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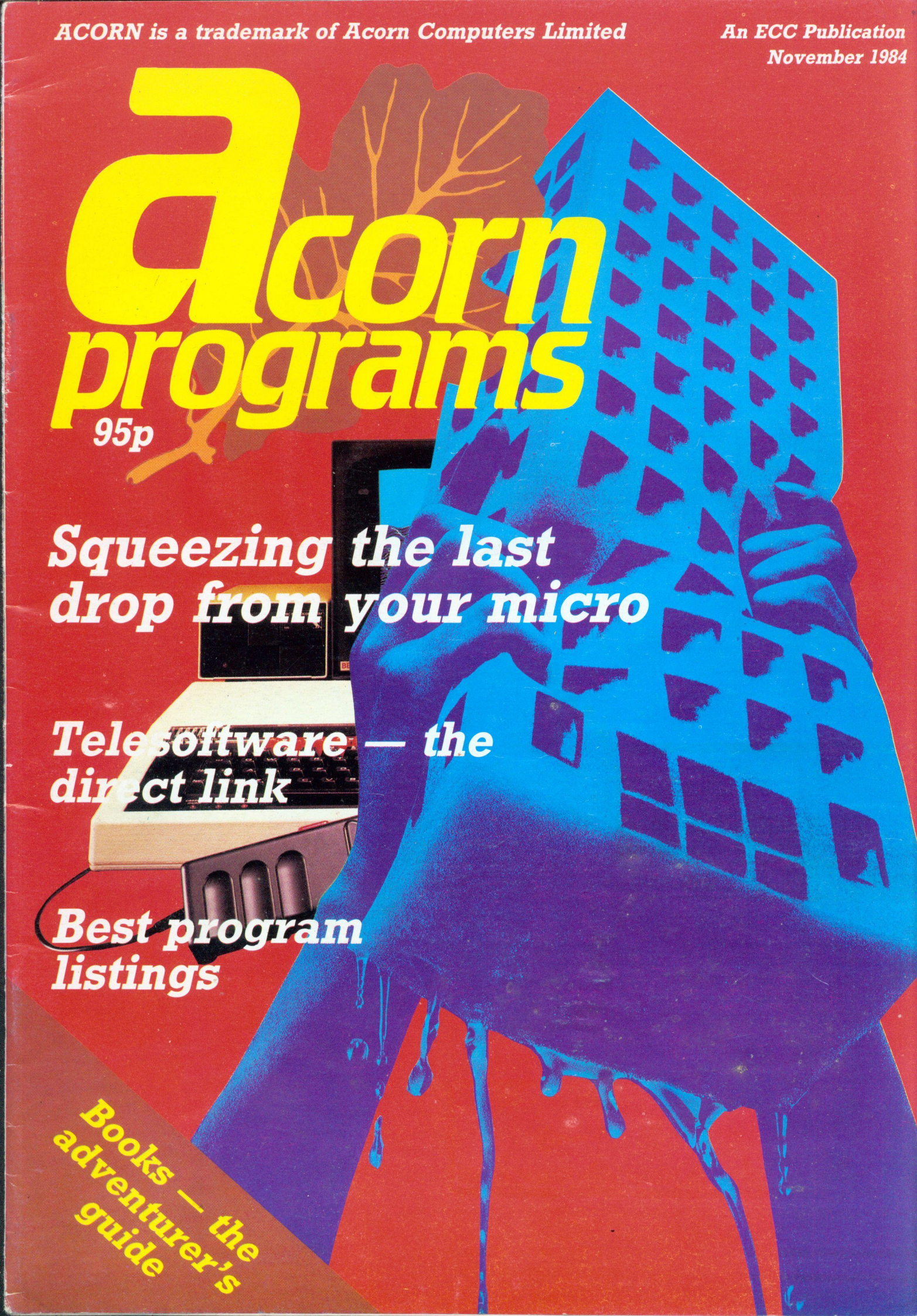

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Encouraging comments

THANK YOU for your many encouraging comments about our new-look monthly *Acorn Programs*. Keep writing to us — in future issues we plan to be publishing a selection of your tips, views and opinions.

This month's magazine reflects the many changes taking place on the Acorn front. Softscope Special on page 12 looks at some of the new programs which are intended for practical use and which point the way to the future. On page 7, Chris Naylor discusses the appearance of the new Acorn business machine and the prospects of the BBC micro as a serious business tool. We also bring you a description by Lawson Brown, BBC telesoftware organiser, of the revolutionary new BBC system for bringing software and the entire Ceefax service directly into homes and schools.

Programming is not forgotten, with Hotline and our Basic Course. This month we have added a new feature with Richard Warner's step-by-step account of the workings of an entertaining graphics display called Bloobers — page 52.

Your excellent programs still make a valuable contribution to the magazine. Please send them to us on disc or cassette, with a brief description and a SAE for their return. Do not forget to include the coupon on page 41.

The Editor

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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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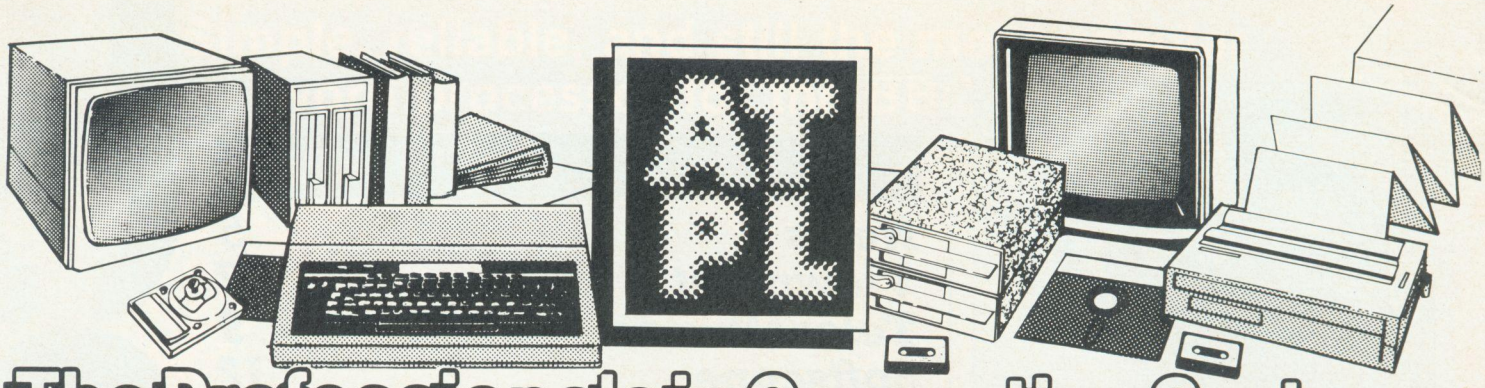

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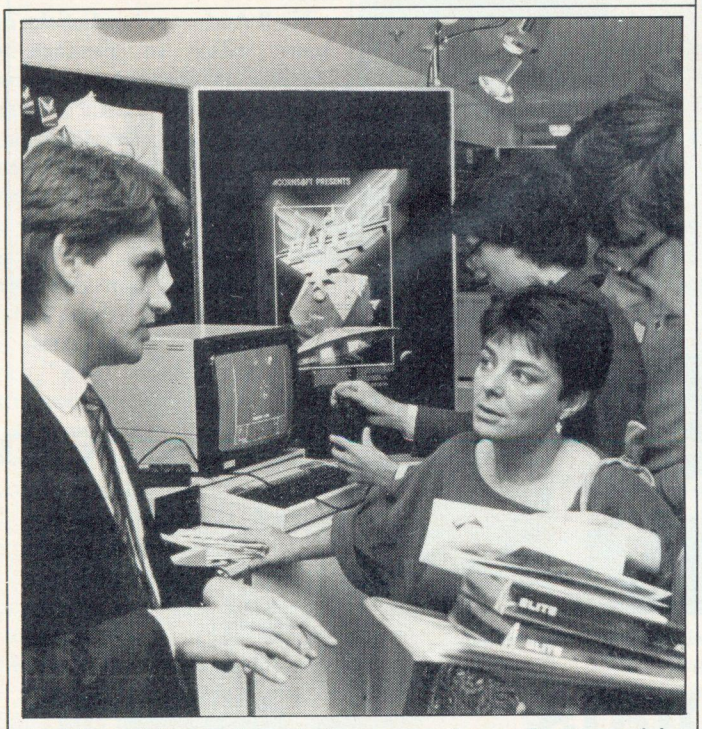
New machine is simple as ABC

THE MUCH-AWAITED Acorn Computers new business machine was unveiled at the Personal Computer World Show. Called the ABC — standing for Acorn Business Computer — it is in fact a range of eight machines, starting with the Personal Assistant at the bottom end of the scale.

All the machines are based on the BBC micro design, with the addition of a built-in second processor, beginning with a Z-80 and working up to an IBM PC-style processor running Xenix. All but the most expensive machines in the range are upgradable and all have built-in networking, plus a choice of storage systems, from floppy disc to Winchester drives. An enclosed two-box solution has the screen, storage and processor in one box and the keyboard in the other.

With prices starting at around £700, the system is aimed squarely at the professional market. According to Acorn, a recent survey shows that the BBC micro has already captured 16 percent of the small business market and the company hopes the ABC with its increased power and networking facilities will find favour with firms of all sizes.

"We are not promoting a new piece of technology," says an Acorn spokesman. "We are giving people what we already know they want in a simpler and more convenient package."



Just like that! Acornsoft marketing manager Jeremy Preston explains how to proceed from 'harmless' to 'deadly' status in Elite, the new cult game launched on an unsuspecting press inside Space Station Zero at Thorpe Park funfair.

A 3-D space flight simulation and galactic adventure combined, Elite is the flagship of a range of 20 titles which Acornsoft is bringing out for the Christmas market, backed by a £150,000 advertising campaign. The company is predicting bumper sales this year, with a turnover of £2.5 million by January, 1985 — double the figure for the same period last year.

Economy package disturbs market

A LOW-PRICED business package for the BBC B and the Electron is causing a stir in the software world. Database Publications, based at Stockport, offers a word processing, database, spreadsheet and graphics program, **Mini Office,** on tape for only £5.95 or on disc for £7.95.

"We are aiming at one-man firms which cannot afford to pay for the business software on the market," says Database managing director Derek Meakin. "The package will also be in the price range of housewives wishing to use it for domestic book-keeping or even children wanting to monitor pocket money."

Another innovator in the software market is Micro Power, which is launching a range of its popular games on disc. Eleven titles released so far include **Killer Gorilla, Jet Power Jack, Ghouls, Frenzy** and **Dune Rider.**

The discs will run on 40- and 80-track drives, as well as in single- and double-density formats, and will sell at £9.95, compared to £7.95 for the cassette versions. Anyone wanting to upgrade a cassette version of the games can do so for £4.95 by sending the tape to Micro Power, Northwood House, North Street, Leeds SS7 2AA.

Expert advice at show

READERS will be able to meet the staff of *Acorn Programs* at the first-ever London MicroMarket which takes place at Wembley Conference Centre from November 10–11. A resident doctor will also be on hand to answer all your BBC and Electron queries.

Besides *Acorn Programs,* other exhibitors will include hardware and software manufacturers for all the leading makes of home computers.

The show is open from 10am-6pm on Saturday and 10am-4pm on Sunday. Tickets cost £1.50 for adults and 75 pence for children under 14.

Doctors' orders

ACORN COMPUTERS hopes to capture the lucrative medical market with a new low-cost system designed to help GPs run surgeries. Sold as a complete system, the £1,999 package consists of specially-written software, plus a BBC micro, dual disc drive, monitor, spark jet printer and a built-in View word processor.

The software automates such routine tasks as repeat prescribing and patients' record-keeping and maintains a drug file for reference with the prescription program.

Acorn estimates that of 8,000 practices in Britain, only about five percent use computers, providing an ideal opportunity to enter a virtually uptapped market. The company hopes that widespread educational and home use has made many GPs familiar with the BBC micro and has placed particular emphasis on ease of use.

The initial software eventually will be followed by other packages to handle tasks like drug usage statistics and registering patients for automatic recall. Similar systems for dentists and opticians are planned.

More news on page 6

Micro crosses the Irish Sea

A PRODUCTION line and an Acorn office in Dublin are aimed by Acorn Computers to make inroads into the Irish home computer market.

Acorn Irish distributor Lendac Data Systems is to begin production of BBC micros at new premises in the IDA Enterprise Centre in Dublin. With the help of Acorn training personnel, the company plans to make 50,000 computers in the first year.

Before starting distribution of Acorn computers, Lendac produced specialised computer systems, networks and disc drives, as well as a range of software.

The agreement with Acorn involves an investment of £500,000 and will more than double the company workforce.

Niall Andrews, head of the Acorn office in Foxrock, Dublin, commented on the joint marketing thrust: "The Irish market is developing rapidly, with up to 35,000 micros sold in 1984 and probably twice that many in the next two years.

"We are confident Acorn can capture more than 20 percent of the home computer market before 1986."

A young hopeful in the computerised chess tournament.

Chess finals without a move

ACORN COMPUTERS and the BBC teletext service Ceefax join forces to promote the first-ever computerised championship, known as Make your Move.

For the finals in January contestants will compete from their schools, using BBC micros with chess software and linked by telephone to the Ceefax computer centre at Shepherd's Bush, London. Contestants' moves will be displayed on Ceefax pages to be watched by enthusiasts all over the country.

Around 26,000 schools in England, Scotland and Wales were invited to take part. The first heat, to be completed by November 9, will produce 32 qualifiers from each of eight regional zones. A knockout second round ending on November 17 will produce eight finalists, one for each zone, to battle for the prizes on the Ceefax system. The quarter-finals start on January 8 with the finals on January 18.

The prize for the winner's school is a complete BBC micro system, with monitor, cassette recorder and teletext adaptor. The runner-up wins a BBC micro and the remaining six finalists all qualify for a teletext adaptor or cash equivalent. All the finalists will also receive an engraved chess clock.

Changing price of Acorn products

TWO MAJOR products from Acorn Computers have changed dramatically in price. The single disc drive, which used to sell for £249, nows costs £199 including VAT. On the other hand the recently-launched Z-80 second processor has increased in price from £299 to £399.

Acorn marketing manager Tom Hohenberg explained the price increase for the Z-80 as permitting dealers to offer better support to customers. "Big demand for the product stretched the resources of our dealers, so we decided to provide a bigger margin to enable them to expand and improve their customer support services," he says.

RED against piracy

A SWANSEA company has patented an ingenious method for preventing software piracy. RED — short for Rising Edge Data Ltd — a subsidiary of Abacus Programs, plans to produce a digitised security card the same size and shape as a credit card.

Each card has a magnetic coding which matches the code written into the software of a protected program. The program can be activated only when the card is inserted into a reader unit which plugs into the back of the computer. Thus programs cannot be copied, although the programmer can still make back-up copies by using the RED security card.

"So far the system is still in the prototype stage," says marketing manager Jayne Robinson, "but it is sure to be well received by programmers and software houses."

If the system is adopted widely, home users would have to buy a RED reader unit to run protected software. Tapes would then be sold together with the security cards. The system could be used on any home computer by adapting the reader unit.

BBC B TOP TEN

	Title	Company
1	Fortress	Pace Software
2	Wallaby	Superior Software
3	Micro Olympics	Database Publications
4	Ghouls	Micropower
5	Smash and Grab	Superior Software
6	Spitfire Command	Superior Software
7	Aviator	Acornsoft
8	Frenzy	Micropower
9	Stock Car	Micropower
10	Mr Wiz	Superior Software

More than just an adults' plaything

Chris Naylor re-assesses the prospects of the BBC Micro

THERE IS a feeling, unjustifiably widespread, that Acorn computers are really just toys. They are well-made toys, it is true, and they are expensive toys, but they are not the kind of thing which real, grown-up, hard-headed people are likely to use.

One reason for that view could be the double-edged sword of Acorn involvement with the BBC for, in the eyes of many people, can anything which features in a television programme ever be anything other than mere entertainment? Not that entertainment does not add up to money. The BBC contract gave Acorn an undeniable edge in its marketing — marketing to whom, games players?

That view is not confined to casual observers of the computer scene. At the time of writing, the Acorn share price had fallen from a high of 193 pence to a trading price of only 120 pence. Although part of the reason was City disappointment at Acorn year-end results, another factor seems to be the feeling that the home computer market is becoming saturated, with everyone who wants one having, by now, obtained one, and more than half Acorn sales are still in that home market.

Acorn is not immune to such thoughts and by now it should have launched a new computer, dubbed the ABC, or Acorn Business Computer, more expensive than the BBC B and aimed specifically at the more expensive commercial market.

Is the BBC Model B really such a no-no so far as serious business usage is concerned? Does it suffer some ailment which makes it unsuitable for serious computing? The answer is a definite no.

As I have mentioned ailments, we might as well turn to the medical profession for proof. In the British Computer Society a number of specialist groups concern themselves with particular areas of computing. Among them is the Primary Care Group, a body of BCS members who are, in the main, all practising doctors. Their interest in computers is in their possible uses in medicine than which, many would argue, there is no more serious application.

Recently, while discussing an aspect of medical computing with one of the members of the group, I was asked if I had a BBC Model B. Why? Because the vast majority of the members of the Primary Care Group use that machine and their standard method of communicating with each other is via the Telecom Gold facility available on it.

When they swap ideas and programs, they do so using the BBC machine as their standard hardware. What they wanted to know was whether or not I had the proper computer to be compatible with the medical profession and if that is not an indication that the BBC suffers no ailments so far as serious use is concerned, it is fairly difficult to think what is.

Programming consultant Chris Naylor

At which point it is no surprise to learn that Acorn has just started to market a BBC B package costing £1,999 which is aimed specifically at practising GPs and was developed by two general practitioners.

The package, like others aimed at GPs, copes with the basically mundane aspects of their work, such as patient record-keeping and the issue of repeat prescriptions. All very useful and commendable in a busy practice but could computers not be made to do more than that? Could they not, for instance, take over some of the more important functions, like diagnosing illnesses? If so, perhaps that could be placed on the BBC micro, too?

The answer is that, as yet, few doctors would be willing to trust a computer program with their patients' well-being. Attempts have been made since the 1950s to develop programs which will act as expert systems in the field of medicine and assist with the diagnostic task.

The most famous is Mycin, which was developed at Stanford Research Institute to give expert advice in the diagnosis of infectious diseases. It was modified later to produce Puff, an expert system aimed to help the diagnosis of pulmonary disorders. At which point things become a little closer to home, because Puff has been re-written into Basic and could, in principle, run on a micro such as the BBC.

The way in which medical diagnosis programs work varies enormously, from the complicated to the very complicated but, if you feel like trying your hand at curing the ills of mankind, you could do worse than to turn back to an 18th century English vicar for help in finding a method. Bayes and his interests lay not so much in medicine as in problems in statistics. During the course of his work he produced a theorem which is frequently used in attempts to implement computerised medical diagnosis systems. Bayes' Theorem can be expressed as a formula:

$$P(H \text{ given } E) = \frac{P(E \text{ given } H)\ P(H)}{P(E)}$$

which states that the probability of some hypothesis given a particular item of evidence is equal to the probability of that evidence given the hypothesis multiplied by the probability of the hypothesis and divided by the probability of the evidence.

If you want to know the probability of a patient having influenza, given that he has a fever, you can work it out simply by considering the probability of an influenza patient having a fever P(E given H), the probability of any random person having influenza P(H), and the probability of any random person having a fever (PE). All that is readily programmed in Basic and a substantial system can be developed to fit inside a machine such as the BBC Model B.

Possibly the day is not far away when a patient will walk into a doctor's consulting room in need of help and the doctor, momentarily stuck for a diagnosis, will switch on his BBC micro for help. When that day comes, will the patient walk out of the surgery thinking that the BBC micro is merely a toy? Not if it helps cure him.

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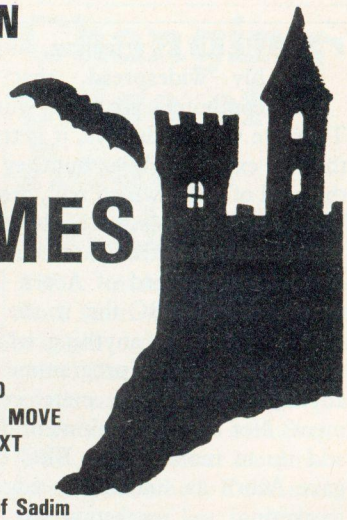

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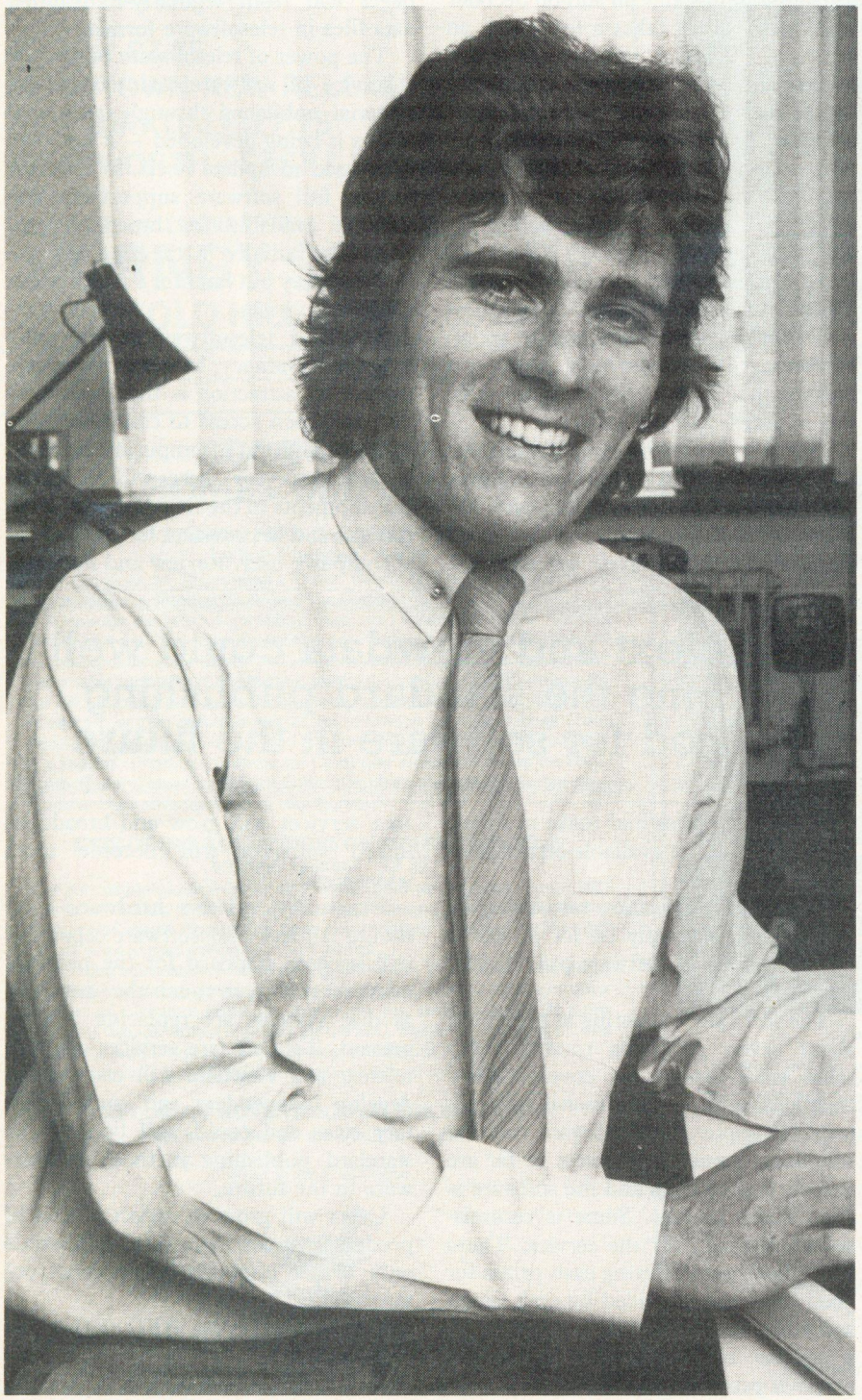
Lawson Brown describes the advantages of a revolutionary new system for broadcasting software via the BBC's Ceefax service

Programs over the air waves

Lawson Brown



TELESOFTWARE services have been widely available for about a year, although trial systems have existed for much longer. In common with most new technology, a profusion of jargon, different systems which are almost compatible and hardware has resulted in confusion and misunderstanding about what is available and the comparative merits of the various systems.

The term telesoftware is a generic one covering the electronic transmission of computer software or data by electronic means. Systems fall into two categories — those using a broadcast signal as the data carrier, such as BBC Ceefax telesoftware, and those relying on a physical link, usually the public telephone system.

Among those services using the telephone network, the biggest is provided by British Telecom on Prestel and includes Viewfax 258 and Micronet 800. They are characterised by low user-hardware costs but relatively high running costs, made up from computer access, telephone and frame charges, together with an annual subscription.

They require complex hardware and software at the transmission end to handle user access, two-way communication and billing. In general, it is impossible for the casual browser to enter those services. Their advantages arise from their ability to be interactive, permitting subscribers to contact suppliers directly, and from the ease with which the supplier may levy a charge for the material. The services are much better-suited to hold large libraries of fairly static material than broadcast systems.

In September, 1983, BBC Ceefax officially launched the world's first scheduled telesoftware service using a broadcast television signal. BBC telesoftware is the culmination of some five years of experimental work to examine

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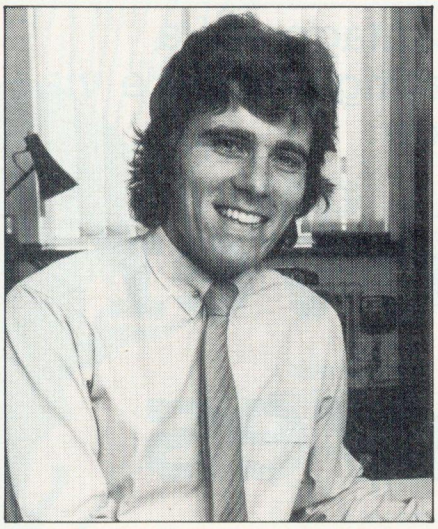

continued from page 9

the feasibility of using teletext systems to transmit data for a range of applications, an important part of which is the broadcast of software and data for domestic applications for the BBC micro as part of the BBC Computer Literacy Project.

BBC telesoftware uses the BBC service Ceefax as its carrier. To understand the telesoftware system fully it is worth looking at how Ceefax is broadcast. An ordinary television picture consists nominally of 625 lines. About 20 of them are not used and appear as a black band if the vertical hold on the receiver is faulty and the picture rolls.

They are referred to by the cognoscenti as the vertical blanking interval. The information needed to create a Ceefax page consists of a stream of digital data, superimposed on some of those lines. Present systems use between four and six of the lines but there is no reason why more could not be used; 16 is about the maximum.

In the foreseeable future it is possible that cable channels could provide a pure teletext service using all 625 lines, with the user able to address some 40 million pages. On receipt of the data required to build a selected page, the decoder in a teletext TV receiver formats the page and displays it on the screen. That data is transmitted serially, hence the waiting time when a page is requested; a full Ceefax cycle is broadcast in about 12 seconds.

Broadcast telesoftware uses the same system to carry data but with a number of enhancements. An error check is included with each page, so that any corrupt data is ignored and recaptured on the next cycle. Pages are linked so that data may be spread over a number of pages and the receiving computer can look for the next section in the correct place.

All teletext — broadcast — and videotext — wire-based — systems use 7-bit words, with the eighth bit used as a parity check. Using that method directly would limit telesoftware services severely so both types of system use methods to set the eighth bit, allowing the full 8-bit character set to be used. The broadcast telesoftware specification contains numerous other facilities for a range of applications still to be developed.

For the receiver, making sense of all that information without direct access to the transmitting source is a complex task, hence hardware to receive and decode broadcast telesoftware tends to be expensive at present and needs more sophisticated intelligence in the receiving microcomputer. The usual hardware configuration is an add-on decoder to a micro which takes a feed from an ordinary TV aerial, decodes the information and feeds it into the databus of the micro. At present, the only telesoftware decoder available is made by Acorn for the BBC Model B and costs £225. All software at present broadcast by the telesoftware service is for the BBC B, although the system is designed to be language and machine independent. The reliability of the system is well proven. With a reasonable aerial, data integrity is extremely high — a bent coathanger with seven signal splitters in series will not suffice.

The facilities provided by the teletext adaptor for the BBC micro are comprehensive. Used in conjunction with the micro, it will allow all U.K. teletext services to be displayed on any TV receiver or monitor and make available many facilities not available on ordinary teletext TV sets.

The main justification for buying an adaptor will normally be for access to the free service of software provided by Ceefax.

The software, consisting at present of about seven programs rotated every other week, has so far covered fairly traditional areas — educational material, utilities, applications software and the occasional game. Most users so far are schools and colleges and the software is from many sources. Some is commissioned specially for the service. There is a "club" page offering cash prizes for good programs provided by enthusiasts and educational material is supplied by a number of professional bodies and research projects.

In many ways, telesoftware is a cure for a disease which has yet to be defined. The full power of the medium will be realised only when the disease has been fully diagnosed. As the sophistication of personal computing increases, the symptoms are becoming clearer. There is an increasing need for access to very rapidly-changing — volatile — data and a demand for high-quality instructional software, often associated with television and radio programmes.

Some of the telesoftware projects being developed reflect those needs and include complete courses in structured programming techniques and software to access volatile data from teletext pages and from regularly-transmitted data files in telesoftware format.

The power of telesoftware to provide a service of software maintenance for material published through traditional means is being developed — it has even been used to update itself. In the near future, full software support services will be available for broadcast programmes, initially in the area of computer literacy but later for a much wider range of subjects.

Broadcast telesoftware is still very much in its infancy; hardware is expensive but its attraction is the completely free and open access to comprehensive software and microcomputing services. In the next year there will be major developments in the field of educational services and in provision for the personal computer user. Review and maintenance services will grow and broadcast-linked software will become more widespread.

'Teletext and viewdata could well become the standard publishing method for software in the future'

Eventually, relative hardware costs should fall and a telesoftware capability will become standard for the personal microcomputer, in much the same way as disc systems are replacing tape at present. Telesoftware services on both teletext and viewdata will continue to develop independent and complementary roles and could well become the standard publishing method for software in the future.

Users will grow to expect a level of product support previously possible only in the high-cost professional environment.

Lawson Brown is the BBC telesoftware organiser.

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Enjoyment for animal lovers

THE MICROPOWER version for the BBC B of the old arcade classic Q*Bert was certainly designed with the animal lover in mind. For starters you become Harvey, the bouncing rabbit. There are no surprises in the basic layout of the screen. You must hop on to each square of two adjoining mountains of diagonal squares.

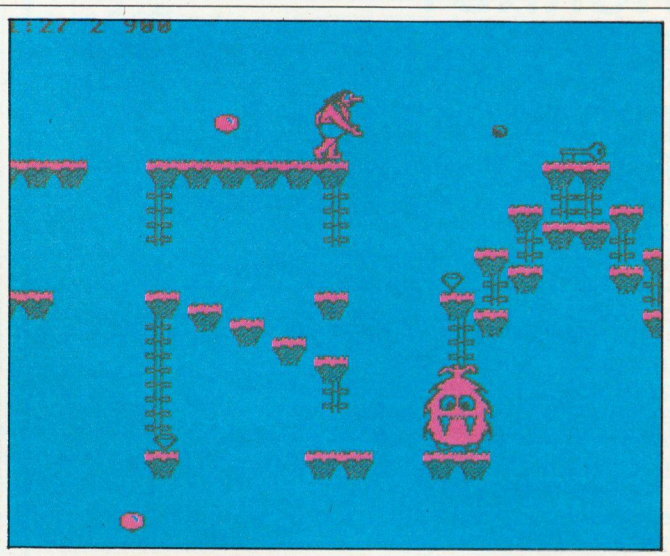
As you bounce round the screen you are pursued by some rather cosy baddies, an albatross which drops lethal guano on top of you and cascading balls which reveal a little fox called Reynard. To escape Reynard you jump on to a spinning disc between the mountains.

On the first two screens the pace seems rather slow and Harvey does not gather much momentum but as you progress up the levels the action quickens. The hazards become more frequent and a little squirrel livens things up by turning the squares back to their original colour.

The graphics of the animals are amusing but the colour combinations can be very irritating. Sometimes there is no contrast between the colour of the squares and Harvey or Reynard. Rather than providing an extra challenge, that is frustrating in the extreme.

All in all, an enjoyable enough game, although perhaps it would be more fun if you could strike back occasionally at your pursuers.

Blockbuster, BBC B, Micro Power, cassette £7.95, disc £9.95.



Introducing the latest word in great graphics

AARDVARK Software may well be responsible for introducing a new word into the vocabulary — **Frak!** It will probably pass into the vernacular and may be used whenever your favourite game will not load. The character responsible is a little caveman, whose sole purpose is to romp over grassy sods and up and down ladders in an attempt to knock the baddies from their perches and gather valuables en route. The aforementioned word is uttered in a bright yellow bubble whenever our hero falls or is struck by a flying dagger or a rising balloon.

It is your task to help him avoid such hazards and, with his only weapon, remove offending monsters as and when necessary. No lasers or wooden clubs, though — just skill with a yo-yo is all that is required. Each victim goes shooting off the screen — exit right. Various difficulties and fates await our friend in the later stages of the game but the reviewer never discovered them. It is a pity he does not say his word via the voice chip — at least he does not in the early stages of the game.

The most remarkable thing about the program is the graphics. Sprites are used with excellent effect and are certainly the best seen to date. Each character could be from a cartoon film. Sideways scrolling of the screen is also a novel approach to this type of game. Sound is employed to good effect — a pleasant ditty accompanies the action continuously, although that can be switched off if desired.

Frak! is certainly far ahead of those games at which we all marvelled a year or two ago. It is amusing, original and entertaining — a classic which will run and run.

Frak! Aardvark Software, BBC B, £8.90

Nuclear meltdown sobering

PICTURE yourself in the heart of a runaway nuclear reactor. Meltdown has begun. It is for you to delay the meltdown. That is done by shooting a proton which moves round a purple neutron. There are also electrons moving around. As well as all that nuclear movement, you are there with your remote-controlled super laser.

Each time you shoot the proton an extra electron appears. You must be wary of the electrons, for if you collide with one you lose one of your three lives. Whatever you do, do not shoot an electron as everything increases speed. A delay in shooting the proton causes meltdown to begin.

The game bears very little similarity to any established games; it really is exceptional, if not particularly enjoyable. The graphics seemed to be used to make the program into something it is not. Consequently, screen layout is not particularly pleasing to the eye and seems somewhat cluttered. If its purpose were more obvious it would be possible to overlook those minor inadequacies.

The scoring system is based on the length of time you survive. That means the longer you survive, the higher your score. That also means that eventually you survive no longer — rather a sobering thought.

Atom Smasher, Romik Software Ltd, Electron, £6.99.

Simple choices best in Shakespeare study

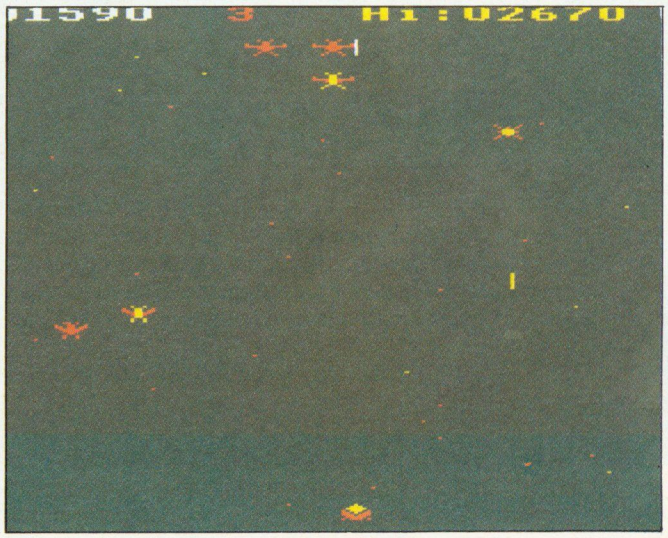
THE MERCHANT of Venice is one of a series of revision study programs for O level and CSE students. On LOADing a student is provided with a list of characters and a list of themes and lines of enquiry — for example, mercy, salvation, Venice, Belmont and plot. Unlike many revision packages which tend to concentrate on what you might call the bare bones of the play, Penguin has produced what might be termed a database. A student can enter up to three words to search for references throughout the play, or in any particular act.

The key words in the menu relate to references in the text only. That can be rather confusing, as very often in a study of a Shakespeare play it is useful to develop themes overall. ENTERing flesh, Shylock and revenge will return the message, 'I have found nothing; perhaps what you were looking for was insignificant.' Scarcely so in The Merchant of Venice. The same also happened when ENTERing Portia, justice and mercy.

On the whole, the program must be judged ultimately on its efficacy at its job, that of revising the play and aiding study. The format, as explained, can do that in some ways but only if the most simple choices are used. It also puts a strain on the enquirer, who without a teacher to guide a student through the main thematic content and imagery of a play, may find it confusing presented in this operational mode.

That would be the case especially for the student who is struggling to understand the play in its entirety, exactly the type of student the program should be helping. Other programs in the series, including Macbeth and Romeo and Juliet, follow the same format and operational mode.

The Merchant of Venice, BBC B and Electron, Penguin Study Software, £5.95.



Commendable speed

BIRDS OF PREY is a variation on the Phoenix arcade game theme.

The player starts with three lives. A bonus life is added every third time the screen is cleared. Attacks are made by different types of birds. They start in formation at the top of the screen, with Swoopers peeling-off and coming in to attack. They then circle and bomb. Kamakazi birds also peel off from formation and then swoop as they descend.

All the ducking and diving to avoid and destroy a flock of menacing, missile-wielding birds tends to make one dizzy. Those who show excellence in the game will appreciate the comprehensive scoring system, especially the Top 5 scoreboard.

Taking into account the comparative slowness of the Electron alongside the BBC, the speed of this game is commendable. That is due mainly to the use of machine coding. The optional use of a joystick adds to the excitement.

Birds of Prey, Romik Software Ltd, £6.99, Electron.

Winning favourite

MANY Software suppliers seem to think you cannot have enough of a good thing. **Cosmic Kidnap** is a direct descendant of that greatest zapper of all time, Space Invaders. There is an added dimension to this latest generation — the aliens have a purpose in life. Rather than attacking for the sake of it, they are attempting to rescue three of their kind from a thickly-walled cell in the middle of the screen.

As the guard you must prevent the captives escaping by zapping the aliens who are busy eating away at the wall and pouring bombs on you. The bombs rain thick and fast from the start but as you move up the screens the pace becomes positively frenetic. With such an old favourite, it must be a winner. Although far from original, Cosmic Kidnap is exhausting and compulsive.

Cosmic Kidnap, Superior Software, BBC B, £7.95.

Play trio does not inspire

PLAYBOX is a compendium of three programs — **Hangman, Memory** and **Bricksmash.** After the title page has loaded, Hangman is immediately chained-in. A short but complete page of instructions is provided. The main program is a fairly standard version of computer-based Hangman games.

It has a good choice of options. There are 14, ranging from capital cities, car companies to fruit and vegetables. The first six options provide graded words based on children's age groups from seven to 12.

The last is perhaps the most interesting, as it permits each player to include his own word list. In the top half of the screen the hangman is built up while the lower part records each guess, the number of guesses and the letters tried. The game is accompanied by good graphics and sound effects.

Memory is a computer version of a popular card game. Two players take turns to choose two cards from an array of 30. If the two match the player receives one point. Play continues until all cards have been paired.

It is a useful exercise, as it tests short-term memory, but like so many games of its genre, is perhaps better left to the cards and off the computer screen.

Bricksmash is essentially a general knowledge quiz. Trapped behind a brick wall, escape is achieved by answering the questions correctly. Correct answers result in a chance to fire a rocket at the wall. After a wall has been blasted, a shot through the gap ends the turn.

In all, not a very inspiring suite of programs — most are available in better versions elsewhere.

Playbox, Comsoft Computer Services, BBC B.

More software on page 16

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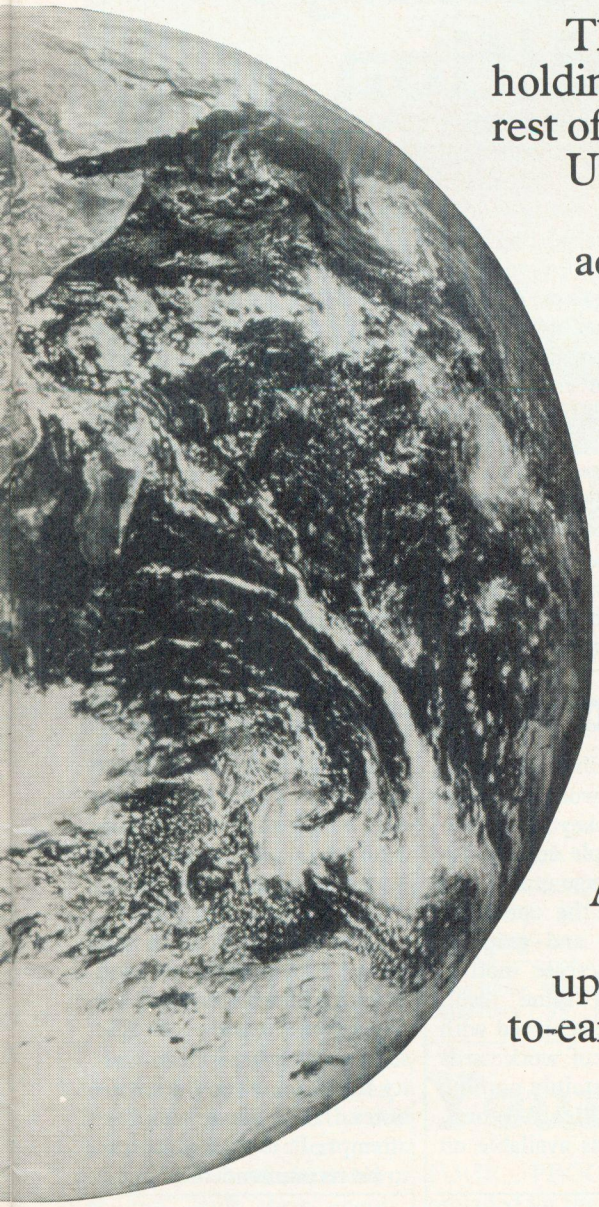

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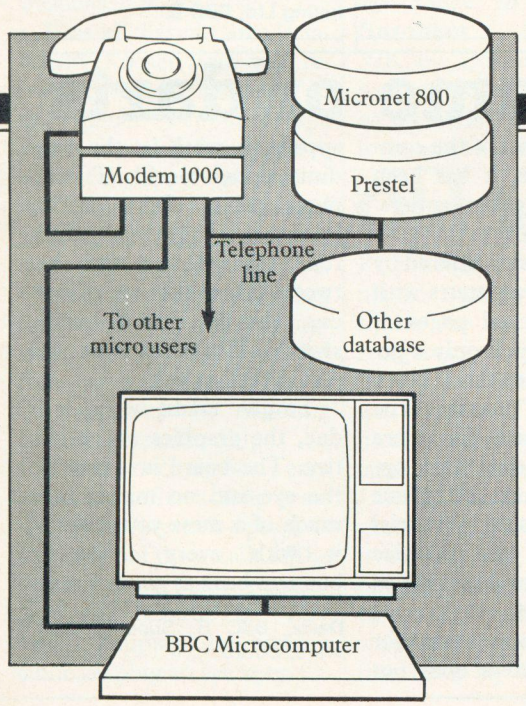

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Timely hints for the parent

MR T TELLS THE TIME for the BBC B OS 1.0 or above from Good Housekeeping Software is an ideal learning package for pre-school-age children to learn the clock face. It is based on a simple working clock which moves round and chimes on the hour. **Clock Numbers** shows a clock face with some numbers missing; Mr T moves up and down the missing numbers at the side of the screen and the child has to press SPACE when the number matches the flashing space.

In **O'clock** the child has to press SPACE when the clock hands match the description at the bottom of the screen. **Matching Hours** operates on three levels, from just the hours to hours/halves/quarters and the player presses SPACE when the two clock faces match.

The accompanying booklet has plenty of hints to guide the parent, hints which mirror primary school practice and so teach effective learning strategy. Graphics and sound are also of a high quality.

Mr T Tells the Time, Ebury Software, BBC B, £12.95.

Character change breaks tradition

MONSTERS and Magic breaks from the tradition of most adventure games by presenting a scenario and giving you the opportunity to fashion the character who will explore it. The object is two-fold — to try to improve the power of your character and ability by gaining treasure and experience and to complete each dungeon module by solving problems and finding the Word of Truth. Only then can you return to base.

The modular approach to an adventure game ensures that the avid adventurer always has another challenge round the corner. When another module is loaded all the experience and treasure is retained from the previous module, thus permitting your character to be improved over a number of games. Characters available include clerics, warriors, rangers and thieves. You may even choose your race — human, dwarfen or elven.

A schematic map of each room is presented to show the exits available; it is very necessary, as some of the occupants are none too friendly. Should you engage in combat, real-time takes over and you must strike quickly as your opponent will not wait. Rooms also contain treasure and objects necessary to solve a puzzle and complete the room. Objects may be sold for money halfway through the game. Do not be too greedy, though, as some apparently useless objects are handy when you least expect it.

Movement between rooms is achieved not by the usual GO EAST and the like but by use of the cursor keys. All other commands are given by a verb and a noun.

The reviewer found it particularly difficult to stay alive and was repeatedly killed early in the game. Fortunately, author Jonathon Holmes made allowances for simpletons by allowing an old character to be re-created with greater attributes, thus giving a better chance of survival.

It sounds very much like many other dungeon and dragon adventures. Where **Monsters and Magic** scores, however, is in its ability to let you alter your attributes and have another attempt. It is one adventure to be recommended.

Monsters and Magic, ISP Marketing Ltd, BBC B.

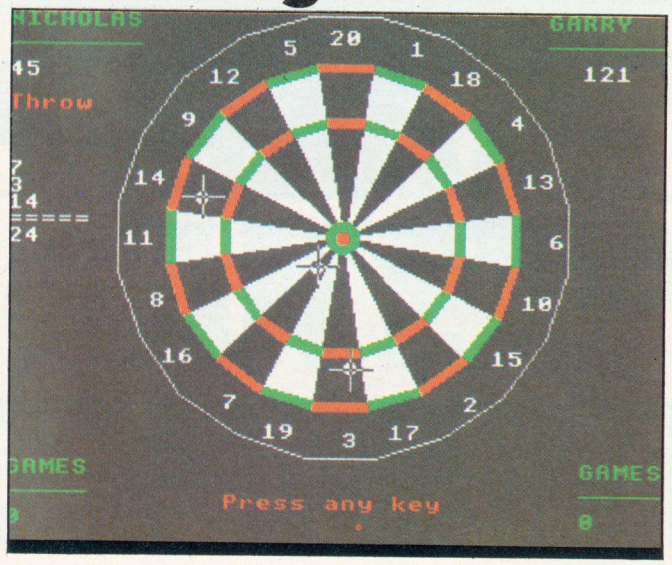
Picture program

FIVE READING games, **Elephant, Girl, Road, Fish** and **Bird,** introduce simple words to children who are beginning to learn to read. Extensive use is made of graphics and sound to illustrate the words. In each section all the words are shown with the pictures and the adult is supposed to read them to the child. The pictures are then shown with one word of the description missing, for example 'two ..... elephants', and words like 'blue or large' appear beneath.

The child has to press SPACE if the word is correct and any other key otherwise. They are simple enough activities for the age group concerned, using the computer colour, sound and graphics facilities to increase motivation, but the same result could easily be achieved with the clever use of work cards and there is certainly nothing original about **Pick A Word.** The program is available on tape or disc.

Pick a Word, Ega Beva Software, BBC B, £11.95.

Nothing like a real game of darts

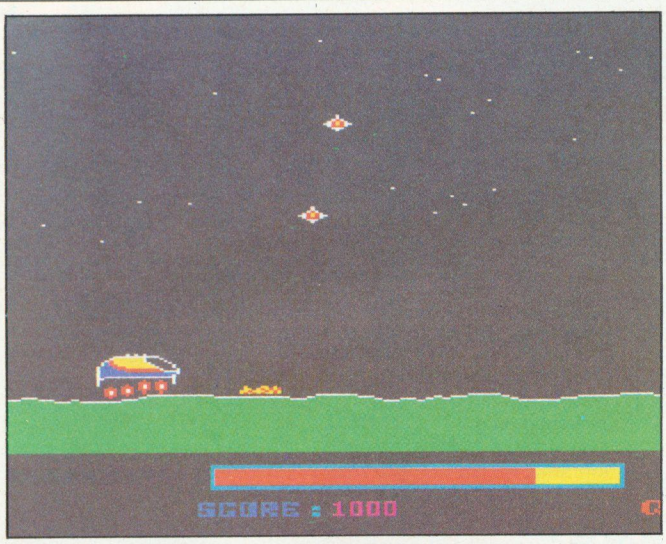


SINCE the dawn of the computer-game age, it has been inevitable that programmers' minds would turn to the darts board. The version offered by Superior Software starts with two tightly-packed pages of instructions which only a genius could understand, never mind put into practice. The only real choice for mere mortals from the three options — 501 game, 301 game and Practice game — is trial and error on the practice game, with error emerging as the clear winner.

Unless you have a taste for complexity, **Darts** does not appear to work in the two-dimensional world of computer games. Darts works, however, with three arrows, a round board and 8ft. between. So, at the risk of heresy, why not, just for once, switch off the machine and play a real game?

To give credit where it is due, the graphics are attractive. The board is a treat to the eye and no matter how much of a mess you make of it with every throw it bounces back as good as new.

Darts, BBC B, Superior Software, £6.95.



The appeal of a familiar landscape

DUNE RIDER brings the alien-zapper down to earth. Instead of zooming through inter-stellar space our hero is in control of a dune buggy, careering at breakneck speed over an inhospitable landscape dotted with lethal lava pits and radioactive rocks.

He is a galactic courier with documents vital to the defence of the planet Zennon. As he bounces across the desert, swarms of alien craft swoop and wheel above him, at him, with their energy weapons.

Fans of that old arcade favourite Rocket Raid will recognise several elements in this game. The landscape scrolls smoothly from right to left but the apparent speed of the buggy can be changed with forward and reverse controls. Its armament consists of two guns, one shooting forward and one directly upward, and its supply of fuel runs out quickly and has to be topped-up by shooting down alien tanker ships.

The controls are fairly easy to manage after a little practice and a joystick option is available but the details of the desert setting and particularly the hazards are very small. Zapping the baddies while keeping an eye open for lava pits can be literally a headache.

It has attractive graphics and although the early stages of the game are a little lacking in variety, it is reasonably compulsive.

Dune Rider, MicroPower, BBC B, cassette £7.95, disc £9.95.

Games offer a broad education

EDUCATIONAL 1 for the BBC/Electron 32K from Golem Ltd, costing £8 on tape and £10 on disc, is a compendium of programs covering a variety of activities of the rule-and-drill type. **Math 1** and **Math 2** cover addition/subtraction, multiplication/division. Sums appear on the screen and the player has to type-in the correct answer. If correct, the player's car moves towards the winning flag; if incorrect the Beeb car does the same. The game is over when one car reaches the flag.

The difficulty level ranges from dealing with numbers up to 10 to numbers up to 100. Both programs are mental arithmetic.

In **Cubecount** cubes are displayed on the screen. As they are stacked it can be difficult to count the cubes as the 'hidden' ones have to be counted. If a mistake is made the cubes are counted out and the player has to try again. After five turns the score is displayed out of five with the question 'Another go Y/N?'.

Shape is a shape-naming exercise. The game consists of a shape being drawn which the player has to name by typing-in the word.

Spell shows a word on the screen for a time and then the player has to spell the word correctly. The words range from easy — cup, ball — to difficult — xenophobic — with a corresponding shorter length of time.

In **Clock** the player has either to set the time, where the time is given and the clock hands have to be set, or in **What's the Time?** a time is shown on the clock and the player has to enter the time. Time is given in digital form, i.e., 6·55, rather than five to seven, so the exercise is really testing digital to analogue recognition. A reasonable selection of activities is provided by **Educational 1** and the program would be useful for six-to-11-year-olds.

Educational 1, Golem Ltd, BBC/Electron, cassette £8, disc £10.

Youngsters learn little

FOUR PROGRAMS are provided for the four to seven age range in **Fun With Numbers** — BBC/Electron 32K by Golem Ltd in this package. **Count** shows cars on the street and the child has to press the correct number. If correct, the cars zoom away with sound effects; if incorrect, they are counted out slowly.

Apples fall off a tree in two groups in **Add** to provide practice in counting and addition, and green bottles fall from a line to illustrate subtraction in the game **Subtract.** There are two levels of difficulty for each game.

Rocket Maths is probably the best game of all with the sum appearing at the bottom of the screen and four answers above. The object is to shoot down the correct answer. Addition or subtraction, or both, can be tested and a high score and energy level is displayed.

The educational content of the programs is very small and the first three programs are little more than electronic workbooks. Rocket Maths is a reasonable tester but offers nothing particularly new. Available in tape or disc versions.

Fun with Numbers, Golem Ltd, BBC/Electron, cassette £8, disc £10.

Old brain teaser

REMEMBER those little plastic puzzles where each square has to be shifted to reorganise a picture? Ega Beva provides the computerised version. There are four pictures on the tape so that it takes a fair amount of time to LOAD. The player can then choose the difficulty level between one and five. At level one the picture is split into two rows by three columns, whereas at level five there are five rows by five columns. One piece can be moved into any square around it using the cursor keys.

Level five is virtually impossible but a real brain teaser. The package is an interesting copy of an old idea with added spice that the player can choose the difficulty level. Not for the faint-hearted but an intriguing concept.

Sliding Block Puzzle, Ega Beva, BBC B, £7.95.

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Dee Vince assesses some of the latest programs designed to be of practical use rather than to provide mere frivolous entertainment

Wanted — help in the home

SERIOUS software for use at home has always been a flimsy area in the field of software development. It has often referred to software which is not absolutely suitable for a business environment nor as a serious practical tool. The home interest market, as some manufacturers describe it, is the place where software with no specific category fits. That is not to say that the software is of no use — there are notable efforts in existence — but the acid test for software in that grouping is not how wonderful the package is but whether it serves any practical use.

In a recent bag of mixed offerings was **Mini Office.** For a remarkably low price three pieces of business software, a word processor, database and spreadsheet, were being offered on one tape, which seemed too good to be true. It was. To be fair, there is so much crammed on to two sides of the tape it could not be anything but good value.

Inside the cassette box is a 32-page booklet describing the wonders of your mini office. Mini is probably an understatement. The word processor can be used in either 20- or 40-column displays. The point of the 20-column display mode defeats me, as anyone who has used a word processor would have difficulty in coping with a 40-column display. The lack of an 80-column mode to work in or a display of the user's document is a point which did not endear me to the program.

The screen display shows the time, number of words and free characters remaining, which on my BBC was not very much. As a serious word processor the program is a non-starter. I would not consider writing the shortest of articles with it for fear of running out of memory and because of the jerky and slow response of the screen. It would probably be good enough for the occasional letter but poses no threat to professional packages available.

After tackling the word processor I could not help thinking that perhaps worse things were in store. The database program is, to all appearances, a better-constructed program. The screen presentation is good and the opening menu is easy to use. As databases go it is no competition to large programs but for the odd small catalogue of butterflies or whatever people collect it is adequate.

With things looking brighter I loaded the spreadsheet and found that all good things come to an end. The size of the spreadsheet is a maximum of 26 columns by 35 rows, which is very small, and the handling of entries from the keyboard is very slow, a matter of seconds to enter one number into a row.

Finally there was a graphics program associated with the spreadsheet which produced histograms, pie charts and graphs. That is the best part of the spreadsheet program, with options to output to an Epson-compatible printer. Overall, Mini Office is a collection of well-known, potentially-useful applications but is, in effect, very limited and its main virtue is the price.

> 'I would not consider writing the shortest of articles with it'

The **Football Pools** program from Hartland Software for £8.95 is exactly what its name suggests. Written originally for Sinclair computers, it has now been re-written for the BBC B and with it your chances of a return for your stake money are increased, or so I am told. As one can imagine, a vast amount of data has to be kept for accurate forecasts to be made. The data supplied with the cassette was correct to April, 1984. The program will select the matches with good odds on fixed odds coupons and will list in order of preference best home/draws/score draws and aways.

The menu presentation is easy to follow and new league tables can be created and saved on to cassette. For those with a head for such things the accompanying four-page leaflet goes into the probability theory of the punter making a killing. As a piece of software it is competent and for those who bet serious-

ly on the pools it, is a practical program.

The ideal piece of software for the busy cook is **What's to Eat?** from Shumwari Associates, a program which permits the user to plan a menu and then obtain a list of ingredients and a shopping list.

To be of practical use a program of this nature should permit the cook to plan a meal for a given number of people and then have a complete shopping list with the quantities required. Unfortunately the quantity element is missing, which seems the obvious use of a home computer in such domestic situations.

The program offers, according to the makers, more than 20,000 possible menu combinations and provides a tantalising menu of suggested meals. When you have chosen your meal and obtained the list of ingredients, it does not indicate how to cook the meal. Neither is there a facility for users to add their own meals. The idea behind the program is good and, if followed to its logical conclusion, would make a useful addition in the kitchen, assuming you have your micro situated beside the cooker.

The program is supplied on cassette or in a longer version on disc and there is a seven-page booklet. The beginners' section in the booklet attempts to teach the Basic command 'Print', the point of the exercise being a mystery. Having said that, it is a fun program but in its present form of little use. For the time being I am still using pencil and paper for my shopping lists.

The Night Sky is a program from Bridge Software for the budding astromoner. There are now a few programs on astronomy and as an aid to newcomers to the hobby this has much to commend the idea. The idea of The Night Sky program is to allow the experienced or a beginner in the field to obtain an accurate plot of the sky at any given position and time. The program achieves the aim and plots a myriad of points on the screen. The sky, shown as a semi-circle with a town below it, is shown in all its glory and the user can choose to see a specified constellation; the computer then shows one by one the visible stars in that constellation. That is, of course, a good idea but better versions have been implemented where the user can see all the visible stars and then point to a star of interest and obtain information on the star or constellation.

'Another area lacking in the program is the ability to locate planets'

Another area lacking in the program is the ability to locate planets, though that is not so important. The package is on either disc or cassette with a four-page document describing the program. The document makes the point that one does not see lines joining stars when one looks at the night sky. That is true but it is probably a lame excuse for not implementing the option of showing lines if the user requires such aids. The software is easy to use and as an aid to learning is not without possibilities.

Finally, an item with an extremely limited market but which may be of use to engineers and architects. It is a serious item which will appeal to those in the field who may have a micro at hand near the drawing board.

Beamscan is a program to determine beam sizes. It is purely in the realm of the professional designer but opens another area for the use of serious home applications software. It is accompanied by a 16-page booklet and is on either disc or cassette.

The home interest market should not be considered the dumping ground for miscellaneous software. As I have tried to indicate, software in this area can be potentially useful if given sufficient thought. It is a market which deserves more software and one where many home users would like good applications to run on a micro. The applications area of computing is the place for the next generation of computer buyers — people who will buy a computer for a practical use in the home.

Mini Office, Database Publications, £5.95.
Football Pools, Hartland Software, £8.95.
What's to Eat? Shumwari Associates, £7.95.
The Night Sky, Bridge Software, £7.95.

Guides to rescue the adventurer

Bruce Smith has read the latest explorations of a popular genre

ADVENTURE GAMES have been around for many years, long before the advent of the zap, bling, bang, wham of the more popular arcade affair. In years past many a mainframe computer housed in several large rooms whiled away the lunch hour with the latest poser.

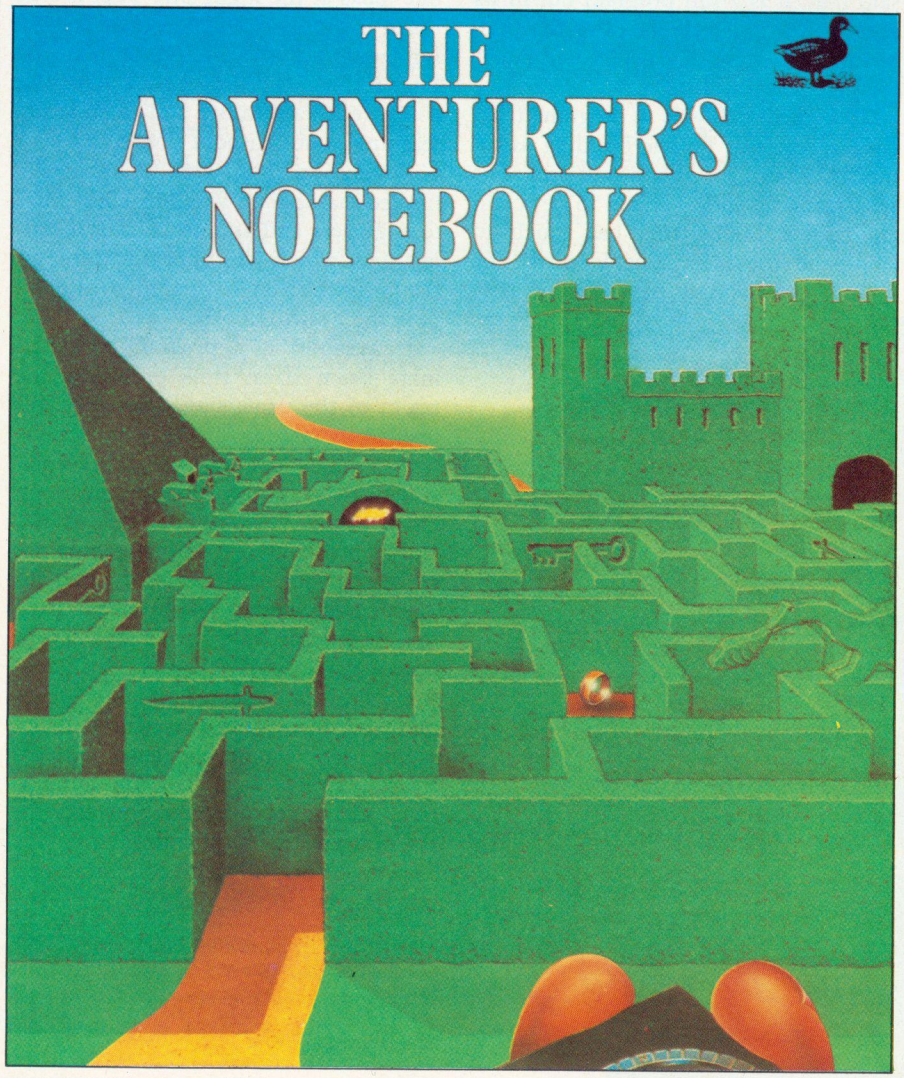
Following the gradual decline of the arcade game on the home computer, more esoteric items of software, such as the adventure game, have appeared. It is therefore not really surprising that the latest games books are not simply games listings for you to type-in and try but are more subtle, combining a few adventure game listings with an in-depth look at the intricacies involved.

Four such books are provided under the Duckworth banner, written by the Gerrard and Gerrard duo. *Exploring Adventures on the BBC Model B* and *Exploring Adventures on the Electron* are almost identical in text and even in cover design. Re-works are satisfactory, so long as they are performed professionally and these are just that.

Before I go further I must confess that I am by no means an adventurer so I have approached the books from the novice's point of view.

Exploring Adventures begins by looking at the development of some of the early adventure games on forerunners of the home computer such as the Pet and provide some very useful, though fundamental, advice about playing adventure games. Tips such as 'never ignore anything' and 'always draw a map' may seem obvious to the old hand but for the likes of me they are essential.

There are various types of adventure game, such as tunnel, castlemaze and underground, and each is discussed and a generalised map provided. Chapter three deals with the Basic programming techniques involved in writing a home-brewed adventure. Just about everything is covered and the main emphasis is, of course, on string-handling and input commands. One criticism is the section devoted to GOSUB and RETURN. Those two commands are really outdated on machines such as the BBC and Electron and should be treated as such, or better still, avoided like the plague.



Now for the important part. Chapter four is devoted entirely to writing your own adventures and covers aspects such as finding and improving your idea, laying out the hazards, drawing an initial map and supplying the data — a difficult chapter to write but done very well. If you are stuck for ideas then move quickly to chapter five, where the scenario for five adventures is provided.

Throughout the programming sections of the book, the aim is to work towards writing a program, Underground Adventure, and chapter six concludes the task by providing a description and program section to handle each of the program's 38 verbs — a really useful tool for learning about the game and how it is written.

The final two chapters provide two more adventure listings for the Castlemaze Adventure and Tunnel Adventure. They are also provided on a companion cassette tape on the Ducksoft label. The Castlemaze Adventure is the simplest according to Gerrard but I still cheated with the listing in the book to see what I should do next.

I found both books very interesting to work through and well worth £6.95.

The Adventurer's Companion by Mike and Peter Gerrard is not written specifically for Acorn micros but it is certainly relevant. If you like a good crib, this book should suit you down to the ground. Essentially it covers playing techniques for four of the more popular

adventure sagas, namely The Hobbit, Adventure Land, Pirate Adventure and Colossal Cave Adventure, of which the first three are available in BBC format.

Each of the adventures is treated in a similar vein; the main parts of the program are analysed and solutions suggested. For example, the Gerrards advise taking a torch from the wall and attaching it to a rope if possible with the immortal line TIE TORCH when we enter the Hobbit's big cavern with torches. Where relevant, an account on scoring is provided. The book also provides detailed maps.

An interesting book, though I feel that it is not really in the spirit of playing the games. I suppose if you are stuck in the cavern with torches, it might prove useful.

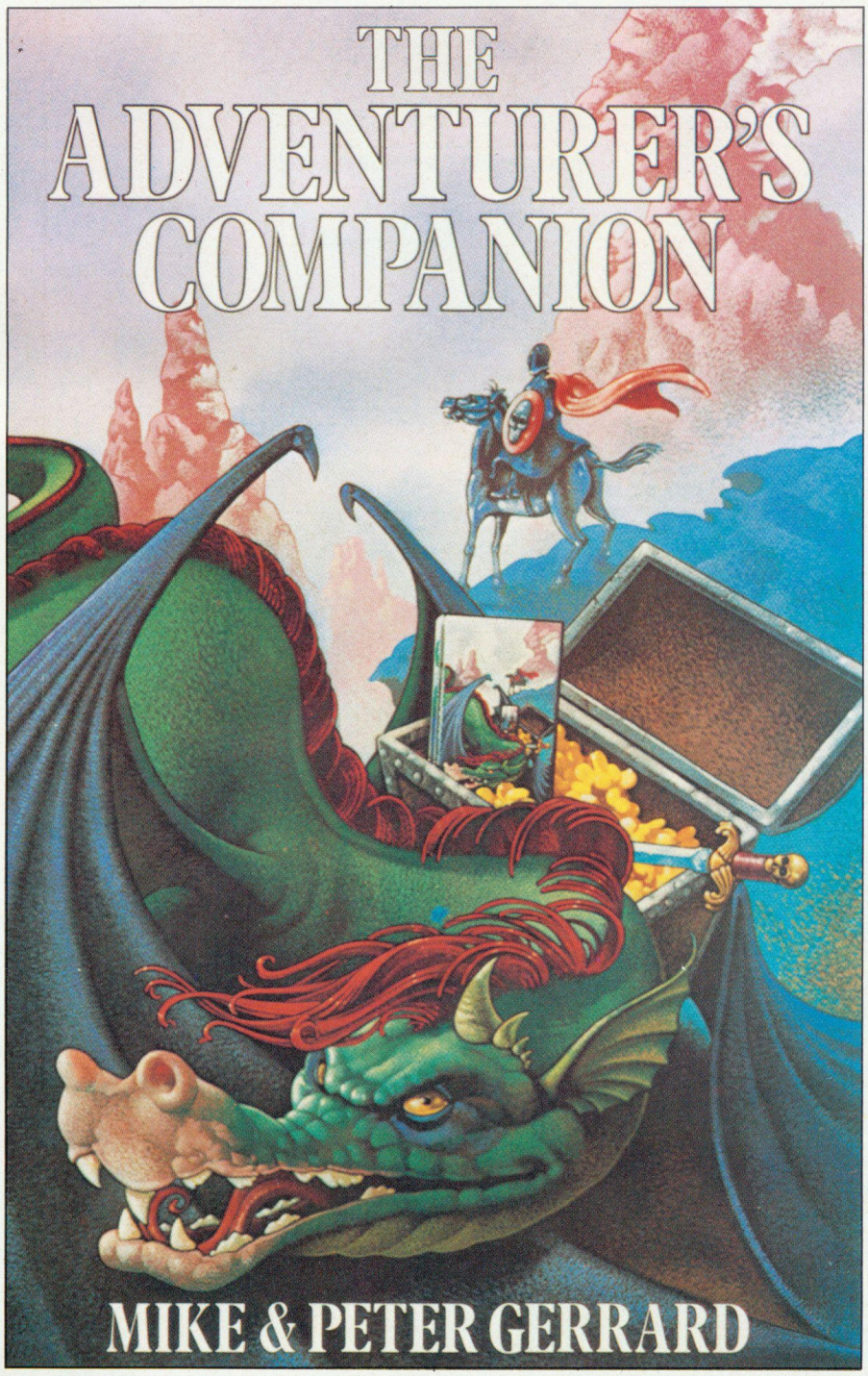
The Adventurer's Notebook is an apt title for a book by Mike Gerrard. The ring-bound volume contains 80 pages of ready-made maps for you to fill in as you work your way through your current active adventure game. Those pages also contain space for your notes on verbs and nouns used, plus location of objects and how to pass them.

Whether you would find this book of use depends on whether you can be bothered to draw your own maps and keep notes about the game you are playing. My view is that it is useful but at £3.95 a little highly-priced.

The Alien Planet (Part 1) is a storybook adventure aimed at teaching programming. That approach of combining an adventure story with programming is a line followed successfully by computer publishers in the U.S., though on two publishers in the U.K. seem to have jumped on the bandwagon. This book is published by Glentop in its Dr Watson series.

Briefly the story is about three heroes who find a tape with programs on it and then investigate them. The wise Dr W explains the various sections of the programs to the intrepid trio. Tasks are also given by Dr Watson and solutions are provided at the back of the book. The latter section, Dr Watson explains, provides a pithy account of each of the commands used in the program. The book is also supplied with a tape of the programs as used by the heroes for £9.95. A useful book for the novice.

Games and other programs for the Acorn Electron is from the Penguin Acorn Computer Library. The book is a compiled affair by Lee Calcraft of Beebug. It is not surprising that the listings are all taken from previous editions of Beebug. It is unlikely, however, that Electron owners will have those as Beebug is specifically for the BBC and most of the programs appeared before the Electron did. The programs are grouped under four headings — action games, thought games, visual displays and, finally, utility programs.



Five programs are in each section and are all well-presented, consisting of screen shot, commentary and very well-produced listings. Typical programs from each section are Mars Lander, Anagrams, 3-D Rotator and Bad Program Lister, and at £3.95 they are a worthwhile addition to an Electron game player's library.

The Good Software Guide contains reviews of about 100 pieces of software under section headings such as adventure, arcade, educational, practical, space games and strategy. Each review fills a page and in addition to the reviewer's commentary a star rating is provided along with details of joystick compatibility and whether the software is written in machine code or Basic. The book is certainly useful if you intend to be spending a large amount on software.

Exploring Adventures on the BBC, Peter Gerrard; Duckworth, £6.95; tape, £7.95.
Exploring Adventures on the Electron, Peter Gerrard; Duckworth, £6.95; tape, £7.95.
The Adventurer's Companion, Mike and Peter Gerrard; Duckworth, £3.95.
The Adventurer's Notebook, Mike Gerrard; Duckworth, £3.95.
The Alien Planet, Dr Watson Series, Glentop; £9.95.
Games for the Acorn Electron, Penguin Acorn Computer Library; £3.95.
The Good Software Guide, Fontana; £3.95.

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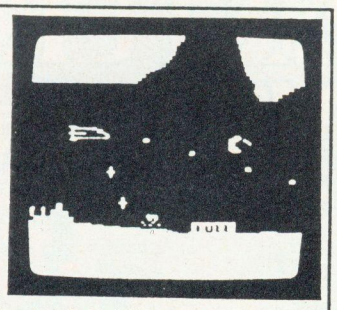

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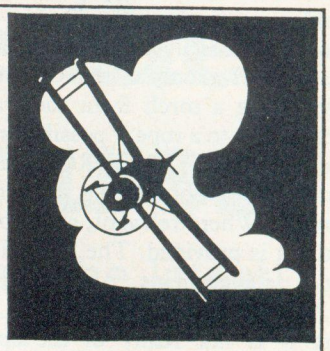

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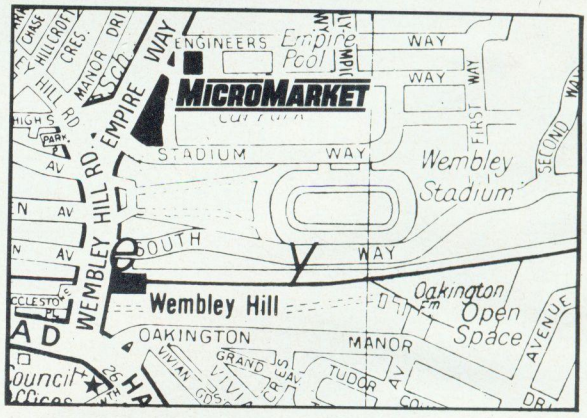

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Our expert Jeremy Richards has selected ROM boards, disc drives and programming techniques from a mixed postbag of readers' queries

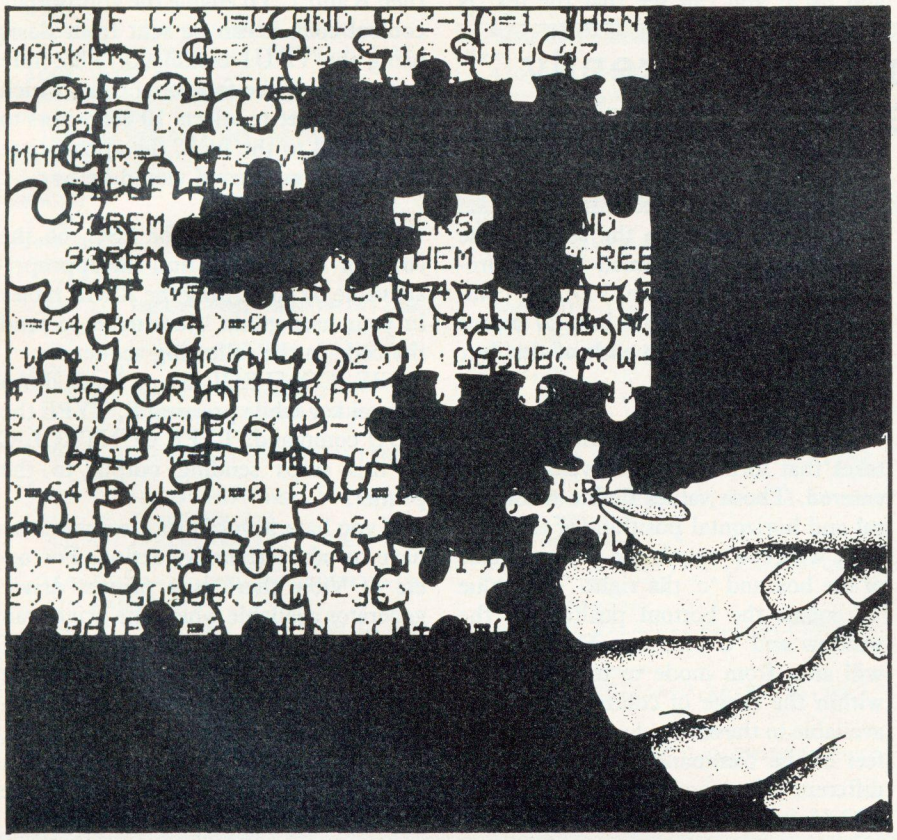
From add-ons to VDU commands

THE ONE definite thing I can say about your queries is that they are unpredictable and this month is no exception, with a postbag covering ROM boards, disc drives, programming and various other issues relating to both the BBC and Electron.

Let us look first at one of the biggest markets for hardware add-ons for the BBC, the sideways ROM board and sideways RAM. Many have asked questions ranging from seeking advice as to which product to buy, to the differences between them and the advantages or disadvantages of those boards.

ROM or read only memory is the permanent firmware in your machine. As the name implies, the instructions stored on the chip can only be read and cannot be changed by or written to by the user. When the machine is turned off the contents of the ROM remain, unlike RAM — random access memory — which loses its contents when the machine is turned off. The user can write and store programs or data in that area and that is where your programs are stored when loaded from cassette or disc.

That is not always convenient and another method of running an application or favourite program instantly is to have that program stored on ROM, where it is available instantly. That is satisfactory if you are using one or two ROMs which you have bought but there are only five ROM sockets available and at least two will be used by the MOS and the Basic chip.



If you have a disc interface another socket will be taken by the disc filing system and that leaves only two sockets for extra ROMs. The BBC has been designed to page — call — up to 16 ROMs and with a wide range of applications now available on ROM, independent manufacturers have produced sideways ROM boards to allow the user to fit 16 ROMs.

When buying a ROM board you should look carefully at the way it fits into the machine, the ease of connection and the documentation. A number of ROM boards available vary in quality. No universal system has been adopted by the manufacturers for the way the ROM board is installed and some boards are neater than others.

The most serious problem which can arise after installation is over-heating, sometimes caused by placing the board over the RAM area. By and large, however, all the boards do what they claim and the faults are with the lack of ease of fitting by the user. Some boards require no soldering but will require the removal of a chip or two and removing a link. That is not a difficult task but if you do not feel competent it is best to have a qualified person do the job.

There are boards which require the user to solder connections to the board.

continued on page 28

continued from page 27

That can be awkward if you are not used to a soldering iron but do not be deterred by all I have said, as the instructions with most of the products are precise and if you are careful you should do no lasting damage.

There is yet another method of using your programs — to load them into sideways RAM. With sideways ROM boards it is possible also to use the commercial ROMs by transferring the contents to disc, to be loaded into RAM whenever you need it. The advantage of that system is that the user can build a library of applications with no worry about running out of sockets in the machine.

If Electron owners feel they are being omitted, do not worry, because just appearing on the market are sideways ROM boards for the Electron and no doubt there will be a large market in that area. Remember, though, that if you have one of the boards the ROMs you use must not be dependent on non-Electron functions like Mode 7 screen presentation.

If you are interested in the ROM filing system or sideways ROMs, more information can be obtained from Acorn in the form of two booklets, though they will be charged for. More detailed accounts will no doubt be appearing in book form shortly.

Next on the list of queries is disc drives, which BBC and Electron machines can utilise, though the Electron disc drives are only just appearing. Two questions which recur are whether to buy the new 3in. drives or the floppy $5\frac{1}{4}$in. and which disc filing system to use.

With regard to disc size, it would be fair to say that the $5\frac{1}{4}$in. floppies are the standard and virtually all software on disc is available in that size. It is only comparatively recently that the smaller hard-cased drives have appeared and their advantage, besides the hard protective casing, is the compact nature of the drive. At present very little software is available commercially in that format but it would seem likely that future machines will adopt the format, as has happened on the more expensive business machines, and it will become a standard.

The other difficulty worrying a few is which DFS to buy. Besides the official Acorn DFS, a range of alternative systems has appeared, the appeal being price and the addition of facilities not available on the Acorn DFS.

It is utilities like formatting and disc editors on which the other DFS ROMs have their appeal. There can, however, be problems with those independent ROMs, in terms of compatability with discs formatted on other machines and the internal structure of the ROMs. It is the latter point which could cause difficulties if the user plans to buy Acorn expansions. You must choose which is the more important and ensure that the product you buy is compatible with other expansion options.

Now to programming. Not everyone, it seems, knows how to use all the VDU commands and one which causes particular frustration is the creation of a text window. The VDU commands can provide the programmer with a powerful set of commands and one such VDU statement is VDU28, which allows the user to create a text window. That means that the text presented on the screen can be boxed into a certain position and the text cannot be printed outside that box. To see what I mean type-in program one:

Program 1

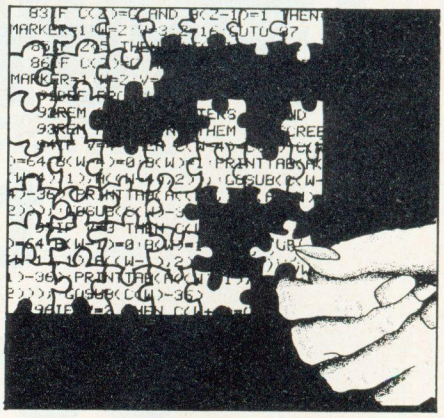
```
10 MODE 2
20 VDU28,5,20,10,5
30 PROCtext
40 GOTO 30
50 DEFPROCtext
60 PRINT"Jeremy"
70 ENDPROC
```

If you run the program and then stop and list it you can see that the text is restricted to a box on the screen. The size of the box is defined by the programmer by using the VDU28 command. To explain what line 20 means let us assign names to each of the four values after VDU28:

VDU28,a,b,c,d

The text window command always takes that form with four values to be entered. Those values define the vertical and horizontal positions of the window, where 'a' equals the left-hand side of the box and 'c' the right. The value 'b' equals the bottom position of the window and 'd' the top. Those values will alter from mode to mode and are within the range of columns and lines available in the selected mode; to get the feel of the command experiment with different values and modes.

C Harvey has pointed out difficulty he is having with the Menu program in the August/September issue of Hotline. He noticed that the menu will allow him to have only up to nine programs and wonders whether there is a mistake. There is no mistake. Because of the way the program was written using the ON statement, the user will have a maximum of nine choices. A better way of writing a disc menu program is to use OSCLI which I described in Hotline in the previous issue.



Some people have written with queries regarding obtaining special printing effects — i.e., enlarged, italic print on a printer. There are now hundreds of possible printers to interface to the BBC or Electron and each has its own set of control codes. It is those codes you need to send to the printer to produce a special effect — you should find a list in your printer instruction manual. Often they are referred to as ESC B 1 and you may try pressing the escape key and then B and 1. To enable the appropriate control code it can be sent from Basic using the VDU1 command. Therefore in the case of the foregoing code, which on my printer re-selects 10 characters to be printed to the inch, the appropriate BBC Basic command would be:

VDU1,27,1,66,1,1

where 27 is the code for ESC, 66 the code for B. You can find the appropriate value by consulting the ASCII tables in your user guide. Remember to send the code in the following sequence: TYPE CONTROL-B — hold down control key while pressing B; TYPE the VDU command; TYPE CONTROL-C — this stops sending output to the printer.

If you have a word processor you may have to take alternative action. For users of View there is a printer driver generator available where the driver can be configured for the user's printer. If you use Wordwise the command can be sent from within the text as an embedded command such as f1 OC27,66,1 f2.

If you have any ideas or subjects you would like dealt with in Hotline, please write.

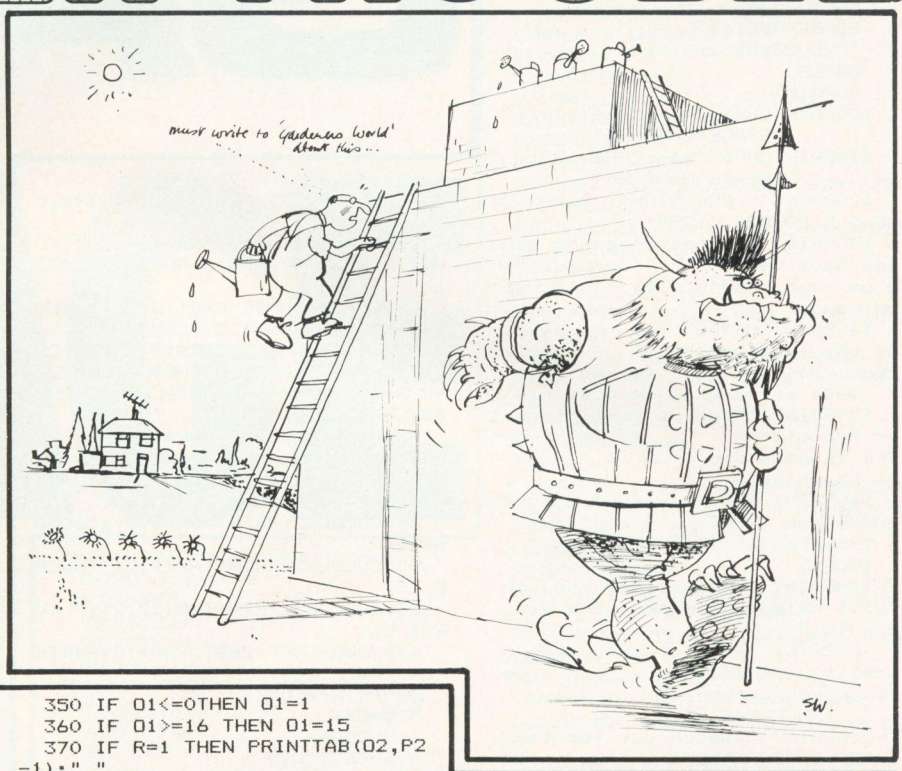
'It is only comparatively recently that the smaller hard-cased drives have appeared'

GARDEN TROUBLE

IF YOU have always thought of gardening as a relaxing and peaceful occupation, **Garden Trouble** by Paul Radcliffe of Danbury, Essex should make you change your mind.

The object is to climb a ladder, followed by a second ladder, to reach the watering can at the top of the screen, then descend to ground level and water the flowers — all while avoiding the two monsters which patrol each level. You had better not dawdle, as you have only 27 seconds in which to save your plants from drought.

Press Z and X to move left and right, : and / to move up and down. Garden Trouble will run on the Electron and BBC B.



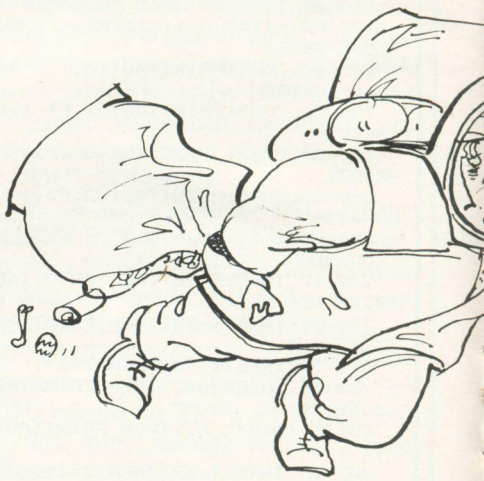

```
  1 *FX 14,6
 10 W=2700
 20 Y=0
 30 G=0
 40 MODE 2
 41 SCORE=0
 50 PROCgraphics
 60 PROCscreen
 70 Z=1:X=19
 80 O1=13:P1=19
 90 O2=14:P2=9
100 TIME=0
110 COLOUR4:FOR N=1 TO 10:PRIN
TTAB(10,20-N);CHR$235:NEXT N
120 COLOUR4:FOR N=1 TO 3:PRINT
TAB(15,10-N);CHR$235:NEXT N
130 COLOUR5:PRINTTAB(Z,X-1);CH
R$232
140 COLOUR 6:PRINTTAB(Z,X);CHR
$233
150 COLOUR1:PRINTTAB(O1,P1);CH
R$231
160 IF TIME>=W THEN PROCdead
170 PRINTTAB(0,1);"TIME=";TIME
/100;"SECS"
175 COLOUR4:PRINTTAB(13,1);"Sc
ore=";SCORE
180 COLOUR3:PRINTTAB(O1,P1-1);
CHR$230
190 COLOUR2: PRINTTAB(O2,P2);C
HR$231
200 COLOUR6:PRINTTAB(O2,P2-1);
CHR$230
221SOUND 1,-15,4,1
222SOUND 1,-15,45,1
270 IF INKEY(-98)THEN PRINTTAB
(Z,X-1);" "
271 IF INKEY(-98)THEN PRINTTAB
(Z,X);" "
272 IF INKEY(-98)THEN Z=Z-1
280 IF INKEY(-67)THEN PRINTTAB
(Z,X);" "
281IF INKEY(-67)THEN PRINTTAB(
Z,X-1);" "
282 IF INKEY(-67)THEN Z=Z+1
290 IF Z<=0THEN Z=1
300 IF Z>=16 AND X=19 THEN Z=1
5
310 IF Z>=19 AND X=9 THEN Z=18
320 R=RND(5)
330 IF R=1 THEN PRINTTAB(O1,P1
-1);" "
331 IF R=1 THEN PRINTTAB(O1,P1
);" "
332 IF R=1 THEN O1=O1+1
340 IF R=2 THEN PRINTTAB(O1,P1
-1);" "
341 IF R=2 THEN PRINTTAB(O1,P1
);" "
342IF R=2 THEN O1=O1-1
350 IF O1<=0THEN O1=1
360 IF O1>=16 THEN O1=15
370 IF R=1 THEN PRINTTAB(O2,P2
-1);" "
371 IF R=1 THEN PRINTTAB(O2,P2
);" "
372 IF R=1 THEN O2=O2-1
380 IF R=2 THEN PRINTTAB(O2,P2
-1);" "
381 IF R=2 THEN PRINTTAB(O2,P2
);" "
382 IF R=2 THEN O2=O2+1
390 IF O2<=0THEN O2=1
400 IF O2>=19THEN O2=18
410 IF O1=Z AND P1=X THEN PROC
dead
420 IF O2=Z AND P2=X THEN PROC
dead
430 IF INKEY(-73)THEN PROCup
440 IF INKEY(-105)THEN PROCdow
n
450 IF Z<12 AND X=6 THEN Z=12
460 IF Z>15 AND X=6 THEN Z=15
470 IF Z=13 AND X=6 THEN SOUND
 1,-15,5,2:IF Z=13 AND X=6 THEN
LET Y=1
480 IF Z=15 AND X=19 THEN G=1
490 IF G=1 AND Y=1 THEN GOTO 8
70
500 GOTO 110
510 DEF PROCgraphics
520 VDU 23,230,34,20,28,42,62,
34,28,28
530 VDU 23,231,28,28,28,62,93,
28,34,65
540 REMman
550 VDU 23,232,60,52,63,24,24,
60,90,153
560 VDU 23,233,24,60,126,102,1
02,102,231,0
570 REMfloor
580 VDU 23,234,255,255,231,195
,231,255,255,255
590 REMladder
600 VDU 23,235,255,195,255,195
,255,195,255,195
610 REMflower
620 VDU 23,236,0,16,40,16,16,1
46,84,56
630 REMwatering can
640 VDU 23,237,0,0,28,254,28,0
,0,0
650 ENDPROC
660 DEF PROCscreen
661 PRINTTAB(4,22);"GARDEN TRO
UBLE"
662 PRINTTAB(3,24);"By Paul Ra
dcliffe"
670 VDU23;8202;0;0;0;
680 COLOUR1:FOR N=1 TO 19:PRIN
TTAB(N,20);CHR$234:NEXT N
690 COLOUR1:FOR N=1 TO 19:PRIN
TTAB(N,10);CHR$234:NEXT N
700 COLOUR2:PRINTTAB(16,19);CH
R$236
710 COLOUR13:PRINTTAB(13,6);CH
R$237
720 FOR N=1 TO 3:PRINTTAB(11+N
,7);CHR$234:NEXT N
730 ENDPROC
740 DEFPROCdead
750 CLS
760 COLOUR1:PRINTTAB(5,10);"YO
U ARE DEAD"
770  FOR N=40 TO 1 STEP-1:SOUN
D 1,-15,N+5,1:SOUND 2,-15,N+10,1
:SOUND 3,-15,N+30,1:NEXT N
780 CLEAR:RUN
790 DEF  PROCup
800 IF Z=10 AND X=19 THEN X=X-
10
810 IF Z=15 AND X=9 THEN X=X-3
820 ENDPROC
830 DEF PROCdown
831 PRINTTAB(Z,X);" "
832 PRINTTAB(Z,X-1);" "
840 IF Z=10 AND X=9 THEN X=X+1
0
850 IF Z=15 AND X=6 THEN X=X+3
860 ENDPROC
870 REM new level
875 SCORE=SCORE+1
876 G=0:Y=0
877 COLOUR13:PRINTTAB(13,6);CH
R$237
878 PRINTTAB(O1,P1);" ":PRINTT
AB(O1,P1-1);" "
879 PRINTTAB(O2,P2);" ":PRINTT
AB(O2,P2-1);" "
880 SOUND 1,-15,1,1
888FOR N=1 TO 80 STEP+3:SOUND
1,-15,N+5,1:SOUND 2,-15,N+10,1:S
OUND 3,-15,N+30,1:NEXT N
890 GOTO70
```

GALA
GA

```
10REM *** SPACE GARBAGE ***
20REPEAT
30MODE7:PROCins
40MODE5:VDU19,3,4;0;:PROCvars

50PROCgame
60DEFPROCins
70VDU23;8202;0;0;0;
80CLS
90PRINT
100PRINTCHR$(141);CHR$(130);"
        SPACE GARBAGE"
110PRINTCHR$(141);CHR$(129); "
        SPACE GARBAGE"
120PRINT'" COPYRIGHT: J.GASCOY
NE & D.BOWERS (1984)"
130PRINT''"Piles of space garb
age have been        accumulatin
g on  the interstella        spa
ce route."
140PRINTCHR$&85'"As the pilot
of the local garbage        colle
ctor you have to clear up the
   mess as quickly as possible"
150PRINT'"Pick up waste from t
he top of the        screen and t
ake it down and drop it      in t
he black hole below."
160PRINT TAB(5,24)CHR$136;CHR$
&85"Press <SPACE> to continue"
170REPEATUNTILGET=32
180CLS
190PRINT'''"*To close and you
 will be sucked into   the blac
k hole."
200PRINT'"*To far away and yo
u will be unable to          je
tison you cargoe of
        NUCLEAR WASTE."
210PRINT'"*Watch out for the
LASER BASES which    fire in se
quence across the screen."
220 PRINT'''"          A.....UP
    <.....LEFT"
230 PRINT'"          Z.....DOWN
  >.....RIGHT"
240 PRINT'"                ?.....D
ROP LOAD"
250PRINT TAB(6,23)CHR$136;CHR$
&85"Press <SPACE> to start"

260REPEATUNTILGET=32
270CLS
280ENDPROC
290DEFPROCvars
300VDU23;8202;0;0;0;
310ENVELOPE2,129,-2,-2,-2,30,0
,0,127,-4,-126,-126,126,0
320 X%=576:Y%=448:L%=3:S%=0:C%
=0:D%=0:V%=0:U%=0:O%=0:H%=20:T%=
1000:G%=1:J%=0:D%=0:R%=0:B%=4000
330DIM A%(11):FORF=1TO11:A%(F)
=1:NEXT
340DIM E1%(8,2):DIM E2%(8,2)
350RESTORE360:FORF=1TO8:READE2
%(F,1),E2%(F,2):NEXT
360DATA0,1,1,1,1,0,1,-1,0,-1,-
1,-1,-1,0,-1,1
370VDU23,226,240,240,240,224,2
24,248,252,255
380VDU23,227,255,252,248,224,2
24,240,240,240
390VDU23,228,240,240,240,224,1
92,192,128,128
400VDU23,229,128,128,192,192,2
24,240,240,240
410VDU23,230,60,66,129,195,255
,255,255,255
420VDU23,231,255,255,255,255,2
55,255,126,60
430VDU23,232,15,15,15,7,7,31,6
3,255
440VDU23,233,255,63,31,7,7,15,
15,15
450VDU23,234,15,15,15,7,3,3,1,
1
460VDU23,235,1,1,3,3,7,15,15,1
5
470VDU23,236,7,127,115,51,63,1
20,120,60
480VDU23,237,224,254,206,204,2
52,30,30,60
490VDU23,238,192,192,192,192,0
,0,0,0
500BLOCK$=CHR$5+CHR$18+CHR$3+C
HR$1+CHR$230+CHR$10+CHR$8+CHR$23
1
510GRAB$=CHR$5+CHR$18+CHR$3+CH
R$1+CHR$236+CHR$237+CHR$4
520LEFT$=CHR$5+CHR$18+CHR$0+CH
R$3+CHR$229+CHR$10+CHR$8+CHR$226
+CHR$10+CHR$8+CHR$227+CHR$10+CHR
$8+CHR$228+CHR$4
530RIGHT$=CHR$5+CHR$18+CHR$0+C
HR$3+CHR$235+CHR$10+CHR$8+CHR$23
2+CHR$10+CHR$8+CHR$233+CHR$10+CH
R$8+CHR$234+CHR$4
540COLOUR2:PRINTTAB(5,0);"BONU
S;"B%
550COLOUR2:PRINTTAB(1,2);"SCOR
E;"S%
560COLOUR2:PRINTTAB(12,2);"LIV
ES;"L%
570VDU5:FORF=288TO288+10*64STE
P64:MOVEF,768
580PRINTBLOCK$
590NEXT
600PROCbw
610VDU31,0,0
620MOVE1216,704:PRINTRIGHT$:MO
VE1216,320:PRINTRIGHT$
630MOVE0,512:PRINTLEFT$
640MOVEX%,Y%:PRINTGRAB$
650DEAD=FALSE
660ENDPROC
670DEFPROCgame
680REPEAT
690VDU4:COLOUR2:PRINTTAB(7,2);
S%
700PROCk
710IFS%>T% THEN T%=T%+1000:L%=
L%+1:COLOUR1:PRINTTAB(18,2);L%
720UNTILDEAD=TRUE
730L%=L%-1
740COLOUR2:PRINTTAB(18,2);L%
750DEAD=FALSE:IFL%>0THEN MOVEX
%,Y%:PRINTGRAB$:GOTO680
760PROCfin
770C%=0
780MOVEX%,Y%:PRINTGRAB$
790DEFPROCpr1
800MOVEM%,K%:PRINTGRAB$:MOVEX%
,Y%
810PRINTGRAB$
820ENDPROC
830DEFPROCpr2
840MOVEM%,K%:PRINTGRAB$:MOVEM%
+32,K%-32:PRINTBLOCK$
850MOVEX%,Y%:PRINTGRAB$:MOVEX%
+32,Y%-32:PRINTBLOCK$
860ENDPROC
870DEFPROCk
880 IFINKEY(-103)THEN IFX%>64
THEN O%=-64
890 IFINKEY(-104)THEN IFX%<108
8 THEN O%=64
900 IFINKEY(-66)THENIFV%<30THE
NV%=V%+10
910 IFINKEY(-98)THENIFV%>-30TH
ENV%=V%-10
920IFINKEY(-105)THENPROCdr
930 IFY%<320THENV%=V%-(15-INT(
Y%/32)):IFSGN(576-X%)=1 THENO%=0
%+64ELSEIFY%<320THENIFSGN(576-X%
)=-1THENO%=O%-64
940 IFSGN(V%)=-1THENIFV%>-2THE
NV%=V%+.3ELSEIFSGN(V%)=1THENIFV%
<2THENV%=V%-.3
950IFSGN(V%)=-1THENV%=V%+2ELSE
```

YOU ARE a hard-working garbage collector whose job is to keep space clear of nuclear waste. At the helm of your inter-galactic garbage ship you must navigate towards the space dump, pick up barrels of waste and deposit them in the black hole beneath you.

Unfortunately you are hampered in your task by laser cannons which have malfunctioned and which fire at you in sequence; also if you get too close to the black hole, you will be sucked into it; if



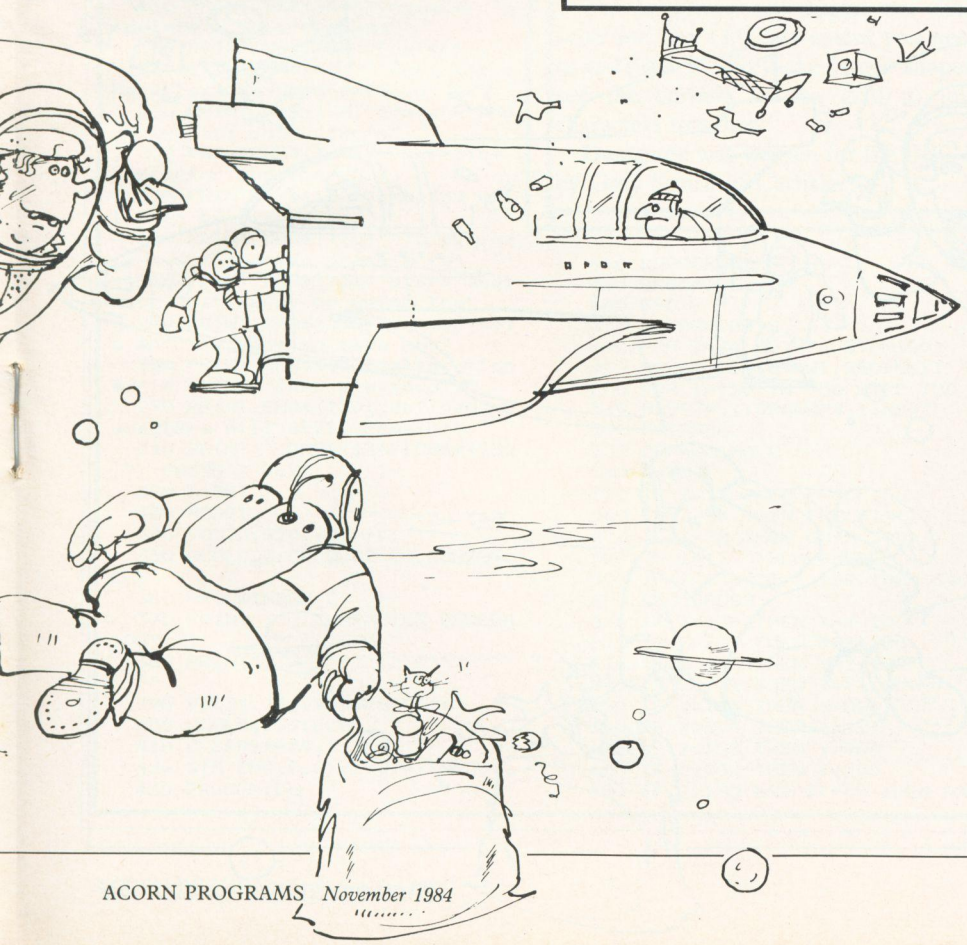
ACTIC RBAGE

you are not close enough you will not be able to drop your barrels.

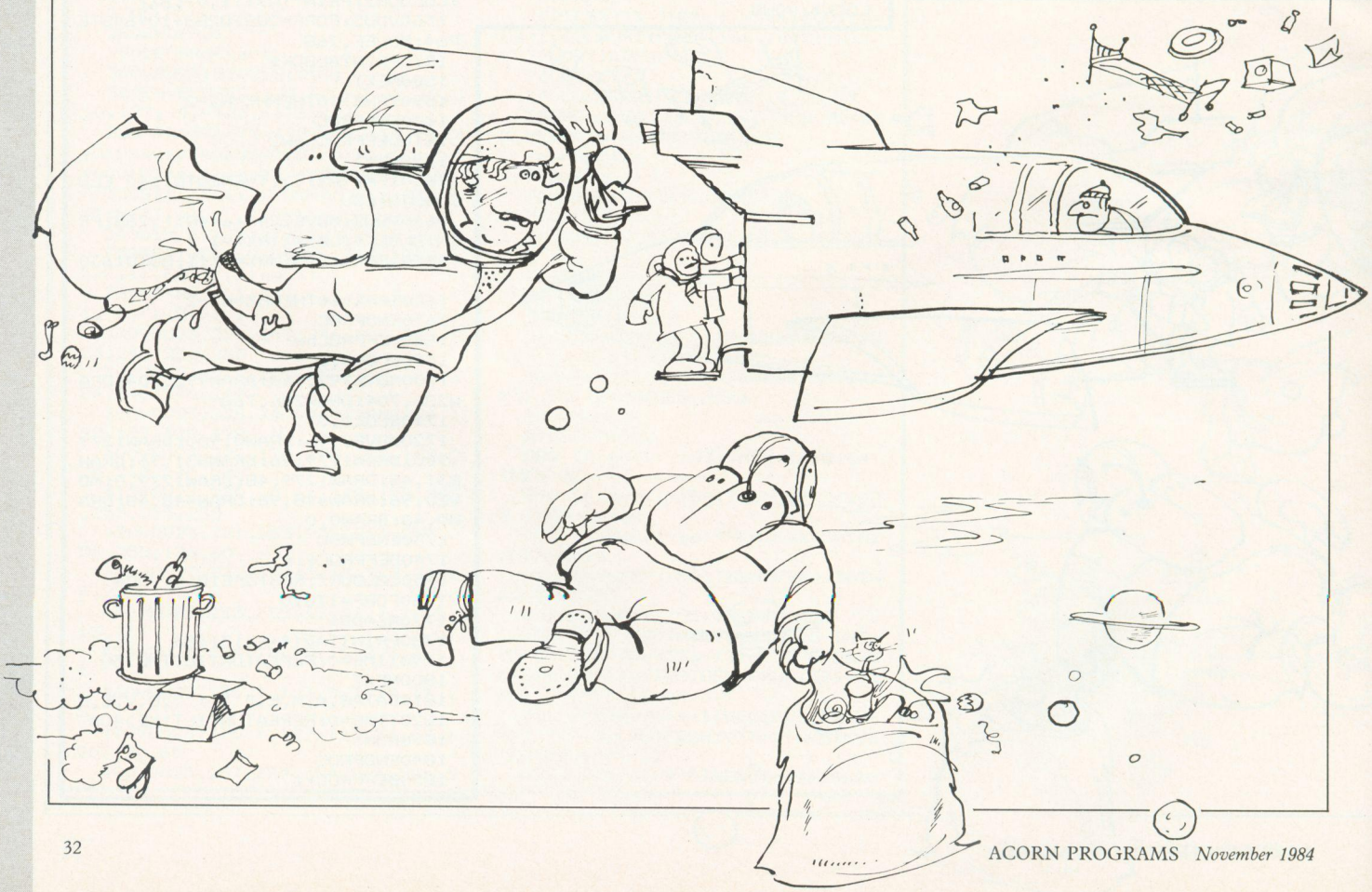
Control keys are A and Z to move up and down, < and > to move left and right, and D to drop a barrel. If your bonus runs out before you have cleared a screen you lose a life, and if you manage to drop all the barrels you move to a new screen where the firing of the laser cannons becomes more frequent.

Galactic Garbage was written for the BBC B by John Gascoyne of Kings Lynn, Norfolk.

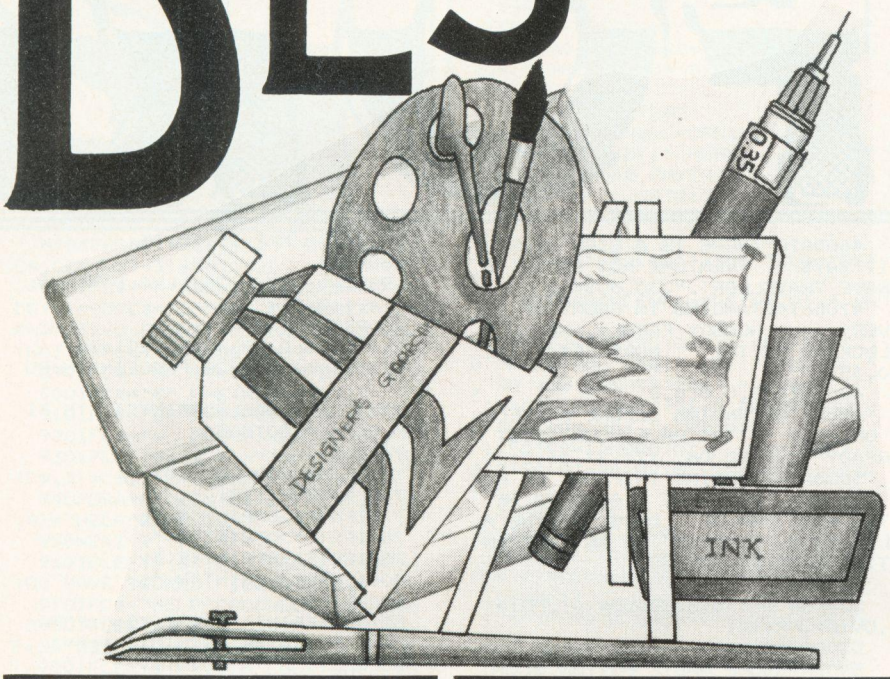
```
IFSGN(V%)=1THENV%=V%-2
  960M%=X%:K%=Y%
  970PROCtu
  980PROCtr
  990PROCtl
 1000PROCtd
 1010IF RND(H%)=1THEN PROCfi
 1020X%=X%+O%:O%=0
 1030Y%=Y%+V%
 1040LETB%=B%-5:VDU4:COLOUR2:PRI
NTTAB(11,0);B%;" ":IFB%=0THENR%=
1:PROCexpl
 1050IFC%=0THEN PROCpr1 ELSE PRO
Cpr2
 1060ENDPROC
 1070DEFPROCexpl
 1080ENVELOPE1,4,0,0,0,0,0,0,126
,-1,-1,-1,126,0:SOUND&10,1,5,200
 1090VDU29,M%;K%;
 1100MOVE0,0:PRINTGRAB$:VDU5
 1110IFC%=1THENMOVE32,-32:PRINTB
LOCK$:VDU5
 1120*FX9,1
 1130*FX10,1
 1140FORF%=1TO20
 1150GCOL3,RND(6)+8
 1160FORG%=1TO8
 1170MOVEE1%(G%,1),E1%(G%,2)
 1180PRINTCHR$238
 1190NEXT
 1200FORG%=1TO8
 1210MOVEE1%(G%,1),E1%(G%,2)
 1220PRINTCHR$238
 1230NEXT
 1240FORG%=1TO8
 1250E1%(G%,1)=E1%(G%,1)+8*(E2%(
G%,1)+RND(3)-2)
 1260E1%(G%,2)=E1%(G%,2)+16*(E2%
(G%,2)+RND(3)-2)
 1270NEXT,
 1280VDU29,0;0;
 1290FORF=1TO8:E1%(F,1)=0:E1%(F,
2)=0:NEXT
 1300IFR%=1THENB%=4000:PROCnew2
 1310X%=576:Y%=448:M%=X%:K%=Y%:V
%=0:O%=0:C%=0:G%=1
 1320VDU4:DEAD=TRUE:ENDPROC
 1330DEFPROCdel
 1340C%=1
 1350MOVEM%+32,K%-32:PRINTBLOCK$
 1360MOVEX%+32,Y%-32:PRINTBLOCK$
 1370A%(((X%-256)/64)+1)=0
 1380ENDPROC
 1390DEFPROCdr
 1400 IF C%=0 OR X%>766 OR X%<38
5 OR Y%>400 THEN ENDPROC
 1410MOVEX%+32,Y%-32:PRINTBLOCK$
 1420C%=0
 1430FORF=Y%-32TO32STEP-32
 1440MOVEX%+32,F:PRINTBLOCK$
 1450TIME=0:REPEATUNTILTIME>F DI
V50
 1460MOVEX%+32,F:PRINTBLOCK$
 1470NEXT
 1480S%=S%+10
 1490T=0:FORF%=1TO11:IFA%(F%)<>0
THENT=1
 1500NEXT
 1510IFT=0THENPROCnew
 1520ENDPROC
 1530DEFPROCnew
 1540FORF%=1TO11:A%(F%)=1:NEXT
 1550S%=S%+50+B%:LETB%=4000:VDU4
:COLOUR2:PRINTTAB(11,0);B%;" "
 1560VDU5:FORF=288TO288+10*64STE
P64:MOVEF,768
 1570PRINTBLOCK$
 1580NEXT
 1590IFH%>10THENH%=H%-2
 1600ENDPROC
 1610DEFPROCnew2
 1620U%=1
 1630IFA%(R%)<>1THENGOTO1640 ELS
E GOTO1650
 1640VDU5:MOVE224+(64*R%),768:PR
INTBLOCK$:LETA%(R%)=1
 1650IFR%<11THENR%=R%+1:GOTO1630

 1660IFH%>10THENH%=H%-2
 1670ENDPROC
 1680DEFPROCbw
 1690GCOL0,2
 1700MOVE992,768:DRAW992,704:DRA
W286,704:DRAW286,768
 1710GCOL0,3
 1720MOVE0,96:DRAW0,900:DRAW1279
,900:DRAW1279,96:DRAW831,96:DRAW
831,48:DRAW1279,48:DRAW1279,0:MO
VE0,96:DRAW448,96:DRAW448,48:DRA
W0,48:DRAW0,0
 1730ENDPROC
 1740DEFPROCfin
 1750COLOUR2:RESTORE1810:VDU4
 1760FORF=1TO10
 1770READB$
 1780PRINTTAB(4+F,13);B$
 1790TIME=0:REPEATUNTILTIME>50
 1800NEXT
 1810DATAG,A,M,E," "," ",O,V,E,R
 1820TIME=0:REPEATUNTILTIME>400
 1830RUN
 1840ENDPROC
 1850DEFPROCfi
```



```
1860IFG%=1THENGOTO1900
1870IFJ%=1THENGOTO1980
1880IFD%=1THENGOTO2070
1890ENDPROC
1900GCOL3,5
1910MOVE64,448:PLOT21,1279,448
1920SOUND&11,2,200,20
1930*FX19
1940MOVE64,448:PLOT21,1279,448
1950IFY%>448THENIFY%-32<448THEN
GOTO2150
1960IFC%=1THENIFY%>448THENIFY%-
96<448THENGOTO2150
1970G%=0:J%=1:GOTO1890
1980GCOL3,5
1990MOVE1216,642:PLOT21,0,642
2000SOUND&11,2,200,20
2010*FX19
2020MOVE1216,642:PLOT21,0,642
2030IFY%>642THENIFY%-32<642THEN
GOTO2150
2040IFC%=1THENIFY%>642THENIFY%-
96<642THENGOTO2150
2050J%=0:D%=1
2060GOTO1890
2070GCOL3,5
2080MOVE1216,262:PLOT21,0,262
2090SOUND&11,2,200,20
2100*FX19
2110MOVE1216,262:PLOT21,0,262
2120IFY%>262THENIFY%-32<262THEN
GOTO2150
2130IFC%=1THENIFY%>262THENIFY%-
96<262THENGOTO2150
2140D%=0:G%=1:GOTO1890
2150PROCexpl:GOTO1890
2160DEFPROCtu
2170IFSGN(V%)=-1 THEN ENDPROC
2180IF ((Y%+V%>=700 AND Y%+V%<7
36) AND (X%<992 AND X%>160)) OR
(Y%+V%>=896) THEN IF V%>26 THEN
PROCexpl
2190IFY%+V%>=896 THEN Y%=896:V%
=0
2200IF (Y%+V%>=700 AND Y%+V%<73
6) AND (X%<992 AND X%>160) THEN
Y%=700:V%=0
2210ENDPROC
2220DEFPROCtr
2230IFSGN(O%)=-1THEN ENDPROC
2240IF C%=1THENIF (X%+O%>128 AN
D X%+O%<256) AND (Y%>700 AND Y%<
864) THEN X%=128:O%=0
2250IF (X%+O%>128 AND X%+O%<256
) AND (Y%>700 AND Y%<800) THEN X
%=128:O%=0
2260IFC%=1 THEN IF (Y%+V%>700 A
ND Y%+V%<864) THEN IF (X%>=256 A
ND X%<=832) THEN IF A%(((X%-256)
/64)+2)=1 THEN O%=0
2270IFC%=1 THEN IF (X%>832 AND
X%<=960) THEN IF (Y%+V%>700 AND
Y%+V%<864) THEN IF ((X%-256)/64)
=10 THEN O%=0
2280IFC%=0THEN IF (Y%>700 AND Y
%<=790) THEN IF (X%+O%>=832 AND
X%<=960) THEN X%=832:O%=0
2290IFC%=0THEN IF (Y%>700 AND Y
%<=790) THEN IF (X%+O%>=768 AND
X%<=832) THEN IF A%(((X%-256)/64
)+2)=1 THEN X%=768:O%=0
2300 IF (Y%+V%>700 AND Y%+V%<=7
90) THEN IF (X%+O%>256 AND X%+O%
<769) THEN IF A%(((X%-256)/64)+3
)=1 THEN O%=0
2310ENDPROC
2320DEFPROCtl
2330IFSGN(O%)=1 THEN ENDPROC
2340IF C%=1 THEN IF (X%+O%>896
AND X%+O%<1024) AND (Y%>700 AND
Y%<864) THEN X%=1024:O%=0
2350IF (X%+O%>864 AND X%+O%<102
4) AND (Y%>700 AND Y%<800) THEN
X%=1024:O%=0
2360IF C%=1 THEN IF (Y%+V%>700
AND Y%+V%<864) THEN IF (X%>256 A
ND X%<=896) THEN IF A%((X%-256)/
64)=1 THEN O%=0
2370IF C%=1 THEN IF (Y%+V%>700
AND Y%+V%<864) THEN IF (X%>=256
AND X%<=320) THEN IF ((X%-256)/6
4)=0 THEN O%=0
2380IF C%=0 THEN IF (Y%>700 AND
Y%<=790) THEN IF (X%+O%>=256 AN
D X%+O%<=384) THEN IF A%(((X%-25
6)/64)-1)=1 THEN X%=384:O%=0
2390IF C%=0 THEN IF (Y%>700 AND
Y%<=790) THEN IF (X%+O%>=256 AN
D X%+O%<=320) THEN X%=320:O%=0
2400IF (Y%+V%>700 AND Y%+V%<790
) THEN IF (X%+O%>256 AND X%+O%<=
896) THEN IF A%(((X%-256)/64)-1)
=1 THEN O%=0
2410ENDPROC
2420DEFPROCtd
2430IFSGN(V%)<>-1 THEN ENDPROC
2440IFC%=0 THEN IF Y%+V%<=122 A
ND (X%<488 OR X%>831) AND V%<-26
THEN PROCexpl
2450IFC%=1 THEN IF Y%+V%<=186 A
ND (X%<488 OR X%>831) AND V%<-26
THEN PROCexpl
2460IF Y%<-50 THEN PROCexpl
2470 IF C%=0 THEN IF (Y%+V%>700
AND Y%+V%<=800) THEN IF (((X%-2
56)/64)=0 OR ((X%-256)/64)=10) T
HEN IF A%(((X%-256)/64)+1)=0 THE
N Y%=800:V%=0
2480IF C%=0 THEN IF (Y%+V%>700
AND Y%+V%<=800) THEN IF (((X%-25
6)/64)=-1 OR ((X%-256)/64)=11) T
HEN Y%=800:V%=0
2490IF C%=1 THEN IF (Y%+V%>700
AND Y%+V%<864) THEN IF (((X%-256
)/64)=-1 OR ((X%-256)/64)=11) TH
EN Y%=864:V%=0
2500IF C%=0 THEN IF (Y%+V%<=800
AND Y%+V%>700) THEN IF (X%+O%>=
256 AND X%+O%<=900) THEN IF A%((
(X%-256)/64)+1)=1 THEN Y%=800:V%
=0:O%=0:PROCdel
2510IF C%=1 THEN IF (Y%+V%<864
AND Y%+V%>700) THEN IF (X%+O%>=2
56 AND X%+O%<=900) THEN IF A%(((
X%-256)/64)+1)=1 THEN Y%=864:V%=
0
2520IF C%=1 THEN IF (Y%+V%<800
AND Y%+V%>700) THEN IF (X%+O%<=9
60 AND X%+O%>=256) THEN Y%=800:V
%=0
2530IF C%=0 THEN IF (Y%+V%>700
AND Y%+V%<800) THEN IF (X%+O%>25
6 AND X%+O%<960) THEN IF (A%(((X%
-256)/64)=1 OR A%(((X%-256)/64)+
2)=1) THEN Y%=800:V%=0
2540IF(Y%+V%<736 AND Y%+V%>700)
AND (X%+O%>256 AND X%+O%<960) T
HEN Y%=736:V%=0
2550ENDPROC
```



DESIGNER



DESIGNER is the program you need to help you create the graphics in your programs. On an 8 × 8 grid, design the shape you want by moving a cross with the cursor keys and pressing RETURN to fill a square. When you have completed the shape, press F and then enter any number between 224 and 255, the spare numbers in the ASCII code.

The computer will display the character and the VDU statement you need to re-create it. To make larger shapes, use the corners of the grid to join characters together.

Designer was written for the BBC B by Gary Smith of Carlisle.

```
  110 MODE7
  120 PRINT
  130 VDU23;8202;0;0;0;
  140 ON ERROR RUN
  150 PRINTCHR$(141);CHR$(157);C
HR$(129);CHR$(136)"          INST
RUCTIONS"
  160 PRINTCHR$(141);CHR$(157);C
HR$(129);CHR$(136)"          INST
RUCTIONS"'''
  170PRINT CHR$(130)" Use the cu
rsor keys to move the cross"
  180 PRINTCHR$(130)"around the
grid.To fill a square press"
  190 PRINTCHR$(130)"<return>.To
 delete a square press"
  200 PRINTCHR$(130)"<delete>."
  210 PRINTCHR$(130)" Once the c
haracter has been defined"
  220 PRINTCHR$(130)"press'F'and
 enter the character's"
  230 PRINTCHR$(130)"number.The
character and the VDU"
  240 PRINTCHR$(130)"command wil
l then be displayed."
  250 PRINT CHR$(130)" To define
 a new character press'N'to"
  260 PRINT CHR$(130)"start agai
n or just carry on using the"
  270 PRINT CHR$(130)"cursor key
s and <return> to make any"
  280 PRINT CHR$(130)"alteration
s.(in either case previously"
  290 PRINT CHR$(130)"defined ch
aracters will still remain)"
  310 PRINT'''CHR$(136);CHR$(132
)"  PRESS A KEY"
  320 A=GET
  330 MODE1
  340 VDU23;8202;0;0;0;
  350 GCOL0,2:COLOUR2:COLOUR129:
CLS
  360 PROCWINDOW_C
  370 PRINT"     CHARACTER GENERA
TOR"
  380 PRINT"     ~~~~~~~~~~~~~~~
~~~"
  390 VDU24,74;149;875;951;
  400 GCOL0,129:CLG
  410 CLEAR:*FX4,1
  420 DIM CHR(8,8):X=824:Y=900
  430 PROCGRID
  440 PROCCROSS
  450 PROCMOVE
  460 END
  470 DEFPROCGRID
  480 FOR I=74 TO 874 STEP100
  490 MOVEI,150:DRAWI,950:NEXT
  500 FOR I=150 TO 950 STEP 100
  510 MOVE74,I:DRAW874,I:NEXT
  520 ENDPROC
  530 DEFPROCMOVE
  540 Z=GET
  550 IF Z=13 THEN PROCFILL
  560 IF Z=70 THEN PROCFIN
  570 IF Z=78 THEN GOTO 390
  580 IF Z=127 THENPROCDEL
  590 IF Z<136 OR Z>139 THEN 540
  600 PROCCROSS
  610 IF Z=136 THEN X=X-100
  620 IF Z=137 THEN X=X+100
  630 IF Z=138 THEN Y=Y-100
  640 IF Z=139 THEN Y=Y+100
  650 IF X<124 THEN X=824
  660 IF X>824 THEN X=124
  670 IF Y<200 THEN Y=900
  680 IF Y>900 THEN Y=200
  690 IF Z>135 AND Z<140 THEN PR
OCCROSS
  700 GOTO540
  710 ENDPROC
  720 DEFPROCFILL
  730 GCOL0,0:MOVEX,Y
  740 PLOT0,-50,-50:PLOT0,100,0:
PLOT81,0,100:PLOT0,-100,0:PLOT81
,0,-100
  750  GCOL0,2:PLOT1,100,0:PLOT1
,0,100:PLOT1,-100,0:PLOT1,0,-100
:MOVEX,Y
  760 PROCCROSS
  770 PROCEVAL
  780 ENDPROC
  790 DEFPROCDEL
  800 GCOL0,1:MOVEX,Y
  810 PLOT0,-50,-50:PLOT0,100,0:
PLOT81,0,100:PLOT0,-100,0:PLOT81
,0,-100
  820 GCOL0,2:PLOT1,100,0:PLOT1,
0,100:PLOT1,-100,0:PLOT1,0,-100:
MOVEX,Y
  830 PROCCROSS
  840 PROCCLEAR
  850 ENDPROC
  860 DEFPROCCROSS
  870 GCOL3,2:MOVEX,Y
  880 PLOT0,-50,-50:PLOT1,100,10
0:PLOT0,-100,0:PLOT1,100,-100:MO
VEX,Y
  890 ENDPROC
  900 DEFPROCEVAL
  910 K=(X-24)/100:L=(Y-100)/100
  920 N=256
  930 FOR M=1 TO K
  940 O=N/2
  950 N=O
  960 NEXT
  970 IF CHR(K,L)>0 THEN990
  980 CHR(K,L)=N
  990 ENDPROC
 1000 DEFPROCCLEAR
 1010 K=(X-24)/100:L=(Y-100)/100

 1020 CHR(K,L)=0
 1030 ENDPROC
 1040 DEFPROCFIN
 1050 PROCWINDOW_B
 1060 CLS
 1070 PRINT"Character number (22
4-255)":INPUTNO
 1080 IF NO<224 OR NO>255 THEN 1
060
 1090 FOR W=8 TO 1 STEP -1
 1100 V=0
 1110 FOR I= 1 TO 8
 1120 U=CHR(I,W)
 1130 V=V+U
 1140 NEXT
 1150 IF W=8 THEN A=V
 1160 IF W=7 THEN B=V
 1170 IF W=6 THEN C=V
 1180 IF W=5 THEN D=V
 1190 IF W=4 THEN E=V
 1200 IF W=3 THEN F=V
 1210 IF W=2 THEN G=V
 1220 IF W=1 THEN H=V
 1230 NEXT
 1240 PRINT"VDU23,";NO;",";A;","
;B;",";C;",";D;",";E;",";F;",";G
;",";H
 1250 PROCSTORE
 1260 ENDPROC
 1270 DEFPROCWINDOW_A
 1280 VDU28,28,30,39,1
 1290 ENDPROC
 1300 DEFPROCWINDOW_B
 1310 VDU28,0,31,39,28
 1320 ENDPROC
 1330 DEFPROCWINDOW_C
 1340 VDU28,1,2,27,0
 1350 ENDPROC
 1360 DEFPROCSTORE
 1370 PROCWINDOW_A
 1380 PRINT'''"Plus 0 ! 1":PRINT
"_______!___":PRINT"        !"
 1390 VDU23,NO,A,B,C,D,E,F,G,H
 1400 FOR I=224 TO 255 STEP2
 1410 PRINT" ";I;" ";CHR$(I);" !
";CHR$(I+1)
 1420 NEXT
 1430 ENDPROC
```

FORE

```
   10REM "= = = = F O R E S T =
 = = =
   20REM "= =  A D V E N T U R
E  = =
   30REM "= =  (c) Tim Meek 198
3  = =
   40REM "10, Mossop Drive,
   50REM "Langtoft,
   60REM "PETERBOROUGH,
   70REM "PE6 9LY
   80REM "Tel. (0778) 345142
   90
  100MODE7
  110*K.100.|MRU.|M
  120ONERROR GOTO730
  130DIMD$(36),N(36),E(36),S(36)
,W(36),D(36),O$(16),PO(16),OV(16
),PR$(16)
  140FORA=1TO36:READD$(A),N(A),E
(A),S(A),W(A)
  150DATAON A SLIPPERY MOSS COVE
RED SLOPE.,5,2,17,0
  160DATAAT A DOOR MARKED 'EXIT'
.,0,3,18,1
  170DATAIN A TUNNEL WITH AN UNC
OMFORTABLYLOW ROOF.,0,4,0,2
  180DATAIN A TUNNEL WITH AN UNC
OMFORTABLYLOW ROOF.,8,0,0,3
  190DATASTANDING IN A HERB PATC
H.,9,6,1,0
  200DATAON A LARGE PATCH OF WAS
TE GROUND.,10,7,0,5
  210DATA"STANDING BY A OLD TREE
 WITH       'TIM WOZ ERE, 22/7/83
' CARVED INTO THE  BARK.",11,0,0
,6
  220DATAIN A TUNNEL WITH AN UNC
OMFORTABLYLOW ROOF.,12,0,4,0
  230DATASTANDING ON A SMALL PIL
E OF       RUBBISH WHICH CONSISTS
 MAINLY OF SMALL  BOTTLES.,13,0,
5,0
  240DATA"ON A BRIDGE, LOOKING O
VER THE    RIVER.",14,0,6,0
  250DATA"STANDING IN THE RIVER,
 AND       GETTING RATHER WET!",
0,12,7,0
  260DATAON A PIECE OF OPEN GROU
ND.,16,0,8,11
  270DATAIN THE EVIL WIZARD'S CA
VE.        LUCKILY HE'S NOT AT HO
ME.,0,14,9,0
  280DATASTANDING IN THE TARANTU
LA PIT.   EVERYTHING IS COVERED
BY SPIDERS.,0,15,10,13
  290DATAIN AN EMPTY BEAR'S CAVE
.,0,0,0,14
  300DATASTANDING ON A PILE OF B
ONES.,0,29,12,0
  310DATASTANDING UNDER A CASCAD
ING        WATERFALL WHICH FLOWS
INTO A POOL.,0,0,23,0
  320DATAIN A COUNTRY LANE.,2,0,
24,0
  330DATAWALKING DOWN A PATH.,0,
20,25,0
  340DATAWALKING DOWN A PATH.,0,
21,0,19
  350DATAAT A CROSSROADS.,35,22,
27,20
  360DATASTANDING BY A SIGN WHIC
H SAYS     'EVIL GO NO FURTHER'.,
36,0,0,21
  370DATANEXT TO A ROCKY POOL.,1
7,0,0,0
  380DATAOUTSIDE A LITTLE COTTAG
E.,18,25,0,0
  390DATAIN A GARDEN.,19,26,0,24
  400DATAIN A SMALL POTTING SHED
.,0,0,0,25
  410DATASTANDING IN A SECLUDED
SPOT.,21,0,0,0
  420DATAAT THE GOOD WIZARD'S CA
VE.,22,0,0,27
  430DATAIN A DARK ALLEY WAY.,0,
30,0,16
  440DATAIN A DARK ALLEY WAY.,0,
0,32,29
  450DATAAMONGST THE SHELVES IN
THE        FARGLY'S STORE.,0,0,33
,0
  460DATA"THERE IS A SIGN HERE.
IT SAYS     'VENTURE NOT SOUTH, B
RAVE TRAVELLER'.",30,0,34,0
  470DATASTANDING IN FRONT OF A
VERY       HUNGRY FARGLY. HE IS B
LOCKING OF THE     NORTH EXIT.,0,
0,35,0
  480DATA"",0,0,0,0
  490DATASTANDING BEFORE A PIECE
 OF WOOD  WITH 'HAVE YOUR IDIOT
READY' CARVED ON  IT.,33,36,21,0
  500DATASTANDING IN FRONT OF AN
 OLD MAN  HERE. HE CLAIMS TO BE
THE WISE MAN OF   DARG (?). HE A
LSO SAYS 'FALLOOM' IS AN  ENCHAN
TING WORD,0,0,22,35
  510NEXT
  520FOR A=1TO15:READO$(A),PO(A)
,OV(A),PR$(A)
  530DATAA MAGIC WAND,23,100,IT
  540DATASOME MAGIC POTION,31,10
0,IT
  550DATAA BAG OF DEAD FLIES.6,0
,THEM
  560DATAA MAGIC HAT,3,100,IT
  570DATAAN IDIOT,18,0,HIM
  580DATAA MAGIC SPELLBOOK,37,10
0,IT
  590DATAA MAGIC SPOON,26,100,IT
  600DATAA LAMP,21,50,IT
  610DATAA PAIR OF DARK GLASSES,
13,15,THEM
  620DATAA BUNCH OF THYME,5,10,I
T
  630DATAA SHARP KNIFE,12,35,IT
  640DATAA BROKEN TORCH,30,5,IT
  650DATAA BROKEN BUCKET,20,10,I
T
  660DATASOME GRASS SEED,25,10,I
T
  670DATAA MAP,28,75,IT
  680NEXT
  690SC=0:T=0:P=28:LL=0:D(3)=-1:
D(4)=-1:D(8)=-1
  700PROCTITLE
  710IFT=5 E(27)=28:S(22)=28
  720IFT=5AND P=28 PROCFINISH:RU
N
  730IFD(P)ANDLL=0PRINT"IT IS PI
TCH DARK.":GOTO850
  740CLS
  750PRINT"YOU'RE ";D$(P)
  760PRINT"EXITS: ";
  770IFN(P)>0PRINT"N ";
  780IFS(P)>0PRINT"S ";
  790IFE(P)>0PRINT"E ";
  800IFW(P)>0PRINT"W ";
  810PRINT
  820B=0:PRINT'"THERE IS:":FORA=
1TO15:IFPO(A)=P PRINTO$(A):B=1
  830NEXT
  840IFB=0 PRINT"NOTHING"
  850INPUTC$:PRINT
  860IFLEFT$(C$,1)=" "C$=RIGHT$(
C$,LEN(C$)-1):GOTO860
```

YOU WILL need to keep your wits about you if you embark on **Forest,** an adventure written for the BBC B by Tim Meek of Peterborough.

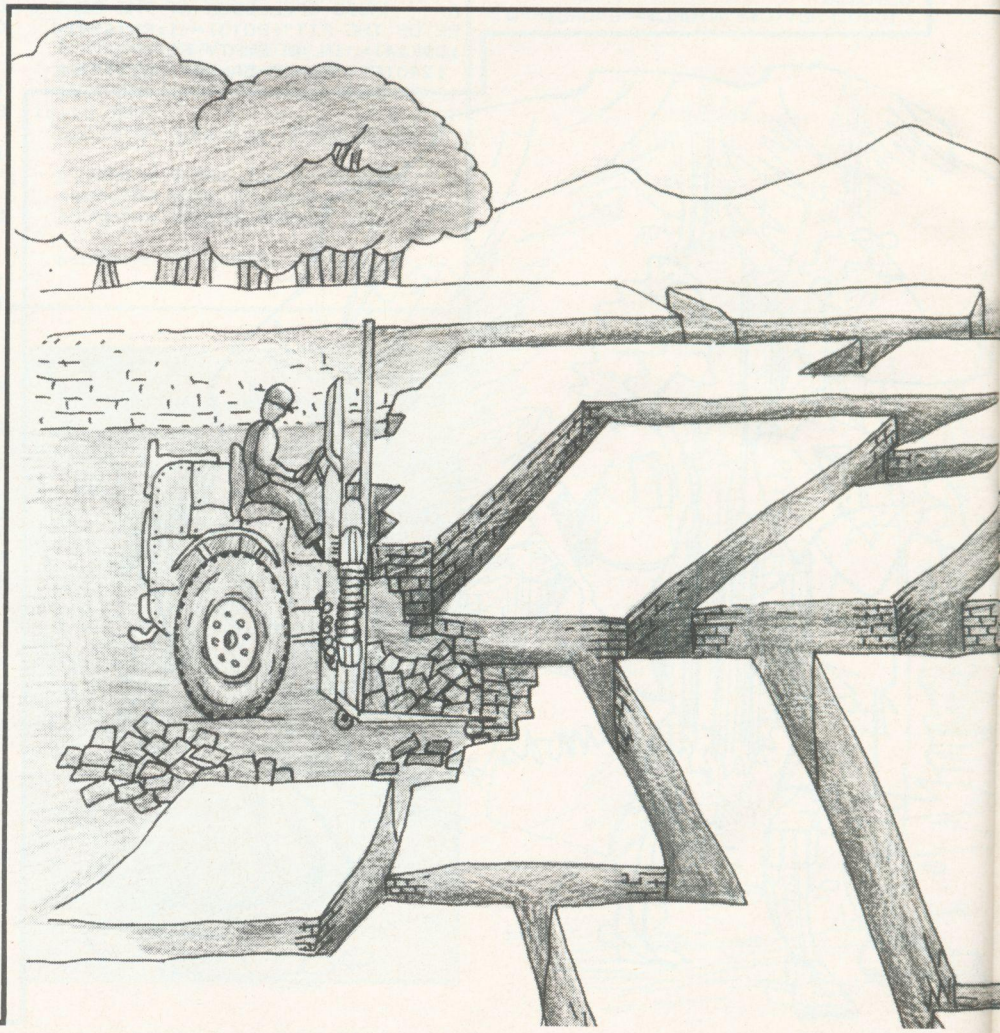
Starting in the Good Wizard's cave, your mission is to venture into the woods and collect the five magic items which the absent-minded old fool has lost. If you return without them, he will not let you back into his cave, but if you succeed in your quest you will be rewarded with a bag of gold.

As in any self-respecting adventure, there are certain paths to follow, useful objects to be picked up, and dangers such as the dreaded fargly to be confronted. The computer understands simple commands including N, S, E and W for directions and words like take, get, look and drop.

```
 870IFRIGHT$(C$,1)=" "C$=LEFT$(
C$,LEN(C$)-1):GOTO870
 880IFC$="N"ANDN(P)=0ORC$="E"AN
DE(P)=0ORC$="S"ANDS(P)=0ORC$="W"
ANDW(P)=0 PRINT"YOU CAN'T GO IN
THAT DIRECTION":GOTO850
 890IFC$="N" P=N(P):GOTO710
 900IFC$="E" P=E(P):GOTO710
 910IFC$="S" P=S(P):GOTO710
 920IFC$="W" P=W(P):GOTO710
 930IFLEFT$(C$,4)="TAKE"ORLEFT$
(C$,3)="GET"PROCTAKE:GOTO850
 940FORA=0TOLEN(C$):IFMID$(C$,A
,4)="HELP"C$="HELP"
 950NEXT
 960IFLEFT$(C$,5)="SCORE"PRINT"
YOU HAVE SCORED ";SC:GOTO850
 970IFC$="HELP"PROCHELP:GOTO850
 980IFLEFT$(C$,4)="DROP"PROCDRO
P:GOTO850
 990IFLEFT$(C$,4)="LOOK"GOTO710
 1000IFLEFT$(C$,4)="WAVE"ORC$="F
ALLOOM"PROCMAGIC:GOTO850
 1010IFLEFT$(C$,4)="LAMP"PROCLAM
P:GOTO850
 1020IFLEFT$(C$,3)="INV"PROCINV:
GOTO850
 1030IFNOT(C$="N"ORC$="E"ORC$="W
"ORC$="S"ORLEFT$(C$,4)="TAKE"ORL
EFT$(C$,3)="GET"ORLEFT$(C$,3)="I
NV"ORLEFT$(C$,4)="LOOK"ORLEFT$(C
$,4)="DROP"ORLEFT$(C$,4)="LAMP"O
RC$="HELP")PRINT"HUH?":GOTO850
 1040END
 1050DEFPROCTAKE
 1060A=0:O=0:FORB=1TO15:IFRIGHT$
(C$,4)=RIGHT$(O$(B),4)A=1:O=B
 1070NEXT
 1080PR$(0)="THAT"
 1090IFD(P)ANDLL=0PRINT"YOU CAN'
T SEE ";PR$(0);" HERE, INFACT"'"
YOU CAN'T SEE ANYTHING - IT'S PI
TCH"'"DARK!":GOTO1250
 1100IFLEFT$(C$,4)="TAKE"CO$="TA
KE"
 1110IFLEFT$(C$,3)="GET"CO$="GET
"
 1120IFA=0ORLENC$=4PRINTCO$;" WH
AT?"
 1130IFA=1ANDPO(O)<>P ANDPO(O)<>
0 PRINT"YOU CAN'T SEE ";PR$(O);"
, SO YOU CAN'T"'CO$" "PR$(O)
 1140IFA=1ANDPO(O)=0 PRINT"YOU'V
E ALREADY GOT ";PR$(O)
 1150IFA=1ANDPO(O)=P PRINT"OK":P
O(O)=0:SC=SC+OV(O):IFOV(O)=100T=
T+1
 1160ENDPROC
 1170DEFPROCDROP
 1180A=0:O=0:FORB=1TO15:IFRIGHT$
(C$,4)=RIGHT$(O$(B),4)A=1:O=B
 1190NEXT
 1200IFA=0ORLENC$=4PRINT"DROP WH
AT?"
 1210IFA=1ANDPO(O)<>0 PRINT"YOU'
RE NOT CARRYING ";PR$(O)
 1220IFA=1ANDPO(O)=0 PRINT"OK":P
O(O)=P:SC=SC-OV(O):IFOV(O)=100T=
T-1
 1230IFA=1ANDO=3ANDP=14PRINT"THE
 SPIDERS SCUTTLE AWAY TO REVEAL
A    MAGIC SPELLBOOK AT THE CENT
RE OF THE PIT":PO(3)=-1:PO(6)=14
:D$(14)="IN AN EMPTY PIT."
 1240IFP=33ANDO=5ANDA=1PRINT"THE
 FARGLY HAS EATEN THE IDIOT, AND
 SAYSYOU CAN GO NORTH IF YOU WAN
T TO.":PO(5)=-1:D$(33)="STANDING
 IN FRONT OF A VERY TALL FARGLY.
":N(33)=31
 1250ENDPROC
 1260DEFPROCINV
 1270PRINT"YOU'RE CARRYING:"
 1280A=0:FORB=1TO15:IFPO(B)=0PRI
NTO$(B):A=1
 1290NEXT
 1300IFA=0PRINT"NOTHING"
 1310ENDPROC
 1320DEFPROCLAMP
 1330IFRIGHT$(C$,2)="ON"ANDPO(8)
=0ANDLL=1PRINT"IT'S ALREADY ON."
 1340IFRIGHT$(C$,2)="ON"ANDPO(8)
=0ANDLL=0PRINT"OK.":LL=1
 1350IFRIGHT$(C$,3)="OFF"ANDPO(8
)=0ANDLL=0PRINT"IT'S ALREADY OFF
."
 1360IFRIGHT$(C$,3)="OFF"ANDPO(8
)=0ANDLL=1PRINT"OK.":LL=0
 1370IFPO(8)<>0 PRINT "YOU'RE NO
T CARRYING IT"'
 1380IFLEN(C$)=4ANDPO(8)=0ORRIGH
T$(C$,2)<>"ON"ANDRIGHT$(C$,3)<>"
OFF"PRINT"HUH?"
 1390ENDPROC
 1400DEFPROCHELP
 1410IFP=14PRINT"WHAT DO SPIDERS
 LIKE TO EAT?":GOTO1450
 1420IFP=23ORP=17PRINT"TRY MAGIC
.":GOTO1450
 1430IFP=33ANDN(33)=0PRINT"MY DI
CTIONARY SAYS:"'"farg'ly, n. fic
ticious forest dweller,  partial
 to idiots.":GOTO1450
 1440PRINT"SORRY, I'M AS LOST AS
 YOU ARE, MATE!"
 1450ENDPROC
 1460DEFPROCMAGIC
 1470IFP<>17ANDP<>23ANDC$="FALLO
OM"PRINT"NOTHING HAPPENS":GOTO15
00
 1480IFC$="FALLOOM"GOTO1500
 1490IFRIGHT$(C$,4)="WAND"ANDP<>
17ANDP<>23ANDPO(1)=0PRINT"NOTHIN
G HAPPENS"
 1500IFRIGHT$(C$,4)="WAND"ANDPO(
1)=0AND(P=17ORP=23)ORC$="FALLOOM
"AND(P=17ORP=23)PRINT"THERE IS A
 BLINDING FLASH, AND YOU      SU
DDENLY FIND YOURSELF BACK ON THE
      SLIPPERY SLOPE.":P=1
 1510IFRIGHT$(C$,4)="WAND"ANDPO(
1)<>0 PRINT"YOU'RE NOT CARRYING
IT"
 1520ENDPROC
 1530DEFPROCTITLE
 1540FORA=1TO2:PRINTTAB(9,1+A)CH
R$141"FOREST ADVENTURE":NEXT
 1550FORA=1TO2:PRINTTAB(8,3+A)CH
R$141"(c)  Tim Meek 1983":NEXT
 1560PRINT"HELLO. AT THE MOMENT
YOU'RE IN A GOOD   WIZARD'S CAVE
. THE ABSENT MINDED FOOL   HAS L
OST FIVE OF HIS MAGIC ITEMS. WHA
T  YOU MUST DO IS TO FIND THEM A
ND BRING   THEM BACK TO HIM AT H
IS CAVE. HE SAYS HEWON'T LET YOU
 BACK IN HIS CAVE";
 1570PRINT" UNLESS   YOU HAVE AL
L FIVE ITEMS WITH YOU."'"SO.....
HAPPY HUNTING!"
 1580PRINT'''TAB(6)"PRESS SPACE
TO CONTINUE":REPEAT
UNTILGET$=" ":CLS
 1590ENDPROC
 1600DEFPROCFINISH
 1610CLS:PRINT'''TAB(9)"WELL D
ONE !"'"YOU HAVE SUCCESSFULLY C
OMPLETED THE      FOREST ADVENTUR
E. THE WIZARD HAS          REWARDE
D YOU WITH A BAG FULL OF GOLD
 PIECES."'"WOULD YOU LIKE TO PLA
Y AGAIN ?"
 1620REPEATA$=GET$:UNTILA$="N"OR
A$="n"ORA$="Y"ORA$="y"
 1630IFA$="N"ORA$="n"END
 1640IFA$="Y"ORA$="y"ENDPROC
```

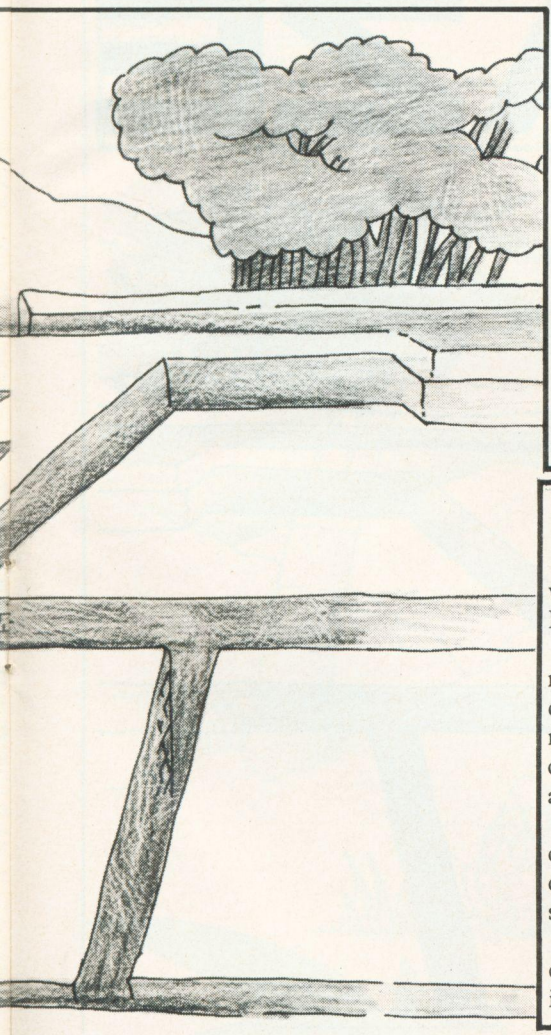
MOVING

```
   10 ON ERROR IF ERR=17 S%=0:H%
=0:GOTO 1040 ELSE MODE7:REPORT:P
RINT" at line ":ERL:STOP
   20 REM  MOVING MAZE  By Gary
Pilbrow
   30 REM  ********************
*******
   40 REM  PRINT FIRST PAGE
   50 REM  ================
   60 T%=0
   70 MODE7
   80 PRINT'
   90 FOR G%=1 TO 2
  100 PRINTTAB(10);CHR$141;CHR$1
31;CHR$157;CHR$129;"MOVING MAZE
 ";CHR$156
  110 NEXT G%
  120 PRINT''"Battle your way up
wards through the     constantly
 changing maze to the RED DOT at
 the top of the screen,and then
down  again to the bottom of the
 screen to    restart on the nex
t level."
  130 PRINT'"Points are scorded
for each RED DOT hit which incre
ases on each level attained."
  140 PRINT'"Control your ship t
hrough the maze,but  DO NOT touc
h anything WHITE,or you will
           EXPLODE!"
  150 PRINT'"   To abort the gam
e press ESCAPE."
  160 FOR G%=5 TO 15
  170 SOUND1,G%-20,G%*10,1
  180 SOUND1,G%-20,G%*10+48,1
  190 SOUND1,G%-20,G%*10+96,1
  200 NEXT G%
  210 PRINT''TAB(5);CHR$134;"PRE
SS ANY KEY TO CONTINUE"
  220 *FX15,0
  230 G$=GET$
  240 REM   PRINT SECOND PAGE
  250 REM   ================
  260 CLS
  270 PRINT''"Press H to HOLD th
e action,then press
any key to continue."
  280 PRINT'"Sound OFF,press Q -
 Sound ON,press S."
  290 PRINT''"Control the ship w
ith the following -"
  300 PRINT'"   1 - CURSOR KEYS"
  310 PRINT"   2 - A up,Z down,<
 left,> right"
  320 PRINT"   3 - * up,? down,Z
 left,X right"
  330 PRINT"   4 - JOYSTICKS"
  340 PRINT''TAB(8)"S=Score,T=Ti
me,L=Level"
  350 PRINT''TAB(5);CHR$134;"ENT
ER YOUR OPTION TO START"
  360 *FX15,0
  370 I$=GET$
  380 I%=VAL(I$)
  390 IF I%<1 OR I%>4 GOTO 370
  400 REM=====================
=======
  410 REM     SET UP FOR GAME
  420 MODE5:CLG
  430 A%=1280:C%=-1:L%=0:S%=0:X%
=RND(950)+100:Y%=140:Z%=FALSE
  440 VDU4
  450 PRINTTAB(0,30);"S 0";TAB(6
,30);"-T ";TAB(14,30);"-L "
  460 REM=====================
=======
  470 REM  EXPLOSION,DOT,SHIP &
SQUARE
  480 VDU23,224,0,0,0,0,0,0,16,1
2
  490 VDU23,225,0,8,8,136,137,73
,74,8
  500 VDU23,226,0,0,0,0,16,32,66
,140
  510 VDU23,227,6,3,0,0,63,0,0,0
  520 VDU23,228,45,110,255,126,2
55,126,61,216
  530 VDU23,229,48,192,0,0,240,0
,128,192
  540 VDU23,230,1,3,6,8,0,0,0,0
  550 VDU23,231,146,18,17,16,16,
16,16,16
  560 VDU23,232,96,48,24,0,0,0,0
,0
  570 VDU23,239,0,24,60,60,60,60
,24,0
  580 VDU23,240,0,24,24,24,60,12
6,102,66
  590 VDU23,241,0,126,126,126,12
6,126,126,0
  600 REM=====================
=======
  610 REM    DRAW SQUARES & DOTS
  620 GCOL0,3
  630 FOR G%=0 TO 1300 STEP 150
  640 FOR H%=200 TO 900 STEP 100
  650 MOVEG%,H%
  660 VDU5,241
  670 NEXT H%,G%
  680 PROCDOT
  690 TIME=0
```



G MAZE

```
  700 REM=======================
=======
  710 REM      MAIN LOOP
  720 REPEAT
  730 GCOL0,0
  740 MOVEX%,Y%
  750 VDU5,240
  760 ON I% GOSUB 2370,2440,2510
,2580
  770 PROCCHECK
  780 GCOL0,3
  790 MOVEX%,Y%
  800 VDU240
  810 IF RND(10)>(9-L%) GCOL0,3:
PROCBAR
  820 IF RND(10)>(10-L%) GCOL0,0
:PROCBAR
  830 PROCLR
  840 PROCRL
  850 SOUND0,-5,3,1
  860 IF POINT(X%+30,Y%)=1 OR PO
INT(X%+45,Y%-32)=1 OR POINT(X%+1
5,Y%-32)=1 OR POINT(X%,Y%-16)=1
OR POINT(X%+60,Y%-16)=1 PROCPOIN
T
  870 VDU4
  880 PRINTTAB(9,30);(TIME)DIV 1
00
  890 IF Z%=TRUE AND Y%<150 PROC
DOT
  900 IF INKEY(-85)H%=TIME:REPEA
T:G%=INKEY(1):UNTIL G%<>-1:TIME=
H%
  910 IF INKEY(-17):*FX210,255
  920 IF INKEY(-82):*FX210,0
  930 UNTIL POINT(X%+28,Y%)=3 OR
 POINT(X%+45,Y%-30)=3 OR POINT(X
%+15,Y%-30)=3 OR POINT(X%,Y%-18)
=3 OR POINT(X%+56,Y%-18)=3
  940 REM=======================
=======
  950 REM      END BIT
  960 H%=TIME
  970 SOUND0,-10,4,5
  980 SOUND0,-10,5,8
  990 SOUND0,-8,6,18
 1000 GCOL0,2
 1010 MOVEX%,Y%
 1020 VDU5,8,227,228,229,8,8,8,1
1,224,225,226,8,8,8,10,10,230,23
1,232
 1030 REPEAT:UNTIL TIME-H%>500
 1040 MODE7
 1050 IF S%>T% T%=S%
 1060 PRINT'''
 1070 FOR G%=1 TO 2
 1080 PRINTTAB(12);CHR$141;CHR$1
33;"GAME OVER"
 1090 NEXT G%
 1100 PRINT'TAB(5);"Score = ";S%
;TAB(18)"BEST SCORE = ";T%
 1110 PRINT'TAB(5);"Level = ";L%
;TAB(23)"Time  = ";(H%)DIV 100
 1120 FOR G%=4 TO 14
 1130 SOUND1,G%-15,101,1
 1140 SOUND1,G%-15,117,1
 1150 SOUND1,G%-15,129,1
 1160 NEXT G%
 1170 PRINT'';TAB(12)CHR$134;"AG
AIN Y/N ?"
 1180 *FX15,0
 1190 G$=GET$
 1200 IF G$="Y" GOTO 1230
 1210 IF G$="N" GOTO 1290
 1220 GOTO 1190
 1230 PRINT'TAB(5)"Do you want i
nstructions  ?"
 1240 *FX15,0
 1250 G$=GET$
 1260 IF G$="Y" GOTO 70
 1270 IF G$="N" GOTO 420
 1280 GOTO 1250
 1290 PRINT'
 1300 FOR G%=1 TO 2
 1310 PRINTTAB(8);CHR$141;CHR$13
6;CHR$131;CHR$157;CHR$129;"BYE";
CHR$132;"FOR";CHR$130;"NOW  ";CH
R$156
 1320 NEXT G%
 1330 *FX210,0
 1340 FOR G%=100 TO 200 STEP 10
 1350 SOUND1,-8,G%,2
 1360 SOUND2,-8,300-G%,2
 1370 NEXT G%
 1380 END
 1390 REM=======================
=======
 1400 DEF PROCTOP
 1410 GCOL0,0
 1420 MOVE0,900:MOVE1279,900
 1430 PLOT85,0,1023:PLOT85,1279,
1023
 1440 GCOL0,3
 1450 G%=RND(750)/150
 1460 G%=G%*150
 1470 MOVEG%+17,900:MOVEG%+17,97
2
 1480 PLOT85,G%+41,900:PLOT85,G%
+41,972
 1490 MOVEG%+56,992:MOVEG%+56,98
1
 1500 PLOT85,G%+450,992:PLOT85,G
%+450,981
 1510 MOVEG%+467,900:MOVEG%+467,
972
 1520 PLOT85,G%+491,900:PLOT85,G
%+491,972
 1530 MOVEG%,1000:VDU5,241
 1540 MOVEG%+150,1000:VDU241
 1550 MOVEG%+300,1000:VDU241
 1560 MOVEG%+450,1000:VDU241
 1570 MOVEG%+225,950
 1580 GCOL0,1
 1590 VDU239
 1600 ENDPROC
 1610 REM=======================
=======
 1620 DEF PROCBAR
 1630 G%=RND(8)*150
 1640 H%=RND(8)*100+92
 1650 MOVEG%-94,H%:MOVEG%-94,H%-
11
 1660 PLOT85,G%,H%:PLOT85,G%,H%-
11
```



ENTHUSIASTS for Pac-man-style arcade games should enjoy this version with a difference, written by G K Pilbrow of Ashford, Kent.

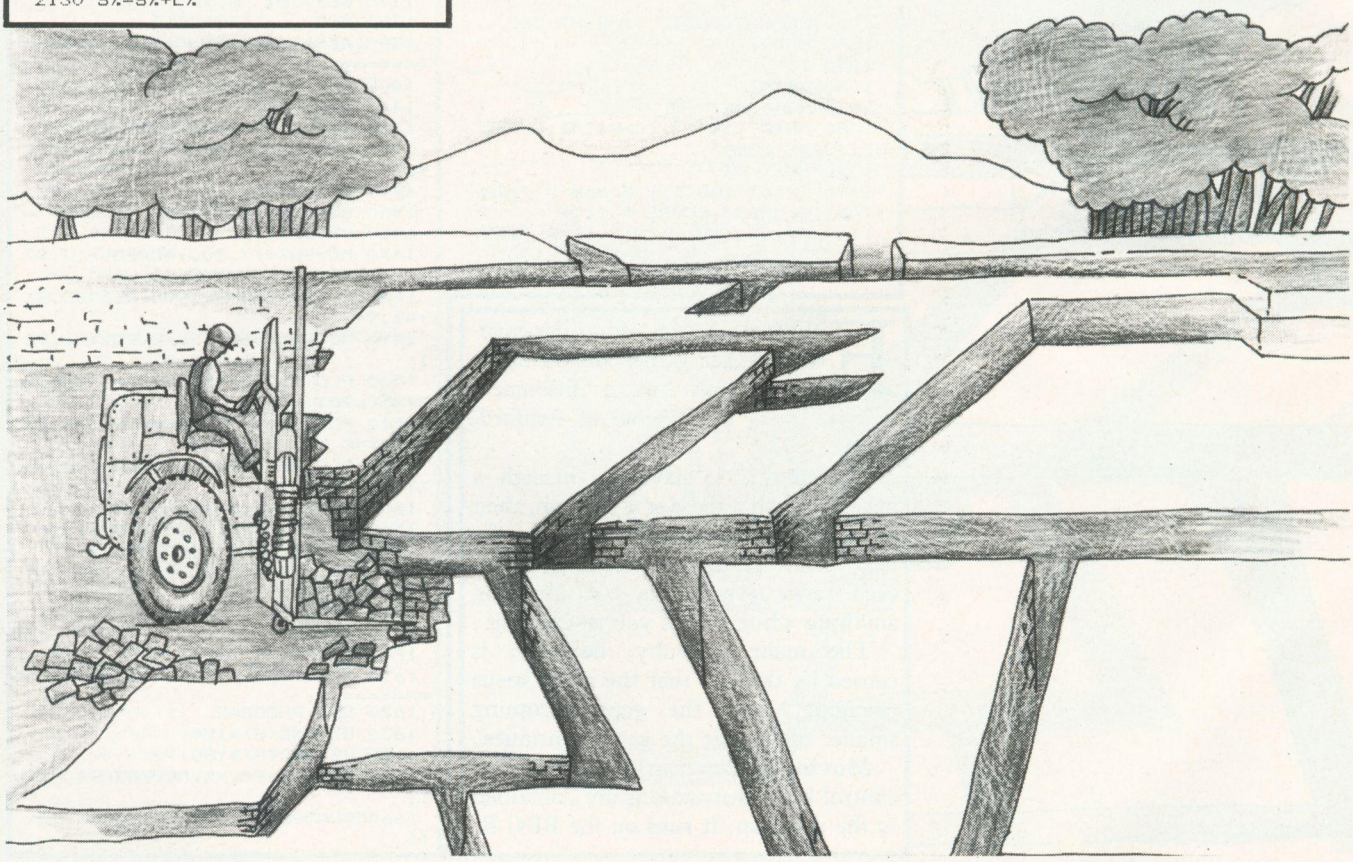
The aim is to navigate through a maze to reach a red dot at the top, then descend to the bottom to re-start on the next level. Picking up dots as you proceed earns you points but touching anything white causes you to explode.

The main difficulty, however, is caused by the fact that the maze keeps changing, with the gaps becoming smaller the longer the game continues.

Moving Maze provides a choice of control keys; instructions are contained in the program. It runs on the BBC B.

```
1670 G%=RND(9)*150-133
1680 H%=RND(7)*100+100
1690 MOVEG%,H%:MOVEG%,H%+72
1700 PLOT85,G%+24,H%:PLOT85,G%+
24,H%+72
1710 ENDPROC
1720 REM======================
=======
1730 DEF PROCLR
1740 IF A%>1279 B%=RND(7)*100+1
64:A%=0
1750 GCOL0,3
1760 MOVEA%+44,B%
1770 MOVEA%+44,B%-56
1780 PLOT85,A%+11,B%
1790 PLOT85,A%+11,B%-56
1800 GCOL0,0
1810 MOVEA%,B%
1820 MOVEA%,B%-56
1830 PLOT85,A%+11,B%
1840 PLOT85,A%+11,B%-56
1850 A%=A%+11
1860 ENDPROC
1870 REM======================
======
1880 DEF PROCRL
1890 IF C%<0 D%=RND(7)*100+164:
C%=1279
1900 GCOL0,3
1910 MOVEC%-44,D%
1920 MOVEC%-44,D%-56
1930 PLOT85,C%-11,D%
1940 PLOT85,C%-11,D%-56
1950 GCOL0,0
1960 MOVEC%,D%
1970 MOVEC%,D%-56
1980 PLOT85,C%-11,D%
1990 PLOT85,C%-11,D%-56
2000 C%=C%-11
2010 ENDPROC
2020 REM======================
=======
2030 DEF PROCPOINT
2040 GCOL0,0
2050 G%=X%/150
2060 G%=G%*150+75
2070 H%=Y%/100
2080 H%=H%*100+50
2090 MOVEG%,H%
2100 SOUND2,-9,120,3
2110 VDU5,239
2120 IF H%>900 Z%=TRUE
2130 S%=S%+L%
2140 VDU4
2150 PRINTTAB(2,30);S%
2160 ENDPROC
2170 REM======================
=======
2180 DEF PROCDOT
2190 Z%=FALSE
2200 L%=L%+1
2210 GCOL0,1
2220 FOR G%=50 TO 150 STEP 10
2230 SOUND1,-7,G%,1
2240 SOUND2,-7,G%+48,1
2250 SOUND3,-7,G%+96,1
2260 NEXT
2270 FOR G%=75 TO 1225 STEP 150
2280 FOR H%=250 TO 850 STEP 100
2290 MOVEG%,H%
2300 VDU5,239
2310 NEXT H%,G%
2320 PROCTOP
2330 VDU4:PRINTTAB(17,30);L%
2340 ENDPROC
2350 REM======================
=======
2360 REM    SUBROUTINE FOR CURS
OR KEYS
2370 IF INKEY(-26) X%=X%-20
2380 IF INKEY(-122) X%=X%+20
2390 IF INKEY(-42) Y%=Y%-20
2400 IF INKEY(-58) Y%=Y%+20
2410 RETURN
2420 REM======================
=======
2430 REM    SUBROUTINE FOR CHOI
CE 2
2440 IF INKEY(-66) Y%=Y%+20
2450 IF INKEY(-98) Y%=Y%-20
2460 IF INKEY(-103) X%=X%-20
2470 IF INKEY(-104) X%=X%+20
2480 RETURN
2490 REM======================
=======
2500 REM    SUBROUTINE FOR CHOI
CE 3
2510 IF INKEY(-73) Y%=Y%+20
2520 IF INKEY(-105) Y%=Y%-20
2530 IF INKEY(-98) X%=X%-20
2540 IF INKEY(-67) X%=X%+20
2550 RETURN
2560 REM======================
=======
2570 REM    SUBROUTINE FOR JOYS
TICKS
2580 IF ADVAL(1)>48000 X%=X%-20
2590 IF ADVAL(1)<16000 X%=X%+20
2600 IF ADVAL(2)>48000 Y%=Y%+20
2610 IF ADVAL(2)<16000 Y%=Y%-20
2620 RETURN
2630 REM======================
=======
2640 DEF PROCCHECK
2650 IF Y%>1000 Y%=1000
2660 IF Y%<125 Y%=125
2670 IF X%<0 X%=0
2680 IF X%>1230 X%=1230
2690 ENDPROC
```

MOVING MAZE



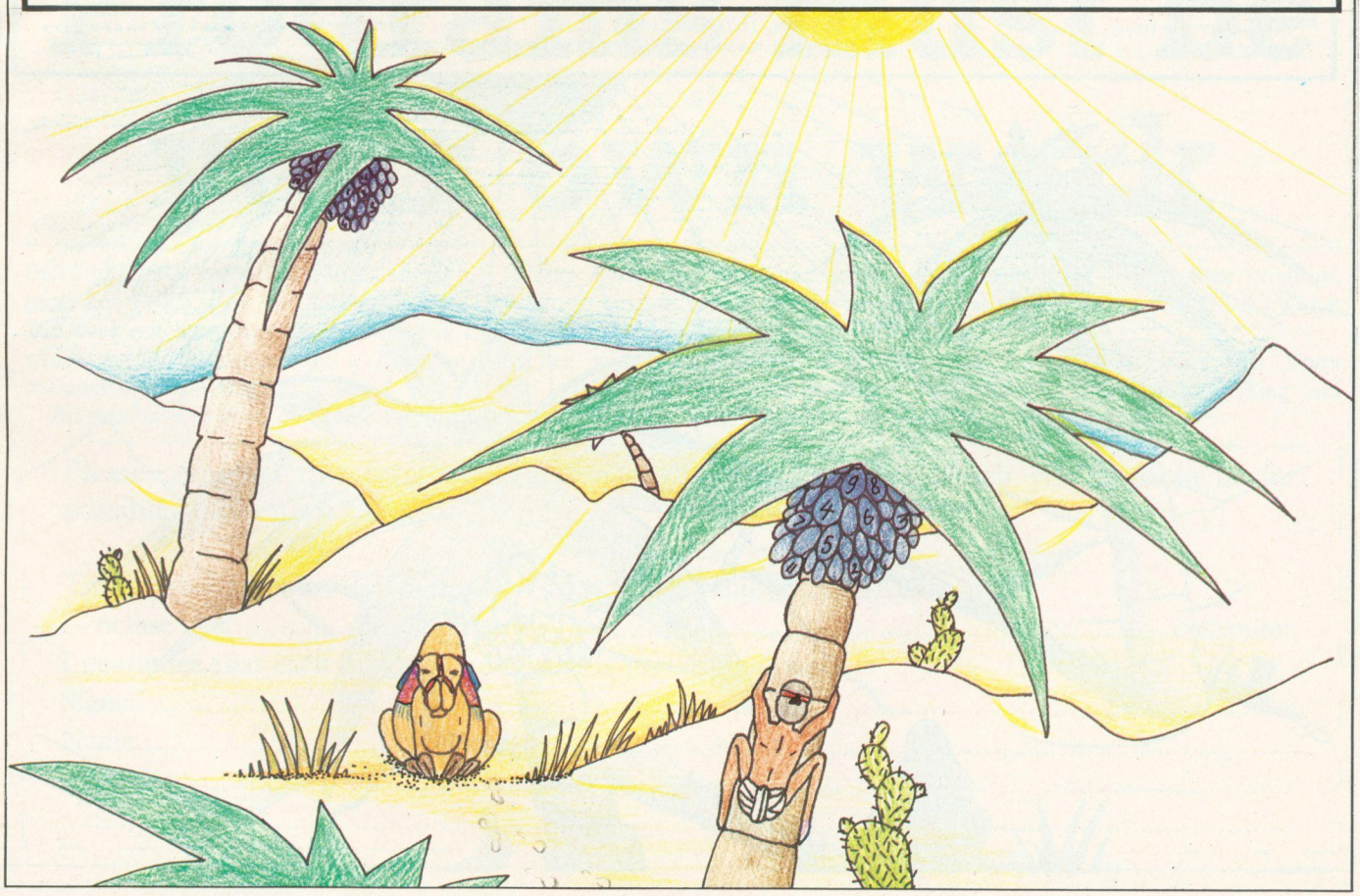
DATE SEARCH

IF YOU want to know what day of the week you were born, or on what date the third Thursday in September will fall in the year 2001, **Date Search** for the Electron and BBC B will supply those vital facts.

It will display the full calendar for any year between 1900 and 3000. All you do is input the year and then press SPACE if you need to consult the calendar for another year.

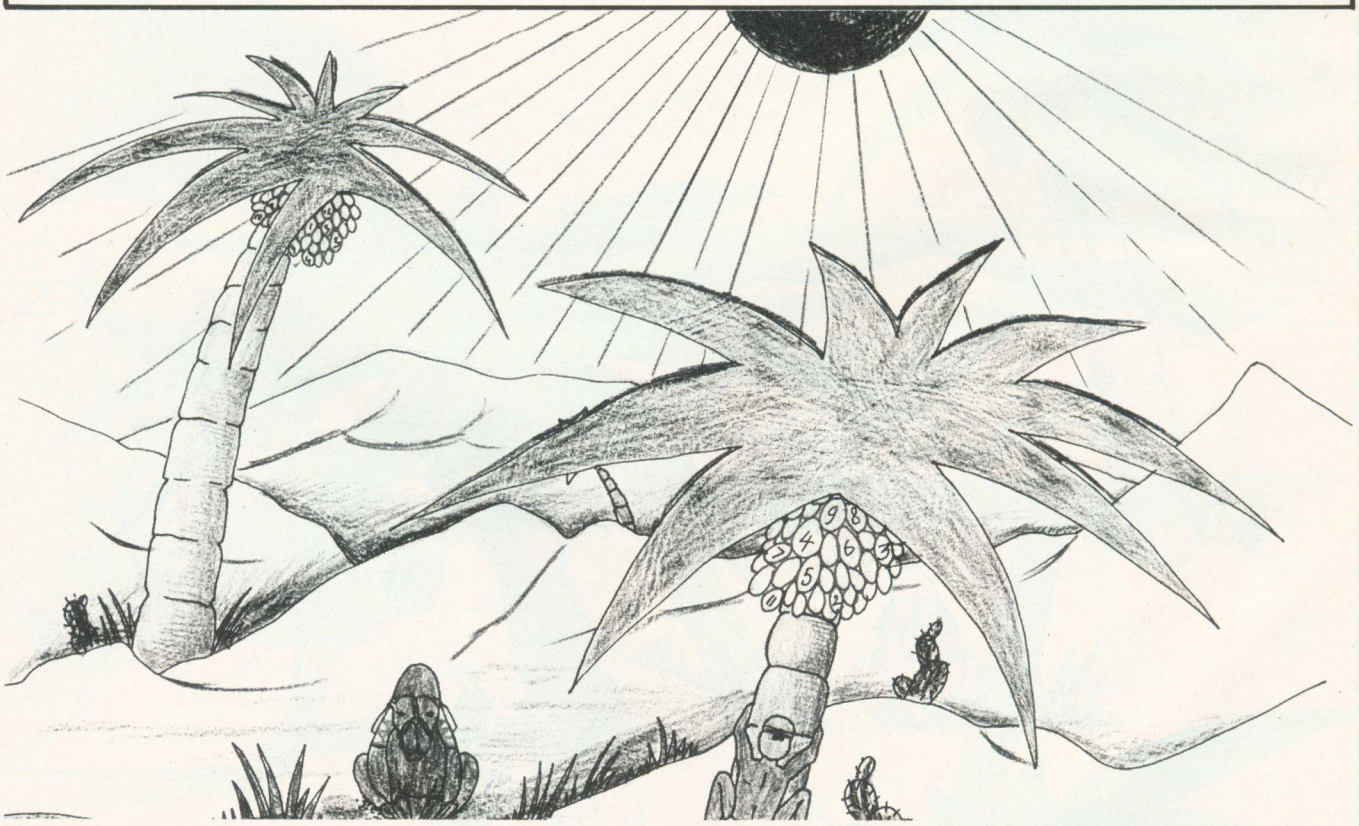
Date Search was written by Martyn Mather of Shirebrook, Nottinghamshire.

```
   15REM ***********************
***
   25REM CALENDAR BY MARTYN MATH
ER
   35REM ***********************
***
   45REM ***********************
***
   55REM SET VARIABLES
   65REM ***********************
***
   70CLEAR
   80DIMM(12):M(1)=31:M(2)=28:M(
3)=31:M(4)=30:M(5)=31:M(6)=30:M(
7)=31:M(8)=31:M(9)=30:M(10)=31:M
(11)=30:M(12)=31
   90*KEY10A%=0|M
  100*FX229,1
  110IFA%=100THEN240
  120A%=100
  135REM ***********************
***
  145REM TITLE
  155REM ***********************
***
  160MODE7
  170VDU23;8202;0;0;0;
  180PRINTTAB(12,5)CHR$(129)"CAL
ENDAR"
  190K=INKEY(250)
  200PROCINTRO
  215REM ***********************
***
  225REM WHICH YEAR?
  235REM ***********************
***
  240MODE7
  250PRINTTAB(0,3)CHR$145;"CALEN
DAR":PRINT
  260PRINT" For which year do yo
u need a calendar?"
  270INPUT" >"A
  280IFA<1900ORA>3000PRINT" This
 year is out of the set range"
  290IFA<1900ORA>3000THEN270
  300PROCWORK
  310IFK=1THENM(2)=29
  320MODE0:PROCCALENDAR
  330MODE7
  340VDU23;8202;0;0;0;
  355REM ***********************
***
  365REM ANY MORE CALENDARS?
  375REM ***********************
***
  380PRINTTAB(0,5)"Do you need a
ny more calendars (Y/N)?"
  390REPEAT
  400K=INKEY(0)
  410IFK=78THEN1430
  420IFK=89THENRUN
  430UNTILFALSE
  445REM ***********************
***
  455REM DISPLAY CALENDAR
  465REM ***********************
***
  470DEFPROCCALENDAR
  480VDU19,3,0,0,0,0
  490VDU23;8202;0;0;0;:CLS:PRINT
TAB(0,0);"CALENDAR ";A:IFK=1THEN
PRINTTAB(71,0)"LEAP YEAR"
  500DATA1,8,976,2,1271,976,2,12
71,16,2,1271,16,2,8,16,2,8,972,1
,8,272,2,1271,272,1,8,336,2,1271
,336,1,8,592,2,1271,592,1,8,656,
2,1271,656
  510DATA1,8,912,2,1271,912,1,12
0,972,2,120,16,1,408,972,2,408,1
6,1,696,972,2,696,16,1,984,972,2
```

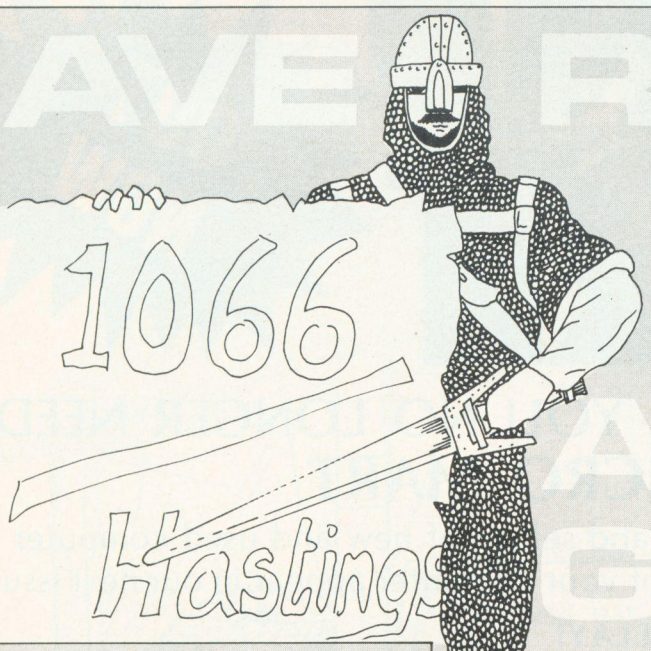


DATE SEARCH

```
,984,16,-1,-1,-1
  520REPEAT
  530READL,M,N
  540IFL=1 MOVEM,N
  550IFL=2 DRAWM,N
  560UNTILL=-1
  570VDU19,3,1,0,0,0
  580Y=4
  590DATA5,23,41,59,5,23,41,59,5
,23,41,59
  600FOR Z=1 TO 12
  610L=0
  620READX
  630P=M(Z)+1
  640IFZ=5 OR Z=9 THENY=Y+10
  650X=X+3
  660REPEAT
  670IFJ=7 THEN750
  680L=L+1
  690IFL=P THEN770
  700O=Y+J
  710IFL<10PRINTTAB(X,O);CHR$32;
L
  720IFL<10THEN740
  730PRINTTAB(X,O);L
  740J=J+1
  750UNTILJ=7
  760J=0:GOTO650
  770NEXTZ
  780DATASun.,Mon.,Tues.,Wed.,Th
ur.,Fri.,Sat.
  790L=3:Y=0
  800FORA=1TO3
  810REPEAT
  820Y=Y+1:Z=Y+L
  830READA$
  840PRINTTAB(1,Z);A$
  850UNTILY=7
  860Y=0
  870L=L+10
  880RESTORE 780
  890NEXT
  900DATA4,January,22,February,4
2,March,60,April,5,May,25,June,4
3,July,59,August,4,September,22,
October,39,November,58,December

  910RESTORE 900
  920J=2
  930FORA=1TO3
  940FORB=1TO4
  950READC,A$
  960PRINTTAB(C+8,J)A$
  970NEXT
  980J=J+10
  990NEXT
 1000REPEAT UNTIL INKEY(0)=32
 1010ENDPROC
 1025REM ***********************
***
 1035REM IS YEAR A LEAP YEAR AND
 1045REM WHAT DAY IS JAN. 1st ON
?
 1055REM ***********************
***
 1060DEFPROCWORK
 1070B=A DIV 100
 1080C=9:D=2:F=0:G=0:H=0
 1090REPEAT
 1100C=C+1
 1110D=D-1
 1120IFD=-1 D=6
 1130UNTIL C=B
 1140E=B*100
 1150REPEAT
 1160I=H+C*100
 1170IFI-1=E F=1 ELSE F=0
 1180IFI=E G=1 ELSE G=0
 1190IFF=0 D=D+1
 1200IFF=1 E=E+4
 1210IFF=1 D=D+2
 1220IFD=7 D=0
 1230IFD=8 D=1
 1240IFA=I THEN1270
 1250H=H+1
 1260UNTIL H=99
 1270J=D:K=G
 1280ENDPROC
 1295REM ***********************
***
 1305REM INTRODUCTION
 1315REM ***********************
***
 1320DEFPROCINTRO
 1330CLS
 1340PRINTTAB(10,1)CHR$141;CHR$1
29"Introdution";TAB(10,2)CHR$141
;CHR$131"Introdution"
 1350PRINTTAB(0,4)"This program
allows you to obtain a     calen
dar for the years between 1900 a
nd 3000. After inputing which ye
ar you wantthe calendar for, the
 computer will workout and print
 the calendar for that     year.
"
 1360PRINTTAB(0,10)" When you ha
ve finished looking at the  cale
ndar press space and the compute
r   will ask you if you need any
 more       calendars."
 1370PRINTTAB(4,22)CHR$141;CHR$1
36;CHR$131"PRESS SPACE TO CONTIN
UE";TAB(4,23)CHR$141;CHR$136;CHR
$132"PRESS SPACE TO CONTINUE"
 1380REPEAT UNTIL INKEY(0)=32
 1390ENDPROC
 1405REM ***********************
***
 1415REM PROGRAM END
 1425REM ***********************
***
 1430MODE7:PRINTTAB(0,5)CHR$129"
GOODBYE"
 1440A%=0:MODE7
 1450*FX229,0
 1460END
 1475REM ***********************
***
```



AVERAGE MARKS



USEFUL for teachers and students needing the average of a set of marks, this short program will make the necessary calculations.

Enter each mark by typing the number followed by RETURN, then press RETURN twice when you want the average so far.

Average Marks was written for the BBC B and the Electron by Richard Lax of Rotherham, S Yorkshire.

```
   10 MODE 2
   20 COLOUR 135:CLS:COLOUR 0
   30 PRINTTAB(2,13)" AVERAGE MA
RKS "
   40 PRINTTAB(2,15)" PRESS A KE
Y"
   50 A=GET:CLS
   60 PRINTTAB(1,2)"PLEASE ENTER
 MARKS"
   70 PRINTTAB(1,3)"PRESS RETURN
 TWICE  TO GET THE AVERAGE  MARK
"
   75 FOR D=1 TO 2000
   80 INPUT W
   90 IF W=+0 THEN PRINT"THE AVE
RAGE MARK IS :";G/R:GOTO 130:END
  100 G=G+W
  110 R=R+1
  120 NEXT D
  130 PRINT"   DO YOU WANT ANOTH
ER GO?(Y/N)"
  140 A$=GET$
  150 IF A$="Y" THEN RUN
  180 END
```

Programs must be your own work

FOLLOWING recent problems involving readers sending programs which were not their own work, we aim to ensure that does not happen again by deciding that only programs which are accompanied by a Program Voucher will be considered for publication.

All you have to do is complete the form below, which will be repeated in each issue, and send it with your program, which should be sent on cassette or disc to the address which appears at the front of the magazine.

With your co-operation we can make sure that *Acorn Programs* continues to the best source for interesting and original games on the BBC B and Electron.

Please complete this form and enclose it with any program which you send to us for possible publication.

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I enclose .....program(s) for the .....computer.

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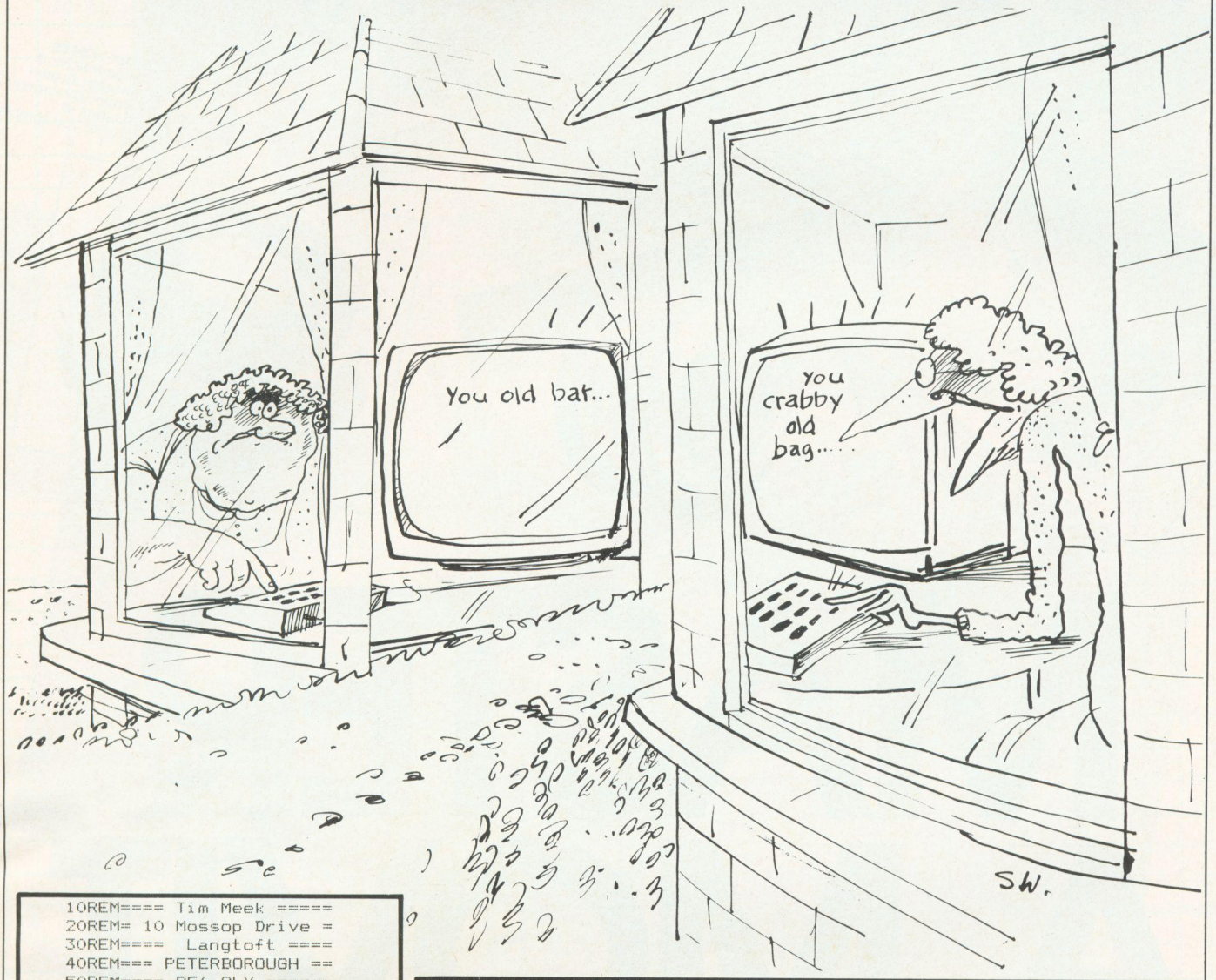
MICRO MART — THE BUY WORD FOR SELLING COMPUTERS

TICKERTAPE




```
   10REM==== Tim Meek =====
   20REM= 10 Mossop Drive =
   30REM====  Langtoft ====
   40REM=== PETERBOROUGH ==
   50REM==== PE6 9LY ======
   60
   70REM= Tel Mkt DEEPING =
   80REM= (0778)  345142 ==
   90
  100
  110MODE7
  120*K.100.|MRU.|M
  130ONERRORGOTO110
  140PRINTCHR$141TAB(14)"MESSAGE
":PRINTCHR$141TAB(14)"MESSAGE"
  150PRINT'CHR$141TAB(9)"(c) Tim
 Meek 1984":PRINTCHR$141TAB(9)"(
c) Tim Meek 1984"'
  160PRINT"This program produces
 a moving message  display, as s
een in some shop windows.  This
is done in red, double height Mo
de 7 text, although the program
is easily  adapted to suit indiv
idual requirements."
  170 PRINT"You will be given th
e prompt 'Message ?'and you shou
ld enter a message of not   more
 than 256 characters. To alter y
our message, simply press Escape
. Should youdo this inadvertentl
y, just press Return";
  180PRINT"and your original mes
sage will be        preserved."''
  190PRINT"      Press SPACE to e
nter message.":REPEATUNTILGET=32
  200*KEY10OLD|M:G.200|M
  210ONERRORGOTO220
  220IFERR=17THEN230
  230PRINTTAB(0,20)" "
  240CLS
  250INPUTLINE"Message?"PRMESSAG
E$:IFPRMESSAGE$<>""MESSAGE$=PRME
SSAGE$
  260VDU23;8202;0;0;0
  270CLS
  280MESSAGE$=MESSAGE$ + "

  "
  290CLS
  300C=0
  310FOR SCREENM%=1TOLEN(MESSAGE
$)
  320FORX%=36TO0STEP-1
  330PRINTTAB(X%,12)CHR$129;CHR$
141;(RIGHT$(LEFT$(MESSAGE$,37-X%
),37-X%)):PRINTTAB(X%,13)CHR$129
;CHR$141;(RIGHT$(LEFT$(MESSAGE$,
37-X%),37-X%))
  340PRINTTAB(0,14)" "TAB(38,12)
" "TAB(38,13)" "
  350 A$=INKEY$(10):IFSCREENM%=3
7GOTO380
  360NEXT
  370FOR SCREENM%=37TOLEN(MESSAG
E$)
  380PRINTTAB(0,12);CHR$129;CHR$
141;(RIGHT$(LEFT$(MESSAGE$,SCREE
NM%),36)):PRINTTAB(0,13)CHR$129;
CHR$141;(RIGHT$(LEFT$(MESSAGE$,S
CREENM%),36))
  390PRINTTAB(0,14)" "TAB(38,12)
" "TAB(38,13)" "
  400C=C+1
  410A$=INKEY$(10)
  420IFC=LEN(MESSAGE$)-37THEN 30
0
  430NEXT
```

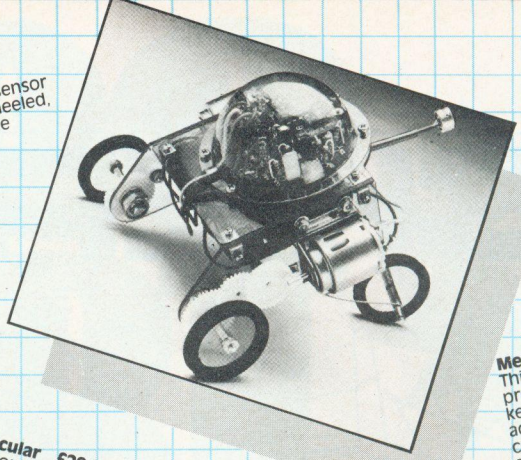
TICKERTAPE by Tim Meek of Peterborough will allow you to use your computer as an all-purpose message machine.

Type-in whatever terms of endearment, advertising slogan or insult you like and the computer will display it as a moving band scrolling across the screen from right to left. The message must be no longer than 256 characters and will appear in double-height mode 7 text.

If you make a mistake in typing your message, you can press ESCAPE to alter it.

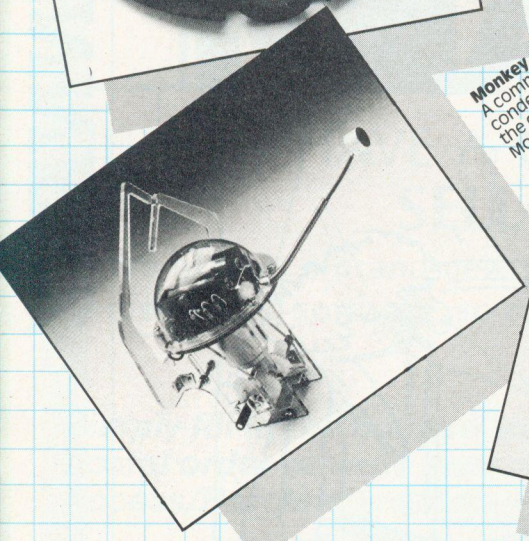
Tickertape was written for the BBC B.

Line Tracer II **£17.99**
Draw a line and the infra-red sensor picks it up and sends this 3 wheeled, twin motored robot along the course you plot.



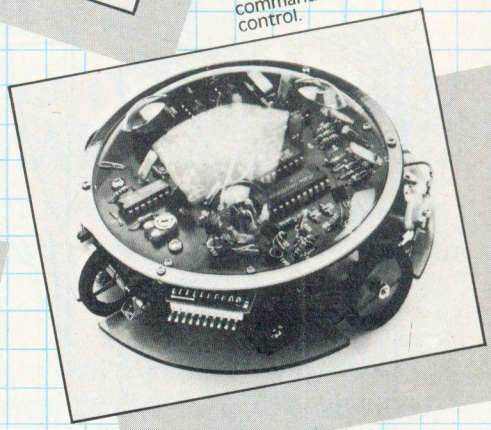
Piper Mouse **£19.99**
Supersonic sound sensor activated. The condenser microphone picks up the sound to send the Piper Mouse scurrying where you want it to go.

Memocon Crawler **£34.99**
This highly intelligent Movit is programmed through its own keyboard. Its impressive memory accepts a broad range of commands and gives you complete control.



Monkey **£9.99**
A command from you into the condenser microphone activates the gripper arms and sends the Monkey climbing along its rope.

Circular **£29.99**
Through its own hand-held remote control you issue instructions to the two independently driven wheels – sending the circular wherever you want it to go.



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–THE MAKING IS O

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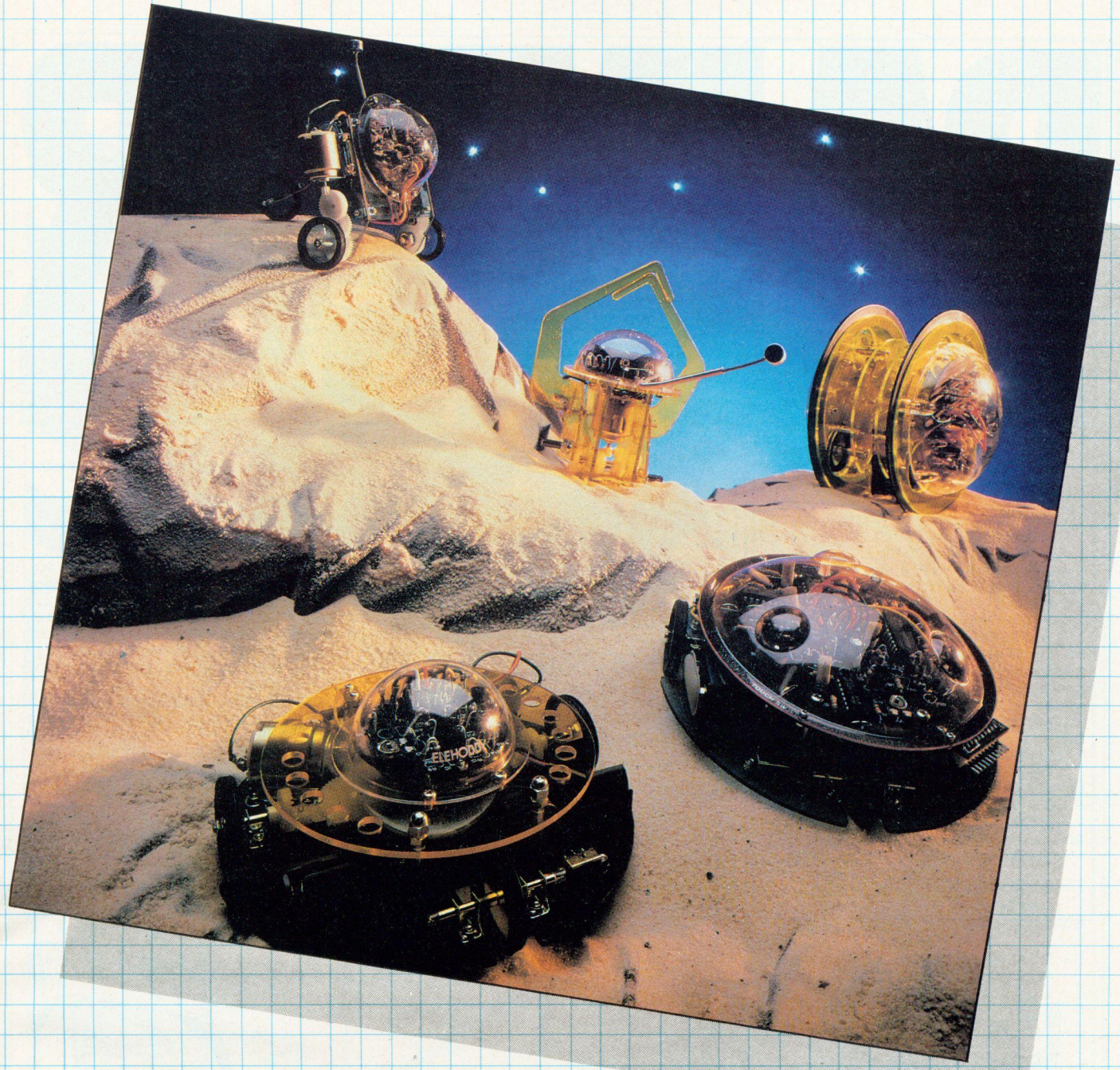
What's more, MOVITS cost a lot less than you might think. In fact, the price is the only thing about them that's down-to-earth!

MOVITS all have their own characters and appeal. They're fun to put together, fun to run. Take your first step into the world of serious robotics. Send off for your MOVITS today.



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☐ MEMOCON CRAWLER @ £34.99 ☐ MONKEY @ £9.99

☐ CIRCULAR @ £29.99

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London EC1V 8BT
Telephone: 01-253 2277

PAINTER

```
10REM --- Etch-A-Scetch ---
20REM By Toby Jefferys 1984
30REM ----------------------
40CLS
50MODE 2
60 VDU23,1,0;0;0;0
70X%=100:Y%=100
80GCOL0,7
90COLOUR 3:PRINTTAB(3,3)"Etch
-A-Sketch":COLOUR 2:PRINTTAB(2,4
)"---------------"
100COLOUR 6:PRINT''"     Use t
he control keys to move the poin
t around the screen,while using
the appropriate keys.Then colour
s can also be changed."
110COLOUR 5:PRINT''"  Controls
:"
120COLOUR 3:PRINT'"Z -Left"
130PRINT'"X -Right":PRINT'"K -
Up":PRINT'"M -Down":PRINT'"1 to
8 -Colours"
140COLOUR 14:PRINTTAB(3,29)"SP
ACE to start"
150COLOUR 7:PRINTTAB(0,30)"___
_________________"
160 REPEAT UNTIL GET=32
170CLS
```

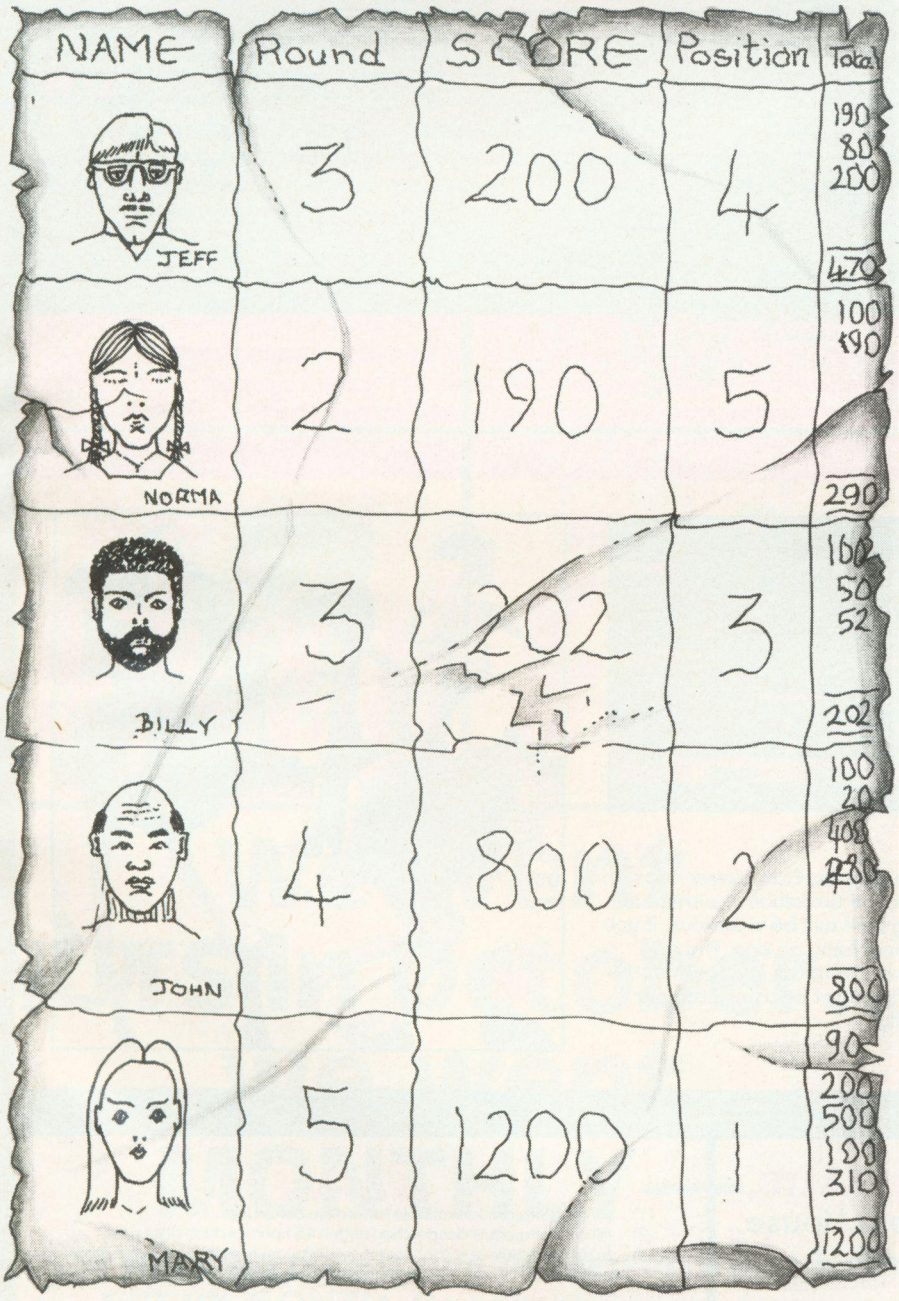
DRAW a multitude of shapes in whatever colour you choose and to a musical accompaniment with this simple program written for the Electron by 12-year-old Toby Jefferys of Peterborough.

Use the Z, X, K and M keys to move your point round the screen and use the numerals from 1 to 8 to change the colour of the line you are drawing.

Painter will also run on the BBC B.

```
180 X%=200:Y%=200
190COLOUR 3:PRINTTAB(3,2)"Etch
-A-Sketch"
200REPEAT
210key=GET
220SOUND 1,-15,RND(254),1
230IF INKEY(-67) THEN MOVE X%,
Y%:X%=X%+50:DRAW X%,Y%:IF X%<100
 THEN X%=100
240IF INKEY(-98) THEN MOVE X%,
Y%:X%=X%-50:DRAW X%,Y%:IF X%>118
0 THEN X%=1180
250IF INKEY(-71) THEN MOVE X%,
Y%:Y%=Y%+50:DRAW X%,Y%:IF Y%>923
 THEN Y%=923
260IF INKEY(-102) THEN MOVE X%
,Y%:Y%=Y%-50:DRAW X%,Y%:IF Y%<99
 THEN Y%=99
270IF INKEY(-49) THEN GCOL0,1
280IF INKEY(-50) THEN GCOL0,2
290IF INKEY(-18) THEN GCOL0,3
300IF INKEY(-19) THEN GCOL0,4
310IF INKEY(-20) THEN GCOL0,5
320IF INKEY(-53) THEN GCOL0,6
330IF INKEY(-37) THEN GCOL0,7
340IF INKEY(-22) THEN GCOL0,0
350IF INKEY(-74) THEN GOTO 170
360UNTIL FALSE
```

SCORE SHEET




```
   10CLS:DIM PLAY$(6).SC(6),tota
l(6),turn(6):*FX11,0
   20PROCinit
   30PROCenterscore
   40END
   50DEFPROCinit
   60VDU23;8202;0;0;0;
   70PRINTTAB(1,3);CHR$(130);"We
lcome to SCORESHEET.This will ke
ep  "CHR$(130)"score for any gam
e with up to six       "CHR$(130)
"players.It records the number o
f turns "CHR$(130)"enters the cu
rrent score and running"
   80PRINTCHR$(130)"total for ea
ch player"
   90PRINTTAB(6,12);CHR$(136);"P
RESS ANY KEY TO CONTINUE":A=GET:
CLS
  100INPUT"ENTER NUMBER OF PLAYE
RS(1-6)"NUM
  110IFNUM<1ORNUM>6 THEN PRINT"T
OO MANY":GOTO100
  120FORX=1TONUM
  130PRINT"PLAYER ";X;:INPUT" PL
EASE ENTER NAME MAX LETTERS=7 "P
LAY$(X)
  140IF LEN(PLAY$(X))>7ORLEN(PLA
Y$(X))<1PRINT"?? TRY AGAIN":GOTO
130
  150NEXT:CLS
  160PRINTTAB(8,1);CHR$(141);CHR
$(132);CHR$(157);CHR$(135);" SCO
RESHEET   ";CHR$(156)
  170PRINTTAB(8,2);CHR$(141);CHR
$(132);CHR$(157);CHR$(135);" SCO
RESHEET   ";CHR$(156)
  180PRINTTAB(4,4);"PLAYER";TAB
(15,4);"TURN";TAB(23,4);"SCORE
";TAB(31,4);"TOTAL"
  190PRINTTAB(2,6)"1";TAB(2,9);"
2";TAB(2,12);"3";TAB(2,15);"4";T
AB(2,18);"5";TAB(2,21);"6"
  200FORX=1TONUM
  210PRINTTAB(4,3*X+3);CHR$132;C
HR$157;CHR$135;PLAY$(X)
  220NEXT:ENDPROC
  230DEFPROCenterscore
  240REPEAT
  250FORX=1TONUM
  260PRINTTAB(2,23);"
                    "
  270PRINTTAB(2,23);CHR$132;CHR$
157;CHR$135;PLAY$(X);
  280PRINTTAB(12,23);:INPUT " EN
TER YOUR SCORE ",SC(X)
  290PRINTTAB(14,3*X+3);"
                    "
  300IF SC(X)>99999 OR SC(X)<-99
999 GOTO280
  310PRINTTAB(24,3*X+3);SC(X)
  320total(X)=total(X)+SC(X)
  330PRINTTAB(32,3*X+3);total(X)
  340turn(X)=turn(X)+1
  350PRINTTAB(17,3*X+3);turn(X)
  360NEXT
  370UNTILFALSE
  380ENDPROC
```

DISPENSE with the services of a scorekeeper at your next Scrabble, dominoes or darts tournament. **Scoresheet** for the BBC B allows you to enter the names of up to six players. As play progresses it displays the number of turns, the latest score and the current total for each one.

Scoresheet was written by M Gorr of Bristol.

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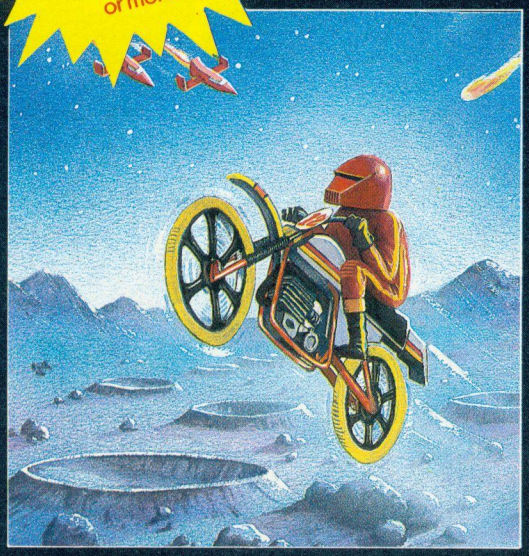

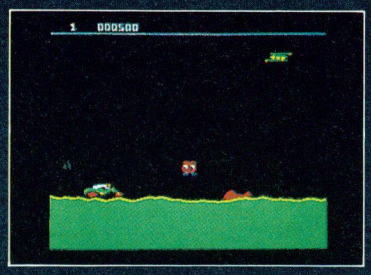

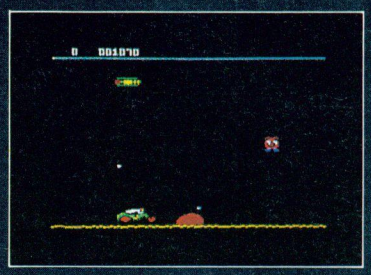

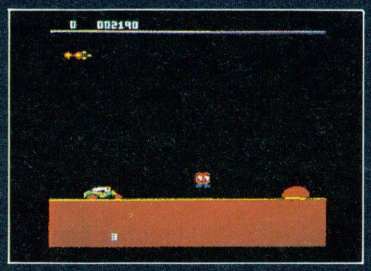

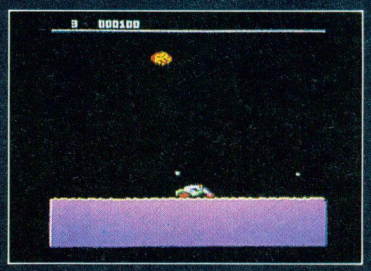

BMX ON THE MOON (32K) **£7.95**

Smooth scrolling-screen arcade action. In this game you control a moon cycle which you use to patrol the surface of the moon. You must avoid the rocks on the surface, and also the monsters bouncing high in the low gravity. You should try to shoot down the spaceships which fly overhead dropping bombs onto the moon surface: A further hazard are the flying barrels which are often just too high to shoot or jump over, and just too low to squeeze underneath.

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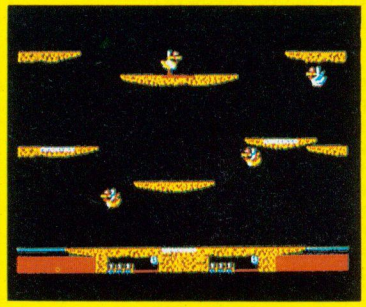

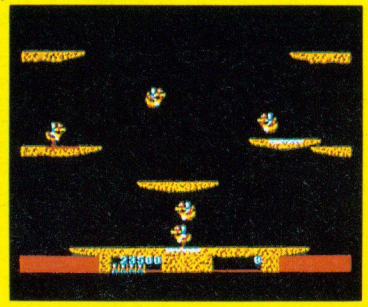

WINGED WARLORDS (32K) **£7.95**

A fascinating arcade-style game for one or two players. Each player rides an ostrich, and the aim is to knock the enemy riders off by colliding with them. In a collision the rider with the highest jousting pole will be victorious. If you are successful, the enemy will revert to its original form: an egg. The egg must be collided with to prevent it from hatching. Avoid the lava bath at the bottom of the screen, and remember: you can fly better by using stronger strokes – imagine you are an ostrich trying to fly!
(KEYBOARD OR JOYSTICKS)

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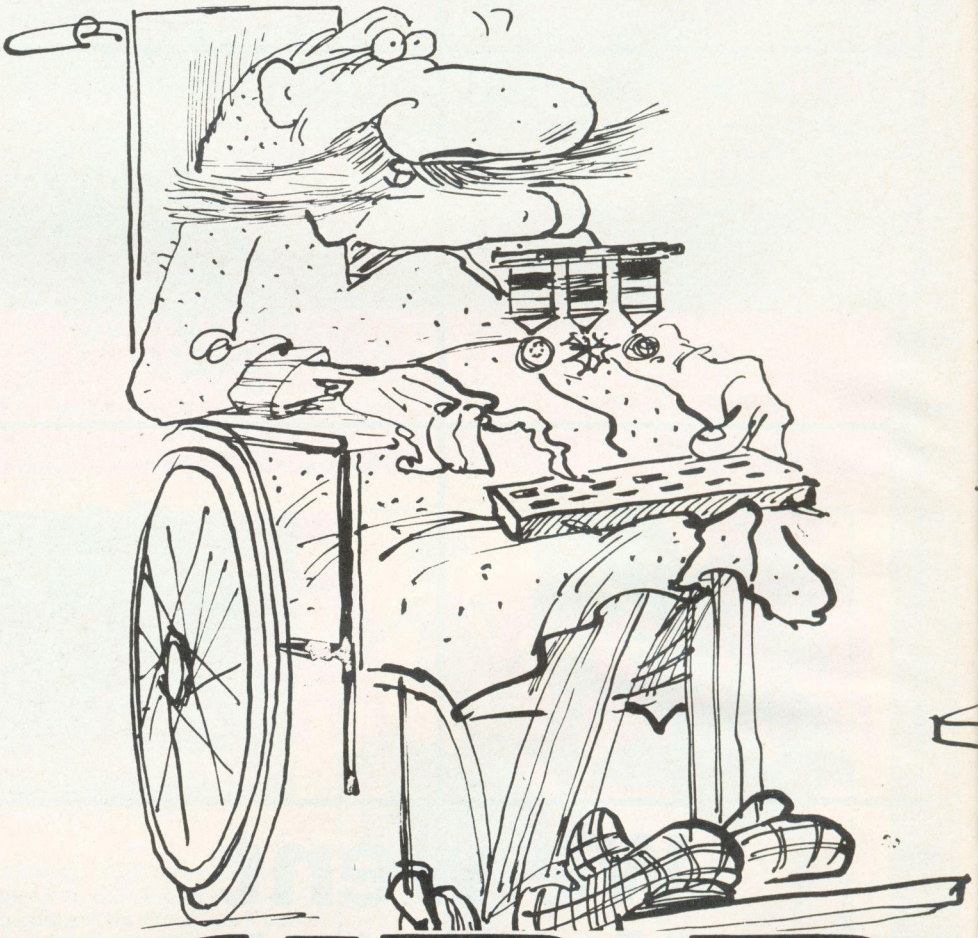
See page 56.

```
   10ONERRORGOTO40
   20*TV255
   30HS%=0
   40ENVELOPE1,5,2,-2,2,1,1,1,80
,0,-127,-127,80,0
   50ENVELOPE2,1,0,0,0,0,0,0,126
,-1,0,-3,126,126
   60ENVELOPE3,3,-1,-1,-1,50,50,
50,126,0,0,-126,126,126
   70ENVELOPE4,2,6,0,0,255,0,0,1
26,0,0,-126,126,126
   80VDU23,224,82,169,82,85,137,
36,73,146
   90VDU23,225,74,37,148,90,28,7
4,36,82
  100VDU23,226,82,36,137,170,145
,36,130,73
  110VDU23,227,28,8,28,28,28,28,
28,8
  120VDU23,230,0,0,60,79,255,255
,0,0
  130VDU23,231,0,3,7,255,255,255
,0,0
  140VDU23,255,255,255,255,255,2
55,255,255,255
  150VDU23,228,0,0,0,63,255,255,
63,0
  160VDU23,229,7,14,28,252,255,2
55,252,0
  170VDU23,233,0,252,252,252,124
,60,28,28
  180VDU23,234,28,28,28,28,28,28
,28,28
  190VDU23,235,28,28,28,28,28,8,
8,8
  200VDU23,236,6,7,7,15,30,60,12
0,240
  210VDU23,237,1,15,31,47,62,60,
120,112
  220VDU23,238,224,192,128,0,0,0
,0,0
  230VDU23,239,224,224,226,231,2
31,231,231,255
  240VDU23,240,54,54,54,54,54,62
,62,255
  250VDU23,241,60,126,126,126,12
6,126,127,255
  260MODE7
  270PROCINST
  280REPEAT
  290SCORE%=0:HITS%=0:DAMAGE%=0:
RO%=FALSE:@%=0:LEVEL%=1
  300X%=96:Y%=96:X1%=X%:Y1%=Y%:F
%=0:A1%=0:B1%=0:C%=12:P%=0:I%=11
00:J%=0:I1%=I%:J1%=J%:BOMB%=0:Q%
=0:V%=0:SP%=12:FR%=40:C1%=0:PIC%
=9:M%=0:U%=10
  310DPLANE$=CHR$237+CHR$238+CHR
$8+CHR$11+CHR$236
  320PLANE$=CHR$230+CHR$231
  330FBOMB$=CHR$233+CHR$8+CHR$10
+CHR$234+CHR$8+CHR$10+CHR$235
  340REPEAT
  350MODE2
  360VDU19,8,0,0,0,0,19,3,5,0,0,
0
  370PROCSET_UP
  380REPEAT
  390PROCGUN
  400PROCFIRE
  410PROCCHOOSE
  420PROCFBOMB
  430PROCPLANE
  440PROCDBOMB
  450UNTILRO%=TRUE OR DAMAGE%=10
0
  460IFRO%=TRUE PROCNEWLEVEL
  470UNTILDAMAGE%=100
  480PROCFINISH
  490UNTILA$<>" "
  500END
  510DEFPROCSET_UP
  520GCOL0,132:CLG
  530COLOUR132:CLS
  540GCOL0,0
  550MOVE5,0:MOVE40,0:PLOT85,5,3
2:PLOT85,40,32
  560GCOL0,1
  570MOVE350,0:MOVE926,0:PLOT85,
926,25:MOVE350,25:PLOT85,350,0
  580VDU5
  590FORLR%=350TO750STEP192
  600MOVELR%,47:VDU239,240,241
  610NEXT
  620VDU4
  630COLOUR5:PRINTTAB(2)"SCORE
   DAMAGE"
  640PRINTTAB(3,2);SCORE%:PRINTT
AB(13,2);DAMAGE%;" %"
  650VDU5
  660ENDPROC
  670DEFPROCCHOOSE
  680IFQ%=1ENDPROC
  690CH%=RND(PIC%):Q%=1
  700ENDPROC
  710DEFPROCGUN
  720PROCKEYS
  730GCOL0,4:PLOT4,40,32:PLOT5,X
1%,Y1%:GCOL0,0:PLOT4,40,32:PLOT5
,X%,Y%:X1%=X%:Y1%=Y%
  740ENDPROC
  750DEFPROCKEYS
  760IFC%<16:IFINKEY(-66)X%=X%-4
:Y%=Y%+4:C%=C%+1:ENDPROC
  770IFC%>6:IFINKEY(-98)X%=X%+4:
Y%=Y%-4:C%=C%-1
  780ENDPROC
  790DEFPROCFIRE
  800IFF%=0AND INKEY(-74)A%=X%:B
%=Y%:F%=1:D%=C%:SOUND&10,2,6,4
  810IFF%=0ENDPROC
```

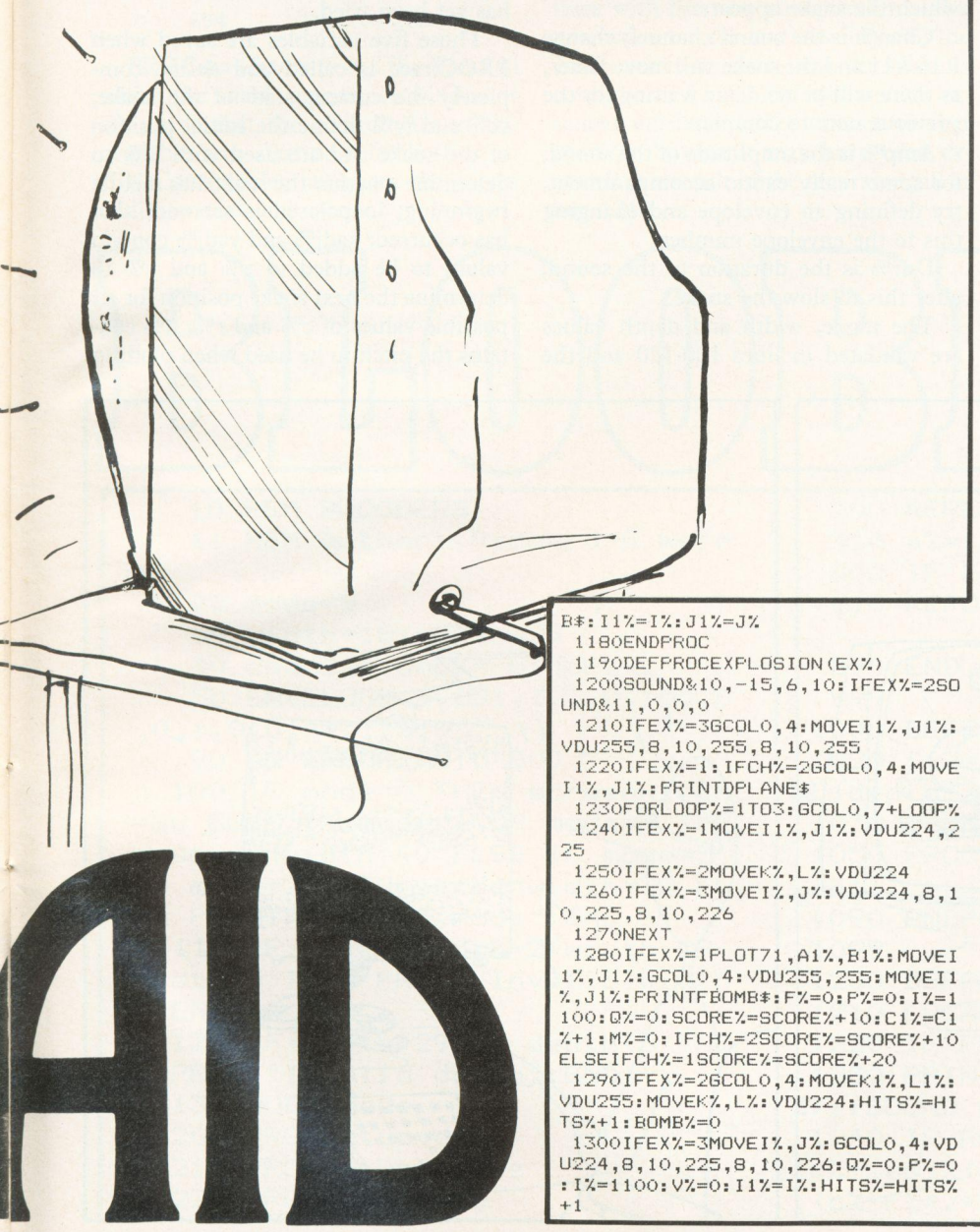
ANYONE nostalgic for the heroic days of World War II can revive the memories with **Air Raid,** written for the BBC B by J K Thorpe of Gainsborough, Lincolnshire.

The player is in charge of the anti-aircraft gun which must defend the city against attacking bombers, dive bombers and doodlebugs. You press A to raise your gun, Z to lower it and RETURN to fire. Destroying an enemy bomber earns you 10 points, a dive bomber 20 points and a doodlebug 30 points. Damage to the city is shown as a percentage and when it reaches 100 percent, the game is lost. Bonus points are awarded at the end of each round.



AIR RA

```
820IFD%=16A%=A%+16:B%=B%+32:GO
TO930
830IFD%=15A%=A%+20:B%=B%+32:GO
TO930
840IFD%=14A%=A%+24:B%=B%+32:GO
TO930
850IFD%=13A%=A%+28:B%=B%+32:GO
TO930
860IFD%=12A%=A%+32:B%=B%+32:GO
TO930
870IFD%=11A%=A%+32:B%=B%+30:GO
TO930
880IFD%=10A%=A%+32:B%=B%+28:GO
TO930
890IFD%=9A%=A%+32:B%=B%+26:GOT
O930
900IFD%=8A%=A%+32:B%=B%+24:GOT
O930
910IFD%=7A%=A%+32:B%=B%+20:GOT
O930
920IFD%=6A%=A%+32:B%=B%+18
930IFPOINT(A%,B%)<4ORPOINT(A%+
10,B%+10)<4ORPOINT(A%-10,B%-10)<
4ORPOINT(A%,B%-28)<4PROCEXPLOSIO
N(1):ENDPROC
940GCOL0,7:PLOT71,A1%,B1%:PLOT
69,A%,B%:A1%=A%:B1%=B%:IFA%>I%+1
28ORB%>J%+32F%=0:PLOT71,A1%,B1%
950ENDPROC
960DEFPROCPLANE
970IFCH%<3ENDPROC
980IFP%=0 J%=RND(450)+400:P%=1
990I%=I%-SP%:MOVEI1%,J1%:GCOL0
,4:PRINTPLANE$
1000IFI%<20P%=0:I%=1100:Q%=0:EN
DPROC
1010MOVEI%,J%:GCOL0,1:PRINTPLAN
E$:I1%=I%:J1%=J%:PROCBOMB
1020SOUND2,1,4,2
1030ENDPROC
1040DEFPROCFBOMB
1050IFCH%<>1ENDPROC
1060IFBOMB%=1PROCBOMB
1070IFP%=0J%=RND(450)+400:V%=RN
D(500)+350:P%=1
1080IFI%<V%PROCDROP:ENDPROC
1090I%=I%-16:MOVEI1%+112,J1%:GC
OL0,4:VDU255
1100IFI%<V%MOVEI1%,J1%:VDU255,2
55:PROCDROP:ENDPROC
1110MOVEI%,J%:GCOL0,0:VDU228,22
9:I1%=I%:J1%=J%
1120SOUND2,1,10,1
1130ENDPROC
1140DEFPROCDROP
1150J%=J%-16:IFPOINT(I%+8,J%-96
)=1ORPOINT(I%+56,J%-96)=1PROCEXP
LOSION(3):ENDPROC
1160MOVEI1%,J1%+16:GCOL0,4:VDU2
55:IFJ%<96MOVEI1%,J1%:PRINTFBOMB
$:Q%=0:P%=0:I%=1100:V%=0:ENDPROC
1170MOVEI%,J%:GCOL0,0:PRINTFBOM
B$:I1%=I%:J1%=J%
1180ENDPROC
1190DEFPROCEXPLOSION(EX%)
1200SOUND&10,-15,6,10:IFEX%=2SO
UND&11,0,0,0
1210IFEX%=3GCOL0,4:MOVEI1%,J1%:
VDU255,8,10,255,8,10,255
1220IFEX%=1:IFCH%=2GCOL0,4:MOVE
I1%,J1%:PRINTDPLANE$
1230FORLOOP%=1TO3:GCOL0,7+LOOP%
1240IFEX%=1MOVEI1%,J1%:VDU224,2
25
1250IFEX%=2MOVEK%,L%:VDU224
1260IFEX%=3MOVEI%,J%:VDU224,8,1
0,225,8,10,226
1270NEXT
1280IFEX%=1PLOT71,A1%,B1%:MOVEI
1%,J1%:GCOL0,4:VDU255,255:MOVEI1
%,J1%:PRINTFBOMB$:F%=0:P%=0:I%=1
100:Q%=0:SCORE%=SCORE%+10:C1%=C1
%+1:M%=0:IFCH%=2SCORE%=SCORE%+10
ELSEIFCH%=1SCORE%=SCORE%+20
1290IFEX%=2GCOL0,4:MOVEK1%,L1%:
VDU255:MOVEK%,L%:VDU224:HITS%=HI
TS%+1:BOMB%=0
1300IFEX%=3MOVEI%,J%:GCOL0,4:VD
U224,8,10,225,8,10,226:Q%=0:P%=0
:I%=1100:V%=0:I1%=I%:HITS%=HITS%
+1
1310DAMAGE%=(HITS%/30)*100:VDU4
:PRINTTAB(3,2);SCORE%:PRINTTAB(1
3,2);DAMAGE%;" %":VDU5:IFC1%=15R
O%=TRUE
1320ENDPROC
1330DEFPROCBOMB
1340U%=U%+1:IFBOMB%=0:IFU%>FR%B
OMB%=1:U%=0:K%=I%+60:L%=J%-32:SO
UND1,3,225,80
1350IFBOMB%=0ENDPROC
1360K1%=K%:L1%=L%:L%=L%-20:IFPO
INT(K%+18,L%-32)=1ORPOINT(K%+42,
L%-32)=1PROCEXPLOSION(2):ENDPROC
1370GCOL0,4:MOVEK1%,L1%:VDU227:
GCOL0,8:MOVEK%,L%:VDU227:IFL%<0E
OMB%=0:SOUND&11,0,0,0
1380ENDPROC
1390DEFPROCDBOMB
1400IFCH%<>2ENDPROC
1410IFP%=0J%=RND(300)+550:CO%=R
ND(200)+250:P%=1
1420IFBOMB%=1PROCBOMB ELSEIFM%=
0:IFJ%<CO%+100U%=FR%:M%=1:PROCBO
MB
1430I%=I%-18:IFJ%>CO%J%=J%-10
1440MOVEI1%,J1%:GCOL0,4:IFJ1%>C
O%PRINTDPLANE$ELSEPRINTPLANE$
1450IFI%<20P%=0:I%=1100:Q%=0:M%
=0:ENDPROC
1460MOVEI%,J%:GCOL0,3:IFJ%>CO%P
RINTDPLANE$:SOUND2,1,30,2ELSEPRI
NTPLANE$:SOUND2,1,4,2
1470I1%=I%:J1%=J%
1480ENDPROC
1490DEFPROCFINISH
1500SOUND&11,4,4,100
1510VDU4:COLOUR9:CLS:PRINTTAB(5
,8)"GAME OVER"
1520IFSCORE%>HS%THENHS%=SCORE%
1530COLOUR5:PRINTTAB(5,12)"SCOR
E ";SCORE%
1540PRINTTAB(2,15)"HIGH SCORE "
;HS%
1550TIME=0:REPEATUNTILTIME=250
1560*FX21,0
1570PRINTTAB(4,20)"Press space"
1580PRINTTAB(3,22)"for another
go"
1590A$=GET$
1600ENDPROC
1610DEFPROCINST
1620PRINTTAB(12,1);CHR$131;CHR$
141;"AIR RAID"
1630PRINTTAB(12,2);CHR$131;CHR$
141;"AIR RAID"
1640PRINTTAB(0,4)"Defend your c
ity against the bombers anddoodl
ebugs with your A.A gun"
1650PRINTTAB(9,7);CHR$133;"A...
.....Elevates gun"
1660PRINTTAB(9,9);CHR$133;"Z...
.....Lowers gun"
1670PRINTTAB(9,11);CHR$133;"RET
URN...Fires"
1680PRINTTAB(9,13);CHR$129;"Bom
ber.....10pts"
1690PRINTTAB(9,15);CHR$129;"Div
e Bomber...20pts"
1700PRINTTAB(9,17);CHR$129;"Doo
dlebug.....30pts"
1710PRINTTAB(12,20);CHR$134;CHR
$136;"PRESS SPACE"
1720A$=GET$
1730ENDPROC
1740DEFPROCNEWLEVEL
1750SOUND&11,4,4,50:BONUS%=100*
LEVEL%
1760LEVEL%=LEVEL%+1:C1%=0:SP%=S
P%+2:FR%=FR%-5:PIC%=PIC%-1:RO%=F
ALSE:BOMB%=0:U%=0:IFPIC%<3PIC%=3
1770IFSP%>20SP%=20
1780SCORE%=SCORE%+BONUS%
1790VDU4
1800COLOUR133:CLS
1810COLOUR0:PRINTTAB(6,12)"LEVE
L "LEVEL%
1820PRINTTAB(3,15)"BONUS ";BONU
S%"PTS"
1830TIME=0:REPEATUNTILTIME=600
1840VDU5
1850ENDPROC
```



Random search with a purpose

Richard Warner reveals the secrets of an entertaining graphics display

BLOOBERS is based on a program published in September, 1980 for the Pet. This version is for a BBC or Electron. It is the only computer program after which a cat has been named.

It is not a game, more an interactive graphics demonstration. A snake moves across the screen, searching continually for its beginning. The path it takes is selected at random; it remembers where it has been, so that a loop eventually is completed. You can press the SPACE bar to force the snake to untrace itself. On completion of a loop, the program stops for six seconds, untraces itself, waits again, and starts a new snake. The slithering of the snake has a musical accompaniment.

The program makes full use of the power of BBC Basic. The plotting procedure is recursive; that means that it calls itself. Remember that when a procedure, or function, is called, the current value of each of the parameters to the procedure is saved. That also happens to all variables mentioned when a LOCAL statement is encountered.

In Bloobers, each new plot of the snake is initiated by a call to PROCtrace. The parameters, which contain the information about the current snake position and which directions it has tried, are saved. That mechanism allows the program to keep track of its path, without having to save the path details explicitly in a series of arrays. The program will run out of memory in which to store its variables unless the screen size is restricted.

Lines 20, 30 and 40 contain variables whose initial values may be altered:

Mode is the screen mode to be used; it may be 0, 1, 2, 4 or 5. With modes 0, 1 and 2, the size of the screen must be reduced, unless you are using a second processor; with a Model A BBC micro, only modes 4 and 5 may be used.

Width is the width of the frame in which the snake appears.

Depth is the depth of the frame in which the snake appears.

Chan% is the sound channel; change it to &11 and the snake will move faster, as there will be no delay waiting for the previous note to complete.

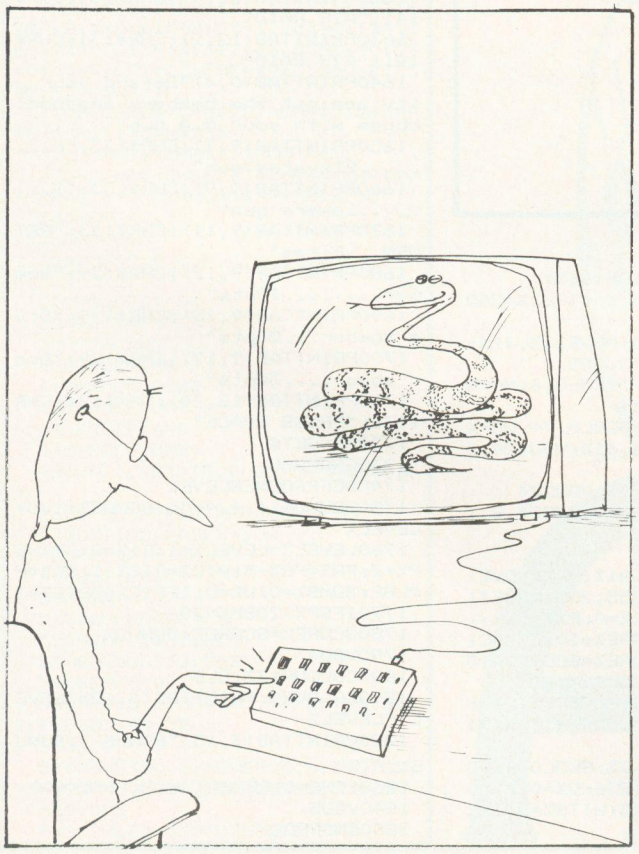
Amp% is the amplitude of the sound; for some really exotic accompaniment, try defining an envelope and changing this to the envelope number.

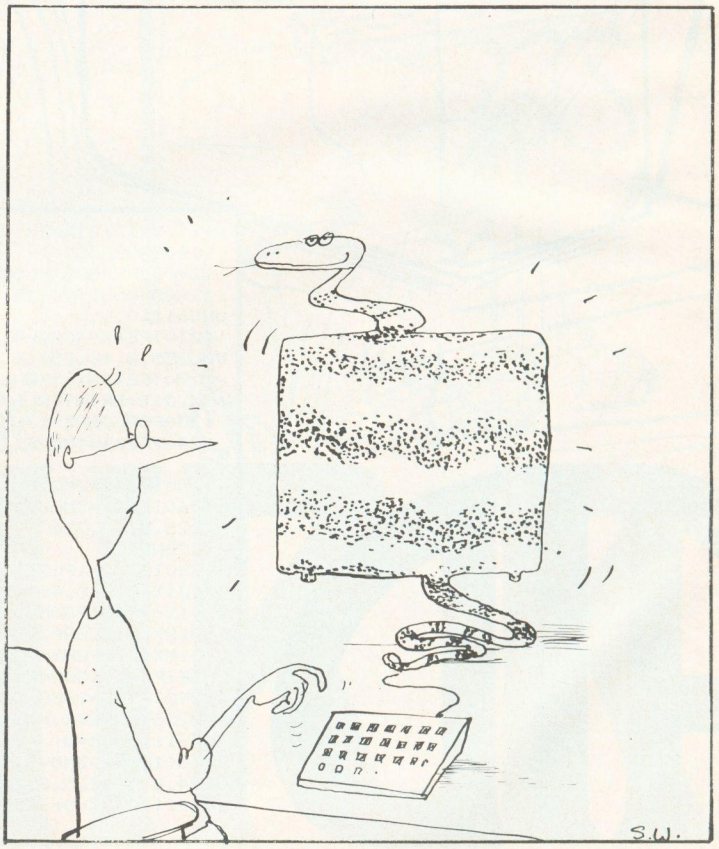
Dur% is the duration of the sound; alter this to slow the snake.

The mode, width and depth values are validated in lines 100-120 and the program will halt if they do not contain valid and consistent values.

Other variables are x% which contains the x co-ordinate of the snake's position; y% contains the y co-ordinate of the snake's position; c% contains the snake character number — it is in the range 0 to 3; 251 is added to obtain the value of the character to be output; r% contains 0 or 1 — it determines which way the snake is twisting; t% indicates whether the second of the two possible directions in which the snake can move has yet been tried.

Those five variables are saved when PROCtrace is called and define completely the current state of the snake; ix% and iy% define the initial position of the snake and are used with ic% to determine whether the snake has met its beginning; loopclosed is set once that has occurred; xadj% and yadj% contain values to be added to x% and y% to determine the next snake position for all possible values of c% and r%; n% contains the pitch to be used when plotting





each of the four characters used in constructing the snake. They are held in line 2590 and may be altered to change the tune.

PROCsetupvdu sets up character definitions for the frame 255 — and the snake 251-254. The four snake characters are quadrants of a circle, as indicated. You could try changing the definitions of the characters used.

```
     251                 252
--------            --------
--------            --------
--------            --------
--------            --------
-----XXX            XX------
----X---            --X-----
---X----            ---X----
---X----            ---X----

---X----            ---X----
---X----            ---X----
---X----            ---X----
----X---            --X-----
-----XXX            XX------
--------            --------
--------            --------
--------            --------
     254                 253
```

PROCdrawframe draws the frame in which the snake appears. A window is set up so that the co-ordinates of the available area start at 1 for both axes. PROCsetuptables initialises the arrays xadj%, yadj% and n%.

A complete trace and untrace of the snake is performed by PROCbloobers. That sets up the initial snake values and calls PROCtrace with those values as parameters. PROCtrace attempts to plot one step of the snake at co-ordinates x%, y% of the frame. It calls FNstoploop to see if it can. It cannot if the character position is already occupied; the snake has met its start point; the space bar is pressed.

PROCtrace immediately exits if FNstoploop returns the value TRUE. It prints the character defined by c% at the defined position and makes a little noise. Line 1240 is the meat of the program; the position to which it must then move is determined by the character last output — c% — and the direction of the twist — r%; arrays xadj% and yadj% are used to determine the new position.

The next character to be output may take one of two values. IF RND (2)=1 selects one at random, calling PROCtrace with the new plot position and a new value for c% and possibly r%; the values selected ensure that the snake is continuous. Line 1250 will not be executed until the snake returns to that position, though it may have been executed as a result of the recursive call at line 1240.

It will then have tried every possible path from that point or have reached the beginning of the snake successfully. At line 1250 the point is unplotted, with some lower-pitched noise. Line 1260 tries using the character not selected when the procedure was called at line 1240, if that has not yet been tried; whether it has been is indicated by t%. If both possibilities have been tried, the procedure exits, having tried every possibility from that point, or met the beginning of the snake.

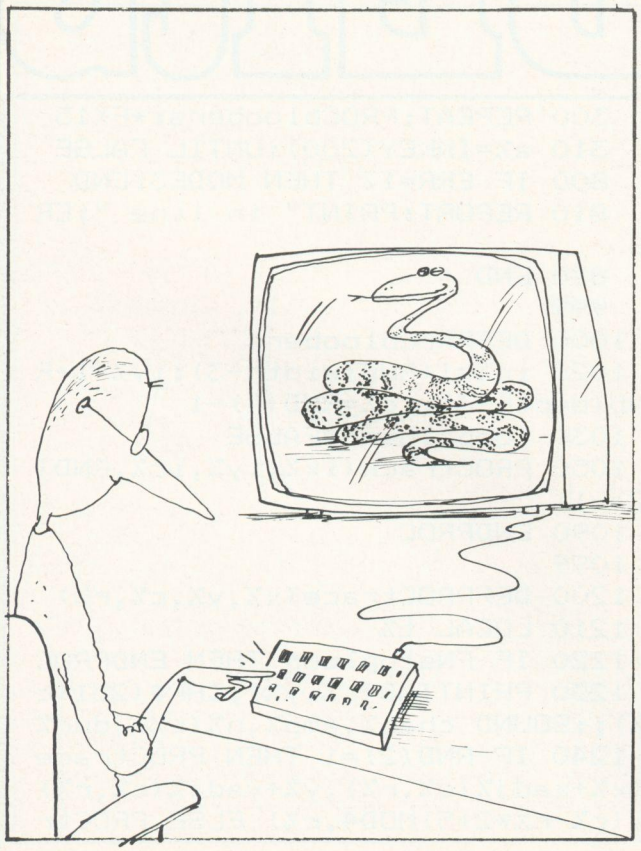
FNstoploop determines whether the plotting is to continue. If the SPACE bar is pressed, or the snake has already met its beginning, the value TRUE is returned, meaning stop. If the character at the current position is a space, it exits with the value FALSE, meaning continue. That will prevent the snake not only over-writing itself but trying to leave the frame in which it is drawn. The remaining lines of the function check to see if the snake has met its beginning; if it has, loopclosed is set to ensure that TRUE is always returned by FNstoploop, forcing the snake to untrace itself. FNchar returns the ASCII code of the character at the defined co-ordinate.

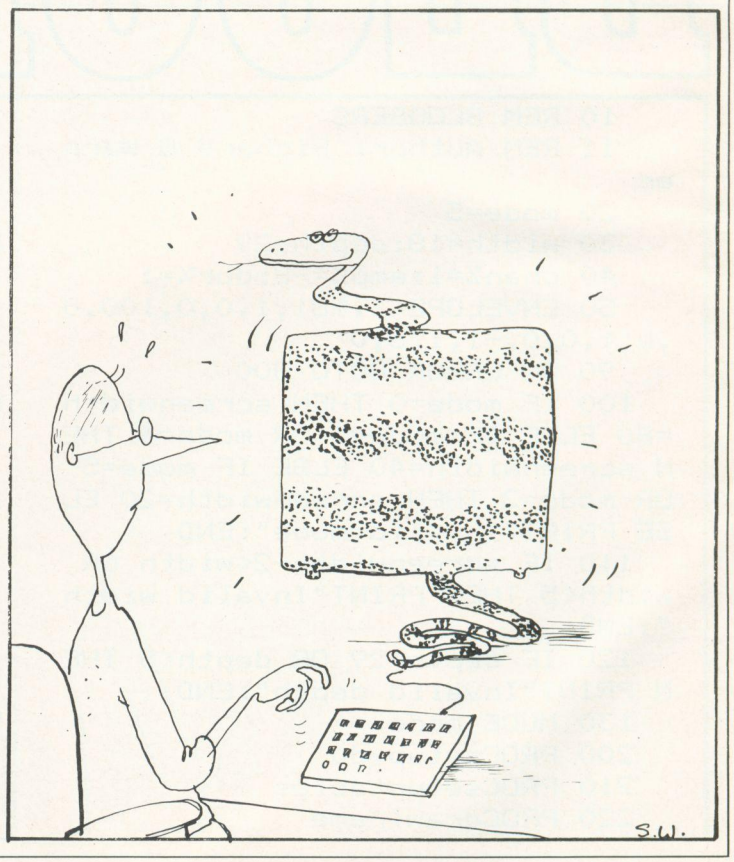
Disc users should re-locate the program to address &E00 before running it unless they have a second processor.

BLOOBERS

```
   10 REM BLOOBERS
   11 REM Author: Richard G Warn
er
   20 mode=5
   30 width=18:depth=29
   40 chan%=1:amp%=-8:dur%=1
   50 ENVELOPE 1,&81,1,0,0,100,0
,0,1,0,0,-1,126,0
   90 ON ERROR GOTO 800
  100 IF mode=0 THEN screenwidth
=80 ELSE IF mode=1 OR mode=4 THE
N screenwidth=40 ELSE IF mode=5
OR mode=2 THEN screenwidth=20 EL
SE PRINT"Invalid mode":END
  110 IF screenwidth-2<width OR
width<5 THEN PRINT"Invalid width
":END
  120 IF depth>29 OR depth<5 THE
N PRINT"Invalid depth":END
  130 MODE mode
  200 PROCsetupvdu
  210 PROCsetuptables
  220 PROCdrawframe
  300 REPEAT:PROCbloobers:*FX15
  310 a%=INKEY(200):UNTIL FALSE
  800 IF ERR=17 THEN MODE3:END
  810 REPORT:PRINT" in line ";ER
L
  890 END
  999
 1000 DEFPROCbloobers
 1020 ix%=1+RND(width-3):iy%=1+R
ND(depth-3):ic%=RND(4)-1
 1030 loopclosed=FALSE
 1050 PROCtrace(ix%,iy%,ic%,RND(
2)-1)
 1090 ENDPROC
 1099
 1200 DEFPROCtrace(x%,y%,c%,r%)
 1210 LOCAL t%
 1220 IF FNstoploop THEN ENDPROC
 1230 PRINTTAB(x%,y%);CHR$(251+c
%);:SOUND chan%,amp%,n%(c%),dur%
 1240 IF RND(2)=1 THEN PROCtrace
(x%+xadj%(c%,r%),y%+yadj%(c%,r%)
,(c%-r%*2+5)MOD4,r%) ELSE PROCtr
```

```
ace(x%+xadj%(c%,r%),y%+yadj%(c%,
r%),(c%-r%*4+6)MOD4,1-r%)
 1250 PRINTTAB(x%,y%);" ";:SOUND
 chan%,amp%,n%(c%)-64,dur%
 1260 IF NOT t% THEN r%=1-r%:c%=
(c%-2*r%+3)MOD4:t%=TRUE:GOTO1220
 1290 ENDPROC
 1299
 1500 DEFFNstoploop
 1510 LOCAL w%:IF loopclosed OR
INKEY(-99) THEN =TRUE
 1520 IF FNchar(x%,y%)=32 THEN =
FALSE
 1530 IF ix%<>x% OR iy%<>y% THEN
 =TRUE
 1540 w%=(ic%-c%+4)MOD4
 1550 IF w%>0 THEN IF (r%=0 AND
w%<>1) OR (r%=1 AND w%<>3) THEN
=TRUE
 1560 loopclosed=TRUE:*FX15
 1570 w%=INKEY(600):=TRUE
 1599
 2000 DEFPROCsetupvdu
 2020 VDU23,255,255,255,255,255,
255,255,255,255
 2030 VDU23,251,0,0,0,0,7,8,16,1
6
 2040 VDU23,252,0,0,0,0,192,32,1
6,16
 2050 VDU23,253,16,16,16,32,192,
0,0,0
 2060 VDU23,254,16,16,16,8,7,0,0
,0
 2070 VDU23,1,0,0,0,0,0,0,0,0
 2090 ENDPROC
 2099
 2200 DEFPROCdrawframe
 2210 LOCAL I
 2220 VDU28,(screenwidth-width)/
2-1,31,screenwidth-1,(30-depth)/
2,30
 2230 PRINTSTRING$(width+2,CHR$(
255))
 2240 FOR I=1 TO depth
 2250 PRINTTAB(0,I);CHR$(255);SP
C(width);CHR$(255);
 2260 NEXT
 2270 PRINTTAB(0,depth+1);STRING
$(width+2,CHR$(255));
 2290 ENDPROC
 2299
 2500 DEFPROCsetuptables
 2510 LOCAL I,J
 2530 DIM xadj%(3,1),yadj%(3,1),
n%(3)
 2540 FOR I=0 TO 3:FOR J=0 TO 1
 2550 READ xadj%(I,J),yadj%(I,J)
 2560 NEXT:NEXT
 2570 FOR I=0 TO 3:READ n%(I):NE
XT:ENDPROC
 2580 DATA 1,0,0,1,0,1,-1,0,-1,0
,0,-1,0,-1,1,0
 2590 DATA 97,109,73,65
 2599
 4000 DEFFNchar(x%,y%)
 4010 LOCAL A%
 4020 PRINTTAB(x%,y%);:A%=&87:=(
USR(&FFF4)AND&FF00)DIV&100
 4099
```





Continuing his programming series, Jeremy Richards explains how you can ring the changes on the sounds emitted by your BBC or Electron

Parameters are instrumental in making music

A VARIETY of commands were shown in the first two parts of this series which form the basis of many programs. Now I change direction and concentrate on the SOUND and ENVELOPE commands. The SOUND command, as its name suggests, and ENVELOPE statement are two commands responsible for producing all those beeps and noises which can emanate from your BBC or Electron.

The sound generator of the BBC and Electron computers is very sophisticated and with a little work from the programmer can produce both musical and noise effects. There is, though, a difference between the sound generators on the BBC and Electron and I will indicate those differences.

The SOUND statement consists of four parts or, to be more precise, parameters. Those parameters control the sound channel to be used, the volume of the sound, the pitch — tone — and the duration for which the sound is played.

That is not so complicated as it sounds. Let us look at each part of the SOUND command in detail. Type-in the following line and then press RETURN:

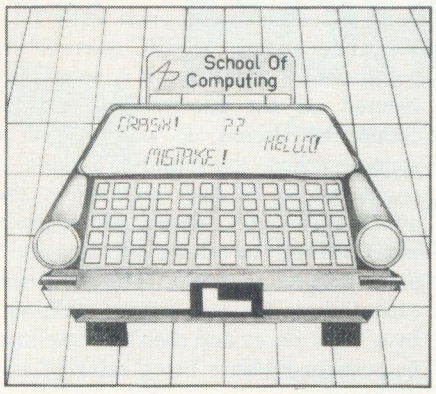
SOUND 1,−15,150,20

You should then have heard a high-pitched beep which lasted for about one second. To understand how I created that sound, let us break the four sets of numbers, which you can see are divided by commas, into their respective parameters and label them:

SOUND C,A,P,D

On the BBC computer there are four sound channels — one for noise, the other three for tone. That is where the first difference occurs between the Electron and BBC. On the Electron only one of those channels can be used at a time, whereas on the BBC they can be synchronised.

We need not worry about that as we



concentrate on creating a sound on one channel only. The four channels are numbered from 0 to 3, the first channel — channel 0 — being the noise channel and channels 1 to 3 responsible for tone. If you are not clear about the difference between noise and tone, type-in the preceding sound example, changing the channel number from 1 to 0. So the statement looks like this:

SOUND 0,−15,150,20

The sound you hear then is not a pure tone but something rather like an explosion. Also change the C parameter to the numbers 1, 2 and 3. Notice that the numbers 1 to 3 make no difference to the sound produced; they are all exactly the same. If you have a BBC you could play three different sounds on three separate channels in unison, allocating one sound to each channel.

The A parameter is the second part of the sound statement, the A meaning amplitude. Once more this parameter has diverse meanings, depending whether you own a BBC or Electron. I will explain the BBC version first, as in the case of all the parameters it is more versatile. The amplitude parameter can be used in three ways.

First, if the number is negative the sound is turned on. That number can be in the range −1 to −15 and increases in volume with −15 the loudest. On the Electron the volume cannot be changed in that way and a negative number signifies only that the sound is switched on.

Second, and this applies to the BBC and Electron equally, if the value assigned to A is zero the sound is turned off. Finally, if the number is between 1 to 16 inclusive an ENVELOPE of that same number will be selected. If you have a BBC you can try altering the volume by changing the negative number between the ranges.

'We could produce tones which cover the spectrum of sounds over a range of five octaves'

The third part of the sound statement is the P parameter, the segment which deals with the pitch of the sound being generated. The value entered can be in the range 0 to 255. If you are musically-minded it can be translated as representations of tones and semitones. Each value is a quarter-semitone and therefore we could produce tones which cover the spectrum of musical sounds over a range of five octaves. To see the effect of those numbers, change the value of P and you will hear a change in the pitch of the note.

The P parameter can have another meaning if the channel you are using is

continued on page 56

continued from page 55

zero — the noise channel. Values between 0 to 7 change the kind of noise generated and once more experiment with those sounds by allocating channel 0 and altering the P parameter.

The duration of a sound is controlled by the D parameter. Each step represents 50mS, so to make the sound last for one second D should equal 20. You have to multiply D by 50 and divide the result by 1,000. Try changing the parameters and you will see how easy it is to create different sounds.

The range of possibilities, however, does not end with the SOUND command. To generate more complex sounds we must turn to the ENVELOPE statement. That is unfortunately where matters become complicated. The ENVELOPE statement has associated with its use 14 parameters. That may seem awesome but its not really so bad once you have played with the parameters. In fact, that is where you can have a good deal of fun trying to create new sounds.

The ENVELOPE statement parameters can be labelled:
ENVELOPE N, T, PI1, PI2, PI3, PN2, PN3, AA, AD, AS, AR, ALA, ALD

Do not be deterred. It is much easier than it looks. The first value N is the envelope number and that refers directly to the number used in the A section of the SOUND statement. To run the sound created you must ensure that A is equal to N. The next value T defines the length of step in one-hundredths of a second or the duration of each pitch change in the specified envelope. For the range allowed for it and other parameters see figure one.

The envelope consists of three stages and the next six parts refer to those three time periods. The six parameters can be divided neatly into two parts, the first three referring to the number of steps involved in the changing of pitch in each section and the last three referring to the number of pitch changes in each of the sections.

Let us look at an example. In the first time stage the parameters concerned are PI1 and PN1. If PI1 equals 1 and PN1 equals 6, imagine a set of stairs with six steps which you are climbing one step at a time. PI1 refers to the size of those step changes, therefore if PI1 was equal to four the step change would be greater. In a similar way, PN1 is the number of steps taken. If we climb our stairs then there are still six steps to climb but we will go that much higher because each step is equivalent to four.

Those changes take place in hundredths of a second, depending on the value you set in T. So PI1, PI2 and PI3 have the same range of values but can be different, as each refers to one of the three time stages respectively. The same applies to parameters PN1, PN2 and PN3. If you are an Electron user your troubles are over because that is as far as the command goes. The remaining six parameters are given a value of 0 to keep it compatible with the BBC but they will have no effect. Remember those zeros must be added for the command to work.

The six preceeding parameters have been concerned with pitch. The final six parameters on the BBC relate to the volume, thus the reason it is not implemented on the Electron, as volume cannot be altered. If we think of a sound, perhaps the sound of a piano, it could consist of four sections — the attack phase AA, decay AD, sustain phase AS and the release AR. Imagine a piano note being struck. It has an attack phase where the note begins, followed by a slight decay and then the note may be sustained before being released and dying away.

Those parameters refer to the change of amplitude — volume — to each step of time. The last two parameters relate to the volume after the attack phase — ALA — and the volume after the decay phase — ALD. You can think of those two parameters as the levels to which the volume will rise or fall. They mark the range for the volume changes to stop.

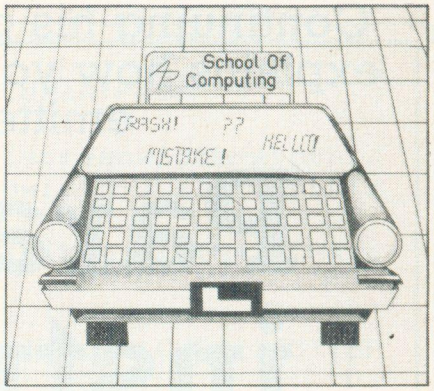
'Either by coincidence or experience, you will create some interesting and surprising effects'

The best way to master the ENVELOPE and SOUND commands is to mess about with the numbers to have an idea of what is happening. Either by coincidence or with experience, or both, you will create some interesting and surprising sound effects.

Remember that the ENVELOPE command will not work without the SOUND statement. I include a short program which creates the sound of a telephone ringing at the other end of the line. Type-in program one:

Program 1

```
10 ENVELOPE 1,1,127,-127,127,1,1,1,
   127,127,-127,-127,126,127
20 SOUND 1,1,160,20
30 FOR pause = 0 TO 5000:NEXT
40 GOTO 20
```



Line 30 has been put in to stop the program for a short time to break up the sound before it is called again in line 40. Note that once an ENVELOPE has been defined it is not necessary for the program to GOTO line 10 again. Once defined, the computer knows that if the number 1 appears in the A section of the SOUND command, ENVELOPE number 1 should be used.

To have you thinking about music on your BBC or Electron, the following program will play a chromatic octave of the 12 semitones from A below middle C:

Program 2

```
10 FOR pitch = 40 TO 88 STEP 4
20 SOUND 1,-15,pitch,5
30 NEXT
```

Line 10 dictates the range of pitch to be played, starting at 40, which is the value for A below middle C, to 80, the value for A above middle C. The sound is played in line 20 where the appropriate pitch is played each time round the loop and the loop is incremented in steps of four. If you remember each pitch number represents a quarter-semitone, to play a semitone every time we need to jump four steps because that is equal to a semitone.

It is worth spending some time exploring the sound capabilities of your Acorn machine. I will return to the subject of sound and music later in the series. Until then, have fun creating new sounds and if you have any particularly interesting or weird ones, send them to me for possible publication.

Figure 1.

Parameters	Range
N	1 to 4
T	0 to 127
PI1	-128 to 127
PI2	-128 to 127
PI3	-128 to 127
PN1	0 to 255
PN2	0 to 255
PN3	0 to 255
AA	-127 to 127
AD	-127 to 127
AS	-127 to 0
AR	-127 to 0
ALA	0 to 126
ALD	0 to 127

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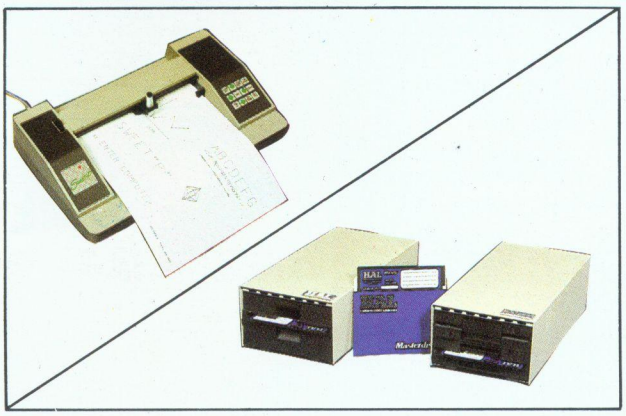

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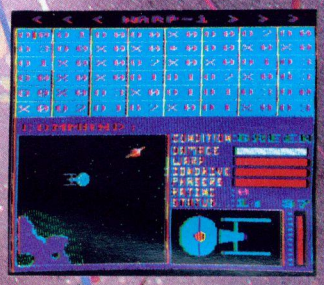

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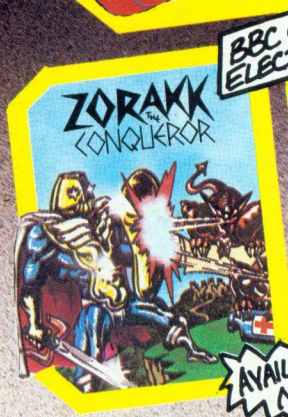

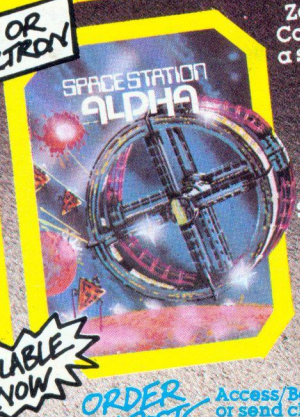

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