelas, said recently that he had read software articles stating that the market would be flooded with games for the Christmas rush and "the retailers job of selecting the ones he is going to carry will be a nightmare". Heelas believes that DK have a more professional approach "with far less of the razzmatazz normally associated with the software industry".





Rats for Christmas

MICROMEGA have recently launched **Jasper,** which they hope will be their big smash for Christmas. According to General Manager, Neil Hooper; "Jasper contains some of the best animation ever used, with a cartoon design and appearance that is cute to look at". Jasper is a platform and arcade adventure concept with 22 screens and excellent graphics in which the player takes on the role of Jasper the rat as he makes his way through the jungle. Programmed for the Spectrum by Derek Brewster, author of the successful games **Codename Mat** and **Kentilla,** Jasper is priced at £6.95.

Terror at the drive-in

DEZZY is the new super heroine in **Drive-In,** produced for the Spectrum by Fantasy Software. Drive-in was launched in mid-October and features Dezzy and her spaceship. After flying into a drive-in, Dezzy finds that she is trapped and has to visit 189 chambers to collect pieces of a spaceship that then has to be constucted.

Another launch from Fantasy is **Backpacker's Guide to the Universe Part I.** Backpacker Part I sees the return of Ziggy, who starred in **The Pyramid.** The game contains 256 screens, 64 of these completely different and the rest containing variations of the graphics and colours. The evil Scarfax is threatening to pull the great plug and let the whole universe go down the drain. Ziggy has been given a 24-hour warning and he goes to the caverns of exile to collect numerous animals and creatures.

Part II should be released in the New Year and Fantasy are undecided as to whether to produce a third part. Paul Dyer, Managing Director of Fantasy, hopes that one day Ziggy and Dezzy will get together.

Revolving design

DESIGN DESIGN are currently putting the finishing touches to their latest venture which they hope to complete in time for a release date of late November/early December. The **Spinning Around Game** is being written by Martin Horsley, author of **Rommel's Revenge** and contributor to **Halls of the Things.** Originally Design Design were keeping tight-lipped over the nature of the game, only saying that "the title gives a good explanation of the theme". They have since revealed that the Spinning Around Game is similar to **Starship Command,** giving a plan view of a spaceship with a firing window and a starfield that moves with the spaceship.

More rubbish

TRAVEL WITH TRASHMAN has arrived. The follow-up to **Trashman** was launched on October 19th. Now New Generation Software are busy working on **Cliff Hanger** which is currently available for the Commodore 64. The conversion from Commodore to Spectrum is being done by James Day and should be ready for release in the new year.

Devilish new game

TWO new Spectrum games now available from Melbourne House are **Sports Hero** and **Hellfire.** Sports Hero is a sport simulation featuring long jump, 100m sprint, 110m hurdles and pole vault. In Hellfire, you have to re-enact the trials of Ulysses. Features include the destructive stare of the Gorgon, minotaurs and a fireball thrower.

To date, Atari's most astonishing game is Pole Position... If you are only going to buy one game, then this is the one you should get.

COMPUTER & VIDEO GAMES.

...Pole Position gives a very strong sense of speed as you hurtle round the track. The super-realism of the three-dimensional effect adds a lot to the game. It is a great graphics demo.

PRACTICAL COMPUTING.

Brilliant!

WHICH MICRO? AND SOFTWARE REVIEW.

...a terrific version of the arcade motor racing game...graphics are superb...sound, too is very good as brakes screech and engines rev-up.

PERSONAL COMPUTER GAMES.

Exciting, exhilarating, excellent, Pole Position takes the lead as the best Atari race game around.

PERSONAL COMPUTER NEWS.

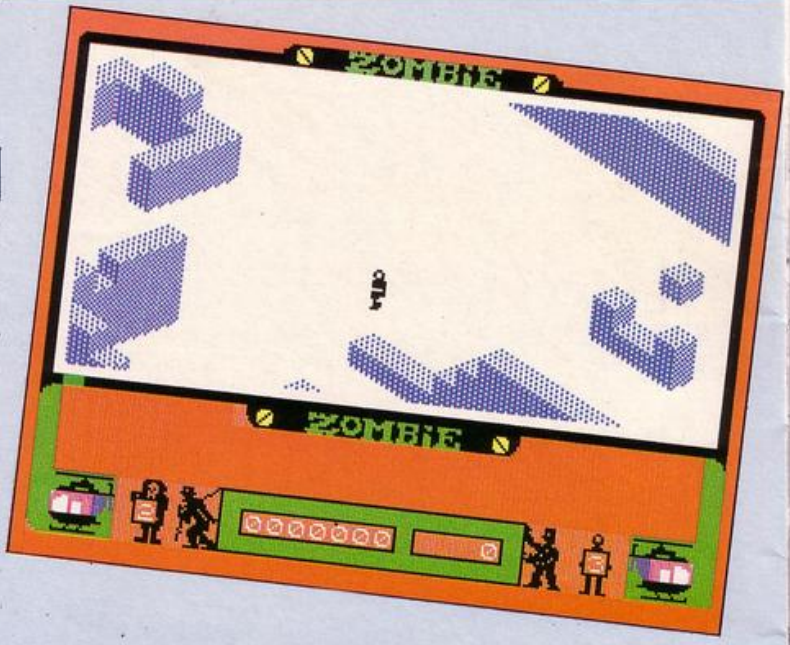
What can we say?

We're overwhelmed. Though we should just add that with Atarisoft, you can now play Pole Position* on the Commodore 64, BBC and Spectrum computers, as well as on all Atari® systems. And you'll also find available other games such as Galaxian,* Robotron,† Moon Patrol† and Ms Pacman.

POLE POSITION

LOOK OUT FOR OTHER LEADING COMPUTER GAMES FROM ATARISOFT. PRICES START FROM £7.99 *TRADEMARK OF NAMCO. ®TM ARE TRADEMARKS OF ATARI CORP. †TRADEMARK OF WILLIAMS.

HIDEOUS!



ZOMBIE ZOMBIE

SOMEWHERE in this deserted city where no people can be found and the walls provide hiding places but no homes, somewhere in this city lurk the zombies. Hideously deformed, green creatures, they wander the grey streets mindlessly, striking dread into the hearts of hapless strangers.

When the zombies change from green to red, then is the time to flee. Their minds reanimated for a short time, their killer instinct leads them towards the nearest living creature. In **Zombie Zombie,** the nearest creature is bound to be you.

Flying high above the city in your helicopter, you detect the zombies below. Safety can only be gained by their destruction, and you plan to lead them to their deaths, luring them to the dizzy heights of the city, and then trusting their mindless forms will leap to oblivion on the hard ground below.

First though, you must leave the safety of your helicopter, and walk the streets of terror below. In any of those streets may lurk a zombie and your only weapons are your skill and your helicopter.

Use the helicopter to shape the city to your plans, to lift the giant building blocks and send them crashing down in new forms to create an entirely new city. Then leave your refuge and try to destroy the undead.

Zombie Zombie is the follow up to **Ant Attack,** featuring the same high-quality three-dimensional graphics, and choice of viewing angles. It closely resembles its predecessor in looks and feel, although the change of plot, and the addition of the rebuilding facility add to its excitement.

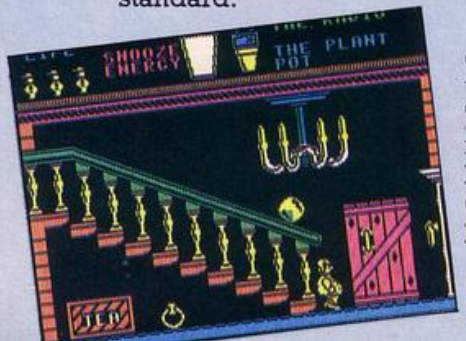
Zombie Zombie is produced for the 48K Spectrum by Quicksilva, 13 Palmerston Road, Southampton.

Price: £6.95
Game type: Arcade
Rating: 70%

PYJAMARAMA

LOGICALLY, there must come a point when animated graphics are produced throughout a Spectrum game on which no other software manufacturer can improve. Mikrogen, with their new game, **Pyjamarama,** are fast approaching that point.

Pyjamarama stars Wally, hero of their previous game, **Automania.** Wally is a large, flicker-free, cartoon-like graphic character. He lives in a world which fills the television screen, and appears to fill the computer, crammed with graphics of the same standard.



In Pyjamarama, Wally is experiencing a nightmare in which mundane objects appear to be out to get him, he can carry only two items at once although he can find any amount of strange things to carry, the house seems to hate him, and the only way to wake up is to find and wind up his alarm clock.

This is made even less easy by the fact that, even when asleep, Wally runs out of energy.

The variety and imaginative quality of the enemies faced by Wally are almost unrivalled by any other piece of Spectrum software.

Pyjamarama is produced for the 48K Spectrum by Mikrogen, 44 The Broadway, Bracknell, Berkshire.

Price: £6.95
Game type: Arcade
Rating: 80%

CHINESE JUGGLER

IN THE rush to provide games with as many playing screens as possible, it is sometimes forgotten that some of the best thought-out games can be played in very few screens. **Chinese Juggler,** with its ten levels of play but effectively only one playing screen is a good example of this.

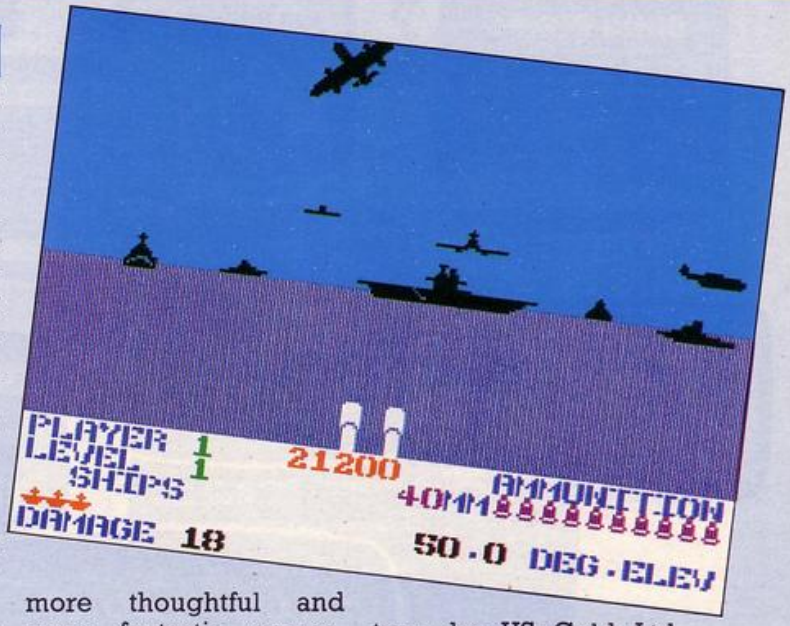
You play the Chinese juggler of the title, and it is your aim to set a plate spinning on each of the eight posts shown, within the time limit, without allowing any to fall if it can be avoided.

The game is, perhaps, a little too easy and, once you have completed the first levels, the middle levels are relatively easy. Only the last levels, in which you have to match changing border colours, are very difficult.

Produced for the 48K Spectrum by Ocean Software Ltd, 6 Central Street, Manchester.

Price: £6.90
Game type: Arcade
Rating: 60%

BEACH HEAD



JUST when you thought it was safe to go back to your computer, the bombers are back with a vengeance. **Beach head** throws you in the deep end with a challenging naval battle, forces you into an invasion by land, and then leaves you to storm the enemy fortress.

Firstly you move across a map, choosing where you are to begin your assault. Move through the hidden passage, avoiding the torpedoes and mines, then shoot down the bombers approaching from the aircraft carrier, bomb the enemy ships and then move on to Beach head and the final battle.

Arcade enthusiasts will love this game. The graphics in many sections are superb, especially the representations of approaching aircraft which appear from the distant decks of an aircraft carrier, approach rapidly and then swerve above you.

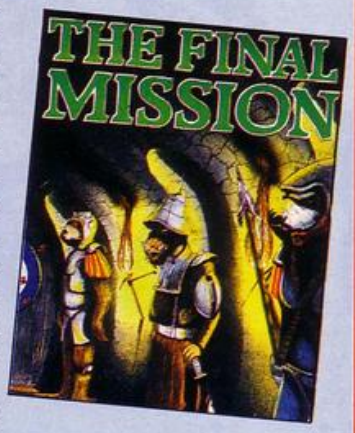
The difficulty levels are also well set. The game is easy enough for novices to accumulate high scores, but difficult enough to make it very difficult to complete.

Earlier in the year it appeared as though games of mindless destruction for the Spectrum were disappearing from the charts once and for all, to be replaced by more thoughtful and more fantastic games. Although Beach Head is an excellent arcade game, it is a step backwards thematically.

Beach Head is produced for the 48K Spectrum by US Gold Ltd., Unit 24, Tipton Trading Estate, Bloomfield Road, Tipton, West Midlands.

Price: £7.95
Game type: Arcade
Rating: 67%

THE FINAL MISSION



THE final part of the trilogy of Ket adventure programs is **The Final Mission.** To play it, it is not necessary to have played the other two adventures first, as your position is explained in the accompanying instructions. However, those players who wish to win the video offered as a prize to the first person to complete the trilogy, would have to play all three games.

The adventure begins with you locked in a dark cell, and your first aim is to escape from the prison complex. Early moves are easy, the puzzles then become more difficult at the very minute you feel you have finally understood the programmer's way of thinking.

The vocabulary of the adventure is large, with options to examine objects, search locations, and listen for suspicious sounds. There is also a fight option characteristic of the trilogy. Having entered into a fight, your strength and prowess are shown on screen, and your progress in the fight until it ends or you withdraw. Knowing when to fight and when to negotiate is essential in all the Ket games.

Once again, Incentive have produced an intriguing and difficult adventure.

Final Mission is produced for the 48K Spectrum by Incentive Software, 54 London Street, Reading.

Price: £5.50
Game type: Adventure
Rating: 70%

KUNG-FU

THERE ARE clear signs that software manufacturers are beginning to move away from characters made up of user-defined graphics to larger scale, more sophisticated character. Bug Byte have followed this route with their new program **Kung-Fu.**

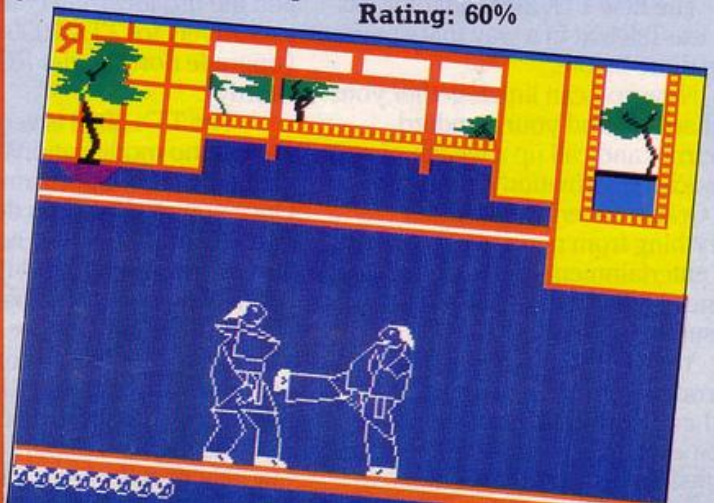
The title screen shows a dainty, willow-pattern plate design, while the playing sequence shows two large-size kung-fu experts. There are options to play the computer or to play against another human. Moving your character to the left or right results in a graceful walk, accompanied by some very Oriental-sounding music.

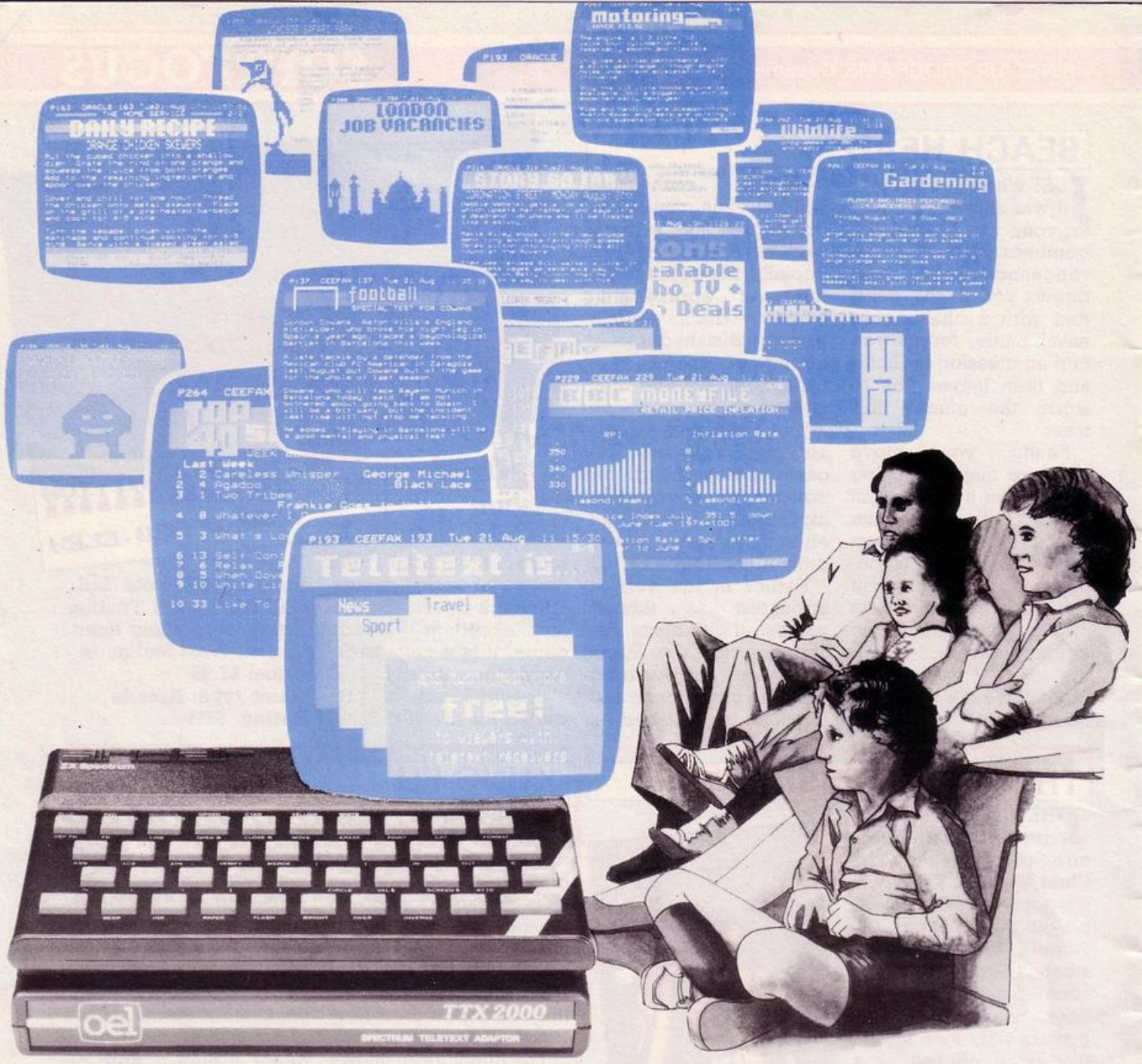
Two sorts of kicks and two sorts of punch are available to you. The computer plays very well, and is unlikely to provide you with any easy opening.

Bug-byte have produced a very elegant simulation game. However the lack of variety in either screen picture or background noise may mean that it palls more quickly than other detailed simulations.

Produced for the 48K Spectrum by Bug-Byte Limited, Mulberry House, Canning Place, Liverpool.

Price: £6.95
Game type: Simulation
Rating: 60%





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SIR LANCELOT

IN THE excitement of software launches for Christmas it is easy to overlook the fact that, these days, 16K Spectrum owners are suffering just as much as ZX-81 owners from scarcity of new software. Melbourne House have taken this into account with their new launch, **Sir Lancelot,** which will run on the 16K Spectrum.

It is a complicated arcade-style adventure in which the aim is for your character, Sir Lancelot, to avoid the moving nasties on the screen and, by moving left and right and jumping, collect the objects. To confuse matters even more, there is a time limit of 999 time units, and these slip away extremely quickly.

The game calls for strategy and timing. Each screen will take some time to complete as, with the time limit ticking away rapidly, it is not necessary only to be able to collect the objects, but to be able to collect them as quickly as possible.

There are many screens, of which the first two are likely to keep you occupied for some time.

The graphics are smooth and flicker-free, the game is fast moving and a number of fun details, such as the extra-life Sir Lancelots which march up and down the screen, make this an excellent game, which will probably be enjoyed by 48K and 16K owners.

Sir Lancelot is produced for the 16K Spectrum by Melbourne House, Church Yard, Tring, Hertfordshire.

Price: £5.95
Game type: Arcade
Rating: 80% (16K rating)

THE PRINCE

WINNER of the 1984 Cambridge awards, sponsored by CCS and *Sinclair User* magazine, was **The Prince,** a four player game of strategy and tactics.

The game is based on Machiavelli's book of the same name, which details unsrupulous practices for political survival in the court of a powerful prince. These practices must be carried out carefully by you as you try to collect the secret word and secret object which are necessary to persuade the prince to appoint you as his lore master.

The game necessitates interrelation with the other players, as well as with the spies and henchmen controlled by the computer. Without the help of the computerised characters you

are unable to obtain the information you need or the things you want while, without the help of the other players you are unlikely to survive the machinations of life in court.

Of course, none of the computer's characters are 100% reliable, so it is not advisable to take their word in every situation. The other players, on the other hand, are your rivals for the prince's favour, so are likely to double-cross you whenever they feel they can do so safely.

The Prince is produced for the 48K Spectrum by CCS Ltd, 14 Langton Way, London.

Price: £7.95
Game type: Strategy
Rating: 80%

DARK STAR

SOME software companies do not make it easy for you. Take the new program from Design Design, **Dark Star,** for instance. The on-screen instructions are brief to the point of absurdity, indicating little other than that you should shoot on sight, whatever happens. The four pages of tiny print on the inlay go to the other extreme. It takes so long to distinguish the instructions from the story line that it is tempting to just give up and play the game.

Despite all complications, the rudiments of the game are quite straightforward. You fly through the galaxy, encountering enemy ships, which you destroy. A plan of the entire galaxy can be obtained by pressing key one. The next sector can be entered by flying through one of the squares which approach in groups.

The object is to liberate all the planets in your galaxy. Reach a planet's surface by flying at the collections of yellow lines, check out the enemy by pressing one again, and then bomb all the bases before leaving the planet.

Dark Star is produced for the 48K Spectrum by Design Design, 125 Smedley Road, Manchester.

Price: £7.50
Game type: Arcade
Rating: 68%

ERIK THE VIKING

LEVEL 9 are well-known for their excellent adventure games for the 48K Spectrum. **Erik the Viking** represents a new departure for them, from the world of text-only adventure, into that of graphics adventure.

The graphics are very well presented. The lower portion of the screen is left free for text, while at the top, flanked by representations of vikings, are shown pictures of the locations. The pictures are clear and detailed, although they do take some time to draw and are repeated each time you visit a location.

You play the part of Erik the Viking. Erik's ship, the Golden Dragon is in the boathouse, waiting to set sail. Before you can do so, there is the farm, including ice house and sauna to be searched, weapons to be found, and a crew to be summoned.

As usual in a Level 9 adventure there are almost too many clues to be found, and locations to visit although the vocabulary appears to be more restricted than usual.

Published for Level 9 by Mosaic Publishing Ltd., 187 Upper Street, London N1.

Price: £9.95
Game type: Adventure
Rating: 75%

SPECTRUM PLUS

THE NEW Sinclair Spectrum plus slipped very quietly onto the British computer scene. One day it was not there, Sinclair were denying rumours of any new launch, and no new Sinclair computer was expected until the next year. The next day, there it was, a Spectrum computer dressed up to the nines.

The Spectrum+ is, essentially, a 48K Spectrum computer with a QL-style keyboard. It arrives complete with six programs.

Since its release in 1982, one of the main points about the Spectrum which has been criticised has been its keyboard. Its small, tacky keys, each with a huge variety to tasks to perform were almost universally hated, except by those who had just upgraded from the ZX-81. It seems infortunate, then, that the Spectrum+, which is obviously designed to remove these grounds for complaints, should point up the advantages of the Spectrum keyboard.

While Sinclair claims that the new model has typewriter-action keyboard, it certainly does not have a typewriter keyboard. On a typewriter the keys are divided by substantial gaps, and the rows of keys are on different levels. The Spectrum+ keyboard places all the keys as close together as possible and, although the keyboard itself can be tilted, the rows are all on one level. They are not easy to distinguish, and the keyboard seems little suited to the purposes of a trained typist.

The number of functions used by each key has been maintained. The Z key, for example, performs six separate functions, and will print LN, BEEP, COPY,:,Z or z on screen. This multiplicity of uses was criticised on the Spectrum but there, at least, the different words were distinguished by colour and position so that it was immediately obvious in which mode you could obtain which new word. On the Spectrum+ each of these words is printed on one key in white. It looks stylish, but is difficult to use.

There are advantages to the new keyboard. The cursor keys have been moved to the bottom of the keyboard, and have been regrouped. The left and right cursors are operated to the left hand, and the up and down keys by the right hand. Newcomers to Sinclair computers will no doubt be relieved while those who have spent hours with the Sinclair cursors on other machines and have now upgraded will be furious.

Extended mode, true video and inverse all have a key of their own now, to avoid complicated combinations of key depressions. The break key has been moved

out of the way to the top right, and the edit key has been moved down to become a single key function. Typists will be pleased to see that the space key has become a space bar, and that the symbol shift key now appears twice, once at either end of the keyboard.

The Spectrum+ does not stand in the same relation to the Spectrum as the Spectrum did to the ZX-81. It is not a machine to which Spectrum owners will, or should upgrade. Both software and manual are available separately, and better add-on keyboards can be bought for the Spectrum. If you do decide to upgrade, bear in mind that all Spectrum software and hardware should be compatible with the Spectrum+. The exceptions are interfaces to be plugged into the back of the computer such as the Kempston joystick and Kempston printer interface. The Spectrum+ is too tall a computer for an interface with its plug at the front to be useable.

While the computer itself is likely to be of only limited interest to those people who already possess a 48K Spectrum, its appearance is much more significant. The Spectrum+ will attract people to Sinclair computers who would otherwise have ignored them, and gone for a machine with a clearer keyboard. It demonstrates a continuing commitment from Sinclair Research to machines at this level, and to the software companies already producing software for the Spectrum. As such, it should ensure that Sinclair retains or increases its market share, that hardware and software manufacturers continue producing for the market, and begin to produce even better products for a larger market. Whatever the fortunes of the Spectrum+, it must be good for Spectrum owners.

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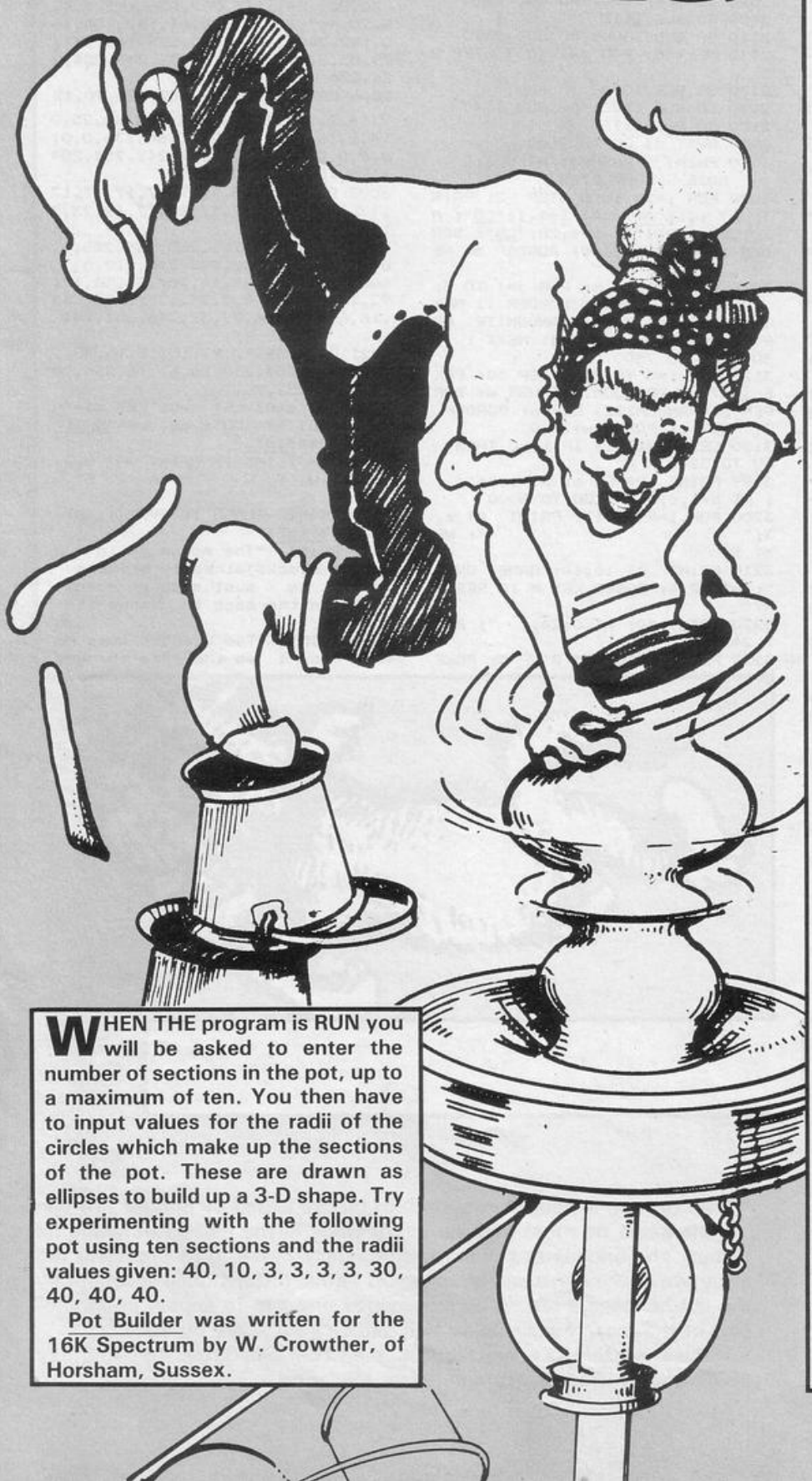
RUGBY FINAL

PRESS any key to stop the "O" next to a space. If you do this you will advance by one. Proceed until you reach the end to score four points. Two more points are then scored for placing the ball between the posts. You may decide to kick the ball at any time during the game. Further instructions are displayed once the program is RUN.

Rugby Final is a game for two players, written for the16K ZX-81 by Maurice Gibbs of Sneinton Dale, Nottingham.

```
   1 PRINT " ZX81(16K) ""RUGBY""
"," ▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒"
   2 PRINT "PRESS ANY KEY TO STO
P THE ""O"" NEXT TO THE "" "".
  IF YOU DO THIS"
   3 PRINT "YOU WILL ADVANCE BY
ONE ","DO THIS UNTIL YOU REACH T
HE END","AND YOU SCORE FOUR POIN
TS"
   4 PRINT "TWO MORE POINTS ARE
THEN SCORED BY PLACING THE ""O""
 BETWEEN THE POSTS"
   5 PRINT ,,"ABOVE YOUR NAME TH
ERE IS ""▒3▒""THIS MEANS YOU H
AVE 3 GOES LEFT"
   6 PRINT "YOU MAY ALSO SEE ""▒
P▒4▒""",,"YOU NOW HAVE A PENALTY
(3 PTS)"
   7 PRINT "PRESS ""N"" NOT TO T
AKE IT"
   8 PRINT ,,"ANY TIME YOU MAY D
ECIDE TO KICK THEN PRESS ""K"" I
T WILL TRAVEL BY DOUBLE THE NUMB
ER OF GOES LEFT"
   9 PRINT ,," INPUT YOUR NAMES
"
  10 DIM U$(2,14)
  12 INPUT U$(1)
  14 INPUT U$(2)
  16 CLS
  20 LET F=3
  40 LET T=80
  50 DIM A(2)
  60 LET R=19
  70 LET P=15
  80 LET X=2
  90 LET B$="    2"
 100 LET B=0
 110 FAST
 120 FOR I=1 TO 14
 140 FOR K=3 TO 21 STEP 2
 150 PRINT AT K,(I*2);"▒";
 160 NEXT K
 180 NEXT I
 200 FOR I=15 TO 26
 210 PLOT 1,I
 220 PLOT 60,I
 230 NEXT I
 240 FOR I=0 TO 62
 250 PLOT I,39
 260 NEXT I
 290 LET O=0
 300 PRINT AT 0,11;"TIME"
 310 PRINT U$(1);A(1);":";A(2);"
";U$(2)
 400 RAND
 490 SLOW
 500 LET T=T-3
 510 PRINT AT 0,17;INT T;" "
 520 IF T<1 THEN GOTO 2000
 530 IF O<>3 THEN PRINT AT 0,5+(
X-1)*16;"▒";F-B;"▒"
 550 IF O=0 AND RND>.95 THEN GOT
O 1400
 600 PRINT AT R,P;" "
 610 LET R=INT (RND*19)+3
 615 IF O=2 THEN LET R=INT (RND*
10)+5
 620 PRINT AT R,P;"O"
 625 LET S$=INKEY$
 630 IF S$="" THEN GOTO 600
 632 FOR I=1 TO 20
 634 NEXT I
 636 PRINT AT R,P;" "
 640 IF O<>0 THEN RETURN
 650 IF R/2=INT (R/2) THEN GOTO
700
 660 LET B=B+1
 670 IF B=F THEN GOSUB 1200
 690 GOTO 500
 700 IF S$="K" THEN GOTO 1500
 710 LET B$(3)=CHR$ (20+X)
 720 LET B$( TO 2)=STR$ P
 740 LET P=VAL B$
 750 IF P=1 OR P=29 THEN GOTO 10
00
 900 GOTO 500
1030 LET A(X)=A(X)+4
1040 LET O=2
1050 GOSUB 300
1060 IF O=3 THEN GOSUB 1710
1070 IF R<14 AND R>8 THEN GOSUB
1150
1080 GOSUB 1200
1090 IF O=2 THEN LET P=15
1100 GOTO 290
1150 LET A(X)=A(X)+O
1160 LET P=15
1170 RETURN
1200 PRINT AT 0,5+(X-1)*16;"
"
1210 LET X=X+1
1220 IF X=3 THEN LET X=1
1230 LET F=INT (RND*5)+1
1240 LET B=0
1250 RETURN

1400 IF (X=1 AND P<15) OR (X=2 A
ND P>15) THEN GOTO 600
1405 PRINT AT 0,6+(X-1)*16;"P";"
▒";F-B
1410 LET S$=INKEY$
1420 IF S$="N" THEN GOTO 530
1430 IF S$="" THEN GOTO 1410
1440 LET O=3
1445 GOSUB 1600
1450 GOTO 1050
1500 LET S$=STR$ P+CHR$ (20+X)+S
TR$ VAL "4*(F-B)"
1505 LET P=VAL S$
1510 IF P<3 OR P>27 THEN GOSUB 1
700
1530 GOSUB 1200
1550 GOTO 300
1600 IF X=1 THEN LET P=29
1610 IF X=2 THEN LET P=1
1620 RETURN

1700 IF R<14 AND R>8 THEN LET A(
X)=A(X)+3
1710 IF X=1 THEN LET P=23
1720 IF X=2 THEN LET P=7
1730 RETURN
2000 PRINT AT 0,0;"              FINAL
 SCORE"
4000 REM **          RUGBY        **
5000 REM **            BY         **
6000 REM **        M.GIBBS        **
```

POT BUILDER



WHEN THE program is RUN you will be asked to enter the number of sections in the pot, up to a maximum of ten. You then have to input values for the radii of the circles which make up the sections of the pot. These are drawn as ellipses to build up a 3-D shape. Try experimenting with the following pot using ten sections and the radii values given: 40, 10, 3, 3, 3, 3, 30, 40, 40, 40.

Pot Builder was written for the 16K Spectrum by W. Crowther, of Horsham, Sussex.

```
  1 DIM w(12): LET g=0: DIM x(1
30): DIM y(130): LET f=0
  3 INK 7: BORDER 0: PAPER 0: B
RIGHT 1: CLS
  4 GO SUB 4000
  5 LET s=w(1)/3: FOR h=s TO 14
5 STEP (145-s)/num
  6 LET g=g+1
  7 LET a=w(g): LET b=a/3
 10 FOR l=3 TO 93 STEP 10
 20 LET x= SIN (l/50* PI )*a+12
7
 30 LET y= COS (l/50* PI )*b+h

 35 IF l=3 THEN  LET sx=x: LET
sy=y
 60 LET f=f+1: LET x(f)=x: LET
y(f)=y
 70 NEXT l
 80 LET f=f+1: LET x(f)=sx: LET
 y(f)=sy
 100 NEXT h
1005 PRINT  AT 10,10; OVER 1;"Pl
ease wait"
1006 LET ta=0
1007 IF num>3 THEN  LET ta=num-3

1010 FOR l=1 TO num*10-9+ta: PLO
T x(l),y(l)
1030 DRAW x(l+11)-x(l),y(l+11)-y
(l)
1050 NEXT l
1060 FOR l=1 TO num*11-1
1070 PLOT x(l),y(l)
1090 DRAW x(l+1)-x(l),y(l+1)-y(l
)
2000 NEXT l
3000 PRINT #1;"Press any key to
continue": PAUSE 0: PRINT  AT 0,
0;"Press 's' to create a new sha
pe or 'a' to alter the old one."

3010 IF  INKEY$ ="s" THEN  GO TO
 1
3020 IF  INKEY$ ="a" THEN  GO TO
 5000
3030 GO TO 3010
4000 INPUT "No of sections in po
t(max=10) ";num
4005  LET hi=160/num: LET st=0

4007 PRINT  AT 0,0;" Radius/pixe
ls  0 25 50 75 100 "
4010 FOR i=1 TO num
4015 LET st=st+hi
4020 PRINT  AT 21,0;"Radius of s
ection ";i
4030 INPUT w(i)
4035 GO SUB 6000
4040 NEXT i
4050 PRINT  AT 20,0;"Press 'v' t
o view pot or 'a' to alter any r
adii.       "
4060 IF  INKEY$ ="v" THEN  CLS :
 PRINT  AT 10,10;"Please wait":
RETURN
4070 IF  INKEY$ ="a" THEN  GO TO
 5000
4080 GO TO 4060
5000 CLS : PRINT  AT 0,16;"0 25
50 75 100 "
5010 LET st=0
5020 FOR i=1 TO num
5030 LET st=st+hi
5040 GO SUB 6000
5050 NEXT i
5055 PRINT  AT 20,0;"Press 'a' t
o alter, 'v' to view.
5056  IF  INKEY$ ="v" THEN  CLS
: PRINT  AT 10,10;"Please wait":
 LET g=0: LET f=0:: GO TO 5
5057 IF  INKEY$ ="a" THEN  GO TO
 5060
5058 GO TO 5055
5060 PRINT  AT 21,0;"Section to
be changed (1 to ";num;")": INPU
T f
5070 INPUT "New radius ";r
5080 LET w(f)=r
5095 GO TO 5010
6000 PLOT 0,st: DRAW  INK 0;254,
0: PLOT 127-w(i),st: DRAW w(i),0
: PLOT 127,st-5: DRAW 0,10: PLOT
 127,st: DRAW w(i),0
6010 RETURN
```

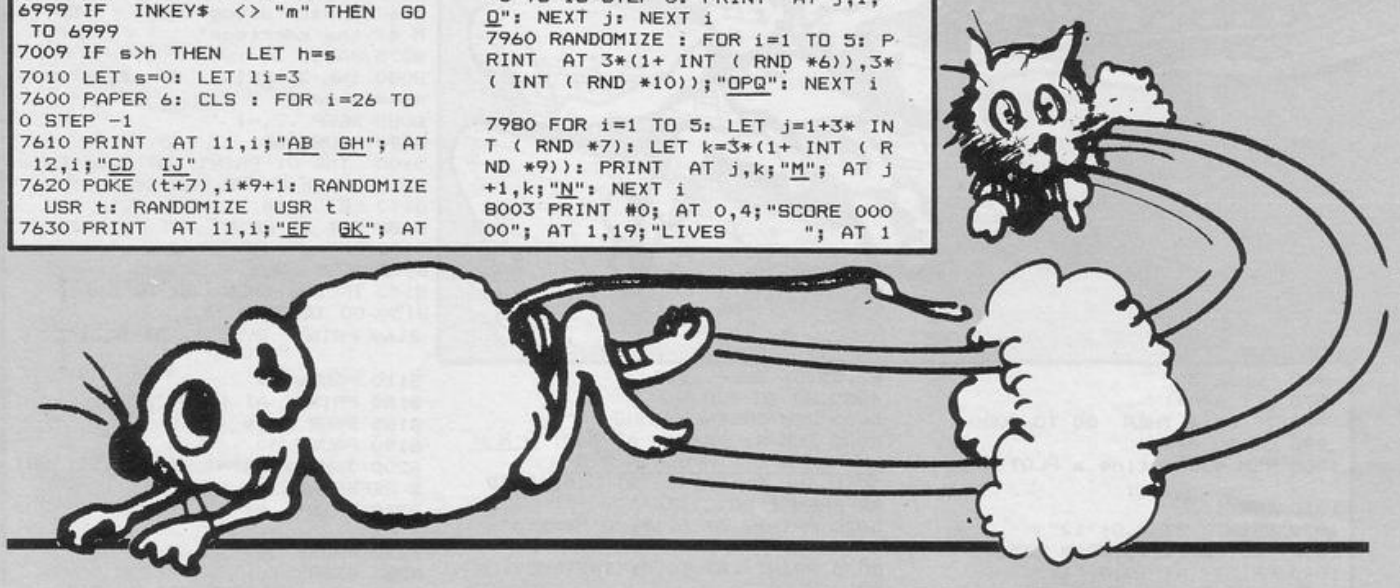
MOUSE MAZE

```
   3 CLEAR  USR "a"-60: LET z= U
SR "a"-60: LET t=z+5: LET w=z+26

  30 RESTORE : PAPER 7: INK 0: B
ORDER 7: CLS : GO TO 6000
1050 LET f=y+3*(( INKEY$ ="w" AN
D  ATTR (y+2,x)=32)-( INKEY$ ="2
" AND  ATTR (y-1,x)=32))
1060 LET g=x+3*(( INKEY$ ="0" AN
D  ATTR (y,x+2)=32)-( INKEY$ ="9
" AND  ATTR (y,x-1)=32))
1070 IF  ATTR (f,g)=32 THEN  LET
 a=a+1: LET s=s+5: PRINT #0; AT
0,15- LEN  STR$ s;s
1080 PRINT  PAPER 6; AT y,x;"  "
; AT y+1,x;"  ": LET y=f: LET x=
g
1090 PRINT  PAPER 6; AT y,x;a$(d
 TO d+1); AT y+1,x;b$: RETURN

1120 PRINT  PAPER 8; AT b,c;"  "
; AT b+1,c;"  "
1145 LET c=c+3*((c<x AND  ATTR (
b,c+2)=32)-(c>x AND  ATTR (b,c-1
)=32))
1160 PRINT  FLASH 1; PAPER 8; AT
 b,c;c$(d TO d+1); AT b+1,c;d$(d
 TO d+1)
1165 IF  ATTR (y,x)>159 THEN  GO
 TO 3100
1170 RETURN
1176 PRINT  PAPER 8; AT b,c;"  "
; AT b+1,c;"  "
1180 LET b=b+3*((b<y AND  ATTR (
b+2,c)=32)-(b>y AND  ATTR (b-1,c
)=32))
1190 PRINT  FLASH 1; PAPER 8; AT
 b,c;c$(d TO d+1); AT b+1,c;d$(d
 TO d+1)
1195 IF  ATTR (y,x)>159 THEN  GO
 TO 3100
1200 RETURN
1300 PRINT  AT 3*(1+ INT ( RND *
6)),1+3*( INT ( RND *10)); PAPER
 4;"  ": RETURN
1310 LET j=1+3* INT ( RND *7): L
ET k=3*(1+ INT ( RND *9)): PRINT
  PAPER 4; AT j,k;" "; AT j+1,k;
" ": RETURN
1320 LET j=1+3* INT ( RND *7): L
ET k=3*( INT ( RND *10)): PRINT
 AT j,k;"M"; AT j+1,k;"N": RETUR
N
1340 PRINT  AT 3*(1+ INT ( RND *
6)),3*( INT ( RND *10));"OPQ": R
ETURN
1600 RANDOMIZE  USR t: RANDOMIZE
  USR w: RETURN
2004 IF  INKEY$ ="m" THEN  GO SU
B 4000
2005 IF a>69 THEN  GO TO 3000
2010 FOR d=1 TO 3 STEP 2
2050 GO SUB 1040
2060 GO SUB 1300: GO SUB 1310
2100 GO SUB 1115
2110 GO SUB 1300: GO SUB 1310
2115 NEXT d: FOR d=1 TO 3 STEP 2

2120 GO SUB 1040
2130 GO SUB 1320: GO SUB 1340
2150 GO SUB 1175
2999 NEXT d: GO TO 2000
3010 PRINT  FLASH 1; AT 0,1;"
    MAZE   COMPLETED          "
3020 FOR i=20 TO 0 STEP -2: PRIN
T  AT i,1;"AB"; AT i+1,1;"CD"; A
T i,28;"AB"; AT i+1,28;"CD": BOR
DER 1: GO SUB 1600: BORDER 5: NE
XT i
3030 FOR i=1 TO 6: FOR j=1 TO 3:
 RANDOMIZE  USR t: BORDER 1: NEX
T j: FOR j=1 TO 3: RANDOMIZE  US
R w: BORDER 7: NEXT j: NEXT i
3099 GO TO 7500
3120 FOR i=0 TO 255 STEP 10: POK
E (w+7),i: RANDOMIZE  USR w: BOR
DER 2: RANDOMIZE  USR w: BORDER
7: NEXT i: POKE (w+7),0
3130 LET li=li-1: IF li=0 THEN
GO TO 3200
3199 PRINT  PAPER 6; AT b,c;"  "
; AT b+1,c;"  ": GO TO 8000
3200 FOR i=9 TO 13: PRINT  AT i,
3;"                          ": NE
XT i
3210 PRINT  AT 10,10;"GAME  OVER
"; AT 12,4;"PRESS KEY M TO RESTA
RT"
3220 PRINT #0; AT 0,24;"  "; AT
1,24;" 0"
3230 FOR i=0 TO 255 STEP 5: POKE
 (t+7),i: RANDOMIZE  USR t: NEXT
 i: POKE (t+7),0
3240 IF  INKEY$ <> "m" THEN  GO
 TO 3240
3299 GO TO 7000
4010 PRINT  PAPER 6; AT y,x;"  "
; AT y+1,x;"  "
4015 GO SUB 1600: GO SUB 1600
4016 LET s= INT (s-s/10): PRINT
#0; AT 0,15- LEN  STR$ s;s
4019 LET x=29-x: LET y=20-y
4050 RETURN
6005 DATA 14,17,35,36,31,7,7,7,0
,30,225,241,145,242,236,192,1,4,
8,20,4,7,30,30,128,64,160,160,16
0,192,240,240,0,120,135,143,137,
79,55,3,112,136,196,36,248,224,2
24,224
6006 DATA 0,0,0,36,102,126,90,12
7,14,2,2,2,14,62,252,248,60,25,2
,4,9,18,4,0,244,210,164,136,0,0,
0,0,0,0,0,14,2,2,194,242,254,254
,188,152,20,18,36,8
6007 DATA 1,3,5,9,17,17,17,17,17
,17,17,17,17,17,17,17,17,19,23,3
1,31,0,0,0
6009 DATA 255,255,255,255,255,0,
0,0,255,254,252,248,240,0,0,0
6020 DATA 32,24,16,167,35,58,72,
92,15,15,15,30,0,243,211,254,238
,16,67,16,254,29,32,246,251,201

6021 DATA 58,72,92,15,15,15,30,1
,243,211,254,238,16,67,16,254,28
,32,246,251,201
6100 LET s=0: LET h=0: LET a$="A
BEF": LET b$="CD": LET c$="GHGK"
: LET d$="IJIL"
6505 CLS : INK 1: PRINT  AT 0,2;
"M  O  U  S  E     M  A  Z  E"

6510 PRINT  FLASH 1; OVER 1; AT
0,0;"(32*g3)"
6530 PRINT '"The mouse is in a m
aze of blocksjoined by bridges.
To win, he  must step on every
block in the maze to change its
olour."
6535 PRINT '"The bridges keep mo
ving around  so the maze changes
```

The mouse is caught in a maze of blocks joined by bridges. To win the game he must step on every block in the maze to change its colour. The bridges in the maze continually move, thus changing the structure of the maze and blocking off paths. If the mouse is caught by the cat he loses a life. In an emergency press M to appear in another part of the maze but doing so will reduce your score by 10%.

Mouse Maze was written for the 16K Spectrum by Anthony Sherwood of West Bromwich, West Midlands.

```
 all the     time. If the mouse
is caught by the cat, he loses a
 life."
6536 PRINT "In an emergency, the
 mouse can  do a disappearing ac
t, but this costs him 10% of his
 score."
6539 INK 2: LET i=10
6540 PRINT ' TAB i-2; INVERSE 1;
" CONTROL  KEYS "
6545 PRINT ' TAB i;"UP          2"

6550 PRINT  TAB i;"DOWN        W"

6551 PRINT  TAB i;"LEFT        9"

6552 PRINT  TAB i;"RIGHT       O"

6553 PRINT  TAB i;"DISAPPEAR M"

6555 FOR i= USR "a" TO  USR "q"+
7: READ j: POKE i,j: NEXT i
6556 FOR i=z TO z+46: READ j: PO
KE i,j: NEXT i: GO SUB 1600
6560 PRINT #0; AT 1,8; INVERSE 1
; INK 2;" KEY M TO START"
6999 IF  INKEY$ <> "m" THEN  GO
 TO 6999
7009 IF s>h THEN  LET h=s
7010 LET s=0: LET li=3
7600 PAPER 6: CLS : FOR i=26 TO
0 STEP -1
7610 PRINT  AT 11,i;"AB  GH"; AT
 12,i;"CD  IJ"
7620 POKE (t+7),i*9+1: RANDOMIZE
  USR t: RANDOMIZE  USR t
7630 PRINT  AT 11,i;"EF  BK"; AT
 12,i;"CD  IL": RANDOMIZE  USR t
: RANDOMIZE  USR t: PRINT  AT 11
,i;"       "; AT 12,i;"       ": N
EXT i: POKE (t+7),0: INK 0: PAPE
R 7
7800 LET a=1: CLS : PRINT  AT 0,
2;"M  O  U  S  E    M  A  Z  E"

7810 PRINT  FLASH 1; OVER 1; INK
 4; AT 0,1;"(29*g3)"
7920 FOR i=1 TO 20: PRINT  PAPER
 4; AT i,1;"
          ": NEXT i
7925 FOR i=1 TO 19 STEP 3: PRINT
  AT i,0;"M"; AT i+1,0;"N"; AT i
+2,0;"O": NEXT i
7926 PRINT  AT 21,0;"OPQOPQOPQOP
QOPQOPQOPQOPQOPQOPQ"
7927 FOR i=3 TO 27 STEP 3: FOR j
=3 TO 18 STEP 3: PRINT  AT j,i;"
O": NEXT j: NEXT i
7960 RANDOMIZE : FOR i=1 TO 5: P
RINT  AT 3*(1+ INT ( RND *6)),3*
( INT ( RND *10));"OPQ": NEXT i

7980 FOR i=1 TO 5: LET j=1+3* IN
T ( RND *7): LET k=3*(1+ INT ( R
ND *9)): PRINT  AT j,k;"M"; AT j
+1,k;"N": NEXT i
8003 PRINT #0; AT 0,4;"SCORE 000
00"; AT 1,19;"LIVES      "; AT 1
,1;"HI SCORE 00000"; AT 0,24;"
    "
8004 PRINT #0; AT 0,15- LEN  STR
$ s;s; AT 1,15- LEN  STR$ h;h
8005 PRINT #0; AT 0,24;: FOR i=1
 TO li: PRINT #0;"AB";: NEXT i

8006 PRINT #0; AT 1,24;: FOR i=1
 TO li: PRINT #0;"CD";: NEXT i

8090 LET y=10: LET x=4: LET b=1:
 LET c=28: LET i=1: GO SUB 1600

8095 PRINT  PAPER 6; AT y,x;"EF"
; AT y+1,x;b$: GO TO 2000
```



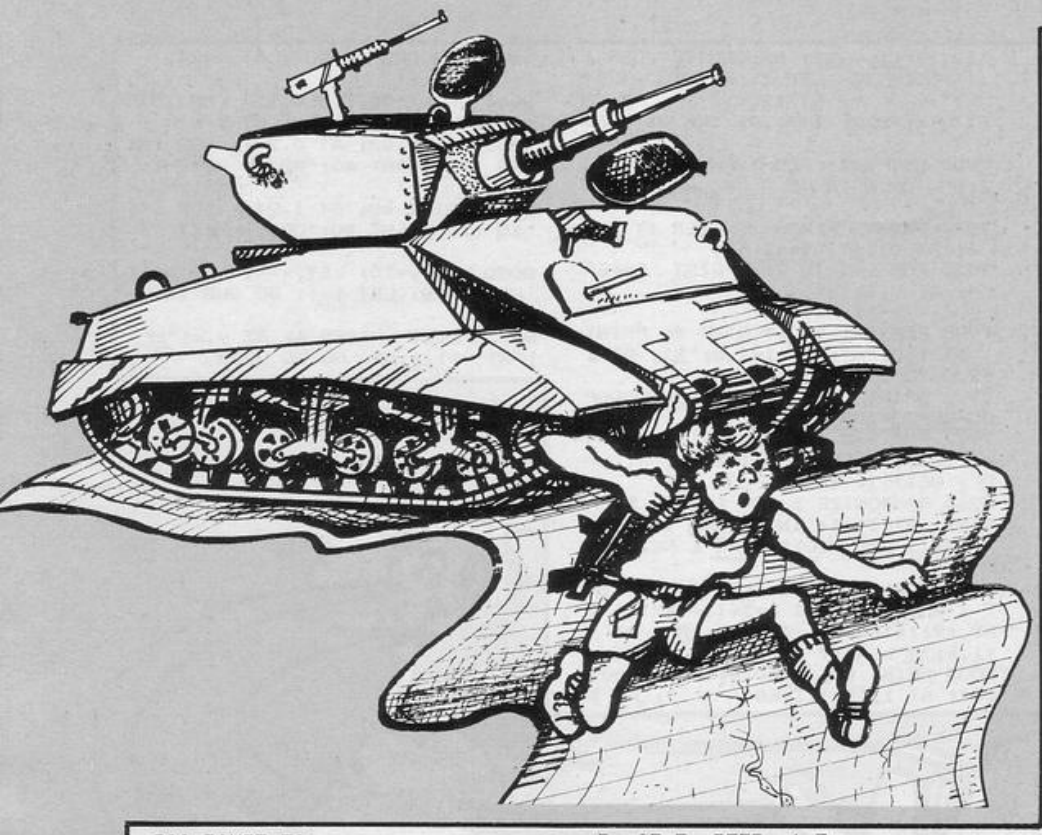
GRIDREF

The screen displays a small section of an ordnance survey map which has been greatly enlarged. Various conventional signs are shown for training purposes and a tank is also shown. To destroy the tank a six figure grid reference has to be entered. If the co-ordinates are correct the tank explodes.

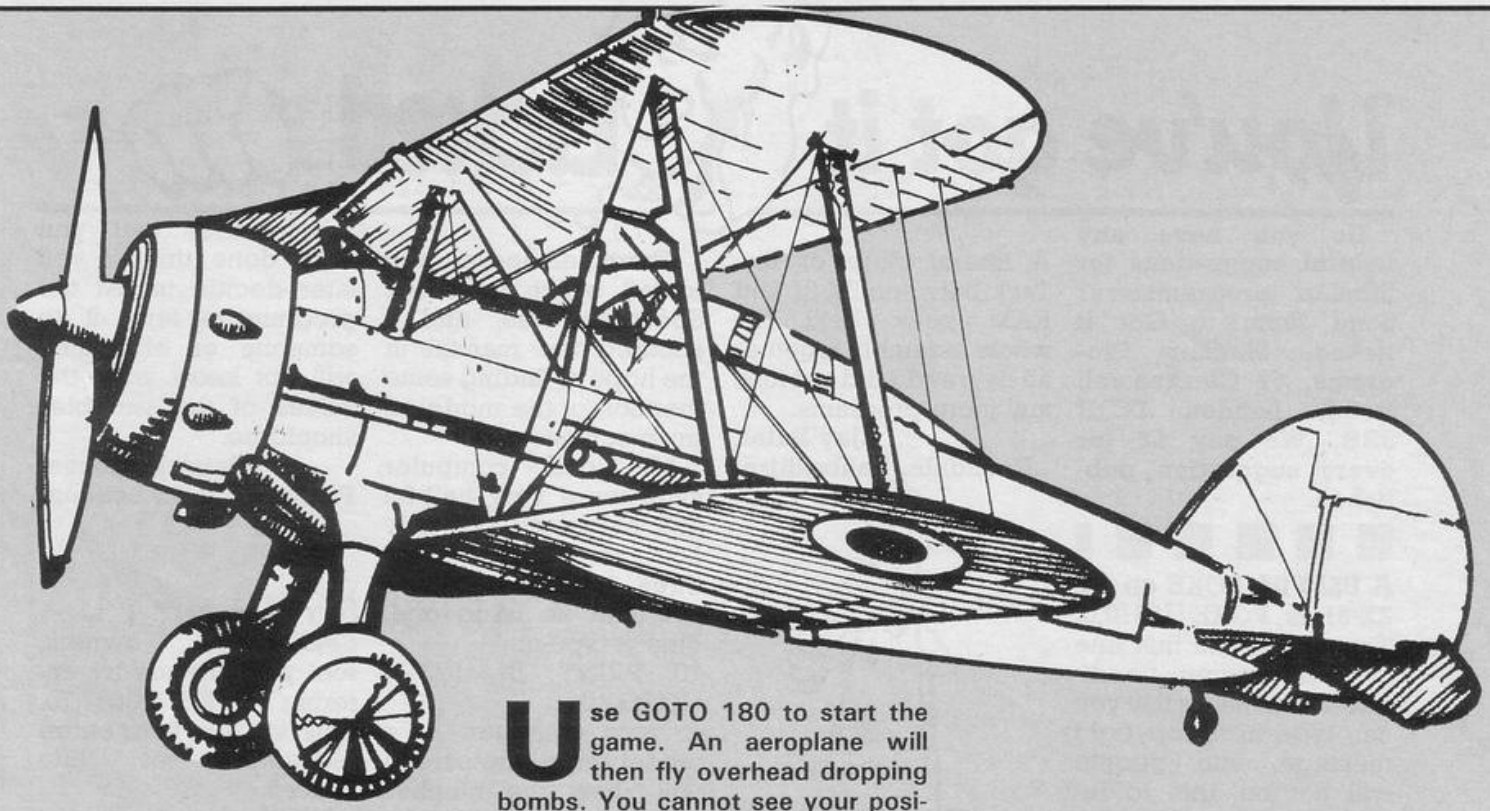
Gridref was written for the 16K Spectrum by G. Meakin of Nottingham.

```
  1 CLS
 10 PAPER 7: BRIGHT 1
 11 CLS
 12 PAPER 7
 20 GO SUB 6000
 30 GO SUB 5000
 80 CLS
 85 PAPER 7
 90 CLS
 95 PAPER 7
100 GO SUB 1000
110 GO SUB 2000
500 REM s=score/n=target number
510 LET s=0
520 FOR n=1 TO 10
600 LET n=1
610 GO SUB 1500
630 INK 4: PRINT  AT a,b;"H"
640 BEEP .05,10
650 INPUT e
660 INPUT f
670 GO SUB 3000
680 IF e<200 OR e>229 THEN  GO
TO 8500
690 IF f<100 OR f>120 THEN  GO
TO 8500
700 INK 0: PRINT  AT h,g;"I"
710 GO SUB 9500
720 PAUSE 50
730 PRINT  OVER 1, AT h,g;"I"
740 IF a=h AND b=g THEN  GO TO
4000
750 BEEP .1,1: BEEP .2,-5
760 PRINT  AT a,b;" "
```

continued on page 24



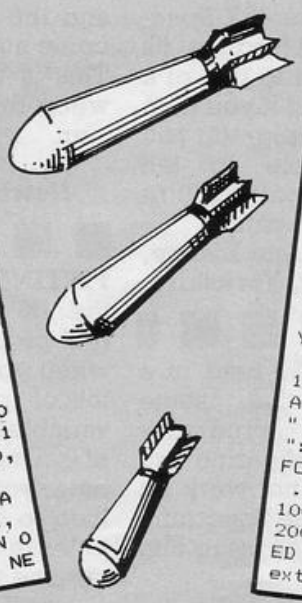
```
 900 PAUSE 50
 970 LET n=n+1
 980 IF n=11 THEN  GO TO 9000
 990 GO TO 610
1000 REM subroutine a PLOT grid

1010 INK 1
1020 PRINT  AT 0,0;"12"
1030 PLOT 20,171: DRAW 235,0
1040 PRINT  AT 10,0;"11"
1050 PLOT 20,91: DRAW 235,0
1060 PRINT  AT 20,0;"10"
1070 PLOT 20,11: DRAW 235,0
1100 PRINT  AT 21,1;"20"
1110 PLOT 20,11: DRAW 0,160
1120 PRINT  AT 21,11;"21"
1130 PLOT 100,11: DRAW 0,160
1140 PRINT  AT 21,21;"22"
1150 PLOT 180,11: DRAW 0,160
1160 PRINT  AT 21,31;"2"
1170 PLOT 255,11: DRAW 0,160
1500 REM subroutine b RANDOM
     SYMBOL PLOTTER
1510 LET a= INT (( RND *17)+2)
1520 LET b= INT (( RND *26)+5)

1530 RETURN
2000 REM subroutine c SYMBOL
     PRINTER
2010 GO SUB 1500
2020 INK 0: PRINT  AT a,b;"A"
2030 GO SUB 1500
2040 INK 0: PRINT  AT a,b;"B"
2050 GO SUB 1500
2060 INK 0: PRINT  AT a,b;"C"
2070 GO SUB 1500
2080 INK 0: PRINT  AT a,b;"D"
2090 GO SUB 1500
2100 INK 0: PRINT  AT a,b;"E"
2110 GO SUB 1500
2120 INK 5: PRINT  AT a,b;"F"
2130 GO SUB 1500
2140 INK 2: PRINT  AT a,b;"G"
2150 GO SUB 1500
2160 INK 0: PRINT  AT a,b;"+"
2170 RETURN
3000 REM subroutine d GRID REF
     TO PRINT POSITION
3010 LET g=2+(e-200)
3020 LET h=20-(f-100)
3030 RETURN
4000 LET s=s+1
4010 BEEP .05,1: BEEP .05,3: BEE
P .05,5: BEEP .1,7
4020 GO TO 900
5000 REM INSTRUCTIONS
5005 INK 4: PRINT  AT 3,0;"H H H
 H H H H H H H H H H H H "
5010 INK 5: PRINT  AT 5,4;"GRID
REFERENCE PRACTICE"
5020 PRINT  AT 6,19;"G Meakin"

5030 PRINT  AT 10,0;"INSTRUCTION
S"
5040 PRINT  AT 11,0;" The screen
 will show a portion  of an o.s.
 map,greatly enlarged"
5050 PRINT  AT 13,0;" On the map
 will appear besides normal symb
ols a tank."
5060 PRINT  AT 15,0;" Your task
is to destroy the    tank by ent
ering its grid       reference"

5070 PRINT  AT 18,0;" PRESS ENTE
R AFTER EACH HALF    OF THE CO-O
RDINATES"
5080 BEEP .5,0: BEEP .2,1: BEEP
.2,0: BEEP .2,-1: BEEP .2,0: BEE
P .5,1: BEEP .1,2: BEEP .1,1
5090 PRINT  AT 21,0;"Press ENTER
 to go on"
5100 PAUSE 4e4
5110 GO TO 8000
6000 REM USER DEFINED GRAPHICS
6010 FOR n=0 TO 79
6020 READ a
6040 DATA 16,56,16,124,124,124,1
24,124
6050 DATA 16,56,16,56,124,254,12
4,56
6060 DATA 34,20,8,20,34,20,20,28

6070 DATA 34,20,8,20,42,8,8,28

6080 DATA 56,14,8,8,28,20,20,28

6090 DATA 0,8,20,42,65,127,0,0

6100 DATA 0,8,20,62,127,127,0,0

6110 DATA 0,0,252,28,127,255,127
,0
6120 DATA 162,118,203,106,22,89,
8,182
6130 DATA 0,36,36,36,36,36,36,0
6140 POKE  USR "a"+n,a
6150 NEXT n
6160 RETURN
8000 REM REMINDER
8010 CLS
8011 PAPER 6
8012 CLS
8013 BEEP .1,-10: BEEP .1,-15: B
EEP .5,-25
8020 PAPER 6: INK 0: PLOT 50,50:
 DRAW 50,0: DRAW 0,50: DRAW -50,
0: DRAW 0,-50
8030 PRINT  AT 15,4;"10"; AT 9,4
;11
8040 PRINT  AT 16,5;"20"; AT 16,
11;"21"
8050 PAUSE 50
8060 INK 2: PRINT  AT 0,0;"DON'T
 FORGET:"
8070 INK 0: PRINT  AT 2,0;"You h
ave to walk along the      BOTTO
M of the corridor"
8075 PAUSE 30
8080 INK 2: PRINT  AT 17,3;"====
=========>"
8085 BEEP .2,-1
8090 PAUSE 50
8100  INK 0: PRINT  AT 5,0;"Befo
re you can CLIMB the stairs"
8110 LET z=16
8120 INK 2: PRINT  AT z,3;"J"
8130 LET z=z-1
8135 BEEP .2,1
8140 IF z=8 THEN  GO TO 8160
8150 GO TO 8120
8160 PRINT  OVER 1, AT 8,3;"^"

8170 PAUSE 50
8180 PRINT  AT 14,8;"A"
8185 BEEP .1,1
8190 PAUSE 50
8200 INK 0: PRINT  AT 12,15;"GRI
D REFERENCE"
8210 PRINT  AT 13,15;"IS     203
 101"
8220 PAUSE 50
8225 BEEP .1,1
8230 INK 0: PRINT  AT 20,0;"O.K.
?      PRESS enter TO START"
8240 PRINT  AT 21,0;"      PRESS
 1 TO SEE DEMO AGAIN"
8245 INPUT a$
8250 IF a$="1" THEN  GO TO 8000

8260 BEEP .1,1: BEEP .1,3: BEEP
.2,5
8270 GO TO 80
8500 REM idiot proofing
8510 INK 2: PRINT  AT 21,0;"   D
OES NOT COMPUTE,TRY AGAIN!   "
8520 BEEP .1,0: BEEP .5,-5
8530 PAUSE 50
8540 INK 0: PRINT  AT 21,0;"  20
      21        22       2"
8550 GO TO 650
9000 REM Endgame
9010 CLS
9020 INK 2: PRINT  AT 5,0;"YOUR
SCORE IS:",s
9025 BEEP .1,1: BEEP .1,2: BEEP
.1,3
9030 PRINT  AT 10,0;"Another pra
ctice?Y-yes  N-no"
9040 INPUT x$
9050 IF x$="y" THEN  GO TO 80
9060 IF x$="n" THEN  GO TO 9070

9070 NEW
9500 REM EXPLOSION SOUND FX
9510 BEEP .05,-50: BEEP .05,-40:
 BEEP .05,-50
9520 BEEP .05,-50: BEEP .02,-40:
 BEEP .01,-50
9530 BEEP .05,-50: BEEP .05,-40:
 BEEP .05,-50
9540 BEEP .05,-50: BEEP .05,-40:
 BEEP .05,-50
9550 BEEP .05,-50: BEEP .05,-40:
 BEEP .05,-50
9560 RETURN
```



Use GOTO 180 to start the game. An aeroplane will then fly overhead dropping bombs. You cannot see your position on the screen until a bomb has been released. Catch the bombs using keys 5 and 8 for left and right and seek refuge in the shelter. If your score falls below −2 or the radiation level reaches 45% the game will end.

Bomb catcher was written for the 16K Spectrum by D. Kirkwood of Irvine, Ayrshire.

BOMB CATCHER



```
  1 LET d$="  "; LET hi=0; LET t
=0
  2 LET h$="NOBODY"
  3 GO TO 800
  5 LET pause=2
  6 LET rad=0
  7 LET w= INT ( RND *8)
 10 LET p=w
 15 LET live=3
 20 LET t=0
 35 CLS
 37 PRINT  AT 21,0;"SCORE=";t;"
LIVES="; FOR j=1 TO live: PRINT
 AT 21,14+j;"A"; NEXT j: PRINT
AT 21,19;"RAD.LEV:";rad;"%": PR
INT  AT 18,27;"(2*g3:g7)"; AT 19
,29;"(g5)"; AT 20,0;"(32*ig8)"

 40 LET r= INT ( RND *24)
 41 GO SUB 700
 50 FOR y=1 TO 19
 60 PRINT  AT y,r;"O"; BEEP .00
3,10+y
 65 PAUSE pause
 70 LET n=p+( INKEY$ ="8")-( IN
KEY$ ="5")
 80 IF n<0 OR n>29 THEN  LET n=
p
100 PRINT  AT 19,p;"  "; AT 19,n
;"A"; AT y,r;"  "
110 LET p=n
120 NEXT y
130 LET t=t+(p=r): IF t=30 OR t
=60 OR t=90 THEN  LET pause=paus
e-1: IF pause=0 THEN  LET pause=
0.5
140 GO SUB 500
150 GO TO 36
170 STOP
180 FOR i=0 TO 7: READ a: DATA
0, BIN 01000100, BIN 00101000, B
IN 00111000, BIN 00111000, BIN 0
0111000, BIN 00010000,0: POKE U
SR "o"+i,a: NEXT i
190 FOR n=0 TO 7: READ x: POKE
USR "a"+n,x: NEXT n
200 DATA  BIN 00011000, BIN 000
11000,0, BIN 01111110, BIN 01011
010, BIN 00011000, BIN 00100100,
 BIN 00100100
201 FOR i=0 TO 7: READ a: DATA
0,0, BIN 00001111, BIN 0111111,
BIN 0111111, BIN 00111111, BIN 0
0000011,0: POKE  USR "g"+i,a: NE
XT i
202 FOR i=0 TO 7: READ a: DATA
0,0, BIN 11111100,255, BIN 00000
011,255, BIN 11111100,0: POKE  U
SR "h"+i,a: NEXT i
203 FOR i=0 TO 7: READ a: DATA
0,0,0,255,255, BIN 11111110,0,0:
 POKE  USR "j"+i,a: NEXT i: FOR
i=0 TO 7: READ a: DATA 0, BIN 00
000110, BIN 00001110,254,254,0,0
,0: POKE  USR "k"+i,a: NEXT i
250 GO TO 1
500 IF y=20 AND p <> r AND n<27
THEN  LET live=live-1: GO TO 10
00
501 IF live <= 0 THEN  GO TO 80
0
502 IF n>27 THEN  LET t=t-1
503 IF y=19 AND p <> r AND n>24
THEN  LET rad=rad+5
504 IF t<-1 THEN  LET live=live
-1
505 IF rad >= 45 THEN  GO TO 20
00: GO TO 800
506 CLS : RETURN
700 FOR k=29 TO 0 STEP -1: PAUS
E pause: PRINT  AT 0,k-1;"GHJK "
: BEEP .001,9: BEEP .002,9: IF k
=r THEN  RETURN
701 NEXT k
800 INK 7: PAPER 0: BORDER 2: C
LS : PRINT  AT 0,6;d$; AT 4,4;"S
CORE"; AT 4,13;"HI-SCORE"; AT 4,
27;"BY"
801 PRINT  AT 6,4;t; AT 6,17;hi
; AT 6,25;h$
802 IF t>0 THEN  LET d$="THE CI
TY WAS DESTROYED": PRINT  AT 0,4
;d$
804 IF t>0 THEN  LET d$="THE CI
TY WAS DESTROYED": PRINT  AT 0,4
;d$
805 IF t>hi THEN  INPUT "ENTER
YOUR INITIALS";h$: LET hi=t
809 PAUSE 0: GO TO 4
1000 PRINT  AT 19,r;"(sp:ig8)";
AT 18,r;"(g5:ig8:ig5)"; AT 17,r;
"(3*ig8)"; AT 16,r;"(g4:ig8:ig7)
": LET rad=rad+5: FOR d=0 TO 2:
FOR x=0 TO 20: BEEP .006,d: BEEP
 .005,x: NEXT x: NEXT d
1001 GO TO 501
2000 PRINT  AT 21,1;"YOU HAVE DI
ED FROM RADIATION ": REM Enter t
ext in inverse mode
```

You've got it Licked

Do you have any helpful suggestions for Sinclair programmers? Send them to Got it licked, Sinclair Programs, 67 Clerkenwell Road, London EC1R 5BH. We pay £2 for every suggestion published.

A USEFUL POKE on the ZX-81 is POKE 16510,0. This makes the first line of your program uneditable. This means that you can type in a copyright message, and people will not be able to remove it from the program listing.

Also, POKE 16441, 20 produces a 34 column screen on the ZX-81.

Carl Butler, Romford, Essex.

AFTER my tenth program crashed on my 16K ZX-81 in just under an hour, I was ready to fling the computer out of the window in desperation. There seemed to be no way of persuading the ZX-81 to work consistently.

I then realised that the fault lay with my RAM pack. No matter how carefully I plugged it in, the movement produced by my typing-in a program shook it free, little by little, until finally the program crashed.

Unwilling to trust my computer in the vicinity of glue, especially of strong glue, and fearful of voiding my guarantee if I did anything too drastic, I hit upon a solution.

A liberal dose of Blu-Tack between ZX-81 and RAM pack held the whole assembly together all day, and I did not lose any more programs.

Ajay Patel, Rochdale, Lancashire.

WHEN you have a 48K Spectrum and write a program, it is often difficult to tell whether that program will fit into a 16K Spectrum. It is easy to decide whether it will fit if it is a very short program, but longer ones are more of a problem.

If you give your friends a program to type-in, and it is too long for their computer they will be annoyed, so it is best to check how long your program is.

If you type CLEAR 32600 on your 48K Spectrum, it will reduce its memory size to that of a 16K machine. If you then enter your program, you will be able to tell whether or not it will fit into a 16K machine.

William Bishop, Keighley, Yorkshire.

RECENTLY I read in a magazine that some commercial programs, and some magazine listings would not work on an issue three Spectrum, but only on an issue one or two.

There seemed no way to tell which issue my Spectrum was, and I scoured the manual in the hope of finding some mention of the model of my machine.

My local computer shop were very helpful and explained not only how to tell an issue three, but also an issue two and an issue one. Firstly, type-in:

10 PRINT IN 57342: GOTO 10

If your computer is a model three, the screen will show the number 191, if not, it will show the number 255.

Next, peer into the back of the machine through the ports there. If you can see wires, you have an issue one but if everything is flat you have an issue two.

Dorette Sampson, Southampton, Hampshire.

I THOUGHT *Sinclair Programs* would be interested in this command I found. If you type RAND USR 1331 into your Spectrum, you will hear a screeching noise, and the border will become magenta and blue. This is useful in games when there is an explosion.

Gavin Moore, Newbury, Berkshire.

FITTING a program into the 1K ZX-81 can be a real problem, especially when you have to waste lots of space by defining variables. An easy way of saving memory is to enter your program, and then to define your variables in statements without line numbers.

Remember that you have done this, if you later decide to list the program to lend it to someone or else they will not know what the values of the variables should be.

Patrick Boscoe, Finsbury Park, London.

SPECTRUM owners, fool your friends by entering POKE 23607,70. This will turn your entire character set into spaces.

When they try to list your program to see what you have done, and to try to copy your work, all they will see is lots of empty space.

John Weinbren, Exmouth, Devon.

SOMETIMES in a program it is necessary to scroll only a few lines, and it is often difficult to think of a way to program this.

If you type into a Spectrum, INPUT AT N,0 where N is one greater than the number of lines you want to scroll, then you will be able to scroll automatically.

Deane Howarth, Chelmsford, Essex.

ERROR TRAPPING

CHANCES are that, almost as soon as you begin to use your computer, you will start to encounter error codes. Errors as you type in lines, caused either by typing errors or inexperience will be marked on the ZX-81 by a letter "S", and on the Spectrum by a flashing "?". In either case you will be unable to enter the line until it is correct.

Errors such as these are usually simple to rectify. Their cause is often a mistake in punctuation. Check that each inverted comma has its pair elsewhere in the line, and that you have not confused commas, semi-colons and colons. Grammatical mistakes which readers are prepared to ignore when you write will be glaringly obvious to your computer.

Problems with error codes usually start when long programs are entered. Each individual line may be correct and have entered easily, but the program is wrong and, as a result, the computer will not run it, or will run only part of it. At this point an error code will appear at the bottom of the screen.

Error codes are normally divided into three parts. The first number tells you which of the standard errors you have made. This enables you to refer to the reports code section of the manual (appendix B) for an explanation of the error. The words which appear give you a brief description of your error, which may help you to correct it without referring to appendix B. The second number is the number of the line on which your computer first encountered the error.

Many of the error codes used are self explanatory. Error code 9, the STOP statement tells you that the computer has come to the word STOP on the line indicated. Error code "C: nonsense in Basis", is also clear.

Other error codes are less easy to understand if you are new to computing. "2: variable not found" is a very common error code, which can prove incomprehensible. A variable is a letter which has been assigned a numeric value. For example, if you type into your computer, "LET A=1", you are giving the letter A the value one. If your computer reports error code 2, check the line number given. The computer will regard all letters standing alone without inverted commas as variables.

For instance, the line:

```
5 PRINT AT 1,a;"b"
```

contains one variable, the letter "a". Typing errors could increase this number to three:

```
5 PRINT AT L,a;b
```

Here, the L key has been pressed instead of the one key, and the inverted commas have accidentally been omitted. These are both common mistakes, resulting in error code 2.

If you have made neither of these mistakes, move backwards through the program. Each variable should have been given a numeric value at some point, either in a LET statement, a DIM statement, or a READ statement. Remember whenever you check back through a program this way, that your computer will not necessarily run lines in order.

Another common error code is "B:integer out of range." An integer is a whole number. 23, 7 and 2001 are integers, 2.3, 7¾ and 2.001 are not. Normally your computer can handle most integers, whether very large or very small. In some cases, though, its range is restricted. For instance, when defining graphics on the Spectrum, the largest numbers you can use are BIN 11111111 or 255. If you type a larger number it will be out of range, and error code B will result.

Integer out of range also results if you instruct the computer to print off the screen.

```
5 PRINT AT 1,31;"x"
```

is acceptable, while

```
5 PRINT AT 1,32;"x"
```

is not. This is most difficult to detect when it occurs in a loop. For example, if your program was printing an alien running across the screen, it might move happily for some time, and then an error code would result as it ran over the edge. This would happen here:

```
5 FOR n=1 to 100
6 PRINT AT 2,n;"H"
7 NEXT n
```

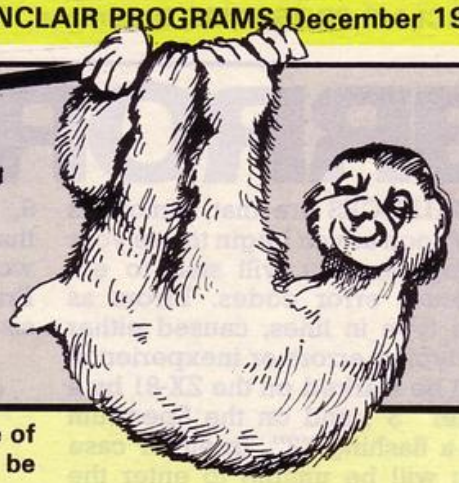
The error code would appear in line 6, because that is where the computer would be asked to print off screen. The error, though, lies in line 5.

It is always important to remember that the computer does not necessarily tell you where you have made a mistake, it simply tells you where it has first met that mistake. This will be most apparent to Spectrum owners where the READ command is used.

The READ command sends the Spectrum away from the line that it is reading, to another line, marked DATA. It will then take a piece of data from that line, and return with it to the READ line. This technique is often used when user-defined graphics are being created. Occasionally, because you have accidentally sent the computer to the DATA line too many times, or because you omitted a number from the DATA lines, or because you missed a comma from the DATA lines, thus making two small numbers into one big number; the computer will fail to find any data to use. It will then return to the READ line and report E: out of data. In this case the error will often be a long way from the line mentioned in your error report.

Turn over for Beginners' programs

Programming—Slow and easy with Computer Sloth



SMART ALEC!

EACH month *Sinclair Programs* takes one of the programs in the Beginners's section, and shows how it works. This month Smart Alec is a version of the board game Mastermind. The aim of the game is to guess the four numbers which the computer has chosen, and to arrange them in the correct order.

Lines five and seven print the instructions on screen, pause and then clear the screen. Lines ten to 135 choose the four numbers a, b, c and d, making sure that they are all different. Line 140 gives letter names for the position of the numbers. For example, if the first number (a) were two, then the value of the first position (e) would also be two.

Line 200 begins the main playing loop of the program. As the player will have seven chances, the game is set to loop seven times. Line 210 waits for the player to enter four numbers. A value is then given to the letter n. Lines 222 to 265 check whether the four numbers input (i,j,k and m) are the same as the four numbers chosen by the computer (a, b, c and d). Whenever two numbers are found to be the same, the value of n is increased by one.

The computer is then sent to the subroutine at line 5000. This prints a varying number of Xs on the screen, depending on the value of n. The Xs are printed at co-ordinates o and r. The value of r increases each time an X is printed, so that the computer prints a row of characters rather than printing them all on top of each other. Line 130 increases o after every turn.

The computer will then return to line 275, where the value of n is returned to one, and the computer checks whether the right numbers are in the right place by comparing i, j, k and m with the place letters e, f, g and h. The computer then moves to the subroutine at line 6000 which will print 0s depending on the value of n, just as the subroutine at 6000 printed Xs.

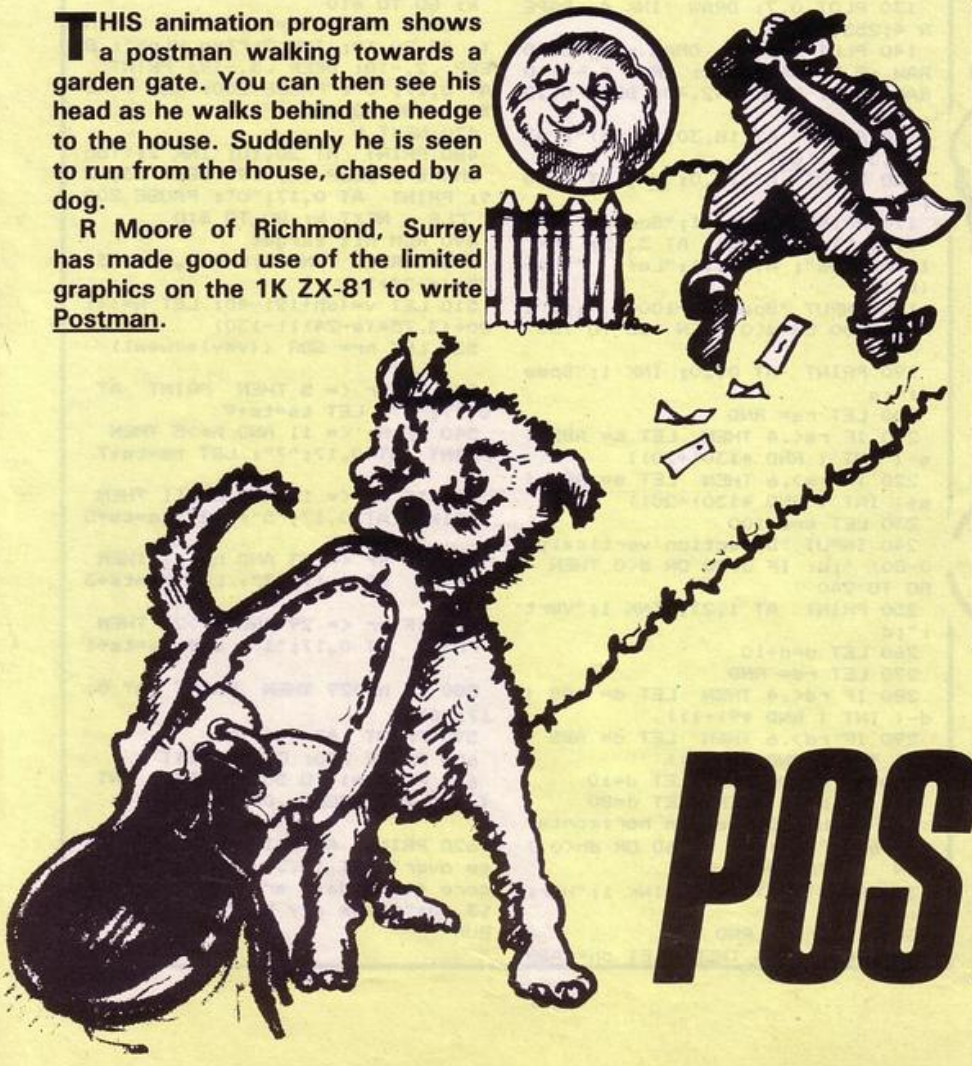
The computer returns to line 310, and loops back to line 200 for another turn. After seven turns the computer will continue to line 320, print the "BAD LUCK" message, and then restart the game. If you have won, this will have been noted in the subroutine at 6000 which will have printed "HOORAY" and finished the game.

```
   5 PRINT "THE COMPUTER WILL CH
OOSE FOUR DIFFERENT NUMBERS BETW
EEN 0 AND 6.  GUESS THE FOUR NUM
BERS.  THE Xs SHOW HOW MANY NUMB
ERS YOU HAVE CORRECT, AND THE 0s
 SHOW HOW MANY ARE IN THE CORREC
T PLACE.  YOU HAVE SEVEN CHANCES
."
   7 PAUSE 400: CLS
  10 LET O=-3
 100 LET A= INT ( RND *7)
 110 LET B= INT ( RND *7)
 115 IF B=A THEN  GO TO 110
 120 LET C= INT ( RND *7)
 125 IF C=B OR C=A THEN  GO TO 1
20
 130 LET D= INT ( RND *7)
 135 IF D=A OR D=B OR D=C THEN
GO TO 130
 140 LET E=A: LET F=B: LET G=C:
```

```
LET H=D
 200 FOR L=1 TO 7
 201 LET O=O+3
 210 INPUT I: INPUT J: INPUT K:
INPUT M
 220 LET N=1
 222 IF I=A OR I=B OR I=C OR I=D
 THEN  LET N=N+1
 225 IF J=1 THEN  GO TO 240
 230 IF J=A OR J=B OR J=C OR J=D
 THEN  LET N=N+1
 240 IF K=I OR K=J THEN  GO TO 2
60
 250 IF K=A OR K=B OR K=C OR K=D
 THEN  LET N=N+1
 260 IF M=J OR M=K OR M=I THEN
GO TO 270
 265 IF M=A OR M=B OR M=C OR M=D
 THEN  LET N=N+1
 270 GO SUB 5000
 275 LET N=1
 277 IF I=E THEN  LET N=N+1
 280 IF J=F THEN  LET N=N+1
 290 IF K=G THEN  LET N=N+1
 305 GO SUB 6000
 310 NEXT L
 320 PAUSE 100: CLS : PRINT  AT
5,2;"BAD LUCK": PAUSE 1000: RUN

5000 LET R=3
5001 IF N=1 THEN  RETURN
5010 FOR P=2  TO N: PRINT  AT 0,
R;"X": LET R=R+1: NEXT P
5020 RETURN
6000 LET R=3
6001 IF N=1 THEN  RETURN
6002 IF N=5 THEN  CLS : PRINT  A
T 5,5;"HOORAY!": STOP
6010 FOR P=2 TO N: PRINT  AT 0+1
,R;"O": LET R=R+1: NEXT P
6020 RETURN
```

THIS animation program shows a postman walking towards a garden gate. You can then see his head as he walks behind the hedge to the house. Suddenly he is seen to run from the house, chased by a dog.

R Moore of Richmond, Surrey has made good use of the limited graphics on the 1K ZX-81 to write Postman.



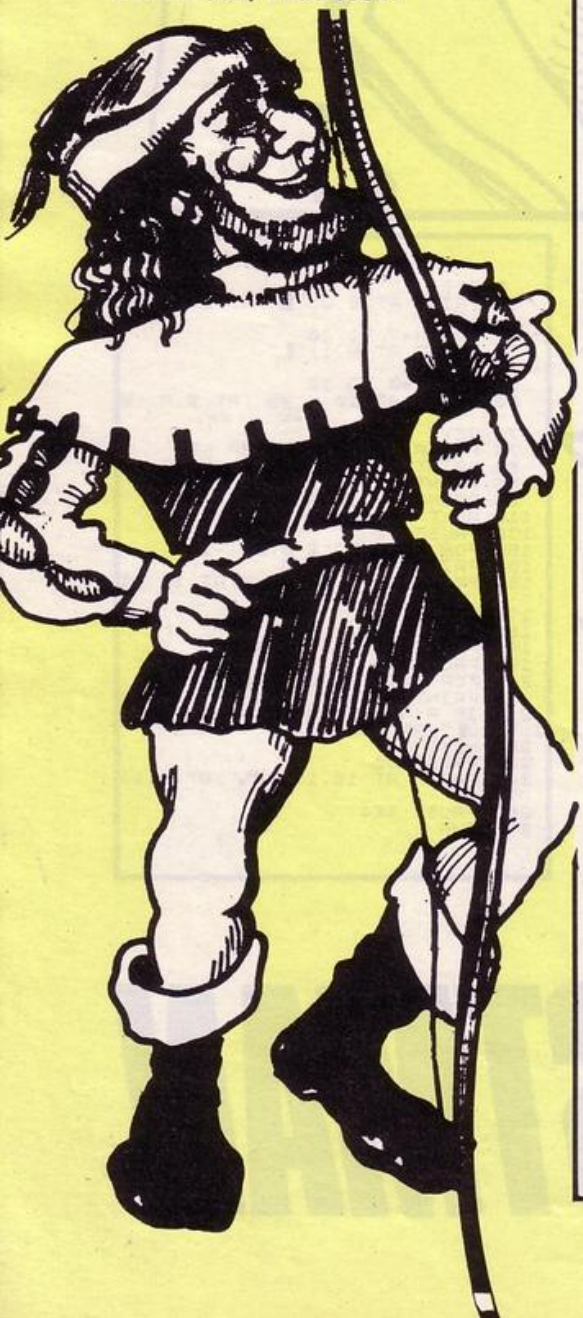
```
  5 CLS
 10 PRINT AT 5,0;"▙";AT 6,0;"▜
";
 20 FOR N=7 TO 10
 30 PRINT AT N,1;"▌"
 40 NEXT N
 50 FOR N=0 TO 10
 60 PRINT AT 10,N;"▒";AT 9,N;"▒
";
 70 NEXT N
 75 FOR A=20 TO 11 STEP -1
 80 PRINT AT 8,A;"O "
 85 PRINT AT 9,A;"▌U "
 90 PRINT AT 10,A;"J "
110 NEXT A
130 PAUSE 50
150 FOR A=10 TO 2 STEP -1
160 PRINT AT 8,A;"O "
161 PRINT AT 9,11;"  ";AT 10,11
;"  "
170 NEXT A
180 PAUSE 100
190 PRINT AT 8,5;"GRRR"
195 PAUSE 10
200 FOR A=2 TO 20 STEP 2
210 PRINT AT 8,A;" O"
215 IF A>=11 THEN PRINT AT 9,A-
1;"  U▌";AT 10,A;"  L"
220 NEXT A
230 PAUSE 30
240 PRINT AT 10,11;"▟▙";AT 9,11
;"?▜"
260 PAUSE 4E4
270 RUN
```

POSTMAN

ARCHER

FOLLOWING the prompts, input the data relating to the speed and horizontal and vertical direction of the arrow. The archer at the bottom left of the screen will then fire the arrow and it will head towards the target depending on the data input. At the beginning of each game you can choose how many shots you want to have.

The Archer was written for the 16K Spectrum by David Bull of Northwood, Middlesex.



```
  10 LET ts=0
  20 BORDER 1: INK 0
  30 FOR z=0 TO 7: READ j: POKE
 USR "m"+z,j: NEXT z
  40 FOR z=0 TO 7: READ j: POKE
 USR "h"+z,j: NEXT z
  50 DATA  BIN 00111101, BIN 011
11111, BIN 00011101, BIN 0001110
1, BIN 00011110, BIN 00010110, B
IN 00010100, BIN 00010100
  60 DATA 0,0,0,0,0, BIN 0000010
0, BIN 00011010, BIN 00011010
  70 INPUT "Number of arrows to
be shot ";na: IF na<1 THEN  GO T
O 70
  80 FOR k=1 TO na
  90 FOR a=5 TO 30 STEP 6
 100 CIRCLE 40,130,a
 110 NEXT a
 120 PRINT  AT 0,2; INK 1;"Targe
t"
 130 PLOT 0,7: DRAW  INK 4; PAPE
R 4;255,0
 140 PLOT 255,60: DRAW -14,-5: D
RAW -8,5: DRAW 2,2: DRAW 6,-4: D
RAW 14,5: PLOT 242,40: DRAW 0,18

 150 PRINT  AT 18,30;"(ig5)"; AT
 17,30;"(ig5)"
 160 PRINT  AT 19,0;"H"; AT 20,0
;"M"
 170 PRINT  AT 0,11;"Score "; AT
 1,11;"Total ";ts; AT 3,11; INK
 1;"Arrows"; AT 4,11;"Left  ";na-
(k-1)
 180 INPUT "Speed(0-1000) ";s: I
F s>1000 OR s<0 THEN  GO TO 180

 190 PRINT  AT 0,20; INK 1;"Spee
d:";s
 200 LET rs= RND
 210 IF rs<.4 THEN  LET s= ABS (
s-( INT ( RND *130)+20))
 220 IF rs>.6 THEN  LET s= ABS (
s+( INT ( RND *130)+20))
 230 LET s=s+100
 240 INPUT "Direction verticaly(
0-80) ";d: IF d>80 OR d<0 THEN
GO TO 240
 250 PRINT  AT 1,21; INK 1;"Vert
:";d
 260 LET d=d+10
 270 LET rd= RND
 280 IF rd<.4 THEN  LET d= ABS (
d-( INT ( RND *9)+1))
 290 IF rd>.6 THEN  LET d= ABS (
d+( INT ( RND *9)+1))
 300 IF d<10 THEN  LET d=10
 310 IF d>80 THEN  LET d=80
 320 INPUT "Direction horizontal
y(0-60) ";dh: IF dh>60 OR dh<0 T
HEN  GO TO 320
 330 PRINT  AT 2,20; INK 1;"Hori
z:";dh
 340 LET rdh= RND
 350 IF rdh<.4 THEN  LET dh= ABS
 (dh-( INT ( RND *18)+2))
 360 IF rdh>.6 THEN  LET dh= ABS
 (dh+( INT ( RND *18)+2))
 370 IF dh>60 THEN  LET dh=60
 380 LET x=s* COS ( PI *d/180)

 390 LET y=s* SIN ( PI *d/180)

 400 FOR b=.5 TO y/16 STEP .2
 410 LET c=.01*(y*b-16*b*b)
 420 LET f=(.04*x*b)+7: LET e=(4
*c+8)+5
 430 PLOT f,e
 440 IF f >= 240 AND e >= 24 AND
 e <= 39 THEN  PRINT  AT 20,14;
INK 1; PAPER 5;"HIT": BEEP .2,20
: BEEP .3,10: GO TO 490
 450 IF  ABS f >= 240 THEN  PRIN
T  AT 20,10; INK 2;"Too Long": B
EEP .2,0: BEEP .3,-10: PRINT  AT
 0,17;"0": PAUSE 200: CLS : NEXT
 k: GO TO 610
 460 IF  ABS e >= 165 THEN  PRIN
T  AT 20,10; INK 2;"Too High": B
EEP .2,-10: BEEP .3,-19: PRINT
AT 0,17;"0": PAUSE 200: CLS : NE
XT k: GO TO 610
 470 NEXT b
 480 PRINT  AT 20,10; INK 2;"Too
 Short": BEEP .2,-19: BEEP .3,-2
9: PRINT  AT 0,17;"0": PAUSE 200
: CLS : NEXT k: GO TO 610
 490 REM hit target
 500 CIRCLE  INK 2;dh+12,100+(3.
75*(e-24)),1
 510 LET v=(dh+12)-40: LET w=((1
00+(3.75*(e-24)))-130)
 520 LET hr= SQR ((v*v)+(w*w))

 530 IF hr <= 5 THEN  PRINT  AT
0,17;"9": LET ts=ts+9
 540 IF hr <= 11 AND hr>5 THEN
PRINT  AT 0,17;"7": LET ts=ts+7

 550 IF hr <= 17 AND hr>11 THEN
 PRINT  AT 0,17;"5": LET ts=ts+5

 560 IF hr <= 23 AND hr>17 THEN
 PRINT  AT 0,17;"3": LET ts=ts+3

 570 IF hr <= 29 AND hr>23 THEN
 PRINT  AT 0,17;"1": LET ts=ts+1

 580 IF hr>29 THEN  PRINT  AT 0,
17;"0"
 590 PRINT  AT 1,17;ts
 600 PAUSE 250: CLS : NEXT k
 610 FOR r=1 TO 50: BORDER  INT
( RND *7): BEEP .005,r: NEXT r

 620 PRINT  AT 8,11; FLASH 1;"Ga
me over"; AT 10,2; INK 1;"Your s
core for ";na;" arrows=";ts; AT
13,10;"press any key": PAUSE 0:
RUN
```

```
10 REM O LITTLE TOWN OF BETHLEHE
M
20 LET C=1: REM CHANGE THE VALUE
OF C TO CHANGE THE SPEED
30 BEEP C,0: BEEP C,5: BEEP C,5:
BEEP C,5: BEEP C,7: BEEP C/2,9:
BEEP C/2,7: BEEP C/2,9: BEEP C/2
,10: BEEP C,12
40 BEEP C,9: BEEP C,10: BEEP C/2
,9: BEEP C/2,5: BEEP C,7: BEEP C
,7: BEEP 2C,5
50 BEEP C,0: BEEP C,5: BEEP C,5:
BEEP C,5: BEEP C,7: BEEP C/2,9:
BEEP C/2,7: BEEP C/2,9: BEEP C/2
,10: BEEP C,12
50 BEEP C,9: BEEP C,10: BEEP C/2
,9: BEEP C/2,5: BEEP C,7: BEEP C
,7: BEEP 2C,5
60 BEEP C/2,5: BEEP C/2,9: BEEP
1.5C,12: BEEP C/2,14: BEEP C/2,1
2: BEEP C/2,10: BEEP C/2,9: BEEP
C/2,7: BEEP C/2,5: BEEP C/2,7: B
EEP C/2,9: BEEP C/2,10: BEEP C,1
2
70 BEEPC,0: BEEP C,5: BEEP C,9:
BEEP C,7: BEEP C,5: BEEP 2C,0
80 BEEP 2C,0: BEEP C,5: BEEP C,5
: BEEP C,5: BEEP C,7: BEEP C/2,9
: BEEP C/2,7: BEEP C/2,9: BEEP C
/2,10: BEEP C,12: BEEP C,9: BEEP
C,10: BEEP C/2,9: BEEP C/2,5: BE
EP C,7: BEEP C,7: BEEP 2C,5
```

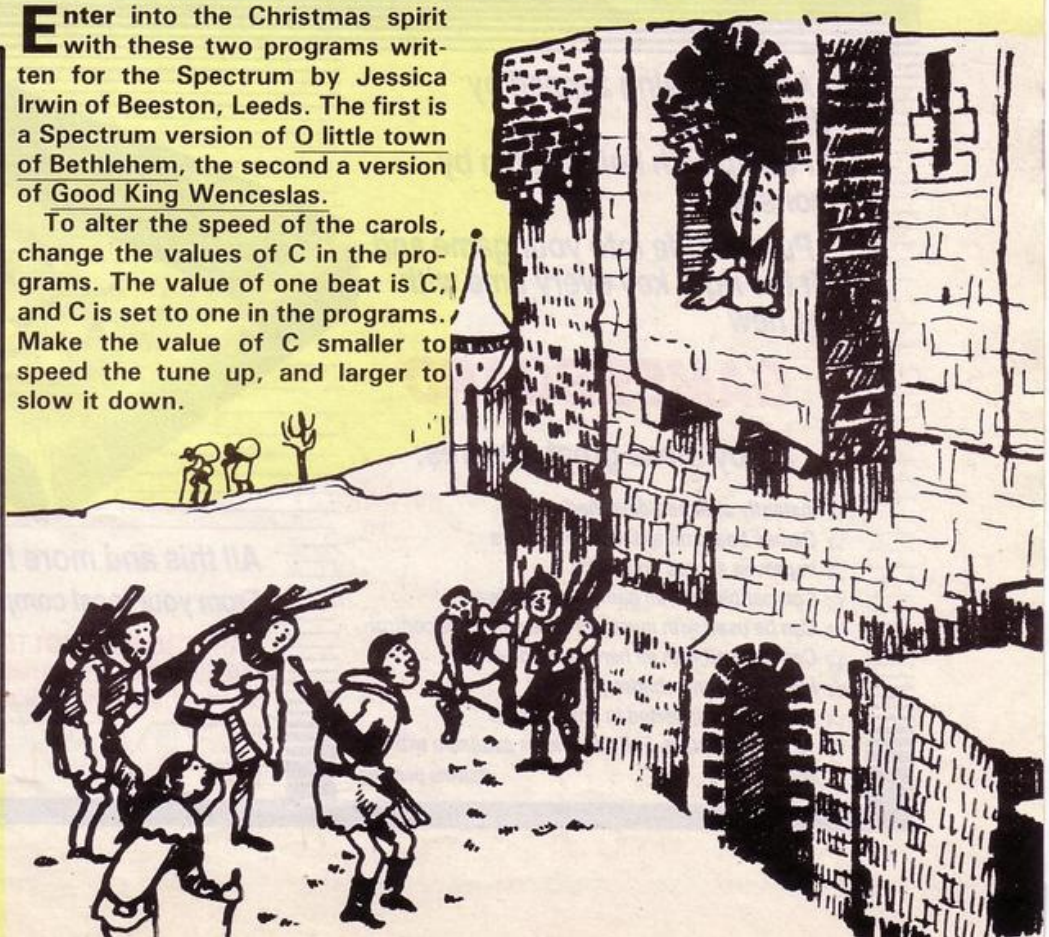
O Little Town of Bethlehem

GOOD KING WENCESLAS

Enter into the Christmas spirit with these two programs written for the Spectrum by Jessica Irwin of Beeston, Leeds. The first is a Spectrum version of O little town of Bethlehem, the second a version of Good King Wenceslas.

To alter the speed of the carols, change the values of C in the programs. The value of one beat is C, and C is set to one in the programs. Make the value of C smaller to speed the tune up, and larger to slow it down.

```
10 REM GOOD KING WENCESLAS
11 LET C=1: REM CHANGE THE VALUE
OF C TO CHANGE THE SPEED OF THE
TUNE
12 BEEP C,8: BEEP C,8: BEEP C,8:
BEEP C,10: BEEP C,8: BEEP C,8: B
EEP 2C,3: BEEP C,5: BEEP C,3: BE
EP C,5: BEEP C,7: BEEP 2C,8: BEE
P *C,8
13 BEEP C,8: BEEP C,8: BEEP C,8:
BEEP C,10: BEEP C,8: BEEP C,8: B
EEP 2C,3: BEEP C,5: BEEP C,3: BE
EP C,5: BEEP C,7: BEEP 2C,8: BEE
P 2C,8
14 BEEP C,15: BEEP C,13: BEEP C,
12: BEEP C,10: BEEP C,12: BEEP C
,10: BEEP 2C,8: BEEP C,5: BEEP C
,3: BEEP C,5: BEEP C,7: BEEP 2C,
8: BEEP 2C,8
15 BEEP C,3: BEEP C,3: BEEP C,5:
BEEP C,7: BEEP C,8: BEEP C,8: BE
EP 2C,10: BEEP C,15: BEEP C,13:
BEEP C,12: BEEP C,10: BEEP 2C,8:
BEEP 2C,13: BEEP 4C,8
```



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7	RADAR LANDING	24	BARREL JUMP	40	DO YOUR SUMS
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10	PSION ATTACK	27	SITTING TARGET	43	UNIVERSE
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SP/12/84

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6	Chuckie Egg	A&F
7	Lords of Midnight	Beyond
8	Trashman	New Generation
9	Ant Attack	Quicksilva
10	Chequered Flag	Psion

HEIGHTS ⬆ DEPTHS ⬇

YOUR CHANCE TO WIN!

The chart above was compiled from the questionnaire which was included in many copies of last month's *Sinclair Programs*. Next month we intend to publish two charts; a top ten and an anti-chart of your most hated programs.

To register your vote, please send the following information on a postcard, or on the back of a sealed envelope: your NAME, your ADDRESS, the PROGRAM YOU LIKE MOST, and the COMPANY which manufactures it, the PROGRAM YOU HATE MOST, and the COMPANY which manufactures it. At the end of the month, when the votes have been counted, one card will be selected at random, and its writer will win £10.

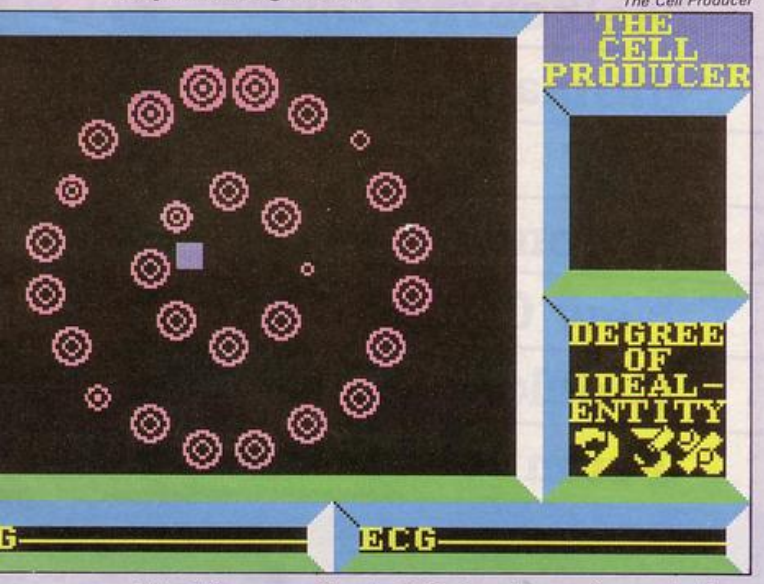
Send your cards to: CHARTLINE, Sinclair Programs, 67 Clerkenwell Road, London EC1R 5BH. Only votes on postcards or the outside of envelopes will be eligible.

Soft spot

DEUS EX MACHINA

Each month Sinclair Programs will be selecting one outstanding game from the software recently released and featuring it in Softspot. The program this month is **Deus ex machina** from Automata. This superb game combines a complete stereo soundtrack with a series of thematically linked games.

The Cell Producer



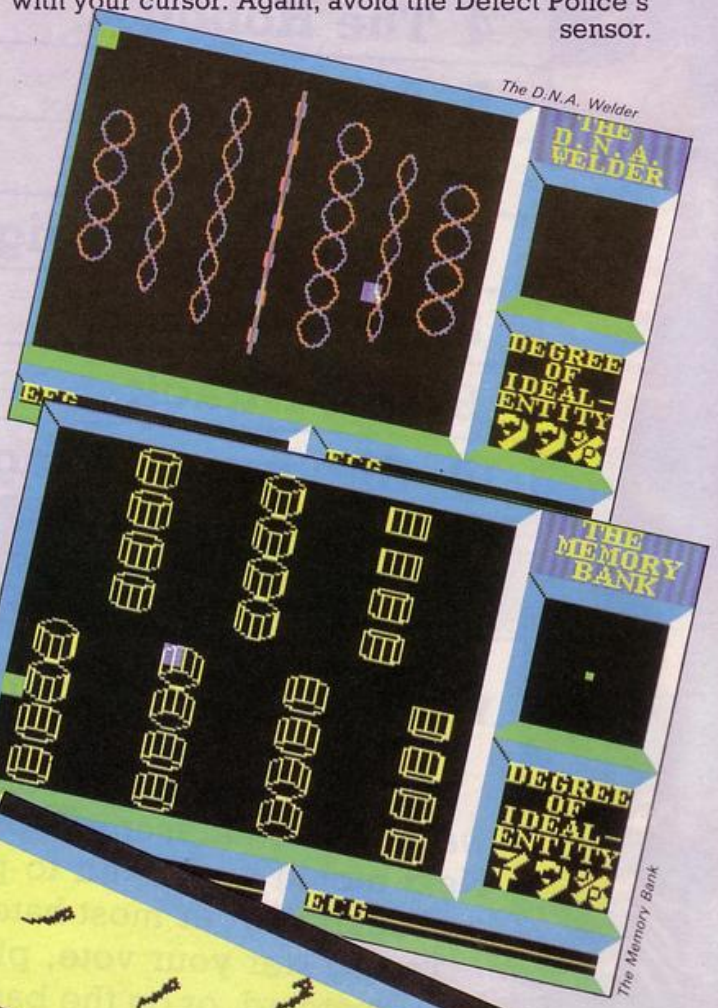
The Memory Bank. Life has been formed. The Defect Police are out to hinder you as you gain as much energy as possible from the memory cells.

The Belle Bank. Animate the cooling eggs, setting them all spinning to confuse the surveillance squads. Doing this will allow the machine to divert one egg for her purposes.

The Beau Bank. One egg has been diverted by the machine. Guide your swimming sperm towards the egg as many times as possible.

The D.N.A. Welder. Life is forged within the machine, as the double helixes revolve slowly. Keep them spinning by touching them with your green cursor, but avoid the tracking blue cursor of the Defect Police.

The Cell Producer. Two circles of cells pulsate with life. Keep them alive by touching each one with your cursor. Again, avoid the Defect Police's sensor.

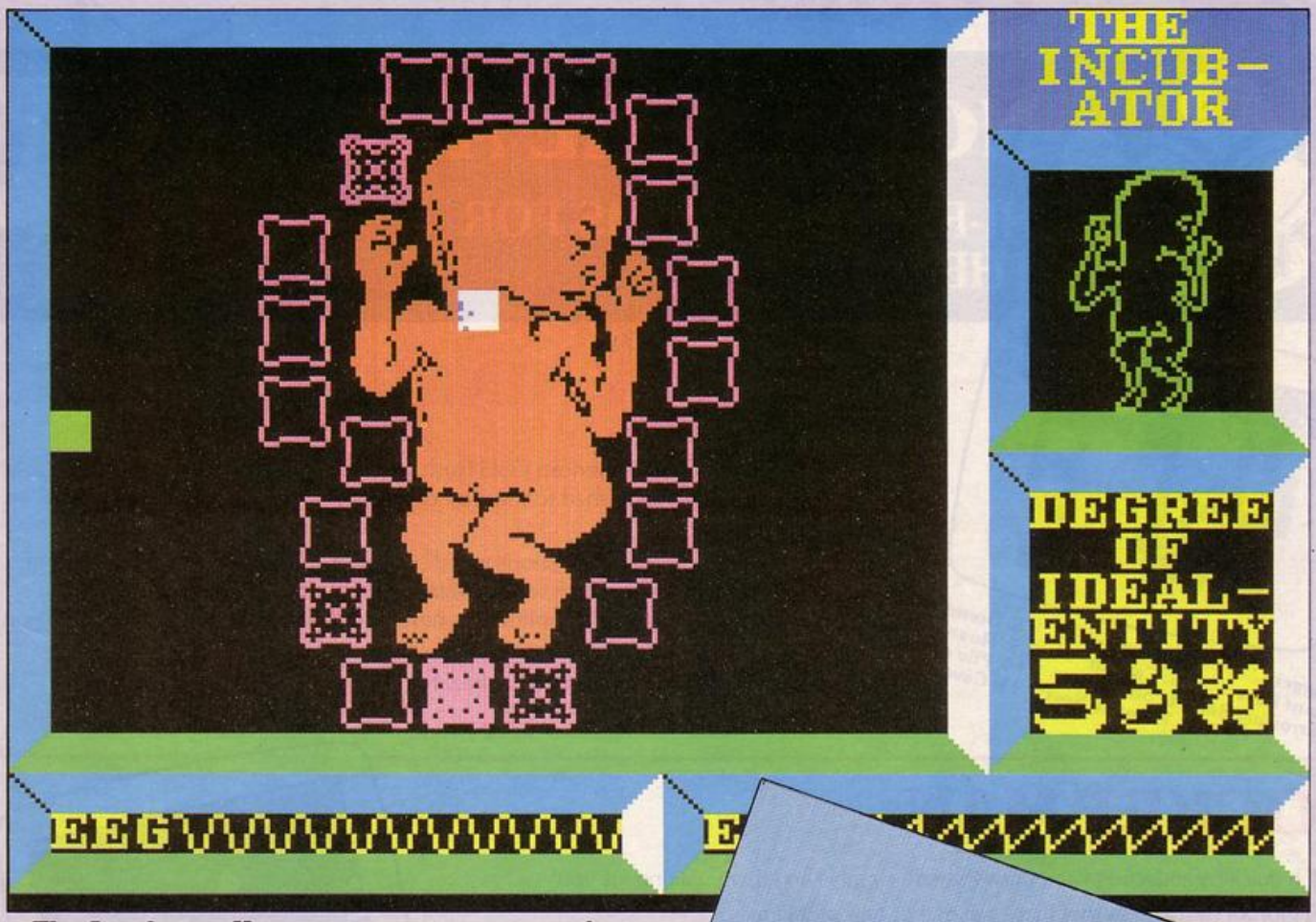


The D.N.A. Welder

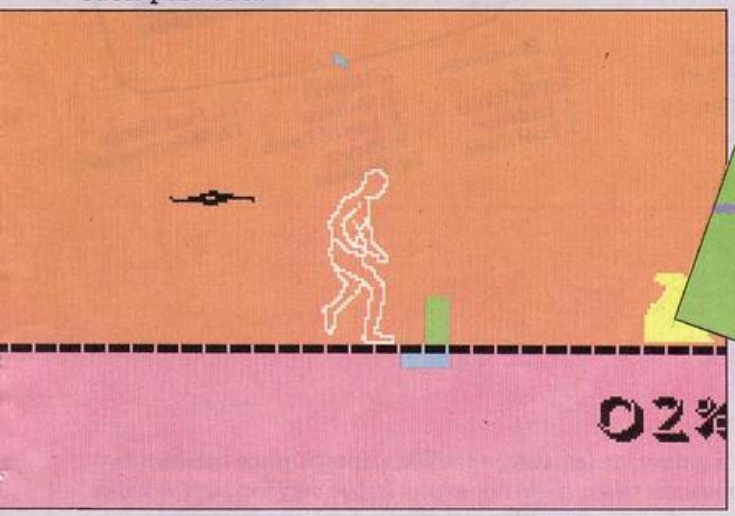
The Memory Bank

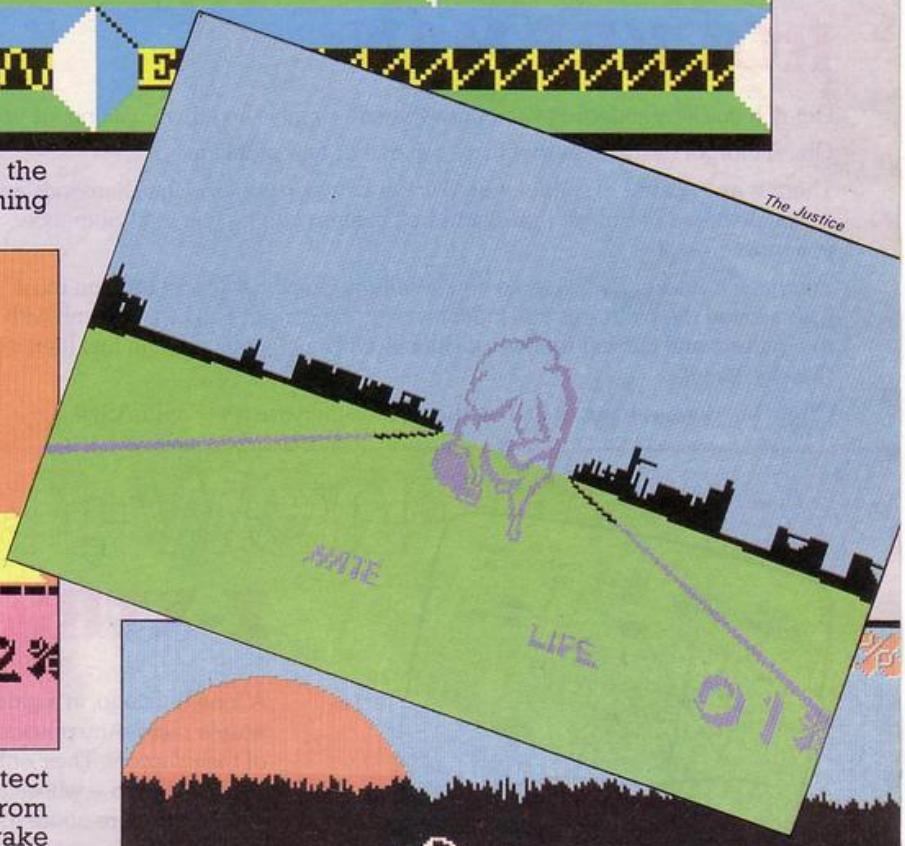
The Belle Bank

The Beau Bank



The Incubator. Use your cursor to protect the growing baby. Keep its cocoon intact by touching each part of it.

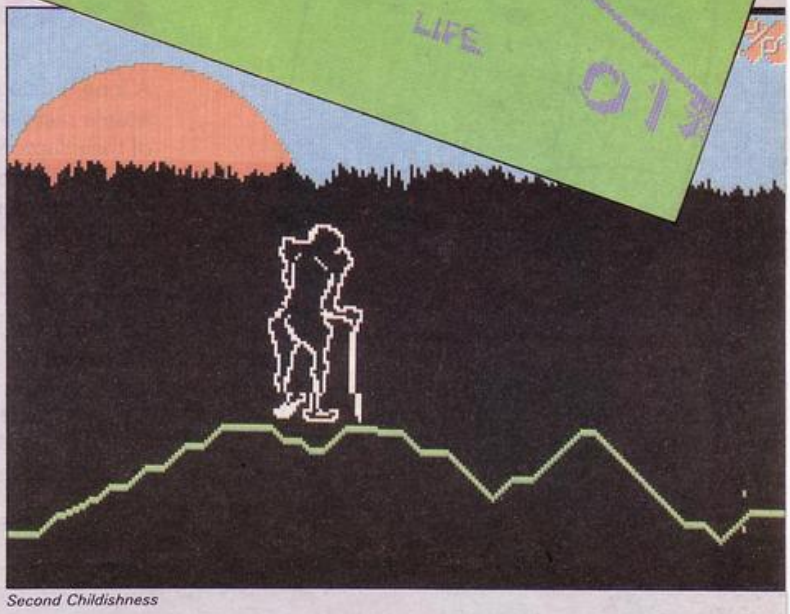




The Soldier. Leap the pitfalls underfoot. Protect yourself from the mental tortures which aim from overhead, from the back-stabbers in your wake and the walls of fire in your path.

The Justice. Holding power at last, you must use it for the best. Stamp out evil but avoid harming noble sentiments or good. Each time you make a mistake some part of your city, shown in the background, will crumble.

Second Childishness. Keep your blood flowing, disperse the blood clots, and then prevent rogue cells from joining and blocking your arteries. Shepherd the stray cells around your system. Use your powers to maintain your body until the very end of the game.

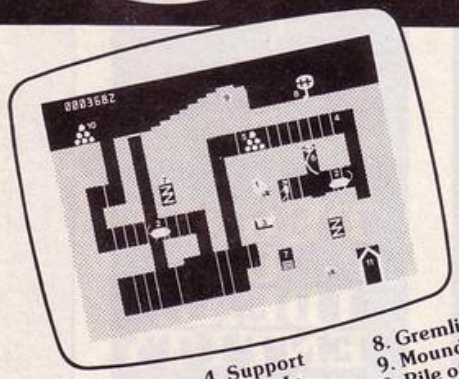


Second Childishness

LOOK!

NOW THERE ARE 3

HI-RES PROGRAMS FOR THE 16K ZX-81



1. Nuggets
2. Giant Rats
3. Burrowing Rat
4. Support
5. Cave In
6. Snake
7. Snake Nest
8. Gremlin
9. Mound
10. Pile of Earth
11. Cave

FORTY NINER

In 1849 the Great American Gold Rush started. Almost everyone who could sold up everything and dashed to the west coast to look for this precious metal – including you!

You must excavate this precious metal – but can you survive the giant rats and that vicious Gremlin which will come to infest your mine? Can you trick the snakes into leaving their comfortable nests and destroy the rats for you? Can you keep the Gremlin at bay?

Riches await you – but so do the hazards!

ROCKET MAN

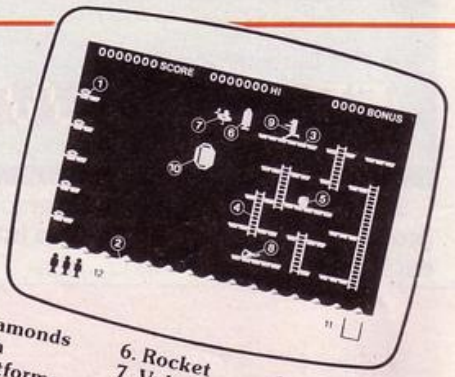
Get rich quick by collecting Diamonds that are simply lying there waiting for you!

Oh . . . I forgot to mention that there are one or two problems!

There is an expanse of shark infested water between you and the Diamonds and a strange breed of Bubble that seems hell bent on getting you in it! Somehow you must cross it . . . .

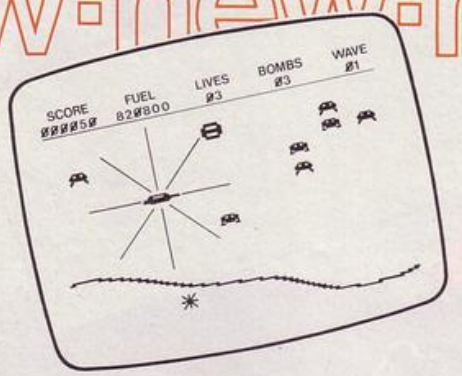
You have a Rocket Pack to help you (a Vulture on higher levels) but you must rush around the platforms and ladders collecting cans of fuel (legs of lamb with the Vulture) and cursing that weird Bubble. Once you have enough fuel then it's Chocks Away!

Oh . . . but don't run out of fuel on the way – otherwise it's . . . SPLASH!



1. Diamonds
2. Sea
3. Platforms
4. Ladders
5. Fuel Cans
6. Rocket
7. Vulture
8. Leg of Lamb
9. Player
10. Bubloid
11. Fuel Gauge
12. Men remaining

new·new·new·new·new·ne



Z-XTRICATOR

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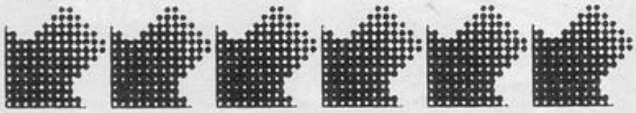
ADVANCED GRAPHICS IN BASIC

MANY OF you who are about to assail new heights with machine code programming will be in some awe at this month's proprintout on "Sprite Graphics". In case you might have been discouraged from attempting this program by the mention of machine code, be assured that no knowledge of this language is required to use it from Basic, and I would strongly recommend the exercise.

Assuming you are familiar with User Defined Graphics (Chapter 14 of the Spectrum handbook), designing and testing your own graphic characters should be

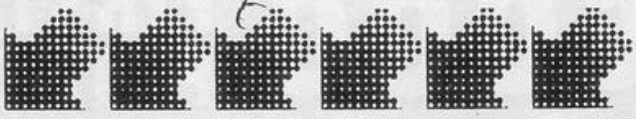


fairly straightforward. In any case, utility programs are available to help you (including a respectable version on the "Horizons" tape which comes with the machine). The next step, then, is to work out how to bring these characters to life on your T.V. screen.

A crude example of movement is given in Program 1. This shows an aeroplane moving across the screen. As the graphic is being moved one character position at a time (eight pixels), movement appears to be rather jerky. (Note the space before the graphic "A" which erases the previous character position).

A much smoother action is produced by Program 2. Here, the aeroplane is moved two pixels at a time although, to obtain this result we have had to set up seven UDGs. In fact there are only four aeroplanes represented by the graphic character pairs BC, DE, FG, and Space-A. For example, BC divides the plane into two parts,

with the tail two pixels into gB and the nose (and wing tip) two characters into gC. Even smoother



action can be gained with single pixel moves, although it would slow down execution, and need 15 UDGs.

Owners of 16K Spectrums especially, should

keep in mind the demand which UDGs make on memory, as eight bytes are used for each. 48K users will not be so restricted on this point, though you will soon find yourself running out

of the 21 assigned memory locations. This need not be a problem though, as Program 3 demonstrates. First, enter and run it. Nothing appears to happen. Now try typing letters. Everything seems normal except that you find yourself in capitals. Switch to lower case (caps shift/2) and, lo and behold, you find the letters a, b, c, d, e, f replaced by UDGs. The program has copied the normal ROM character set to a location in RAM where it can be manipulated at will. A CLEAR command is used (line 10) to lower RAMTOP, and so make room for the new character set which will be preserved with NEW. As we have chosen 64000 as the start location, we have 1367 bytes to play with (from 64000 to 65367 — one byte below start of reserved UDG area on 48K machines). The POKE command in line 10 switches to capitals, leaving us free to overwrite lower case letters, and so generate up to 26 more UDGs. Line 20 puts the start address of the ROM character set into A (starts with Space) and the end address into B (ends with ©). With 96 characters involved, this

Program 1

```
 10 FOR x=0 TO 7: READ y: POKE
 USR "a"+x,y: NEXT x
  20 DATA 0,3,134,140,255,24,48,
96
  30 FOR i=1 TO 31: PRINT  AT 10
,i;" A": PAUSE 5: NEXT i
  40 CLS : GO TO 30
```

gives a total of 768 bytes, as each character is like a UDG and requires eight bytes. Having PEEKed the systems variable CHARS in line 20 for the ROM address, in line 25 we can now POKE in the RAM location. Calculate the numbers to POKE by:

(a) Subtracting 256 from address of first byte of new location (i.e. 64000−256=63744)
(b) Dividing result by 256 and POKE 23607 with integer part (i.e. 63744/256=249)
(c) POKE 23606 with any remainder (63744−256*INT (63744/256)=0)

Program 2

```
  10 FOR x= USR "a" TO  USR "g"+
7: READ y: POKE x,y: NEXT x
  21 DATA 0,3,134,140,255,24,48,
96
  22 DATA 0,0,33,35,63,6,12,24
  23 DATA 0,192,128,0,128,0,0,0
  24 DATA 0,0,8,8,15,1,3,6
  25 DATA 0,48,96,192,240,128,0,
0
  26 DATA 0,0,2,2,3,0,0,1
  27 DATA 0,12,24,48,248,96,192,
128
  40 CLS : FOR i=1 TO 30
  50 PRINT  AT 10,i-1;" A"
  60 PRINT  AT 10,i;"BC"
  70 PRINT  AT 10,i;"DE"
  80 PRINT  AT 10,i;"FG"
  90 NEXT i
 100 GO TO 40
```

This may precede or follow line 30 which copies the ROM characters to RAM. In effect, each step of this X loop is PEEKing a single byte of a ROM character and POKEing it into the next

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A
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Defuse a bomb hidden on the complex planet, Lattica, before it blows!! "...action packed game... addictive" — Sinclair user.

D
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E
50 different screens of mayhem. "A fun game for all ages . . . . which I thoroughly enjoyed." — Home Computing Weekly.

Program 3

```
 10 CLEAR 63999: POKE 23658,8

 20 LET a=256+ PEEK 23606+256*
PEEK 23607: LET b=a+768
 25 POKE 23606,0: POKE 23607,24
9
 30 FOR x=a TO b: POKE 64000+x-
a, PEEK x: NEXT x
 40 FOR x=64520 TO 64567: READ
y: POKE x,y: NEXT x
 50 DATA 60,126,255,y,y,y,126,6
0
 60 DATA 24,60,y,126,255,y,126,
60
 70 DATA 24,y,60,y,126,255,126,
60
 80 DATA 24,y,y,60,y,126,y,60

 90 DATA 24,y,y,y,y,y,y,y
100 DATA 137,74,0,192,3,0,82,14
5
110 DATA 137,74,0,192,3,0,82,14
5
```

location in RAM. Line 40 overwrites "a" to "f" in the new set. As there are 65 characters before "a", the new "a" starts at 64000+65*8 (=64520). Similarly, as we are overwriting six characters, the last address to be overwritten is 64520+6*8−1=64567.

To return to the ROM character set, POKE 23606,0:POKE 23607,60. Knowing that you can now switch between the two sets at will, you might prefer to adapt the above procedure to copy and convert only specified characters.

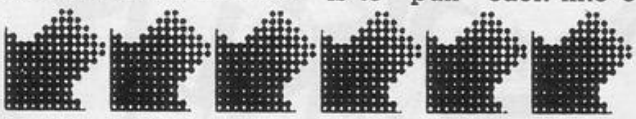
A flashing border will give even more effect to a "Well Done" or title, Program 7 does this and is intended to be run with Program 6. This is a handy little program for studying the under-used OUT command. Slow down the flashing by putting in a PAUSE 0 after each OUT statement. You will find the border alternating

Program 4

```
120 PRINT  AT 10,15;"a": PAUSE
20
130 PRINT  AT 10,15;"b": PAUSE
20
140 PRINT  AT 10,15;"c": PAUSE
20
150 PRINT  AT 10,15;"d": PAUSE
20
160 PRINT  AT 10,15;"e": PAUSE
20
170 PRINT  AT 10,15;"f": PAUSE
20
```

green/white, magenta/white etc. If you delete line 120, you should also be able to make out a series of audible "clicks".

First, let me explain what OUT does, and then we can better understand what it is doing here. OUT is a bit like POKE, though instead of writing a value to a memory address, it writes to a "port" address (for I/O). The OUTs used here on



port address 254, tell the Central Processing Unit that it is communicating directly with the TV (for border) and also with the loudspeaker in your Spectrum. An OUT value cannot be more than one byte, and the state of each of the first five bits is looked at.

On address 254, the first three bits control the border colour, and the fifth controls the loudspeaker. Thus, for an assigned value of 60 (BIN 00111100), the first three bits give the code for green, and the fifth sends a pulse to the L/S. (Bit four, incidentally, controls the MIC socket). The second OUT restores the white border. When you are satisfied about the way OUT works, you might like to compare it with BORDER (RND*8), for effect.

Program 4 demonstrates how a stationary object can be animated. This should be run together with Program 3, as "a" to "f" are the UDGs in our second character set. Alternatively, if you have NEWed and POKEd back to ROM characters, you can run this program independently provided you POKE 23607,249.

BASIC programs intended for commercial release can often be made to look more professional with animated reading material, such as a title or instructions. Program 5 is one way of animating a page of instructions. The object is to "pull" each line of information from left to right, changing the PAPER and INK colours line by line. The loop on Y (line 20) reads nine lines of information into the string Z$. In line 30, X is used to generate as many PRINTs as there are characters in each line. Each PRINT outputs the part of the string from (LEN Y$−X+1) up to the end of the string. Thus, if the length of the string is 31 characters (as in this case), then at the start of the X loop, we are PRINTing Y$ (1 TO 31). Note how INK 9 is used to contrast the colour of the character from the background. Line 35 is another example of the superlative Sinclair logic statements, in this case to rotate paper colours from 1 to 7.

Program 6 might give you a few ideas on how to make your own programs give a more spectacular congratulation on a win, and perhaps encourage a rematch. Line 10 sets up the message in Z$. This string contains 96 characters, so that each letter is set on a

Program 5

```
 10 CLS : LET p=1
 20 FOR y=0 TO 8: READ y$
 30 FOR x=1 TO  LEN y$: PRINT
AT y,0; INK 9; PAPER p;y$( LEN y
$-x+1 TO  ): NEXT x
 35 LET p=p+(p<7)-(6 AND p=7)
 40 NEXT y
 50 DATA " YOU MIGHT LIKE TO TR
Y A MORE ","COLOURFUL AND ANIMAT
ED WAY OF ","INTRODUCING YOUR GA
ME AND TO  ","SPECIFY INSTRUCTI
ONS/CONTROLS ","
               ","TO USE THIS TEC
HNIQUE SIMPLY ","ENTER UP TO 22
LINES OF INFO  ","IN LINE 50 AND
 CHANGE LINE 20  ","TO SUIT (Y
= 0 TO ?)          "
 100 STOP
```

3×3 square. The standard block graphics are used, so a **"Print'n Plotter"** type pad is useful (although not essential) for setting this up. The loop on X (line 20) reads the nine enlarged letters (although the fifth is skipped by line 26, this being a blank). X is set to the position of the first character in each block of three (reading across the whole length of the string). Random INK colours are selected in line

Program 6

```
 10 LET z$="(3*sp:g5:g4:g5:g5:2
*g3:g5:2*sp:g5:7*sp:ig4:g6:sp:ig
6:g6:g5:ig7:g5:g5:2*g3:4*sp:g5:g
5:g5:g5:g3:g2:g5:2*sp:g5:7*sp:ig
5:g4:g2:ig5:g5:g5:g1:ig2:g5:g3:g
2:5*sp:g2:g2:g1:2*g3:g1:2*g3:g1:
2*g3:5*sp:g3:g2:sp:g1:g2:g1:sp:g
1:g1:2*g3:4*sp)"
 20 FOR x=4 TO 28 STEP 3
 26 IF x=16 THEN  GO TO 55
 27 LET xx=x-1
 30 INK ( RND *5)+1
 35 FOR y=0 TO 6
 40 PRINT  AT y,xx;"    "; AT y
+1,xx;z$(x TO x+2); AT y+2,xx;z$
(x+32 TO x+34); AT y+3,xx;z$(x+6
4 TO x+66)
 45 NEXT y
 55 NEXT x
```

30. The loop on Y (line 35) handles the dropping of each letter through six rows. The three horizontal sections of a letter are "picked out" from the string using X,X+32, and X+64 and then printing the next three characters from these positions. The first PRINT has to erase the previous row only (not the whole letter).

Program 7

```
100 FOR y=60 TO 1 STEP -1
110 OUT 254,y
120 BEEP .04,y
130 OUT 254,7
140 NEXT y
```

SPRITE DESIGNER

THIS SUITE of programs was written for the 48K Spectrum by Roger Allen of Gerrards Cross, Buckinghamshire. The programs allow you to design and animate sprite graphics which are as many as 16 pixels by 16 pixels in size.

The best approach to entering and running the listings is as follows.

Firstly, enter listing one. This is the main Basic program for generating sprites. You cannot yet run it, as a machine code file is required. Check it thoroughly, and save it to tape as file S-GEN.

Enter and run listing two. This creates the machine code file SPRITE-MC to be called by S-GEN. The program dumps the machine code file which will follow S-GEN on tape. This utility program is now no longer required so you can NEW it, or transfer it to a separate tape.

Run the main program S-GEN, by loading it back from tape. It will automatically call SPRITE-MC. Use cursor keys to move around the grid. Keys 0 and 1 set and erase squares. You could begin to design a sprite at this point but, on your first run through, continue with the demonstration instead.

Enter and run listing four. This contains the data for two sprites (spiders) which will be SAVEd for you in machine code file S-SPIDER when RUN. Record this on tape directly after SPRITE-MC. This utility is now no longer required so either NEW it or record it on a separate cassette.

In order to run the spider demonstration, reload the sprite generator, press LOAD, and answer yes to the Load sprites? question, and no to the Load sequences? question. The name to be entered is S-SPIDER, and the answer to Where to? should be 1. Then LOAD from tape.

At this point you should be back at the main menu. Try these steps. Press "R"etrieve and ask for sprite 1. This will show the design for the first sprite, together with its data. Check this with listing four. Each sprite is like four user-defined graphics with 32 BINary lines.

Use the "I"nvert option to turn the sprite round or invert it, and then "F"ile the new design as sprite three. Only now will data for the new design be given. Repeat these steps for sprite number two. You can create up to 32 sprites in this way.

You can now "A"nimate. The table of sprites is displayed, with two sets of figures at the bottom.

Change the attributes by entering "y" in response to the prompt. The number of steps is the number of sprites to be included in one animation, with one frame per sprite. The maximum is eight, but enter two on your first run through.

The displacement is the number of pixels to be moved between each frame. The maximum displacement is four, but enter one for a demonstration.

Speed allows you to select an animation speed between one

and six, and colour allows you to choose a colour between one and seven. Now answer "n" to the Change attrs? question in order to move on to sequences.

Enter "y" to the question Change sequences? You can now select the sprites to be included in each rotation. Although this demonstration uses the same sequence for each direction, any selection can be made in any order. For a simple demonstration, press ENTER in answer to U, as you should already have selected one and two. For D, L and R, answer "1" to No. 1, and "2" to No. 2. Do not elect to change the attributes or the sequences.

You can now control the animation with the cursor keys (5-8). Key 4 will hold it steady.

Press "x" to return to the main menu, and try building up your own library of sprites by LOADing and SAVEing.

To see how to use the sprites in a Basic program enter listing five but do not run it. Check it, and dump it to cassette with the file name S-DEMO.

Enter and run listing three. This loads the SPRITE-MC code, so you will have to rewind the cassette to the second file. This program will dump a modified machine code file to tape, which you should place directly after S-DEMO. This utility is now no longer required, so NEW it, or record it on another cassette.

You can now rewind and rerun S-DEMO. This calls the modified machine code file S-BASIC MC. It will then require the S-SPIDER file, so rewind to the start of the third file for this.

This is just a demonstration of using sprites in a Basic program. For your own programs you will only need lines 10 and 9000 onwards.

This is just a demonstration of using Sprites in a Basic program. For your own programs you will only need lines 10 and 9000 onwards. To use sprites in your own programs, first design the sprites using the main program. Make a note of their numbers with reference to the sprite table and save them to cassette.

Load in the demonstration program, which will load in the appropriate machine code. Load the sprites you wish to use, using LOAD "" CODE.

To use the sprites, the routine at line 9000 must be called. First, though, you must set up a number of Basic variables.

X2 and Y2 hold the new coordinates of the sprite which has just been loaded. Variable X1 and Y1 hold the old co-ordinates of the first sprite.

Calling the routine will take the first sprite and plot it at position X1, Y1. As the first sprite should already be on screen in that position and plotting sprites is done in the same way that plotting is done in Basic, this will effectively delete the first sprite. The new sprite is then printed at X2, Y2, and control is restored to the point at which the routine was called.

Notice that when a sprite is first printed on screen, it does not have an old position, so X1 and Y1 must be set to 255 so that no unplotting takes place.

Once control has been returned to the body of the program, X2 and Y2 should be stored as X1 and Y1, and the second sprite should be treated as the first sprite.

For example, if you wanted to print sprite 3 at position 100,100 and then replace it with sprite 5 at position 100, 105; you would let X1=100, X2=100, Y1=100, Y2=105, S1=3 and S2=5. You would then instruct the computer to GOSUB 9000.

If sprite five were to appear at the beginning of the game in position 100, 105; you would enter: X1=255, Y1=255, S1=5, X2=100, Y2=105, S2=5 and the GOSUB 9000.

```
  10 BORDER 0: PAPER 0: INK 6: C
LEAR 30899: LOAD "SPRITE MC" COD
E
  20 RESTORE : DIM z(4): DIM z$(
4,24): LET n$="UDLR": FOR n=1 TO
 4: READ z(n),z$(n): NEXT n
  30 DATA 8," 1, 2, 3, 4, 5, 6,
7, 8",2," 9,10,11,12,13,14,15,16
",5,"17,18,19,20,21,22,23,24",6,
"25,26,27,28,29,30,31,32"
  40 DATA "LLOAD","SSAVE","RRETR
IEVE","IINVERT","FFILE","OSET","
1DELETE","AANIMATE","CCLEAR"
  50 CLS : RESTORE 40: FOR n=1 T
O 9: READ a$: PRINT  TAB 20; INK
 3;"["; INK 7;a$(1); INK 3;"]";
INK 4;" ";a$(2 TO ): NEXT n
  60 PRINT  INK 4; AT 10,18;"SPR
ITE=": INK 1: PLOT 207,79: DRAW
0,18: DRAW 18,0: DRAW 0,-18: DRA
W -18,0: INK 6
  70 PRINT  AT 2,1; INK 5;"SPRIT
E CREATOR"; AT 3,1; INK 1;"
          "
  80 FOR n=0 TO 16: PLOT 0,n*8:
DRAW 128,0: NEXT n
  90 FOR n=0 TO 16: PLOT n*8,0:
DRAW 0,128: NEXT n
 100 INK 6: LET x=21: LET y=0: L
ET a$="": LET c=8: PRINT  AT 12,
17; INK 7;"DATA"; AT 13,17; INK
3;"     ": GO TO 210
 110 LET a$= INKEY$ : IF a$="" T
HEN  GO TO 110
 120 IF a$="0" THEN  LET c=24: B
EEP .1,40: PLOT  INK 7;208+y,101
-x
 130 IF a$="1" THEN  BEEP .1,0:
IF c>21 THEN  PLOT  OVER 1; INK
7;208+y,101-x: LET c=8
 140 IF a$="f" THEN  PRINT  AT x
,y; PAPER c/8-1; OVER 1;" ": BEE
P .1,-20: GO SUB 260
 150 IF a$="c" THEN  BEEP .1,24:
 GO TO 40
 160 IF a$="l" THEN  BEEP .1,20:
 GO TO 680
 170 IF a$="s" THEN  BEEP .1,30:
 GO SUB 610
 180 IF a$="a" THEN  BEEP .1,10:
 GO TO 380
 190 IF a$="r" THEN  BEEP .1,-10
: GO SUB 290
 200 IF a$="i" THEN  BEEP .1,25:
 GO SUB 320
 210 PRINT  AT x,y; PAPER c/8-1;
 OVER 1;" "
 220 LET x=x+(a$="6" AND x <> 21
)-(a$="7" AND x <> 6)
 230 LET y=y+(a$="8" AND y <> 15
```

Continued on page 43

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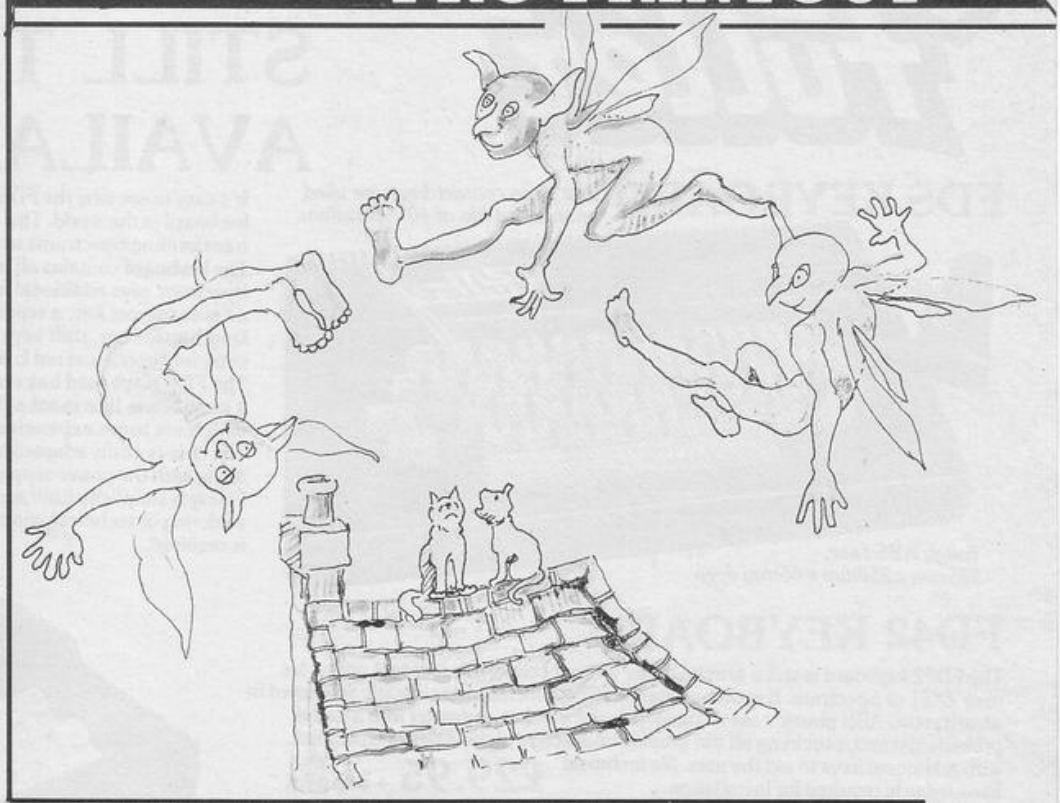
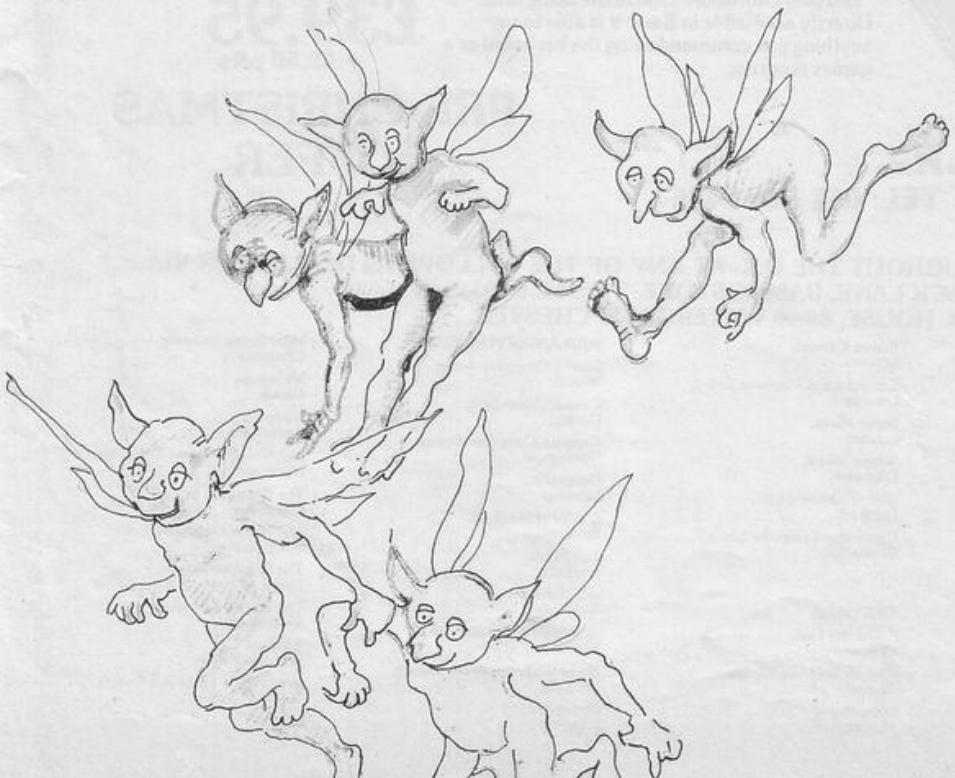
```
)-(a$="5" AND y <> 0)
 240 LET c= ATTR (x,y): PRINT  A
T x,y; OVER 1; PAPER 7;" "
 250 GO TO 110
 260 INPUT "SPRITE NO.? ";a: IF
a<1 OR a>32 THEN  BEEP .1,-14: G
O TO 260
 270 GO SUB 750: LET s=37*a+3155
0-32: POKE 31002, INT (s/256): P
OKE 31001,s-256* PEEK 31002: RAN
DOMIZE  USR 31000
 280 RETURN
 290 INPUT "SPRITE NO.? ";a: IF
a<1 OR a>32 THEN  BEEP .1,-15: G
O TO 290
 300 GO SUB 750: LET s=37*a+3155
0-32: GO SUB 360: POKE 30916, IN
T (s/256): POKE 30915,s- PEEK 30
916*256: RANDOMIZE  USR 30900
 310 LET c= ATTR (x,y): RETURN
 320 INPUT "[1] UP-DOWN [2] LEFT
-RIGHT? ";s: IF s <> 1 AND s <>
2 THEN  BEEP .1,-1: GO TO 320
 330 GO SUB 360:  IF s=1 THEN  P
OKE 30927,120: POKE 30928,0: POK
E 30929,198: POKE 30930,5
 340 GO SUB 750: IF s=2 THEN  PO
KE 30936,0: POKE 30937,0: POKE 3
0938,0: POKE 30945,198: POKE 309
46,9: POKE 30947,146
 350 POKE 30998,201: RANDOMIZE
USR 30900: LET c= ATTR (x,y): RE
TURN
 360 POKE 30998,24: POKE 30927,6
2: POKE 30928,22: POKE 30929,144
: POKE 30930,0: POKE 30936,237:
POKE 30937,68: POKE 30938,60: PO
KE 30945,0: POKE 30946,0: POKE 3
0947,130
 370 PRINT  AT 10,26; INK 7;"  "
; AT 11,26;"  ": RETURN
 380 CLS : PRINT  AT 0,9; INK 5;
"SPRITE  TABLE": PRINT  AT 1,9;
INK 1;"                "
 390 FOR n=31550 TO 32*37+31550
STEP 37: POKE n,150: POKE n+1,1:
 POKE n+2,3: POKE n+3,2: POKE n+
4,2: NEXT n: INK 7: PRINT : RAND
OMIZE  USR 31128: INK 6
 400 FOR n=0 TO 3: FOR m=0 TO 7:
 PRINT  INK 3; AT 2+n*4,1+m*4;n*
8+m+1: NEXT m: NEXT n
 410 PRINT  AT 17,0: FOR n=1 TO
4: PRINT  TAB 31;" ": NEXT n
 420 RESTORE 430: PRINT  AT 17,0
: FOR n=1 TO 4: READ a$: PRINT
INK 6;a$; INK 4;z(n);"  "; INK 6
;n$(n);"="; INK 4;z$(n, TO z(1)*
3-1): NEXT n
 430 DATA "STP=","DIS=","SPD=","
COL="
 440 INPUT "CHANGE ATTRS? "; LIN
E a$: IF a$ <> "y" THEN  GO TO 5
00
 450 INPUT "NO. OF STEPS? ";z(1)
: IF z(1)<1 OR z(1)>8 THEN  BEEP
.1,15: GO TO 450
 460 INPUT "DISPLACEMENT? ";z(2)
: IF z(2)<1 OR z(2)>4 THEN  BEEP
.1,15: GO TO 460
 470 INPUT "SPEED? ";z(3): IF z(
3)<1 OR z(3)>9 THEN  BEEP .1,15:
 GO TO 470
 480 INPUT "COLOUR? ";z(4): IF z
(4)<1 OR z(4)>7 THEN  BEEP .1,15
: GO TO 480
 490 GO TO 410
 500 INPUT "CHANGE SEQUENCES? ";
 LINE a$: IF a$ <> "y" THEN  GO
TO 570
 510 FOR n=1 TO 4: FOR m=1 TO z(
1)
 520 INPUT (n$(n);":NO.";m);"? "
; LINE a$: IF a$="" THEN  GO TO
560
 530 IF  VAL a$<1 OR  VAL a$>32
THEN  BEEP .1,5: GO TO 520
 540 IF  VAL a$<10 THEN  LET a$=
" "+a$
 550 LET z$(n,m*3-2 TO m*3)=a$+"
","": NEXT m
 560 NEXT n: GO TO 410
 570 POKE 31280,z(2): POKE 31278
,z(1): POKE 31267,z(3)
 580 LET p=31281: FOR m=1 TO 4:
FOR n=1 TO 24 STEP 3: LET s= VAL
 z$(m,n TO n+1)*37-32+31550
 590  POKE p+1, INT (s/256): POK
E p,s-256* PEEK (p+1): LET p=p+2
: NEXT n: NEXT m
 600 CLS : PRINT #1; AT 1,5; PAP
ER 1; INK 7; FLASH 1;"PRESS 'x'
 TO CONTINUE": INK z(4): POKE 23
560,56: RANDOMIZE  USR 31164: BE
EP .1,-5: GO TO 40
 610 INPUT "SAVE SPRITES? "; LIN
E b$
 620 INPUT "SAVE SEQUENCES? "; L
INE c$
 630 IF b$="y" OR c$="y" THEN  I
NPUT "NAME? "; LINE a$: IF  LEN
a$>10 OR a$="" THEN  BEEP .1,18:
 GO TO 630
 640 IF b$="y" THEN  INPUT "FROM
? ";a,"TO? ";b: IF a<1 OR a>32 O
R b<1 OR b>32 OR b<a THEN  BEEP
.1,8: GO TO 640
 650 IF b$="y" THEN  SAVE a$ COD
E a*37-37+31550,(b-a+1)*37
 660 IF c$="y" THEN  SAVE a$ DAT
A z$()
 670 RETURN
 680 INPUT "LOAD SPRITES? "; LIN
E b$
 690 INPUT "LOAD SEQUENCES? "; L
INE c$
 700 IF b$="y" OR c$="y" THEN  I
NPUT "NAME? "; LINE a$: IF  LEN
a$>10 THEN  BEEP .1,-8: GO TO 70
0
 710 IF b$="y" THEN  INPUT "WHER
E TO? ";a: IF a<1 OR a>32 THEN
BEEP .1,28: GO TO 710
 720 PRINT  AT 0,0;: IF b$="y" T
HEN  LOAD a$ CODE a*37-37+31550

 730 IF c$="y" THEN  LOAD a$ DAT
A z$()
 740 GO TO 50
 750 FOR n=1 TO 8: PRINT  AT 13+
n,17; INK 5;"                ": N
EXT n: RETURN
9998 SAVE "S-GEN" LINE 0
9999 SAVE "SPRITE MC" CODE 30900
,650
```





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PRO PRINTOUT

Listing 2

```
  10 CLEAR 30899
  20 LET x=0: FOR n=0 TO 640 STE
P 20
  30 FOR m=0 TO 19: READ a: LET
x=x+a: POKE m+n+30900,a: NEXT m
  40 READ a: IF a <> x THEN  PRI
NT "ERROR IN DATA AT LINE ";n+60
: STOP
  50 PRINT  AT 10,10;"DATA LINE
";n+60;" OK": NEXT n
  60 DATA 62,2,205,1,22,253,203,
87,198,62,7,50,144,92,33,67,123,
6,16,14,1647
  80 DATA 2,94,22,8,62,22,215,62
,22,144,0,197,71,215,121,61,237,
68,60,203,3533
 100 DATA 39,203,39,203,39,0,0,1
30,61,79,215,62,17,215,203,43,48
,25,62,0,5216
 120 DATA 215,62,101,144,71,121,
198,208,79,229,213,205,229,34,20
9,225,62,17,215,62,8115
 140 DATA 2,24,1,175,215,62,32,2
15,193,21,32,188,35,13,32,181,16
,177,24,74,9827
 160 DATA 33,67,123,6,16,30,2,22
,8,62,22,144,197,71,123,61,237,6
8,60,203,11382
 180 DATA 39,203,39,203,39,130,6
1,79,120,15,15,15,71,230,224,169
,79,120,230,3,13466
 200 DATA 238,88,71,10,214,8,63,
203,25,8,203,17,203,31,8,193,21,
32,206,8,15316
 220 DATA 119,35,29,32,198,16,19
4,229,62,2,205,1,22,225,6,4,43,6
2,63,50,16913
 240 DATA 144,92,253,203,87,198,
14,8,197,62,22,215,121,198,13,21
5,62,12,203,32,19264
 260 DATA 203,32,128,215,126,43,
50,151,121,229,33,150,121,30,48,
205,40,26,225,193,21633
 280 DATA 13,32,221,16,217,201,0
,0,1,8,151,221,33,67,123,22,4,30
,8,213,23214
 300 DATA 205,131,122,17,37,0,22
1,25,209,121,198,32,79,29,32,239
,120,214,32,71,25348
 320 DATA 21,32,230,201,1,120,96
,17,97,122,42,48,122,58,8,92,254
,56,32,8,27005
 340 DATA 121,133,79,17,97,122,2
4,47,254,53,32,8,121,149,79,17,8
1,122,24,35,28620
 360 DATA 254,55,32,12,120,254,1
73,48,7,133,71,17,49,122,24,19,2
54,54,32,12,30362
 380 DATA 120,254,13,56,7,149,71
,17,65,122,24,3,254,120,200,213,
98,107,197,237,32689
 400 DATA 75,46,122,203,33,13,12
6,245,35,126,35,237,176,18,103,2
7,241,18,111,229,34908
 420 DATA 221,225,193,205,131,12
2,62,5,118,61,32,252,205,113,122
,209,24,148,0,0,37356
 440 DATA 0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,37356
 460 DATA 0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,37356
 480 DATA 0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,37356
 500 DATA 0,0,0,0,0,120,221,190,
251,118,56,11,221,110,252,221,10
2,253,43,124,39649
 520 DATA 181,32,251,197,221,229
,62,175,144,48,12,71,55,31,167,3
1,167,31,205,183,42142
 540 DATA 34,24,3,205,170,34,221
,94,254,221,70,255,203,32,203,32
,203,32,60,75,44567
 560 DATA 229,197,254,5,48,16,79
,221,86,0,6,0,63,203,26,203,24,1
3,32,249,46521
 580 DATA 24,24,22,0,221,70,0,21
4,8,237,68,40,9,63,79,203,16,203
,18,13,48053
 600 DATA 32,249,214,8,237,68,22
1,35,79,126,170,119,35,125,230,3
1,32,9,125,214,50412
 620 DATA 32,254,224,32,1,37,111
,126,168,119,121,193,13,32,182,7
9,125,225,36,124,52646
 640 DATA 230,7,32,10,125,198,32
,111,63,159,230,248,132,103,121,
16,158,221,225,124,55191
 660 DATA 15,15,15,230,3,246,88,
103,221,70,255,4,58,141,92,83,79
,20,229,113,57271
 680 DATA 35,125,230,31,32,7,125
,214,32,48,1,37,111,21,32,239,22
5,125,214,32,59187
 700 DATA 111,48,1,37,16,222,193
,201,0,0,0,0,0,0,0,0,0,0,0,0,600
16
 720 PRINT '"DATA OK"'"NOW SAVE
IT TO TAPE"
 740 SAVE "SPRITE MC" CODE 30900
,650: STOP
9999 SAVE "SG-DATA"
```

```
  10 CLEAR 30899: LOAD "SPRITE M
C" CODE
  20 CLEAR 31295: LET x=0: FOR n
=1 TO 49
  30 READ a: LET x=x+a: POKE n+3
1295,a: NEXT n
  40 READ a: IF x <> a THEN  PRI
NT "ERROR IN DATA": STOP
  50 PRINT "DATA OK"'"NOW SAVE I
T TO TAPE"
  60 SAVE "S-BASIC MC" CODE 3129
6,254: STOP
  70 DATA 58,105,122,205,91,122,
237,75,107,122,205,113,122,58,10
9,122,205,91,122,237
  80 DATA 75,111,122,205,131,122
,201,33,30,123,17,37,0,25,61,32,
252,229,221,225
  90 DATA 201,0,0,0,0,0,0,0,0,50
81
9999 SAVE "SB-DATA"
```

```
  10 CLEAR 31549: LET x=0
  20 FOR n=1 TO 2*37: READ a: LE
T x=x+a: POKE 31549+n,a: NEXT n

  30 NEXT n: READ a: IF a <> x T
HEN  PRINT "ERROR IN DATA": STOP

  40 PRINT "DATA OK"'"NOW SAVING
 IT TO TAPE"
  50 SAVE "S-SPIDER" CODE 31550,
2*37: STOP
  60 DATA 150,1,3,2,2,28,28,54,5
4,99,99,15,248,63,254,57,206,123
,239,127
  70 DATA 127,111,251,112,7,63,2
54,51,102,102,51,76,25,40,10,4,1
6,150,1,3
  80 DATA 2,2,124,31,14,56,3,96,
15,248,63,254,57,206,127,255,127
,127,111,251
  90 DATA 112,7,63,254,51,102,10
2,51,70,49,67,97,1,64,6667
9999 SAVE "SS-DATA"
```

Listing 4

Listing 3

Listing 5

```
  10 CLEAR 31295: LOAD "S-BASIC
MC" CODE
  20 LOAD "S-SPIDER" CODE
  30 BORDER 0: PAPER 0: CLS
  40 DIM l(4,2): DIM p(4,2): LET
 s=1
  50 FOR n=1 TO 4: LET l(n,1)=25
5: LET l(n,2)=255: LET p(n,1)=n*
26: LET p(n,2)=100: NEXT n
  60 FOR n=1 TO 66: FOR m=1 TO 4

  70 LET x1=l(m,1): LET y1=l(m,2
): LET s1=3-s
  80 LET x2=p(m,1): LET y2=p(m,2
): LET s2=s
  90 INK m+3: GO SUB 9900
 100 LET l(m,1)=p(m,1): LET l(m,
2)=p(m,2)
 110 LET p(m,1)=p(m,1)+2
 120 NEXT m: LET s=3-s
 130 NEXT n: STOP
9900 POKE 31337,s1: POKE 31339,x
1: POKE 31340,y1
9910 POKE 31341,s2: POKE 31343,x
2: POKE 31344,y2
9920 RANDOMIZE  USR 31296: RETUR
N
9998 SAVE "S-DEMO" LINE 0
9999 SAVE "S-BASIC MC" CODE 3129
6,254
```

Dear Diary

Got up. Had breakfast. Went to school. Came home.

Two letters were waiting when I got in. One was from Sinclair Programs agreeing that, since I was a government nuclear scientist and built my own silicon chips at the weekend, I could write their hints and tips page, "for a trial period".

The other letter was from the Ministry of Defence and said that I couldn't be a government nuclear scientist until after I'd taken O-Levels.

I sat down with a stiff Ribena and wondered what to do about Sinclair Programs. They'd even sent me a pile of readers' letters to answer!! And the only thing I know about computers is how to cheat at Manic Miner!!!!

Just then, Eustacia got back from primary school and I had a true and genuine stroke of genius.

"Dear sister," I said.

"No," she said, and went upstairs.

I thought I'd better be diplomatic, so I knocked before I barged into her bedroom. As usual, the place looked like Mission Control at Houston, and as usual Eustacia was scowling through her glasses at numbers on a screen. No wonder my parents can't send me to astronaut training school when Eustacia wastes their money on every computer Sinclair makes.

"I like your pony tail," I said casually. "By the way, I was wondering the other day how to renumber Line 1 of a computer program to Line 0 so copyright messages could't be edited or erased, and so that pirates couldn't reRUN listings after pressing BREAK."

Eustacia was too busy to notice me reading all this from one of the readers' letters Sinclair Programs had sent.

"Easy," she said snootily. "POKE 23756,0 renumbers it to 0, and POKE 23756,1 turns it back to 1. Now go away."

"Certainly Eustacia," I said. "And, er, I was just talking to my old friend J. Mason of Peterborough, Cambs, about malefactors who obtain illicit listings by perfidiously pressing BREAK to stop Basic programs."

"Gosh, what long words you know," she said sarcastically. "He should disable the screen window where BREAK is displayed by putting POKE 23659,0 close after Line 1. But tell him his program must avoid screen prompts like INPUT and SCROLL? or replace them with INKEY$ and the auto-scroll command POKE 23692,-1."

"Yes. I did."

"And I suppose you told him to SAVE program LINE n, so that the program auto-runs before anyone can take a listing?"

"Of course," I replied.

I was just thinking that a ten-year-old swot was no match for a human fox like me when she said, without turning round. "No, I don't mind you scribbling notes all over my Boy George poster. I'll buy another one with my half of the Sinclair Programs money."

Sid.

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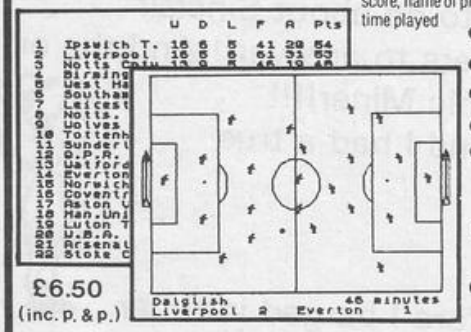

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DPOKE double poke
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ELSE (used with IF ... THEN)
EXIT leave DO-LOOP
FILL enclosed area with specified ink or paper
GET wait for keypress
JOIN two program lines
KEY$ a string
KEYWORDS new keywords on/off
LIST/LLIST line TO line
USED (used with GOTO, GOSUB)
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POKE a string
POP Basic's stack
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SCROLL like ROLL, but without wrap-round
SORT arrays (very fast)
SPLIT program lines
TRACE program execution
UNTIL used with DO or LOOP
USING used with PRINT
WHILE used with DO or LOOP
XDS, YDS move PLOT origin
XRG, YRG change PLOT scale

FUNCTIONS

AND (bit-by-bit)
BIN£ decimal to binary
CHAR$ number to 2 characters
COS£ fast cosine
DEC hexadecimal to decimal
DPEEK double PEEK
FILLED filled area
HEX$ decimal to hexadecimal
INSTRING string search
MEM free memory
MEMORY$ all of memory as a string
MOD modulus
NUMBER 2 characters to number
OR (bit-by-bit)
RNDM fast RND
SCRN$ recognises user graphics
SIN£ fast sine
STRING$ repeats strings
TIME$ current time
USING$ formats numbers
XOR (bit-by-bit)

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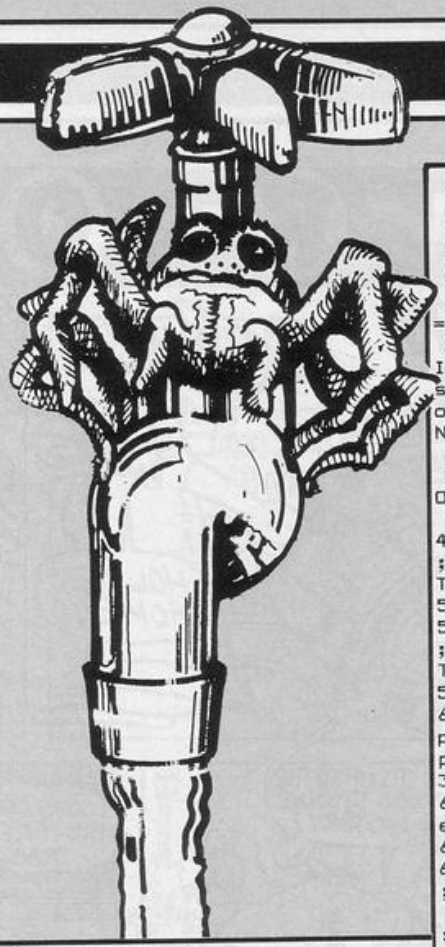
SOFTWARE PIRATE REPORTED AT 221B BAKER STREET
HEADQUARTERS
HOLMES' HOME!!
ON BOARD A LONDON HANSOM CAB
SHERLOCK HOLMES IS IN GREAT DANGER
LEATHERHEAD, CABBIE AND DON'T SPARE THE HORSES
RIGHT AWAY GUV'
LATER IN LEATHERHEAD
SHERLOCK HOLMES HAS BEEN KIDNAPPED AND CANNOT BE TRACED
SO IT'S UP TO THE SPROGS TO SOLVE THE MYSTERY?
DR WATSON
EXHIBIT 'A'
LOOKS LIKE THIS IS A FALSE TRAIL
NO, UP THE CLIFF
HOW DID YOU KNOW?
IT WAS SEDIMENTARY MY DEAR WATSON
JUNIOR SCHOOL
IT MUST BE THROUGH HERE
NO!!
??
IT WASN'T ELEMENTARY MY DEAR WATSON
BUT WHY?
AT THE SOFTWARE PIRATE'S HIDEOUT
HEH, HEH, ONLY ONE DOOR LEADS TO SHERLOCK HOLMES - THE OTHERS LEAD TO BOILING OIL!
RED
YELLOW
GREEN
BLUE
WATSON OPENS THE YELLOW DOOR
AH WATSON - I'VE JUST SOLVED THE LEATHERHEAD MYSTERY
BUT HOW?!
GRRR
A LEMON ENTRY MY DEAR SPROGS, A LEMON ENTRY.



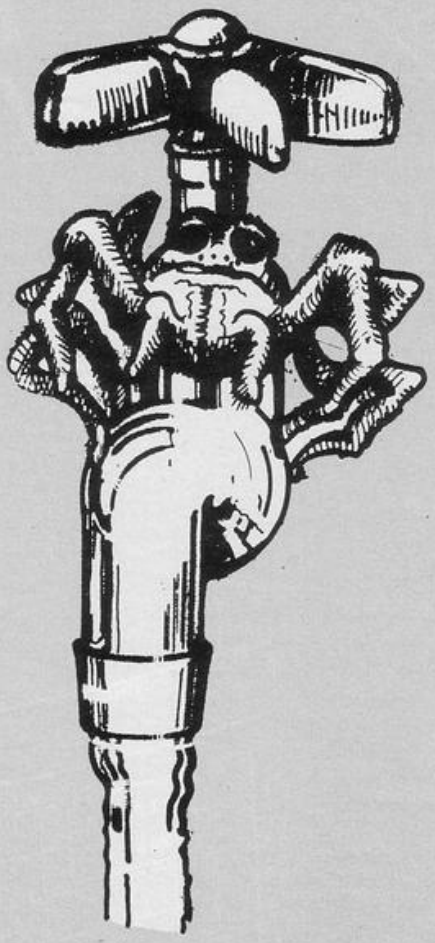
```
  2 BORDER 7: PAPER 7: CLS
  5 POKE 23658,8
 10 GO SUB 8000
 20 LET hsc1=0: LET hsc2=0: LET
hsc3=0
 25 LET q$="Tom": LET r$="Champ
": LET s$="Tim"
 30 BORDER 5: FOR n=0 TO 24: LE
T l= USR 3582: BEEP .009,n: NEXT
 n
 40 PRINT  AT 12,5;"Instruction
s (Y/N)"
 50 INPUT z$
 60 IF z$="Y" THEN  GO TO 70
 65 IF z$="N" THEN  GO TO 100
 68 GO TO 50
 70 BORDER 7: FOR n=0 TO 24: LE
T l= USR 3582: PAUSE 1: NEXT n

 80 LET f$="The idea of the gam
e is to       prevent the cheeky
little        spiders escaping .Y
ou control    a tap.When the spid
ers  try to   climb out of the ba
th,you must   splash them with wa
ter.           The score for each
 spider       depends on how fast
you are to  splash them.When t
hree spiders   have escaped the
game will end"
 81 GO SUB 7100: PAUSE 100: CLS
 : LET f$="If your score reaches
 200 then  the spiders reinforce
ments will be called in.They wil
l run along the bottom of the sc
reen and   you must splash them"

 89 GO SUB 7100: PAUSE 100: CLS
 : LET f$="CONTROLS:- 1 LEFT
                      2 RIGHT
                      0 FIRE"
 90 GO SUB 7100: PAUSE 50: PRIN
T "Press any key to start": PAUS
E 0
100 CLS : LET sc=0: LET lives=3
: LET p=10: LET a$="  AB
                     CD
                     EF
                     GHI
                     JKL    ": LE
T b$=" MN
       OP ": LET c$="Q"
110 INPUT  AT 12,0;"Which skill
 level (1,2,3(easy))";c
120 IF c<1 OR c>3 THEN  GO TO 1
10
130 IF c=1 THEN  LET d=.1
140 IF c=2 THEN  LET d=.5
150 IF c=3 THEN  LET d=.9
160 PAPER 5: BORDER 5: CLS
170 PRINT  AT 0,p;a$
190 FOR f=19 TO 6 STEP -1
200 LET e= INT ( RND *30)
210 PRINT  AT f,e;b$
218 PLOT 0,0: DRAW 255,0: DRAW
0,135: PLOT 0,0: DRAW 0,135: DRA
W 255,0
220 BEEP d,f
230 IF  INKEY$ ="1" AND p>0 THE
N  GO SUB 4000
240 IF  INKEY$ ="2" AND p<29 TH
EN  GO SUB 5000
250 IF  INKEY$ ="0" THEN  GO TO
6000
260 PRINT  AT f,e;"   ": PRINT
AT f+1,e;"   "
270 NEXT f
300 LET lives=lives-1: IF lives
=0 THEN  GO TO 6500
305 BORDER 7: PAPER 7: CLS : PR
INT  INK 9;"EEEKK!!! A spiders e
scaped"''"Lives ";lives''"Score s
o far ";sc: PRINT "PRESS C TO CO
NTINUE"
306 PAUSE 0
310 IF   INKEY$ ="C" THEN  GO T
O 160
315 GO TO 305
4000 FOR k=0 TO 5: PRINT  AT k,p
;"    ": NEXT k: LET p=p-1: PRIN
T  AT 0,p;a$: PLOT 0,135: DRAW 2
55,0: RETURN
5000 FOR k=0 TO 5: PRINT  AT k,p
;"    ": NEXT k: LET p=p+1: PRIN
T  AT 0,p;a$: PLOT 0,135: DRAW 2
55,0: RETURN
6000 FOR g=6 TO 21: PRINT  AT g,
p+3;c$: BEEP .01,g: PRINT  AT g,
p+3;" ": NEXT g: PRINT  AT 21,p+
3;"  "
6010 IF p+3=e OR p+3=e+1 OR p+3=
e+2 THEN  GO TO 6030
6020 GO TO 260
6030 FOR x=1 TO 5: PRINT  AT f,e
; INK x;b$: BEEP .5,x: PRINT  AT
 f,e;"  ": NEXT x: LET sc=sc+f*2
:
6040 IF sc<200 OR sc >= 280 THEN
  GO TO 160
6050 FOR t=2 TO 25: PRINT  AT 10
,t;"BONUS": BEEP .010,t: PRINT
AT 10,t;"     ": NEXT t
6055 LET m=0
6060 FOR j=2 TO 27: PRINT  AT 19
,j;b$: BEEP .009,j: IF  INKEY$ =
"0" THEN  GO TO 6200: PRINT  AT
19,j;"   ": PRINT  AT 20,j;"   "

6061 NEXT j: PRINT  AT 19,27;"
 ": PRINT  AT 20,27;"   "
6062 LET m=m+1: IF m<5 THEN  GO
TO 6060
6100 GO TO 160
6200 FOR w=6 TO 20: PRINT  AT w,
p+3;c$: BEEP .01,w: PRINT  AT w,
p+3;" ": NEXT w: PRINT  AT 20,p+
3;" "
6210 IF p+3=j OR p+3=j+1 OR p+3=
j+2 THEN  GO TO 6230
6220 PRINT  AT 19,j;"   ": PRINT
  AT 20,j;"   ": LET m=m+1: IF m
<5 THEN  GO TO 6060: GO TO 160

6230 FOR x=1 TO 5: PRINT  AT 19,
j; INK x;b$: BEEP .5,x: PRINT  A
T 19,j;"  ": NEXT x: LET sc=sc+5
0
6240 LET m=m+1: IF m<5 THEN  GO
TO 6060: GO TO 160
6500 CLS : FOR i=1 TO 2: BEEP 0.
6,-24: BEEP 0.4,-24: BEEP 0.2,-2
4: BEEP 0.6,-24: BEEP 0.4,-21: B
EEP 0.2,-22: BEEP 0.4,-22: BEEP
0.2,-24: BEEP 0.4,-24: BEEP 0.2,
```

YOU CONTROL the tap at the top of the bath. As the spiders climb up the side of the bath you have to splash them with drops of water. The game ends if three spiders manage to escape. If your score reaches 200 the spiders' reinforcements will arrive and you will have to splash them as they run across the screen.

Splash was written for the 16K Spectrum by Tom and Tim Carson of Monkhide, Herefordshire.

SPLASH

```
-25: BEEP 0.6,-24: NEXT i
6510 PRINT ''"Your final score i
s ";sc
6520 IF c=1 AND sc >= hsc1 THEN
 LET hsc1=sc: PRINT  FLASH 1;'"N
ew high score": INPUT '"Your nam
e please ";q$: GO TO 7000
6530 IF c=2 AND sc >= hsc2 THEN
 LET hsc2=sc: PRINT  FLASH 1;'"N
ew high score": INPUT '"Your nam
e please ";r$: GO TO 7000
6540 IF c=3 AND sc >= hsc3 THEN
 LET hsc3=sc: PRINT  FLASH 1;'"N
ew high score": INPUT '"Your nam
e please ";s$: GO TO 7000
6560 PAUSE 100
7000 CLS : BORDER 7: PAPER 7: CL
S : PRINT "QQQQQQQQQQQQQQQQQQQQQQ
QQQQQQQQQQQQ": FOR f=1 TO 20: PRI
NT "Q"; TAB 31;"Q": NEXT f: PRIN
T "QQQQQQQQQQQQQQQQQQQQQQQQQQQQQQ
QQQ"
7010 PRINT  AT 5,8; INK 0; FLASH
 1;"Hall of Fame": PRINT : PRINT

7020 PRINT  INK 1; AT 7,3;"LEVEL
 1 ": PRINT  AT 8,3;"     ";hsc1;
"   ";q$
7030 PRINT  INK 2; AT 10,3;"LEVE
L 2": PRINT  AT 11,3;"    ";hsc2;
"  ";r$
7040 PRINT  INK 3; AT 13,3;"LEVE
L  3": PRINT  AT 14,3;"     ";hsc
3;"  ";s$
7050 PRINT  AT 18,3;"Hit any key
 to play again": PAUSE 0
7060 CLS : LET lives=3: LET sc=0
: GO TO 110
7100 LET m1=0: LET m2=0: LET X=
LEN f$
7110 FOR n=1 TO X
7120 IF m2<32 THEN  GO TO 7140
7130 LET m1=m1+1: LET m2=0
7140 PRINT  AT m1,m2; INK 0;"Q"

7150 BEEP .010, RND *50
7160 PRINT  AT m1,m2;f$(n): LET
m2=m2+1
7170 NEXT n
7180 RETURN
8000 FOR u= USR "a" TO  USR "q"+
7: READ v: POKE u,v: NEXT u: RET
URN
8010 DATA 0,0,3,206,186,186,202,
15
8020 DATA 0,0,0,204,54,54,76,192

8030 DATA 4,3,3,3,6,26,20,36
8040 DATA 128,0,0,0,128,96,32,16

8050 DATA 36,36,36,36,36,36,36,4
7
8060 DATA 16,16,16,16,16,16,16,2
08
8070 DATA 127,112,48,95,40,36,34
,35
8080 DATA 248,56,16,208,63,0,127
,128
8090 DATA 0,0,0,0,0,224,220,34

8100 DATA 36,43,44,48,31,12,127,
220
8110 DATA 127,255,0,31,224,64,24
8,12
8120 DATA 145,201,229,229,127,12
7,126,0
8130 DATA 3,7,3,1,227,159,135,31

8140 DATA 192,224,192,128,199,24
9,225,248
8150 DATA 103,143,147,39,71,131,
129,0
8160 DATA 230,241,201,228,226,19
3,128,0
8170 DATA 8,24,28,44,78,94,126,6
0
```



WALL of FUNGUS

Fly your mini plane up and down the screen, destroying the deadly Wall of Fungus which grows steadily. Although defeat is imminent, the whole insect world depends on you for survival and you must protect it for as long as possible. Use 1 and SHIFT to move up and down and 0 to fire your anti-fungi missile.

Written for the 16K ZX-81 by Robert Street of Belper, Derbyshire.

```
  1 CLS
  2 SAVE "W.O.F"
  5 CLS
 10 DIM A(22)
 20 LET H=11
 30 LET S=0
 40 LET A$="▟▙ "
 50 LET FU=1000
 60 FOR F=1 TO 22
 70 LET A(F)=32
 80 NEXT F
 85 LET U=65015
 90 LET D=65279
 95 LET FM=65007
100 PRINT AT H,10;A$
110 LET X=INT (RND*22)+1
120 LET A(X)=A(X)-2
130 PRINT AT X-1,A(X);"▀▀"
135 LET Z=PEEK 16421+256*PEEK 1
6422
140 IF A(X)<=14 THEN GOTO 400
145 IF Z=U OR Z=D THEN GOTO 200
150 IF Z=FM THEN GOTO 250
160 LET FU=FU-1
170 IF FU<1 THEN GOTO 350
190 GOTO 100
200 PRINT AT H,10;"   "
210 LET H=H-(Z=U)+(Z=D)
220 GOTO 100
250 IF A(H+1)>28 THEN GOTO 100
260 LET A(H+1)=A(H+1)+2
265 FOR F=15 TO A(H+1)-1
270 PRINT AT H,F-1;" ."
275 NEXT F
280 PRINT AT H,F-1;" "
290 LET FU=FU-5
300 LET S=S+10
310 GOTO 100
350 CLS
360 PRINT "▛GAME OVER▜  YOU RAN
OUT OF FUEL"
370 PRINT ,,"SCORE=";S
380 GOTO 450
400 CLS
410 PRINT "▛GAME OVER▜
          YOU WERE DEFEATED BY
THE DEADLY WALL OF FUNGUS."
420 PRINT ,,"SCORE=";S
450 PRINT ,,"PRESS N/L TO PLAY
AGAIN        PRESS ""L"" TO LOA
D ANOTHER GAME  PRESS ""S"" TO S
AVE THIS GAME"
460 IF INKEY$=CHR$ 118 THEN RUN
S
470 IF INKEY$="L" THEN LOAD ""
480 IF INKEY$="S" THEN RUN
490 GOTO 460
```

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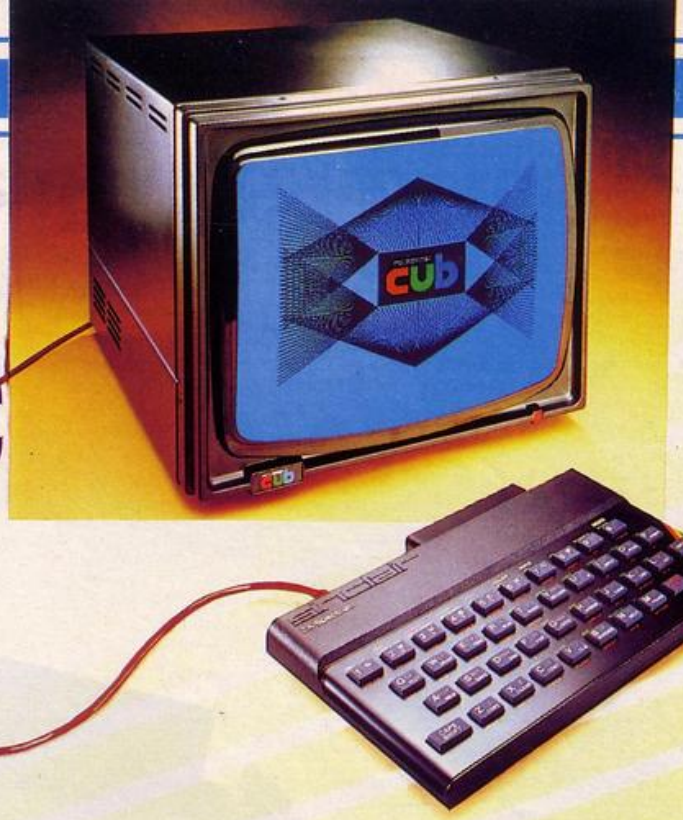


FIRST PRIZE: A COLOUR MONITOR FOR YOUR SPECTRUM

50 Runners-up will win a copy of the chart-topping game **Fighter Pilot** from Digital Integration; or a copy of **Pyjamarama** the great game from Mikrogen, reviewed this month; or a copy of the brand-new game, **Witch's Cauldron,** also from Mikrogen.

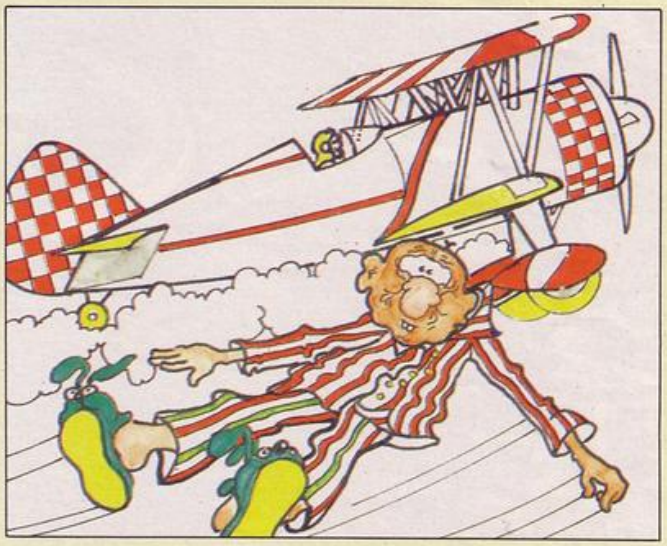
Now is your chance to connect your computer to its own colour monitor. No more fighting to play **Jet Set Willy** while everyone else wants to watch **Coronation Street,** no more shimmering graphics and inexplicable colours. The winner of our competition will be freed from all these troubles.

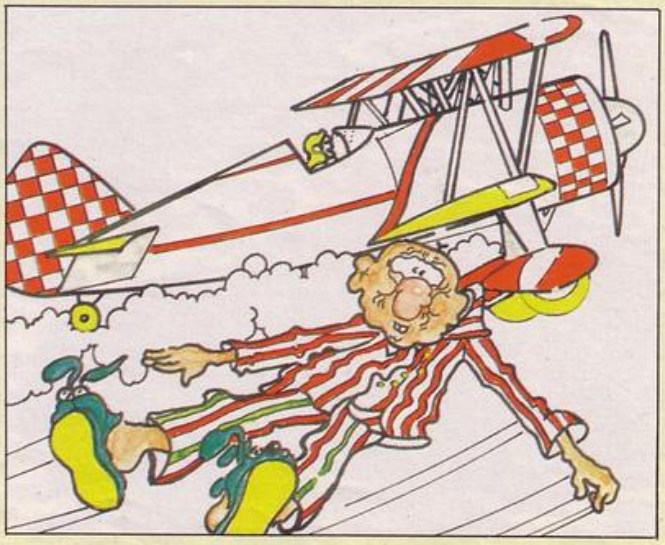
How to enter

Study the two pictures on the right. The top picture shows the result on a Cub monitor when Pyjamarama and Fighter Pilot collided on screen. The lower picture shows the result on another screen. The lower picture contains six mistakes. Just ring the mistakes in red ink, fill in your name and address and send the picture to MONITOR COMPETITION, Sinclair Programs, 67 Clerkenwell Road, London EC1R 5BH.

The winner of the monitor will be the author of the first correct answer drawn following the closing date of December 30th. The subsequent fifty correct answers drawn will be awarded runners-up prizes.

Entries in envelopes which are not marked clearly MONITOR COMPETITION will be disqualified. Employees of EMAP, Microvitec, Digital Integration and Mikrogen are not eligible to enter. The editor's decision is final.





Amazing how played out some things

become.

Will you think the same of your micro in 6 months' time?

Remember the days when every record player was gifted with a needle instead of a stylus. 45's were "in," 78's were "out."

Before the days of hi-fi and laser discs. When a graphic equaliser was a breakthrough on the football pitch instead of in music technology.

Look at a record player now and it's a museum piece.

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But imagine communicating with other micro users on a nationwide mainframe system. Updating yourself daily with the very latest computer news and reviews. Paging a special Bulletin Board. Feasting from ™Prestel's vast menu. Even downloading a choice of software *absolutely free.*

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For Just £13 a quarter (and, for most of you, a local telephone call whenever you want to connect up) you could subscribe to the Micronet system.

The only extra you need to connect up is a modem unit. Which is a small enough outlay for what it buys.

Micronet's features are almost limitless and constantly updating so why not see it in action at John Lewis stores, selected W. H. Smith shops and Spectrum UK dealers.

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Making the most of your micro.

The ultimate development from

agf

Designed exclusively for the ZX Spectrum, Protocol 4 brings you game control customising in a way that no other interface does. It can accept all commercially standard joysticks, including the Quickshot II with 'rapid fire' or Trackball controllers, and is compatible with ALL Spectrum software. **OPERATES LIKE FIXED OPTION INTERFACES OR CAN BE FULLY HARDWARE PROGRAMMED**

The flexibility of Protocol 4 control is achieved by a specially designed 'CustomCard' system. CustomCards are easily programmed to suit all types of games.

Simply clip in a programmed card for immediate customised control. You can even change or reprogram the cards without affecting the game in the computer so that you can get exactly the responses you want. With the addition of extra cards you can build up a whole library of 'CustomCards' for all your favourite games.

Utilising Hardware Programmed technology you have the benefit of automatic eight direction control, no power-down programming loss, guaranteed conflict-free operation with other peripherals, including microdrives, and no extra software to load or awkward joystick movements and key presses to make each time you load another game. The keyboard remains fully operative at all times.

It is also perfectly possible to connect up to five Protocol 4's on one Spectrum, each programmed separately, for multiple player control — only possible with the hardware programmed design.

Incorporated into the design is a computer Reset button for clearing the computer memory between games without pulling the power plug out.

Fully guaranteed for 18 months, Protocol 4 comes supplied with five CustomCards, ten Quick Reference Programming Cards and complete instructions.

PROGRAMMABLE INTERFACE

As the first fully hardware programmed joystick interface, this product has become well established over the past year and will accept ALL standard joysticks or trackballs, including Quickshot II with 'rapid fire', for use with ALL Spectrum or ZX81 software — not just those with a joystick option.

* No Software programming required.
* Programming is *not* lost when power is disconnected between games.
* Eight way movement — with or without the fire button pressed — only requires setting of the four normal directions.
* Compatibility is guaranteed with ALL key reading techniques — machine code or BASIC.
* Several interfaces can be separately programmed and fitted to one computer for multiple player games.
* Keyboard operation is totally unaffected by this interface, as with all AGF add-ons, and will never conflict with *any* other device fitted at the same time.
* Twelve months guarantee, key programming information and a pack of Quick Reference Cards, to speed up setting of the clips, are supplied with full instructions.

INTERFACE II

The AGF Interface II represents the best low cost introduction to joystick control.

The 'AGF' control standard is now offered by over 100 games or utility programs for use with any joystick or trackball.

Any game which is controlled by the cursor movement keys (5,6,7,8) or has a Protek option is also compatible with Interface II.

A rear connector allows other peripherals to be connected at the same time.

This product is available for either the Spectrum or ZX81, is supplied with full instructions, a 12 month guarantee, and a 12½% discount voucher against further AGF mail-order purchases.

ROMSLOT

The new AGF RomSlot is designed for anyone who already owns a programmable joystick interface, or prefers to use the keyboard to control games, and would like to add the facility of ROM cartridge software to their system.

RomSlot will accept the Sinclair range of instant loading games and will also be compatible with the new releases from Parker Software — exciting new games only to be available in ROM format.

This system allows instant play. Your computer memory size is not important and you will be able to play games that could ordinarily require more RAM.

RomSlot incorporates an extra feature called 'Restart'. This allows you to instantly *restart* the ROM game.

RomSlot is guaranteed for 12 months and has a full width expansion connector to accept joystick interfaces, speed units and printers etc.

QUICKSHOT

The Quickshot joystick is an excellent value game controller incorporating suction cups for sure-footed precision with a comfortably contoured handle offering a convenient top firing button as well as one on the base.

QUICKSHOT II

Quickshot II has improved styling with a trigger type firing button as well as the top firing action, with a broader base for greater suction stability.

It also has a unique 'Auto-Fire' facility which at the flick of a switch provides a constant rapid firing action simulating a fast trigger finger.

	PRICE	TICK BOX OPPOSITE REQUIRED ITEM
AGF Protocol 4	£29.95 + £1.00 p&p	☐
AGF Programmable Interface	£24.95 + £1.00 p&p	☐
AGF RomSlot	£ 9.95 + £0.50 p&p	☐
AGF Interface II	£ 9.95 + £0.50 p&p	☐
Quickshot II Joystick	£10.50 + £0.50 p&p	☐
Quickshot Joystick	£ 7.95 + £0.50 p&p	☐
Extra 'CustomCards' (5 per pack)	£ 3.95 inc. p&p	☐
Extra Quick Reference Programming Cards (10 per pack)	£ 0.65 inc. p&p	☐

SPECIFY COMPUTER

I enclose cheque for .....
(total for items required)

My Name .....

Address .....

.....

Send to: AGF Hardware, 26 Van Gogh Place, Bognor Regis, West Sussex, PO22 9BY.
(0243) 823337

There's nowhere else to go

agf

QUESTLINE

Valhalla and the Lords of Midnight

FEW ADVENTURE games for the Spectrum have generated as large an amount of interest, and as few hints and tips as **Valhalla** from Legend.

Perhaps the major problem is that the action on screen is so interesting that it is easy to be diverted from your quest. Mapping the easily accessible locations is a huge task, expecially as it becomes apparent that some areas, especially in hell, look very similar.

To map the adventure successfully, several points must be taken into account. The name of each location is important, as are the directions in which you can leave it. Ringways must also be noted, together with their other exit. Also important are more detailed descriptions of the location. Is there a castle or a hut in the background? What colour are the windows if you are in a building? Is there a box or cupboard in sight? All these points are essential if you are to be sure of your position.

Also useful are the starting locations of objects. Things move around during the game but, when loading a fresh game, it is useful to know immediately where keys, rings and weapons can be found. Many of the characters move little and it is worth noting where they can be found, in order to enlist their help. It is sometimes quicker to go and find a character than to try to summon them.

Mapping the game is an arduous tack because, to do it properly, it is necessary to use the HELP command in every location. Without regular HELP checks it is easy to miss details such as an otherwise invisible exit which can be used only in certain circumstances.

While mapping is tedious work it is easy to become distracted, and enjoy other aspects of Valhalla. Character changing, for example, takes some time, but it is pleasing to try to change the characters of the major gods and goddesses by your actions, or to change your character from good to bad and back again.

Small wonder, then, that many people have not progressed very far with Valhalla, and have found only one or two quest items. John Rundle, of 26 Western Road, Aldershot, Hampshire has managed to complete the entire game, and it is with his help that the map shown was drawn.

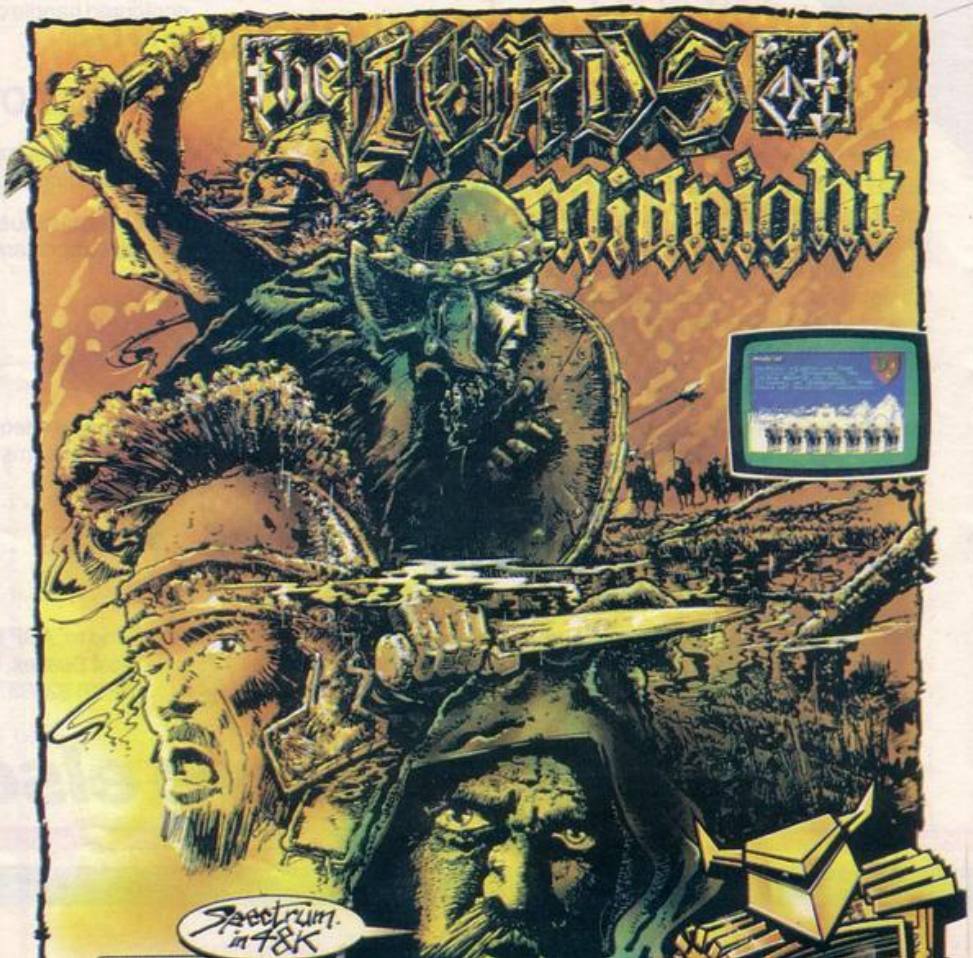
We have chosen to show the locations without indicating routes between them, or objects to be found in locations. However, for those who are completely bemused, John has offered to send a Valhalla fact sheet to any reader who sends him a stamped addressed envelope.

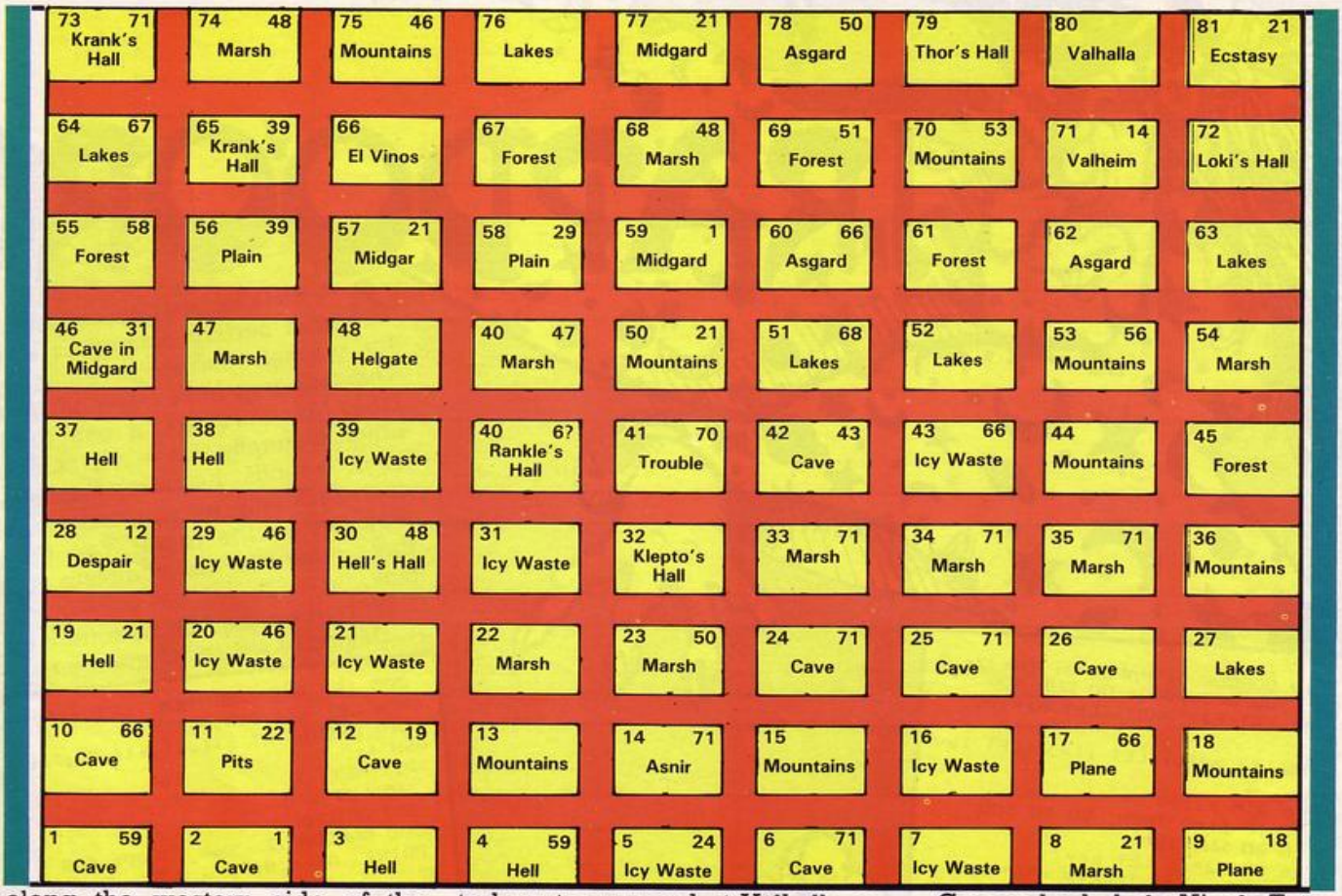
Where are all the quest objects? Ofnir can be found in location 496-423, Drapnir in 2789-2752 and Skornir in 1984/496. Complete the calculations to find the locations.

Several readers have found it possible to find Felstrong before any other objects have been found. To find it you will need to enlist the services of a very strong character. Bear in mind that, like you, characters gradually lose their strength if they do not eat or drink.

Another program on which *Sinclair Programs* has received many queries is the **Lords of Midnight** from Beyond. Although winning the game by battle is the most difficult way of finishing, destroying the Ice Crown has presented many problems for readers.

Many readers have found that, whenever they move Morkin north, towards the Ice Crown, he meets the forces of the Foul, and is killed in battle. Another problem, encountered when moving





along the western side of the country, is a shortage of food and shelter which can result in an exhausted Morkin finding himself unable to move. In this case, the problems are exacerbated if Morkin is accompanied by anyone.

Sarah Irwin of Tooting, London suggests that Morkin begin the game by heading in the wrong direction entirely, south east. She explains that the south is bound to be free of the Foul at the beginning of the game, and that the eastern borders are almost invariably clear. When you finally arrive at the northern icy wastes, two months later, the Foul have almost all moved south.

Having followed the southern, eastern and northern boundaries, move south from Deadhenge to reach the Tower of Doom and collect the ice crown. Then move westwards to the ice wastes in the west. Move south to find Fawkin the Skulkrin at Moonhenge.

Once Fawkrin has been recruited, the Ice Crown will be destroyed by nightfall, which will be registered by an unimpressive line of text on screen. Jessica destroyed the Ice Crown within thirty nine days, without moving any one of the other characters she controlled.

If you have any suggestions as to how to succeed at Valhalla or Lords of Midnight, let us know at the address below. If you have hints or clues to offer on any adventure game, or if you would like help, please complete the form below. If you are asking for help, please enclose a hint, however small. Even escaping the first location of some adventures proves difficult for inexperienced adventurers.

Can anybody help Nicola Tate, who does not know how to look at the screen in Snowball from Level 9? Tom Forbes is unable to pass the giant in Knight's Quest from Phipps Associates even with the help of the dragon. Chris Lewis cannot do anything with the small trampoline in Temple of Vran from Incentive, and Jessica Irwin does not know how to cross the quicksand in the same game.

To: Questline, Sinclair Programs,
67 Clerkenwell Road, London EC1R 5BH

From: .....

.....

HELP OFFERED .....

.....

.....

.....

HELP WANTED .....

.....

.....

TRAPDOORS

AN EVIL wizard derives pleasure from setting dangerous tasks for weaker mortals to complete. The task you have been set is to cross fron one side of a room to the other. Naturally this is not as easy as it sounds because trapdoors open suddenly as you make your way across the room. You have three chances to complete the task.

Written for the 16K Spectrum by A. Davies of Neath, Glamorgan.

```
  10 BORDER 0: PAPER 0: INK 7: C
LS : GO SUB 1000: GO SUB 400
  11 LET h$="AMD": LET hi=1000

  15 LET sc=0: LET li=3: LET lev
=1
  16 DIM z(lev,2)
  17 IF li=0 THEN  GO TO 300
  18 GO SUB 100
  20 LET a=x: LET b=y
  30 LET x=x+( INKEY$ ="6" AND x
<15)-( INKEY$ ="7" AND x>0): LET
y=y+( INKEY$ ="8" AND y<31)-( I
NKEY$ ="5" AND y>0)
  32 IF  ATTR (x,y)=135 THEN  PR
INT  AT a,b; PAPER 5; INK 1;"A":
 LET li=li-1: FOR f=-20 TO -30 S
TEP -1: BEEP .1,f: NEXT f: GO TO
 16
  35 IF  INT ( RND *2)=0 AND c=0
 THEN  GO SUB 200
  36 IF c>0 THEN  LET c=c-1: BEE
P .01,50: IF c=0 THEN  FOR f=1 T
O lev: PRINT  AT z(f,1),z(f,2);
PAPER 5; INK 1;"A": BEEP .01,0:
NEXT f
  40 PRINT  AT a,b; PAPER 5; INK
 1;;"A"; AT x,y; PAPER 5; INK 0;
"B"
  41 PRINT  AT 18,8;sc; AT 18,30
;li; AT 20,11;hi; AT 20,27;h$
  42 IF y=0 THEN  FOR f=59 TO 40
 STEP -1: BEEP .01,f: BEEP .01,f
-5: NEXT f: LET lev=lev+1: LET s
c=sc+100: CLS : GO TO 16
  45 LET sc=sc+1
  50 GO TO 20
 100 RESTORE 100: DATA 255,129,1
29,129,129,129,129,255,0,0,60,60
,60,60,0,0
 102 FOR f=0 TO 15: READ a: POKE
  USR "a"+f,a: NEXT f
 105 LET x=10: LET y=30: LET c=0
: LET l=0: LET m=0
 110 FOR f=0 TO 15: PRINT  AT f,
0; PAPER 5; INK 1;"AAAAAAAAAAAAA
AAAAAAAAAAAAAAAAA": NEXT f
 115 INK 6: PLOT 0,0: DRAW 255,0
: DRAW 0,39: DRAW -255,0: DRAW 0
,-39: INK 7
 116 PRINT  AT 18,2; INK 4;"SCOR
E:"; AT 18,24; INK 3;"LIVES:"; A
T 20,2; INK 2;"HI-SCORE:"; AT 20
,24; INK 5;"BY"
 117 PRINT  AT 16,0; INK 2; PAPE
R 6;"**************************
*****"
 120 RETURN
 200 FOR f=1 TO lev
 202 LET m= INT ( RND *31): LET
l= INT ( RND *15)
 203 LET z(f,1)=l: LET z(f,2)=m
```

```
 205 IF  RND <.5 THEN  LET z(f,1
)=x: LET z(f,2)=y-1
 210 PRINT  AT z(f,1),z(f,2); FL
ASH 1;" "
 212 NEXT f
 215 LET c=5
 220 RETURN
 300 RANDOMIZE  USR 33000: CLS :
 PRINT  AT 6,8;"G A M E  O V E
R"
 310 PRINT  AT 10,11;"SCORE:";sc
 320 IF sc>hi THEN  LET hi=sc: P
RINT  AT 12,0;"You have beaten t
odays HI-SCORE.Well Done . . . P
lease enter  your Initials.(no
t more than 3  characters long).
": INPUT h$: IF  LEN h$<1 OR  LE
N h$>3 THEN  LET h$=h$( TO 3)
 330 PRINT  AT 21,0; FLASH 1; PA
PER 6; INK 1;"  PRESS 'ENTER' T
O PLAY AGAIN  "
 340 IF  CODE  INKEY$  <> 13 THE
N  GO TO 340
 350 CLS : GO TO 15
 400 DATA 33,0,88,17,1,88,1,191,
2,54,7,237,176,6,6,33,0,88,120,1
19,17,1,88,197,1,191,2,237,176,6
,254,33,255,0,17,2,0,197,229,205
,181,3,225,193,43,16,243,193,16,
221,201
 410 RESTORE 400: FOR f=0 TO 50:
READ a: POKE 33000+f,a: NEXT f:
RETURN
1000 PRINT  TAB 9;"T R A P D O O
 R"
1005 PRINT : PRINT
1010 PRINT  INK 4;"In this game
you have been  unlucky enoug
h to be imprisionedby an evil wi
zard who has set a diabolical te
st for you.  He has devise
d a torment for youwhich involve
s crossing a floor which is cove
red with TRAPDOORS.You must move
to the left side  of the room w
ithout falling downone of the tr
apdoors which are  continualy op
ening and closing  in different
places."
1015 PRINT  INK 4;"If you make i
t to the otherside the amount of
 trapdoors opening and closing w
ill increase."
1020 PRINT  INK 3;"Use the arrow
 keys to move."
1025 PRINT : PRINT  TAB 3; INK 2
; PAPER 7; FLASH 1;"  PRESS 'ENT
ER' TO START  "
1030 IF  CODE  INKEY$  <> 13 THE
N  GO TO 1030
1032 CLS
1035 RETURN
```

PARKIE

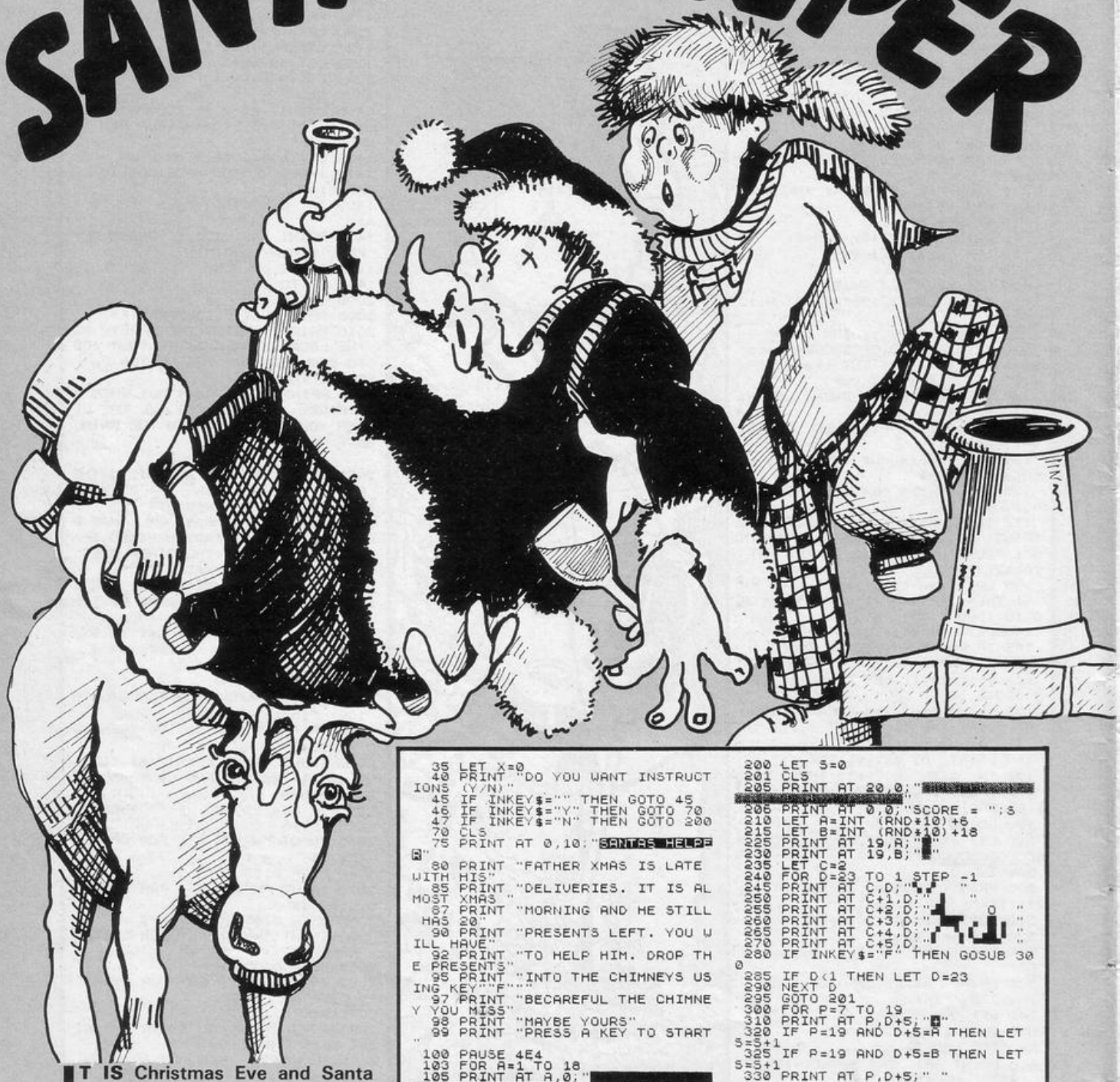
```
   0> REM GAME AND GRAPHICS BY M
.MCAULAY AND R.TINNER
   1 LET hs=0: LET n$="NOBOBY":
LET u$="": GO SUB 9000: PAPER 4:
 INK 1: BORDER 4: CLS
   2 POKE 23658,8: GO SUB 2000
   3 LET bd=0: LET li=15: LET sc
ore=0
   4 PAPER 4: BORDER 4: INK 1: C
LS : LET time=sk
  10 GO SUB 500
  15 PRINT  AT 2,15; INK 1;" "
  20 LET x1=1: LET y1=0
  25 LET hd=0
  50 LET x=2: LET y=15
  55 PRINT  AT 1,15;"D"; AT 0,15
;"E"
  60 PRINT  AT x,y; INK 1;"B"
  70 PRINT  AT 0,0;"SCORE=";scor
e; AT 0,21;"TI="; INT time;"  "
  80 LET xx=x: LET yy=y
 100 IF  INKEY$ =r$ THEN  LET y1
=1: LET x1=0
 110 IF  INKEY$ =l$ THEN  LET y1
=-1: LET x1=0
 120 IF  INKEY$ =u$ THEN  LET y1
=0: LET x1=-1
 130 IF  INKEY$ =d$ THEN  LET y1
=0: LET x1=1
 132 IF  INKEY$ = CHR$ 32 THEN
PRINT  AT 20,12; FLASH 1;"PAUSIN
G": PAUSE 0: PAUSE 0: PRINT  AT
20,12;"CCCCCCC"
 135 LET time=time-1: IF time <=
 -1 THEN  PRINT  AT 0,24;"0 ": G
O TO 1000
 140 LET x=x+x1: LET y=y+y1
 145 IF x=0 THEN  GO TO 1200
 150 IF  ATTR (x,y)=39 THEN  LET
 score=score+1: LET hd=hd+1: BEE
P 0.005,10
 155 IF hd >= 15+bd THEN  PRINT
 AT 0,15; INK 1;" "; AT 1,15; IN
K 1;" "
 160 PRINT  AT xx,yy; INK 1;" "
 170 IF  ATTR (x,y)=32 THEN  LET
 x=xx: LET y=yy: LET time=time-5
: BEEP 0.005,30
 190 GO TO 60
 500 LET a$="CCCCCCCCCCCCCCCCCCC
CCCCCCCCCCCC"
 501 INK 0
 505 PRINT "SCORE=";score; AT 0,
21;"TI="; INT time;"  "
 510 PRINT a$; AT 20,0;a$
 520 FOR n=1 TO 20
 530 PRINT  AT n,0;"C"; AT n,31;
"C"
 535 PRINT  AT 21,3;"HIGH-SCORE=
";hs;" BY ";n$
 540 NEXT n
 550 PRINT  AT 1,15;" "
 600 FOR n=0 TO not
 610 PRINT  AT  INT ( RND *17)+2
, INT ( RND *30)+1;"A"
 611 PRINT  AT 2,15; INK 1;" "
 620 NEXT n
 630 FOR n=1 TO li
 640 LET a= INT ( RND *16)+3: LE
T b= INT ( RND *30)+1
 650 IF  ATTR (a,b) <> 33 THEN
GO TO 640
 660 PRINT  AT a,b; INK 7;"."
 670 NEXT n
 680 RETURN
1000 PRINT  AT 10,12;"TIME UP":
BEEP 0.5,20
1005 IF score>hs THEN  GO TO 140
0
```

WORKING at the local park you have to collect all the litter before your time runs out. Once you have completed this task the park gates will open and you will move into another park containing more hazards. Running into a tree or fence will incur a time penalty.

Parkie was written for the 16K Spectrum by R. Tinner and M. McAuley of Kingswood, Bristol.

```
1010 PRINT  AT 20,0;"CCPRESS ANY
 KEY TO PLAY AGAINCCC": PAUSE 0:
 PAUSE 0: CLS : GO TO 2
1200 LET time=time+1: LET score=
score+time
1202 PRINT  AT 10,12;"WELL DONE"
: FOR n=30 TO -10 STEP -1: BEEP
0.005,n
1220 PRINT  AT 12,12; FLASH 1;"B
ONUS=";time
1225 NEXT n
1230 LET li=li+3
1234 LET not=not+5
1235 LET bd=bd+3
1240 GO TO 4
1400 CLS
1405 PRINT  AT 0,7;"CONGRATULATI
ONS!"; AT 4,3;"YOU HAVE A NEW HI
GH-SCORE"
1406 LET hs=score
1410 INPUT "ENTER NAME(MAX 10 CH
ARS)";n$
1420 IF  LEN n$>10 THEN  GO TO 1
410
1430 PRINT  AT 21,0;"  PRESS ANY
 KEY TO PLAY AGAIN"
1435 PAUSE 0: CLS
1440 GO TO 2
2000 INK 0
2005 PRINT  AT 0,13;"PARKIE"
2010 PRINT  "BEING THE PARKIE AT
 THE LOCAL   PARK,IT IS YOUR JOB
 TO COLLECT  ALL THE LITTER ~.~
BEFORE THE   "
2015 PRINT "TIME RUNS OUT.WHEN Y
OU HAVE     COLLECTED ALL THE LI
TTER YOU    MUST GO TO THE MAIN
GATE ~E~
     D."
2020 PRINT "DO NOT WALK INTO THE
 FENCE ~C~  OR TRESS ~A~ OR YOU
WILL GET A  TIME PENALTY"
2030 PRINT '"THE GAME ONLY HAS O
NE KEY      ALREADY DEFINED,SPA
CE FOR PAUSE ALL THE OTHER KEYS
MUST BE     DEFINED"
2040 PRINT "YOU MAY SELECT THE K
EYS USED IN THE LAST GAME BY TYP
ING ~Y~ WHENASKED."
2045 INPUT "ENTER SKILL(1 TO 5)
";SK
2046 LET SK=SK+2
2047 LET SK=SK*50
2048 INPUT "NUMBER OF TREES(5 TO
 100) ";not
2049 IF not<5 OR not>100 THEN  G
O TO 2048
2050 INPUT "SAME KEYS(Y/N) "; LI
NE s$: IF s$="Y" AND u$ <> "" TH
EN  RETURN
2055 IF s$="Y" AND u$="" THEN  B
EEP 0.5,15
2060 INPUT "WHICH KEY FOR UP ";
LINE u$
2065 BEEP 0.05,20
2070 INPUT "WHICH KEY FOR DOWN "
; LINE d$
2075 BEEP 0.05,20
2080 INPUT "WHICH KEY FOR LEFT "
; LINE l$
2085 BEEP 0.05,20
2090 INPUT "WHICH KEY FOR RIGHT
"; LINE r$
2091 BEEP 0.05,20
2095 INPUT "DID YOU ENTER THE RI
GHT KEYS"; LINE k$
2096 IF k$="N" THEN  GO TO 2060
2097 INK 0
2100 RETURN
5035 PRINT  AT 21,0;"HIGH-SCORE=
";hs;" BY ";n$
9000 FOR n=0 TO 39
9010 READ d: POKE  USR "a"+n,d:
NEXT n
9020 DATA 16,24,56,60,124,126,25
4,16,24,24,60,82,82,24,36,36
9030 DATA 170,170,170,255,170,17
0,170,170
9040 DATA 255,165,165,165,255,16
5,165,255,24,36,66,255,165,165,1
65,165
9060 RETURN
```

SANTA'S HELPER



IT IS Christmas Eve and Santa still has twenty presents to deliver. He has chosen you to help him drop the presents down the chimneys whilst he flies overhead controlling the reindeers. Be careful not to miss a chimney, as it may be your house that will go without presents.

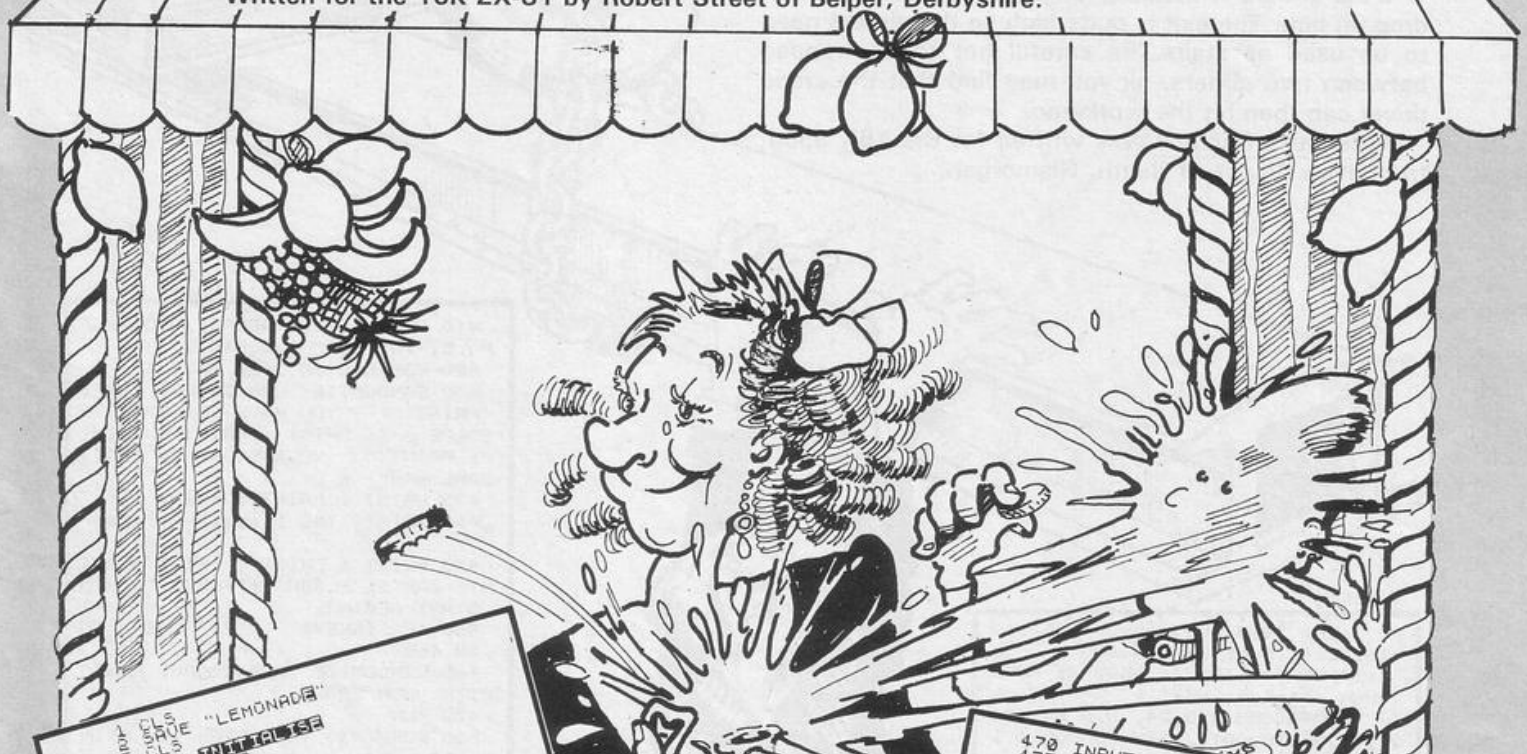
Santa's Helper was written for the 16K ZX-81 by Sheila Martin of Newcastle-upon-Tyne.

```
  35 LET X=0
  40 PRINT "DO YOU WANT INSTRUCT
IONS (Y/N)"
  45 IF INKEY$="" THEN GOTO 45
  46 IF INKEY$="Y" THEN GOTO 70
  47 IF INKEY$="N" THEN GOTO 200
  70 CLS
  75 PRINT AT 0,10;"SANTAS HELPF
R"
  80 PRINT "FATHER XMAS IS LATE
WITH HIS"
  85 PRINT "DELIVERIES. IT IS AL
MOST XMAS "
  87 PRINT "MORNING AND HE STILL
 HAS 20"
  90 PRINT "PRESENTS LEFT. YOU W
ILL HAVE"
  92 PRINT "TO HELP HIM. DROP TH
E PRESENTS"
  95 PRINT "INTO THE CHIMNEYS US
ING KEY""F"""
  97 PRINT "BECAREFUL THE CHIMNE
Y YOU MISS"
  98 PRINT "MAYBE YOURS"
  99 PRINT "PRESS A KEY TO START
"
 100 PAUSE 4E4
 103 FOR A=1 TO 18
 105 PRINT AT A,0;"
 110 NEXT A
 115 PRINT AT 8,16;"  ";AT 9,15
;"
 120 PRINT AT 10,15;"  *  *";AT 1
1,15;"
 125 PRINT AT 12,16;"  ";AT 13,
15;"
 130 PRINT AT 14,14;"  O  ";AT
 15,13;"
 135 PRINT AT 16,13;"   O   ";
AT 17,13;"
 140 PRINT AT 18,14;"     "
 145 FOR B=1 TO 18
 150 LET R=RND*12
 155 LET T=INT (RND*8)+21
 160 PRINT AT B,R;"*"
 165 PRINT AT B,T;"*"
 170 NEXT B
 175 PAUSE 300
 200 LET S=0
 201 CLS
 205 PRINT AT 20,0;"
                    "
 206 PRINT AT 0,0;"SCORE = ";S
 210 LET A=INT (RND*10)+6
 215 LET B=INT (RND*10)+18
 225 PRINT AT 19,A;"
 230 PRINT AT 19,B;"
 235 LET C=2
 240 FOR D=23 TO 1 STEP -1
 245 PRINT AT C,D;"
 250 PRINT AT C+1,D;"
 255 PRINT AT C+2,D;"
 260 PRINT AT C+3,D;"
 265 PRINT AT C+4,D;"
 270 PRINT AT C+5,D;"
 280 IF INKEY$="F" THEN GOSUB 30
0
 285 IF D<1 THEN LET D=23
 290 NEXT D
 295 GOTO 201
 300 FOR P=7 TO 19
 310 PRINT AT P,D+5;"
 320 IF P=19 AND D+5=A THEN LET
 S=S+1
 325 IF P=19 AND D+5=B THEN LET
 S=S+1
 330 PRINT AT P,D+5;" "
 335 NEXT P
 340 LET X=X+1
 345 IF X=20 THEN GOTO 400
 350 RETURN
 400 CLS
 405 PRINT AT 5,0;"YOU DELIVERED
 ";S;"PRESENTS"
 410 IF S<20 THEN PRINT AT 10,0;
"SO IF YOU MISSED YOUR HOUSE"
 415 IF S<20 THEN PRINT AT 15,0;
"YOU HAD BETTER TRY AGAIN"
 420 PRINT AT 17,0;"DO YOU WANT
TO TRY AGAIN (Y/N)"
 425 IF INKEY$="" THEN GOTO 425
 430 IF INKEY$="Y" THEN GOTO 200
 435 IF INKEY$="N" THEN PRINT AT
 19,14,"GOODBYE THEN"
 437 STOP
 440 SAVE "XMAS"
 450 GOTO 35
```

LEMONADE STAND

YOU are in charge of a lemonade stand for three weeks and it is your objective to make as much profit as possible in this time. Each day you have to decide where to set your stand, how many bottles of lemonade to buy and how much to charge for each bottle. Buying lemonade in bulk will give you a saving of £5. At the end of the three weeks you will be told if you made a profit or loss.

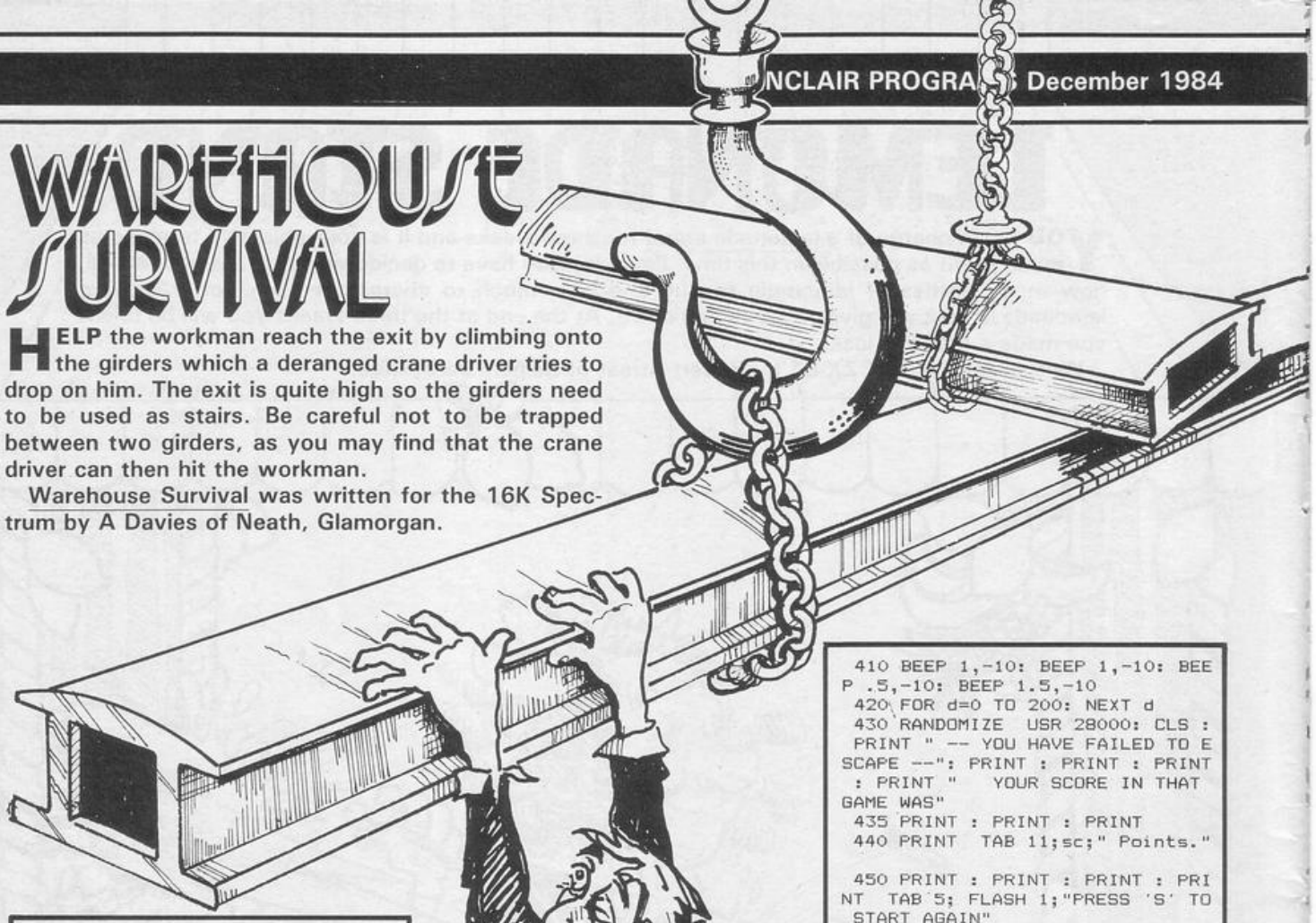
Written for the 16K ZX-81 by Robert Street of Belper, Derbyshire.




```
1 CLS
2 SAVE "LEMONADE"
5 CLS
10 REM INITIALISE
20 LET ST=0
30 LET PR=8
40 LET DY=1
50 LET MO=80
95 PRINT "  LEMONADE"
100 PRINT "
105 PRINT "
110 PRINT "
115 PRINT "
120 FOR F=4 TO 8
125 PRINT "
130 NEXT F
140 PRINT AT 6,2;"PRICE=";PR;"P
"
150 PRINT AT 0,17;"
"
155 FOR F=1 TO 8
160 PRINT AT F,17;"
"
165 NEXT F
170 PRINT AT F,17;"
"
200 PRINT AT 2,18;"MONEY £";MO;
AT 4,18;"STOCK ";ST;" BTLS";AT 6
,18;"PRICE ";PR;"P"
210 PRINT AT 8,18;"DAY ";DY
220 PRINT AT 11,0;"
"
240 NEXT F
250 REM SET STAND
260 PRINT AT 12,0;"WHERE SHALL
YOU SET YOUR STAND ?"
270 PRINT ,,"1>ST. PETERS SQUAR
E","2>MARGATE ROAD","3>MALCOLM
STREET","4>TARTAN ROAD"
280 LET U$=INKEY$
290 IF U$<"1" OR U$>"4" THEN GO
TO 280
300 IF U$="1" THEN LET PE=10000
310 IF U$="2" THEN LET PE=6000
320 IF U$="3" THEN LET PE=4500
330 IF U$="4" THEN LET PE=9500
340 IF U$="1" THEN LET MO=MO-5
345 IF U$="2" THEN LET MO=MO-3
350 IF U$="3" THEN LET MO=MO-2
355 IF U$="4" THEN LET MO=MO-4
360 PRINT AT 2,25;MO
370 GOSUB 1200
380 REM BUY FROM WHOLESALERS
390 PRINT "HOW MANY BTLS WILL Y
OU BUY FROM THE WHOLESALER AT SP
PER BTL ?"
395 PRINT ,,"PRESS ""B"" TO BUY
BULK"
400 INPUT B$
405 IF B$="B" THEN GOTO 1000
406 IF B$="" THEN LET B$="0"
407 LET BTLS=VAL B$
410 LET MO=MO-(.05*BTLS)
420 LET ST=ST+BTLS
430 PRINT AT 4,24;("0" AND ST<1
0);("0" AND ST<100);ST;" BTL";AT
2,25;MO
440 GOSUB 1200
450 REM ADJUST PRICES
460 PRINT "HOW MUCH WILL YOU SE
LL YOUR     LEMONADE FOR ? (P PE
R BTL)"
470 INPUT P$
475 IF P$="" THEN GOTO 480
477 LET PR=VAL P$
480 IF PR>20 OR PR<1 THEN GOTO
470
490 PRINT AT 6,24;PR;"P "
495 PRINT AT 6,8;PR;"P"
500 GOSUB 1200
510 REM SALES
520 LET SL=(PE/50)-INT ((RND*10
0)+25)-(3*PR)-20*(PR>10)
525 GOSUB 800
530 LET MO=MO+(SL*PR)/100
540 LET ST=ST-SL
550 PRINT AT 2,25;MO;AT 4,24;("
0" AND ST<10);("0" AND ST<100);S
T;" BTL"
560 PRINT AT 12,0;"YOU SOLD ";S
L;" BOTTLES IN DAY ";DY
570 PRINT ,,"PRESS ANY KEY"
580 IF INKEY$<>"" THEN GOTO 900
590 GOTO 580
600 IF MO<=0 THEN GOTO 700
610 LET DY=DY+1
615 PRINT AT 8,22;DY
620 IF DY=22 THEN GOTO 650
630 GOTO 250
650 IF MO<80 THEN GOTO 920
655 PRINT AT 12,0;"YOU LASTED F
OR THE REQUIRED 3   WEEKS AND MA
DE A TOTAL PROFIT OF £";MO-80;"
ANOTHER GO ?"
660 LET U$=INKEY$
670 IF U$="Y" THEN GOTO 5
680 IF U$="L" THEN LOAD ""
685 IF U$="S" THEN RUN
690 IF U$="N" THEN STOP
695 GOTO 660
700 PRINT "HARD LUCK YOU LASTED
FOR ";DY;" DAYS AND LOST £";(AB
S MO)+80;" ANOTHER GO ?"
710 GOTO 660
800 IF SL>ST THEN GOTO 850
810 IF SL<=0 THEN GOTO 830
820 RETURN
830 LET SL=INT (RND*30)+1
840 IF ST>SL THEN RETURN
850 LET SL=SL-INT (RND*30)+5
860 IF SL<ST THEN RETURN
870 GOTO 850
900 GOSUB 1200
910 GOTO 600
920 PRINT AT 12,0;"YOU LASTED F
OR THE REQUIRED 3   WEEKS BUT UN
FORTUNATLY YOU LOST £";80-MO;" I
N THE PROCESS       ANOTHER GO ?
"
930 GOTO 660
1000 LET ST=ST+500
1010 LET MO=MO-20
1015 PRINT AT 4,24;ST;" BTL"
1020 GOTO 440
1200 FOR F=12 TO 21
1210 PRINT AT F,0;"
"
1220 NEXT F
1230 PRINT AT 12,0;
1240 RETURN
```

GB

WAREHOUSE SURVIVAL



HELP the workman reach the exit by climbing onto the girders which a deranged crane driver tries to drop on him. The exit is quite high so the girders need to be used as stairs. Be careful not to be trapped between two girders, as you may find that the crane driver can then hit the workman.

Warehouse Survival was written for the 16K Spectrum by A Davies of Neath, Glamorgan.

```
  1 LET li=3: LET sc=0: LET lev
=16: LET lp=5: GO SUB 600
  2 FOR f=0 TO 23: READ a: POKE
 USR "a"+f,a: NEXT f
  3 DATA 255,255,24, BIN 001001
00, BIN 01000010, BIN 10000001,1
29,129
  4 DATA 0, BIN 01110111,0, BIN
 11011101,0, BIN 01110111,0, BIN
 11011101
  5 DATA  BIN 00111000, BIN 001
11000, BIN 00010000, BIN 0011100
0, BIN 01010100, BIN 00010000, B
IN 00101000, BIN 0100100
  6 FOR f=0 TO 48: READ a: POKE
 28000+f,a: NEXT f
  7 DATA 33,0,88,17,32,0,213,22
9,17,32,0,6,22,54,24,25,16,251,2
29,213,33,16,39,17,1,0,205,181,3
,209,225,225,229,6,22,54,0,25,16
,251,225,209,27,35,122,179,32,21
4,201
  8 GO SUB 200
  10 LET r= INT ( RND *30)+1: IF
 RND <.6 THEN  LET r=y
  20 FOR f=0 TO r
  30 PRINT  AT 2,f; INK 4;"A"
  35 BEEP .002,2
  36 GO SUB 250
  40 PRINT  AT 2,f;" "
  50 NEXT f
 100 FOR f=2 TO 20
 105 IF  ATTR (f,r)=5 THEN  PRIN
T  AT f,r; INK 2; PAPER 6; FLASH
 1;"C": FOR d=-20 TO -40 STEP -1
: BEEP .01,d: NEXT d: LET li=li-
1: PRINT  AT f,r;" ": RANDOMIZE
 USR 28000: GO TO 8
 110 IF  ATTR (f+1,r)=4 THEN  PR
INT  AT f,r; INK 4;"A": LET sc=s
c+lp: GO TO 10
 120 PRINT  AT f,r; INK 4;"A"
 122 GO SUB 250
 125 BEEP .01,21-f
 140 PRINT  AT f,r;" "
 150 NEXT f
 155 PRINT  AT f-1,r; INK 4;"A"

 156 LET sc=sc+lp
 160 GO TO 10
 200 BORDER 0: PAPER 0: INK 7: C
LS
 201 PRINT  PAPER 6; INK 2; AT 1
,0;"BBBBBBBBBBBBBBBBBBBBBBBBBBBB
BBBB"
 210 FOR f=3 TO 20: PRINT  AT f,
0; PAPER 6; INK 2;"B"; AT f,31;
PAPER 6; INK 2;"B": NEXT f
 220 PRINT  PAPER 6; INK 2;"BBBB
BBBBBBBBBBBBBBBBBBBBBBBBBBBB"
 225 PRINT  AT 0,0; PAPER 7; INK
 1;"SCORE:"; TAB 25;"LIVES:"
 226 PRINT  AT lev,31; FLASH 1;"
E"
 240 LET x=20: LET y=30
 245 RETURN
 250 LET a=x: LET b=y
 255 PRINT  AT 0,7; PAPER 7; INK
 1;sc; AT 0,31;li
 260 IF  INKEY$ ="1" AND  ATTR (
x,y-1)=7 THEN  LET y=y-1: GO TO
280
 265 IF  INKEY$ ="1" AND  ATTR (
x,y-1)=4 AND  ATTR (x-1,y-1)=7 T
HEN  LET x=x-1: LET y=y-1: GO TO
280
 270 IF  INKEY$ ="0" AND  ATTR (
x,y+1)=7 THEN  LET y=y+1: GO TO
280
 275 IF  INKEY$ ="0" AND  ATTR (
x,y+1)=4 AND  ATTR (x-1,y+1)=7 T
HEN  LET x=x-1: LET y=y+1
 280 IF  ATTR (x+1,y)=7 THEN  LE
T x=x+1
 285 PRINT  AT a,b;" "; AT x,y;
INK 5;"C"
 286 IF x=lev THEN  GO TO 500
 287 IF li=0 THEN  GO TO 400
 290 RETURN
 400 PRINT  AT 10,11; PAPER 7; I
NK 4; FLASH 1;" GAME OVER "
 410 BEEP 1,-10: BEEP 1,-10: BEE
P .5,-10: BEEP 1.5,-10
 420 FOR d=0 TO 200: NEXT d
 430 RANDOMIZE  USR 28000: CLS :
 PRINT " -- YOU HAVE FAILED TO E
SCAPE --": PRINT : PRINT : PRINT
 : PRINT "   YOUR SCORE IN THAT
GAME WAS"
 435 PRINT : PRINT : PRINT
 440 PRINT  TAB 11;sc;" Points."

 450 PRINT : PRINT : PRINT : PRI
NT  TAB 5; FLASH 1;"PRESS 'S' TO
 START AGAIN"
 460 IF  INKEY$ <> "s" THEN  GO
 TO 460
 465 RANDOMIZE  USR 28000: RANDO
MIZE  USR 28000
 470 RUN
 500 FOR f=30 TO y STEP -1: PRIN
T  AT lev+1,f; INK 6;"A": BEEP .
1,45: NEXT f
 505 PRINT  AT x,y;" "
 510 PAUSE 50: FOR f=y TO 31
 520 PRINT  AT lev,f; INK 5;"C"

 530 BEEP .1,-20: PRINT  AT lev,
f;" "
 540 NEXT f
 550 FOR f=y TO 30: PRINT  AT le
v+1,f;" ": BEEP .1,45: NEXT f: P
AUSE 50
 560 LET lev=lev-2: IF lev <= 2
THEN  LET lev=2
 570 LET lp=lp+15
 580 RANDOMIZE  USR 28000: GO TO
 8
 600 BORDER 7: PAPER 7: INK 1: C
LS
 610 PRINT  TAB 11;"- CHARLIE -"
 615 PRINT : PRINT  TAB 9;"By A.
Davies '84"
 620 PRINT : PRINT
 630 INK 3: PRINT "Are you brave
 enough to take on the ultimate
challenge ?.        If so,here's
what you have to    do. Charlie h
as got himself intoa terrible st
ate. Some how he    has managed t
o get trapped on    level 8 of a
big warehouse.      It is your jo
b to get Charlie    out of each l
evel in turn.       However there
 is a crane driver hell bent on
squashing you with big metal bar
s. Use these bars   to climb on.
And get in line     with the exit
 marked 'E'."
 640 PRINT  INK 1;" USE 1 and 0
for left and right "
 650 PRINT : PRINT  FLASH 1;"  P
RESS ANY KEY TO START GAME  "
 660 IF  INKEY$ ="" THEN  GO TO
660
 670 RETURN
```

MINE MAZE

```
  1 GOSUB 5000
  2 LET T=40
  3 LET G=1
  4 LET G=G+1
  5 LET U=0
  6 FAST
 10 FOR F=1 TO 22
 20 PRINT "
"
 30 NEXT F
 40 LET Y=0
 50 PRINT AT Y,0;"
"
 55 IF Y=20 THEN GOTO 100
 60 LET Y=Y+2
 70 GOTO 50
100 PRINT AT 0,0;"
"
110 PRINT AT 21,0;"
"
120 FOR F=1 TO 22
125 LET Y=0
130 PRINT AT Y,0;"▒"
140 LET Y=Y+1
145 IF Y=21 THEN GOTO 160
150 GOTO 130
160 LET Y=1
170 PRINT AT Y,31;"▒"
180 LET Y=Y+1
190 IF Y>21 THEN GOTO 210
200 GOTO 170
210 SLOW
211 LET C=1
220 LET D=1
250 PRINT AT C,D;"■"
255 PRINT AT 0,22;" SCANNER "
256 PRINT AT 0,2;T;" MOVES LEFT

260 LET A=INT (RND*19)+1
262 LET B=INT (RND*29)+1
265 PRINT AT A,B;"■"
272 LET T=T-1
274 PRINT AT 0,2;T;
275 IF T=0 THEN GOTO 6000
277 IF RND<.1 THEN GOSUB 7000
279 PRINT AT C,D;"■"
280 IF INKEY$="5" THEN LET D=D-
1
290 IF INKEY$="6" THEN LET C=C+
1
300 IF INKEY$="7" THEN LET C=C-
1
310 IF INKEY$="8" THEN LET D=D+
1
350 PRINT AT C,D;
353 IF PEEK (PEEK 16398+256*PEE
K 16399)=0 THEN GOTO 2000
360 PRINT "■"
2500 IF C<A THEN PRINT AT 0,22;"
SOUTH
"
2501 IF C>A THEN PRINT AT 0,22;"
NORTH
"
2502 IF C=A THEN PRINT AT 0,22;"
"
2503 IF D=B THEN PRINT AT 0,17;"
"
2550 IF D>B THEN PRINT AT 0,17;"
WEST"
2551 IF D<B THEN PRINT AT 0,17;"
EAST"
2552 IF D=B AND A=C THEN GOTO 30
00
2560 GOTO 270
3000 CLS
3010 PRINT AT 2,0;"WELL DONE YOU
 DEFUSED THE BOMB. NEXT TIME YOU
 WILL NOT HAVE AS  MANY MOVES."
3020 PAUSE 300
3021 LET T=T+3-(G+2)
3035 CLS
3036 LET U=U+1
3040 GOTO 6
5000 FOR F=1 TO 45
5003 PRINT AT 10,10;"MINE MAZE."
5005 PRINT AT 10,10;"MINE MAZE."
5007 NEXT F
5020 PRINT AT 10,8;"
"
5030 PRINT AT 1,5;"INSTRUCTIONS"
5040 PRINT AT 2,5;"
"
5050 PRINT AT 4,0;"USING THE CUR
SOR KEYS YOU MUST  MOVE AROUND T
HE MAZE AND TRY TO DEFUSE THE BO
MB. YOUR ONLY      PROBLEM IS YO
U CANNOT SEE THE   BOMB SO YOU M
UST FOLLOW YOUR    SCANNER (TOP
LEFT OF SCREEN) TO FIND THE BOMB
."
5051 PRINT AT 12,0;"BEWARE THE "
"RAGNAT"" HE FIRES    BOLTS OF E
NERGY FROM THE SIDE   OF THE SCR
EEN"
5060 PRINT AT 15,5;"PRESS A KEY"
5070 PAUSE 4E4
5075 CLS
5080 RETURN
6000 CLS
6001 PAUSE 50
6010 PRINT AT 10,0;"YOU RAN OUT
OF TIME AND YOU WEREKILLED BY TH
E BOMB."
6020 PAUSE 300
6030 CLS
6035 PRINT AT 10,5;"YOU DEFUSED
";U;" BOMBS."
6037 PAUSE 150
6039 CLS
6040 PRINT AT 10,7;"ANOTHER GAME
(Y/N)"
6045 IF INKEY$="" THEN GOTO 6045
6050 IF INKEY$="Y" THEN GOTO 606
1
6060 STOP
6061 CLS
6062 GOTO 2
7000 LET Y=INT (RND*20)
9000 LET X=1
9010 PRINT AT Y,X;
9015 IF X=29 THEN GOTO 9500
9017 PRINT "■"
9020 LET X=X+1
9030 GOTO 9010
9500 PRINT AT Y,1;"
"
9550 GOTO 270
9800 FOR F=1 TO 30
9801 PRINT AT C,D;"■"
9803 PRINT AT C,D;"*"
9805 NEXT F
9807 CLS
9810 PRINT AT 10,0;"YOU WERE KIL
LED BY THE ""RAGNAT"""
9814 PAUSE 200
9815 CLS
9818 PAUSE 200
9820 GOTO 6020
```

DEFUSE the bomb hidden in the mine, following the prompts on the scanner. Use the cursor keys to move around the maze and find the bomb before the time runs out. Watch out for the ragnat who fires bolts of energy from the side of the screen.

Mine Maze was written for the 16K ZX-81 by Graham Dando, of Leigh, Lancs.

A small, hungry grass snake called Snakey is in search of food. Help him to collect all the food parcels which have to be collected in numerical order. If you manage to pick up the nine parcels you will save Snakey from starvation. The keys to use are Q, A, O and P.

Written for the 16K Spectrum by Julian Ireland of Maidstone, Kent.

SNAKEY

```
1 GO SUB 7000: LET hs=0: LET
h$="Me"
5 BORDER 2: PAPER 7: CLS : IN
K Q
7 INPUT ""
10 LET len=3
30 LET sc=0
40 LET ml=10: LET mc=16
50 LET d=50
60 GO SUB 1000
70 LET screens=0
100 PRINT INK 4; AT 1,c; "A"; A
T l-1(1),c-c(1); "B"; AT y,x;" "
105 BEEP .01,10
110 FOR n=len TO 2 STEP -1: LET
l(n)=l(n-1): LET c(n)=c(n-1): N
EXT n
120 LET a$= CHR$ PEEK 23560
130 LET l(1)=-1*(a$="q")+(a$="a
")
140 LET c(1)=-1*(a$="o")+(a$="p
")
150 LET l=l+l(1): LET c=c+c(1)
160 LET y=y+l(len): LET x=x+c(l
en)
170 IF l<0 OR l>21 OR c<0 OR c>
31 OR ATTR (l,c)=50 THEN GO TO
500
180 IF ATTR (l,c)=15 THEN GO
SUB 200
190 GO TO 100
200 LET q= VAL SCREEN$ (l,c);
205 BEEP .01,30
210 LET z=z+1: IF q <> z THEN
GO TO 500
220 IF z=9 THEN GO TO 300
230 LET len=len+1: LET l(len)=l
(len-1): LET c(len)=c(len-1): LE
T y=y-l(len): LET x=x-c(len)
240 RETURN
300 LET len=3: LET sc=sc+100*sc
reens: LET screens=screens+1: LE
T d=d+20: POKE 23659,1: PRINT A
T 22,0; PAPER 6; FLASH 1;" BONU
S! BONUS! BONUS! BONUS! ";: FOR
i=0 TO 60: BEEP .01,i: NEXT i:
PRINT AT 22,0;" ": POKE 23659,2:
GO SUB 1000: RETURN
500 BEEP .2,-10: BORDER 2: INPU
T "": FOR n=1 TO 200: BORDER 1:
BORDER 1: BORDER 2: BORDER 1: BO
RDER 2: BORDER 2: BORDER 2: BORD
ER 2: NEXT n
505 BORDER 2
520 PAPER 2: CLS : INK 7
530 PRINT '' TAB 5;"You clear
ed ";screens;" screens", TAB 5;
"and scored ";sc;" points."'' TAB
5;"The high score was ";hs'' TA
B 5;"But i
t is now ";sc;"." LET hs=sc: IN
PUT "What is your name:"; LINE h
$: PRINT '' TAB 5;"Held by ";h$;
GO TO 560
550 PRINT '' TAB 5;"The high sc
ore is ";hs'' TAB 5;"Held by ";h
$
560 PRINT '' TAB 5;"Another Gam
e ?"
570 IF INKEY$ ="y" THEN GO TO
5
580 IF INKEY$ ="n" THEN STOP
590 GO TO 570
1000 CLS : FOR n=1 TO d: BEEP .0
1,0: PRINT AT RND *21, RND *31
; INK 2; PAPER 6;"C": NEXT n
1010 FOR n=1 TO 9
1015 BEEP .01,20: LET a= RND *20
+1: LET b= RND *30+1: IF SCREEN
$ (a,b) <> " " THEN GO TO 1015
1020 PRINT AT a,b; PAPER 1; INK
7;n: NEXT n
1030 DIM l(12): DIM c(12)
1040 LET l=0: LET c=0: LET y=0:
LET x=0
1050 LET z=0
1060 POKE 23560,32
1070 RETURN
9000 FOR n=0 TO 23: READ a: POKE
USR "a"+n,a: NEXT n
9010 DATA BIN 01111110, BIN 100
00001, BIN 10100101, BIN 10111101, B
IN 10000001, BIN 01111110
9020 DATA BIN 01111110,255,255,
255,255,255,255, BIN 01111110
9030 DATA 255,255, BIN 11000011,
BIN 11000011, BIN 11000011,255,255
9040 BORDER 2: PAPER 2: INK 7: C
LS
9045 PRINT AT 2,11; FLASH 1;"##
SNAKEY##"; AT 7,7;"By Julian Ire
land"
9050 PRINT AT 20,1; INK 6; FLAS
H 1;"PRESS ANY KEY FOR INSTRUCTI
ONS": PAUSE 0: CLS
9060 PRINT AT 1,11; FLASH 1;"##
SNAKEY##": PRINT AT 3,0;"YOU AR
E A COLD,THIN AND HUNGRY GRASS
SNAKE CALLED 'SAD SID'. HELP
SAD SID TO GET AS MANY BAGS O
F FOOD (1 TO 9),AS YOU CANBEFORE
'SAD SID' HITS THE SIDE OF THE
SCREEN OR A POISONOUS MUSHROOM.
9070 PRINT AT 20,3; FLASH 1; IN
K 6;"PRESS ANY KEY TO CONTINUE."
: PAUSE 0
9080 CLS : PRINT AT 1,11; FLASH
1;"KEYS"
9090 PRINT AT 3,11;"O.....U
P"; AT 5,11;"A.....DOWN"; AT
7,11;"O.....LEFT"; AT 9,11;
"P.....RIGHT": PRINT AT 20,
4; FLASH 1;"PRESS ANY KEY TO PLA
Y": PAUSE 150: RETURN
```

Softstone
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ITEM: THE 'DRAGON' REACTOR
ITEM: CORE TEMPERATURE CRITICAL
MELTDOWN IMMINENT
ITEM: FAHRENHEIT 2990
SHUTDOWN REACTOR
ITEM: FAHRENHEIT 2995
MELTDOWN IMMINENT
SHUTDOWN REACTOR
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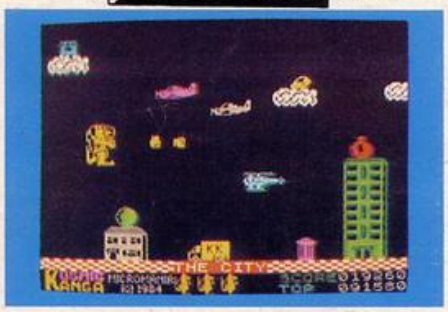

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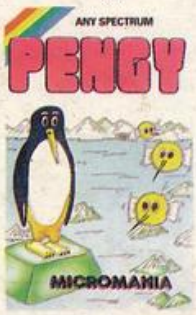

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