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acorn programs

Outstanding efforts

CHOOSING the best 20 listings from the many which readers sent for this issue of *Acorn Programs* has not been an easy task. Your efforts have produced some outstanding results and therefore we are publishing the first of what we hope will be many Star Programs, worth a double fee of £30 to the author. Our Star Program for this issue is Ghost Hunter, a chilling and professionally-designed game by Paul Williams of Bury, Lancs — page 30.

We have also, once again, expanded the editorial content to provide all the software and programming advice you need. Besides our usual three pages of software reviews, there is an in-depth appraisal of the latest releases from Acornsoft and more advice on your programming queries from our Hotline expert. Bruce Smith has read some new books and Jeremy Richards goes back to basics in the start of a series on programming your BBC or Electron.

We still need your programs, so keep sending them — on disc or cassette with a brief explanation of what each one does and for which machine it is intended. Obviously we cannot print all the work you send and we will return any cassettes we do not plan to use, provided they are accompanied by a SAE.

As usual, all our listings have been made from working copies of the programs and all will run on the BBC B, even if written for the Electron.

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Telephone, all departments: 01-359 3525. If you would like to contribute to *Acorn Programs,* please send programs on disc or cassette to *Acorn Programs,* ECC Publications, 2 Newington Green Road, London N1 4AQ. We cannot undertake to return them unless a stamped, addressed envelope is enclosed. We pay a basic rate of £15 for the copyright of each program published.

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Of course, we have the classics like THE HOBBIT (text only) £14.95 and PIMANIA (win £6,000!) £10.00 and the 747 FLIGHT SIMULATOR (*"the best"*) £8.95. But we also have, among others ...

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For children of all ages, the bargain of the year! Four arcade games linked together on one tape for one price! - and with very pretty, fast-moving graphics (+ Hall of Fame). Fight your way through SPACE INVADERS, LASER ATTACK, FIREBIRD and MOTHERSHIP. It's very hard to get bored - or to remember the right technique for each game! STIX OK. **(Dr SOFT) £7.95**

FORTRESS

Too new for reviews, this **'ZAXXON'** - type game works beautifully on your Beeb. As Pace say ... the Fortress awaits you. It is a classic computer game, in a smashing 3D graphic form. All the features you would expect, plus a Hall of Fame. Fast and furious. STIX OK. **(Pace) £8.95**

POOL

A very realistic simulation in this game for two players. (With very good Scott Joplin music, too!) You can play solo to perfect your technique. Excellent and smooth hi-res colour graphics make the full-screen table a pleasure to play on. You control the cue angle and strength of shot and can get it down to a fine art. Choose the frames to play, too. Great display: very satisfying program. NO STIX. **(Dynabyte) £7.95**

LORDS OF TIME

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CYLON ATTACK

"Stands head and shoulders above the rest" (Acorn User) "Excellent ... the standard by which other games will be judged" (Micro User). "A superb program with excellent graphics" (CompChoice) You will really believe you are launching from and docking with a mother ship: you will see and feel you are refuelling: you will know exactly when you can kill the enemy. UNIQUE 50-PLACE HI-SCORE TABLE CAN BE SAVED. Great. And 3D, of course. STIX OK. **(A & F) £7.90**

TRENCH

"It's very hard even at skill level one ... a challenge to your skills" (A&B Comp) "Manna from heaven" (PersCompNews). One of the most exciting games we've ever played. Fly your Beeb X-wing Fighter down the 3D Trench towards the Death Star-style target, dodging the tie-fighters as they attack. 9 skill levels: sensational graphics: one of our best sellers. STIX OK. **(Virgin) £7.95**

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Acorn in business with the ZX-80 processor

ACORN is bidding strongly for the small business market with the launch of its long-promised Z-80 second processor. The £299 expansion unit upgrades the BBC micro into a full CP/M-based business system and is accompanied by a range of applications programs.

"Our dual processor design offers a speed and performance better than most conventional business systems," claims Acorn marketing manager Tom Hohenberg.

The Z-80 second processor comprises a 'C' chip running at 6MHz and 64K of RAM. It uses the BBC Tube interface to exchange data at high speed with the existing 6503 processor. The dual operation has the Z-80 handling the application program while the host BBC micro concentrates on input/output, screen graphics and system routines.

The free software supplied to the buyer with the expansion unit includes the GSX-80 graphics system compatible with all the CP/M family of operating systems; a disc-based word processor; a filing system and mailing facility; a spreadsheet program; and an integrated accounting system.

Acorn says demand for the new system is high and that it is working towards the end of a large backlog of orders received before the processor was launched.

Acorn managing director Chris Curry, centre, looks on while Formula 3 driver David Hunt prepares to take P Bushby of March, Cambridgeshire, round the track at an Acorn-sponsored European Raceday at Silverstone. The ride was part of Bushby's prize for winning a cartoon-captioning competition in the *Daily Express*.

Micros at two major shows

ROBOTICS, education and a users' clinic will be among the highlights of the second official Acorn User Exhibition at London's Olympia from August 16–19.

The exhibition will be open from 10am to 8pm each day. Tickets cost £3 for adults, £2 for children under 16. There is £1 reduction for tickets ordered in advance from the organisers, Computer Marketplace (Exhibitions) Ltd, 20 Orange Street, London WC2H 7ED.

High Technology and Computers in Education is the theme of another major exhibition, organised by the same company, to be held at London's Barbican Centre from January 24–26, 1985. Exhibits will include computer hardware and software, as well as robotics, lasers, video and teaching aids. Teachers, lecturers and local government officials from all over the country will be invited to the show.

Award for innovation

ACORN COMPUTERS won the Queen's Award for Technological Achievement for its BBC micro.

The Award pays special tribute to the advanced design and commends Acorn for "the development of a microcomputer system with many innovative features." Chris Curry, managing director of Acorn Computers, comments:

"We have aimed consistently to design computers which have set technological standards instead of merely meeting a price. Our approach is vindicated both by the Award and by the fact that two years since it was launched, the BBC micro is still the most advanced computer of its kind."

The Award helps Acorn to refute criticisms from such as Sir Clive Sinclair, who has threatened to supplant the BBC micro in education with his own QL, and those who say that the design of the BBC is now out-moded.

The BBC still vastly outnumbers other computers in schools.

First add-on for Electron

ELECTRON owners can now run printers, joysticks and software cartridges from their machines with the Plus-1, one of a recent spate of add-ons from Acorn.

Selling at £59.90, the Plus-1 adds a Centronics-compatible printer interface, a joystick analogue port and two slots for ROM cartridge software.

Six new cartridges have already been released by Acornsoft for the Electron Plus-1 system, including **Snapper, Starship Command, Hopper** and the artificial intelligence programming language Lisp. Cartridges cost £14.95, except for Lisp, which retails at £39.95.

"We expect demand for the unit to be good and we are manufacturing it in large quantities," says an Acorn spokesman. Acorn has also announced an interface which links the BBC micro to the viewdata services run by British Telecom.

The £113.85 adaptor links into the telephone network and allows users to access the business and consumer information published by Prestel and to use the Micronet 800 tele-software service. They can also send and receive electronic mail via Telecom Gold.

The adaptor is available by mail order only from Vector Marketing, London Road, Dennington Estate, Wellingborough, Northamptonshire NN8 2RL.

BBC B TOP TEN

Position	Title	Company
1	Aviator	Acornsoft
2	Fortress	Pace Software
3	Jet Power Jack	Micro Power
4	Overdrive	Superior Software
5	Ghouls	Micro Power
6	Battle Tank	Superior Software
7	JCB Digger	Acornsoft
8	Danger UXB	Micro Power
9	Snooker	Acornsoft
10	The Mine	Program Power

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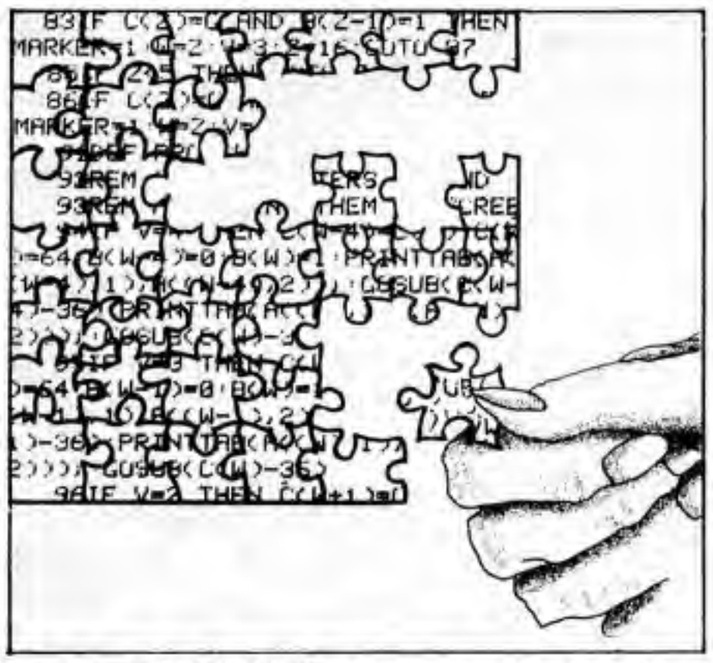


Expanding the possibilities of the BBC and Electron

Jeremy Richards discusses your latest hints and queries

HOTLINE last month inspired many of you to write about your Acorn machines. A number of queries concerned the use of the operating system calls, the various expansion ports of the BBC and options for the Electron.

The operating system of both the BBC and the Electron is the most sophisticated among home computers and many aids have been included to help the programmer. The subject which raises many queries, and also hints, is the use of *FX commands. FX calls are a means of enabling the user to control a range of effects in the computer without resorting to complicated assembler language routines.

C Johnson of Leicester sent a tip for turning-off the sound of Acorn machines, something which can be useful when the arcade games are keeping the rest of the family awake at night. Unfortunately the tip is slightly incorrect, due, I am sure, to a typing error. Johnson suggests using *FX201,3 to disable the sound output. *FX201,3 disables the keyboard, meaning that the machine will not respond to any key on the keyboard except the break key. To re-enable the keyboard the break key has to be pressed.

The command to turn off sound is *FX210,1. Any number greater than 0 will turn off the sound. To re-enable sound, either press the break key or type *FX210,0. Therefore if you are running software which utilises the sound capabilities of the BBC and Electron, typing the *FX command will stop any sound effects. That should work in most cases unless the software uses in the program initialisation *FX210,0 to enable sound.

I have been asked about expansion options for the Electron. As you have probably seen advertised, there are now a few expansion units for the Elk and Acorn is releasing its first add-on, the Plus-1. The expansion box connects to the Electron via the edge connector on the rear of the machine. It contains a parallel printer port and a joystick interface. To complete the unit two ROM cartridge sockets enable the user to buy software in cartridge form.

The advantage of cartridge software is that by plugging-in a program is available in much less loading time but the cost is likely to be greater than that of tape software.

While on the subject of expansion options, another source of mystery to some is the RS423 port at the back of the BBC. It seems not everyone is acquainted with it and what it does. The RS423 is a serial interface and can have a variety of uses. The most common are controlling serial printers and communicating with other machines.

In the case of the latter a prime example is accessing telecommunications systems such as Prestel or British Telecom Gold. By connecting either an acoustic coupler or modem to the RS423 port, the BBC can then communicate with mainframe computers, by a telephone line, to send and receive information. That leads neatly to the other form of communications device, the teletext adaptor. Those who already have a teletext receiver on a television set and would like to use it in conjunction with a BBC cannot do so without the adaptor for the computer. What would be the advantage of buying a teletext adaptor? If you already own a teletext set, you would be able to receive the free software transmitted by the BBC on pages 700 onwards.

The teletext system uses another of the external ports of the BBC, the 1MHz bus. It is similar in nature to the user port except it is far more versatile for more complex hardware add-ons.

Why can those devices not be added on to the Electron? In the case of the Elk, Mode 7, which is the teletext display screen, is missing. Therefore there is no correct display available for teletext pages. Second, the peripheral connections are not available, although that is not to say that such devices may never be added.

Users of the Electron or BBC often want to carry out a function or command as quickly as possible. An excellent means of doing it is to re-define one of the user-definable keys. They are labelled f0, f1 and so on and on the BBC the first 10 are shown as red keys on the keyboard. I find it useful when programming or typing-in other people's programs to have some function keys set up to carry out the same set of commands at the press of one key. To do that we use the *KEY command and program one gives an example of its use.

Program 1.

```
 10 *KEY 0 NEW: M
 10 *KEY 1 *EXEC"
 30 *KEY 2 RUN: M
 20 *KEY 3 OLD: M
 50 *KEY 4 LOAD"
 60 *KEY 5 CHAIN"
 70 *KEY 6 LIST: M
 80 *CAT: M
 90 *KEY 8 *WORD: M
100 *KEY 9 *BASIC: M
110 *KEY 10 OLD: M LIST: M
```

In a line where you wish a RETURN to be issued, i.e., where you have typed *BASIC and wish the command to be carried out, a control code has to be issued, in this case control-M, which would be the same as pressing the RETURN key. To do that we use the character above the '/' key which, if you are using Mode 7, shows as two vertical lines, but on the key or in other modes as a single broken vertical bar.

More than one function can be assigned to a key and in that way a set of commands can be carried out in one attempt. It is also possible to use a colon (:) to separate statements as in Basic multi-statement lines, but bear in mind that it will not be understood as a multi-

Continued on page 8

'The advantage is that a program is available in much less time'

statement line, as the command is being carried out by the operating system and not Basic. Therefore if using operating system commands like *KEY, it is best to have them on their own on a line, or as the last statement on a Basic line, as control is passed to the operating system for the rest of a line once an asterisk is encountered.

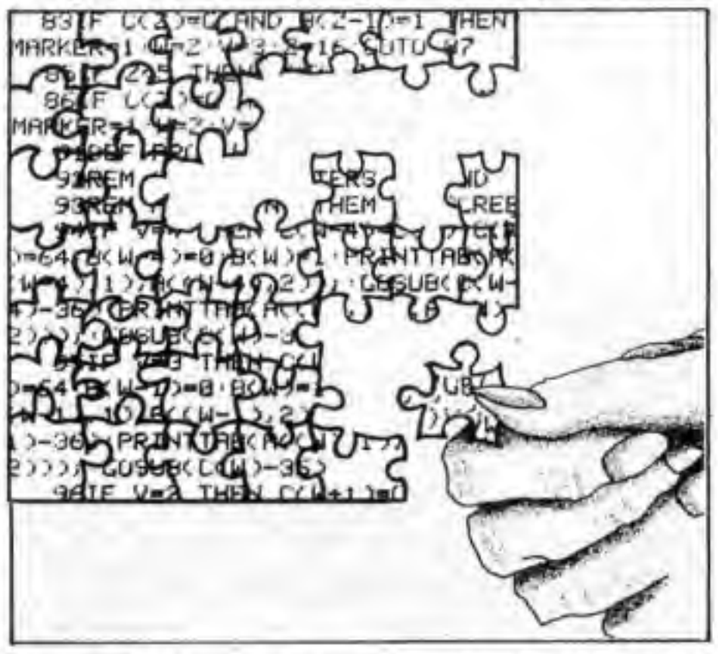
Let us look at a routine which can be incorporated in your programs. This utility is meant for disc users; it would work for tape as well, though it would be very slow. The routine is to provide a menu selection of your programs and permits you to press just one key to load and run a program. Type-in program two and save it to disc with the title !MENU.

Program 2.

```
 10 CLS
 20 PRINT TAB (10,0);"GAMES DISC 1"
 30 PRINT TAB (0,4);"1...PROGA"
 40 PRINT TAB (0,6);"2...FROGGER"
 50 PRINT TAB (0,8);"3...BINGO"
 60 PRINT TAB (0,14);"Enter number of
choice"
 70 A$=GET$
 80 A=VAL(A$)
 90 IF A<1 OR A>3 THEN 70
100 ON A GOTO 110,120,130
110 CHAIN"PROGA"
120 *RUN FROGGER
130 CHAIN"BINGO"
```

Once saved to disc, use *BUILD to make a !BOOT file, typing-in at line 1 CHAIN"!MENU" and then press RETURN. At line 2 press the escape key and a file !BOOT should have been created. Then type *OPT 4,3 to set the *EXEC option. The menu program will then be run every time Shift-Break is pressed—that is done by pressing and holding the Shift key while pressing and releasing the Break key.

To explain how to customise the program to run programs on your disc



let us look at the listing in detail. Line 10 clears the screen. You might like to replace it with a Mode statement and include colour in the titles. I favour Mode 7 and make use of the double-height characters using 'CHR$141'. Line 20 is the title of the disc and lines 30 to 50 show the names of the programs on the disc. The lines shown are only examples and you must enter as many as are appropriate for the number of programs contained on your disc. Line 60 tells the user to enter his choice.

Lines 70–100 are the real heart of the program and are responsible for reading the user's input and carrying it out if correct. The key pressed by the user is read in at line 70 and is converted into a numeric variable at line 80. Line 90 is set to the minimum and maximum number of programs to be chosen and if the number or key pressed is outside the number of programs displayed, the user is returned to line 70 until an appropriate key is pressed.

The 'ON' statement in line 100 then sends the program to the correct line for execution. Therefore if the number pressed was '1' the program goes to line 110, where a command to load that program is carried out; if '2', then to line 120 and so on.

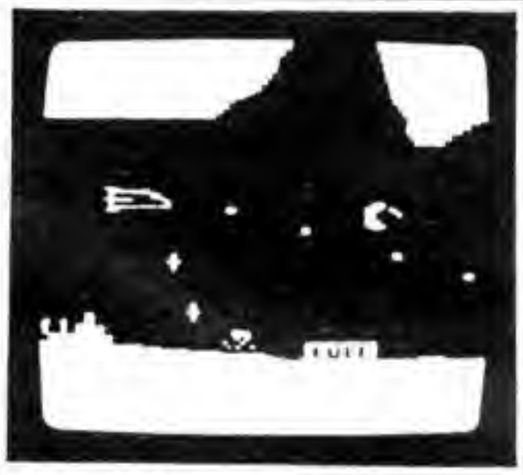
When adding new programs to your menu, besides altering the screen display, lines 90 and 100 should be altered as well to take account of a new number of programs. Finally the correct command for loading and running must be used in the final section.

The program is simple to use and makes it easy to add new programs to the list. It is the fastest program I can show but there are many other ways of creating menus and if you have a better routine, please send it to us.

SLOGGER SOFTWARE

MACHINE CODE GAMES FOR **BBC 'B', ELECTRON, SPECTRUM 16/48K**

A MAZE IN SPACE



Use Joysticks or Keyboards to navigate your Starship to the planet surface and then into the maze below. Having been told in which section of the maze your target is hidden, your objective is to seek out and destroy it to complete a mission. Beware of the numerous alien defence systems. Two levels of difficulty! Horizontal and diagonal scrolling!
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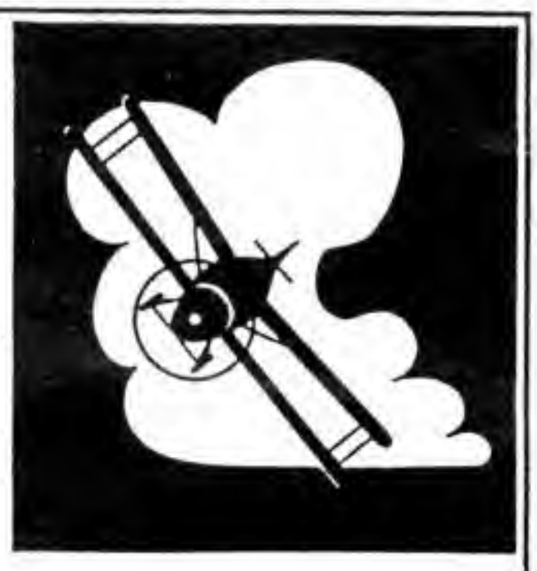

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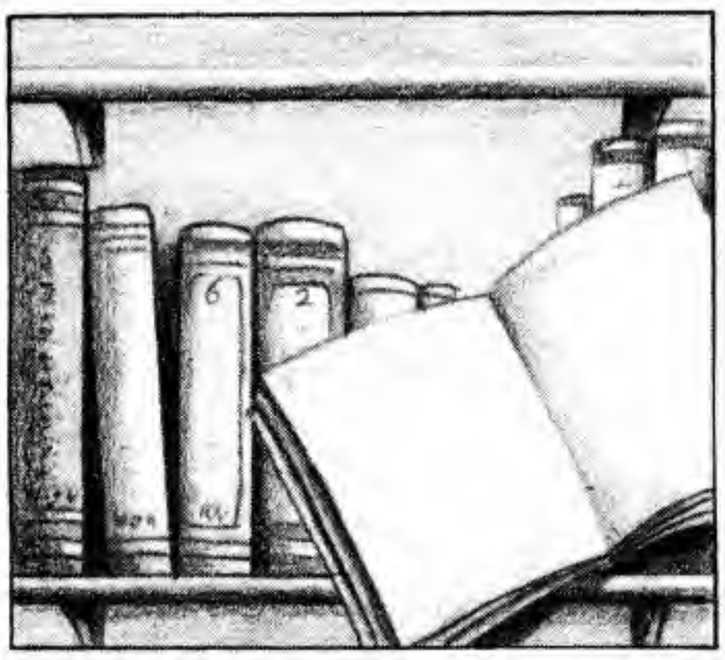


Beginners' path through the literary jungle

Bruce Smith takes a critical look at some recent publications

WITHOUT doubt the publishing industry was given a big lift when the home computer and, in particular, the Acorn micros, made their appearances. A walk into any bookshop illustrates the point with row after row of books on your favourite micro. Choosing a book to supplement the User Guide which can look daunting to many first-time users can be a difficult task. To help you wade through this literary jungle I have been burning the midnight oil reading a selection of books available for the BBC and Electron on the subject of programming.

The name R A Penfold will be familiar to readers of the electronic computing press. Penfold has teamed up with J W Penfold to produce two introductory pocket books for the BBC and Electron. *An Introduction to Programming the BBC Model B Micro* is a well-written introduction. A shortcoming is that it assumes you have already mastered your keyboard, as no details on obtaining shifted characters or using the function keys are given. Another immediate minus is the omission of an index, though the well thought-out layout of each chapter should enable first-time users find their way around quickly.

Unusually the book starts with a description of variables and arrays. Many of the more erudite books tend to leave that aspect of programming to several chapters later, even though they have been using both in demonstration programs from page one.

After all, one of the main uses of a computer in the home is to store information, whether it be household accounts or the carry-over to the next adventure game session. The chapter explains the differences between variable types and the demonstration programs are short and concise.

Chapters two and three discuss print formatting and getting information into the BBC while a program is running using the GET, INPUT and INKEY commands. Procedures and functions, facilities which set the Acorn machines apart from their contemporaries, are explained with clear, pithy examples in chapter four and the reader is left in no doubt as to their usefulness. Sound, graphics and sprites are covered in the ensuing chapters, along with an examination of the binary and hexadecimal numbering systems; again, example programs point the way.

The Penfolds' bent for interfacing makes an appearance in chapter 10. Although interesting reading, I feel it is a little out of the depth of the introductory reader. Curiously the last chapter is dedicated to the Teletext Mode 7. I would have thought that should have occurred somewhat earlier as it is undoubtedly the operating mode the reader will be using most. Overall a good book and at £1.95 a very worthwhile buy.

An *Introduction to Programming the Acorn Electron,* also by Penfold and Penfold, not surprisingly follows the same track as the former title. In fact, only the last two chapters differ. Chapter 10 on interfacing provides useful details on adding 8-bit input and output ports to the Electron, though once again it is an odd inclusion in an introductory book. Due to the lack of a teletext display on the Electron, chapter 11 details the handling of data files, giving a telephone directory program as an example.

All my comments on the BBC version hold true and again at £1.95 it is an absolute snip.

At the other end of the price range for introductory programming books are two Dr Watson series volumes by Alan Marshfield titled *BBC Basic Programming Course* and *BBC Advanced Basic Course.* Both plastic-cased volumes have an accompanying cassette containing the main programs from the book.

My first impression was that they are somewhat congested; that is probably because they are computer-set, which produces a heavy compact type. Also, many of the illustrations are of the hand-drawn type, which looks a little unprofessional and cheap, though at £14.95 neither volume can be considered inexpensive.

BBC Basic Programming Course starts with an overview of the keyboard and gets the user generally playing around typing-in silly little commands. Not that I am decrying that; on the contrary, I think it is a very useful exercise and gets the reader used to the keyboard and over initial computer nerves. The final part of the chapter has the reader using the cassette to save and load items, an aspect often overlooked by other introductory books.

Chapters two and three deal with number and string handling in a rather disjointed manner, with perhaps too much mathematical bias for an introductory book. Surely also the REPEAT . . . UNTIL loop is worth more than a page and a half of coverage.

The game of Hangman is used to provide the basis of introducing DATA, READ, graphics and colour in chapter four—a pleasant approach all drawn together at the end by a suitable program. Chapter five takes a similar tack, using a bat 'n ball version of squash to introduce several other graphical features of the BBC plus an insight into animation.

The final chapter is titled Diamonds of Time and again uses various games programs to examine other aspects such as FN and TIME. That chapter is somewhat disjointed and left me wondering what it was all about. Thirteen appendices are tacked on to the end of the text giving the usual details of ASCII codes, keywords and *FX calls, though the latter are scarcely mentioned in the text.

The accompanying cassette contains

Continued on page 10

'A shortcoming is that it assumes you have already mastered your keyboard'

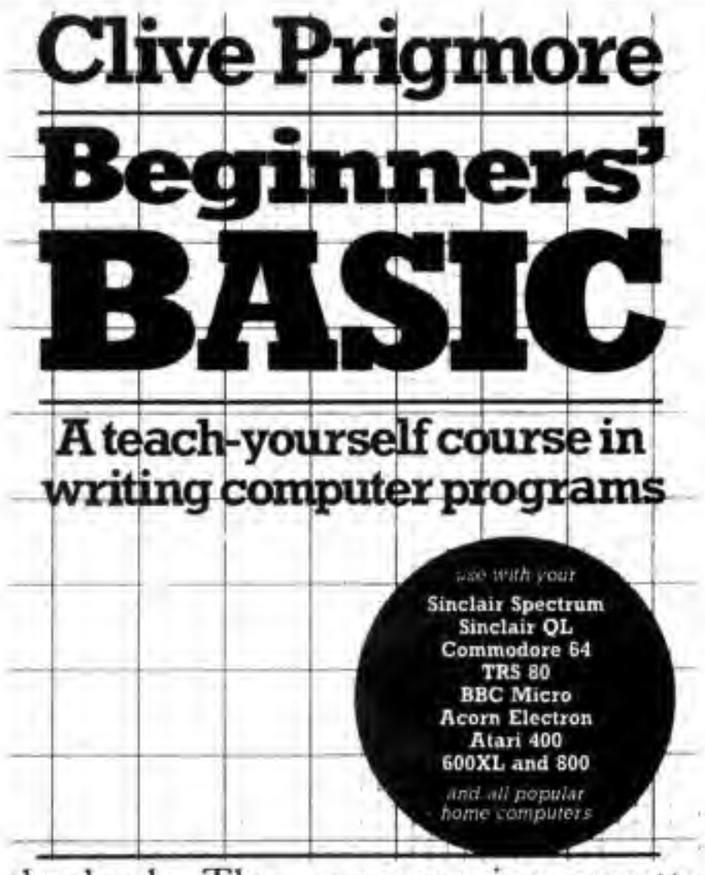
Continued from page 9

eight of the longer program listings. Although it is pleasant to load rather than type them in, I wonder how many people would buy the cassette if it were sold separately.

The book is really a mixed bunch of pages offering good and bad. I would certainly advise any prospective buyers to give it a good perusal in the shop before purchase.

The BBC Advanced Basic Course follows from the previous volume, so much so that it starts with chapter seven. That chapter details the implementation of bar charts and integer numbers. It also introduces the ASC and CHR* functions, elementary items which should have been dealt with in the first volume.

The games approach is taken up again in the next chapter with the development of a space game, although being an advocate of structured programming I am always wary of programs which contain even one GOTO statement, particularly within procedures. Chapter nine provides a useful entry to the world of computer sound and at long last introduces the excellent function keys. Once again the final chapter is a mish-mash of items based on data handling and chunky graphics. Finally, 13 appendices—yes, the same ones—end



the book. The accompanying cassette holds 15 programs from the book.

I would not recommend the book to someone wishing to learn advanced Basic programming techniques. There are numerous omissions, no details on sorting techniques, and the layout does not encourage bed-time reading.

Clive Prigmore's *Beginner's Basic* is a general book on programming not written specifically for the BBC or Electron but written with them and the other popular home micros in mind. Even so, this large A4-sized spiral-bound book deserves mention. It deals with all the main introductory areas simply, clearly and with short programming examples. Chapter topics include writing your own programs, decisions, strings, loops and lists, sorting, searching, and files and menus.

One of the biggest points in the book's favour is its excellent production. It really is a pleasure to look at and the lucid writing puts across all the author's points.

There are inevitable weaknesses in a book of this kind. For example, the book details the RANDOMIZE function which does not exist in BBC Basic. Many of the specialised BBC keywords are also missing—there is no mention of PROCs. At £9.95 it is a worthwhile investment, though it should be supplemented with a BBC or Electron-specific book.

An Introduction to Programming the BBC Model B Micro, by R A & J W Penfold, 134 pages, £1.95, published by Bernard Babani.

An Introduction to Programming the Acorn Electron, by R A & J W Penfold, 134 pages, £1.95, published by Bernard Babani.

BBC Basic Programming Course, by Alan Marshfield, £14.95 inc. cassette, published by Honeyfold Software Ltd.

BBC Advanced Basic Course, by Alan Marshfield, £14.95 inc. cassette, published by Honeyfold Software Ltd.

Beginners' Basic, by Clive Prigmore, 216 pages, £9.95, published by Windward.

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Although similar to Educational 1 this tape is more advanced and aimed at seven to 12 year olds. The tape includes MATH1, MATH2, AREA, MEMORY, CUBECOUNT and SPELL.

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. . . 'Very good indeed' . . . A&B Computing – Jan/Feb 1984.

JIGSAW AND SLIDING PUZZLES *BBC/ELECTRON* *Tape £7.95 Disc £9.95*
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Killer ape retains most of its power

KILLER GORILLA from Program Power — or Micro-Power as the company is now called — has long figured prominently in the popularity charts for BBC games. Now a new version has been produced for the Electron and the transition has been achieved very smoothly.

In the best Donkey Kong tradition, the aim is to manoeuvre the hero along a series of platforms and up ladders towards a helpless maiden held captive at the top by a fearsome primate. In defence of his prize, the gorilla hurls down barrels towards the rescuer who can, for a short time, smash them with an axe he has had the good fortune to pluck from thin air; when the axe vanishes, he is reduced to leaping over the barrels as best he can.

Practice will reveal tactical ways in which a players's score can be improved. Trying to leap over a series of barrels rolling close together is not a good idea and standing below the edge of a platform may mean being squashed flat from above. Completing one screen leads to another more difficult one, with useful objects to be picked up along the way and large gaps in the platforms creating additional dangers. A touching scene rewards you if you whisk the heroine from the gorilla's clutches.

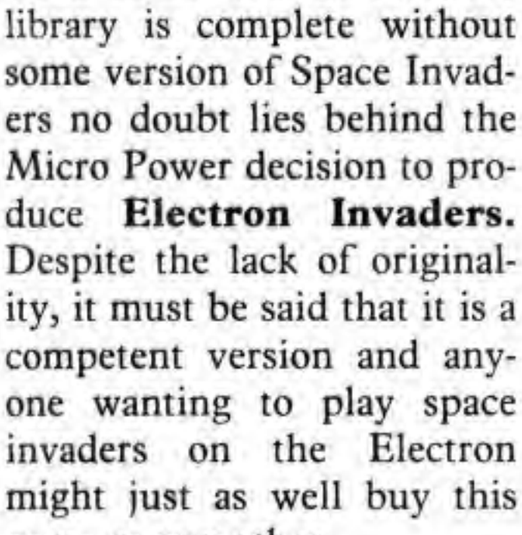
Within the limitations imposed by the slightly less sophisticated graphics and sound of the Electron, the game still has all the attractions which have endeared it to BBC owners. A catchy tune, which mercifully can be silenced at the touch of a key, accompanies the action and the excellent graphics have plenty of humorous detail, including the way in which the hero spins on the spot and finally keels over with his legs in the air whenever he moves into the path of a barrel.

Killer Gorilla should receive a warm welcome from Electron owners who will be well served if more software for the machine reaches this high standard. The game is produced by Micro Power, 8-8a Regent Street, Chapel Allerton, Leeds LS7 4PE. It costs £7.95.

Competent invaders

THE IDEA that no software library is complete without some version of Space Invaders no doubt lies behind the Micro Power decision to produce **Electron Invaders.** Despite the lack of originality, it must be said that it is a competent version and anyone wanting to play space invaders on the Electron might just as well buy this game as any other.

In the classic manner, it features a variety of alien hordes, each of which earns the player a different number of points when zapped. The player moves a laser back and forth along the baseline and can shelter behind defensive bunkers; beware of exploding bombs which produce a spectacular and potentially dangerous shower of shrapnel.



Clearing one screen leads to another in which the invaders start their offensive lower down the screen. One or two people can play and compete for high scores and the game includes a useful silence facility for those who tire of the piercing sound.

Electron Invaders is available from Micro Power, 8-8a Regent Street, Chapel Allerton, Leeds LS7 4PE and costs £7.95.

Return of the insect train

YET ANOTHER Electron game which goes back to early arcade classics for its roots is **Centipede** from Superior Software. The object is to prevent the snake-like centibug from reaching the bottom of the screen by firing at it from a laser base. Various insects which detach themselves from the train can be zapped for different scores according to their type.

The scenario will no doubt seem familiar to old hands but for those not in search of originality Centipede is entertaining enough, with an attractive screen display and a choice of skill levels to add extra challenge. A cassette insert with no explanations is uninviting but instructions are provided on-screen.

Centipede is produced by Superior Software, Regent House, Skinner Lane, Leeds LS7 1AX and costs £7.95.

Quick on the thaw

PENGUINS attempting to shunt ice blocks into place seem to be a popular theme of a recent batch of micro games. **Pengwyn,** produced on a two-sided tape for the BBC and the Electron, has a number of by now familiar features but has managed to combine them in a reasonably lively and entertaining way.

The object is to manoeuvre randomly placed flashing squares into a straight line, either by melting the ice blocks surrounding them or by pushing them into an empty space if one is available. Three penguins represent the player's three lives and their task is complicated by the monsters — fluffy and beaming but monsters nonetheless — which materialise from the ice blocks and pursue the hard-pressed birds. They can defend themselves either by running away or by pushing an ice block into the monster's path.

Besides skill in moving the penguin quickly round the screen, the game requires quick decisions on the best course of action when confronted with an ice block or a monster. To make things even more exciting, the player's score is calculated on the basis of the time taken to organise a straight line; the number of monsters also increases steadily.

It is a pity that Postern has not bothered to mark the tape on each side with the computer for which it is intended and that the screen instructions are lacking in any punctuation, but in other respects the company has produced an above-average game.

Postern is at PO Box 2, Andoversford, Cheltenham, Glos GL54 5SW and the game costs £6.95.

More reviews on page 12.

Effective two-fold attack

EXCELLENT line graphics add conviction to **3-D Tankzone** for the BBC B.

As supreme commander of a fortified hilltop command post your job is to scan the surrounding terrain and the horizon for enemy tanks and aircraft. To defend yourself against them, you have an anti-aircraft cannon and an anti-tank missile launcher; you can choose to play the game with either type of weapon or a combination of both. You fire at enemy aircraft by lining them up in your sights and you aim at tanks by moving indicators at the top and sides of the screen.

Although basically a simple zapping game, 3-D Tankzone has been carefully produced and provides some fine effects. The rotation of the command post and the movement of the tanks in particular are realistically conveyed.

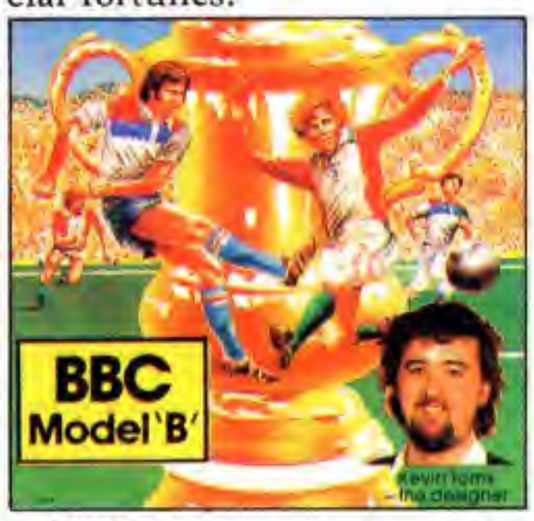
The only real criticism of the game is that the action is a trifle slow.

3-D Tankzone is produced by Dynabyte Software, 31 Topcliffe Mews, Wide Lane, Morley, Leeds LS27 8UL and costs £8.95.

Football game is a resounding win

FOOTBALL MANAGER from Addictive Software should send soccer fans 'over the moon' but the game scores highly with non-enthusiasts, too.

As manager of your favourite team, it is your job to decide each week who will play in the next match on the fixture list, whether to buy or sell players, and whether to borrow money or repay a loan according to the club's financial fortunes.



Whichever team you choose, you start in division four. By the end of 22 League matches, you hope to be promoted to division one and possibly win the FA Cup as well. If the team closest to your heart is not available, the game allows you to customise the data file to include your own team and players.

Among the many other options offered are seven skill levels ranging from beginner to genius. If you start as a beginner and do well, your rating is adjusted automatically at the end of the season. The most crucial decision affecting your team's performance, however, involves the selection of players and it is based on the attributes of the two opposing teams. Their energy, morale, defence and attacking strength are valued on a scale of points, and players are chosen according to positional skills and energy they can bring to the team. True to life, players' energy is depleted after a game and restored after a rest.

Having settled all the details, you can then sit back and watch the game — a short, animated sequence showing the 'highlights'. Scores, injuries and new league placings are all displayed at the end.

The combination of graphic action and informed decision-making distinguishes **Football Manager** from many other strategy games and the scope and careful presentation of the program make it entertaining and absorbing. It is produced by Addictive Games, 7A Richmond Hill, Bournemouth H2 6HE and costs £7.95.

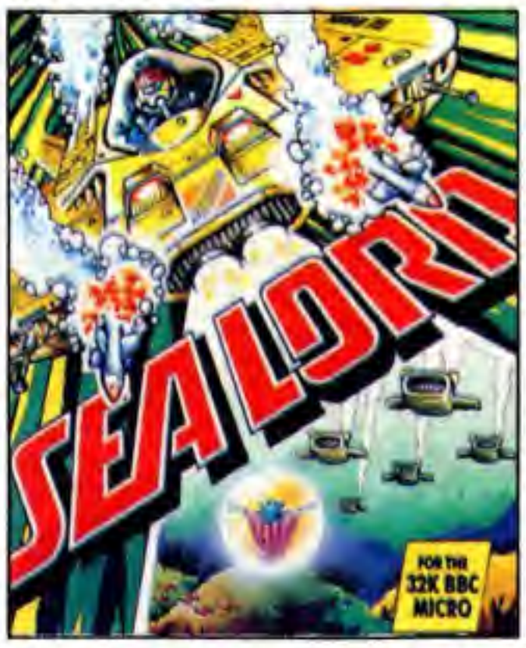
Submerged twist

THE SIMPLE arcade theme of shooting the enemy before they shoot you is given a slight twist by **Sea Lord** for the BBC B. Your minisubmarine is cruising through a rocky seascape when the local sea lord decides that you are trespassing and sends a fleet of scout ships to destroy you.

Using left and right rotation keys to turn and face your pursuers, you must try to blast them out of the way before they collide with you and deprive you of one of your three lives. Having eliminated the scouts, you are then harrassed by submarines and yet more deadly vessels if you manage to get rid of those. A score of 1,500 points earns you an extra mini-sub with which to continue your battle.

The graphics are far from sophisticated, with wavy blue lines and a few cubes representing the sea and rocks, and the action cannot be described as hair-raising, but the movement of the submarine and the firing action lift the game somewhat out of the ordinary. The novelty can provide even jaded players with some entertainment.

Sea Lord is produced by Bug-Byte, Mulberry House, Canning Place, Liverpool L1 8JB. It costs £7.50.



Trap ensnares player

FRENZY for the BBC B shows that sophisticated graphics are not the prime ingredient of an enjoyable game, although a little more effort on the pictorial front would certainly not have done any harm.

A small square represents the robot craft with which the player must try to trap a train of dots standing in for deadly atomic particles running free in a scientific research centre. As the Leptons cross the screen and bounce off the walls, you attempt gradually to enclose areas of the screen within your ion trail, causing them to change colour.

When Leptons are trapped in a coloured area or when more than 95 percent of the screen has been filled in they are immobilised, but if they crash into the robot craft or its ion trail before you have returned to base, you lose your life and possibly the game.

If you succeed on one screen, life becomes more complicated as Chasers move along the outer borders, threatening to collide with the robot craft.

Although the concept and graphics are extremely simple, **Frenzy** is a surprisingly addictive game in which timing and a shrewd eye for angles are needed for success. Interest is added not only by the increasing difficulty of the game but by the fact that scoring is affected by whether you choose to drive your craft slowly, earning a higher score but more dangerous, or fast, and by the tactical decisions you can make to improve your chances.

Frenzy is one of a new batch of releases from Micro Power, Northwood House, North Street, Leeds LS7 2AA and costs £7.95.

Just a question of general knowledge

THE VALUE of general knowledge quizzes as an educational tool may be debatable but Kosmos Software has devised an entertaining and thoughtfully designed learning game in its **Answer Back Senior Quiz.**

Aimed at children aged 12 and over, the tape provides a series of 15 quizzes on subjects ranging from astronomy and music to sport, literature and mythology. They are combined with amusing graphics and a simple zapping game. Questions are flashed on to the screen by a laser-wielding robot and whenever they are answered correctly the student is offered the option of firing at an alien craft.

Intended as a spur to encourage children to supply the correct answers, the zapping exercise probably acts more as a distraction, drawing the attention from the answer displayed on the screen. In other respects, however, the quiz is effective in helping to memorise answers and provides an excellent grounding for would-be Mastermind contenders, if nothing else.

After the introductory section has appeared on the screen, each individual quiz must be loaded separately, a laborious process if a topic which is low on the list is requested. A quiz consists of 50 questions and at the start you are offered a choice of how many you want to answer, whether you want them in a multiple choice, yes/no or fill-in-the-missing-letters format, and whether you want to be timed. Such choices make it possible to repeat each quiz more than once, varying the format.

More valuable still, the authors have allowed for teachers or parents to modify existing quizzes or create new ones of their own, so that the quiz can also be used to drill pupils on what has already been taught in class.

Answer Back Senior Quiz is produced by Kosmos Software, 1 Pilgrims Close, Harlington, Dunstable, Beds LU5 6LX and costs £10.95.

Screwball bounces into favour

SCREWBALL for the BBC B belongs to a group of games which are popular at present and all trace their origins to Atari's Q*bert. The lack of originality can be forgiven because MRM Software has managed to make this a particularly entertaining version.

Assuming the guise of what looks like an animated corkscrew, you have 60 seconds to change the colour of a diagonal grid of squares by jumping on each one in turn. As you dash about the screen you are pursued by black bugs which are liable to materialise on top of you and eliminate one of your lives. You can, however, defend yourself against them by spinning quickly on the spot and drilling a hole through which, with a little luck, the bugs will fall, earning you a bonus score.

Sensible placing of the control keys is one asset of the game. Amusing and realistic 3-D graphics and fast action should also help to keep you playing **Screwball** for some time. Available from MRM Software, 17 Cross Coates Road, Grimsby, South Humberside, Screwball is good value at £5.70.

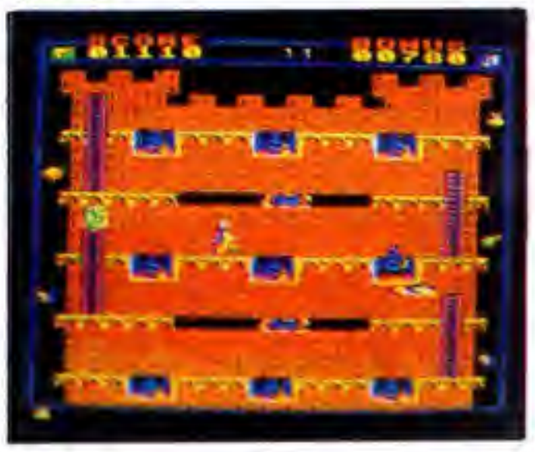
Scaling challenge

IF YOU LIKE your arcade games to present a real challenge, you should enjoy **Castle Assault** for the BBC B. The object is to scale the walls of a castle, jumping over monsters, climbing ladders and leaping on to moving platforms to reach a bag of gold at the top. Bonus points are gained by gathering the fruit to be found at either end of each level.

In spite of a generous provision of lives—you start with five men—you will probably not find it an easy mission unless you have had plenty of practice at the keyboard. Jumping over the monsters and on and off the platforms requires accurate timing and on the first screen a flying duck makes life even more hazardous as you reach the upper levels of the castle.

Castle Assault has many elements, from ladders and platforms to flying ducks, which are now familiar features of many computer games but it combines them in a lively and colourful way. Excellent graphics and fast action should keep you playing.

Castle Assault is produced by MRM Software, 17 Cross Coates Road, Grimsby, South Humberside and costs £5.70.



Hangman is back

CHALKSOFT claims that **Word Skill,** released recently as a 40-track disc for the BBC B, improves spelling and deductive skills, enriches the vocabulary, encourages discussion, and more besides. Be that as it may, the program is certainly a well-produced version of an old favourite commonly known as Hangman.

The program is designed for use at home or in the classroom and provides a number of options to suit a variety of situations and pupil skill levels. The game can be played on the basis of familiar phrases, or of random sentences thrown up by the computer out of its memory store. Pupils can play against each other or against the computer, they can make up their own phrases for others to guess, they can be timed or not timed.

The game also includes a range of facilities for the benefit of the teacher who can edit and save sets of phrases or, most important, alter the sound level of the game or print-out class scores. The teacher can also retain mastery by using a password to prevent pupils altering the program settings or breaking-out of a game to return to the main menu, although that no doubt invaluable arrangement can make the game a little cumbersome at times.

Scores are calculated according to the percentage of correct letters placed, with points deducted for any incorrect letters attempted, and players completing phrases in the required time are rewarded with a repertoire of jolly tunes.

A thorough and carefully planned treatment of a simple concept, Wordskill is available from Chalksoft, 37 Willowslea Road, Worcester WR3 7QP and costs £12.25.

Games taken seriously

Nicole Segre finds recent releases from Acornsoft are unoriginal but reliable

SOFTWARE from Acornsoft has always tended to back the image of the BBC micro as a serious machine on which a little light relief is allowed occasionally in the shape of games displaying the graphics and sound capabilities of the machine. The company has stepped up production recently with a number of releases which only reinforce that tradition.

Most successful of the new Acornsoft games so far appears to have been **Aviator,** whose author Geoffrey Crammond we interviewed in the June/July issue. A feat of complex programming, the game puts the player in the cockpit of a Spitfire, reproducing faithfully every aspect of the performance of the World War Two aircraft. The cassette is accompanied by a detailed instruction booklet and a map, and the chair-bound pilot can practise take-off, landing and even flying through the streets of Acornville or looping the loop.

Although it has only simple black-and-white line graphics, Aviator is impressively realistic and provides a challenge which is at the same time entertaining and educational. The combination has taken Aviator to the top of the best-selling charts and kept it there for some weeks.

Another strong contender, creeping slowly up the charts behind Aviator, is **JCB Digger,** sponsored by J C Bamford Excavators as a promotional exercise. The game features that familiar accessory of any building site, a JCB 3CX excavator loader, pitted in a battle of wits against a horde of Meanies.

> 'The action thus ranges from fairly easy at the start to positively frantic at the end'

The stuggle takes place on an island where the Meanies are trying to capture the digger, which in turn is attempting either to scoop up the Meanies and push them into the sea or to dig holes into which they can fall. Meanwhile, clearing the forests and undergrowth which cover the island provides an additional activity and earns the player extra points.

The great asset of JCB Digger is its colourful and lively graphics. As you drive the digger round the island, the screen scrolls in every direction to reveal more features of the island geography and its fringe of white-capped, moving waves. Although the beaming, blob-like Meanies are scarcely terrifying to look at, the digger is an amusingly accurate portrayal, complete with a driver who is flung from his cabin whenever the Meanies pounce.

Successive waves of increasingly dangerous Meanies are designed to enliven the action of JCB Digger. However, the action of JCB Digger fails to exert a strong grip, especially if you are playing with keyboard controls rather than a joystick.

Besides using the movement keys to drive the excavator, digging a hole requires pressing the SHIFT key three times, while filling a hole to trap a Meanie is achieved by pressing the space bar and driving back over the hole, both awkward manoeuvres to perform in a hurry. In contrast, the alternative method of scoring, consisting of shovelling away the landscape, is a little too leisurely to provide real excitement.

Less enterprising on the graphics front but more fun to play is **Carousel,** in which a fairly familiar shooting stall theme has been refined into a lively and addictive game.

A jolly fairground tune accompanies the action, which consists of shooting at revolving pipes and a conveyor belt of owls, ducks and rabbits. To keep you on your toes, you are harassed occasionally by a duck which swoops to steal bullets from your remaining store, displayed at the bottom of the screen.

On the positive side, you can improve your score by aiming at a series of letters interspersed among the animals. If you manage to shoot them in the correct order to spell 'bonus' you gain extra points for each letter hit. You can also replenish your stock of bullets by shooting at boxes at the top corners of the screen, provided they are displaying a positive number.

Clearing the first screen gives you a chance at the jackpot — shooting at a single polar bear as it crosses the screen. You then proceed to new and more difficult screens where the animals move faster and the birds swoop more frequently. The action thus ranges from fairly easy at the start to positively frantic at the end, thereby winning the favour of everyone who likes zapping games, from ham-fisted novices to nimble-fingered keyboard experts.

In the same vein of a familiar theme which cannot fail to please is **Crazy Tracer.** The object is to guide your paint roller round the edges of a grid of rectangles. Whenever a rectangle is completed, it changes colour and scores the player points according to the size of the rectangle; rectangles with objects in them such as cherries are worth most points. Hampering you in your efforts to race round the grid are so-called 'monsters' which pursue the roller to squash it. Predicting the path the monsters will take is as vital in succeeding as is dexterity with the control keys.

Although effective enough, the graphics in Crazy Tracer are in no way startling and the idea has appeared with slight variations many times elsewhere. Nevertheless, it makes a challenging and addictive game, which has been presented with typical Acornsoft thoroughness and attention to detail.

A slightly more ambitious production is **Free Fall,** which combines interesting and original graphics with unusual and difficult controls. The accompanying booklet of instructions makes somewhat unpleasant reading. A space battleship has been injected with a cyanide-based atmosphere by hostile aliens called Alphoids. Only one crew member has managed to don his space suit in time and must defend himself, and the vital records of the space station, barehanded against the Alphoids.

Alphoids can be destroyed by kicking, punching, ramming or throwing a bomb at them. The crewman can be killed by fire, explosions or suffocation. The Alphoids take a variety of forms, such as venomous craboids, biting and

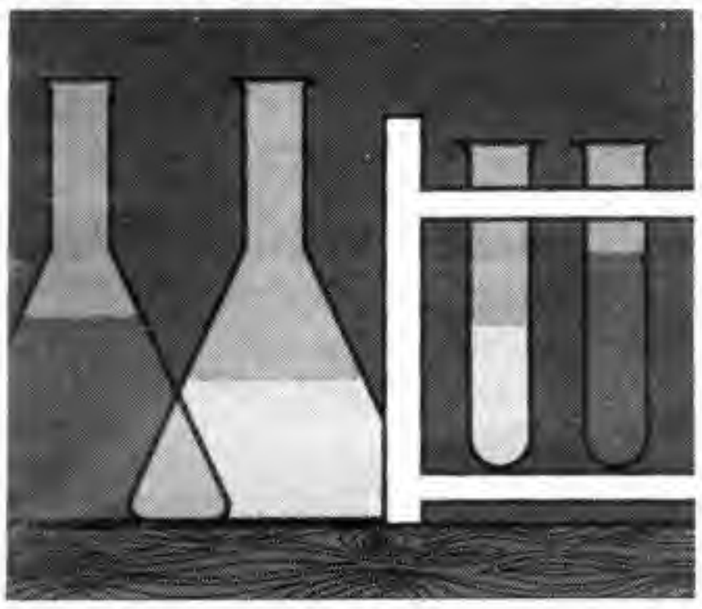
fire-breathing lobstoids, and waspoids which can do everything all the other breeds can do and have a deadly sting as well.

Points in the complex game are earned according to the species of Alphoid which has been destroyed and the method used to achieve it. The octagonal space station is shown as stationary but is in fact rotating, and the crewman, propelled by air jets attached to his suit, moves in curves rather than straight lines. The rate of rotation increases as the player's score mounts and the heartbeat of the crewman and the amount of breathable air he has remaining are displayed at the side of the screen.

Jaded computer games players may find the novelty and intricacies of Free Fall much to their liking but for the inexperienced player the complexity of the controls may prove too discouraging. There are separate keys to propel the crewman left and right, to move each of his arms and legs, and even to catch and throw a bomb; equivalent functions are provided using a joystick by moving it to different compass points.

Surviving for any length of time, or even keeping the crewman from knocking himself out against the walls of the space station, is a daunting task. Excellent animated graphics, if only in black-and-white lines, add considerably to the interest of this difficult game.

A batch of educational programs from Acornsoft has also made a recent appearance, including a series of language tapes based on the Linkword method developed by Dr Michael



Gruneberg.

More academic in bias, while retaining a strong element of entertainment, is **Chemical Analysis,** one of a series of three chemistry programs for schools. The tape covers three main areas — elements, organic and inorganic — and is aimed at children aged 14 to 17.

In each case, pupils learn or revise by trying to guess at substances, asking the computer a series of questions until the answer becomes clear. In the case of

By Don Walton

34 x 10

elements, for example, pupils are given a clue like "It is used in fireworks". They can then choose from a list of questions like "What colour is it?" "How does it react with oxygen?" "Does it conduct electricity?" and so on.

By a process of elimination, they should arrive at the answer — magnesium. They are then asked to supply the symbol for that element and after being shown a score card, can proceed to the next mystery element.

The game can be played on three levels, with a longer and more difficult selection of elements on level three. If they are truly puzzled, pupils can submit by pressing ESCAPE, which makes the computer provide the answer to the last question and proceed to the next. Another helpful feature is that questions which have already been asked change colour. The only slight disadvantage of this absorbing and instructive program is the awkwardness of entering symbols with their mixture of upper- and lower-case letters.

The organic and inorganic sections of the tape follow the same pattern, except that the questions concern tests on the substances and their results. Thoughtfully designed and absorbing, Chemical Analysis should prove a useful tool for both teachers and pupils.

Number Chaser, produced for Acornsoft by ASK, which specialises in educational programs, is a curious paradox in that it aims to use the computer to counteract some of the ill-effects produced by calculators. Dependence on calculators, the authors say, means that many children are unable to do sums in their heads and often cannot judge whether an answer is correct within a few digits.

Number Chaser takes the shape of a race game, in which you can choose your vehicle, from bicycle — easy level — to racing car. The computer flashes a sum at the top of the screen, with four possible answers at the top of each lane. You move your vehicle into the lane with the answer you think is closest to being correct, and if you have chosen correctly you gather speed and get closer to the finishing line. If you are wrong the vehicle behind you gets nearer, eventually crashing into you and ending your race.

Although designed as a colourful and lively game, Number Chaser fails to hold the attention for as long as it might, especially in the more difficult section where the number of questions and the length of the race is a little discouraging. Still, a quick bicycle or stock car race might prove a useful exercise for some children, although it is a pity that at least one spelling error crept into the program.

On the whole, however, the latest releases under the Acornsoft banner maintain the company reputation for software which, without making any great claims to originality, is reliable and thoughtfully produced.

Aviator, cassette version £14.95, disc £17.65; **JCB Digger, Carousel, Free Fall, Crazy Tracer, Chemical Analysis** and **Number Chaser,** cassette £9.95.

All programs available from Acornsoft, Betjeman House, 104 Hills Road, Cambridge CB2 1LQ.

BBC messages at your command

Jeremy Richards begins a new programming series

THERE must be many who, despite typing-in listings, have not learned all the ins and outs of BBC Basic. I hope to take you from first principles, through all the Basic commands to the more complex programming of sound, graphics and other effects.

When you have turned on your BBC or Electron and you can see a message at the top of the screen and a flashing cursor, what do you do? You have probably tried typing-in a friendly message like 'HELLO' but all you receive in reply is a message telling you that you have made a mistake.

In the words of a radio series, don't panic. Computers are only machines. Before they can produce all the wondrous effects you have seen on other machines they have to be given a set of instructions telling them what is required. That set of instructions is known as a program and is a logical sequence of commands through which the computer works its way. You could, of course, never write a program and buy other people's software but it is more interesting and eventually more rewarding to be able to write your own programs, and that is what we will do. Try typing the following:

```
PRINT "HELLO"
```

When you have typed that line, finish by pressing the RETURN key. See what happens? The word 'HELLO' has appeared on the next line. Now type the same line, except this time change what appears between the quotes. For example, you could type:

```
PRINT "MY NAME IS JEREMY"
```

Again, press RETURN when you have finished it. What has been printed to the screen has changed, this time to what you placed between the quotation marks—by the way, use the double quotation mark above the number 2.

Two important things can be learned from this. First, at the end of any line, unless I indicate otherwise, always press the RETURN key. That tells the computer to carry out your instruction. Second, what we have done is to give the computer a legal instruction—a command it recognises. In this case the command it understands is 'PRINT'. By now you probably have guessed that the PRINT command does what it says. It prints to the screen anything you place between the quotation marks.

You cannot type-in commands like that all the time. What we have done so far is to issue a direct command. We now need to store our commands so that they can be carried out in the sequence we wish. We might want, for example, to write the name and address of a friend on the screen in a number of lines. To do that try program one:

```
10 PRINT "CHRISTOPHER
   DAVIS"
20 PRINT "10 THE AVENUE"
30 PRINT "BASILDON. ESSEX"
```

Remember to press RETURN at the end of each line. When finished, type RUN (RETURN) and the name and address is printed on three successive lines. What you have just done is to write your first program. Not the most exciting program in the world but it is a program. Each line represents a command to the computer which the machine obeys.

I used lines numbered 10 to 30. The numbers are not important—they could just as easily be lines 1, 4, 25. The important thing is that they represent a guideline to the computer as to the order in which the commands should be executed. The computer reads line 10 first, carries out whatever is written there and then proceeds to the next line, line 20. It is good convention to build a program in steps of 10, as there are always times when you will need to insert an extra line and that would be difficult if you had left no space by writing a program using steps of one.

To look at the program again type LIST (RETURN) and that command will print-out a listing of your program in the correct sequence. The command can be used only to list a program and cannot be used as part of a program.

Let us go a little further. We have seen how the PRINT statement can place words on the screen but it can also carry out mathematical instructions. Type-in the following:

```
PRINT 25*2
```

That statement causes the computer to type '50'. That is different from what we have seen previously. Note this time there are no quotation marks. In the previous example the quotation marks were placed to inform the machine that we were dealing with a non-numerical event or something which did not require any mathematics to be involved.

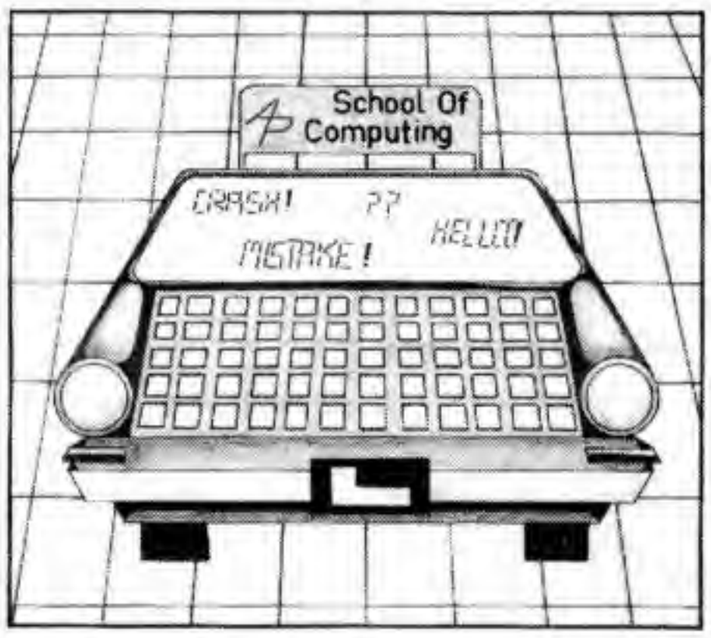
In this present example I have asked the computer to tell me what 25 multiplied by 2 is and it has replied with the correct answer, 50. Therefore the computer is capable of being a calculator as well. The asterisk '*' is the sign for multiplication and the division sign is '/'. Addition and subtraction uses the conventional '+' and '−' signs. Try using PRINT statement to do the following:

(a) Add 25 and 12
(b) Subtract 23 from 79
(c) Divide 80 by 10

You should have typed the following to answer:

(a) PRINT 25+12

'You could, of course, buy other people's software, but it is more interesting and more rewarding to write your own programs'



(b) PRINT 79-23
(c) PRINT 80/10

We can then use what we have learned to begin to write a program to test multiplication tables. Type the following program 2a, using exactly the same line numbers:

```
10 PRINT "This program will give you the answer"
20 PRINT "to any number in the eight times table."
30 PRINT "ENTER ANY NUMBER"
```

You should by now understand what will happen if you run this program. It asks the user to enter any number. That is where we reach our second keyword statement. We need to be able to enter information or input into the computer. To do that we use the INPUT statement which tells the computer we are requesting information and the computer will wait until an answer is given. For example, type:

```
INPUT number
```

In response to the question mark enter a number. If you enter a number the '>' prompt will return. If you then type:

```
PRINT number
```

the number you entered will appear. What you have done is to allow the value entered to be given to a numeric variable, the variable name being 'number'. It could just as easily have been called 'a' or 'Fred'.

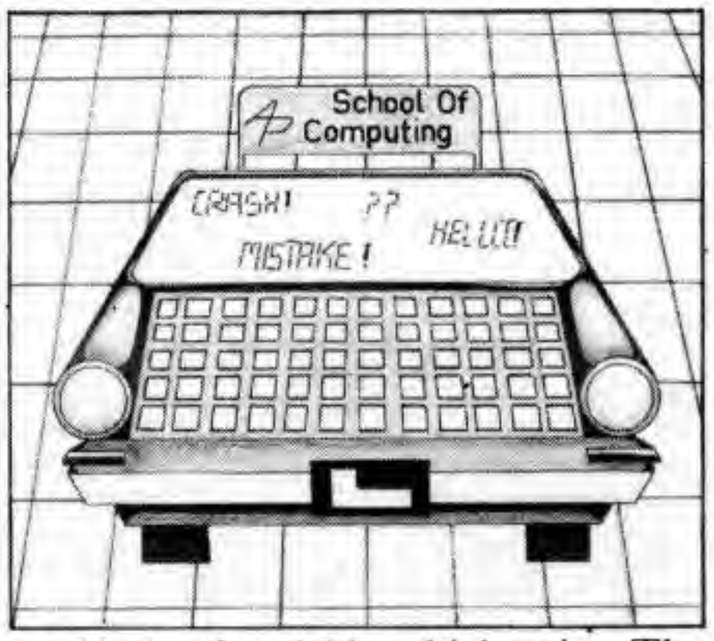
You can think of a variable as a box. When you used the INPUT statement the number you entered was placed in the box called 'number' and at a later date when you asked for the contents of the box by typing 'PRINT number' the number you entered was shown. Use the example again in program 2b but this time change the variable name, i.e., 'number' becomes 'a'. Now add two more lines to complete the program as follows:

```
40 INPUT a
50 PRINT 8*a
```

Run the program. Can you see what is happening? Line 40 waits for the user to input a number and that number is multiplied by eight in line 50 and the PRINT statement prints that result to the screen.

What happens if we enter a non-numeric value, i.e., the letter 'A'? Although it would appear that the reply is accepted, the result we obtain will always be zero. That is because the machine is expecting a numeric value and if anything else is typed-in, the computer reads it as a zero.

That example leads to the two different kinds of variable which exist. The first we have already encountered, a numeric variable. The second kind of variable we can use is called a string variable. When using a string variable any keyboard character is accepted and stored. The difference between that and a numeric variable is that maths cannot be carried out on a string variable. To distinguish between the two kinds of variables, a certain rule is followed.



With the numeric variables we can call it what we like. Therefore where we have stored our numeric input in the program, we called it 'a' but could just as easily have called it 'number' or 'acorn'. To tell the computer we are using a string variable we add a '$'—dollar—sign on to the end of the variable name. For instance, if we want to ask the user's name and then print a personal greeting to that person, we can write program three:

```
10 INPUT name$
20 PRINT "Nice to meet you ";name$
```

The semicolon in line 20 tells the computer to place the variable 'name$' next to the last thing printed, in this case a space, because we want to leave a space between 'you' and the name entered.

'The second kind of variable we can use is a string variable when any keyboard character is accepted and stored'

Therefore a string variable allows any alphanumeric character, i.e., any keyboard character, but it cannot carry out mathematics on a number entered. If you are still not sure about the difference between a numeric and string variable, try to write a program to carry out multiplication; this time use a string variable—one with a '$' sign at the end—to work out the result.

Finally, let us learn a few more Basic keywords. The first keyword is 'LET'. You will often see in programs lines like:

```
tag=9
```

or

```
y=y+8
```

In the first example we have told the computer the numeric variable 'tag' equals 9 or, to be more exact, we have said 'LET tag=9'. The keyword LET is optional and we will not make use of it but the important thing to remember is that when we tell the computer a variable is something or that, as in the second example, the numeric variable 'y' equals the value of 'y' plus 8, we are saying 'LET this variable equal . . .'

So, for instance, if we want to printout a name 10 times we could type 10 lines each with the same PRINT statement:

```
10 PRINT "James"
20 PRINT "James"
30 PRINT "James"
```

That is a tedious way of doing it so we can use our ability to increment a value on a variable by typing:

```
10x=0
20 PRINT "James"
30 x=x+1
40 IF x<10 GOTO 20
50 END
```

Line 10 sets the value of x to 0. Line 20 is where we print our word. At line 30 the value of x is increased by 1—LET x equal the value of x, which at this point is 0, and add 1 to it, therefore making x equal to 1. Now two new keywords, IF and GOTO. What we have said in line 40 is that IF x is less than 10 GOTO line 20, where the print phrase is repeated. That continues until x is greater than 10. If x is greater than 10 the program is finished, thus the END statement at line 50.

I have now provided sufficient information for you to start writing some interesting and useful programs and I leave you with a problem. Write a program which tests someone's knowledge of any multiplication table chosen. Use all the commands to write a program friendly to the user and offering a variety of problems to solve.

The commands you have learned so far should allow you to start writing a number of programs and next time we will deal with some new commands and consider how to plan the writing of a program.

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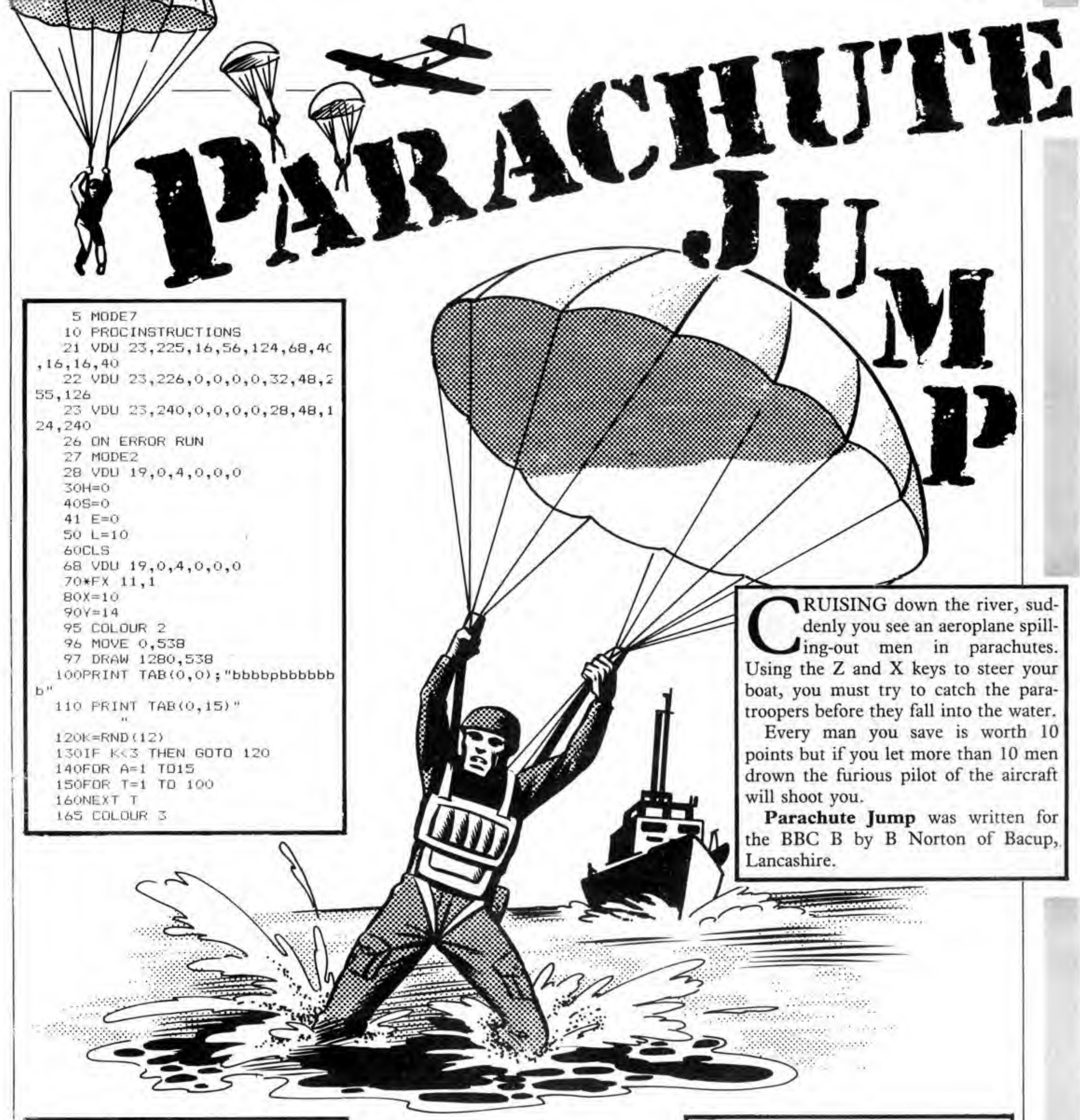


```
    5 MODE7
   10 PROCINSTRUCTIONS
   21 VDU 23,225,16,56,124,68,40
,16,16,40
   22 VDU 23,226,0,0,0,0,32,48,2
55,126
   23 VDU 23,240,0,0,0,0,28,48,1
24,240
   26 ON ERROR RUN
   27 MODE2
   28 VDU 19,0,4,0,0,0
   30H=0
   40S=0
   41 E=0
   50 L=10
   60CLS
   68 VDU 19,0,4,0,0,0
   70*FX 11,1
   80X=10
   90Y=14
   95 COLOUR 2
   96 MOVE 0,538
   97 DRAW 1280,538
  100PRINT TAB(0,0);"bbbbpbbbbbb
b"
  110 PRINT TAB(0,15)"
      "
  120K=RND(12)
  130IF K<3 THEN GOTO 120
  140FOR A=1 TO15
  150FOR T=1 TO 100
  160NEXT T
  165 COLOUR 3
```

CRUISING down the river, suddenly you see an aeroplane spilling-out men in parachutes. Using the Z and X keys to steer your boat, you must try to catch the paratroopers before they fall into the water.

Every man you save is worth 10 points but if you let more than 10 men drown the furious pilot of the aircraft will shoot you.

Parachute Jump was written for the BBC B by B Norton of Bacup, Lancashire.

```
  170PRINT TAB(K,A);CHR$(225)
  180PRINT TAB(K,A-1);"  "
  190A$=INKEY$(0)
  200IF A$="Z" AND X>1 THEN X=X-
1
  210IF A$="X" AND X<17 THEN X=X
+1
  215 COLOUR 2
  220PRINT TAB(X,Y);" ";CHR$(226
);" "
  224 COLOUR 6
  225 MOVE 0,538
  226 DRAW 1280,538
  227
  230*FX 15,0
  240NEXT A
  250IF K=X+1 THEN PROCSCORE ELS
E PROCLIVES
  260GOTO 100
  270DEF PROCSCORE
  280SOUND 1,-15,150,1
  290S=S+10
  295 COLOUR 3
  300PRINT TAB(1,18);"SCORE=";S
  310 IF S>H THEN H=S
  320 PRINT TAB(1,20);"HI-SCORE=
";H
  330ENDPROC
  340DEF PROCLIVES
  342 PRINT TAB(E,16);" ";CHR$(2
40);" "
  343 E=E+1
  350 L=L-1
  360SOUND 0,-15,50,2
  365 COLOUR 3
  370PRINT TAB(1,19);"LIVES=";L

  380IF L<1 THEN PROCFINISH
  390 ENDPROC
  400DEF PROCFINISH
  405 COLOUR 3
  410PRINT TAB(0,21);"HIT THE S
PACE BAR  FOR ANOTHER GO"
  420TIME=0:REPEAT:UNTIL TIME>3C
  430SOUND 1,-15,30,5:SOUND 1,-1
5,50,5:SOUND 1,-15,20,10:SOUND 1
,-15,50,5
  440G=GET
  450IF G=32 THEN GOTO 40 ELSE G
OTO 440
  460DEF PROCINSTRUCTIONS
  470CLS
  480PRINT TAB(11,4);CHR$(141);C
HR$(134);"PARACHUTE":PRINT TAB(1
1,5);CHR$(141);CHR$(134);"PARACH
UTE"
  485*FX 11,9
  490PRINT TAB(3,9);"You are sai
ling in the River Burt when you
see an aeroplane spilling out me
n in parachutes.You can miss 10
men,but after that the pilot sho
ots you dead."
  500PRINT "PRESS THE SPACE BAR
TO CONT"
  510G=GET
  520CLS
  530PRINT TAB(3,9);"Every life
saved is worth 10 points.You mus
t catch as many men as you can b
efore your lives run out.You con
trol the boat with Z=left & X=ri
ght."
  540PRINT "PRESS THE SPACE BAR
TO PLAY"
  550G=GET
  560ENDPROC
```

ADDRES

```
   10REM*************************
*******
   20REM************DATABASE****
*******
   30REM*********BY D.SENTINELLA
*******
   40REM*************************
*******
   50REM***********VARIABLES****
*******
   60REM*************************
*******
   70MODE4:DIMB$(200,4):DIMC$(4)
:C$(1)="NAME":C$(2)="ADDRESS":C$
(3)="TELEPHONE NUMBER":C$(4)="DA
TE OF BIRTH":DIMF$(200,5):F=0:D=
0
   80REM***********INSTRUCTIONS*
*******
   90VDU26:CLS:VDU23,1,0;0;0;0;0
;:PRINTTAB(10,2);"INSTRUCTIONS":
PRINTTAB(10,3);"------------"
  100PRINTTAB(2,5);"This is a DA
TA BASE program for the   ACORN
ELECTRON."
  110PRINTTAB(2,7);"This program
 allows you to keep up to 200 na
mes,addresses,telephone numbers
  and dates of birth."
  120PRINTTAB(2,10);"Included in
 the program is a MENU.To  use i
t enter the letter to the left o
f  the instruction."
  130PRINTTAB(3,30);"PRESS ANY K
EY TO CONTINUE":T$=GET$
  140
  150REM**MENU**
  160VDU26:CLS:PRINTTAB(19,2);"M
ENU":PRINTTAB(19,3);"----"
  170PRINTTAB(10,6);"A......WRIT
E A NEW FILE."
  180PRINTTAB(10,8);"B......LOOK
 AT CURRENT FILE."
  190PRINTTAB(10,10);"C......ADD
 TO CURRENT FILE."
  200PRINTTAB(10,12);"D......SAV
E FILE TO TAPE."
  210PRINTTAB(10,14);"E......LOA
D FILE FROM TAPE."
  220PRINTTAB(10,16);"F......INS
TRUCTIONS."
  230PRINTTAB(10,18);"G......IND
EX."
  240PRINTTAB(10,20);"H......DEL
ETE A NAME."
  250PRINTTAB(5,24);"PLEASE ENTE
R THE LETTER YOU WANT."
  260A$=GET$:IF A$<>"A" AND A$<>
"B" AND A$<>"C" AND A$<>"D" AND
A$<>"E" AND A$<>"F" AND A$<>"G"A
ND A$<>"H" THEN260
  270IF D<1THEN IFA$="B" ORA$="C
"OR A$="D"OR A$="G"OR A$="H" THE
N CLS:PRINT "YOU HAVE NO FILE IN
 MEMORY!":FORA=1TO2000:NEXTA:GOT
O150
  280VDU26:CLS:MOVE10,958:DRAW12
69,958:DRAW1269,10:DRAW10,10:DRA
W10,958
  290IF A$="A"THEN PROCA
  300IF A$="B"THEN F=0:PROCB
  310IF A$="C"THEN PROCC
  320IF A$="D"THEN PROCD
  330IF A$="E"THEN PROCE
  340IF A$="F"THEN GOTO80
  350IF A$="G"THENPROCG
  360IF A$="H"THENPROCH
  370GOTO150
  380
  390DEF PROCA:REM**WRITE A FILE
**
  400PRINTTAB(12,1);"WRITE A FIL
E.":VDU28,1,15,38,3:MOVE10,510:D
RAW1269,510
  410PRINTTAB(1);"In this part o
f the program you can  write a n
ew file.The computer will    pri
nt up what it wants you do enter
."
  420MOVE10,510:DRAW1269,510
  430INPUT"How many people do yo
u want in your   file?"D
  440IF D<1OR D>200THENPRINT"YOU
R NUMBER IS NOT BETWEEN 1-200!":
FORA=1TO3000:NEXTA:CLS:GOTO430
  450CLS:FOR A=1TO D STEP2:VDU28
,1,15,38,3:CLS
  460PRINT"PERSON..";A
  470INPUT"NAME....."B$(A,1)
  480INPUT"ADDRESS....."B$(A,2)
  490INPUT"TELEPHONE NUMBER.....
"B$(A,3)
  500INPUT"DATE OF BIRTH....."B$
(A,4)
  510IF A+1>D THEN GOTO590
  520VDU28,1,30,38,17:CLS
  530PRINT"PERSON..";A+1
  540INPUT"NAME....."B$(A+1,1)
  550INPUT"ADDRESS....."B$(A+1,2
)
  560INPUT"TELEPHONE NUMBER.....
"B$(A+1,3)
  570INPUT"DATE OF BIRTH....."B$
(A+1,4)
  580NEXTA
```

YOU CAN KEEP up to 200 names and addresses on this useful database program written for the Electron by David Sentinella of Camberley, Surrey. The main menu allows you to create a new file, retrieve information, add to existing files, and SAVE or LOAD from tape. Entries are indexed automatically and there is space on each one for entering a person's date of birth.

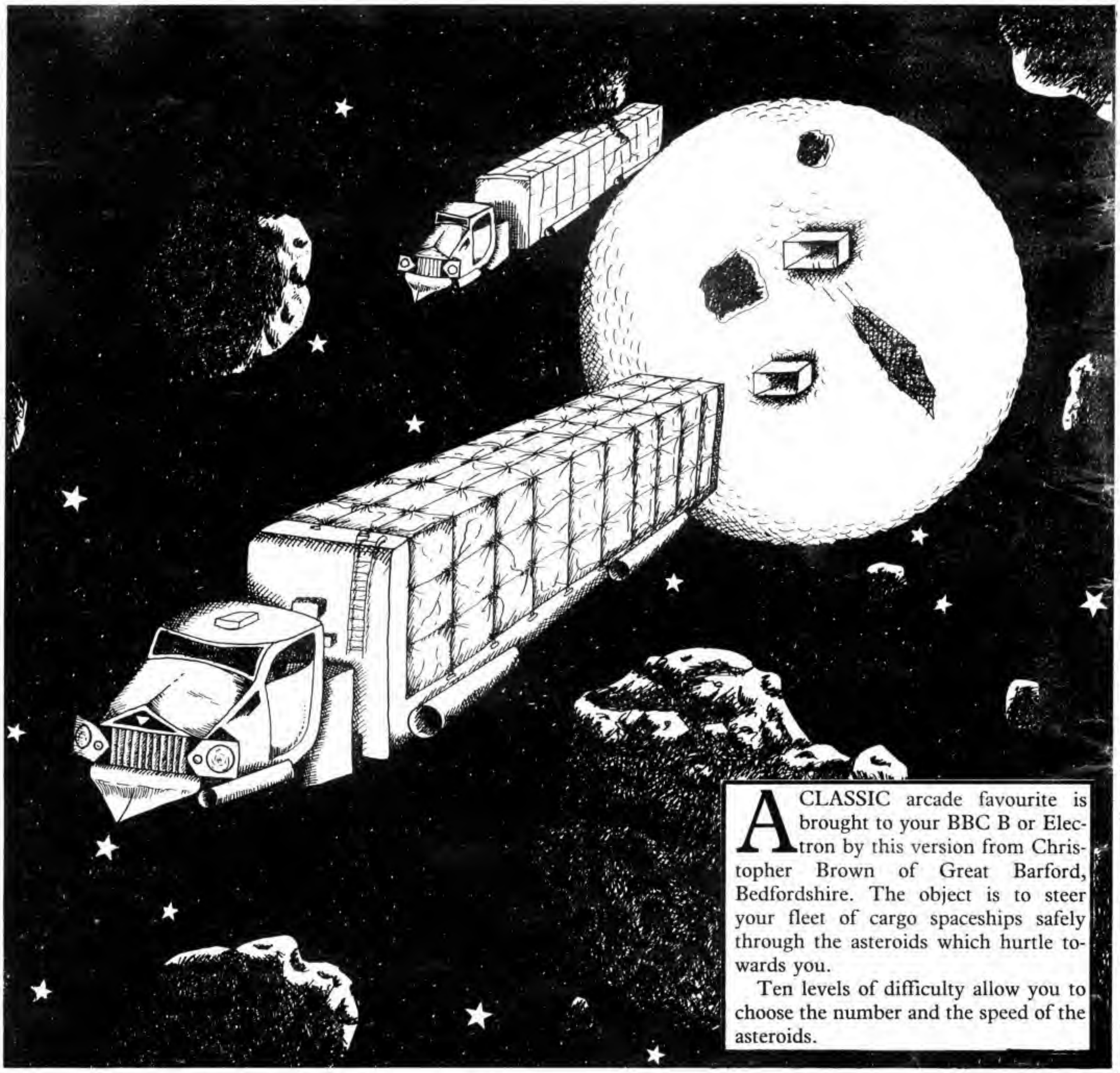
Address Book will also run on the BBC B.

S BOOK

```
  590VDU28,1,30,38,17:CLS:PRINT"
PRESS ANY KEY TO RETURN TO MENU.
":T$=GET$:VDU26:CLS:ENDPROC
  600
  610DEF PROCB:F=0:REM**LOOK AT
A FILE**
  620Z=0:PRINTTAB(10,1);"LOOK AT
 CURRENT FILE":VDU28,1,30,38,3
  630IFZ=1THENZ=2:RETURN ELSEPRI
NTTAB(2,0);"In this part of the
program you can look at the file
 in memory.All the    computer n
eeds to know is one piece    of t
he following infomation:-NAME,
  ADDRESS,TELEPHONE NUMBER OR DA
TE OF    BIRTH."
  640PRINT"The first letter of t
he first word     will do!"
  650INPUT"Please enter which of
 the above list  you know.."D$
  660IF D$<>"NAME" AND D$<>"ADDR
ESS" AND D$<>"TELEPHONE NUMBER"
AND D$<>"DATE OF BIRTH" THEN670
ELSE680
  670IFD$<>"N" AND D$<>"A" AND D
$<>"D"AND D$<>"T" THENPRINT"YOU
MUST ENTER ONE OF THE ABOVE LIST
!":FORA=1TO3000:NEXTA:CLS:GOTO63
0
  680IFD$="N"THEN D$="NAME"
  690IFD$="A"THEN D$="ADDRESS"
  700IFD$="D"THEN D$="DATE OF BI
RTH"
  710IFD$="T"THEN D$="TELEPHONE
NUMBER"
  720FORA=1TO4
  730IF D$=C$(A) THEN C=A
  740NEXTA
  750PRINT:PRINT"PART OF THE INF
OMATION WILL DO":PRINT"PLEASE EN
TER THE ";C$(C);" OF THE PERSON?
":INPUTE$
  760FORA=1TOD
  770IF INSTR(B$(A,C),E$)>=1THEN
 GOSUB950 ELSEGOTO780
  780NEXTA
  790IF E$=" " OR E$=""THEN PRIN
T"YOU DID NOT ENTER ANYTHING!!":
FORA=1TO2000:NEXTA:ENDPROC ELSE8
00
  800IF F=0THEN PRINT"THE ";D$;"
 YOU ENTERED IS NOT IN THE    FI
LE!!":FORA=1TO2000:NEXTA:ENDPROC
 ELSE810
  810IF Z=1THENRETURN ELSE REM**
*WRITE RESULTS TO SCREEN***
  820CLS:MOVE10,500:DRAW1269,500
  :A=0
  830MOVE10,500:DRAW1269,500
  840A=0
  850REPEAT:VDU28,1,15,38,3:CLS:
A=A+1
  860PRINT"PERSON..";A
  870FORZ=1TO4:PRINT"  ";C$(Z);"
.....";F$(A,Z):NEXTZ
  880VDU28,1,30,38,17:CLS:IF A=F
 THEN920
  890PRINT"PERSON..";A+1
  900FORZ=1TO4:PRINT"  ";C$(Z);"
.....";F$(A,Z):NEXTZ
  910A=A+1:PRINTTAB(2,10);"PRESS
 ANY KEY TO CONTINUE!":T$=GET$
  920PRINTTAB(2,10);"PRESS ANY K
EY TO CONTINUE!":IF GET$=""THEN9
20
  930UNTILA=F:VDU26:CLS:ENDPROC
  940REM
  950F=F+1:FOR E=1TO4:F$(F,E)=B$
(A,E):NEXTE:F$(F,5)=STR$(A):RETU
RN
  960
  970DEF PROCC:REM**ADD TO CURRE
NT FILE**
  980PRINTTAB(10,1);"ADD TO CURR
ENT FILE":VDU28,1,30,38,3:CLS
  990VDU28,1,30,38,3:CLS
 1000PRINTTAB(2,1);"In this part
 of the program you can   add to
 the file in memory.You enter
this in the same way as you did
      before.":INPUT"Number of p
eople you wish to add to   the c
urrent file.."G
 1010IF G>200 OR G<1THEN PRINT"Y
OUR NUMBER IS NOT BETWEEN 1-200!
":FORA=1TO2000:NEXTA:CLS:GOTO100
0
 1020IF D+G>200 OR D+G<1THENPRIN
T"THE OVERALL NUMBER IS OVER 200
!":FORA=1TO2000:NEXTA:CLS:GOTO10
00
 1030MOVE10,500:DRAW1269,500
 1040FORA=D+1 TO (D+G)STEP 2
 1050VDU28,1,15,38,3:CLS
 1060PRINT"PERSON..";A
 1070INPUT"NAME.....";B$(A,1)
 1080INPUT"ADDRESS.....";B$(A,2)
 1090INPUT"TELEPHONE NUMBER.....
";B$(A,3)
 1100INPUT"DATE OF BIRTH.....";B
$(A,4)
 1110VDU28,1,30,38,17:CLS
 1120IF A=(D+G) THEN 1190
 1130PRINT"PERSON..";A+1
 1140INPUT"NAME.....";B$(A+1,1)
 1150INPUT"ADDRESS.....";B$(A+1,
2)
 1160INPUT"TELEPHONE NUMBER.....
";B$(A+1,3)
 1170INPUT"DATE OF BIRTH.....";B
$(A+1,4)
 1180NEXTA
 1190VDU28,1,30,38,17:CLS:PRINT"
PRESS ANY KEY TO RETURN TO MENU.
":G$=GET$:VDU26:CLS:D=D+G
 1200ENDPROC
 1210
 1220DEF PROCD:REM**SAVE FILE**
 1230PRINTTAB(10,1);"SAVE FILE T
O TAPE":VDU28,1,30,38,3
 1240PRINT"  In this part of the
 program the     computer will s
ave the file on tape.":INPUT"PLE
ASE ENTER FILE NAME.."L$
 1250I=0:H=OPENOUTL$ :REPEAT:I=I
+1:FORA=1TOD:I$=B$(A,I)
 1260PRINT£H,I$:NEXTA
 1270I$="NO MORE":I$=I$+STRING$(
248," ")
 1280PRINT£H,I$
 1290UNTILI=4:CLOSE£H
 1300ENDPROC
 1310
 1320DEF PROCE:REM**LOAD FILE**
 1330PRINTTAB(10,1);"LOAD FILE F
ROM TAPE":VDU28,1,30,38,3
 1340PRINT"  In this part of the
 program the     computer will l
oad a file from tape..":INPUT"PL
EASE ENTER FILE NAME.."L$
 1350H=L$:D=0:J$="NO MORE":J$=J$
+STRING$(248," ")
 1360FORA=1TO4:D=0:REPEAT:D=D+1
 1370INPUT£H,I$:B$(D,A)=I$:UNTIL
I$=J$
 1380NEXTA:CLOSE£H
 1390FORA=1TO4:B$(D,A)="":NEXTA:
ENDPROC
 1400DEF PROCG:REM**INDEX**
 1410PRINTTAB(15,1);"INDEX":PRIN
TTAB(1,3);"NUMBER....NAME":VDU28
,1,30,38,4
 1420CLS:FORA=1TOD
 1430PRINTTAB(0);A;".........";B
$(A,1)
 1440IFVPOS>=20 AND A<>D THENPRI
NTTAB(1,23);"PRESS ANY KEY TO CO
NTINUE":Z$=GET$:CLS
 1450NEXTA:PRINT''"PRESS ANY KEY
 TO RETURN TO MENU":Z$=GET$:ENDP
ROC
 1460DEF PROCH:F=0:REM**DELETE A
 NAME**
 1470PRINTTAB(13,1);"DELETE A NA
ME":VDU28,1,30,38,3
 1480PRINT"In this part of the p
rogram you can   delete a name t
hat is in the file.To  do this y
ou need to know one of the   fol
lowing:-name,address,telephone
   number or date of birth.":Z=1
 1490GOSUB640
 1500IFZ=2THENGOTO1480
 1510CLS:FORA=1TOF:I=0:PRINT"PER
SON";A
 1520REPEAT:I=I+1:PRINTTAB(0);C$
(I);"....";F$(A,I):UNTILI=4
 1530PRINT''"DO YOU WISH TO DELE
TE THIS NAME(Y/N)":Z$=GET$:IF Z$
="Y"THENGOTO1560
 1540CLS:NEXTA
 1550PRINT''"PRESS ANY KEY TO RET
URN TO MENU":Z$=GET$:ENDPROC
 1560FORQ=VAL(F$(A,5)) TO D
 1570I=0:REPEAT
 1580I=I+1:B$(Q,I)=B$(Q+1,I)
 1590UNTILI=4
 1600NEXTQ:D=D-1:GOTO1540
```

CARGORAMA

```
  10 ON ERROR GOTO 20
  20 CLS
  30 GOSUB 410
  40 MODE 1
  41 *FX 200,2
  50 *FX 11,0
  60 VDU 23,240,126,126,126,126
,126,126,60,24
  70 HS=0
  80 X=15:Y=10:S=0:D=0
  90 VDU23;8202;0;0;0;
 100 COLOUR 2
 110 PRINTTAB(RND(30),31)"*"
 120 PRINTTAB(RND(30),30)"*"
 130 FOR K=0 TO DS
 140 PRINTTAB(RND(30),30)"*"
 150 NEXT K
 160 COLOUR 1
 170 PRINTTAB(X,Y);CHR$(240);TA
B(1,1);S
 180 SOUND1,-5,X,1
 190 S=S+1
 200 I$=INKEY$(10)
 210 IF I$="Q" D=-1
 220 IF I$="P" D=1
 230 X=X+D
 240 IF I$="@" S=S-80 :CLS
 250 LET D=0
 260 IF X>30 X=30
 270 IF X<1 X=1
 280 IF POINT(X*32+16,656)>0 GO
TO 300
 290 GOTO 100
 300 PRINT TAB(X-1,Y)"<£>"
 310 IF S$="N" GOTO 330
 320  FOR I=1 TO 100:SOUND 0,-5
,I,1:NEXT
 330 CLS
 340 PRINT TAB(5,5)"YOUR SCORE
IS ";S
 350 IF S>HS THEN  HS=S:INPUT"E
NTER YOUR NAME " H$
 360 PRINT "      HIGH SCORE
 "
 370 PRINT"    ";HS;" by ";H$
 380 GOSUB 530
 390 CLS
 400 GOTO 80
 410 PRINT
 420 PRINT"     ";
 430 PRINT" £££££CASTEROIDS££££
£££  "
 440 PRINT "            BY"
 450 PRINT "   CHRISTOPHER BROW
N (C) 1984"
 460 PRINT
 470 PRINT "     LEFT ~Q"
 480 PRINT "    RIGHT ~P"
 490 PRINT "    HELP ~@ BUT YOU
R SCORE IS 80 LESS"
 500 PRINT " SOUND ?(Y/N) ";:IN
PUT S$
 510 *FX 210,0
 520 IF S$="N" THEN *FX 210,1
 530 INPUT "DIFICULTY (1 TO 30)
 "DS
 540 CLS
 550 RETURN
 560 VDU 23;8202;0;0;0;
```

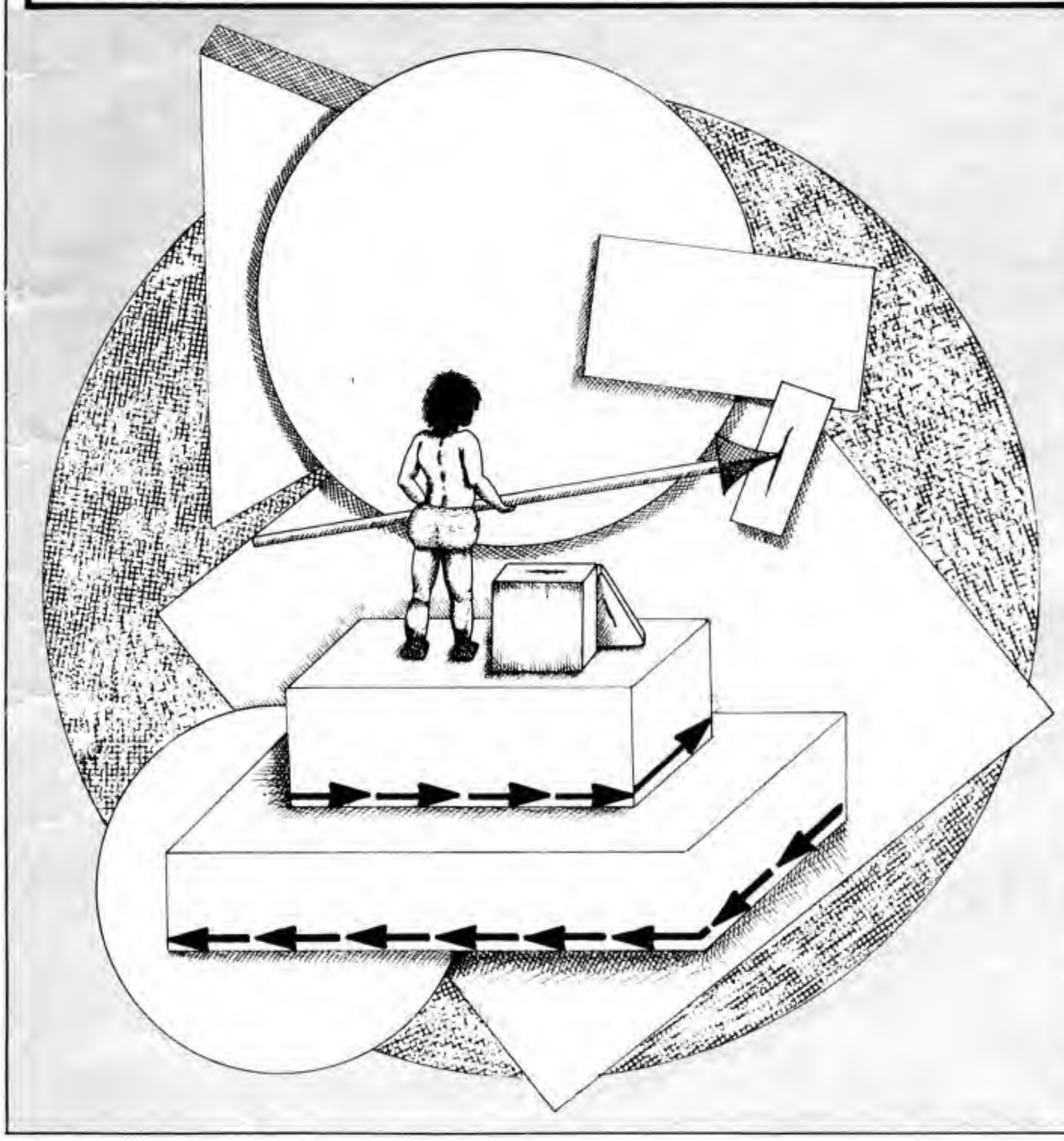


A CLASSIC arcade favourite is brought to your BBC B or Electron by this version from Christopher Brown of Great Barford, Bedfordshire. The object is to steer your fleet of cargo spaceships safely through the asteroids which hurtle towards you.

Ten levels of difficulty allow you to choose the number and the speed of the asteroids.

MIX & MATCH

```
   10 MODE 2
   15 ON ERROR GOTO3700
   16 VDU23;8202;0;0;0;
   20 PROCINIT
   30 PROCSPEED
   40 S%=RND(4)
   45 CLG
   46 GCOL0,1
   50 X%=600:Y%=1000:I%=100
   60 IF S%=1 THEN PROCSQUARE(X%
,Y%,I%)
   70 IF S%=2 THEN PROCDIAMOND(X
%,Y%,I%)
   80 IF S%=3 THEN PROCTRIANG(X%
,Y%,I%)
   90 IF S%=4 THEN PROCRECT(X%,Y
%,I%)
  110 PROCLINE
  120 PROCANSWER
  140 GOTO 40
 1000 DEFPROCINIT
 1005 I%=100
 1010 GCOL0,9
 1020 X%=220:Y%=1000
 1030 PROCSQUARE(X%,Y%,I%)
 1050 GCOL0,10
 1060 X%=800:Y%=1000
 1070 PROCDIAMOND(X%,Y%,I%)
 1100 GCOL0,12
 1110 X%=200:Y%=500
 1120 PROCTRIANG(X%,Y%,I%)
 1150 GCOL0,14
 1160 X%=1100:Y%=500
 1170 PROCRECT(X%,Y%,I%)
 1400 DELAY =TIME
 1410 REPEAT
 1420 UNTIL TIME-DELAY=800
 1430 GCOL0,1
 1440 X%=220:Y%=1000
 1450 PROCSQUARE(X%,Y%,I%)
 1460 GCOL0,2
 1470 X%=800:Y%=1000
 1480 PROCDIAMOND(X%,Y%,I%)
 1490 GCOL0,4
 1491 X%=200:Y%=500
 1492 PROCTRIANG(X%,Y%,I%)
 1493 GCOL0,6
 1494 X%=1100:Y%=500
 1495PROCRECT(X%,Y%,I%)
 1496 ENDPROC
 1500 DEFPROCSPEED
 1520 PRINT TAB(5,5);"SELECT SPE
ED"
 1530 PRINT TAB(5,9);"1.Fast"
 1540 PRINT TAB(5,12);"2.Medium"
 1550 PRINT TAB(5,15);"3.Slow"
 1560 INPUT SP
 1561 IF SP <1 THEN GOTO 1560
 1562 IF SP >3 THEN GOTO 1560
 1570 ENDPROC
 1600DEFPROCSQUARE(X%,Y%,I%)
 1610 MOVE(X%-2*I%),(Y%)
 1620 DRAW(X%+2*I%),(Y%)
 1630 DRAW(X%+2*I%),(Y%-4*I%)
 1640 DRAW(X%-2*I%),(Y%-4*I%)
 1650 DRAW(X%-2*I%),(Y%)
 1660 ENDPROC
 1700 DEFPROCDIAMOND(X%,Y%,I%)
 1710 MOVE X%,Y%
 1720 DRAW(X%+2*I%),(Y%-2*I%)
 1730 DRAW(X%),(Y%-4*I%)
 1740 DRAW(X%-2*I%),(Y%-2*I%)
 1750 DRAW X%,Y%
 1760 ENDPROC
 1800 DEFPROCTRIANG(X%,Y%,I%)
 1810 MOVE X%,Y%
 1820 DRAW (X%+2*I%),(Y%-4*I%)
 1830 DRAW (X%-2*I%),(Y%-4*I%)
 1840 DRAW X%,Y%
 1850 ENDPROC
 1900 DEFPROCRECT(X%,Y%,I%)
 1910 MOVE(X%-I%).Y%
 1920 DRAW(X%+I%),Y%
 1930 DRAW(X%+I%),(Y%-4*I%)
 1940 DRAW(X%-I%),(Y%-4*I%)
 1950 DRAW(X%-I%),Y%
 1960 ENDPROC
 2000 DEFPROCLINE
 2010 I%=50:X%=200:Y%=500
 2020 PROCSQUARE(X%,Y%,I%)
 2030 X%=450
 2040 PROCDIAMOND(X%,Y%,I%)
 2050 X%=800
 2060 PROCTRIANG(X%,Y%,I%)
 2070 X%=1100
 2080 PROCRECT(X%,Y%,I%)
 3000N%=0
 3001 REPEAT
 3002N%=N%+1
 3003 IF N%=5 N%=1
 3011 PRINT TAB(17,24);" "
 3012 PRINT TAB((5*(N%-1)-3),24)
;" "
 3013 PRINT TAB(((5*N%)-3),24);"
^"
 3014 A$=INKEY$(100*SP)
 3015 UNTIL A$<>""
 3040 ENDPROC
 3100 DEFPROCANSWER
 3110 IF N%=S% THEN PROCRIGHT EL
SE PROCWRONG
 3115 *FX15,1
 3120 ENDPROC
 3200 DEFPROCRIGHT
 3210 GCOL0,12
 3220 MOVE 400,400
 3230 DRAW 500,300
 3240 DRAW 700,800
 3270 DELAY =TIME
 3280 REPEAT
 3290 UNTIL TIME-DELAY=600
 3300 ENDPROC
 3400 DEFPROCWRONG
 3410 GCOL0,7
 3520 MOVE 400,800
 3530 DRAW 800,400
 3540 MOVE 800,800
 3550 DRAW 400,400
 3560 DELAY=TIME
 3570 REPEAT
 3580 UNTIL TIME-DELAY=600
 3590 ENDPROC
 3700 IF ERR=17 THEN CLG:GOTO 30
 3710 REPORT
```

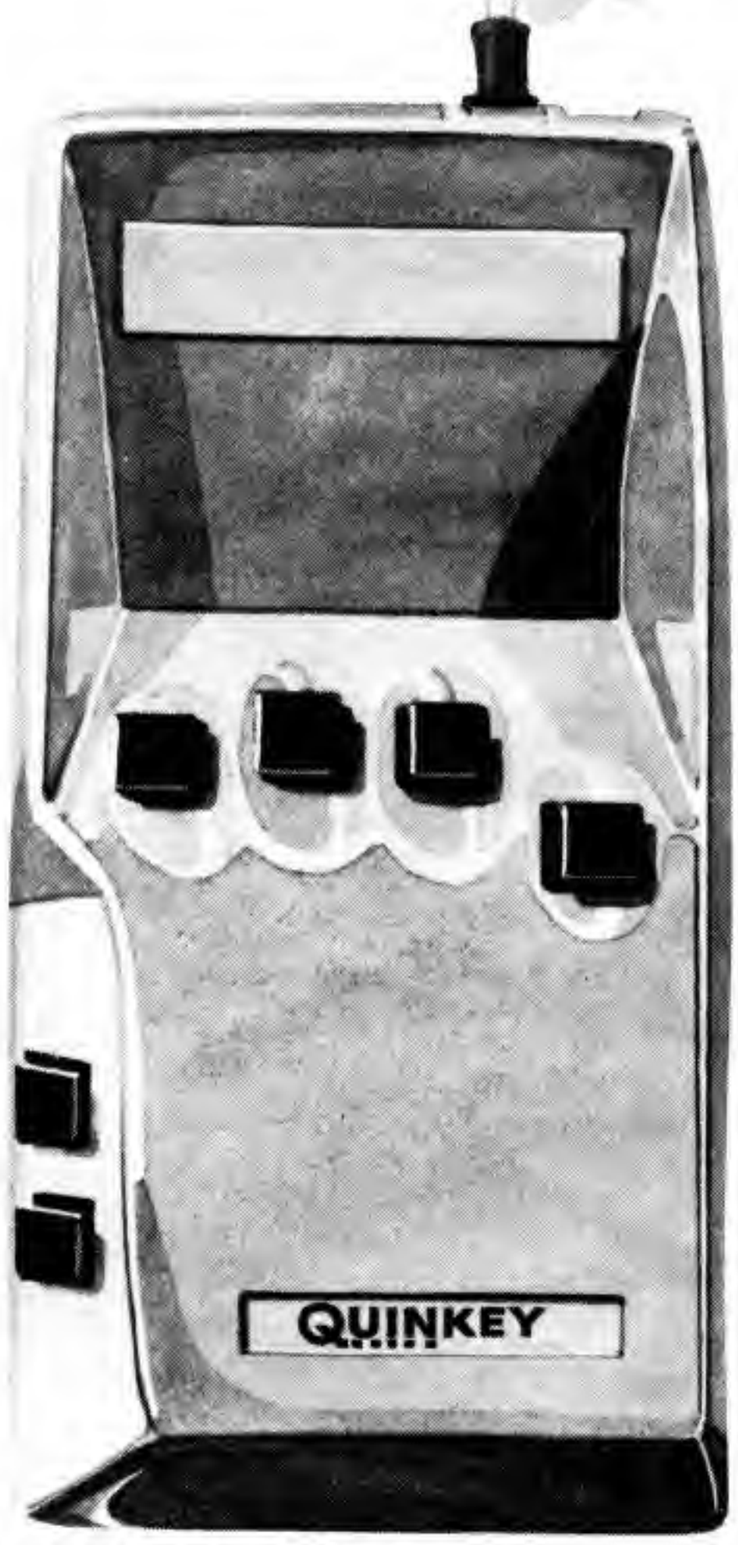


MRS B J GRIBBLE of Oxford wrote **Mix and Match** for the Electron and BBC B to help the youngest member of the family, aged three, to learn to use a computer and to recognise geometric shapes.

At the start, four basic shapes are displayed at the bottom of the screen. One is then selected and re-drawn at the top of the screen and an arrow moves along the bottom row. The child presses the space bar when the arrow is facing the shape matching the one at the top of the screen. A correct answer is rewarded with a flashing tick, an incorrect one with a large cross.

A new game starts automatically after eight seconds and the speed of the game can be varied by pressing ESCAPE to return to the menu.

CLEARLY HE HAD ONLY ONE KEYBOARD IN MIND WHEN HE DESIGNED THE HUMAN HAND



IMAGINE A KEYBOARD

. . . so simple to use that in under an hour you're touch typing the entire alphabet, numbers and punctuation.

. . . so effortless it needs only one hand, your eyes never leaving the screen or the document you're copying.

A keyboard you can hold in your palm, and yet, so powerful, it can replace every input, command and function key of your BBC computer . . .

Just think how effortless it would be if you could *touch type* your programs, data and text.

How you could lean back and relax; be faster and more accurate; your mind free to think, and your eyes to read.

IT'S CALLED QUINKEY

And for **£49.95** you'll get everything you need — hardware and software — to use Quinkey with your BBC computer.

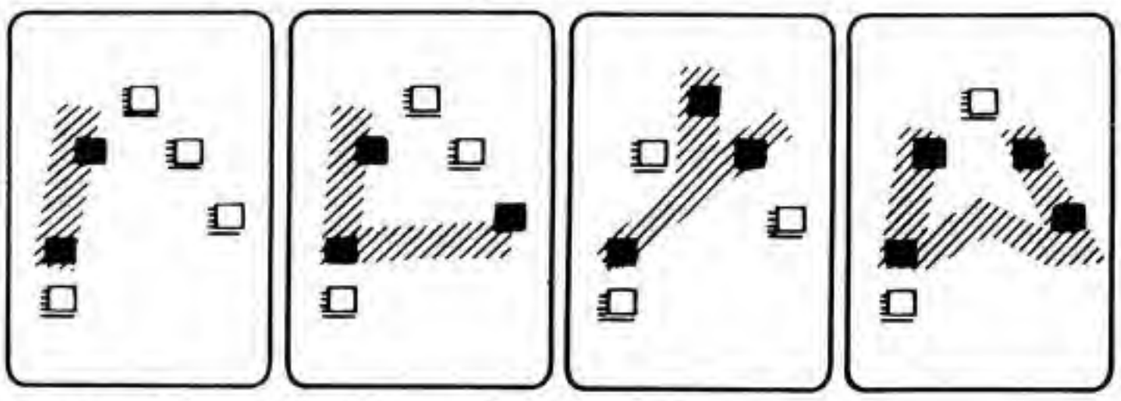
HOW CAN 6 KEYS DO THE WORK OF 72?

You simply press the keys in different combinations. Each combination represents a character.

Quinkey has 5 keys plus a Control key, each finger belonging to its own key — so there's no need to hunt and peck . . . BUT . . .

. . . HERE'S THE MAGIC!

Look at these diagrams:



See how the lines joining the key combinations form the characters? For each letter there's an instantly recognised and easily memorised visual clue.

That's the trick — and it works!

YOU CAN TRY IT NOW!

Rest the fingers of your right hand on a table top. Imagine the keys.

To write an "I" you press your Thumb and Index finger down at the same time.

For an "L" you press your Thumb, Index and Little fingers.

To write "Y" you use your Thumb, Middle and Ring fingers . . . and so on.

That's all there is to it.

Here's what users are saying about the keyboard:

– PETER RODWELL (as Editor of 'Personal Computer World') "took me half an hour to learn the alphabet . . . far easier than learning to type. It's an addictive device, and I'm starting to wonder how I ever managed without one."

– PETER WHEELER (in the 'Times Educational Supplement') "a new user can start to touch type after one hour's usage."

– FRANK DALE (BBC Producer – writing in 'Electronic Times') "no other machine is so easy to use, so easy to learn, so generally useful . . ."

NO RISK, MONEY BACK GUARANTEE.

If you're unhappy with your Quinkey just return it within two weeks for a full and courteous refund.

ONLY £49.95 (including VAT and postage & packing).
HERE'S WHAT YOU GET.

- ★ One Quinkey keyboard.
- ★ Breakthrough multi-channel interface for up to four keyboards (plug into analogue port).
- ★ Two new powerful software packages, PROG & WP (described below).
- ★ Comprehensive Quinkey manual.

"PROG" and "WP" (free with the Quinkey package) are utility programs written specially for the BBC.

"PROG" enables your BBC to recognise and interpret the signals from the Quinkey keyboard. It combines easily with your application programs enabling you to use Quinkey as a comprehensive alternative keyboard.

"WP" optimises Quinkey to work with word-processing packages "Wordwise," "View" and "Edword" – a perfect text-writing combination.

KEYBOARD RANGE.

All BBC "B" keyboard inputs generate from the Quinkey, except the hard-wire key, "Break."

TECHNICAL DATA:
Loading length: &605. Running length: &300.
No zero-page locations, all ADC channels.
Interrupt service vector IRQ2V, correctly chained.

TESTED COMPATIBILITY

BBC Model "B"	Acorn
OS 1.2	
BASIC I or BASIC II (unless using INKEY with negative argument)	Acorn
DFS 0.90	Acorn
View A1.4	Acornsoft
Wordwise 1.17	Computer Concepts
Edword	Clwyd Technics

QUINKEY IN THE CLASSROOM.

Quinkey keyboards allow up to four children to use one BBC computer at the same time. "QUAD" software supplied with the Educational Pack enables children to write simultaneously on a split screen and print out their work separately.

(Send the coupon if you would like more information about the remarkable results that children of all ages and abilities are having with Quinkey.)

Order from your nearest BBC Acorn dealer or by sending in the coupon below, now.

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An associate company of the Hambro Life Group of Companies

31 Southampton Row, London WC1B 5HJ

To: **Vector Marketing Ltd., Denington Estate, Wellingborough, Northants. NN8 2RL.**

PLEASE SEND:

001 _____ **Quinkey pack(s) @ £49.95** £_____

002 _____ Extra keyboard(s) @ **£29.95** £_____

003 _____ Educational Pack(s) @ **£148.80** £_____
(Quinkey pack plus 3 extra keyboards and additional "QUAD" software)

+ postage and packing £ 2.50

I realise that I can return the pack(s) undamaged within two weeks of receipt of order, if I am not fully satisfied, for a complete refund.

Send more information about Quinkey in the classroom. ☐

I enclose a cheque made payable to:
Vector Marketing "Microwriter Ltd" for £_____

Or debit my Visa/Access credit card No._____

SIGNED:_____

NAME:_____

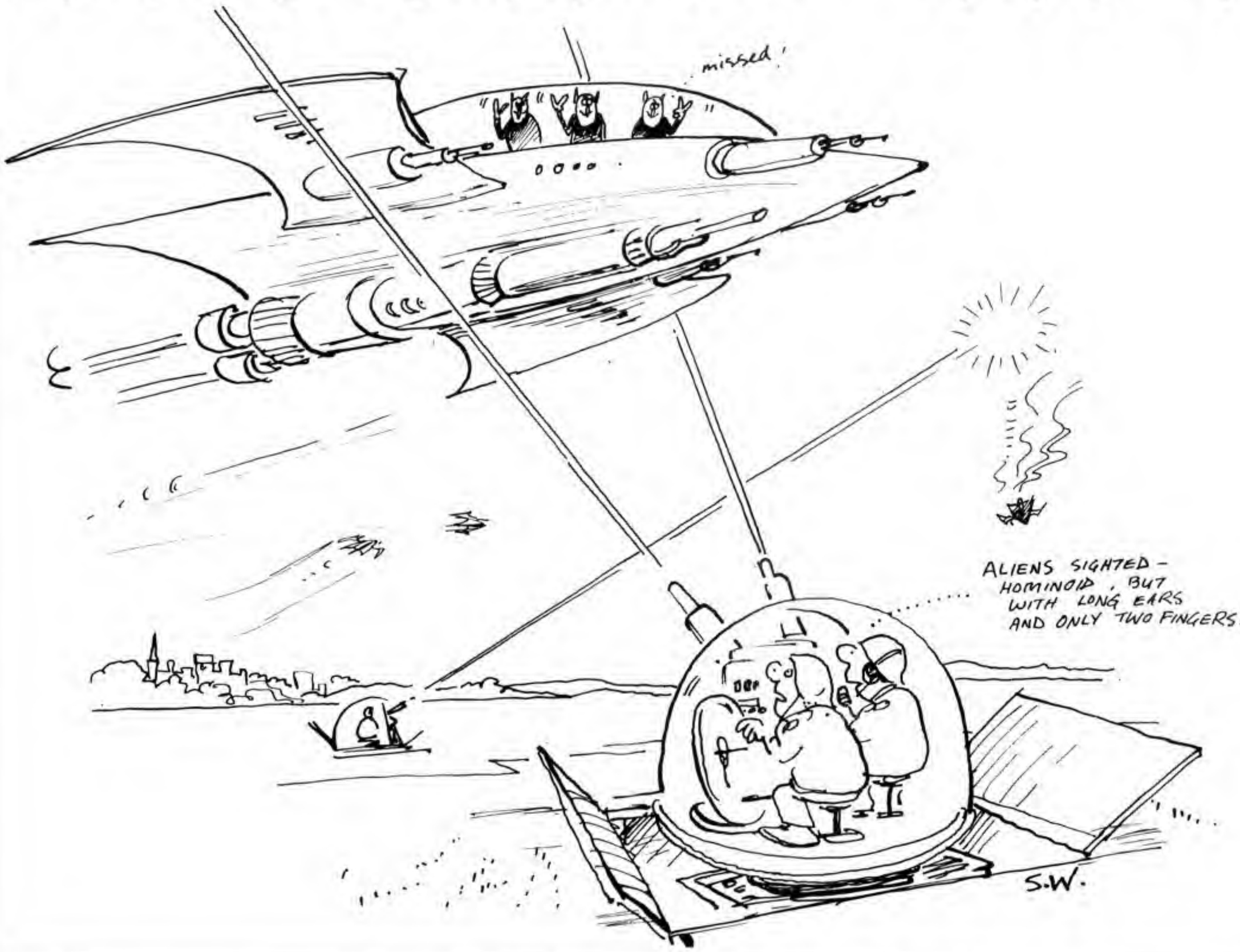
ADDRESS:_____

AP/8/84

Please allow up to 28 days for delivery. Reg. no. 1374069

microwriter
QUINKEY
THE BEST IDEA SINCE THE HUMAN HAND

LASER 'BAT




```
   10REM************************
***
   20REM************************
***
   30REM      VARIABLES
   40REM   X&Y = BASE POSITION
   50REM   NX&NY= MISSILE POSITIO
N
   60REM   T&G   = ENEMY SHIP(TARG
ET)
   70REM            POSITION
   80REM   LEV = LEVEL OF DIFFICU
LTY
   90REM   R&RN= THESE PASS ON LE
V AS
  100REM          A RANDOM NUMBER
INTO
  110REM          THE TARGETFIRE P
ROC
  120REM   F1,2,3,4 = FLAGS
  130REM   THE OTHER VARIABLES US
ED ARE
  140REM   SELF EXPLANITORY.
  150REM   THE REMARKS CAN,OF COU
RSE,BE
  160REM   LEFT OUT OF THE PROGRA
M.
  170REM************************
***
  180REM************************
***
  190F3=0
  200F4=0
  2100LDSCORE=0
  220TITLE=0:TITLE2=0
  230NX=0:NY=0:T=1:G=5 :LIFE=5:S
CORE=0:EX=5
  240VDU23,173,0,0,240,254,240,0
,0,0:VDU23,174,0,30,158,255,158,
30,0,0, :VDU23,175,8,8,8,8,8,28,
28,62
  250A$=CHR$174+CHR$173 :B$=CHR$
175
  260MODE7:VDU23;8202;0;0;0;:PRO
CTITLE :MODE2:VDU23;8202;0;0;0;:
PROCTITLEB
  270X=10:Y=25:PRINTTAB(X,Y);B$
  280PRINTTAB(13,1)"Life";LIFE:P
RINTTAB(1,1);"Score";SCORE
  290F=0
  300REM************************
******
  310REM   START OF MAIN LOOP
  320REM************************
******
  330REPEAT
  340 IF POINT(NX*64+32,1024-(NY
-1)*32-15)=2 THEN PROCHIT
  350PROCTARGET
  360PROCLEFT
  370PROCRIGHT
  380PROCGUIDE
  390PROCFIRE
  400PROCTARGETFIRE
  410UNTIL FALSE
  420REM************************
****
  430REM    END OF MAIN LOOP
  440REM************************
****
  450DEFPROCLEFT
  460 OLDPOS=X
  470IF INKEY(-98) THEN X=X-1:IF
X<=1THENX=1
' 480PRINTTAB(X+1,Y)" " :PRINTTA
B(X,Y);B$
  490ENDPROC
  500REM************************
******
  501REM************************
*******
  510DEFPROCRIGHT
  520IF INKEY(-67) THEN X=X+1: I
F X>=19THEN X=19
  530PRINTTAB(X-1,Y)" " :PRINTTA
B(X,Y);B$
  540ENDPROC
  550REM************************
******
  551REM************************
******
  560DEFPROCFIRE
  570IF NY<=2THENF=0:PRINTTAB(NX
,NY)" "
  580 IF F=1 THEN NY=NY-1:COLOUR
1:PRINTTAB(NX,NY)"!":PRINTTAB(NX
,NY+1)" ":COLOUR7:GOTO600
  590IF INKEY(-74) THEN F=1:NX=X
:NY=Y:SOUND1,-15,30,4:SOUND1,-10
```

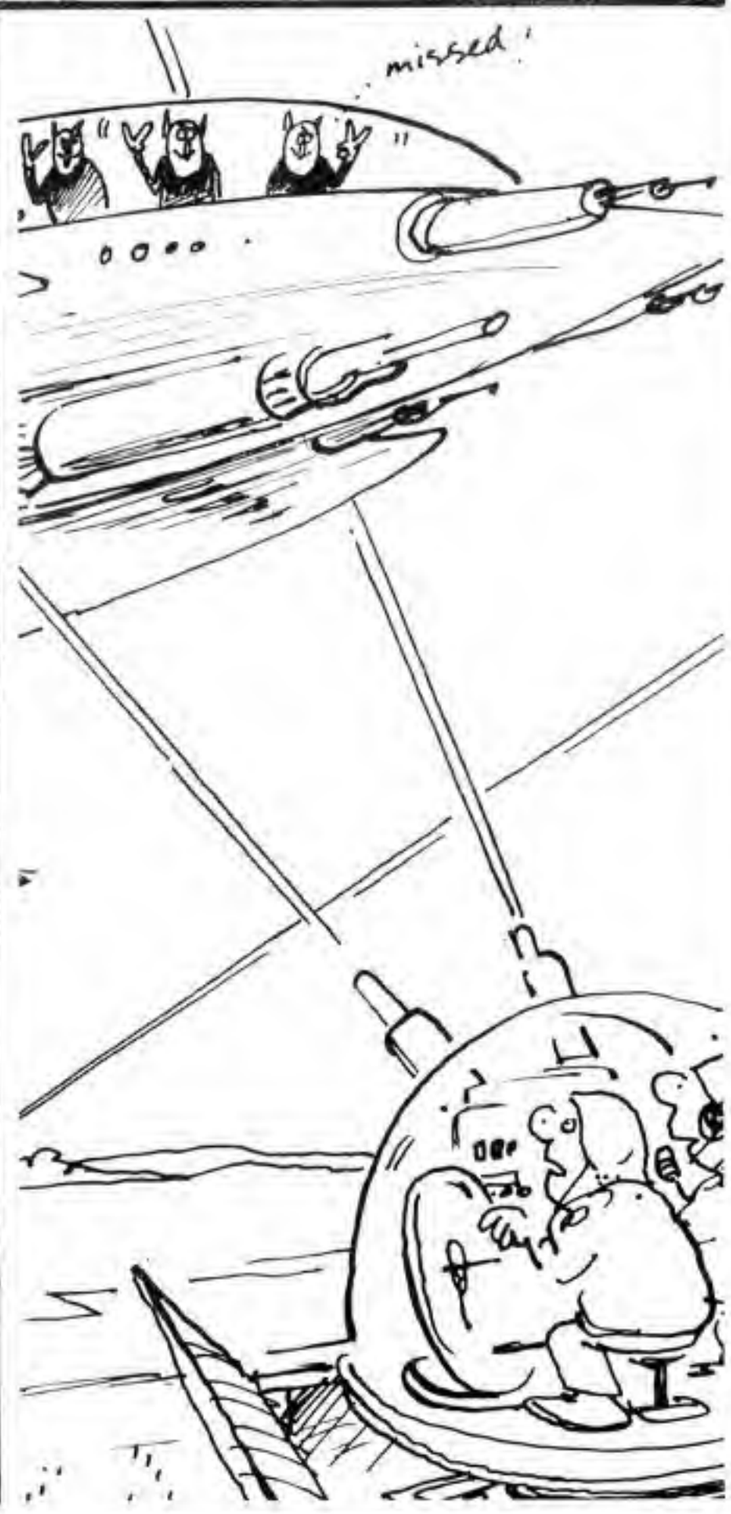
'TILE

FIRE at the enemy ship as it flies overhead on its attack run. You score 10 points for each direct hit but watch for the return fire, which is extremely accurate. You can avoid it by moving your base left and right with the Z and X keys.

Fire by pressing RETURN. You have five lives and when you score 100 points you gain an extra life. There are four levels of difficulty, from easy to impossible. **Laser Battle** was written for the BBC B by C Fothergill of Gainsborough, Lincs.

```
,30,2
  600ENDPROC
  610REM*************************
*******
  611REM*************************
*******
  620DEFPROCTARGET
  630T=T+1:IF T=19 THEN PRINTTAB
(18,G)"   ":T=T=1
  640IF G=Y THEN G=5
  650PRINTTAB(T-1,G)"  ":COLOUR2
:PRINTTAB(T,G);A$:COLOUR7
  660ENDPROC
  670REM*************************
******
  671REM*************************
*******
  680DEFPROCTARGETFIRE
  690RN=RND(INT(R)):IF SCORE>500
  THEN R=R-1:IF R<1THEN RN=1
  700IF  RN=1 AND SCORE>50THEN G
COL0,1:MOVE(T+2)*64,850:DRAW OLD
POS*64,200:GCOL0,0:MOVE(T+2)*64,
850:DRAWOLDPOS*64,200:SOUND0,-7,
2,2:GCOL0,7 :IF OLDPOS=X THEN LI
FE=LIFE-1:PRINTTAB(13,1)"Life
 ":PRINTTAB(13,1)"Life";LIFE
  710IF SCORE=100 AND F3=0 THEN
F3=1:PROCSETUP
  720IF SCORE-OLDSCORE=100 AND S
CORE>100 THEN PROCSETUP
  730IF LIFE=0 THEN PROCGAMEEND
  740ENDPROC
  750REM*************************
******
  751REM*************************
******
  760DEFPROCGUIDE
  770IFNX>=19THENNX=19
  780IF INKEY(-122)THEN NX=NX+1
:PRINTTAB(NX-1,NY)" ":IFNX>=19TH
ENNX=19
  790IF INKEY(-26)THEN NX=NX-1:P
RINTTAB(NX+1,NY)" ":IF NX<=1THEN
 NX=1
  800 IF NY<=2 THEN NY=2
  810ENDPROC
  811REM*************************
******
  820REM*************************
*****
  830DEFPROCHIT
  840PRINTTAB(NX,NY);" "
  850 FORN=1TO32
  860COLOURRND(INT(16)):PRINTTAB
(T,G);A$:PROCDELAY(6)
  870PRINTTAB(T,G)"       "
  880IF F4=0 THEN PROCSOUND ELSE
 GOTO 890
  890NEXT
  900F4=0
  910T=1
  920F=0 :NX=0:NY=0 :COLOUR7:SCO
RE=SCORE+10:PRINTTAB(1,1)"Score
";SCORE
  930PROCDELAY(100)
  940ENDPROC
  950REM*************************
*******
  951REM*************************
******
  960DEFPROCDELAY(TM)
  970TIME=0:REPEAT UNTILTIME=TM
  980ENDPROC
  990REM*************************
*******
  991REM*************************
******
 1000DEFPROCSETUP
 1010*FX15,0
 1020OLDSCORE=SCORE
 1030LIFE=LIFE+EX
 1040CLS
 1050COLOUR10:PRINTTAB(2,10)"YOU
 HAVE GAINED
       EXTRA LIVES    "
 1060COLOUR7
 1070PRINTTAB(5,19)"Hit  Space"
 1080PROCDELAY(100)
 1090*FX15,0
 1100REPEAT UNTIL GET=32 :CLS:PR
INTTAB(1,1)"Score";SCORE:PRINTTA
B(13,1)"Life";LIFE
 1110ENDPROC
 1120REM*************************
****
 1121REM*************************
*****
 1130DEFPROCTITLE
 1140 T$="  LASER  ATTACK  " :IN
ST$="Instructions    "
 1150CLS
 1160FOR N=35TO7STEP-1
 1170TITLE=TITLE+1
 1180PRINTTAB(N,3);LEFT$(T$,TITL
E)
 1190PROCDELAY(1)
 1200NEXT
 1210FOR N=35 TO 10STEP -1
 1220TITLE2=TITLE2+1
 1230PRINTTAB(N,5);LEFT$(INST$,T
ITLE2)
 1240PROCDELAY(1)
 1250NEXT
 1260PROCDELAY(100)
 1270PRINT:PRINTTAB(3);"The obje
ct of the game is to hit
 the enemy ship as it flies on
          its attack run"
 1280PRINT:PRINTTAB(3)"For every
 hit you get ten points.        H
owever the enemy ship will fire
        back.The good news is tha
t it              won't fire back i
mmediatly."
 1290PRINT:PRINTTAB(3)"The bad n
ews is that when it does        I
T IS EXTREMELY ACCURATE.So keep
        on the move"
 1300PRINT:PRINTTAB(3);"Every ti
me you are hit you loose
a life.When you score one hundre
d        you gain extra lives"
 1310PRINT:PRINTTAB(7);"(Press a
ny key)"
 1320REPEAT UNTIL GET
 1330CLS
 1340PRINT:PRINT:PRINT:PRINTTAB(
5)CHR$135"SURVIVAL    RATE"
 1350PRINT:PRINTTAB(3)CHR$129"Le
vel 1 ______ Easy"
 1360PRINT:PRINTTAB(3)CHR$128"Le
vel 2 ______ Not so easy"
 1370PRINT:PRINTTAB(3)CHR$130"Le
vel 3 ______ @*~£_?.. hard"
 1380PRINT:PRINTTAB(3)CHR$131"Le
vel 4 ______ Impossible"
 1390PRINT:INPUTTAB(5)"Enter lev
el number "LEV:IF LEV<1 OR LEV>4
 THEN GOTO1330
 1400IF LEV=1 THEN R=75
 1410IF LEV=2 THEN R=25
 1420IF LEV=3 THEN R=5
 1430IF LEV=4 THEN R=2
 1440ENDPROC
 1450REM*************************
*****
 1451REM*************************
*****
 1460DEFPROCTITLEB
 1470PRINT:PRINT:PRINT:PRINT:COL
OUR2:PRINTTAB(2);"Enemy Ship
";A$ :COLOUR7:PRINT:PRINTTAB(2)"
Your Base    ";B$:COLOUR4:PRINT:
PRINTTAB(2);"Base Left    Z
                    Base Right
 X"
 1480PRINT:COLOUR5:PRINTTAB(2);"
Fire        RETURN"
 1490COLOUR6:PRINT:PRINTTAB(2);"
To guide your
        missile use the
                right & left
                        cursor k
eys"
 1500COLOUR7
 1510PRINT:PRINT:PRINTTAB(2)"(Pr
ess any key)"
 1520REPEATUNTIL GET
 1530CLS
 1540ENDPROC
 1541REM*************************
*******
 1550REM*************************
*******
 1560DEFPROCGAMEEND
 1570CLS
 1580PRINT:PRINT:PRINT:PRINT:PRI
NT:PRINT:COLOUR1:PRINTTAB(4)"GAM
E   OVER":COLOUR7
 1590*FX15,0
 1600PRINT:PRINT:PRINT:PRINT:PRI
NTTAB(1);"Another game? Y/N "

 1610PRINT:PRINT:INPUTTAB(8)Q$:I
F LEFT$(Q$,1)="Y" THEN RUN ELSE
GOTO 1610
 1620ENDPROC
 1630DEFPROCSOUND
 1640F4=1
 1650SOUND0,-9,4,16:SOUND0,-10,4
,16:SOUND0,-12,4,16
 1660ENDPROC
```



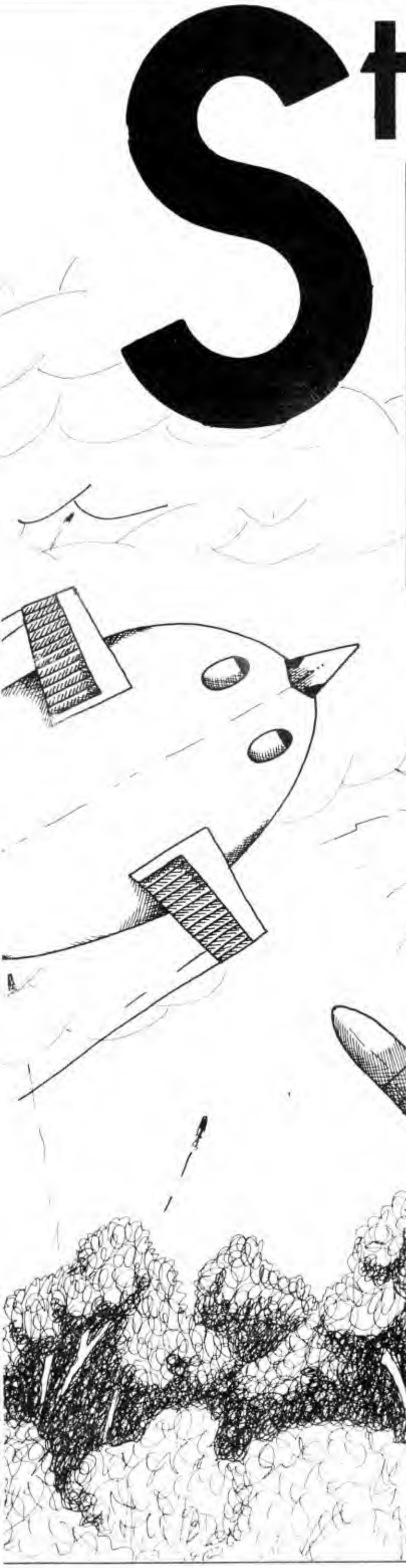
PIGEON

BRIAN BUDD of Guildford, Surrey has devised an entertaining armchair version of the sport of clay pigeon shooting. Launch your pigeon with the space bar, then fire at it using SHIFT. The number of hits you have scored, the latest hi-score and the number of shots you have remaining will be shown at the bottom of the screen.

The game is not so simple as it sounds, as each pigeon you release rises at a different speed. **Pigeon Shoot** was written for the BBC B.

```
   10 ON ERROR PROCerror
   20 MODE 6
   30 PROCinstructions
   40 VDU 23,240,0,0,56,60,0,0,6
0,4,4
   50 VDU 23,231,0,24,60,60,24,0
,0,0
   60 VDU 23,232,145,66,36,24,36
,66,145,4
   70 VDU 23,241,0,0,0,0,0,0,120
,104
   80 VDU 23,242,108,96,124,124,
0,0,0
   90 VDU 23,243,1,1,0,0,0,124,1
24,108
  100 VDU 23,244,108,108,108,108
,0,0,0,0
  110 VDU 23,249,0,0,0,0,16,32,0
,128
  120 VDU 23,250,128,0,0,0,0,0,0
,0
  130 VDU 23,230,0,60,60,60,63,6
3,0,0
  140 VDU 23,245,0,0,0,0,110,0,0
,0
  150 VDU 23,246,0,0,0,56,56,0,0
,0
  160 VDU 23,247,0,2,0,0,0,0,0,0
  170 VDU 23,248,0,0,0,0,0,0,64,
0
  180 VDU 23,251,0,0,0,0,0,0,0,1
7
  190 VDU 23,252,18,28,0,0,0,0,0
,0
  200 VDU 23,253,0,0,0,0,0,0,128
,0
  210 HIHIT=0
  220 REPEAT
  230 MODE 2
  240 VDU 23;8202;0;0;0;
  250 GCOL 0,134:CLG
  260 COLOUR 132:COLOUR 3
  270 PRINT TAB(0,0)SPC(20)
  280 PRINT TAB(0,1)" CLAY PIGEO
N SHOOT.";SPC(20-POS)
  290 PRINT TAB(0,2)SPC(20)
  300 VDU 5
  310 GCOL0,2
  320 MOVE 0,0:MOVE 1280,0:PLOT
85,0,250:PLOT 85,1280,250
  330 VDU 4:COLOUR 131:COLOUR 0:
PRINT TAB(5,27)"HI-HITS:";HIHIT;
TAB(12,29)"LEFT:10";TAB(1,29)"HI
T:0":VDU 5
  340 MOVE 100,300:GCOL0,1:VDU 2
40
  350 MOVE 100,300:GCOL0,5:VDU 2
46
  360 MOVE 100,300:GCOL0,3:VDU 2
51
  370 MOVE 100,300:GCOL0,4:VDU 2
41
  380 MOVE 100,270:GCOL0,4:VDU 2
42
  390 MOVE 100,270:GCOL0,3:VDU 2
52
  400 MOVE 100,270:GCOL0,0:VDU 2
43
  410 MOVE 100,270:GCOL0,5:VDU 2
47
  420 MOVE 100,252:GCOL0,0:VDU 2
44
  430 MOVE 100,252:GCOL0,7:VDU 2
45
  440 MOVE 135,300:GCOL0,0:VDU 2
49
  450 MOVE 135,300:GCOL0,5:VDU 2
48
  460 MOVE 135,300:GCOL0,2:VDU 2
53
  470 MOVE 135,270:GCOL0,0:VDU 2
50
  480 MOVE 700,270:GCOL0,0:VDU 2
30
  490 HIT=0
  500 FOR A=1 TO 10
  510 VDU 4:COLOUR 134:COLOUR 1:
PRINT TAB(2,5)"PULL WHEN READY"
  520 REPEAT UNTIL GET=32
  530 SOUND 0,-15,110,2
  540 VDU 4:COLOUR 134:COLOUR 1:
PRINT TAB(2,5)"                ":
COLOUR 131:COLOUR 0:PRINT TAB(12
,29)"LEFT: ";10-A:VDU 5
  550 S=RND(5)+2
  560 finish=FALSE:fire=FALSE
  570 BX=165:BY=290:CY=300
  580 REPEAT
  590 MOVE 700,CY:GCOL0,6:VDU 23
1
  600 CY=CY+S
  610 MOVE 700,CY:GCOL0,1:VDU 23
1
  620 IF fire=FALSE AND INKEY(-1
) THEN fire=TRUE:SOUND 0,-15,100
,1
  630 *FX 15,1
  640 IF fire=TRUE THEN BX=BX+10
:BY=BY+10:GCOL0,0:PLOT 69,BX,BY
  650 IF BX>=700 AND BX<=730 THE
N PROCcheck
  660 IF CY>=900 THEN finish=TRU
```

SHOOT



```
  670 IF BY>=900 THEN finish=TRU
E
  680 UNTIL finish=TRUE
  690 MOVE 700,CY:GCOL0,6:VDU 23
1
  700 MOVE 170,270:MOVE 1280,920
:GCOL0,6:PLOT 85,170,920
  710 NEXT A
  720 VDU 4:COLOUR 134:COLOUR 4
  730 PRINT TAB(5,7)"GAME OVER"
  740 IF HIT>HIHIT THEN PRINT TA
B(1,9)"Congratulations!";TAB(0,1
0)"You have set a High.":HIHIT=H
IT:PROCthemetune
  750 PRINT TAB(0,13)"Press SPAC
E to play."
  760 REPEAT UNTIL GET=32
  770 UNTIL 0
  780 END
  790 DEF PROCcheck
  800 IF BY<=CY AND BY>=CY-30 TH
EN PROChit
  810 ENDPROC
  820 DEF PROChit
  830 HIT=HIT+1
  840 MOVE 700,CY:GCOL0,1:VDU 23
2
  850 SOUND 0,-15,151,7
  860 finish=TRUE
  870 TIME=0:REPEAT UNTIL TIME=1
00
  880 MOVE 700,CY:GCOL0,6:VDU 23
2
  890 VDU 4:COLOUR 131:COLOUR 0:
PRINT TAB(1,29)"HIT:";HIT:VDU 5
  900 ENDPROC
  910 DEF PROCthemetune
  920 SOUND 3,-10,97,4
  930 SOUND 3,-11,21,4
  940 SOUND 3,-12,121,4
  950 SOUND 3,-13,81,4
  960 SOUND 3,-14,97,4
  970 SOUND 3,-15,109,4
  980 SOUND 3,-14,97,4
  990 SOUND 3,-12,81,4
 1000 ENDPROC
 1010 DEF PROCinstructions
 1020 VDU 19,0,4,0,0,0
 1030 PRINT TAB(8,0)"**********
**********"
 1040 PRINT TAB(8,1)"* Clay Pige
on Shoot *"
 1050 PRINT TAB(8,2)"*   By Bria
n Budd   *"
 1060 PRINT TAB(8,3)"**********
**********"
 1070 PRINT TAB(12,4)"Instructio
ns"
 1080 PRINT'"   Your rifle is ai
med at the sky,your   clay pigeo
n launcher is loaded with 10  cl
ay pigeons,all you have to do is
      launch a clay pigeon and s
hoot it down."
 1090 PRINT"   BUT,the clay pige
ons fly up into the  air at diff
erent speeds,making it a     lit
tle more difficult."
 1100 PRINT'"   At the bottom of
 the screen on the    left is th
e number of clay pigeons you  ha
ve hit,on the right is the numbe
r of  clay pigeons left.You only
 have one     shot at each clay
pigeon."
 1110 PRINT'"   Press ";:COLOUR
 129:COLOUR 0:PRINT"SPACE";:COLO
UR 128:COLOUR 1:PRINT" for more
instructions.";
 1120 PROCthemetune
 1130 REPEAT UNTIL GET=32
 1140 CLS
 1150 PRINT TAB(8,0)"**********
**********"
 1160 PRINT TAB(8,1)"* Clay Pige
on Shoot *"
 1170 PRINT TAB(8,2)"*   By Bria
n Budd   *"
 1180 PRINT TAB(8,3)"**********
**********"
 1190 PRINT TAB(15,5)"Keys:-"
 1200 PRINT''""";:COLOUR 129:COL
OUR 0:PRINT" SPACE ";:COLOUR 128
:COLOUR 1:PRINT" to launch a cla
y pigeon.(PULL!)"
 1210 PRINT''""";:COLOUR 129:COL
OUR 0:PRINT" SHIFT ";:COLOUR 128
:COLOUR 1:PRINT" to fire your ri
fle."
 1220 PRINT'"  Press ";:COLOUR
129:COLOUR 0:PRINT" SPACE ";:COL
OUR 128:COLOUR 1:PRINT" to play.
";
 1230 REPEAT UNTIL GET=32
 1240 ENDPROC
 1250 DEF PROCerror
 1260 IF ERR=17 THEN RUN
 1270 VDU 4
 1280 CLS
 1290 COLOUR 3
 1300 REPORT:PRINT" at line ";ER
L
 1310 END
 1320 ENDPROC
```

Ghost H

```
   10REPEATUNTILGET=32
   20REM"GHOST2"
   30DIM SKX%(10),SKY%(10),G$(3)
,N1%(8),D1%(8),N2%(15),D2%(15)
   35DIMH$(4):H$(1)=CHR$233:H$(2
)=CHR$224:H$(3)=CHR$234:H$(4)=CH
R$224
   40MODE1:VDU23;8202;0;0;0;
   50PROCchr:PRINTTAB(12,16);S$;
TAB(15,17)"= 100 POINTS";TAB(11,
23);B$;TAB(15,23)"= 1000 POINTS"
   60H%=0:HS%=0
   70FORI%=0TO1280:PLOT69,I%,RND
(160)+832:NEXT
   80PRINTTAB(12,13)"REPENT SINN
ER!"
   90FORI%=12TO1264STEP16:MOVEI%
,0:GCOL0,2:PLOT1,0,64:NEXT:MOVE0
,8:DRAW1280,8:MOVE1280,56:DRAW0,
56
  100FORI%=12TO1264STEP16:MOVEI%
,800:GCOL0,2:PLOT1,0,32:NEXT:MOV
E0,804:DRAW1280,804:MOVE1280,824
:DRAW0,824
  110PROCtune
  120REPEAT
  130LV%=3:sc%=0:SC%=0:D%=40:H%=
0
  140U%=0:c%=0:zap%=0:LVL%=1
  150REPEAT
  160PROCinit
  170PROCtomb
  180X%=640:Y%=512:C$="+":GCOL4,
0:MOVEX%,Y%:PRINTC$
  190REPEAT
  200PROCplay
  210UNTILV%=10RH%>=10ORSPY%<=96
  220FORI%=1TO3:VDU19,I%,RND(7);
0;:NEXT
  230MOVESPX%,SPY%:GCOL3,2:PRINT
old$
  240IFH%=10D%=D%-10:H%=0:PROCle
vel
  250IFD%<=10D%=10
  260IFSPY%<=96PROCrebound
  270UNTIL LV%=0
  280PROCend
  290UNTILO
  300REM"==INIT
  310DEFPROCinit
  315SOUND1,1,150,2
  320GCOL0,1:FORT%=0TO640STEP4:M
OVET%,68:PLOT1,0,728:MOVE1280-T%
,68:PLOT1,0,728:NEXT:SOUND0,2,4,
1
  330VDU4:COLOUR3:PRINTTAB(16,10
)"LEVEL ";LVL%:PRINTTAB(13,12)"H
iSCORE 000  ";TAB(21,12);HS%:FOR
T=1TO3000:NEXT
  340VDU24,0;68;1279;796;:CLG:VD
U26
  350old$=G$(1):VDU4:bat%=1:bx%=
0:by%=0
  360VDU20:COLOUR1:PRINTTAB(14,0
)"SCORE ";sc%;"     ";TAB(0,0);"L
IVES ";LV%;TAB(32,0)"HITS ";H%;"
 "
  370VDU5:f%=0
  380M%=24:V%=0
  390FORI%=1TO3:VDU19,I%,RND(7);
0;:NEXT
  400VDU23,255,255,255,255,255,2
55,255,255,255
  410VDU23,254,60,60,60,255,255,
60,60,60
  420T$=CHR$255+CHR$8+CHR$11+CHR
$254+CHR$8+CHR$10+CHR$10+CHR$255
  430SPX%=RND(1184):SPY%=960:GCO
L3,2:MOVESPX%,SPY%:PRINTG$(1)
  440ENDPROC
  450REM"==PLAY
  460DEFPROCplay
  470PROCkeys
  480E%=RND(D%):IFE%=2PROCskel
  490e%=RND(130):IFe%=2PROCbat:f
%=1
  500IFf%=1g%=RND(60):IFg%=3PROC
bat:f%=0:g%=0
  510ENDPROC
  520REM"==KEYS
  530DEFPROCkeys
  540IFV%=10RH%>=100RSPY%<=96END
PROC
  550IFINKEY(-98)PROCm(-M%,0)
  560IFINKEY(-67)PROCm(M%,0)
  570IFINKEY(-73)PROCm(0,M%)
  580IFINKEY(-105)PROCm(0,-M%)
  590IFINKEY(-99)PROCf
  600IFINKEY(-74)PROCsz
  610IFINKEY(-2)REPEATUNTILINKEY
(-65)
  620ENDPROC
  630REM"==MOVE
  640DEFPROCm(x%,y%)
  650IFX%+x%>1248ORX%+x%<0ORY%+y
%<32ORY%+y%>960ENDPROC
  660GCOL4,0:MOVEX%,Y%:PRINTC$
  670X%=X%+x%:Y%=Y%+y%
  680GCOL4,0:MOVEX%,Y%:PRINTC$
  690ENDPROC
  700REM"==TOMBS
  710DEFPROCtomb
  720F%=0
  730FORI%=32TO1248STEP128
  740F%=(F%+1)MOD11
  750TY%=RND(17)*32+192
  760SKX%(F%)=I%:SKY%(F%)=TY%
  770MOVEI%,TY%:GCOL0,1:PRINTT$
  780A%=RND(1200)+32:B%=RND(640)
+128:IFPOINT(A%+16,B%-48)<>1MOVE
A%,I%:PRINTT$
  790NEXT
  800ENDPROC
  810REM"--SKELLINGTON
  820DEFPROCskel
  830IFV%=10RH%>=100RSPY%<=96GOT
O910
  840IFSPY%<=96GOTO910
  850PROCspool
  860PROCkeys
  870R%=RND(10)
  880SOUND2,4,5,1
  890MOVESKX%(R%),SKY%(R%):GCOL3
,1:PRINTT$:PROCkeys:MOVESKX%(R%)
,SKY%(R%):GCOL3,3:PRINTS$
  910:
  920ENDPROC
  930REM"==FIRE!!
  940DEFPROCf
  950LOCALT
  960SOUND3,3,100,1
  970MOVE640,0:GCOL4,0:DRAWX%+16
,Y%-16:FORT=1TO60:NEXT:DRAW640,0
  980PROChit
  990ENDPROC
 1000REM"==HIT?
 1010DEFPROChit
 1020IFPOINT(X%+8,Y%-8)=1PROCreb
ound:ENDPROC
 1030FORJ%=1TO10
 1040IFX%>=SKX%(J%)-24ANDX%<=SKX
%(J%)+32ANDY%<=SKY%(J%)+48ANDY%>
=SKY%(J%)-48ANDPOINT(SKX%(J%),SK
Y%(J%))=1PROCrebound:GOTO1080
 1050IFX%=SKX%(J%)ANDY%=SKY%(J%)
ANDPOINT(X%,Y%)=1PROCrebound:GOT
O1080
 1060IFX%>=SKX%(J%)-24ANDX%<=SKX
%(J%)+32ANDY%<=SKY%(J%)+16ANDY%>
=SKY%(J%)-64ANDPOINT(X%,Y%)<>1MO
VESKX%(J%),SKY%(J%):GCOL3,3:PRIN
TS$:SOUND1,1,50,1:MOVESKX%(J%),S
KY%(J%):GCOL3,1:PRINTT$:PROCsc(1
00)
```

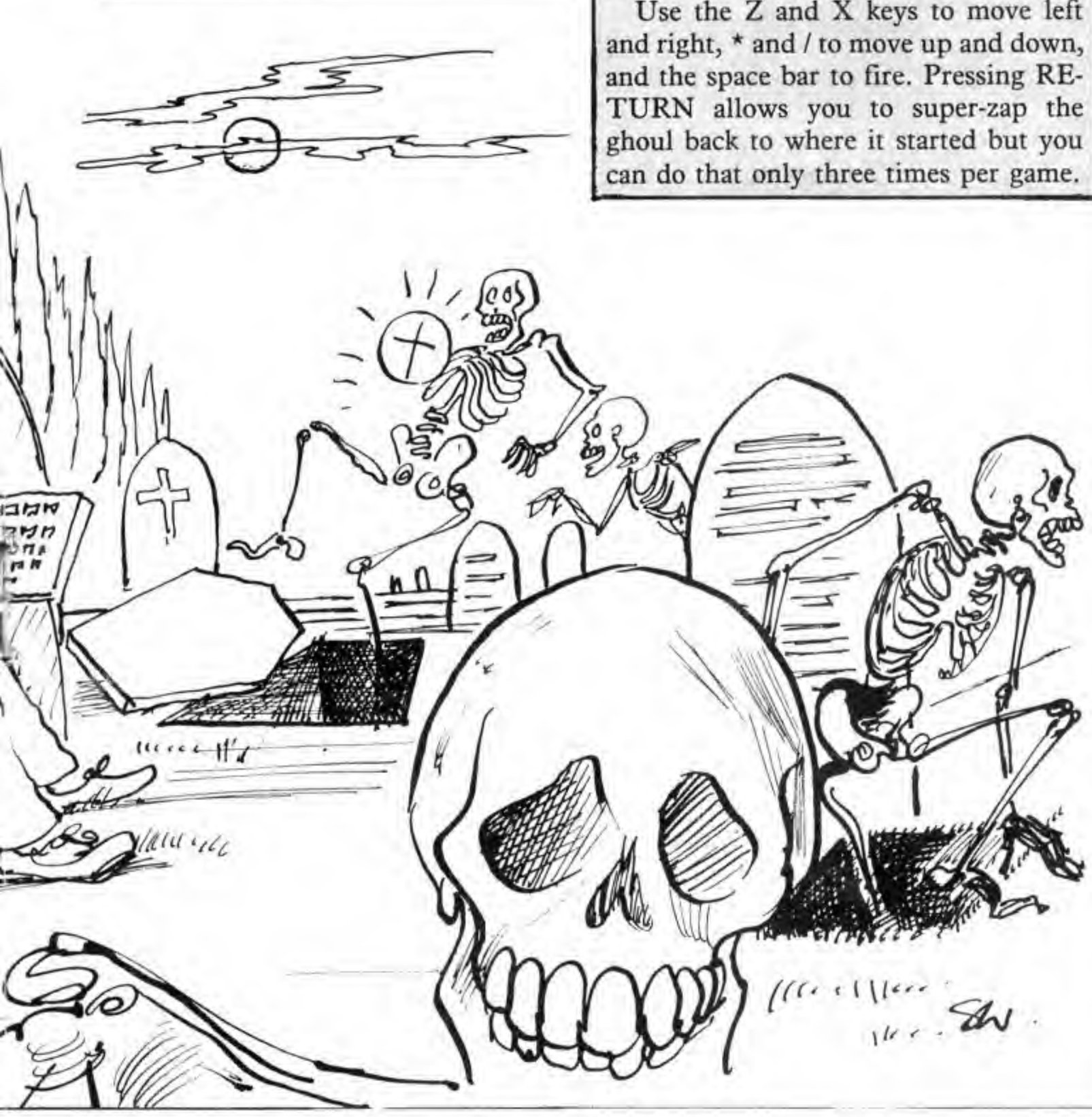
Ghost Hunter

```
 1070IFbat%=0:IFX%>=bx%ANDX%<=bx
%+32ANDY%<=by%+16ANDY%>=by%-8SOU
ND1,3,200,6:MOVEbx%,by%:GCOL3,2:
PRINTB$:H%=H%-1:PROCsc(1000):bat
%=1:bx%=4000:GOTO1080
 1080NEXT
 1090ENDPROC
 1100REM"==SCORE
 1110DEFPROCsc(SC%)
 1120sc%=sc%+SC%
 1130H%=(H%+1)MOD11
 1140VDU4:PRINTTAB(20,0);sc%;TAB
(37,0);H%:VDU5
 1150ENDPROC
 1160REM"==REBOUND...AARRR!!
 1170DEFPROCrebound
 1180SOUND0,2,4,1:LV%=LV%-1
 1190V%=1:VDU19,0,15;0;:*FX9,2
 1200*FX10,2
 1210FORT=1TO2000:NEXT:VDU19,0,0
;0;
 1220ENDPROC
 1230REM"==END
 1240DEFPROCend
```

PAUL WILLIAMS of Bury, Lancashire earns £30 for the first of our Star Programs. Written for the BBC B, this exciting and chilling game, **Ghost Hunter,** has you chasing the skeletons which have risen unbidden from their coffins in the graveyard. You can despatch them by placing a cross over your target and pressing the fire button but beware of the ghoul which creeps stealthily down the screen.

If it reaches the fence at the bottom, or if you bump into a tombstone in the dark, you will lose one of your three lives. When you have eliminated 10 skeletons you will find yourself on a new and even spookier screen.

Use the Z and X keys to move left and right, * and / to move up and down, and the space bar to fire. Pressing RETURN allows you to super-zap the ghoul back to where it started but you can do that only three times per game.



```
 1250IFsc%>HS%HS%=sc%
 1260*FX15,0
 1270VDU4:VDU24,0;68;1279;796;:C
LG:PRINTTAB(15,14)"GAME OVER";TA
B(6,0)"O";TAB(10,20)"Press SPACE
 to play";:REPEATUNTILGET=32
 1280ENDPROC
 1290REM"==SPOOK
 1300DEFPROCspook
 1310MOVESPX%,SPY%:GCOL3,2:PRINT
old$
 1320U%=(U%+1)MOD3+1
 1330SPY%=SPY%-32:IFSPX%>640SPX%
=SPX%-RND(100)
 1340IFSPX%<640SPX%=SPX%+RND(100
)
 1350MOVESPX%,SPY%:GCOL3,2:PRINT
G$(U%):old$=G$(U%)
 1360ENDPROC
 1370REM"==SUPER-ZAP!!!
 1380DEFPROCsz
 13901Fzap%=3ENDPROC
 1400SOUND2,2,130,2:MOVE640,0:GC
OL4,0:DRAWSPX%+48,SPY%-48
 1410GCOL3,2
 1420FORT%=1TO20:MOVESPX%,SPY%:P
RINTold$
 1430NEXT:MOVESPX%,SPY%:PRINTold
$
 1440GCOL4,0:MOVE640,0:DRAWSPX%+
48,SPY%-48
 1450SPX%=RND(1184):SPY%=960:MOV
ESPX%,SPY%:GCOL3,2:PRINTold$
 1460zap%=zap%+1
 1470ENDPROC
 1480REM"==TUNE
 1490DEFPROCtune
 1500RESTORE1560:FORI%=1TO7:READ
N1%(I%),D1%(I%):NEXT
 1510i%=2
 1520FORK%=1TO15:READN2%(K%),D2%
(K%):NEXT:FORJ%=1TO15
 1530IFJ%<9SOUND1,-1,N1%(J%)+75,
D1%(J%)*i% :SOUND0,-15,3,D1%(J%)
*i%
 15350=J%MOD4+1:PRINTTAB(12,16)H
$(0)
 1540SOUND2,-12,N2%(J%)-16,D2%(J
%)*i%:SOUND3,-12,N2%(J%)+32,D2%(
J%)*i%:NEXT
 1550ENDPROC
 1560DATA81,6,93,6,89,6,77,6,81,
6,65,6,61,20
 1570DATA81,4,89,2,93,2,89,2,81,
2,77,4,81,2,89,4
 1580DATA61,2,81,4,89,2,93,2,89,
2,81,2,77,20
 1590REM"==BAT...EEK!!
 1600DEFPROCbat
 1610IFbat%=1:bx%=RND(1100)+32:b
y%=RND(700)+96:SOUND1,1,240,1:MO
VEbx%,by%:GCOL3,2:PRINTB$:bat%=0
:ENDPROC
 1620IFbat%=0MOVEbx%,by%:GCOL3,2
:PRINTB$:bat%=1:ENDPROC
 1630REM"==LEVEL
 1640DEFPROClevel
 1650LVL%=LVL%+1
 1660IFLVL%=3OR LVL%=5LV%=LV%+1:
VDU4:PRINTTAB(6,0);LV%:SOUND1,1,
150,2
 1670ENDPROC
 1675REM"==CHR$
 1680DEFPROCchr
 1690S$=CHR$224+CHR$8+CHR$8+CHR$
10+CHR$228+CHR$225+CHR$227+CHR$8
+CHR$8+CHR$8+CHR$10+CHR$227+CHR$
226+CHR$228+CHR$8+CHR$8+CHR$10+C
HR$229+CHR$8+CHR$10+CHR$230
 1700G$(1)=CHR$235+CHR$236+CHR$2
37+STRING$(3,CHR$8)+CHR$10+CHR$2
38+CHR$239+CHR$240+STRING$(2,CHR
$8)+CHR$10+CHR$241
 1710G$(2)=CHR$235+CHR$236+CHR$2
37+STRING$(3,CHR$8)+CHR$10+CHR$2
38+CHR$239+CHR$240+STRING$(2,CHR
$8)+CHR$10+CHR$242
 1720G$(3)=CHR$235+CHR$236+CHR$2
37+STRING$(3,CHR$8)+CHR$10+CHR$2
38+CHR$239+CHR$240+STRING$(2,CHR
$8)+CHR$10+CHR$243:B$=CHR$231+CH
R$232:ENDPROC
```

TICTA

PAUL EARWAKER of Ipswich, Suffolk devised this version of Noughts and Crosses for the BBC B.

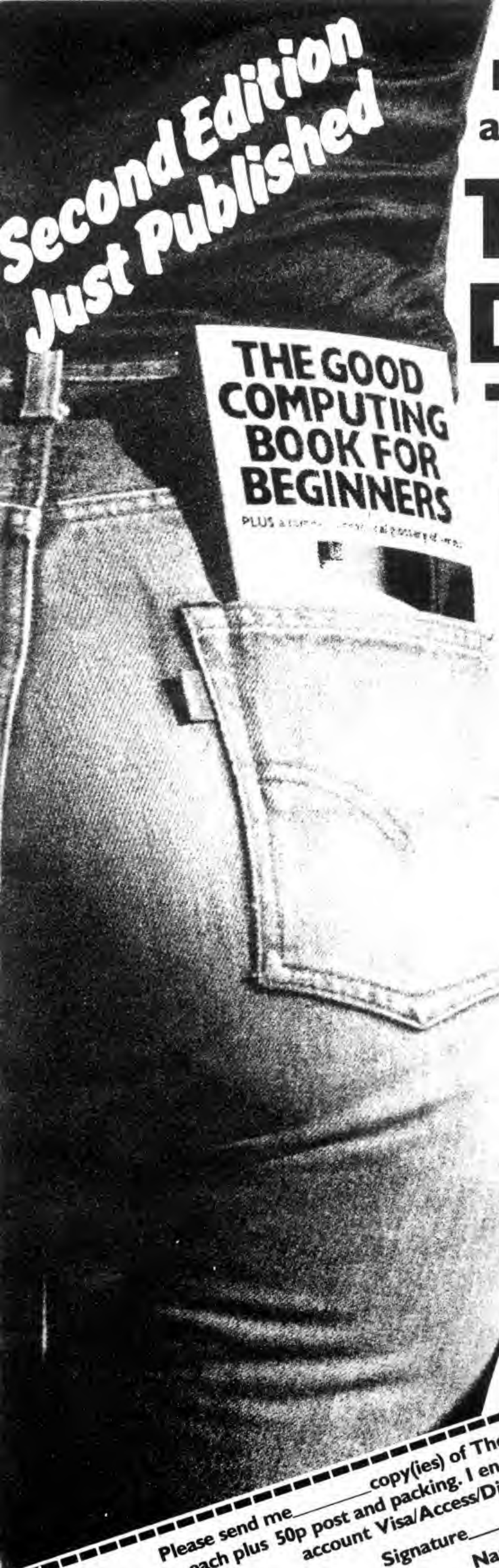
Blue always starts and moves the blue cursor on to a chosen square; pressing TAB will fill in that square. Red moves the red cursor and fills the square in the same way. A continuous line of three squares, either vertically, horizontally or diagonally, wins the game.

```
   10 REM**TICTACTOE**
   20 REM**BY PAUL EARWAKER**
   30 *TV255
   40 MODE7
   50 PRINTTAB(10,12)CHR$141"TIC
TACTOE"
   60 PRINTTAB(10,13)CHR$141"TIC
TACTOE"
   70 PRINTTAB(10,19)"PRESS SPAC
E TO PLAY"
   80 IF INKEY(-99) THEN GOTO 90
 ELSE GOTO 80
   90 MODE1
  100 VDU5
  110 G%=9:BX%=200:BY%=950:RX%=8
00:RY%=950
  120 *FX15,0
  130 VDU 19,2,6,0,0,0
  140 VDU 23,245,0,0,60,60,60,60
,0,0
  150 VDU 23;8202;0;0;0;
  160 PROCGRID
  170 REPEAT
  180 PROCBLUE
  190 PROCRED
  200 UNTIL G%=0
  210 CLS
  220 *FX15,0
  230 VDU 4
  240 COLOUR 3:INPUTTAB(10,12)"A
 DRAW-ANOTHER GAME?(Y/N)"
  250 IF GET$="Y" OR GET$="y"THE
N RUN ELSE GOTO 250
  260 END
  270 DEFPROCGRID
  280 GCOL0,3
  290 FOR X=200 TO 1100 STEP 300
  300 MOVE X,30
  310 DRAW X,925
  320 NEXT
  330 FOR Y=30 TO 950 STEP 300
  340 MOVE 200,Y
  350 DRAW 1100,Y
  360 NEXT
  370 ENDPROC
  380 DEFPROCBLUE
  390 REPEAT
  400 IF INKEY(-26) AND BX%>200
BX%=BX%-300:X%=INKEY(30)
  410 IF INKEY(-122) AND BX%<800
 BX%=BX%+300:X%=INKEY(30)
  420 IF INKEY(-58) AND BY%<950
BY%=BY%+300:X%=INKEY(30)
  430 IF INKEY(-42) AND BY%>350
BY%=BY%-300:X%=INKEY(30)
  440 MOVE BX%+10,BY%-25:GCOL0,2
:VDU 245,127
  450 UNTIL INKEY(-97)
  460 PROCANALISE1
  470 ENDPROC
  480 DEFPROCRED
  490 IF G%=0 ENDPROC
  500  REPEAT
  510 IF INKEY(-26) AND RX%>200
RX%=RX%-300:X%=INKEY(30)
  520 IF INKEY(-122) AND RX%<800
 RX%=RX%+300:X%=INKEY(30)
  530 IF INKEY(-58) AND RY%<950
RY%=RY%+300:X%=INKEY(30)
  540 IF INKEY(-42) AND RY%>350
RY%=RY%-300:X%=INKEY(30)
  550 MOVE RX%+10,RY%-25:GCOL0,1
:VDU 245,127
  560 UNTIL INKEY(-97)
  570 PROCANALISE2
  580 ENDPROC
  590 DEFPROCANALISE1
  600 IF POINT(BX%+150,BY%-150)=
0 THEN PROCFILL1:G%=G%-1:PROCCHE
CK1:PROCRED ELSE SOUND 1,-10,200
,1:X%=INKEY(20):PROCBLUE
  610 ENDPROC
  620 DEFPROCANALISE2
  630 IF POINT(RX%+150,RY%-150)=
0 THEN PROCFILL2:G%=G%-1:PROCCHE
CK2:PROCBLUE ELSE SOUND 1,-10,20
0,1:X%=INKEY(20):PROCRED
  640 ENDPROC
  650 DEFPROCFILL1
  660 GCOL0,2
  670 MOVE BX%,BY%-320
  680 FOR C=BX% TO BX%+300 STEP
4
```

ACTOE

```
690 MOVE C,BY%-320
700 DRAW C,BY%-20
710 NEXT
720 PROCGRID
730 ENDPROC
740 DEFPROCFILL2
750GCOL0,1
760MOVE RX%,RY%-320
770FOR D=RX% TO RX%+300 STEP 4

780MOVE D,RY%-320
790DRAW D,RY%-20
800NEXT
810PROCGRID
820ENDPROC
830 DEFPROCCHECK1
840IF POINT(350,800)=2 AND POI
NT(350,500)=2 AND POINT(350,200)
=2 THEN PROCWINNER1 ELSE GOTO 85
0
850IF POINT(650,200)=2 AND POI
NT(650,500)=2 AND POINT(650,800)
=2 THEN PROCWINNER1 ELSE GOTO 86
0
860IF POINT(950,800)=2 AND POI
NT(950,500)=2 AND POINT(950,200)
=2 THEN PROCWINNER1 ELSE GOTO 87
0
870IF POINT(350,800)=2 AND POI
NT(650,800)=2 AND POINT(950,800)
=2 THEN PROCWINNER1 ELSE GOTO 88
0
880IF POINT(350,500)=2 AND POI
NT(650,500)=2 AND POINT(950,500)
=2 THEN PROCWINNER1 ELSE GOTO 89
0
890IF POINT(950,200)=2 AND POI
NT(650,200)=2 AND POINT(350,200)
=2 THEN PROCWINNER1 ELSE GOTO 90
0
900IF POINT(350,800)=2 AND POI
NT(650,500)=2 AND POINT(950,200)
=2 THEN PROCWINNER1 ELSE GOTO 91
0
910IF POINT(950,800)=2 AND POI
NT(650,500)=2 AND POINT(350,200)
=2 THEN PROCWINNER1 ELSE GOTO 92
0
920ENDPROC
930DEFPROCCHECK2
940IF POINT(350,800)=1 AND POI
NT(350,500)=1 AND POINT(350,200)
=1 THEN PROCWINNER2 ELSE GOTO 95
0
950IF POINT(650,200)=1 AND POI
NT(650,500)=1 AND POINT(650,800)
=1 THEN PROCWINNER2 ELSE GOTO 96
0
960IF POINT(950,800)=1 AND POI
NT(950,500)=1 AND POINT(950,200)
=1 THEN PROCWINNER2 ELSE GOTO 97
0
970IF POINT(350,800)=1 AND POI
NT(650,800)=1 AND POINT(950,800)
=1 THEN PROCWINNER2 ELSE GOTO 98
0
980IF POINT(350,500)=1 AND POI
NT(650,500)=1 AND POINT(950,500)
=1 THEN PROCWINNER2 ELSE GOTO 99
0
990IF POINT(950,200)=1 AND POI
NT(650,200)=1 AND POINT(350,200)
=1 THEN PROCWINNER2 ELSE GOTO 10
00
1000IF POINT(350,800)=1 AND POI
NT(650,500)=1 AND POINT(950,200)
=1 THEN PROCWINNER2 ELSE GOTO 10
10
1010IF POINT(950,800)=1 AND POI
NT(650,500)=1 AND POINT(350,200)
=1 THEN PROCWINNER2 ELSE GOTO 10
20
1020 ENDPROC
1030 DEFPROCWINNER1
1040 ENVELOPE 1,1,0,0,0,0,0,0,2
0,-1,0,-1,80,40
1050 CLS
1060 *FX15,0
1070 VDU4:COLOUR 2
1080 PRINTTAB(10,12)"BLUE WINS-
WELL DONE!"
1090 SOUND 1,1,70,5
1100 SOUND 1,1,90,10
1110 PRINT
1120 PRINT
1130 INPUTTAB(10,14)"ANOTHER GA
ME?(Y/N)"
1140 IF GET$="Y" THEN RUN ELSE
GOTO 1140
1150 ENDPROC
1160 DEFPROCWINNER2
1170 ENVELOPE 1,1,0,0,0,0,0,0,2
0,-1,0,-1,80,40
1180 CLS
1190 *FX15,0
1200 VDU4:COLOUR 1
1210 PRINTTAB(10,12)"RED WINS-W
ELL DONE!"
1220 SOUND 1,1,70,5
1230 SOUND 1,1,90,10
1240 PRINT
1250 PRINT
1260 INPUTTAB(10,14)"ANOTHER GA
ME?(Y/N)"
1270 IF GET$="Y" THEN RUN ELSE
GOTO 1270
1280 ENDPROC
```



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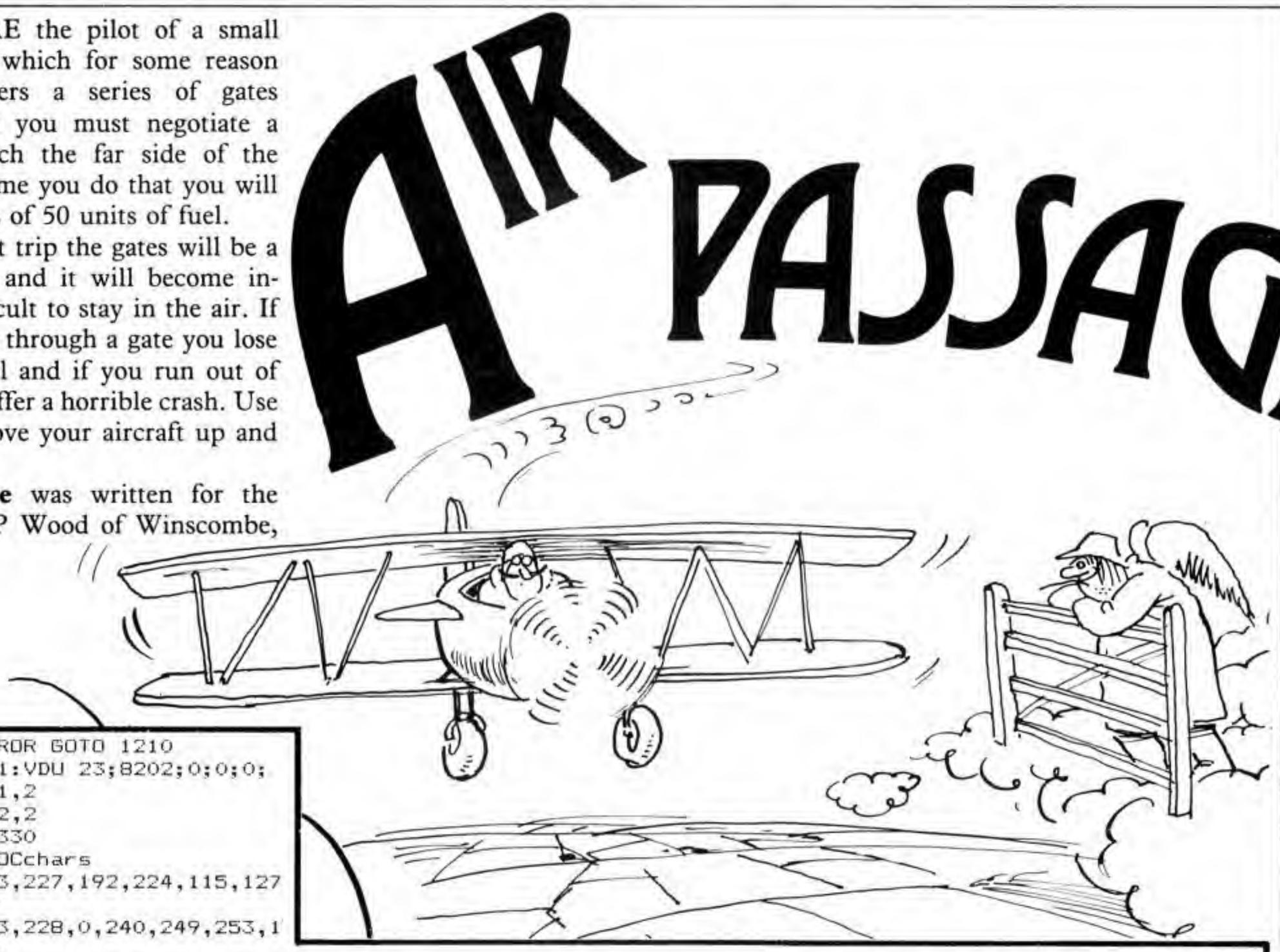
AIR PASSAGE

YOU ARE the pilot of a small aircraft which for some reason encounters a series of gates through which you must negotiate a passage to reach the far side of the screen. Each time you do that you will receive a bonus of 50 units of fuel.

On your next trip the gates will be a little narrower and it will become increasingly difficult to stay in the air. If you fail to pass through a gate you lose 40 units of fuel and if you run out of fuel you will suffer a horrible crash. Use Q and C to move your aircraft up and down.

Air Passage was written for the BBC B by A P Wood of Winscombe, Avon.



```
   10 ON ERROR GOTO 1210
   20 MODE 1:VDU 23;8202;0;0;0;
   30 *FX 11,2
   40 *FX 12,2
   50 GOTO 330
   60 DEFPROCchars
   70 VDU 23,227,192,224,115,127
,127,63,1,0
   80 VDU 23,228,0,240,249,253,1
5,253,249,0
   90 PL$=CHR$(227)+CHR$(228)
  100 VDU 23,229,60,60,60,60,60,
60,60,60
  110 VDU 23,230,34,34,148,82,0,
25,93,255
  120 VDU 23,231,8,137,73,34,2,1
6,156,255
  130 SP$=CHR$(230)+CHR$(231)
  140 ENDPROC
  150 DEFPROCsetup
  160 VDU 19,1,6,0,0,0
  170 COLOUR 1
  180 FOR A=8 TO 38 STEP 6
  190 H=RND(10)+6
  200 FOR B=1 TO H
  210 PRINT TAB(A,B);CHR$(229)
  220 NEXT B
  230 FOR B=H TO H+SP
  240 PRINT TAB(A,B);" "
  250 NEXT B
  260 FOR B=H+SP TO 30
  270 PRINT TAB(A,B);CHR$(229)
  280 NEXT B,A
  290 ENDPROC
  300 DEFPROCvars
  310 HE=10:FU=300:SC=0:SP=7
  320 ENDPROC
  330 PROCchars
  340 PROCvars
  350 PROCintro
  360 PROCsetup
  370 COLOUR 2
  380 VDU 19,3,3,0,0,0
  390 FOR D=1 TO 37
  400 PROCcheck
  410 PRINT TAB(D,HE);PL$
  420 IF FU>100 THEN SOUND 0,-10
,24,1
  430 PRINT TAB(6,0);"Fuel ";FU;
" "
  440 FU=FU-1
  450 IF FU<=-1 THEN PROCfuel
  460 IF FU<100 AND FU>50 THEN S
OUND 1,-12,130,1
  470 IF FU<51 THEN SOUND 1,-12,
160,1
  480 PRINT TAB(22,0);"Score ";S
C
  490 SC=SC+1
  500 Z$=INKEY$(0):*FX 15,1
  510 TIME=0:REPEAT UNTIL TIME=3
*T
  520 PRINT TAB(D,HE);"  "
  530 IF Z$="Q" AND HE>3 THEN HE
=HE-1:FU=FU-1
  540 IF Z$="C" AND HE<30 THEN H
E=HE+1:FU=FU-1
  550 NEXT D
  560 FU=FU+50
  570 SP=SP-.1
  580 GOTO 360
  590 DEFPROCcheck
  600 X1=(32*D)+45
  610 Y1=(32*(32-HE))-16
  620 IF POINT(X1,Y1)=1 THEN SOU
ND 0,-15,22,7:FU=FU-40
  630 ENDPROC
  640 DEFPROCfuel
  650 FOR L=HE TO 30 STEP 1
  660 SOUND 1,-15,20,1
  670 SOUND 1,-15,80,1
  680 SOUND 1,-15,60,1
  690 PRINT TAB(D,L-1);"  ";TAB(
D,L);PL$
  700 PRINT TAB(6,0);"----  0 "
  710 SOUND 1,-15,20,1
  720 SOUND 1,-15,80,1
  730 SOUND 1,-15,60,1
  740 PRINT TAB(6,0);"Fuel  0  "
  750 NEXT L
  760 PRINT TAB(D,30);SP$
  770 SOUND 0,-15,29,10
  780 SOUND 0,-15,28,10
  790 TIME=0:REPEAT UNTIL TIME=2
00
  800 CLS:GOTO 330
  810 DEFPROCintro
  820 COLOUR 2
  830 PRINT TAB(9,1);PL$;" A I R
 B L O C K ";PL$
  840 PRINT '"  AS YOU SOAR THRO
UGH THE SKIES IN YOUR"
  850 PRINT '"TRUSTY PLANE YOU E
NCOUNTER A SERIES OF"
  860 PRINT '"GATES. YOU MUST FL
Y THROUGH THE GATES"
  870 PRINT '"AND REACH THE FAR
SIDE OF THE SCREEN."
  880 PRINT '" EVERY TIME YOU DO
 THIS YOU WILL GET"
  890 PRINT '"A BONUS 50 UNITS O
F FUEL BUT NEXT TIME"
  900 PRINT '"YOU MEET THE GATES
THE GAPS WILL BE A"
  910 PRINT '"BIT SMALLER. HOW L
ONG CAN YOU KEEP IN"
  920 PRINT '"THE AIR ? IF YOU F
AIL TO GO THROUGH A"
  930 PRINT '"GATE THEN YOU WILL
 STAY IN THE AIR BUT"
  940 PRINT '"WILL LOSE 40 UNITS
 OF FUEL !"
  950 PRINT '" WHEN YOUR FUEL GE
TS LOW THEN YOU WILL"
  960 PRINT '"BE ALERTED BY A TO
NE."
  970 PRINT '"       ";PL$;" ANY
 KEY TO CONTINUE ";PL$
  980 *FX 15,0
  990 IF INKEY$(0)="" THEN 990
 1000 CLS
 1010 PRINT TAB(9,1);PL$;" A I R
 B L O C K ";PL$
 1020 PRINT TAB(1,5);"CHOOSE YOU
R PLANE SPEED FROM 1 TO 5"
 1030 PRINT TAB(1,7);"(1 IS FAST
 AND 5 IS SLOW)"
 1040 *FX 15,0
 1050 A$=INKEY$(0)
 1060 IF A$="" THEN 1050
 1070 T=VAL(A$)
 1080 PRINT TAB(8,13);" Q  KEY I
S UP"
 1090 PRINT TAB(8,16);" C  KEY I
S DOWN"
 1100 TIME=0:REPEAT UNTIL TIME=3
00
 1110 CLS
 1120 A$=PL$+" G O O D  L U C K
 "+PL$
 1130 FOR A=1 TO LEN(A$)
 1140 PRINT TAB(8+A,13);MID$(A$,
A,1)
 1150 SOUND 1,-15,RND(20),1
 1160 TIME=0:REPEAT UNTIL TIME=5
 1170 NEXT A
 1180 TIME=0:REPEAT UNTIL TIME=1
00
 1190 CLS
 1200 ENDPROC
 1210 *FX 11,40
 1220 *FX 12,7
 1230 MODE 7:END
```

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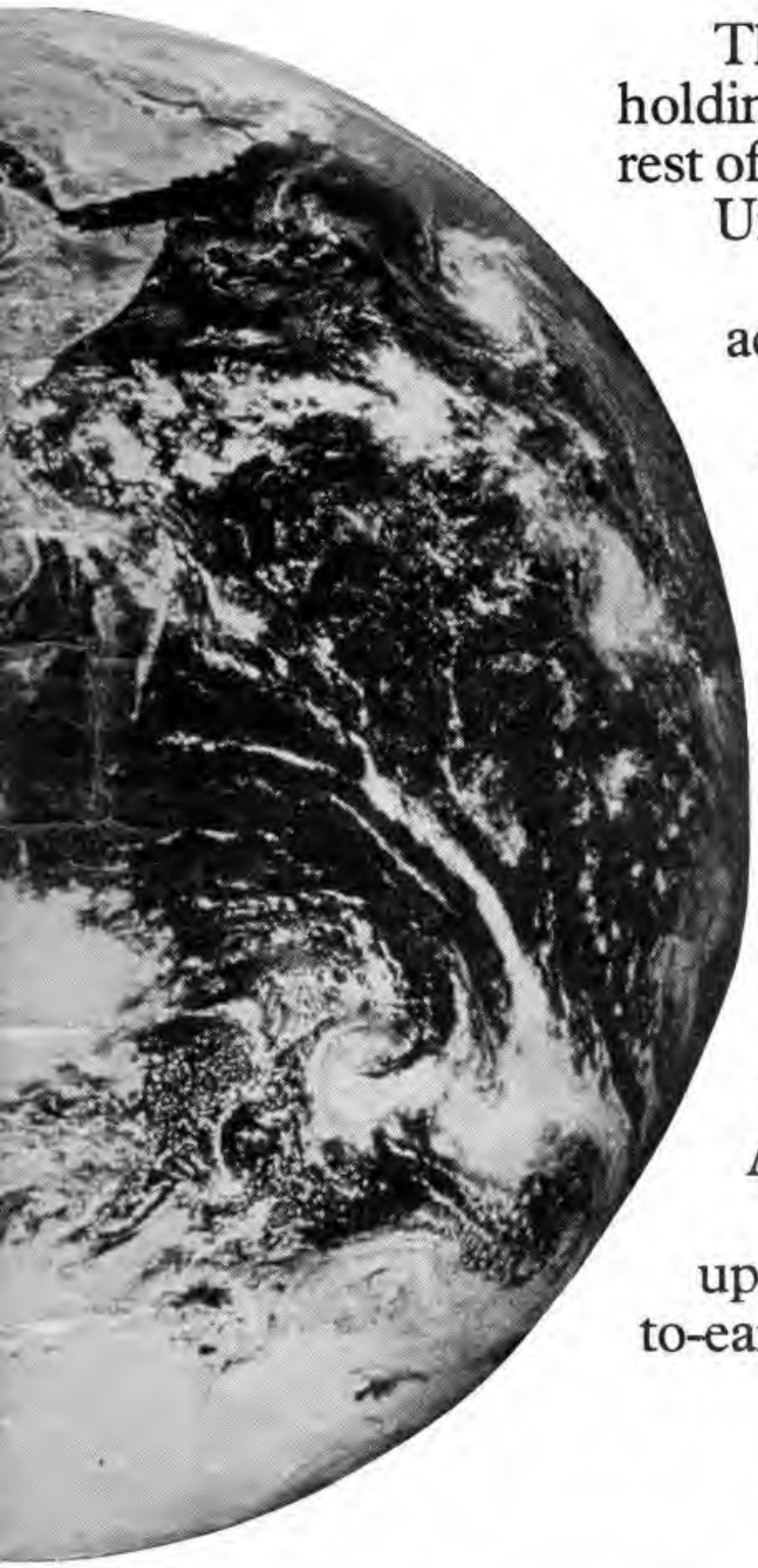

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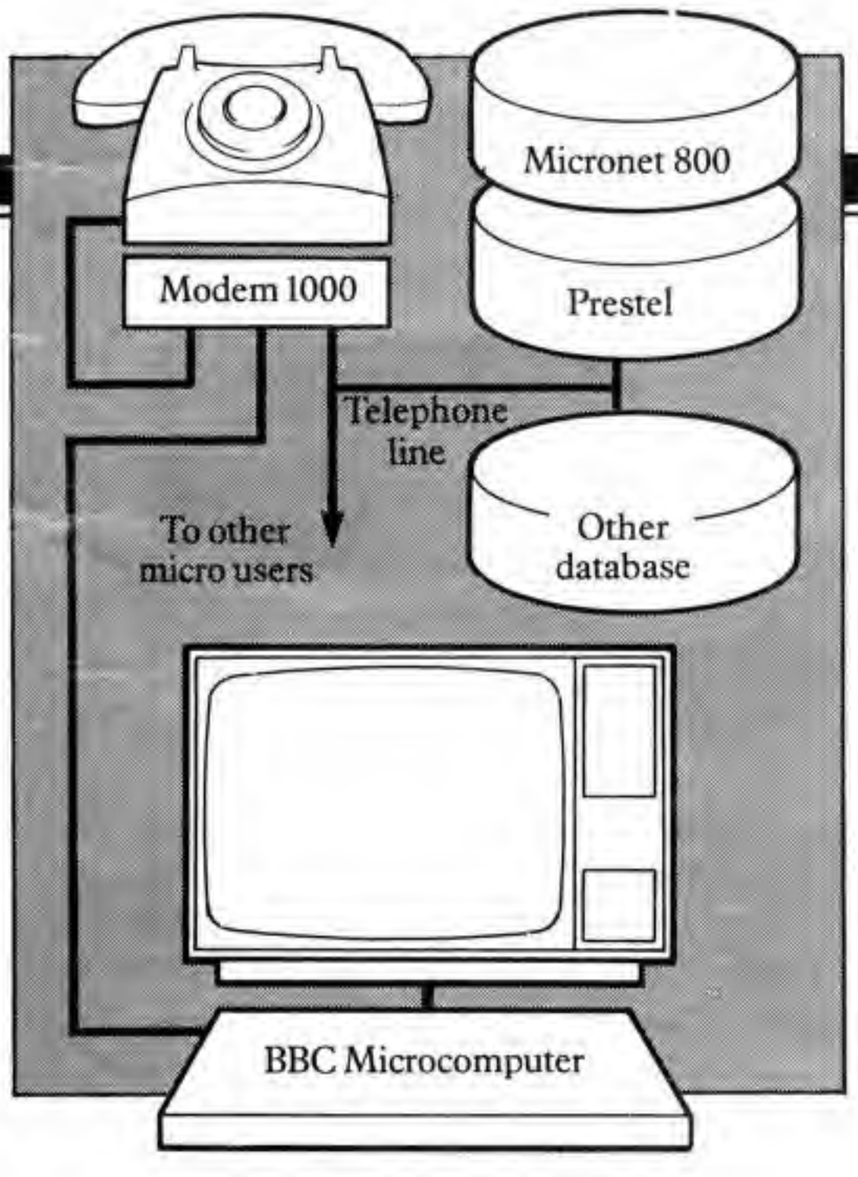

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gothic h

```
   10REM**************
   20REM* MAD CASTLE *
   30REM*      BY     *
   40REM*    MARTIN   *
   50REM*    EARLE    *
   60REM**************
   70VDU23,225,0,60,195,129,195,
60,0,0
   80VDU23,226,28,42,54,28,8,28,
127,93
   90VDU23,227,93,93,20,20,20,54
,0,0
  100VDU23,228,6,9,57,94,220,156
,188,184
  110VDU23,229,184,168,104,36,36
,36,54,0
  120VDU23,230,0,0,0,40,112,220,
248,62
  130VDU23,231,60,127,220,23,23,
55,39,207
  140VDU23,232,153,189,153,153,2
55,255,60,60
  150VDU23,233,60,60,36,36,36,36
,36,102
  160VDU23,234,0,231,24,36,0,0,0
,0
  170VDU23,235,0,129,195,102,24,
60,24,36
  180VDU23,236,40,112,220,248,62
,60,127,222
  190VDU23,237,16,56,56,124,56,5
6,16,0
  200VDU23,238,0,0,0,0,192,193,2
49,255
  210VDU23,239,255,129,129,129,1
29,129,129,255
  220VDU23,240,14,14,30,56,56,12
4,116,228
  230VDU23,241,230,179,144,144,1
52,192,0,0
  240ENVELOPE1,2,-1,-1,-1,25,25,
25,126,0,0,-126,126,126
  250ENVELOPE2,2,4,4,4,10,10,10,
0,0,0,0,0,0,0
  260*FX9,5
  270*FX10,5
  280*FX11,0
  290DIMBX%(2),BY%(2):PROCRESET:
SC%=0:HI%=0:HI$=""
  300MODE6:PROCINSTRUCTIONS
  310MODE5:PROCSHOW
  320MODE5:VDU23;8202;0;0;0;
  330PROCSETUP:PROCLADDER:PROCBR
ICKS:PROCCAGE:PRINTTAB(X%,Y%);CH
R$227;TAB(X%,Y%-1);CHR$226
  340REPEAT:IFS%=1PROCS1:PROCDR:
PROCBA:PROCMO:PROCS1:PROCBA
  350IFS%=2PROCS2:PROCDR:PROCBA:
PROCMO:PROCS2:PROCBA
  360IFS%=3PROCS3:IFX%=9THENSOUN
D1,2,30,60:PROCRE
  370UNTILL%=0
  380PROCSCORE:PRINTTAB(1,23);"A
NOTHER GAME (Y/N)":REPEAT:A$=GET
$:UNTILA$="Y"ORA$="N":IFA$="Y"PR
OCRESET:SC%=0:GOTO320
  390MODE6
  400*FX12,0
  410END
  420DEFPROCWT(T%)
  430TI%=TIME:REPEAT:IFS%=1PROCS
1 ELSE IF S%=2PROCS2 ELSEIFS%=3P
ROCS3
  440UNTILTIME>TI%+T%:ENDPROC
  450DEFPROCSETUP
  460MOVE900,0:MOVE1279,0:GCOL0,
1:PLOT85,1279,1023:MOVE900,1023:
PLOT85,900,0
  470COLOUR1:FORA=0TO10:PRINTTAB
(A,31);CHR$(225);:NEXT:PROCLADDE
R:ENDPROC
  480DEFPROCLADDER
  490MOVE640,32:GCOL0,3:DRAW704,
160:MOVE704,32:DRAW768,160
  500C=32:FORB=650TO704STEP16:C=
C+32:MOVEB,C:DRAWB+64,C:NEXT:END
PROC
  510DEFPROCBRICKS
  520PRINTTAB(12,26);CHR$225;CHR
$225:F=26:FORE=11TO2STEP-1:PRINT
TAB(E,F);CHR$239:F=F-1:NEXT:PRIN
TTAB(0,17);CHR$225;CHR$225
  530COLOUR3:PRINTTAB(1,16);CHR$
241;TAB(1,15);CHR$240:COLOUR1:PR
INTTAB(0,10);CHR$225;CHR$225;" "
:FORG=3TO13:PRINTTAB(G,10);CHR$2
25;:NEXT:ENDPROC
  540DEFPROCS1
  550COLOUR3:IFL%<>0GOTO580
  560*FX15,1
  570PRINTTAB(X%,Y%);" ";TAB(X%,
Y%-1);" ":ENDPROC
  580A$=INKEY$(0):IFX%=10ANDA$="
Z"X%=X%-1:PRINTTAB(X%,Y%);CHR$22
7;" ";TAB(X%,Y%-1);CHR$226;" ":P
ROCLADDER:PROCSC(-2)
  590IFA$="X"ANDX%<12X%=X%+1:PRI
NTTAB(X%-1,Y%);" ";CHR$227;TAB(X
%-1,Y%-1);" ";CHR$226:PROCSC(2):
IFX%>10PROCDEAD:PROCLADDER
  600IFA$="Z"ANDX%>1ANDX%<>10X%=
X%-1:PRINTTAB(X%,Y%);CHR$227;" "
;TAB(X%,Y%-1);CHR$226;" ":PROCSC
(-2)
  610IFX%>10ANDS%=1PROCDEAD
  620 IFA$="/"ANDX%=10PRINTTAB(X
%,Y%);" ";TAB(X%,Y%-1);" ":Y%=25
:X%=X%+1:S%=2:PROCLADDER:PRINTTA
B(X%,Y%);CHR$227;TAB(X%,Y%-1);CH
R$226:PROCSC(4)
  630ENDPROC
  640DEFPROCS2
  650COLOUR3
  660A$=INKEY$(0)
  670 IFA$="Z"ANDX%>2X%=X%-1:Y%=
Y%-1:PRINTTAB(X%+1,Y%+1);" ";TAB
(X%+1,Y%);" ";TAB(X%,Y%);CHR$227
;TAB(X%,Y%-1);CHR$226:PROCSC(-2)
:IFX%<>2PROCC
  680IFA$="X"ANDX%<11X%=X%+1:Y%=
Y%+1:PRINTTAB(X%-1,Y%-1);" ";TAB
(X%-1,Y%-2);" ";TAB(X%,Y%);CHR$2
27;TAB(X%,Y%-1);CHR$226:PROCSC(2
):PROCC:ENDPROC
TTAB(X%,Y%+1);" ";TAB(X%,Y%);CHR
$227;TAB(X%,Y%-1);CHR$226:FORE%=
1TO1500:NEXT:PROCBA:FORE%=1TO150
0:NEXT:PROCBA:Y%=Y%+1:PRINTTAB(X
%,Y%-1);" ";TAB(X%,Y%-2);" ";TAB
(X%,Y%);CHR$227;TAB(X%,Y%-1);CHR
$226:PROCC
  700IFA$="/"ANDX%=2S%=3:Y%=9:PR
INTTAB(2,16);" ";TAB(2,15);" ";T
AB(X%,Y%);CHR$227;TAB(X%,Y%-1);C
HR$226:PROCSC(20)
  710ENDPROC
  720DEFPROCS3
  730Y%=9:A$=INKEY$(0):COLOUR3:I
FA$="X"ANDX%<13X%=X%+1:PRINTTAB(
X%-1,Y%);" ";CHR$227;TAB(X%-1,Y%
-1);" ";CHR$226
  740IFA$="Z"ANDX%>0X%=X%-1:PRIN
TTAB(X%+1,Y%);CHR$227;" ";TAB(X%
+1,Y%-1);CHR$226;" "
  750ENDPROC
  760DEFPROCDR
  770VDU19,2,15,0,0,0:COLOUR2:PR
INTTAB(7,27);CHR$234:PROCWT(20):
PRINTTAB(7,27);" ";TAB(7,28);CHR
$235:PROCWT(20):PRINTTAB(7,28);"
 ":PRINTTAB(7,30);CHR$229;TAB(7,
29);CHR$228
  780IFX%=7ANDS%=1ORX%=8ANDS%=1P
ROCDEAD:ENDPROC
  790PROCWT(30):PRINTTAB(7,30);"
";TAB(7,29);" ":ENDPROC
  800DEFPROCMO
  810VDU19,2,4,0,0,0:COLOUR2:PRI
NTTAB(12,30);CHR$230:PROCS1:PROC
WT(20):PROCS1:COLOUR2:PRINTTAB(1
2,30);CHR$236:PROCWT(20):PROCS1:
COLOUR2:PRINTTAB(12,30);CHR$231;
TAB(12,29);CHR$230:IFX%=10ANDS%=
1PROCDEAD:PROCLADDER
  820PROCWT(10):PROCBA:COLOUR2:P
RINTTAB(12,29);" ";TAB(12,30);CH
R$236:PROCWT(20):COLOUR2:PRINTTA
B(12,30);CHR$230:PROCWT(20):PRIN
TTAB(12,30);" "
  830ENDPROC
  840DEFPROCBA
  850FORC%=0TO2:PRINTTAB(BX%(C%)
,BY%(C%));" ";TAB(BX%(C%)+1,BY%(
```

THE WICKED Dr Frankenstein has imprisoned your friend at the top of his castle and you are determined to go to the rescue, but your way is fraught with hazards. First there is Dracula, who swoops out of thin air. If you are beneath him when he lands, or just past him, you lose a life. You must also dodge the prehistoric monster which lurks in the moat and jump over the barrels which roll down the stairs.

Use the Z and X keys to move left and right, and / to jump over a barrel or go up the stairs.

Gothic Horror was written for the Electron by Martin Earle of Goole, North Humberside.

2ORROR

```
C%)+1);CHR$237:NEXT:FORD%=0TO2:B
X%(D%)=BX%(D%)+1:BY%(D%)=BY%(D%)
+1:IFY%+1=BY%(D%)ANDX%=BX%(D%)SO
UND1,1,150,5:SOUND1,-15,100,2:PR
OCSC(10)
  860IFBX%(D%)=X%ANDBY%(D%)=Y%AN
DX%<>2PROCDEAD
  870IFBY%(D%)=25ANDY%<>25PRINTT
AB(BX%(D%),BY%(D%));" "
  880IFBY%(D%)=25BY%(D%)=16:BX%(
D%)=2
  890*FX15,1
  900NEXT
  910ENDPROC
  920DEFPROCC
  930J%=0:REPEAT:IFBX%(J%)=X%AND
BY%(J%)=Y%PROCDEAD
  940J%=J%+1:UNTILJ%=3
  950ENDPROC
  960DEFPROCDEAD
  970L%=L%-1:S%=1:COLOUR3:PRINTT
AB(X%,Y%-1);" ";TAB(X%,Y%);CHR$2
38:SOUND1,1,100,50:FORH%=0TO6000
:NEXTH%:PRINTTAB(X%,Y%);" ":X%=1
:Y%=30:PRINTTAB(X%,Y%);CHR$227;T
AB(X%,Y%-1);CHR$226
  980ENDPROC
  990DEFPROCSC(I%)
 1000SC%=SC%+I%:PRINTTAB(2,1);"S
CORE=";SC%;" ":ENDPROC
 1010DEFPROCSCORE
 1020CLG:IFSC%>HI%PROCHISC:CLS
 1030PRINTTAB(2,5);"YOUR SCORE="
;SC%:PRINTTAB(0,9);"HIGHEST SCOR
E=";HI%:PRINTTAB(9,11);"BY":PRIN
TTAB(10-(LENHI$)/2,13);HI$:ENDPR
OC
 1040DEFPROCHISC
 1050PRINTTAB(3,7);"WELL DONE YO
UR";TAB(0,9);"SCORE IS THE HIGHE
ST";TAB(6,11);"SO FAR":PRINTTAB(
2,13);"WHAT'S YOUR NAME":PRINTTA
B(1,15);:INPUTHI$:IFLENHI$>19HI$
=LEFT$(HI$,20)
 1060IFHI$=""THENCLS:GOTO1050
 1070PRINTTAB(3,17);"PRESS SPACE
 TO";TAB(5,19);"CONTINUE":REPEAT
:A$=GET$:UNTILA$=" ":HI%=SC%
 1080ENDPROC
 1090DEFPROCRESET
 1100X%=1:Y%=30:L%=2:S%=1:BX%(0)
=2:BX%(1)=4:BX%(2)=7:BY%(0)=16:B
Y%(1)=18:BY%(2)=21
 1110ENDPROC
 1120DEFPROCCAGE
 1130COLOUR3:PRINTTAB(13,9);CHR$
233;TAB(13,8);CHR$232;TAB(11,9);
CHR$227;TAB(11,8);CHR$226:GCOL0,
1:MOVE640,704:DRAW800,704:MOVE64
0,800:DRAW800,800:FORX=656TO784S
TEP32:MOVEX,704:DRAWX,800:NEXT:E
NDPROC
 1140ENDPROC
 1150DEFPROCRE
 1160PROCSC(150):FORR=9TO0STEP-1
:FORS=0TO100:NEXTS:PRINTTAB(R+1,
Y%);" ";" ";TAB(R+1,Y%-1);" ";"
":PRINTTAB(R,Y%);CHR$227;CHR$227
;TAB(R,Y%-1);CHR$226;CHR$226:NEX
T:PROCCATCH:PROCRESET:ENDPROC

 1170DEFPROCCATCH
 1180 FORX=13TO3STEP-1:FORL=0TO1
50:NEXT:PRINTTAB(X+1,Y%);" ";" "
;TAB(X+1,Y%-1);" ";" ":PRINTTAB(
X,Y%);CHR$233;TAB(X,Y%-1);CHR$23
2:NEXTX:FORI=2TO12:FORK=0TO150:N
EXTK:PRINTTAB(I-1,Y%);" ";" ":PR
INTTAB(I-1,Y%-1);" ";" "
 1190PRINTTAB(I,Y%);CHR$227;CHR$
233:PRINTTAB(I,Y%-1);CHR$226;CHR
$232:NEXTI
 1200CLG:PROCSETUP:PROCLADDER:PR
OCBRICKS:PROCCAGE:ENDPROC
 1210DEFPROCINSTRUCTIONS
 1220PRINTTAB(15,1);"MAD CASTLE"
;TAB(15,2)"__________":PRINT'"YO
U MUST RESCUE YOUR FRIEND FROM T
HE":PRINT"EVIL FRANKINSTEIN WHO
HAS PUT YOUR":PRINT"FRIEND IN A
CAGE.FORTUANATLY":PRINT"FRANKINS
TEIN IS A BIT FORGETFULL AND HE"
 1230PRINT"HAS LEFT THE KEYS IN
THE LOCK.SO WHAT":PRINT"YOU HAVE
 TO DO IS TO DODGE DRACULA WHO":
PRINT"IS CONSTANTLY SWOOPING DOW
N FROM THIN":PRINT"AIR.IF YOU AR
E EITHER IN FRONT OF":PRINT"HIM
OR WHERE HE HAS LANDED YOU WILL"
 1240PRINT"LOSE ONE OF YOUR LIVE
S.":PRINT'"  NEXT YOU HAVE TO D
ODGE THE MONSTER":PRINT"WHO KEEP
S COMING OUT OF THE WATER.":PRIN
T"IF YOU EITHER ARE NEXT TO THE
WATER":PRINT"WHEN HE COMES OUT O
R YOU RUN INTO THE"
 1250PRINT"WATER YOU WILL LOSE A
 LIFE.":PRINT'"  PRESS SPACE TO
 CONTINUE":REPEAT UNTIL GET=32:C
LS
 1260PRINT'"  NEXT YOU HAVE TO
JUMP OVER THE":PRINT"BARRELS WHI
CH ARE BEING ROLLED DOWN":PRINT"
THE STAIRS.IF YOU DON'T YOU WILL
 LOSE":PRINT"A LIFE.":PRINT'"
IF YOU ARE AT THE LADDERS ON THE
"
 1270PRINT"FIRST LEVEL OR AT THE
 TOP OF THE STAIRS":PRINT"ON THE
 SECOND LEVEL OR YOU WANT TO JUM
P":PRINT"OVER A BARREL PRESS THE
 / KEY.":PRINT'"PRESS X TO GO RI
GHT":PRINT"       Z TO GO LEFT"
 1280PRINT'"THE AUTO-REPEAT OF
THE KEYS HAS BEEN":PRINT"TURNED
OF IN THIS GAME SO YOU CANNOT":P
RINT"KEEP MOVING IF YOU KEEP YOU
R FINGER":PRINT"ON THE KEY.HOWEV
ER IF YOU WANT THE":PRINT"AUTO-R
EPEAT ON PRESS 'S'"
 1290PRINT'"PRESS 'S' OR SPACE
TO CONTINUE"
 1300REPEAT:A=GET:UNTILA=83ORA=3
2:IFA=83THENPROCCHANGE:ENDPROC
 1310IFA=32ENDPROC
 1320DEFPROCSHOW
 1330 PRINT'CHR$226:PRINTCHR$227
;"....YOU":PRINT'CHR$228:PRINTCH
R$229;"....DRACULA":PRINT'CHR$23
0:PRINTCHR$231;"....MONSTER":PRI
NT'CHR$232:PRINTCHR$233;"....FRA
NKENSTIEN":PRINT'CHR$237;"....BA
RREL":PRINT''"PRESS SPACE TO PL
AY"
 1340REPEAT UNTIL GET=32:ENDPROC
 1350DEFPROCCHANGE
 1360*FX12,0
 1370*FX11,10
 1380ENDPROC
```

TUNNEL TRO

```
   10 REM ************************
*
   20 REM ***   TUNNEL     RUN   **
*
   30 REM ***    By    S.Rear    **
*
   40 REM ************************
*
   50 ON ERROR IF ERR=17 THEN RU
N ELSE GOTO 260
   60 REM >>>>DEFINE><CHARS.<<<<
   70 VDU 23,224,126,255,129,129
,165,129,255,126
   80 VDU 23,225,126,129,165,129
,129,129,129,126
   90 VDU 23,226,0,153,102,60,60
,102,153,0
  100 VDU 23,227,0,0,36,24,24,36
,0,0
  110 VDU 23,228,0,0,33,245,255,
223,4,0
  120 VDU 23,229,128,128,128,128
,128,128,128,128
  130 REM >>>>CONTROL><PROGRAM<<
<<<
  140 *FX4,1
  150 MODE7:VDU 23;8202;0;0;0;:P
ROCINST
  160 PROCINIT:MODE2:VDU 23;8202
;0;0;0;:PROCSCREEN
  170 REPEAT
  180 SOUND1,-10,10,1:SOUND3,-10
,11,1
  190 PROCALIEN:PROCOXYGEN:PROCA
LIEN
  200 PROCOXYGEN:PROCGAURDIAN
  210 UNTIL RE%<>0
  220 IF RE%=1 THEN GOTO 160
  230 MODE7:*FX4,0
  240 END
  250 REM >>>>ERROR><TRAP<<<<
  260 MODE7:REPORT:PRINT" at lin
e ";ERL:*FX4,0
  270 END
  280 REM >>>>DEFINE><PROCEDURES
<<<<
  290 DEFPROCINIT
  300 TU$=STRING$(20,CHR$228):SC
%=0
  310 SK%=6:SO%=100:AX%=630:AY%=
90
  320 GX%=630:GY%=540:OC%=0:OXL%
=805
  330 RE$="":RE%=0
  340 ENDPROC
  350 DEFPROCSCREEN
  360 COLOUR128:CLS:COLOUR6:VDU4
  370 PRINTTAB(0,1);"OXYGEN:";TA
B(13,1);"1UP:";SC%
  380 FOR TUN%=4 TO 30 STEP 2
  390 COLOUR2:PRINTTAB(0,TUN%);T
U$;TAB(RND(16)+2,TUN%);" ";
  400 IF RND(3)=1 AND TUN%<>4 TH
EN COLOUR12:PRINTTAB(0,TUN%-1);C
HR$227;
  410 IF RND(3)=1 AND TUN%<>4 TH
EN COLOUR12:PRINTTAB(19,TUN%-1);
CHR$227;
  420 NEXT TUN%:COLOUR2:PRINTTAB
(0,30);TU$;TAB(0,3);" ";TAB(19,3
);" ";
  430 VDU5
  440 FOR OX%=450 TO 800 STEP 6
  450 GCOL0,1:MOVE OX%,990:VDU 2
29
  460 GCOL0,6:MOVE OX%+2,990:VDU
 229
  470 SOUND2,-10,SO%,1:SOUND1,-1
0,SO%,1:SO%=SO%+1
  480 NEXT OX%
  490 GCOL0,5:MOVEAX%,AY%:VDU 22
4
  500 GCOL0,3:MOVEGX%,GY%:VDU 22
6
  510 ENDPROC
  520 DEFPROCALIEN
  530 IF AY%=922 THEN PROCBONUS
  540 IF INKEY(-26) AND AX%>=60
THEN PROCDELALIEN:AX%=AX%-20:PRO
CPRIALIEN:PROCCHECK1
  550 IF INKEY(-122) AND AX%<=11
55 THEN PROCDELALIEN:AX%=AX%+20:
PROCPRIALIEN:PROCCHECK1
  560 IF INKEY(-66) AND POINT(AX
%+30,AY%+20)=0 THEN PROCDELALIEN
:AY%=AY%+64:PROCPRIALIEN
  570 IF INKEY(-98) AND POINT(AX
%+30,AY%-45)=0 AND AY%>=90 THEN
PROCDELALIEN:AY%=AY%-64:PROCPRIA
LIEN
  580 IF AY%>=992 THEN PROCBONUS
  590 ENDPROC
  600 DEFPROCDELALIEN
  610 GCOL0,0:MOVEAX%,AY%:VDU 22
4
  620 ENDPROC
  630 DEFPROCPRIALIEN
  640 GCOL0,5:MOVEAX%,AY%:VDU 22
4
  650 PROCOXYGEN
  660 ENDPROC
  670 DEFPROCCHECK1
  680 IF AX%=50 AND POINT(30,AY%
-10)=12 THEN SOUND 0,-15,4,4:MOV
E4,AY%+2:GCOL0,0:VDU227:PROCSCOR
E
  690 IF AX%=1170 AND POINT(1246
,AY%-8)=12 THEN SOUND 0,-15,4,4:
MOVE1223,AY%+2:GCOL0,0:VDU227:PR
OCSCORE
  700 ENDPROC
  710 DEFPROCSCORE
  720 VDU4:COLOUR6:SC%=SC%+10
  730 PRINTTAB(17,1);SC%:VDU5
  740 ENDPROC
  750 DEFPROCOXYGEN
  760 OC%=OC%+1:IF OC%=(5+SK%) T
HEN OC%=0 ELSE ENDPROC
  770 MOVE OXL%-5,990:GCOL0,0:VD
U 229
  780 OXL%=OXL%-5:IF OXL%<=450 P
ROCDEAD
  790 ENDPROC
  800 DEFPROCGAURDIAN
  810 IF GY%-2=AY% AND GX%>AX%-6
4 AND GX%<AX%+64 THEN PROCDEAD
  820 PROCDELGAURD
  830 IF GX%<=60 THEN GX%=GX%+66
:PROCPRIGAURD:ENDPROC
  840 IF GX%>=1160 THEN GX%=GX%-
66:PROCPRIGAURD:ENDPROC
  850 IF GY%<AY% AND RND(SK%-1)=
1 THEN IF RND(3)=1 THEN GY%=GY%+
64:PROCPRIGAURD:ENDPROC
  860 IF GY%>AY% AND RND(SK%-1)=
1 THEN IF RND(3)=1 THEN GY%=GY%-
64:PROCPRIGAURD:ENDPROC
  870 IF GX%<AX% AND RND(4)=1 TH
EN GX%=GX%+22:PROCPRIGAURD:ENDPR
OC:ELSE IF RND(4)=1 THEN GX%=GX%
-22:PROCPRIGAURD:ENDPROC
  880 IF RND(2)=1 THEN GX%=GX%+2
2:PROCPRIGAURD:ENDPROC:ELSE GX%=
GX%-22:PROCPRIGAURD:ENDPROC
  890 ENDPROC
  900 DEFPROCDELGAURD
  910 GCOL0,0:MOVE GX%,GY%:VDU 2
26
  920 ENDPROC
  930 DEFPROCPRIGAURD
  940 IF GY%<92 THEN GY%=92 ELSE
```

UBLE

SCATTERED about a maze of tunnels are flashing crystals, each of which is worth 10 points, but you have only a limited time to reach them before your oxygen supply runs out. Beware, too, of the evil guardian who can glide through the tunnel walls and destroy you on contact.

If you manage to reach the top of the maze, you earn 100 bonus points. Control keys are A and Z to move up and down and left and right arrowed cursor keys.

Tunnel Trouble was written for the BBC B by Simon Rear of Immingham, South Humberside.

```
 IF GY%>860 THEN GY%=860
  950 GCOL0,3:MOVE GX%,GY%:VDU 2
26
  960 ENDPROC
  970 DEFPROCDEAD
  980 FOR T%=0 TO 8
  990 GCOL0,0:MOVEAX%,AY%:VDU 22
4
 1000 GCOL0,1:MOVEAX%,AY%:VDU 22
5
 1010 FOR S%=300 TO 555 STEP5:SO
UND 2,-15,S%,.1:NEXT S%
 1020 GCOL0,0:MOVEAX%,AY%:VDU 22
5
 1030 GCOL0,5:MOVEAX%,AY%:VDU 22
4
 1040 FOR S%=300 TO 555 STEP5:SO
UND 2,-15,S%,.1:NEXT S%
 1050 NEXT T%:PROCNEWGAME
 1060 ENDPROC
 1070 DEFPROCBONUS
 1080 SC%=SC%+100:VDU4
 1090 COLOUR132:CLS:COLOUR11:PRI
NTTAB(5,9);"B O N U S";TAB(7,10)
;"1 0 0"
 1100 PROCTUNE
 1110 FOR WA=0 TO 500:NEXT WA
 1120 GX%=630:GY%=540:AX%=630:AY
%=90:OC%=0:OXL%=805:SO%=100
 1130 SK%=SK%-1:IF SK%<3 THEN SK
%=3
 1140 PROCSCREEN:VDU5
 1150 ENDPROC
 1160 DEFPROCNEWGAME
 1170 MOVE300,540:GCOL0,3:PRINT"
ANOTHER GAME"
 1180 MOVE500,480:PRINT"Y/N":*FX
15,1
 1190 REPEAT
 1200 RE$=INKEY$(0)
 1210 IF RE$="Y" OR RE$="y" THEN
 RE%=1
 1220 IF RE$="N" OR RE$="n" THEN
 RE%=2
 1230 UNTIL RE%<>0
 1240 ENDPROC
 1250 DEFPROCINST
 1260 PRINTTAB(15,1);CHR$(129);C
HR$(141);"TUNNEL RUN";TAB(15,2);
CHR$(129);CHR$(141);"TUNNEL RUN"
;TAB(16,3);CHR$(130);"By  S.Rear
"
 1270 PRINTTAB(2,5);CHR$(131);"G
uide your alien around the tunne
ls";TAB(2,6);CHR$(131)"collectin
g the flashing crystals."
 1280 PRINTTAB(2,8);CHR$(132);"B
EWARE! If you come in contact wi
th";TAB(2,9);CHR$(132);"the gaur
dian,who can glide through";TAB(
2,10);CHR$(132);"tunnel walls,or
 your oxygen runs out";TAB(2,11)
;CHR$(132);"you will be DESTROYE
D!!"
 1290 PRINTTAB(2,13);CHR$(133);"
YOU SCORE- 10 pts per crystal.";
TAB(13,14);CHR$(133);"BONUS 100
pts for reaching";TAB(13,15);CHR
$(133);"the top of the screen."
 1300 PRINTTAB(2,17);CHR$(134);"
USE KEYS-  A=UP   Z=DOWN";TAB(13
,18);CHR$(134);"← =LEFT → =RIGHT"
 1310 PROCTUNE
 1320 PRINTTAB(11,21);CHR$(129);
"HIT A KEY TO BEGIN.":*FX15,1
 1330 KEY$=GET$
 1340 ENDPROC
 1350 DEFPROCTUNE
 1360 FOR WAIT=0 TO 100:NEXT WAI
T
 1370 RESTORE:FOR TU%=0 TO 10:RE
ADP%,D%
 1380 SOUND1,-13,P%,D%:SOUND3,-1
3,P%,D%
 1390 NEXT TU%
 1400 FOR WAIT=0 TO 3000:NEXT WA
IT
 1410 DATA 109,5,117,5,125,5,109
,8,125,5,117,5,109,5,97,4,109,5,
117,5,125,5
 1420 ENDPROC
```

CHICKEN

```
   10MODE7
   20FOR0=1TO2:VDU157:PRINTTAB(1
2);CHR$129;CHR$141"Cer_SPLAT!":N
EXT0
   30PRINT''"Moggy has just been
to collect the      apples from
the orchard, when on his wayback
 he suddenly remembers the eggs.
"
   40PRINT''"This is where you c
ome in.You have to   control Mog
gy and collect all the eggs, but
 as you do this a large chicken
will hatch from each one."
   50PRINT"These will run around
 and kill you if   they bump int
o you!"''"Your job is to kill the
m by getting     above them and
dropping the apples onto them."
   60PRINT''" A new sheet is sta
rted after all the   chickens ha
ve been killed; starting a   new
 sheet will also give you SIX mo
re   apples and an EXTRA life."
   70A$=GET$
   80CLS
   90FOR0=1TO2:VDU157:PRINTTAB(1
2);CHR$129;CHR$141"Cer_SPLAT!":N
EXT0
  100PRINT''"You start off with t
hree lives and six  apples(and y
ou get an extra apple every time
 you lose a life).There are also
 sixchickens to every sheet so i
t is good tokill one chicken per
 apple."
  110PRINT''"It is possible to ki
ll more than one    chick at a t
ime and this is by getting  two
chicks on line and then dropping
 an apple. The apple will contin
ue past the first chicken and ki
ll the second, or    even third."

  120PRINT''"KEYS:"
  130PRINT''"Z   -   LEFT"
  140PRINT"X   -   RIGHT"
  150PRINT"*   -   UP"
  160PRINT"?   -   DOWN"
  170PRINT"RETURN   -   DROP APPLE
"
  180PRINTTAB(8);CHR$136;"PRESS
ANY KEY TO START"
  190A$=GET$
  200MODE2
  210ENVELOPE1,129,0,0,0,0,0,0,2
5,-2,0,100,120,100
  220PROCchrs
  230PROCinit
  240DIMD(6),F(6),E(6)
  250VDU28,0,31,19,10:COLOUR131:
CLS
  260VDU28,0,9,19,0:COLOUR132:CL
S
  270VDU28,0,31,19,0
  280GCOL0,1:COLOUR128:COLOUR7
  290MOVE60,840:DRAW250,1000:PLO
T85,440,840
  300FORZ=6TO8
  310FORI=1TO5:PRINTTAB(I,Z)CHR$
224;CHR$224;CHR$10;CHR$8;CHR$8;C
HR$224;CHR$224:NEXT
  320NEXT
  330FORX=1TO4
  340PRINTTAB(RND(16)+2,RND(15)+
10)CHR$224;CHR$224;CHR$10;CHR$8;
CHR$8;CHR$224;CHR$224
  350NEXT
  360COLOUR131
  370COLOUR6
  380FORI=1TO6
  390AM=AM+1
  400J=RND(16)+2:K=RND(15)+10
  410D(AM)=J:F(AM)=K
  420PRINTTAB(J,K)CHR$228
  430NEXT
  440COLOUR128
  450PRINTTAB(4,8)" ":PRINTTAB(4
,9)" "
  460COLOUR131
  470COLOUR0
  480PRINTTAB(6,1)"LIVES ";LIV:P
RINTTAB(6,2)"SCORE ";SC
  490REPEAT
  500X0=X:Y0=Y
  510PRINTTAB(X,Y)M$
  520IF HATCHED=0 THEN 540
  530PROCmovedemon
  540IFINKEY(-98)AND X>1 X=X-1
  550IFINKEY(-67)AND X<18 X=X+1
  560IFINKEY(-105)AND Y<30 Y=Y+1
  570IFINKEY(-73)AND Y>11 Y=Y-1
  580IFINKEY(-74)PROCDROP
  590IF APPLES=6 THEN PROCDEATH

  600IFFNCH(X,Y)=CHR$132 PROCEAT

  610IFFNCH(X,Y)=CHR$133 PROCDEA
TH
  620IFFNCH(X,Y)<>CHR$32 X=X0:Y=
Y0
  630IF X=X0 AND Y=Y0 THEN520
```

CHICKEN RUN

```
 640PRINTTAB(XO,YO)" "
 650UNTIL2=3
 660DEF PROCchrs
 670VDU23,224,254,254,254,0,127
,127,127,0
 680VDU23,225,120,8,60,126,126,
126,126,60
 690VDU23,240,60,255,60,90,126,
126,126,60
 700VDU23,228,24,60,126,126,126
,126,126,60
 710VDU23,229,192,64,92,126,63,
31,8,24
 720VDU23,231,66,40,149,32,74,1
6,165,0
 730ENDPROC
 740DEF PROCinit
 750VDU23;8202;0;0;0;
 760X=9:Y=10
 770AM=0:HATCHED=0
 780APPLES=0
 790LIV=3:SC=0
 800DEAD=0
 810M$=CHR$17+CHR$1+CHR$240
 820D$=CHR$17+CHR$5+CHR$229
 830ENDPROC
 840DEF FNCH(Q,R)
 850LOCALA%,LX,LY,C
 860VDU31,Q,R
 870A%=135
 880C=USR(&FFF4)
 890C=C AND&FFFF
 900C=C DIV&100
 910VDU31,POS,VPOS
 920=CHR$(C)
 930DEF PROCEAT
 940SOUND0,-15,1,2
 950PRINTTAB(X,Y)CHR$231
 960SOUND0,-10,6,15
 970FORD=1TO200:NEXT
 980PRINTTAB(X,Y)" "
 990PROCcheckegg
1000X=XO:Y=YO
1010HATCHED=HATCHED+1
1020ENDPROC
1030DEF PROCDROP
1040IFFNCH(X,Y+1)<>CHR$32 THEN
ENDPROC
1050APPLES=APPLES+1
1060APY=Y+1
1070COLOUR2:PRINTTAB(X,APY)CHR$
225
1080IF FNCH(X,APY+1)=CHR$133 TH
EN PROCkill
1090IF FNCH(X,APY+1)<>CHR$32 TH
ENENDPROC
1100IF APY>29 THEN ENDPROC
1110SOUND1,-15,APY*3,5
1120FORD=1TO30:NEXT
1130PRINTTAB(X,APY)" "
1140APY=APY+1
1150*FX15,0
1160GOTO1070
1170DEF PROCcheckegg
1180FORI=1TO6
1190IF (D(I)=X)AND(F(I)=Y)THEN
E(I)=1
1200NEXT
1210ENDPROC
1220DEF PROCmovedemon
1230FORI=1TO6
1240IF E(I)<>1 THEN 1350
1250PRINTTAB(D(I),F(I))" "
1260CX=RND(3)-2:CY=RND(3)-2
1270D(I)=D(I)+CX:F(I)=F(I)+CY
1280IFD(I)<1 THEN D(I)=D(I)+1
1290IFD(I)>18 THEN D(I)=D(I)-1

1300IFF(I)<11 THEN F(I)=F(I)+1
1310IFF(I)>28 THEN F(I)=F(I)-1
1320IF (D(I)=X)AND(F(I)=Y)THEN
PROCDEATH
1330IF FNCH(D(I),F(I))<>CHR$32
THEN D(I)=D(I)-CX:F(I)=F(I)-CY
1340PRINTTAB(D(I),F(I))D$
1350NEXT
1360ENDPROC
1370DEF PROCkill
1380DEAD=DEAD+1
1390SOUND0,-15,4,50
1400FORI=1TO6
1410IFX=D(I) AND APY+1=F(I)THEN
E(I)=0
1420NEXT
1430FORI=1TO150:NEXT
1440SC=SC+10
1450COLOUR0
1460PRINTTAB(X,APY+1)" ":PRINTT
AB(6,2)"SCORE ";SC
1470IF DEAD=6 THEN PROCnext
1480ENDPROC
1490DEF PROCDEATH
1500SOUND0,-15,6,40
1510FORX=1TO5
1520VDU19,3,4;0;19,4,3;0;
1530FORD=1TO500:NEXT
1540VDU19,3,3;0;19,4,4;0;
1550FORD=1TO500:NEXT
1560NEXT
1570COLOUR0
1580LIV=LIV-1:APPLES=APPLES-1:P
RINTTAB(6,1)"LIVES ";LIV:IF LIV>
0 THEN PRINTTAB(X,Y)" ":X=5:Y=10
:ENDPROC
1590PRINTTAB(0,12)"BAD LUCK!"'"
ANOTHER GAME Y/N?"
1600FOR SO=1TO11
1610READF,D:SOUND1,1,F,D
1620NEXT
1630DATA73,12,73,12,73,3,73,12,
85,12,81,3,81,12,73,3,73,12,69,3
,73,12
1640A$=GET$
1650IFA$="Y"THEN RUN
1660IFA$="N"THEN END
1670GOTO1640
1680ENDPROC
1690DEF PROCnext
1700APPLES=APPLES-6:LIV=LIV+1
1710COLOUR6
1720DEAD=0
1730AM=0
1740FORI=1TO6
1750AM=AM+1
1760J=RND(16)+2:K=RND(15)+10
1770D(AM)=J:F(AM)=K
1780PRINTTAB(J,K)CHR$228
1790NEXT
1800COLOUR0
1810PRINTTAB(6,1)"LIVES ";LIV
1820ENDPROC
```

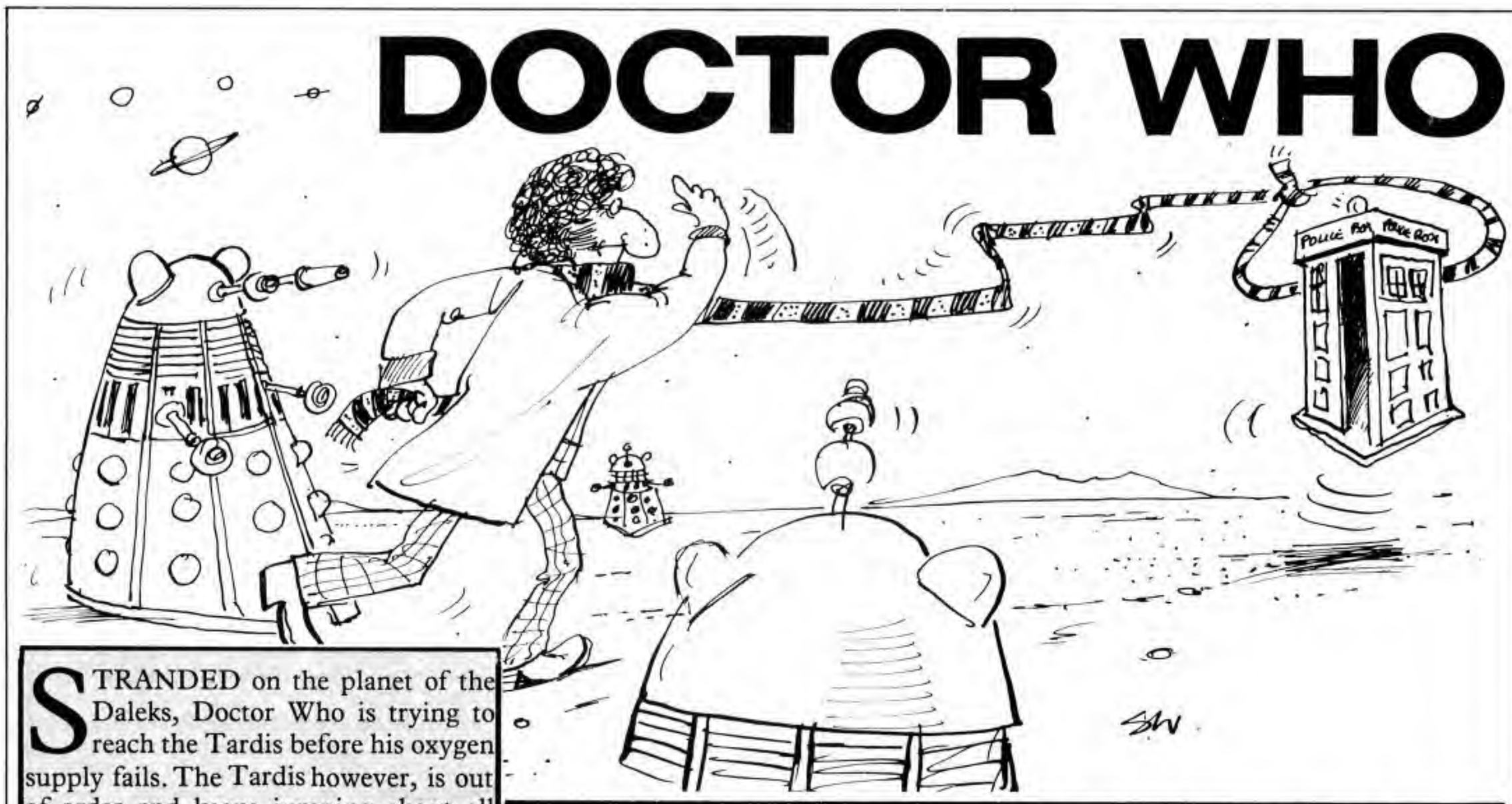
OUR HERO Moggy has been picking apples in the orchard when he remembers that he also has to collect all the eggs in the farmyard. Each time he picks up an egg, a large, dangerous chicken hatches from it and can kill Moggy simply by bumping into him. Moggy, however, can dispose of the chickens by dropping his apples on them.

Use Z to move left, X to move right, * to move up, ? to move down, and RETURN to drop an apple. You start with six apples and three lives and you get an extra apple every time you lose a life. It is still a good idea to kill a chicken, or even several if you manage to get them stacked one above the other, with every apple as there are six chickens to be eliminated. After that, you go to a new screen with six more apples and an extra life.

Remember that as you pick up an egg, a chicken hatches and can zap you immediately, so move out of the way quickly. The author of the game, Roddy Mack of Felixstowe, Suffolk, suggests approaching the eggs diagonally to improve your chances.

Chicken Run was written for the BBC B.

DOCTOR WHO



STRANDED on the planet of the Daleks, Doctor Who is trying to reach the Tardis before his oxygen supply fails. The Tardis however, is out of order and keeps jumping about all over the screen. Can you guide the doctor to it while keeping out of the way of the Daleks? Use Z and X to move left and right, * and / to move up and down.

Doctor Who was written for the BBC B by Ranjan Bhattacnarya of Harpenden, Herts.

```
   10 REM             DR.WHO
   20 REM
   30 REM   by R.Bhattacharya 19
83
   40 REM
   50 MODE7
   60 PROCPD("DR.WHO")
   70 PRINT
   80 PROCD(CHR$133+"BY R.BHATTA
CHARYA 1983")
   90 PRINT"The tardis is on the
 blink and keeps on jumping arou
nd all over the screen.Can  you
get to the tardis before your
    oxygen supply runs out, so t
hat you can make your escape fro
m the daleks planet?"
  100 PROCD(CHR$134+"CONTROL KEY
S:-")
  110 PRINT
  120 PROCD(CHR$130+"UP     = '*'
")
  130 PROCD(CHR$131+"DOWN   = '/'
")
  140 PROCD(CHR$133+"LEFT   = 'Z'
")
  150 PROCD(CHR$132+"RIGHT = 'X'
")
  160 PROCPD("ENTER SKILL LEVEL
0-9 (0=HARDEST)")
  170 S%=GET-48:IFS%<0ORS%>9THEN
170
  180ENVELOPE1,1,100,0,-3,15,1,5
0,126,-1,0,-5,126,126
  190 MODE4
  200W%=0:VDU19,0,4;0;19,1,3;0;

  210PROCINIT:TIME=0:REPEATUNTIL
TIME=200
  220REPEAT
  230PRINTTAB(34,0);P%;" "
  240P%=P%-1:IFP%=0Z%=1
  250IFH%=0PROCTARDIS
  260PROCPLAYER:IFZ%=1THEN300
  270PROCDALEK:IFZ%=1ORV%=1THEN3
00
  280PROCPLAYER:IFZ%=1THEN300
  290IFU%MOD(S%+2)=0ORU%MOD(S%+2
)=1PROCDALEK
  300U%=U%+1:UNTILZ%=1ORV%=1
  310PROCEND
  320IFF$="Y"THEN210
  330MODE7:END
  340DEFPROCINIT
  350VDU23,224,255,255,255,255,2
55,255,255,255,23,225,0,16,124,1
24,68,68,68,124,23,226,124,124,1
24,124,124,124,124,254,23,227,0,
56,124,57,58,20,126,125,23,228,1
24,124,56,56,108,68,68,204
  360VDU23,229,0,24,63,60,60,126
,126,127,23,230,126,126,126,126,
126,126,255,0,23,231,0,28,62,156
,92,40,126,190,23,232,62,62,28,2
8,54,34,34,51,23,233,0,24,252,60
,60,126,126,254,23;8202;0;0;0;
  370D1$=CHR$227+CHR$8+CHR$10+CH
R$228:D2$=CHR$231+CHR$8+CHR$10+C
HR$232:K1$=CHR$233+CHR$8+CHR$10+
CHR$230:K2$=CHR$229+CHR$8+CHR$10
+CHR$230:T$=CHR$225+CHR$8+CHR$10
+CHR$226
  380A%=RND(16):B%=RND(25)+3:J%=
RND(16)+20:K%=RND(25)+3:C%=0:D%=
0:Z%=0:G%=0:H%=0:P%=200:U%=0:V%=
0
  390CLS:PRINTTAB(7,0);"D r  W h
 o      OXYGEN LEFT"
  400FORI%=0TO39:PRINTTAB(I%,1);
CHR$224:NEXT:PRINTTAB(0,8);"¦";T
AB(0,11);"¦";TAB(0,20);"¦";TAB(0
,23);"¦";TAB(39,8);"¦";TAB(39,11
);"¦";TAB(39,20);"¦";TAB(39,23);
"¦";TAB(A%,B%);D2$;TAB(J%,K%);K1
$
  410E%=A%:F%=B%:L%=J%:M%=K%:D$=
D2$:K$=K1$:ENDPROC
  420DEFPROCPLAYER
  430IFINKEY(-105)=-1D%=1:C%=0
  440IFINKEY(-73)=-1D%=-1:C%=0
  450IFINKEY(-98)=-1C%=-1:D%=0:D
$=D1$
  460IFINKEY(-67)=-1C%=1:D%=0:D$
=D2$
  470A%=A%+C%:B%=B%+D%
  480IFA%<1ANDB%<>9ANDB%<>21A%=1
  490IFA%=0A%=38:C%=-1:G%=1
  500IFA%>38ANDB%<>9ANDB%<>21A%=
38
  510IFA%=39ANDG%=0A%=1:C%=1
  520IFB%<2B%=2
  530IFB%>29B%=29
  540IFA%=J%AND(B%=K%ORB%=K%+1OR
B%+1=K%)Z%=1
  550COLOUR0:PRINTTAB(E%,F%);D$:
COLOUR1:PRINTTAB(A%,B%);D$
  560IFH%=1PROCT
  570E%=A%:F%=B%:G%=0:ENDPROC
  580DEFPROCDALEK
  590IFJ%<A%J%=J%+1:K$=K2$:IFJ%>
38J%=38
  600IFJ%>A%J%=J%-1:K$=K1$:IFJ%<
1J%=1
  610IFK%<B%K%=K%+1:IFK%>29K%=29
  620IFK%>B%K%=K%-1:IFK%<2K%=2
  630IFA%=J%AND(B%=K%ORB%=K%+1OR
B%+1=K%)THENZ%=1
  640COLOUR0:PRINTTAB(L%,M%);K$:
COLOUR1:PRINTTAB(J%,K%);K$:L%=J%
:M%=K%:ENDPROC
  650DEFPROCTARDIS
  660X%=RND(35)+2:Y%=RND(26)+3
  670COLOUR1:PRINTTAB(X%,Y%);T$
  680H%=1:SOUND1,1,100,10:ENDPRO
C
  690DEFPROCT
  700IFRND(50)=25COLOUR0:PRINTTA
B(X%,Y%);T$:H%=0
  710IFJ%=X%AND(K%=Y%ORK%=Y%+1OR
Y%=K%+1)COLOUR0:PRINTTAB(X%,Y%);
T$:H%=0
  720IFA%=X%ANDB%=Y%V%=1
  730IFA%=X%AND(B%=Y%+1ORY%=B%+1
)ANDC%<>0:COLOUR0:PRINTTAB(X%,Y%
);T$:H%=0
  740ENDPROC
  750DEFPROCEND
  760IFZ%=1SOUND0,-15,150,7:TIME
=0:REPEATUNTILTIME=50
  770IFV%=1:FORI%=-15TO-5STEP5:F
ORJ%=255TO0STEP-10:SOUND1,I%,J%,
1:NEXT:NEXT
  780W%=1:CLS
  790COLOUR1
  800IFV%=1PRINTTAB(5,14);"YOU'V
E MADE IT!!!"
  810IFZ%=1PRINTTAB(5,14);"YOU'R
E DEAD!!!"
  820*FX15,1
  830PRINTTAB(5,20);"PRESS SPACE
 BAR FOR ANOTHER GAME";TAB(5,22)
;"OR 'N' TO CHANGE SKILL LEVEL)"
:F$=GET$
  840IFF$<>" "ANDF$<>"N"THEN830

  850 IF F$=" " THEN GOTO 200
  860 IFF$="N" THEN RUN
  870VDU23;11,255;0;0;0:ENDPROC
  880 DEF PROCPD(A$)FOR I%=0TO1:
VDU&9D81;&8D83;:PRINTSPC(16-LENA
$DIV2)A$:NEXT:ENDPROC
  890 DEF PROCD(A$)FORI%=0TO1:VD
U&8D;:PRINTSPC(10)A$:NEXT:ENDPRO
C
```

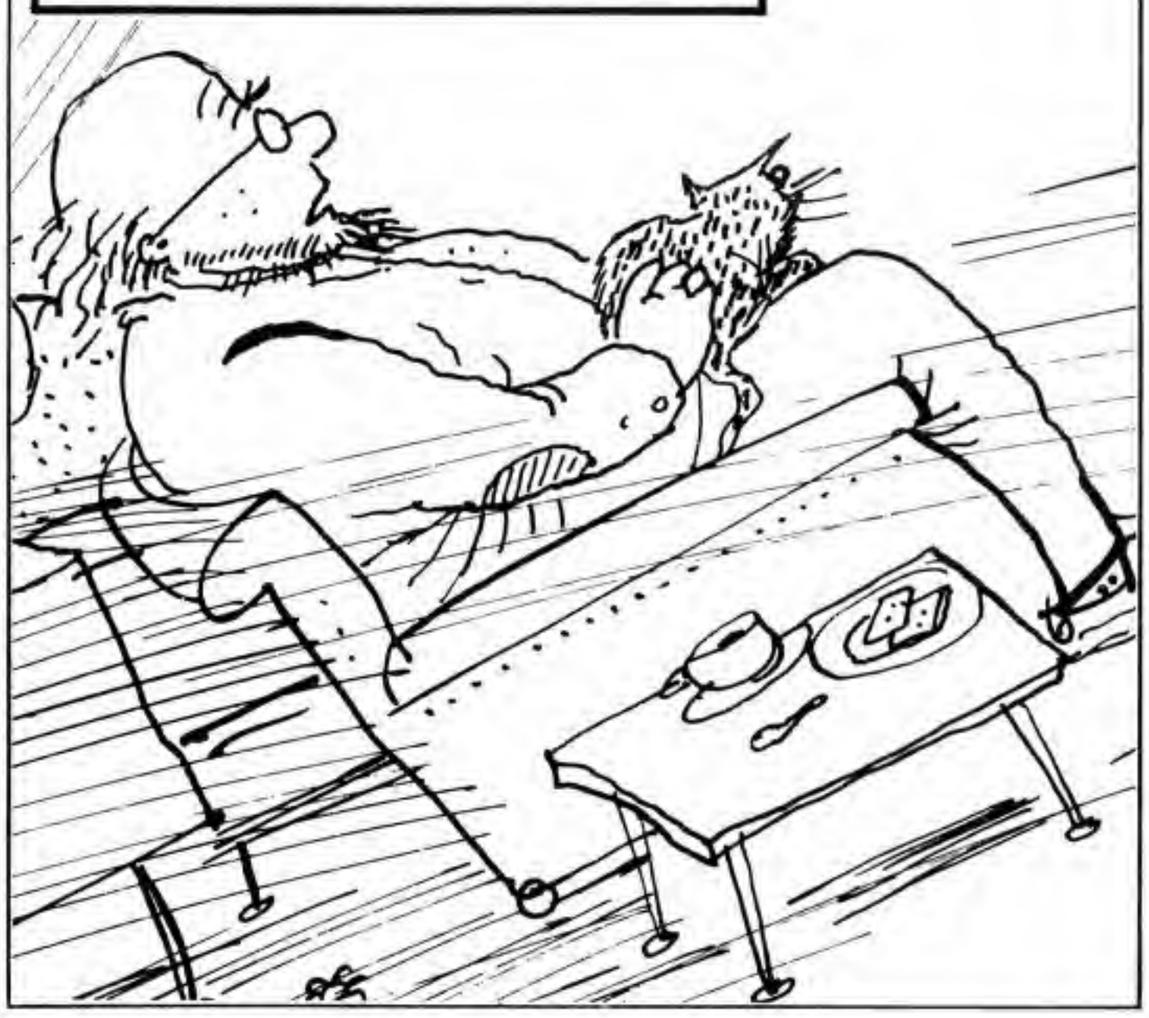
MONSTER MATHS

THERE ARE some difficult questions and some easier ones in **Monster Maths,** a multi-purpose maths quiz devised by Ross Colquhoun of Crieff, Perthshire for the BBC B.

You can choose to be tested on addition, subtraction, multiplication or division, and must complete one section correctly before you are allowed to go to the next. In the division section, you will be asked for the remainder as well as the main answer.

```
   10 REM ****MATHS****
   20 REM ****BY R. COLQUHOUN***
*
   30 MODE7
   40 PROCINSTRUCTIONS
   50 CLS
   60 DEFPROCSELECT
   70 SCORE=0
   80 PRINT"PLEASE ENTER THE LET
TER THAT CORRESPONDS TO YOUR QUE
STIONS."
   90 A=GET
  100 IF A=65 THEN PROCADD
  110 IF A=83 THEN PROCSUBTRACT
  120 IF A=77 THEN PROCMULTIPLY
  130 IF A=68 THEN PROCDIVIDE
  140 ENDPROC
  150 DEFPROCADD
  160 CLS
  170 PROCTITLE
  180 A=RND(100)
  190 B=RND(100)
  200 PRINT TAB(0,3)"WHAT IS ";A
;" + ";B
  210 PRINT TAB(25,5)"SCORE= ";S
CORE
  220 IF SCORE=10 THEN PROCPRES
  230 INPUT ANS
  240 IF ANS=A+B THEN SCORE=SCOR
E+1:SOUND 1,-15,53,10:GOTO160
  250 IF ANS<>A+B THEN SOUND 0,-
15,20,20
  260 IF ANS<>A+B THEN PRINT"WRO
NG.PLEASE TRY AGAIN.":GOTO 200
  270 ENDPROC
  280 DEFPROCTITLE
  290 PRINT TAB(0,0);CHR$(130);C
HR$(157);CHR$(132);CHR$(141);"
      MATHS"
  300 PRINT TAB(0,1);CHR$(130);C
HR$(157);CHR$(132);CHR$(141);"
      MATHS"
  310 PRINT TAB(0,23);CHR$(130);
CHR$(157);CHR$(132);CHR$(141);"
      MATHS"
  320 PRINT TAB(0,22);CHR$(130);
CHR$(157);CHR$(132);CHR$(141);"
      MATHS"
  330 ENDPROC
  340 DEFPROCSUBTRACT
  350 CLS
  360 PROCTITLE
  370 PRINT TAB(25,5)"SCORE= ";S
CORE
  380 IF SCORE=10 THEN PROCPRES
  390 C=RND(200)+100
  400 D=RND(100)
  410 PRINT TAB(0,3)"WHAT IS ";C
;" - ";D
  420 INPUT ANSW
  430 IF ANSW=C-D THEN SCORE=SCO
RE+1:SOUND 1,-15,53,10:GOTO 350
  440 IF ANSW<>C-D THEN SOUND 0,
-15,20,20
  450 IF ANSW<>C-D THEN PRINT"WR
ONG.PLEASE TRY AGAIN.":GOTO 410
  460 ENDPROC
  470 DEFPROCMULTIPLY
  480 CLS
  490 PROCTITLE
  500 E=RND(10)
  510 F=RND(20)
  520 PRINT TAB(25,5)"SCORE= ";S
CORE
  530 IF SCORE=10 THEN PROCPRES
  540 PRINT TAB(0,3)"WHAT IS ";E
;" X ";F
  550 INPUT ANSWE
  560 IF ANSWE=E*F THEN SCORE=SC
ORE+1:SOUND 1,-15,53,10:GOTO 480
  570 IF ANSWE<>E*F THEN SOUND 0
,-15,20,20
  580 IF ANSWE<>E*F THEN PRINT"W
RONG.PLEASE TRY AGAIN.":GOTO 540
  590 ENDPROC
  600 DEFPROCDIVIDE
  610 CLS
  620 PROCTITLE
  630 G=RND(100)+50
  640 H=RND(50)
  650 PRINT TAB(25,5)"SCORE= ";S
CORE
  660 IF SCORE=10 THEN PROCPRES
  670 PRINT TAB(0,3)"WHAT IS ";G
;" DIVIDED BY ";H
  680 INPUT ANSWER
  690 PRINT TAB(0,7)"AND THE REM
AINDER,IF ANY."
  700 INPUT ROS
  710 IF ANSWER=G DIV H AND ROS=
G MOD H THEN SCORE=SCORE+1:SOUND
 1,-15,53,10:PRINT"CORRECT":A$=I
NKEY$(150):GOTO 610
  720 IF ANSWER<>G/H THEN SOUND
0,-15,20,20
  730 IF ANSWER<>G/H THEN PRINT"
WRONG.PLEASE TRY AGAIN.":GOTO 67
0
  740 ENDPROC
  750 DEFPROCPRES
  760 CLS
  770 FOR Y=1 TO 24
```

```
  780 FOR X=1 TO 20
  790 PRINT TAB(X,Y);CHR$(132);"
WELL DONE!";
  800 NEXT X
  810 NEXT Y
  820 A$=INKEY$(200)
  830 GOTO 50:END
  840 DEFPROCINSTRUCTIONS
  850 PROCTITLE
  860 PRINT TAB(0,3);CHR$(129);"
 This program tests your ability
 at "
  870 PRINT TAB(0,4);CHR$(129);"
 doing basic addition,subtractio
n,"
  880 PRINT TAB(0,5);CHR$(129);"
 multiplication and division."
  890 PRINT TAB(0,8);CHR$(131);"
 To select the topic,type in the
 first"
  900 PRINT TAB(0,9);CHR$(131);"
 letter of it."
  910 PRINT TAB(0,11);CHR$(133);
" In the division section you fi
rst have"
  920 PRINT TAB(0,12);CHR$(133);
" to enter the No. of times"
  930 PRINT TAB(0,13);CHR$(133);
" it divides into it then press
RETURN."
  940 PRINT TAB(0,16);CHR$(134);
" The computer then asks you for
 the"
  950 PRINT TAB(0,17);CHR$(134);
" remainder.ALL THE REST ARE AS
NORMAL."
  960 PRINT TAB(0,20);CHR$(129);
CHR$(136);" PRESS THE SPACE BAR
TO CONTINUE."
  970 REPEAT
  980 B=GET
  990 UNTIL B=32
 1000 CLS
 1010 PROCTITLE
 1020 PRINT TAB(0,3);CHR$(129);"
When you reach a score of ten yo
u"
 1030 PRINT TAB(0,4);CHR$(129);"
 are able to change the topic."
 1040 PRINT TAB(0,7);CHR$(131);"
If you get a sum right or wrong
you"
 1050 PRINT TAB(0,8);CHR$(131);"
 get a pleasant or a strange noi
se."
 1060 PRINT TAB(0,11);CHR$(133);
" If you get a sum wrong you are
 asked"
 1070 PRINT TAB(0,12);CHR$(133);
" to try again."
 1080 PRINT TAB(0,17);CHR$(133);
"  GOOD LUCK!!"
 1090 A$=INKEY$(1000)
 1100 GOTO 830
```



REGARDEZ

LANGUAGE LEARNING AIDS FOR FRENCH, GERMAN & SPANISH

FOR BBC(32K) · ELECTRON SPECTRUM (48K)

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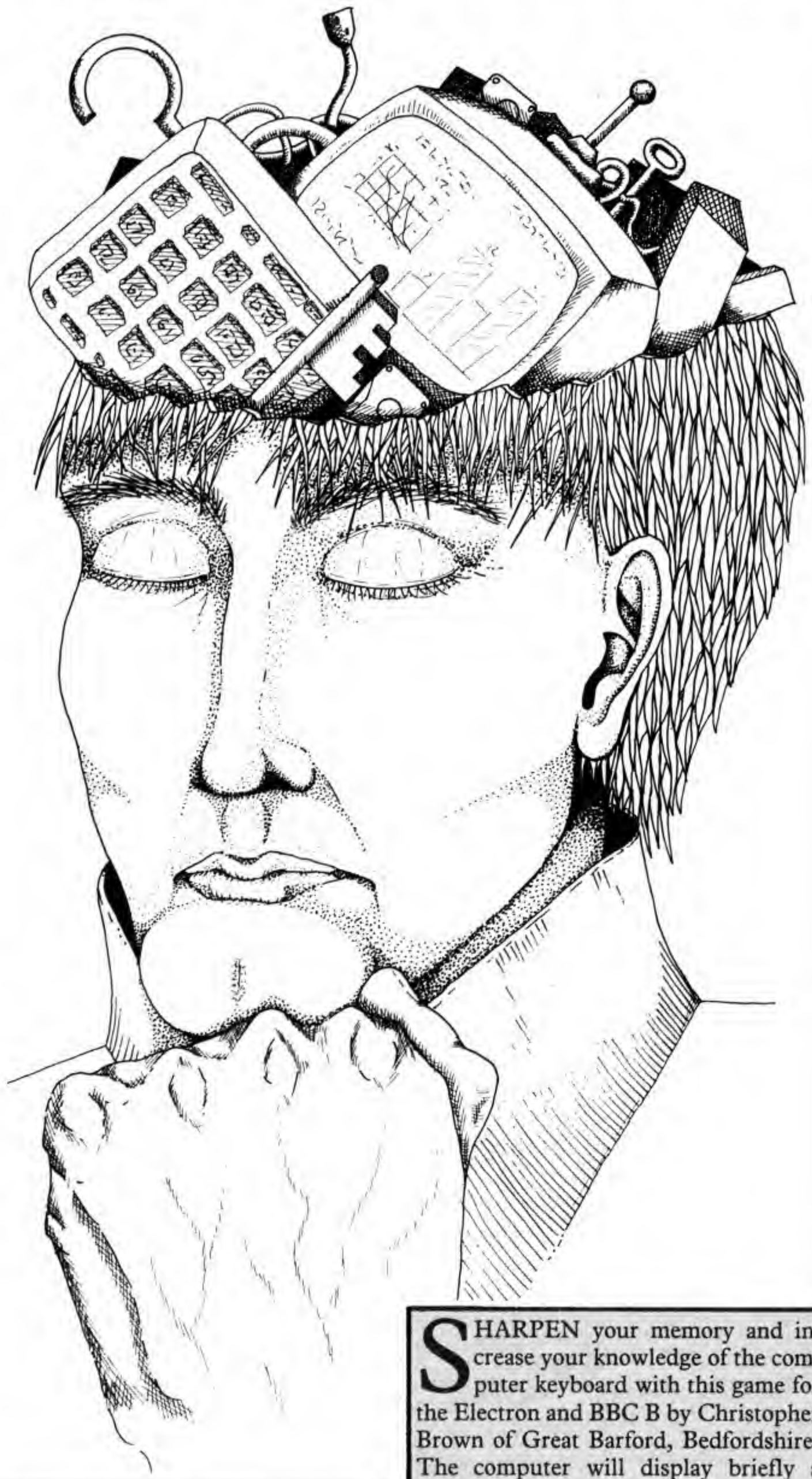
MEMORY KEYS

```
  1  *FX 200,2
 10 ON ERROR GOTO 10
 20 MODE7
 30 S=0
 40 PROCI
 50  DIM Q$(P,L)
 60  DIM A$(P,L)
 70 MODE 2
 80 FOR I=1 TO L
 90 J=INT(RND(91)+35)
100 FOR M=1 TO P
110 A$(M,I)=CHR$(J)
120 NEXT M
130 NEXT I
140 CLS
150 FOR I=1 TO L
160 PRINT " ";A$(1,I);
170 NEXT I
180 FOR I=1 TO 10000
190 NEXT I
200 FOR J=1 TO P
210 CLS
220 PRINT "PLAYER ";J
230 FOR I=1 TO L
240 INPUT Q$(J,I)
250 NEXT I
260 NEXT J
270 FOR J=1 TO P
280 S=0
290CLS
300 PRINT "PLAYER ";J;" YOU GO
T"
310 FOR I=1 TO L
320 FOR H=1 TO L
330 IF Q$(J,I)=A$(J,H)  S=S+1:
PRINT Q$(J,I);" ";:A$(J,H)="£"
340 NEXT H
350 NEXT I
360 PRINT
370 PRINT
380 PRINT "SCORE=";S
390 PRINT
400 PRINT "YOU DIDN'T GET "
410 FOR I=1 TO L
420 IF A$(J,I)="£"  A$(J,I)=""
430 PRINT A$(J,I);" ";
440 NEXT I
450 PROCS
460 PRINT:PRINT:PRINT:PRINT:PR
INT" press SPACE BAR to      go
on"
470 REPEAT
480 F$=GET$
490 UNTIL F$=" "
500 NEXT J
510 RUN
520 DEFPROCI
530 PRINT "**********************
**********************"
540 PRINT "**********BRAIN******
****TEST************"
550 PRINT "**********************
**********************"
560PRINT:PRINT:PRINT:PRINT
570PRINT "         The computer
 will print up                10 c
haracters , then you
   type in one character
          which you think is i
n it.                 Then press R
ETURN then do                 the
next characte";
580 PRINT "r and so
   on."
590PRINT:PRINT:PRINT:PRINT
600 INPUT"        HOW MANY cha
acters ?"L
610 PRINT:PRINT:INPUT"        H
OW MANY PLAYERS ?"P
620PRINT"             SPACE BAR
TO START"
630 REPEAT
640 F$=GET$
650 UNTIL F$=" "
660ENDPROC
670 DEFPROCS
680 PRINT:PRINT:PRINT
690 IF S=L PRINT "BRILIANT!" :
ENDPROC
700 IF S<L/2 PRINT "NOT VERY G
OOD" :ENDPROC
710 IF S>L/2 PRINT "NOT BAD" :
ENDPROC
```



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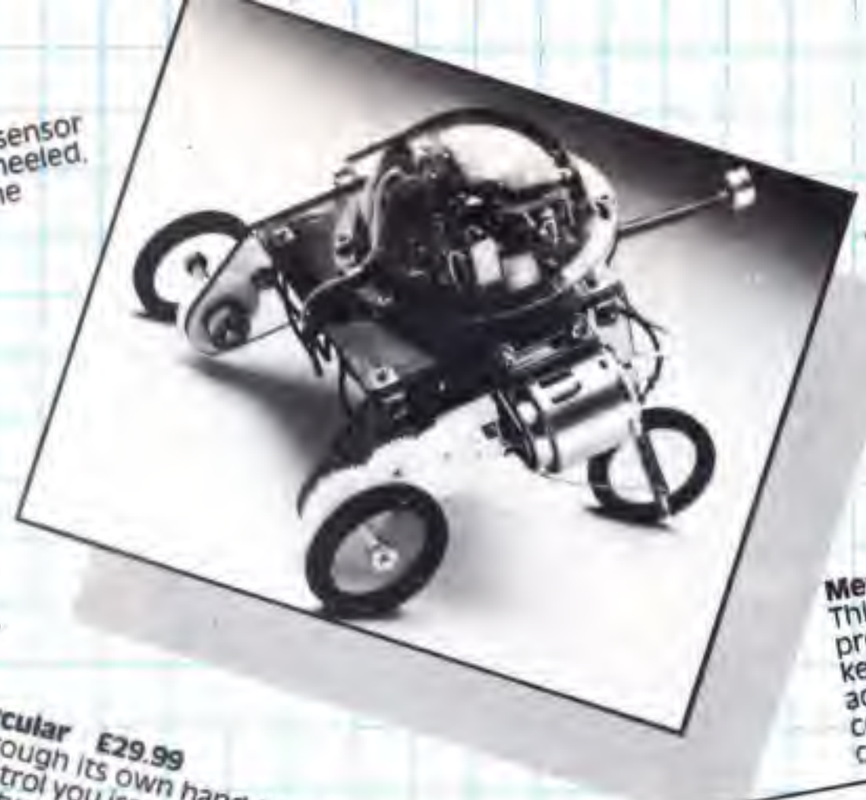

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CATAC

```
 10 REM ****************
 20 REM ****************
 30 REM **              **
 40 REM ** CATACOMBS   **
 50 REM **              **
 60 REM ** BY C.Stow   **
 70 REM **              **
 80 REM ****************
 90 REM ****************
100MODE7
110VDU23;8202;0;0;0;
120PROCINST
130PROCINIT
140PROCHEADING
150PROCCHECK
160REPEAT:REPEAT
170INPUT"Next command",CO$
180IFLEN(CO$)=0 PRINTCHR$133"W
hat?"
190UNTILLEN(CO$)>0
200PRINTCHR$129;STRING$(30,"*"
)
210PROCANAL
220PROCTP
230UNTIL LOSE OR WON
240PROCEND
250RUN
260DEFPROCHEADING
270PRINT''SPC10;CHR$129;CHR$1
41;"CATACOMBS"
280PRINTSPC10;CHR$129;CHR$141;
"CATACOMBS"
290PRINTSPC10;CHR$132;"*******
****"
300ENDPROC
310DEFPROCCHECK
320IF(POSI=6 OR POSI=9) AND (N
OT 0 OR (IP(1)<>POSI AND IP(1)<>
0)) PRINT"It is pitch black in h
ere.":ENDPROC
330PRINT'"You are now ";PL$(PO
SI)
340PRINT'"VISIBLE EXITS :"
350FORI=1TO4
360IF NP(POSI,I)>0 PRINTDT$(I)
;":";
370NEXT
380PRINT''"I can now see :"
390SH=FALSE
400FORI=1TO6
410IF IP(I)=POSI PRINTI$(I):SH
=TRUE
420IF IP(I)=POSI AND I=1 AND N
OT 0 PRINTBRT$(0)
430IF IP(I)=POSI AND I=1 AND 0
 PRINTBRT$(LT)
440NEXTI
450IF NOT SH PRINT"nothing at
all."
460ENDPROC
470DEFPROCANAL
480IF LEN(CO$)=1 IF INSTR("NES
W",CO$)>0 PROCM:ENDPROC
490IF CO$="HELP" PROCCHECK:PRO
CINV:PRINT"Your score is ";SC;".
":PRINT"Moves made : ";MOV:ENDPR
OC
500PROCOC:ENDPROC
510DEFPROCTP
520SC=SC-1:MOV=MOV+1
530DD=FALSE
540IF 0 RLT=RLT-0.1:DD=TRUE
550LT=INT(RLT)
560IF DD AND LT=0 PRINT"Your l
amp has just gone out.":0=FALSE
570WON=(POSI=8 AND IP(2)=8)
580ENDPROC
590DEFPROCM
600DI=INSTR("NESW",CO$)
610IF NP(POSI,DI)=0 PRINT"I'm
afraid there's a wall in the way
.":ENDPROC
620IF (POSI=6 OR POSI=9) AND (
NOT 0 OR (IP(1)<>POSI AND IP(1)<
>0)) PRINT"You have fallen down
a trapdoor!":LOSE=TRUE:ENDPROC
630POSI=NP(POSI,DI)
640PROCCHECK
650ENDPROC
660DEFPROCOC
670CN=FNcom:TN=FNth
680IF CN=0 OR TN=0 PRINT"I can
't work out what you mean.":ENDP
ROC
690ON CN GOTO 700,700,710,710,
720,730,740
700PROCTAKE:ENDPROC
710PROCLIGHT:ENDPROC
720PROCOFF:ENDPROC
730PROCDROP:ENDPROC
740PROCKILL:ENDPROC
750ENDPROC
760DEFFNcom
770NO=0:I=0
780REPEAT:I=I+1
790IF LEFT$(CO$,LEN(MOC$(I)))=
MOC$(I) NO=I
800UNTIL NO>0 OR I=7
810=NO
820DEFFNth
830NO=0:I=0
840REPEAT:I=I+1
850IF RIGHT$(CO$,LEN(IN$(I)))=
IN$(I) NO=I
860UNTIL NO>0 OR I=6
870=NO
880DEFPROCTAKE
890IF IP(TN)<>POSI PRINT"It's
not in here.":ENDPROC
900IF TN=5 OR TN=6 PRINT"Stop
cracking the funny's!":ENDPROC
910IF CAD=3 PRINT"I can't carr
y any more.I'm not BIONIC!!":END
PROC
920IF(TN)=0
930PRINT"RIGHT ON.."
940CAD=CAD+1
950ENDPROC
960DEFPROCLIGHT
970IF IP(TN)<>0 PRINT"I would
but I haven't got it.":ENDPROC
980IF TN<>1 PRINT"You've got t
o be joking!":ENDPROC
990IF 0 PRINT"It's already on.
Fool!":ENDPROC
1000IF LT=0 PRINT"Oh no! It won
't relight.":ENDPROC
1010PRINT"RIGHT ON.."
1020=TRUE
1030ENDPROC
1040DEFPROCOFF
1050IF IP(TN)<>0 PRINT"I'm not
carrying that.":ENDPROC
1060IF TN<>1 PRINT"HA!HA!HA!HA!
":ENDPROC
1070IF NOT 0 PRINT"It's already
 off.Idiot.":ENDPROC
1080PRINT"RIGHT ON.."
1090=FALSE
1100ENDPROC
1110DEFPROCDROP
1120IF IP(TN)<>0 PRINT"I haven'
t got it.":ENDPROC
1130IP(TN)=POSI
1140PRINT"RIGHT ON.."
1150CAD=CAD-1
1160ENDPROC
1170DEFPROCKILL
1180IF IP(TN)<>POSI PRINT"You'l
l be lucky to find it in here.":
ENDPROC
1190IF TN=5 PROCKILL_MUM:ENDPRO
C
1200IF TN=6 PROCKILL_DRAC:ENDPR
```

YOU ARE TRAPPED In the **Catacombs** in this adventure written for the BBC B by Carl Stow of Hull. To escape, you have to find the treasure and deposit it in front of the main door to make it open.

Some useful words to help you in your quest are HELP, GET, KILL and DROP. Beware of Dracula, the giant rats, the mummy and, above all, trapdoors.

CATACOMBS

```
OC
 1210PRINT"Funny!!!"
 1220ENDPROC
 1230DEFPROCKILL_MUM
 1240IF IP(3)=0 PRINT"You shoot
at the mummy.Direct hit!!":IP(5)
=-1:SC=SC+30:ENDPROC
 1250IF IP(4)=0 PRINT"You try ga
rlic to drive the mummy away  bu
t he is not affected.":ENDPROC
 1260PRINT"You have a fight with
 the mummy but      you are kille
d in the scuffle."
 1270LOSE=TRUE
 1280ENDPROC
 1290DEFPROCKILL_DRAC
 1300IF IP(4)=0 PRINT"You get ou
t your garlic.DRACULA is instant
ly killed":IP(6)=-1:SC=SC+30:END
PROC
 1310IF IP(3)=0 PRINT"You shoot
at DRACULA but you miss.":ENDPRO
C
 1320PRINT"You fight DRACULA but
 he bites your      neck and you
are killed."
 1330LOSE=TRUE
 1340ENDPROC
 1350DEFPROCEND
 1360IF WON PRINT'''"      WELL D
ONE !! YOU MADE IT!"
 1370IF LOSE PRINT'''"      HARD
CHEESE MATE!!!___YOU'VE MESSED
   IT UP!!!!":SC=0
 1380PRINT'''"   You took ";MOV;
" moves,"
 1390PRINT"   and your final sco
re was ";SC;"."
 1400PRINT''CHR$130;"    PRESS S
PACE TO TRY AGAIN"
 1410G=GET:ENDPROC
 1420DEFPROCINIT
 1430DIMPL$(9)
 1440FORP=1TO9
 1450READPL$(P)
 1460NEXT
 1470DATA in a dark passage lead
ing    east,in a large room.Ther
e is     light from a grate abov
e
 1480DATA in a small dark cupboa
rd,in a torture chamber
 1490DATA in a long corridor,in
a room full of giant rats
 1500DATA in a room full of skel
etons,at the main doorway.It is
locked
 1510DATA in a passage.The light
 is not on
 1520DIMNP(9,4)
 1530FORI=1TO9:FORJ=1TO4
 1540READNP(I,J)
 1550NEXTJ:NEXTI
 1560DATA0,2,0,0,0,0,5,1,0,0,6,0
 1570DATA0,5,7,0,2,6,0,4,3,0,9,5
 1580DATA4,0,0,0,0,9,0,0,6,0,0,8
 1590DIMI$(6),IN$(6),IP(6)
 1600FORI=1TO6:READI$(I),IN$(I),
IP(I):NEXT
 1610DATA a lamp,LAMP,5
 1620DATA the treasure,TREASURE,
7
 1630DATA a loaded gun,GUN,3
 1640DATA a clove of garlic,GARL
IC,1
 1650DATA a big mean mummy,MUMMY
,4
 1660DATA Dracula,DRACULA,9
 1670DIMMOC$(7):FORI=1TO7:READMO
C$(I):NEXT
 1680DATA GET,PICK,TURN ON,LIGHT
,BLOW OUT,DROP,KILL
 1690DIMDT$(4):FORI=1TO4:READDT$
(I):NEXT
 1700DATA North,East,South,West
 1710DIMBRT$(2)
 1720BRT$(0)="( It's not on )"
 1730BRT$(1)="( It's going out )
"
 1740BRT$(2)="( It's lit and it'
s shining brightly )"
 17500=FALSE:RLT=2.9:LT=2:POSI=1
:LOSE=FALSE:WON=FALSE:MOV=0:SC=5
0:CAD=0
 1760ENDPROC
 1770DEFPROCINV
 1780PRINT'''"I am carrying :"
 1790SH=FALSE:FORI=1TO6
 1800IFIP(I)=0 PRINTI$(I):SH=TRU
E
 1810IFIP(I)=0 AND I=1 AND NOT O
 PRINTBRT$(0)
 1820IFIP(I)=0 AND I=1 AND O PRI
NTBRT$(LT)
 1830NEXTI:IF NOT SH PRINT"nothi
ng."
 1840ENDPROC
 1850DEFPROCINST
 1860PRINT:FORI=1TO2:PRINTCHR$13
4;CHR$157;CHR$132;CHR$141;SPC6;"
C A T A C O M B S":NEXT
 1870PRINT'CHR$129;"In this adve
nture you are trapped in"
 1880PRINTCHR$129;"the Catacombs
.To get out you must get"
 1890PRINTCHR$129;"the treasure
and drop it at the main"
 1900PRINTCHR$129;"door.The door
 will then open and you "
 1910PRINTCHR$129;"will be free.
But first you must"
 1920PRINTCHR$129;"complete the
adventure."
 1930PRINT'CHR$134;"Some command
s to help you on your way"
 1940PRINTCHR$134;"are:HELP,TURN
 ON,KILL,DROP etc...."
 1950PRINT'CHR$134;"But beware o
f the trapdoors!!!!"
 1960PRINT''CHR$133;"You will ge
t a score at the end of the"
 1970PRINTCHR$133;"game."
 1980PRINT''CHR$133;SPC8;"PRESS
SPACE TO PLAY."
 1990REPEAT UNTIL GET=32:CLS
 2000 ENDPROC
```

```
    5 MODE 6
   10 DIM store%(255)
   15 VDU 23,150,0,0,0,28,28,28,
0,0
   20 VDU 23,200,0,0,0,126,126,1
26,0,0
   25 VDU 19,1,2,0,0,0
   30
   35 PROCintro
   40 PROCinput
   45 PROCassemble
   50 PROCopt
   55 PROCmorse
   60 PROCchoice
   65 IF G=32 THEN 50 ELSE RUN
   70 END
   75
   80 DEFPROCintro
   85 PRINT'TAB(12)"MORSE TEACHE
R"
   90 PRINT'"   Morse Teacher is
 a program which will make you f
amiliar with the Morse Code.
First,type a message into the
      computer.This should be no
 longer than  255 symbols and wr
itten in capital"
   95 PRINT" letters,as all othe
r characters will    be ignored
and treated  as spaces.      Pre
ss the <RETURN> key when the ent
ry   is complete.The numbers 0 t
o 9 may      also be used."
  100 PRINT"   The computer will
 then turn the entry into Morse
Code,with a delay between    eac
h letter you determine.The spaci
ng   between each word will be c
alculated    in direct ratio to
this value."
  105 PRINT"   A screen display
of the standard      Morse code
is shown throughout,and the  mes
sage is printed out on the scree
n    as the code is produced."
  110 PRINT'TAB(10)"<PRESS SPACE
 BAR>"
  115 REPEAT UNTIL GET=32
  120 ENDPROC
  125
  130 DEFPROCinput
  135 CLS:PRINT TAB(12)"MORSE TE
ACHER"
  140 PRINT"   Input your messa
ge now.The standard  'start of m
essage' and 'end of message' cod
es will be automatically added t
o    it.These are listed along w
ith the      other codes on the
next page."''
  145 INPUT LINE A$
  150 ENDPROC
  155
  160 DEFPROCassemble
  165 FOR X%=1 TO LEN(A$)
  170 I%=0
  175 A%=ASC(MID$(A$,X%,1))
  180 IF A%>64 AND A%<91 THEN st
ore%(X%)=A%-64:I%=1:NEXT
  185 IF A%>47 AND A%<58 THEN st
ore%(X%)=A%-21:I%=1:NEXT
  190 IF I%=0 THEN store%(X%)=40
:NEXT
  195 ENDPROC
  200
  205 DEFPROCopt
  210 CLS:PRINT TAB(12)"MORSE TE
ACHER"
  215 PRINT'"DELAY BETWEEN LETTE
RS IN"
  220 INPUT"1/100s OF A SECOND <
40 to 500>"sec%
  225 IF sec%>500 OR sec%<40THEN
 210
  230 SEC%=sec%*2
  235 ENDPROC
  240
  245 DEFPROCmorse
  250 CLS:PRINT'TAB(12)"MORSE TE
ACHER"
  255 PROCtable
  260 PRINT TAB(9,16)"<SPACE BAR
 TO START>"
  265 REPEAT UNTIL GET=32
  270 PRINT TAB(9,16)SPC(25)
  275 PROCstart
  280 PROCspace
  285 FOR X%=1 TO LEN(A$)
  290 IF store%(X%)>0 AND store%
(X%)<27 THEN PRINT;CHR$(store%(X
%)+64);
  295 IF store%(X%)>26 AND store
%(X%)<37 THEN PRINT;CHR$(store%(
X%)+21);
  300 IF store%(X%)=40 THEN PRIN
T;" ";
  305 IF store%(X%)=40 PROCspace
:NEXT
  310 IF store%(X%)=0 THEN 330
  315 ON store%(X%) GOSUB 355,36
0,365,370,375,380,385,390,395,40
0,405,410,415,420,425,430,435,44
0,445,450,455,460,465,470,475,48
0,485,490,495,500,505,510,515,52
0,525,530
  320 t%=TIME:REPEAT UNTIL TIME-
t%=sec%
  325 NEXT
  330 PROCend
  335 PRINT'TAB(11)"<PRESS SPACE
 BAR>"
  340 REPEAT UNTIL GET=32
```

MORSE CODE

LEARN and practise Morse Code with this program written for the BBC B by John Hopwood of Truro, Cornwall.

The program displays the standard Morse Code table and also allows you to type in a message of up to 255 symbols which it will then reproduce in the appropriate dots and dashes. You can choose the speed of the message to suit your skill level.

Make sure your message is in capitals; anything else will be interpreted by the program as a space.

```
  345 ENDPROC
  350
  355 PROCd:PROC1:RETURN
  360 PROC1:PROCd:PROCd:PROCd:RE
TURN
  365 PROC1:PROCd:PROC1:PROCd:RE
TURN
  370 PROC1:PROCd:PROCd:RETURN
  375 PROCd:RETURN
  380 PROCd:PROCd:PROC1:PROCd:RE
TURN
  385 PROC1:PROC1:PROCd:RETURN
  390 PROCd:PROCd:PROCd:PROCd:RE
TURN
  395 PROCd:PROCd:RETURN
  400 PROCd:PROC1:PROC1:PROC1:RE
TURN
  405 PROC1:PROCd:PROC1:RETURN
  410 PROCd:PROC1:PROCd:PROCd:RE
TURN
  415 PROC1:PROC1:RETURN
  420 PROC1:PROCd:RETURN
  425 PROC1:PROC1:PROC1:RETURN
  430 PROCd:PROC1:PROC1:PROCd:RE
TURN
  435 PROC1:PROC1:PROCd:PROC1:RE
TURN
  440 PROCd:PROC1:PROCd:RETURN
  445 PROCd:PROCd:PROCd:RETURN
  450 PROC1:RETURN
  455 PROCd:PROCd:PROC1:RETURN
  460 PROCd:PROCd:PROCd:PROC1:RE
TURN
  465 PROCd:PROC1:PROC1:RETURN
  470 PROC1:PROCd:PROCd:PROC1:RE
TURN
  475 PROC1:PROCd:PROC1:PROC1:RE
TURN
  480 PROC1:PROC1:PROCd:PROCd:RE
TURN
  485 PROC1:PROC1:PROC1:PROC1:PR
OC1:RETURN
  490 PROCd:PROC1:PROC1:PROC1:PR
OC1:RETURN
  495 PROCd:PROCd:PROC1:PROC1:PR
OC1:RETURN
  500 PROCd:PROCd:PROCd:PROC1:PR
OC1:RETURN
  505 PROCd:PROCd:PROCd:PROCd:PR
OC1:RETURN
  510 PROCd:PROCd:PROCd:PROCd:PR
OCd:RETURN
  515 PROC1:PROCd:PROCd:PROCd:PR
OCd:RETURN
  520 PROC1:PROC1:PROCd:PROCd:PR
OCd:RETURN
  525 PROC1:PROC1:PROC1:PROCd:PR
OCd:RETURN
  530 PROC1:PROC1:PROC1:PROC1:PR
OCd:RETURN
  535
  540 DEFPROC1
  545 t%=TIME
  550 SOUND 3,-10,128,8
  555 REPEAT UNTIL TIME-t%=65
  560 ENDPROC
  565
  570 DEFPROCd
  575 t%=TIME
  580 SOUND 3,-10,128,3
  585 REPEAT UNTIL TIME-t%=40
  590 ENDPROC
  595
  600 DEFPROCspace
  605 t%=TIME:REPEAT UNTIL TIME-
t%=SEC%
  610 ENDPROC
  615
  620 DEFPROCstart
  625 PROC1:PROCd:PROC1:PROCd:PR
OC1
  630 ENDPROC
  635
  640 DEFPROCend
  645 PROCd:PROC1:PROCd:PROC1:PR
OCd
  650 ENDPROC
  655
  660 DEFPROCtable
  665 RESTORE 835
  670 FOR X%=3 TO 11
  675 PRINT TAB(2,X%)CHR$(62+X%)
;
  680 GOSUB 820:NEXT
  685 FOR X%=3 TO 11
  690 PRINT TAB(12,X%)CHR$(71+X%
);
  695 GOSUB 820:NEXT
  700 FOR X%=3 TO 10
  705 PRINT TAB(22,X%)CHR$(80+X%
);
  710 GOSUB 820:NEXT
  715 FOR X%=3 TO 11
  720 PRINT TAB(32,X%)CHR$(46+X%
);
  725 GOSUB 840:NEXT
  730 PRINT TAB(22,11)"0";
  735 VDU 200,200,200,200,200
  740 PRINT''TAB(2)"Start of mes
sage";
  745 VDU 200,150,200,150,200
  750 PRINT TAB(2)"End of messag
e";
  755 VDU 150,200,150,200,150
  760 ENDPROC
  765
  770 DEFPROCchoice
  775 CLS
  780 PRINT TAB(12)"MORSE TEACHE
R"
  785 PRINT''TAB(2)"Press the <S
PACE BAR> to try the same  mess
age again,and <S> to set a new
    message"
  790 G=GET:IF G<>32 AND G<>83 T
HEN 790
  795 ENDPROC
  800
  805 REM Type this data in care
fully
  810 REM Any mistakes will ruin
 the
  815 REM code table
  820 READ Q%,W%,E%,R%
  825 VDU Q%*50,W%*50,E%*50,R%*5
0
  830 RETURN
  835 DATA 3,4,0,0,4,3,3,3,4,3,4
,3,4,3,3,0,3,0,0,0,3,3,4,3,4,4,3
,0,3,3,3,3,3,3,0,0,3,4,4,4,4,3,4
,0,3,4,3,3,4,4,0,0,4,3,0,0,4,4,4
,0,3,4,4,3,4,4,3,4,3,4,3,0,3,3,3
,0,4,0,0,0,3,3,4,0,3,3,3,4,3,4,4
,0,4,3,3,4,4,3,4,4,4,4,3,3
  840 READ Q%,W%,E%,R%,T%
  845 VDU Q%*50,W%*50,E%*50,R%*5
0,T%*50
  850 RETURN
  855 DATA 3,4,4,4,4,3,3,4,4,4,3
,3,3,4,4,3,3,3,3,4,3,3,3,3,3,4,3
,3,3,3,4,4,3,3,3,4,4,4,3,3,4,4,4
,4,3
```

INVISIBLE MAZE

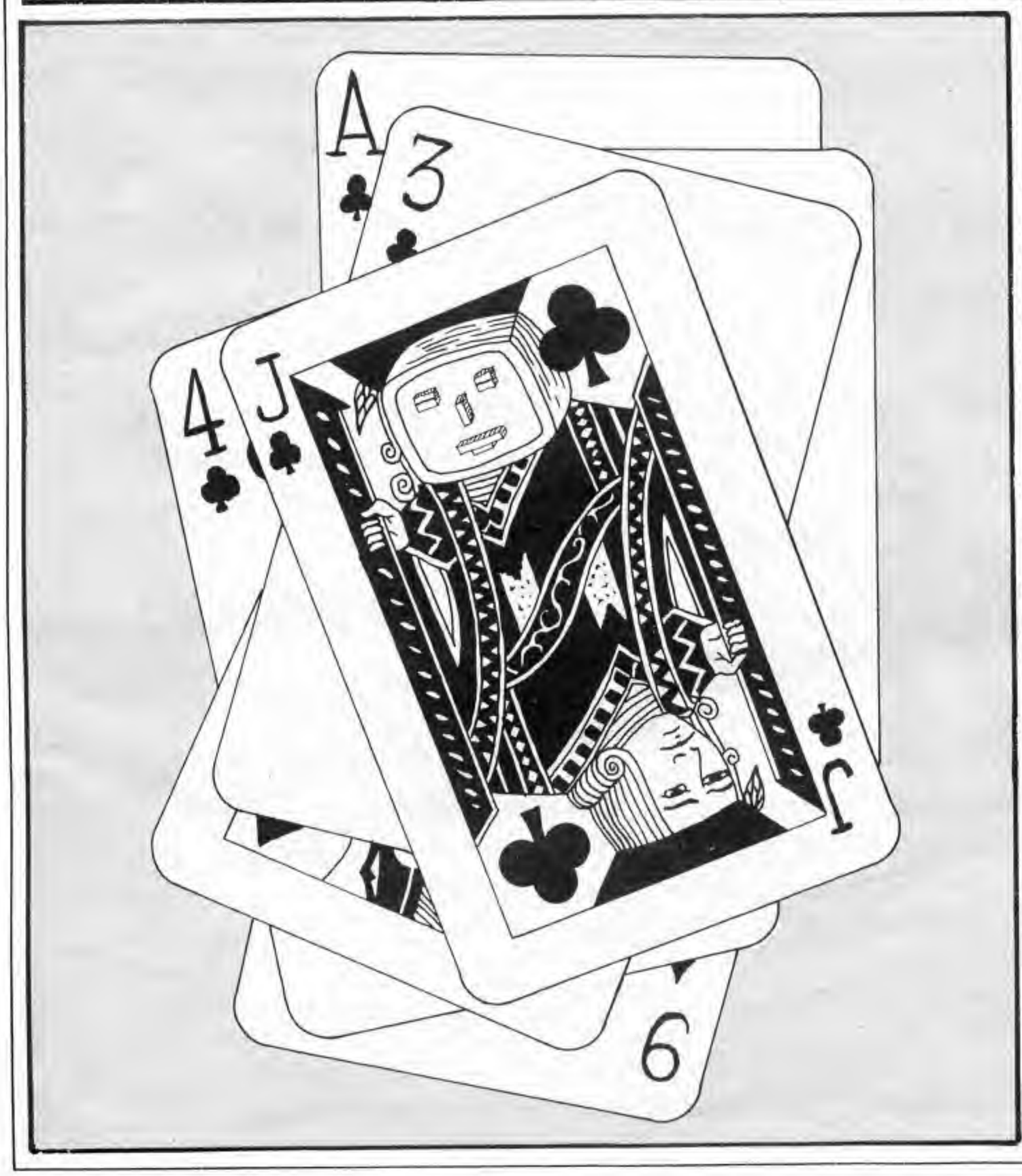
```
 10 REM  ***************
 20 REM  * MAZE CRAZE *
 30 REM  ***************
 40 REM BY I.FREELANCE
 50 MODE 1
 60 COLOUR 129
 70 CLS
 80 B$="*"
 90 C$= STRING$(40,B$)
100 DIM MAZE$(8,8)
110 FOR Y=1 TO 8
120 FOR X=1 TO 8
130 READ MAZE$(Y,X)
140 NEXT X
150 NEXT Y
160 REM maze set up
170 X=1:Y=1
180 A$=MAZE$(Y,X)
190 GOSUB 310
200 VDU 31,0,20
210 INPUT DIRECTION$
220 DIRECTION$=LEFT$(DIRECTION
$,1)
230 N=INSTR(A$,DIRECTION$,1)
240 IF N=0 THEN 210
250 IF DIRECTION$="N" THEN Y=Y
-1
260 IF DIRECTION$="S" THEN Y=Y
+1
270 IF DIRECTION$="W" THEN X=X
-1
280 IF DIRECTION$="E" THEN X=X
+1
290 IF X=8 AND Y=3 THEN 500
300 GOTO 180
310 REM screen display
320 CLS
330 PRINT C$
340 PRINT TAB(3);"You can move
:";A$
350 PRINT
360 PRINT C$
370 PRINT
380 VDU 31,0,10
390 RETURN
400 STOP
410 REM data line
420 DATA S,SE,WE,WE,WE,WS,ES,S
W
430 DATA NS,NE,WE,WE,WS,NS,NS,
NS
440 DATA NS,SE,WE,WS,NS,NS,NS,
N
450 DATA NS,NS,SE,NW,NS,NS,NE,
WS
460 DATA NSE,NSW,NE,WE,NSW,NE,
WS,NS
470 DATA NS,NS,E,WS,NE,WS,NS,N
S
480 DATA NS,NE,WE,NEW,WS,NS,NE
,NW
490 DATA NE,WE,WE,WE,NW,NE,WE,
W
500 REM maze finish
510 CLS
520 VDU 19,3,8,0,0,0
530 PRINT TAB(11,5);"YOU HAVE
DONE IT"
540 END
```

YOU ARE LOST in a mystery maze and must try to find your way to the finish. Key-in N, S, E or W for the direction you wish to go; the computer will not allow you to proceed if there is a wall in the way. One hint to help you — the maze is an eight by eight grid.

Invisible Maze was written for the Electron by Ian Freelance of Hull, North Humberside.

WHIST

```
 2320ON ERROR GOTO 1030
 1010MODE 6:REPEAT:PROCgame:r=GE
T:UNTIL FALSE
 1020
 1030RUN
 1040
 1050
 1060
 1070DEF PROCgame
 1080CLS
 1090PROCinitialise
 1100PROCdeal
 1110trump=RND(4)-1
 1120FOR round=1 TO 13
 1130PROCdisplay(1)
 1140REMr=GET:PROCdisplay(2)
 1150PROCplay1:PROCplay2
 1160PROCcompare
 1170NEXT round
 1180PROCdisplay(1)
 1190ENDPROC
 1200
 1210
 1220
 1230DEF PROCinitialise
 1240LOCAL F
 1250DIM card$(12),card(3,12)
 1260FOR F=0 TO 12
 1270READ card$(F)
 1280NEXT F
 1290DATA 2,3,4,5,6,7,8,9,10,J,Q
,K,A
 1300win=1:ypts=0:hpts=0
 1310VDU 23,224,8,28,28,107,127,
107,8,28
 1320VDU 23,225,8,28,62,127,62,2
8,8,0
 1330VDU 23,226,54,127,127,127,6
2,28,8,0
 1340VDU 23,227,8,28,62,127,127,
127,28,62
 1350J=11:Q=12:K=13:A=14
 1360ENDPROC
 1370
 1380
 1390
 1400DEF PROCdeal
 1410FOR F=1 TO 13:FOR G=1 TO 2
 1420r=RND(13)-1:s=RND(4)-1:IF c
ard(s,r)>0 THEN 1420 ELSE card(s
,r)=G
 1430NEXT G:NEXT F
 1440ENDPROC
 1450
 1460
 1470
 1480DEF PROCdisplay(n)
 1490LOCAL F,G
 1500CLS
 1510PRINT TAB(0,1)"WON: ";ypts,
TAB(10,1) "TRUMPS: ";CHR$(224+tr
ump),TAB(24,1)"LOST: ";hpts
 1520FOR F=0 TO 3:PRINT TAB(2,4+
2*F) CHR$(224+F):NEXT F
 1530FOR G=0 TO 3
 1540PRINT TAB(6,4+2*G);
 1550FOR F=12 TO 0 STEP -1
 1560IF card(G,F)=n THEN PRINT c
ard$(F);" ";
 1570NEXT F
 1580NEXT G
 1590ENDPROC
 1600
 1610
 1620
 1630DEF PROCinput
 1640PRINT TAB(0,18)"Your turn t
o play."
 1650 PRINT TAB(0,19)"Enter SUIT
 then enter CARD:"
 1660REPEAT
```



TO PARAPHRASE an old adage, east is east and whist is whist, and there is no need to say more for fans of the popular card game about this program written for the BBC B by Sunil Iyer of Dundee University.

His computer version of **Whist** will prove a worthy opponent for anyone who fancies a quiet game or simply wants to sharpen their playing in preparation for the next whist drive.

```
 1680REPEAT:PRINT TAB(0,20)"
     ":PRINT TAB(0,20);:A$=GET$:
suit=INSTR("CDHS",A$)-1:UNTIL su
it<>-1:PRINT A$
 1690REPEAT:PRINT TAB(20,20);:A$
=GET$:UNTIL INSTR("123456789J0KA
",A$)>0
 1700IF A$="1" THEN A$="10"
 1710PRINT A$
 1720card=EVAL A$-2
 1730UNTIL card(suit,card)=1
 1740ENDPROC
 1750
 1760
 1770
 1780DEF PROCyplay1
 1790PROCinput
 1800card(suit,card)=0
 1810ENDPROC
 1820
 1830
 1840
 1850DEF PROChplay1
 1860r=RND(4)-1:s=RND(13)-1:IF c
ard(r,s)<>2 THEN 1860
 1870hissuit=r:hiscard=s
 1880PRINT TAB(0,17)"He plays th
e ";CHR$(224+hissuit);" ";card$(
hiscard)
 1890card(hissuit,hiscard)=0
 1900ENDPROC
 1910
 1920
 1930
 1940DEF PROChplay2
 1950REM:PRINT FNsuit(2,suit):ST
OP
 1960IF FNsuit(2,suit)=0 THEN PR
OCothersuit:GOTO 2050
 1970hissuit=suit
 1980F=card+1:REM    play highes
t card
 1990IF F>12 THEN 2020
 2000IF card(suit,F)=2 THEN hisc
ard=F:hissuit=suit:GOTO 2050
 2010IF F<12 THEN F=F+1:GOTO 200
0
 2020F=0:REM          play lowest
 card
 2030IF card(suit,F)=2 THEN hisc
ard=F:GOTO 2050
 2040IF F<card-1 THEN F=F+1:GOTO
 2030
 2050PRINT TAB(0,21)"He plays th
e ";CHR$(224+hissuit);" ";card$(
hiscard)
 2060card(hissuit,hiscard)=0
 2070r=GET
 2080ENDPROC
 2090
 2100
 2110
 2120DEF PROCothersuit
 2130F=0
 2140IF card(trump,F)=2 THEN his
card=F:hissuit=trump:GOTO 2180
 2150IF F<12 THEN F=F+1:GOTO 214
0
 2160hiscard=0
 2170hissuit=0
 2180IF card(hissuit,hiscard)=2
THEN 2210
 2190hissuit=hissuit+1:IF hissui
t<4 THEN GOTO 2180
 2200hiscard=hiscard+1:GOTO 2170
 2210ENDPROC
 2220
 2230
 2240
 2250DEF FNsuit(r,s)
 2260t=0
 2270FOR F=0 TO 12
 2280IF card(s,F)=r THEN t=t+1
 2290NEXT F
 2300=t
 2310
 2320
 2330
 2340DEF PROCyplay2
 2350PROCinput
 2360IF suit<>hissuit AND FNsuit
(1,hissuit)>0 THEN 2350
 2370card(suit,card)=0
 2380r=GET
 2390ENDPROC
 2400
 2410
 2420
 2430DEF PROCcompare
 2440IF suit<>trump AND hissuit=
trump THEN win=2:GOTO 2500
 2450IF suit=trump AND hissuit<>
trump THEN win=1:GOTO 2500
 2460IF win=1 AND hissuit<>suit
THEN win=1:GOTO 2500
 2470IF win=2 AND hissuit<>suit
THEN win=2:GOTO 2500
 2480IF card>hiscard THEN win=1
 2490IF hiscard>card THEN win=2
 2500IF win=1 THEN ypts=ypts+1
 2510IF win=2 THEN hpts=hpts+1
 2520ENDPROC
```

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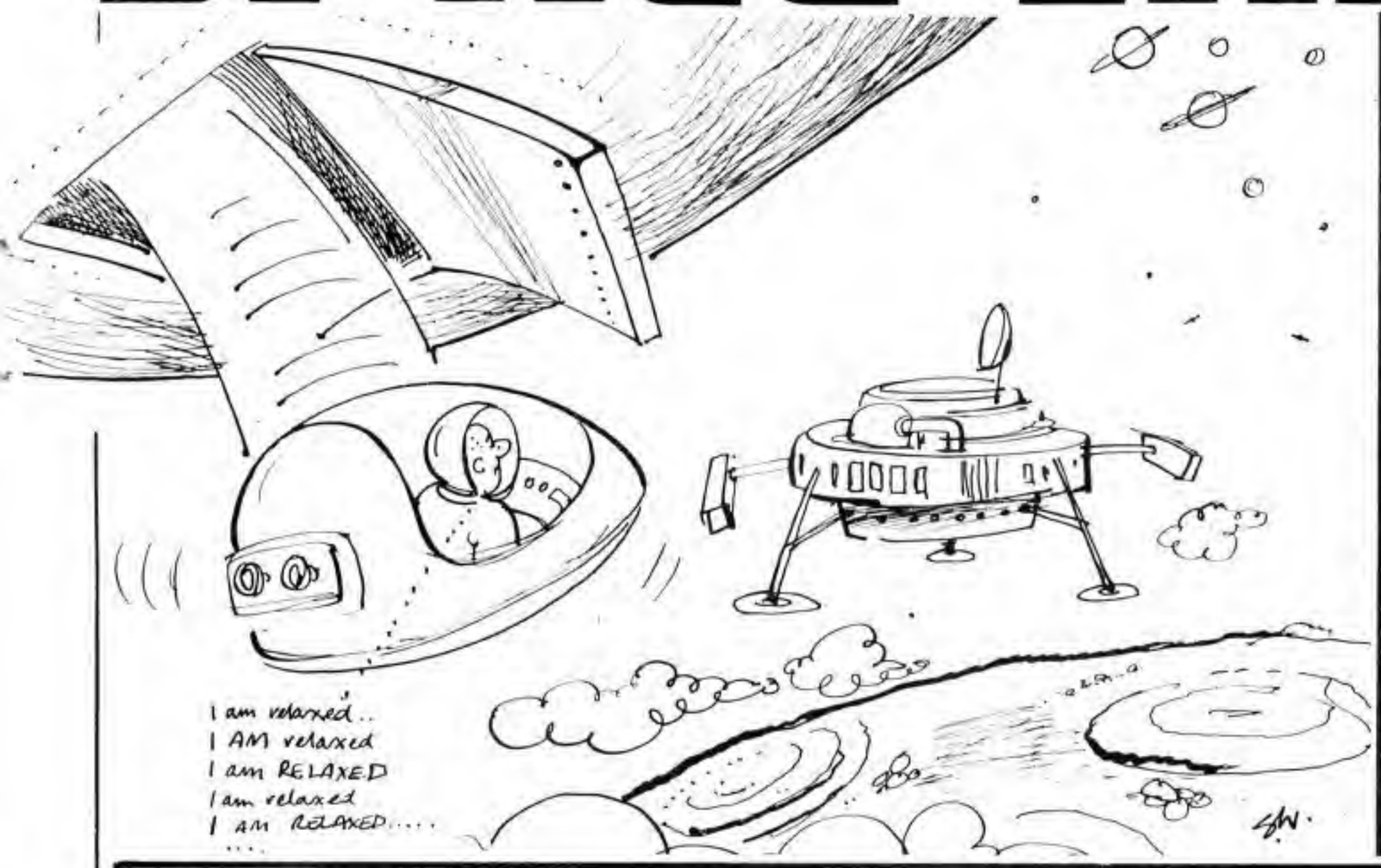
SPACE LANDING



ON ARRIVAL at a distant planet, you must bale out of your mothership and guide your space vessel towards the moving landing craft below. Every time you achieve your difficult mission you advance to a new screen and the game becomes a little faster. If you fail and crash, you lose one of your three lives.

Move your ship left and right as it floats downwards using the < and > keys and press the space bar to drop from the mothership. Docking with the landing craft earns you 10 points, plus a bonus of the screen number multiplied by 10. At screen 10 and again at screen 20 you gain an extra life.

Steven and Mark Ozanne, who wrote **Space Landing** for the Electron, set a high score of 2,750 points.

```
   10 MODE 1:PROCINSTRUC
   20 MODE 2
   30 N$="ELECTRON" : HI=50
   40 SCORE=0:LI=3:SHEET=1
   50 GCOL 0,7:MOVE 0,0:DRAW 127
0,0:DRAW 1270,120:DRAW 0,120:DRA
W 0,0
   60 B=RND(2)
   70 VDU 23,1,0;0;0;0;
   80 FOR I=1 TO 100
   90 GCOL 0,RND(15) : PLOT 69,R
ND(1280),RND(1020):NEXT I
  100 VDU23,240,0,0,0,0,1,2,7,10
 : VDU23,241,0,24,24,126,165,24,
0,0 : VDU23,239,0,0,0,0,128,64,2
24,80
  110 SSH=10
  120 PRINT TAB(SSH-1,1);CHR$(24
0) : PRINT TAB(SSH,1);CHR$(241)
: PRINT TAB(SSH+1,1);CHR$(239)
  130 SSH=SSH+1:IF SSH=19 THEN P
RINT TAB(SSH-2,1);"    ":SSH=3
  140 FOR Q=0 TO 100:NEXT:PRINT
TAB(SSH-2,1);" ":IF INKEY(-99) T
HEN GOTO 160
  150 SOUND 0,-15,-50,2:GOTO 120

  160 PRINT TAB(SSH-2,1);CHR$(24
0)
  170 PRINT TAB(1,1);" "
  180 VDU23,241,0,24,24,126,165,
24,0,0
  190 VDU 23,230,66,102,129,129,
129,66,189
  200 U=2:S=SSH-1:SC=RND(16)+2
  210 COLOUR 3
  220 FOR I=1 TO LI
  230 PRINT TAB(11+I,30);CHR$(24
1)
  240 NEXT:COLOUR 6
  250 PRINT TAB(12,29);"LIVES"
  260 PRINT TAB(1,29);"SCORE"
  270 COLOUR 1
  280 PRINT TAB(1,30);SCORE
  290 COLOUR 3
  300 PRINT TAB(S,U);CHR$(241)
  310 COLOUR 5
  320 PRINT TAB(SC,27);CHR$(230)

  330 FOR Q=0 TO 200-SHEET*10:NE
XT : IF INKEY(-103) THEN PROCLEF
T
  340 IF INKEY(-104) THEN PROCRI
GHT
  350 PRINT TAB(S,U);" "
  360 PRINT TAB(SC,27);" "
  370 SOUND 0,-15,-25,1
  380 IF U=27 AND S=SC THEN PROC
score
  390 IF U=27 THEN PROCCRASH
  400 IF SC<1 THEN B=2
  410 IF SC>17 THEN B=1
  420 IF B=1 THEN SC=SC-1
  430 IF B=2 THEN SC=SC+1
  440 U=U+1
  450 IF S<1 THEN S=19
  460 IF S>19 THEN S=1
  470 GOTO 210
  480 DEF PROCLEFT
  490 IF U=27 AND S=SC THEN PROC
score
  500 IF U=27 THEN PROCCRASH
  510 PRINT TAB(S,U);" "
  520 PRINT TAB(SC,27);" "
  530 SOUND 1,-15,1,2:S=S-1:GOTO
 380
  540 DEF PROCRIGHT
  550 IF U=27 AND S=SC THEN PROC
score
  560 IF U=27 THEN PROCCRASH
  570 PRINT TAB(S,U);" "
  580 PRINT TAB(SC,27);" "
  590 SOUND 1,-15,1,2:S=S+1:GOTO
 380
  600 DEF PROCscore
  610 SOUND 1,-15,70,5:SOUND 1,-
15,30,10
  620 COLOUR 2
  630 PRINT TAB(5,8);"BONUS ";SH
EET*10
  640 SCORE=SCORE+SHEET*10
  650 SCORE=SCORE+10:IF SHEET=10
 OR SHEET=20 THEN LI=LI+1:SOUND
1,-15,90,5:SOUND 1,-15,50,5:SOUN
D 1,-15,20,15:PRINT TAB(5,10);"E
XTRA LIFE"
  660 FOR I=1 TO 2000:NEXT
  670 PRINT TAB(5,8);"
      "
  680 PRINT TAB(5,10);"
  "
  690 PRINT TAB(5,13);"
  "
  700 PRINT TAB(SSH-2,1);"    "

  710 COLOUR 7
  720 PRINT TAB(0,27);"
          "
  730 SHEET=SHEET+1
  740 GOTO 110
  750 DEF PROCCRASH
  760 LI=LI-1
  770 FOR I=1 TO 16
  780 VDU 19,0,I,0,0,0:SOUND 0,-
15,I,1:NEXT
  790 PRINT TAB(SSH-2,1);"    "

  800 PRINT TAB(11,30);"      ":C
OLOUR 7
  810 PRINT TAB(0,27);"
          "
  820 GCOL 0,7:MOVE 0,0:DRAW 0,1
20:DRAW 1270,120
  830 IF LI=0 THEN PROCEND
  840 GOTO 110
  850 DEF PROCEND
  860 CLG:COLOUR 1
  870 IF SCORE>HI THEN PROCHI
  880 PRINT TAB(1,3);"YOUR SCORE
 WAS ":COLOUR 12:PRINT TAB(16,3)
;SCORE
  890 COLOUR 2
  900 PRINT TAB(3,10);"HIGH SCOR
E ";HI;:PRINT TAB(4,12);"BY ";N$

  910 COLOUR 7
  920 PRINT TAB(3,20);"PRESS  'C
  TO"
  930 PRINT TAB(5,22);"PLAY AGAI
N"
  940 REPEAT UNTIL GET=67
  950 CLS:GOTO 40
  960 DEF PROCHI
  970 PRINT TAB(3,3)"ENTER YOUR
NAME"
  980 COLOUR 13:INPUT N$
  990 HI=SCORE:CLS:ENDPROC
 1000 DEF PROCINSTRUC
 1010 COLOUR 130:CLS:GCOL 0,0:VD
U 5
 1020 MOVE 400,900 : PRINT "INST
RUCTIONS"
 1030 MOVE 400,897 : PRINT "____
_____" : GCOL 0,1
 1040 MOVE 275,778:PRINT " USE <
 TO MOVE LEFT"
 1050 MOVE 270,678:PRINT " USE >
 TO MOVE RIGHT"
 1060 MOVE 100,550:PRINT "USE SP
ACE TO DROP OUT OF YOUR SHIP"
 1070 GCOL 0,0:MOVE 420,300:PRIN
T "PRESS SPACE":MOVE 420,250:PRI
NT "TO CONTINUE"
 1080 REPEAT UNTIL GET=32:ENDPRO
C
```

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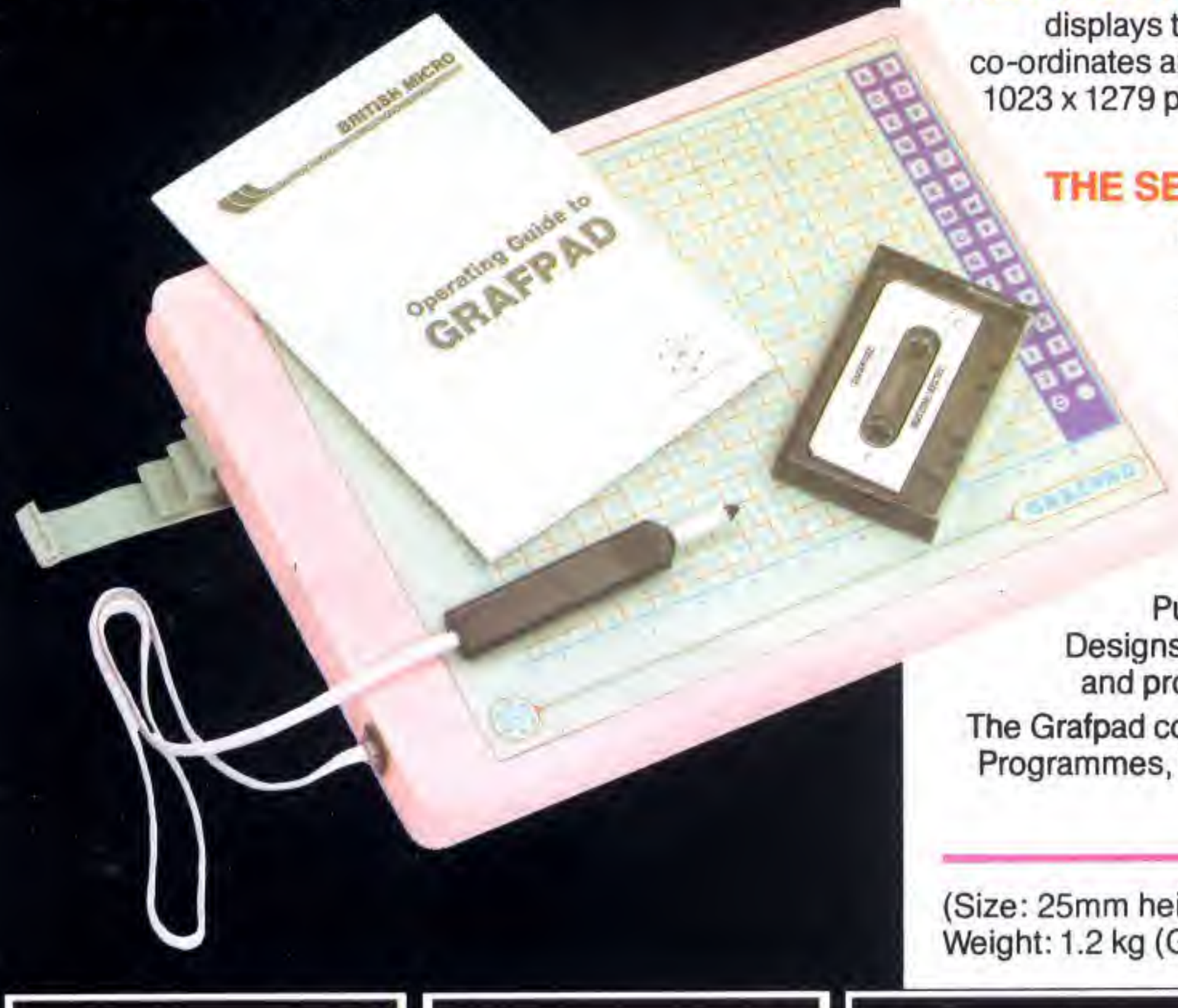

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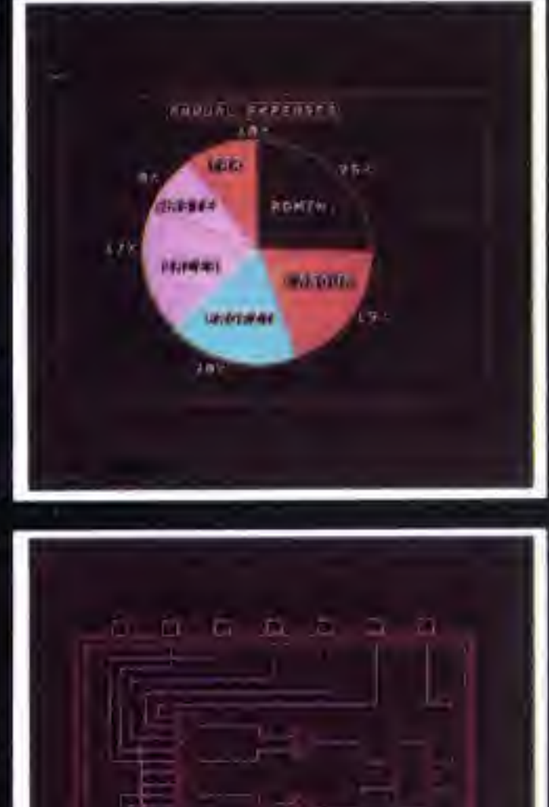

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