95p

sinclair programs

40 programs for the Spectrum, ZX81 and ZX80

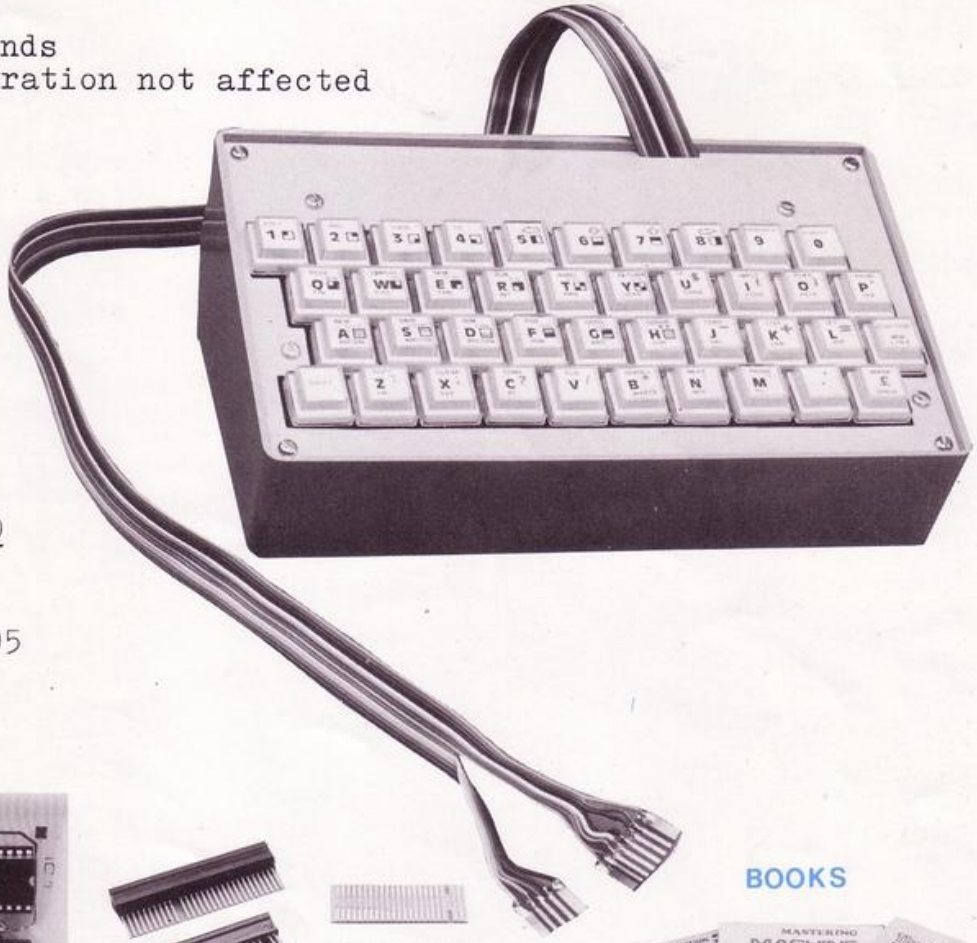
July/August

OCTOPUS
TREASURE HUNT
FIRE BRIGADE
GOLF
CRIBBOARD
STUNT RIDER
CONSTELLATIONS
MEMORY TEST
ALIEN LURE
HAPPY FACE
TRAIN BLOCK
SHIP MISSILE
EXTERMINATE
KNIGHTS MOVE
PIGEON RACE
SPECTRUM RAINBOW
ZOMBIES
GRUB RACE
SIMPLE SUMS
WORD PUZZLER
SOLITAIRE
SKETCHER
SPACE SHIP DOCKER
DUEL
STAR SMASH
MORSE CODE TUTOR

KEYBOARD £25·70

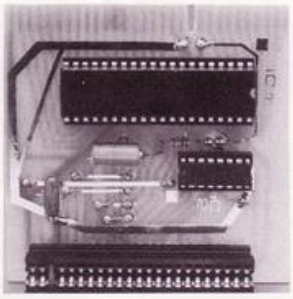
No soldering - just plug in
Proper switches
Two colour legends
RAM/PRINTER operation not affected

KIT £20·50
CASE 10·30
EXTRA KEYS
48 P



MUSIC BOARD

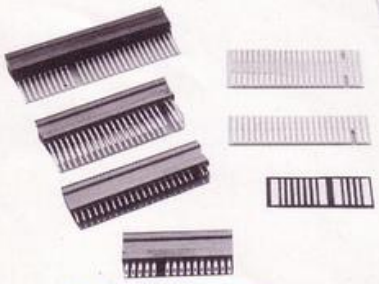
3 channels
Kit £16.95
Built £18.95



IN OUT PORT

24 Lines(in or out)
Controlled by (BASIC)

Built £16.95
Kit £18.95



CONNECTORS

23 Way female	£2.95
23 Way male	1.30
30 way ribbon	1.40

BOOKS

Getting acquainted	4.95
Mastering machine code	5.95
Programming for real applications	6.95
Tape for above	11.44

REDDITCH ELECTRONICS

Distributors for Redditch Electronics:
HARRIS LOCKYER ASSOCIATES
DEPT SP
33 PEDMOR CLOSE
WOODROW SOUTH
REDDITCH, WORCS.
TEL: 0527 24452.

Send SAE for free illustrated catalogue (5" x 7")
All prices include VAT and postage.
Orders under £10 add 40p.
Overseas add £1.80

BARCLAYCARD VISA Access

Contents

Editor
Nigel Clark

Production editor
Harold Mayes

Design
Bill Scolding

Editorial director
John Sterlicchi

Advertisement director
Simon Horgan

Advertisement manager
Les Morton

Editorial/production assistant
Sue Hawes

Managing director
Terry Cartwright

Chairman
Richard Hease

Sinclair Progams is published monthly by ECC Publications Ltd. It is not in anyway connected with Sinclair Research Ltd.

Telephone
All departments
01-359 7481

If you would like to contribute to Sinclair Programs, please send programs (preferably on cassette) to—
Sinclair Programs
ECC Publications,
30-31 Islington Green,
London N1 8BJ

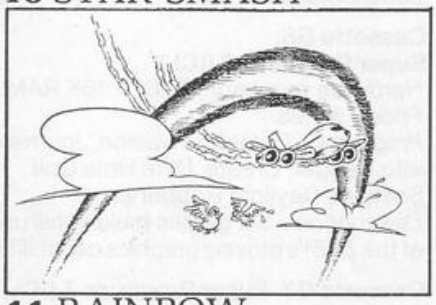
We will pay £10 for each program printed.

© Copyright 1982
Sinclair Progams
ISSN No. 0263-0265

Printed and typeset by
Bournehall Press Ltd,
Welwyn Garden City,
Herts.

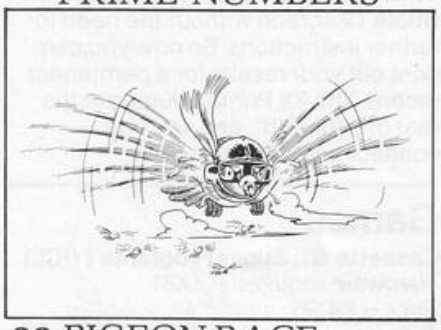
Distributed by
Spotlight Magazine Distibution Ltd,
1 Benwell Road
Holloway,
London N7
01-607 6411

8 OCTOPUS
9 DRAGON CRUNCH
10 STAR SMASH



11 RAINBOW SPECTRUM
12 WORD PROCESSOR
14 TRAIN BLOCK SUMS
15 PONTOON
17 HANGMAN
18 CHORDS
19 TREASURE HUNT
20 CRIBBOARD

21 ALIEN LURE
23 WIPE OUT SHIPS
24 PEARL DIVER
25 CONSTELLATIONS
26 WORD PUZZLER
28 FIRE BRIGADE MEMORY TEST
29 KNIGHT'S MOVE
30 STUNT RIDER
31 DOCKING
32 GOLF
34 HAPPY FACE DUEL
35 LEAGUE TABLES
37 TUG PRIME NUMBERS



38 PIGEON RACE
40 COMPOUND INTEREST OWZAT
41 OL' FAITHFUL
42 COVER THE BOX
44 MULTIPLICATION TRAIN

45 ZOMBIES
46 SKETCHER MORSE CODE
47 SOLITAIRE
48 GRUB RACE

New ZX81 Software from Sinclair.

A whole new range of software for the Sinclair ZX81 Personal Computer is now available – direct from Sinclair. Produced by ICL and Psion, these really excellent cassettes cover games, education, and business/household management.

Some of the more elaborate programs can only be run on a ZX81 augmented by the ZX 16K RAM pack. (The description of each cassette makes it clear what hardware is required.) The RAM pack provides 16-times more memory in one complete module, and simply plugs into the rear of a ZX81. And the price has just been dramatically reduced to only £29.95.

The Sinclair ZX Printer offer full alphanumerics and highly-sophisticated graphics. A special feature is COPY which prints out exactly what is on the whole TV screen without the need for further instructions. So now you can print out your results for a permanent record. The ZX Printer plugs into the rear of your ZX81, and you can connect a RAM pack as well.

Games

Cassette G1: Super Programs 1 (ICL)
Hardware required – ZX81.
Price – £4.95.
Programs – Invasion from Jupiter. Skittles. Magic Square. Doodle. Kim. Liquid Capacity.
Description – Five games programs plus easy conversion between pints/gallons and litres.

Cassette G2: Super Programs 2 (ICL)
Hardware required – ZX81.
Price – £4.95.
Programs – Rings around Saturn. Secret Code. Mindboggling. Silhouette. Memory Test. Metric conversion.
Description – Five games plus easy conversion between inches/feet/yards and centimetres/metres.

Cassette G3: Super Programs 3 (ICL)
Hardware required – ZX81.
Price – £4.95.
Programs – Train Race. Challenge. Secret Message. Mind that Meteor. Character Doodle. Currency Conversion.
Description – Fives games plus currency conversion at will – for example, dollars to pounds.

Cassette G4: Super Programs 4 (ICL)
Hardware required – ZX81.
Price – £4.95.
Programs – Down Under. Submarines. Doodling with Graphics. The Invisible Invader. Reaction. Petrol.
Description – Five games plus easy conversion between miles per gallon and European fuel consumption figures.

Cassette G5: Super Programs 5 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £4.95.
Programs – Martian Knock Out. Graffiti. Find the Mate. Labyrinth. Drop a Brick. Continental.
Description – Five games plus easy conversion between English and continental dress sizes.

Cassette G6: Super Programs 6 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £4.95.
Programs – Galactic Invasion, Journey into Danger. Create. Nine Hole Golf. Solitaire. Daylight Robbery.
Description – Six games making full use of the ZX81's moving graphics capability.

Cassette G7: Super Programs 7 (ICL)
Hardware required – ZX81.
Price: – £4.95.
Programs – Racetrack. Chase. NIM. Tower of Hanoi. Docking the Spaceship. Golf.
Description – Six games including the fascinating Tower of Hanoi problem.

Cassette G8: Super Programs 8 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £4.95.
Programs – Star Trail (plus blank tape on side 2).
Description – Can you, as Captain Church of the UK spaceship Endeavour, rid the galaxy of the Klingon menace?

Cassette G9: Biorhythms (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £6.95.
Programs – What are Biorhythms? Your Biohythms.
Description – When will you be at your peak (and trough) physically, emotionally, and intellectually?

Cassette G10: Backgammon (Psion)
Hardware required – ZX81 + 16K RAM.
Price – £5.95.
Programs – Backgammon. Dice.
Description – A great program, using fast and efficient machine code, with graphics board, rolling dice, and doubling dice. The dice program can be used for any dice game.

Cassette G11: Chess (Psion)
Hardware required – ZX81 + 16K RAM.
Price – £6.95.
Programs – Chess, Chess Clock.
Description – Fast, efficient machine code, a graphic display of the board and pieces, plus six levels of ability, combine to make this one of the best chess programs available. The Chess Clock program can be used at any time.

Cassette G12: Fantasy Games (Psion)
Hardware required – ZX81 (or ZX80 with 8K BASIC ROM) + 16K RAM.
Price – £4.75.
Programs – Perilous Swamp. Sorcerer's Island.
Description – Perilous Swamp: rescue a beautiful princess from the evil wizard Sorcerer's Island: you're marooned. To escape, you'll probably need the help of the Grand Sorcerer.

Cassette G13: Space Raiders and Bomber (Psion)
Hardware required – ZX81 + 16K RAM.
Price – £3.95.
Programs – Space Raiders. Bomber.
Description – Space Raiders is the ZX81 version of the popular pub game. Bomber: destroy a city before you hit a sky-scraper.

Cassette G14: Flight Simulation (Psion)
Hardware required – ZX81 + 16K RAM.
Price – £5.95.
Program – Flight Simulation (plus blank tape on side 2).
Description – Simulates a highly manoeuvrable light aircraft with full controls, instrumentation, a view through the cockpit window, and navigational aids. Happy landings!

Education

Cassette E1: Fun to Learn series – English Literature 1 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £6.95.
Programs – Novelists. Authors.
Description – Who wrote 'Robinson Crusoe'? Which novelist do you associate with Father Brown?

Cassette E2: Fun to Learn series – English Literature 2 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £6.95.
Programs – Poets, Playwrights. Modern Authors.
Description – Who wrote 'Song of the Shirt'? Which playwright also played cricket for England?

Cassette E3: Fun to Learn series – Geography 1 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £6.95.
Programs – Towns in England and Wales. Countries and Capitals of Europe.
Description – The computer shows you a map and a list of towns. You locate the towns correctly. Or the computer challenges you to name a pinpointed location.

Cassette E4: Fun to Learn series – History 1 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £6.95.
Programs – Events in British History. British Monarchs.
Description – From 1066 to 1981, find out when important events occurred. Recognise monarchs in an identity parade.

Cassette E5: Fun to Learn series – Mathematics 1 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £6.95.
Programs – Addition/Subtraction. Multiplication/Division.
Description – Questions and answers on basic mathematics at different levels of difficulty.

Cassette E6: Fun to Learn series – Music 1 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £6.95.
Programs – Composers. Musicians.
Description – Which instrument does James Galway play? Who composed 'Peter Grimes'?

Cassette E7: Fun to Learn series – Inventions 1 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £6.95.
Programs – Inventions before 1850. Inventions since 1850.
Description – Who invented television? What was the 'dangerous Lucifer'?

Cassette E8: Fun to Learn series – Spelling 1 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £6.95.
Programs – Series A1-A15. Series B1-B15.
Description – Listen to the word spoken on your tape recorder, then spell it out on your ZX81. 300 words in total suitable for 6-11 year olds.

Business/household

Cassette B1: The Collector's Pack (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £9.95.
Program – Collector's Pack, plus blank tape or side 2 for program/data storage.
Description – This comprehensive program should allow collectors (of stamps, coins etc.) to hold up to 400 records of up to 6 different items on one cassette. Keep your records up to date and sorted into order.

Cassette B2: The Club Record Controller (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £9.95.
Program – Club Record Controller plus blank tape on side 2 for program/data storage.
Description – Enables clubs to hold records of up to 100 members on one cassette. Allows for names, addresses, 'phone numbers plus five lots of additional information – eg type of membership.

Cassette B3: VU-CALC (Psion)
Hardware required – ZX81 + 16K RAM.
Price – £7.95.
Program – VU-CALC.
Description – Turns your ZX81 into an immensely powerful analysis chart. VU-CALC constructs, generates and calculates large tables for applications such as financial analysis, budget sheets, and projections. Complete with full instructions.

Cassette B4: VU-FILE (Psion)
Hardware required – ZX81 + 16K RAM.
Price – £7.95.
Programs – VU-FILE. Examples.
Description – A general-purpose information storage and retrieval program with emphasis on user-friendliness and visual display. Use it to catalogue your collection, maintain records or club memberships, keep track of your accounts, or as a telephone directory.

How to order

Simply use the FREEPOST order form below and either enclose a cheque or give us your credit card number. Credit card holders can order by phone – simply call Camberley (0276) 66104 or 21282 during office hours. Either way, please allow up to 28 days for delivery, and there's a 14-day money-back option, of course.

sinclair
ZX81
SOFTWARE

Sinclair Research Ltd,
Stanhope Road, Camberley, Surrey, GU15 3PS.
Tel: Camberley (0276) 66104 & 21282.

To: Sinclair Research, FREEPOST, Camberley, Surrey, GU15 3BR.
Please send me the items I have indicated below.

Qty	Cassette	Code	Item price	Total
	G1: Super Programs 1	30	£4.95	
	G2: Super Programs 2	31	£4.95	
	G3: Super Programs 3	32	£4.95	
	G4: Super Programs 4	33	£4.95	
	G5: Super Programs 5	34	£4.95	
	G6: Super Programs 6	35	£4.95	
	G7: Super Programs 7	36	£4.95	
	G8: Super Programs 8	37	£4.95	
	G9: Biorhythms	38	£6.95	
	G10: Backgammon	39	£5.95	
	G11: Chess	40	£6.95	
	G12: Fantasy Games	41	£4.75	
	G13: Space Raiders & Bomber	42	£3.95	
	G14: Flight Simulation	43	£5.95	
	E1: English Literature 1	44	£6.95	

Qty	Cassette	Code	Item price	Total
	E2: English Literature 2	45	£6.95	
	E3: Geography 1	46	£6.95	
	E4: History 1	47	£6.95	
	E5: Mathematics 1	48	£6.95	
	E6: Music 1	49	£6.95	
	E7: Inventions 1	50	£6.95	
	E8: Spelling 1	51	£6.95	
	B1: Collector's Pack	52	£9.95	
	B2: Club Record Controller	53	£9.95	
	B3: VU-CALC	54	£7.95	
	B4: VU-FILE	55	£7.95	
	ZX 16K RAM pack	18	£29.95	
	ZX Printer	27	£59.95	
	Post & packing – *only* if ordering hardware		£2.95	

TOTAL £ ____

I enclose a cheque/postal order to Sinclair Research Ltd for £ ____

Please charge my *Access/Barclaycard/Trustcard no.
**Please delete as applicable.*

Mr/Mrs/Miss

Address

NSA 26

sinclair programs

Say hello to the magazine that no Sinclair User can do without

We are proud to announce **Sinclair Programs** which, with its unique formula, is going to prove a great companion publication to **Sinclair User.**

The first edition of Sinclair Programs is on sale now and contains 40 programs covering the whole spectrum of ZX usage . . . all listed for you to key in. To guarantee you receive the magazine that guarantees you hours of enjoyment fill in the order form below.

ORDER FORM

☐ Please start me a subscription to Sinclair Programs at £6.60 for six issues including postage.
Applies U.K. only.

☐ Please send me a single copy of Sinclair Programs at £1.10 to include postage.
Applies U.K. only.

I enclose a cheque for £..... made payable to ECC Publications Ltd.

Name.....

Address.....

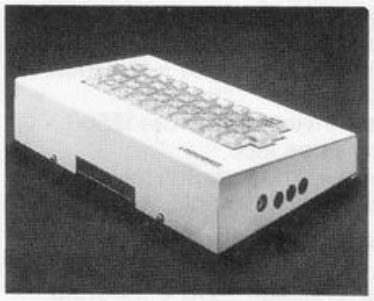
Also available at all leading newsagents.

PROTOS 2

KEYBOARD AND ENCLOSURE FOR ZX81

IDEAL FOR THE CLASSROOM, INDUSTRY, OFFICE OR HOME

- Top industry specification computer keys, not calculator types, and good for 6 million operations.
- Heavy guage steel body enclosing ZX81 PCB and keyboard — weight 1.5kg.
- No soldering — connectors mimmick ZX81 connectors.
- Just 3 fixings for ZX81 PCB and 2 screws fix case.
- Despatch within 7 days of order.



£57.95 inc VAT + £2.50 p+p

CHEQUES TO "FROME COMPUTING". Details large SAE.

PROTOS COMPUTER SYSTEMS,
FROME COMPUTING, 20 ASHTREE ROAD,
FROME, SOMERSET, DA11 2SF.

READ-OUT

READ-OUT FOR SOFTWARE & BOOKS

READ-OUT PUBLISHING LTD 8 Camp Road, Farnborough, Hampshire, GU24 6EW
Telephone: 0252 510331/2 Telex 858001 GOWER G

THE ZX BOOK CLUB

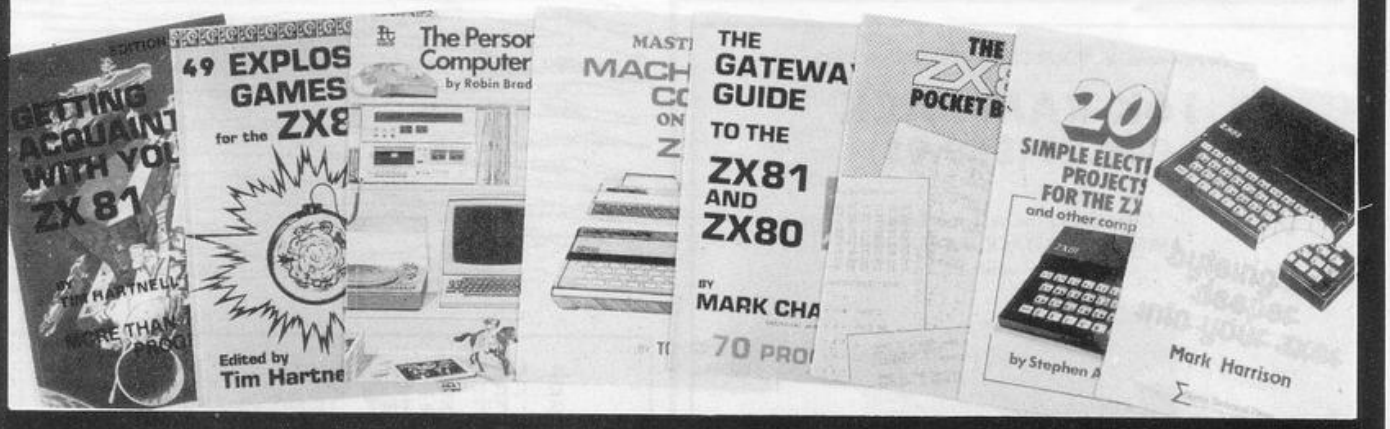
The ZX81 is the world's biggest selling computer and, just announced, is its big brother, the **ZX SPECTRUM.**

For value for money, these two computers must be the best "computer" buys on the market – but – to get the most from them, every owner, and prospective owner, needs a library of books for programs and operations.

Read-Out has selected the following bestselling books and can supply from stock.

For the Beginner:– **Getting Acquainted with your ZX81** by Tim Hartnell, containing over 80 programs. **34 Amazing Games for the ZX81** by Alistair Gourlay, which shows you what you can do with only 1K of memory. **49 Explosive Games for the ZX81** by Tim Hartnell which describes games listings for the memory sizes 1K – 8K. *Coming Soon!* **Learning to Use the ZX81** by Robin Bradbeer and **Learning to Use the ZX Spectrum** by Robin Bradbeer – two new books in a new series designed to help the first-time user (both due August/September 1982). **The Personal Computer Book 2nd edition** by Robin Bradbeer – an introduction to the world of microcomputing which is generally regarded as the best available.

For the Enthusiast:– **Mastering Machine Code on your ZX81** by Toni Baker will help you develop your programming skills to a point where you can really use machine code easily. **The Gateway Guide to the ZX81 and ZX80** by Mark Charlton is a "doing" book describing each function and statement in turn, illustrates it in a demonstration routine or program and then combines it with previously discussed material. **The ZX81 Pocket Book** by Trevor Toms covers the use of the ZX81 in detail and leads the reader into a clear understanding of programming. A brand new book is **20 Simple Electronic Projects for the ZX81** by Stephen Adams which can really put your ZX81 to practical use in a number of interesting electronic projects – thermometer, burglar alarm, voltmeter etc. **Byteing Deeper into your ZX81** by David Johnson-Davies – the bestseller which tells you how to get to grips with your ZX81 and with 39 programs to match!



Order through **READ-OUT PUBLISHING COMPANY LTD**

8 CAMP ROAD, FARNBOROUGH, HAMPSHIRE GU24 6EW.
24 hour answering service. Telephone: 0252 510331/2

Name _____

Address _____

_____

Make cheques payable to Read-Out Publishing Company Ltd.

I enclose my cheque for £.....

Please debit my Access ☐ Signed _____

Number ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ Date _____

Please send me : copy/ies of :
All prices include postage.

- ☐ Getting Acquainted with your ZX81 @ £6.95
- ☐ 34 Amazing Games for the 1K ZX81 @ £5.95
- ☐ 49 Explosive Games for the ZX81 @ £6.95
- ☐ Learning to Use the ZX81 @ £5.95 (due Aug/Sep)
- ☐ Learning to Use the ZX Spectrum @ £5.95 (due Aug/Sep)
- ☐ The Personal Computer Book @ £7.55
- ☐ Mastering Machine Code on Your ZX81 @ £8.50
- ☐ Gateway Guide to the ZX81 @ £7.45
- ☐ The ZX81 Pocket Book @ £6.95
- ☐ 20 Simple Electronic Games for the ZX81 @ £7.45
- ☐ Byteing Deeper into your ZX81 @ £6.45

ZX/1

THERE ARE memories of Captain Nemo and the Nautilus in the game of **Octopus.** A submarine is being chased by the octopus—which unfortunately looks more like a crab—and it is only a question of time before it is caught.

As the game progresses, the speed of the submarine falls but that of the octopus does not. The aim is to stay out of the grips of the octopus for as long as possible. The submarine is manoevured using the normal cursor keys.

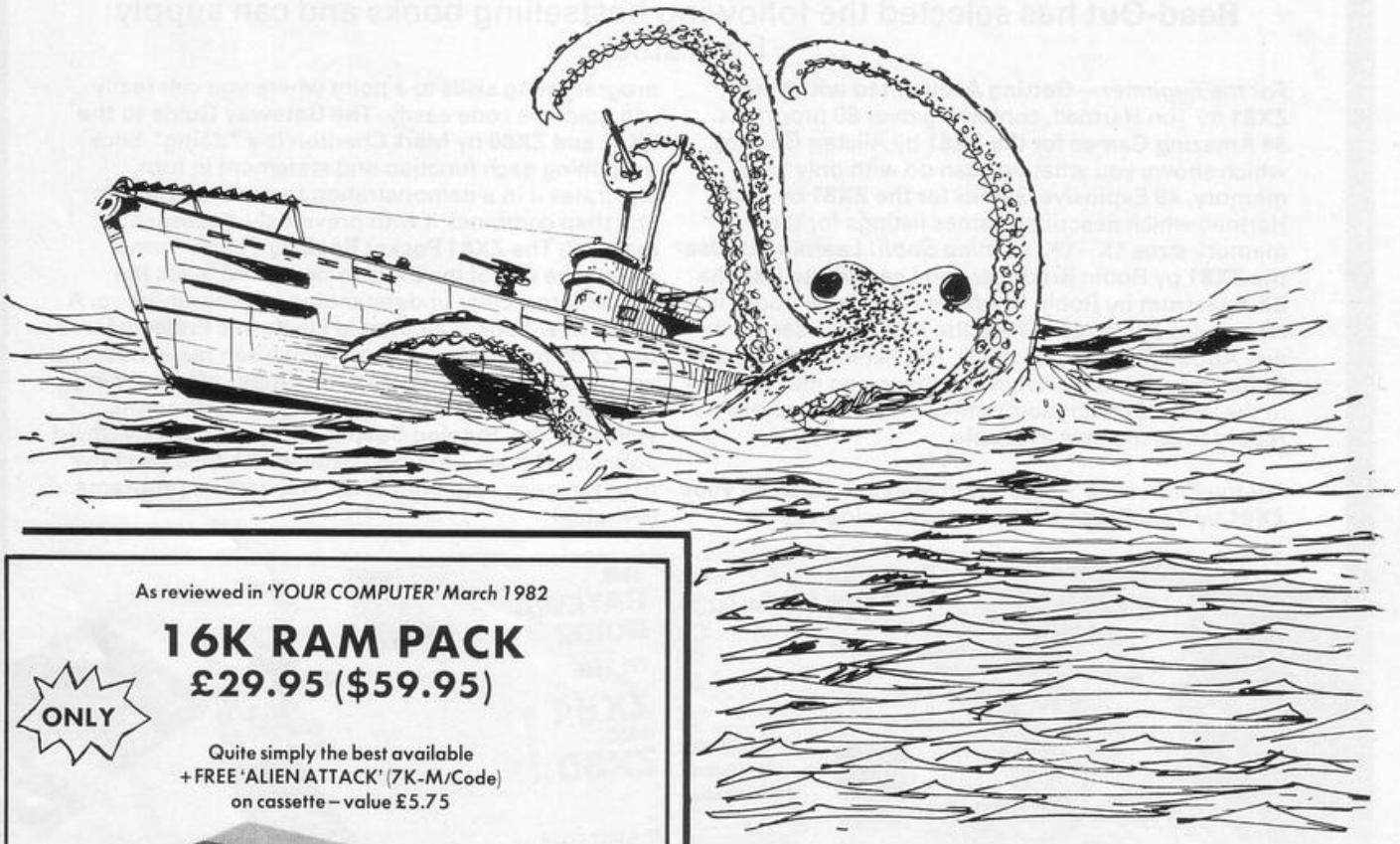
After several attempts, the *Sinclair Programs* reviewer managed a score of 109.

As an added interest, when the octopus hits the top of the screen the lines comprising it are reversed, giving the impression that it is standing on its hands.

The graphics in lines 1 and 2 for the octopus are shifted T, P and Y and shifted Y, space and shifted T.

Octopus was sent by Colin Macdonald, of Gourock, Renfrewshire.

OCTOPUS



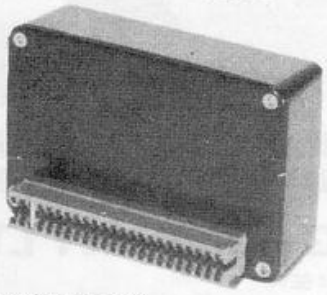
As reviewed in *'YOUR COMPUTER' March 1982*

16K RAM PACK

£29.95 ($59.95)

ONLY

Quite simply the best available
+FREE 'ALIEN ATTACK' (7K-M/Code)
on cassette – value £5.75



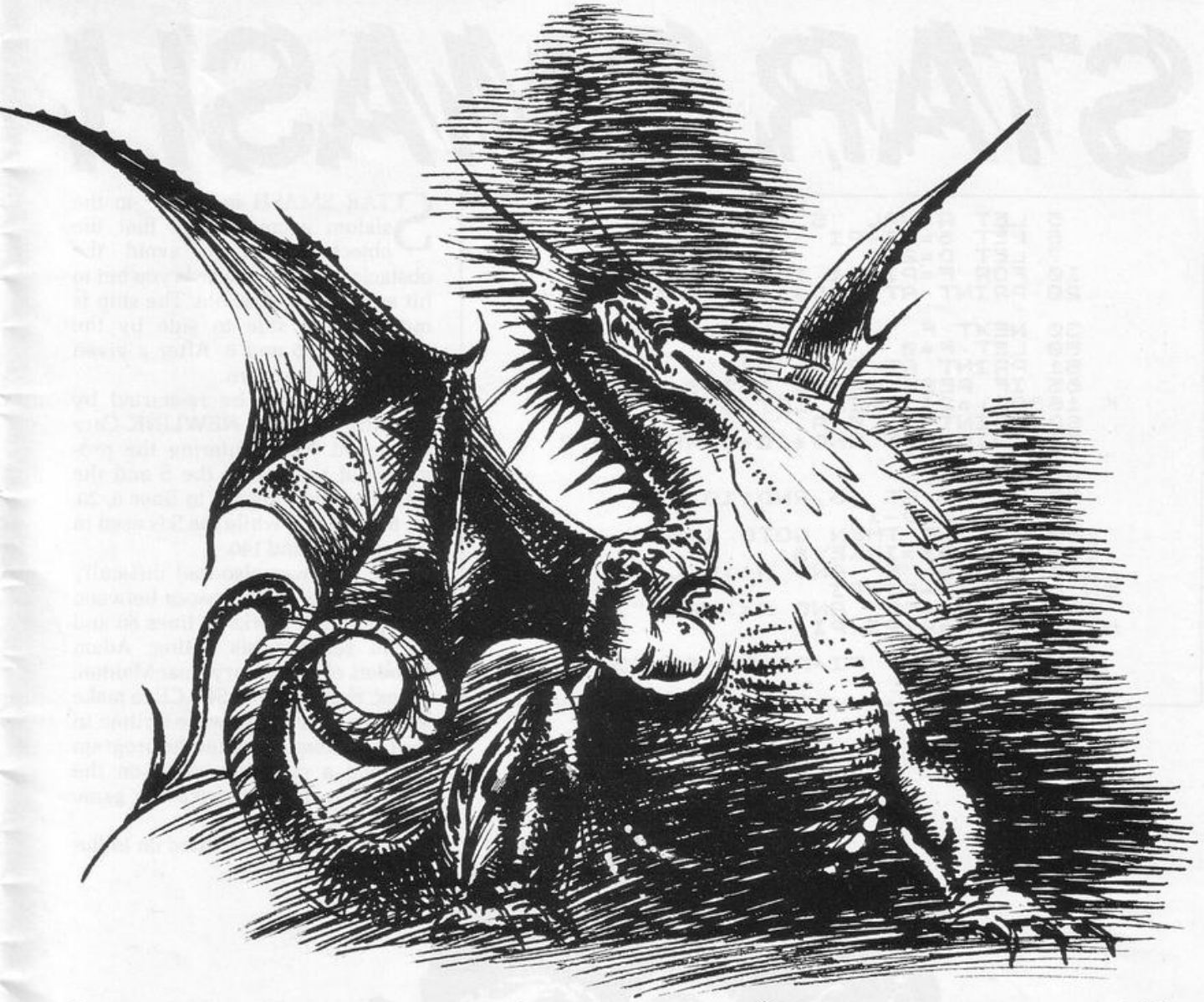
Fully built, tested and guaranteed
Uses existing power supply (min 600 m.a.)
Compatible with printer.
No wobble problems.
Gold-plated edge connector for perfect contact with your ZX81.
Normally despatched within 10 days of receipt of your order.

With advances in Microtechnology we are now able to offer the **64K RAM PACK.** Same quality as the 16K to give massive memory to your ZX81 with external dimension no larger than the 16K RAM pack (above).

ONLY £62.95 ($125)

JRS SOFTWARE
18 Wayside Avenue, Worthing, Sussex BN13 3JU
Telephone: Worthing 65691
(evenings and weekends only)


```
   1 LET A$="▛▀▜"
   2 LET B$="▚▞"
   3 LET K=INT (RND*10)+1
   4 LET L=INT (RND*10)+1
   5 LET C$="▄▄▄"
   6 LET G=INT (RND*10)+12
   7 LET H=INT (RND*10)+1
   8 GOTO 50
   9 PRINT AT G,H;C$;AT K,L;A$
  10 PRINT AT K+1,L;B$
  11 IF K=G AND L=H THEN PRINT A
T 20,0;"SCORE =";SCORE
  12 IF K=G AND L=H THEN STOP
  13 IF G>K THEN LET K=K+1
  14 IF L>H THEN LET L=L-1
  15 IF K>G THEN LET K=K-1
  16 IF H>L THEN LET L=L+1
  17 IF INKEY$="5" THEN LET H=H-
DD
  18 IF INKEY$="8" THEN LET H=H+
DD
  19 IF INKEY$="6" THEN LET G=G+
DD
  20 IF INKEY$="7" THEN LET G=G-
DD
  22 CLS
  23 LET SCORE=SCORE+1
  24 IF SCORE>=30 THEN LET DD=1
  25 GOTO 9
  50 LET SCORE=0
  51 LET DD=2
  52 GOTO 9
```



Dragon Crunch

```
    2 CLS
    4 LET H=SIN PI
    6 LET O=VAL "2"
    8 LET C$=" ***********"
   10 PRINT "INPUT N0;S0;0E;0W;NW
;NE;SE;SW"
   15 FOR K=H TO VAL "9"
   25 PRINT C$
   30 NEXT K
   40 LET E=INT (RND*K)
   50 LET Y=INT (RND*K)
   60 LET G=INT (RND*K)
   70 LET X=INT (RND*K)
   75 IF NOT H THEN GOTO CODE "■"
 AND E*G*Y*X
   80 INPUT B$
   85 IF LEN B$<0 THEN GOTO VAL "
80"
   90 LET Y=0+(B$(SGN 0)="S" AND
0<K)-(B$(SGN 0)="N" AND 0>SGN 0)
  100 LET X=P-(B$(0)="W" AND P>SG
N 0)+(B$(0)="E" AND P<K)
  110 LET E=E+SGN (Y-E)*(RND>0/K)
  120 LET G=G+SGN (X-G)*(RND>0/K)
  130 IF H THEN PRINT AT 0,P;" ";
AT A,I;" "
  140 PRINT AT Y,X;"■";AT E,G;"■"
  150 LET P=X
  160 LET 0=Y
  170 LET H=H+SGN K
  180 LET A=E
  190 LET I=G
  210 GOTO VAL "80"+CODE "■"*(Y=E
 AND X=G)
  270 CLS
  280 PRINT "<> NOT FAST ENOUGH <
> SCORE= ";H,"NEXT RUN? 1 OR 0"
  290 INPUT H
  300 IF H THEN RUN
```

DESPITE the short history of *Sinclair Programs* and its companion publication, *Sinclair User*, we are already spawning new ideas. The inspiration for **Dragon Crunch** from D G Hockey of London, E18 was Tim Hartnell's **Monster Munch,** which appeared in the May edition of *Sinclair User*.

Hockey thinks that this version is better, because it lasts longer and fits into the 1K ZX-81 by using a number of memory-saving devices.

To move the figure which is being chased by the dragon, it is necessary to enter twø letters, such as W for west and NE for north-east but that is not too much of a problem.

When the dragon eventually catches you the number of moves taken is shown. Hockey says that the maximum achieved by his family was 48.

STAR SMASH

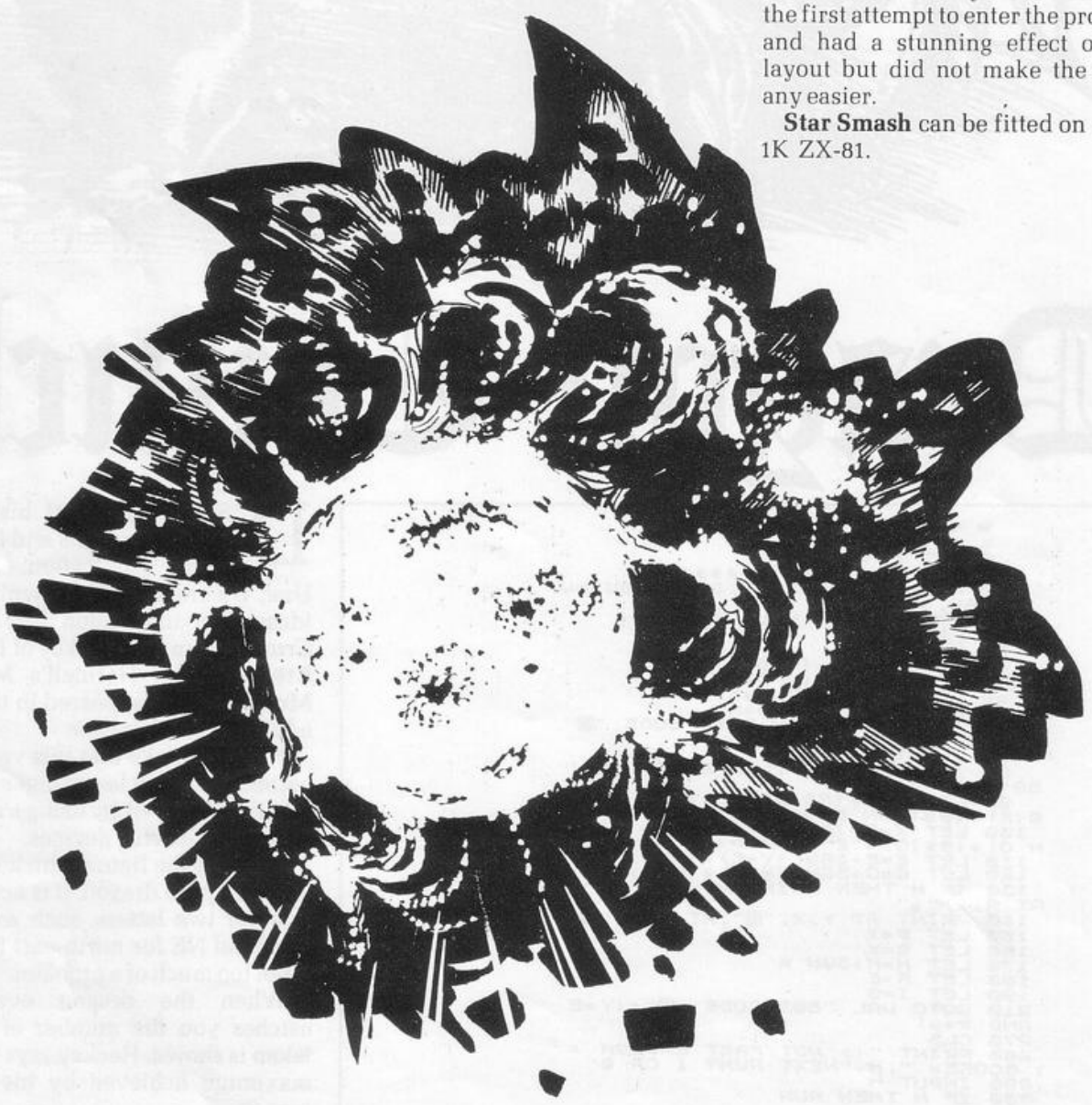
```
    5 LET A=VAL "5"
    6 LET S=PI-PI
    7 LET D=200
   10 FOR F=PI/PI TO VAL "S"
   20 PRINT AT RND*10+5,RND*10;"+
"
   30 NEXT F
   50 LET F=0
   51 PRINT AT F,A;"V"
   65 IF PEEK (PEEK 16398+256*PEE
K 16399)=21 THEN LET S=S+1
   80 PRINT AT F,A;" "
   81 PRINT AT RND*10+5,RND*10;"
"
   86 SCROLL
   88 PRINT AT 15,RND*10;"+"
   90 LET D=D-1
  100 IF D=0 THEN GOTO 140
  105 LET A$=INKEY$
  110 IF A$="5" AND A<>VAL "0" TH
EN LET A=A-PI/PI
  120 IF A$="8" AND A<>VAL "11" T
HEN LET A=A+PI/PI
  130 GOTO 50
  140 PRINT AT PI-PI,PI-PI;"SCORE
  = ";S
```

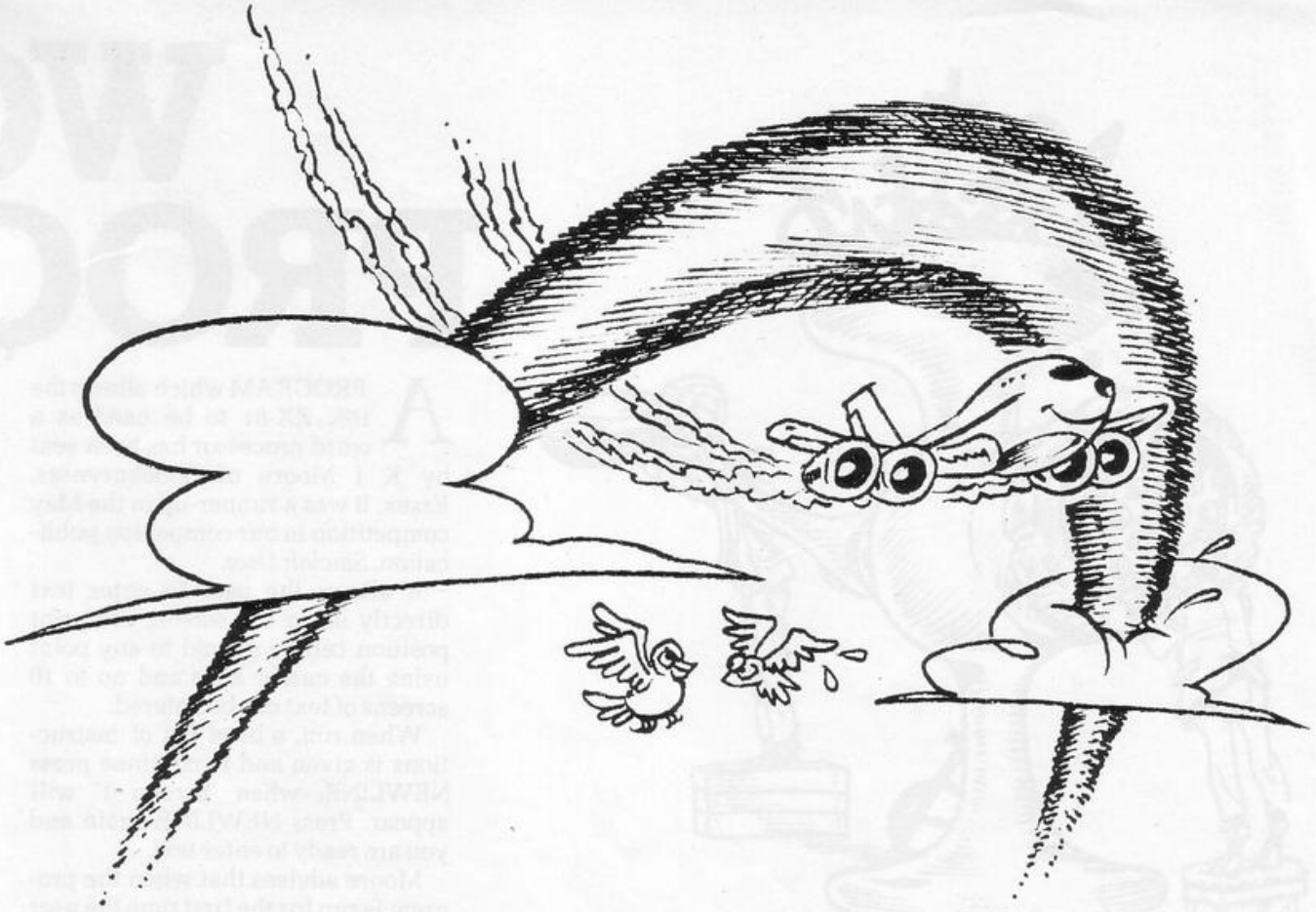
STAR SMASH is similar to the slalom games except that the object is not to avoid the obstacles moving towards you but to hit as many as possible. The ship is moved from side to side by the cursor keys 5 and 8. After a given time a score is shown.

The game can be re-started by pressing RUN and NEWLINE. Care is needed when entering the program not to confuse the S and the figure 5. Fives appear in lines 5, 20, 81, 88, and 110, while the S is used in lines 6, 10, 65 and 140.

Our reviewer also had difficulty entering the single spaces between the quotation marks in lines 80 and 81. In sending his listing, Adam Hobden, of Tollesbury, near Maldon, Essex, rightly wrote SPACE to make the lines clear. They were written in the first attempt to enter the program and had a stunning effect on the layout but did not make the game any easier.

Star Smash can be fitted on to the 1K ZX-81.





RAINBOW SPECTRUM

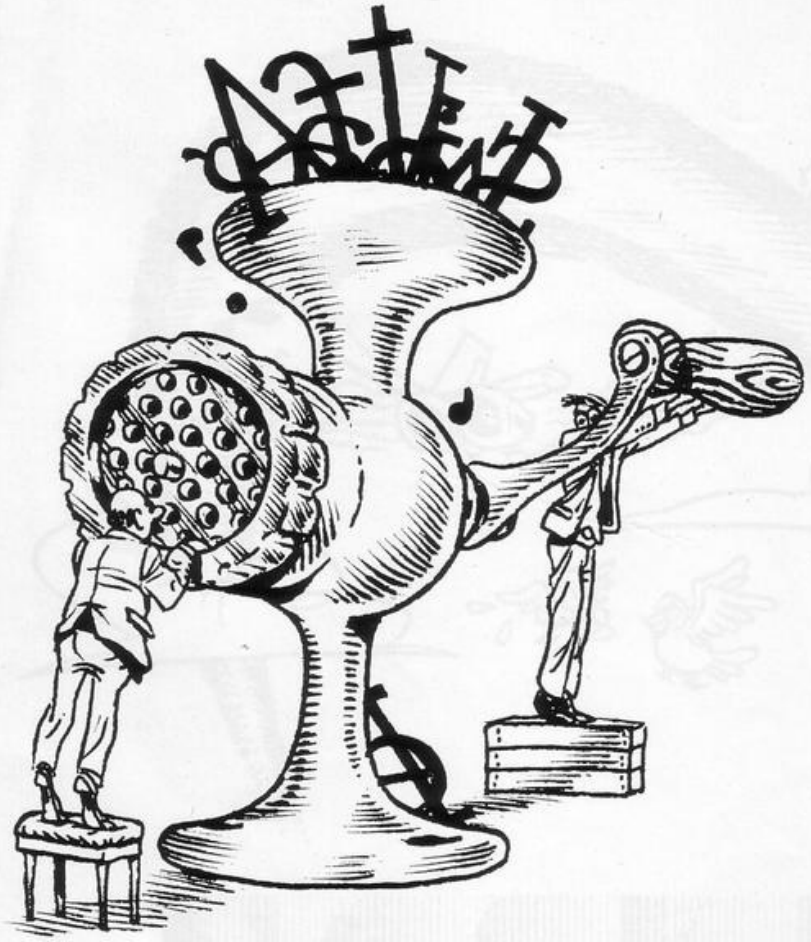
FOR THOSE fortunate enough to have managed to obtain Spectrums, here are two simple programs you can try on your new machine.

The first **Rainbow,** which as you might expect draws a rainbow, makes use of the Spectrum colour capabilities. The other, **Interfere,** requires the addition of the printer on which it produces some very attractive interference patterns.

Both are the work of Richard Altwasser, who designed the hardware for the Spectrum. Both are featured in a book which will be available soon. It is called the *Cambridge Colour Collection*, costs £6.95, and can be obtained from Altwasser at 22 Foxhollow, Bar Hill, Cambridge.

```
  50 REM Rainbow
 100 BORDER 0: INK 7: PAPER 0: R
ESTORE 1000: FOR m=0 TO 7
 110 READ a,b,c: FOR n=0 TO 11*(
m<7): PLOT PAPER b; INK c; INVER
SE a;0,n+12*m: DRAW PAPER b; INK
 c; INVERSE a;255,0,-1,5: IF ABS
 ((m/2)-INT (m/2))>.1 THEN LET n
=n+7
 120 BEEP .01,30: NEXT n: NEXT m
 130 PAPER 0: INK 7: INVERSE 0
 140 STOP
1000 DATA 0,0,2,1,6,2,0,6,4,1,5,
4,0,5,1,1,3,1,0,3,0,1,0,0


1700 REM interfere
1705 BORDER 0: INK 7: PAPER 0: B
RIGHT 1: CLS : OVER 1
1710 LET DX=8*2↑(1+INT (RND*3)):
 LET X1=256/DX: LET C=5+INT (RND
*2): FOR G=0 TO 1: INK C: IF G T
HEN INK 8-C
1720 FOR K=0 TO X1-1: FOR N=0 TO
 1: FOR X=0 TO DX-1: PLOT DX*K,1
75*N: DRAW X,175-350*N: PLOT DX*
(K+1)-1,175*N: DRAW -X,175-350*N
: NEXT X: NEXT N: NEXT K
1730 NEXT G: GO TO 1700
1740 GO TO 1700
```



WO
PROCI

A PROGRAM which allows the 16K ZX-81 to be used as a word processor has been sent by K J Moore of Shoeburyness, Essex. It was a runner-up in the May competition in our companion publication, *Sinclair User*.

It allows the user to enter text directly on to the screen; the print position can be moved to any point using the cursor keys and up to 10 screens of text can be entered.

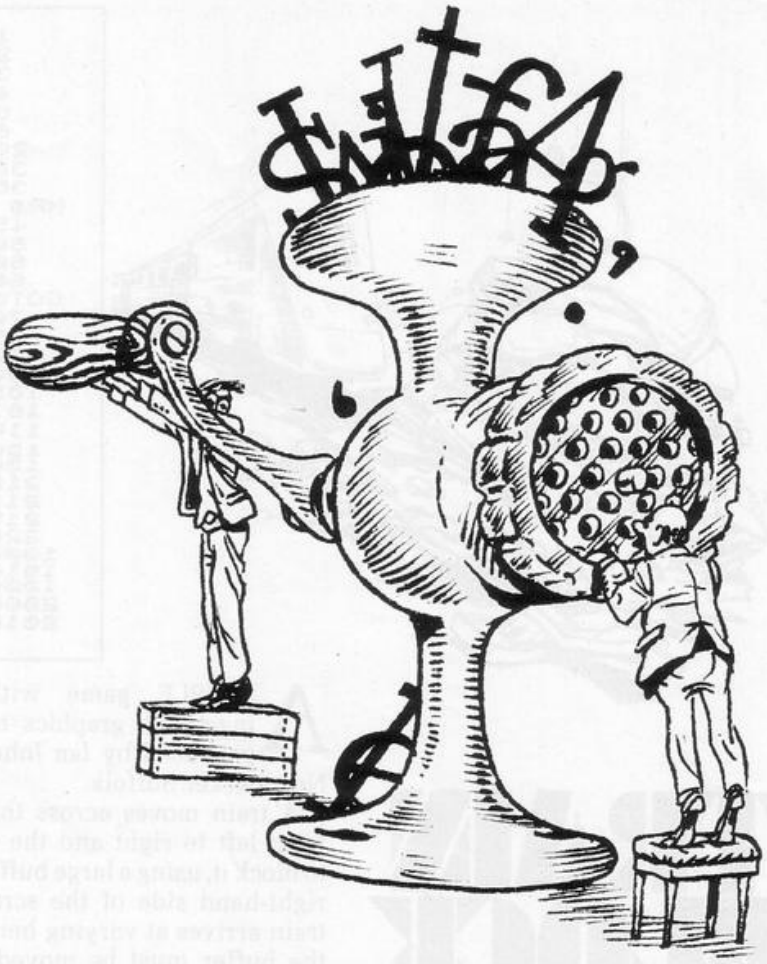
When run, a brief list of instructions is given and to continue press NEWLINE, when 'Screen 1' will appear. Press NEWLINE again and you are ready to enter text.

Moore advises that when the program is run for the first time the user becomes used to entering text on the screen before proceeding to press

LISTING OF ZX WORD PROCESSOR

```
  10 PRINT AT 2,0;"    WORD-PROC
ESSOR"
  15 PRINT AT 4,0;"USE THE KEY-B
OARD AS NORMAL"
  20 PRINT AT 6,0;"PRESS ""NEW-L
INE"" FOR A SPACE"
  25 PRINT "PRESS ""FUNCTION"" F
OR A NEW LINE"
  30 PRINT "PRESS ""GRAPHICS"" F
OR INV CHRS"
  35 PRINT "PRESS ""EDIT"" FOR P
RINTING MENU"
  40 PRINT
  50 PRINT
  60 PRINT "DO NOT PRESS THE ""S
PACE"" KEY -"
  70 PRINT "THIS WILL STOP THE P
ROGRAM..."
  80 INPUT U$
  90 CLS
 100 LET DFA=PEEK 16396+256*PEEK
 16397
 110 LET G=0
 120 LET OP1=0
 130 LET OP2=0
 140 LET N=1
 150 DIM A$(10,22,32)
 200 FOR N=1 TO 10
 205 LET OP1=0
 206 LET G=0
 210 PRINT AT 10,5;"SCREEN ";N
 220 INPUT U$
 230 CLS
 240 FOR L=0 TO 21
 250 FOR C=0 TO 31
 260 LET CI=0
 270 IF INKEY$="" THEN GOTO 280
 290 LET A=CODE INKEY$
 291 IF A>63 AND A<112 THEN GOTO
 280
 292 IF A<11 THEN GOTO 280
 295 IF A=118 AND G=0 THEN LET A
=0
 300 IF A=116 THEN GOSUB 5000
 310 IF A>111 AND A<116 THEN GOS
UB 1000
 350 IF A=121 AND OP1=0 THEN GOT
O 415
 352 IF A>118 THEN GOTO 280
 355 IF A=117 THEN GOSUB 6000
 360 IF A=117 THEN GOTO 240
 370 IF A=116 THEN GOTO 260
 375 IF G=1 THEN GOSUB 5500
 380 IF CI=1 THEN GOTO 260
 385 LET OP1=0
 390 LET A$(N,L+1,C+1)=CHR$ A
 400 PRINT AT L,C;CHR$ A
 405 IF INKEY$<>"" THEN GOTO 405
 410 NEXT C
 415 IF INKEY$<>"" THEN GOTO 415
 420 NEXT L
 430 NEXT N
 435 GOSUB 6000
 440 GOTO 240
1000 IF A=112 THEN LET L=L-1
1010 IF A=113 THEN LET L=L+1
1020 IF A=114 THEN LET C=C-1
1030 IF A=115 THEN LET C=C+1
1035 IF C<0 THEN LET C=0
1040 IF C>31 THEN LET C=31
1045 IF L<0 THEN LET L=0
1047 IF L>21 THEN LET L=21
1050 IF OP1<>0 THEN POKE OP1,OP2
1060 LET OP1=DFA+(L*33)+C+1
1070 LET OP2=PEEK OP1
1080 PRINT AT L,C;"■"
1090 LET CI=1
1100 RETURN
5000 IF INKEY$<>"" THEN GOTO 500
0
5005 IF G=1 THEN GOTO 5040
5010 LET G=1
5020 PRINT AT L,C;"■"
5030 RETURN
5040 LET G=0
5050 PRINT AT L,C;"■"
5060 RETURN
5500 IF A=118 THEN LET A=128
5505 IF A<11 OR A>64 AND A<>128
THEN GOTO 5000
5510 IF A<>128 THEN LET A=A+128
5520 RETURN
6000 LET P=0
6005 LET S$="N"
6010 CLS
6020 PRINT AT 2,0;"1. LIST SCREE
N N"
6030 PRINT "2. LIST SCREEN N UNT
IL Z"
6040 PRINT "3. LIST SCREEN X THR
U Y"
6050 PRINT "4. LIST SCREEN X THR
U Y UNTIL Z"
6060 PRINT "5.PRINT SCREEN N"
6070 PRINT "6.PRINT SCREEN N UNT
IL Z"
6080 PRINT "7.PRINT SCREEN X THR
U Y"
6090 PRINT "8.PRINT SCREEN X THR
U Y UNTIL Z"
```

RD ESSOR

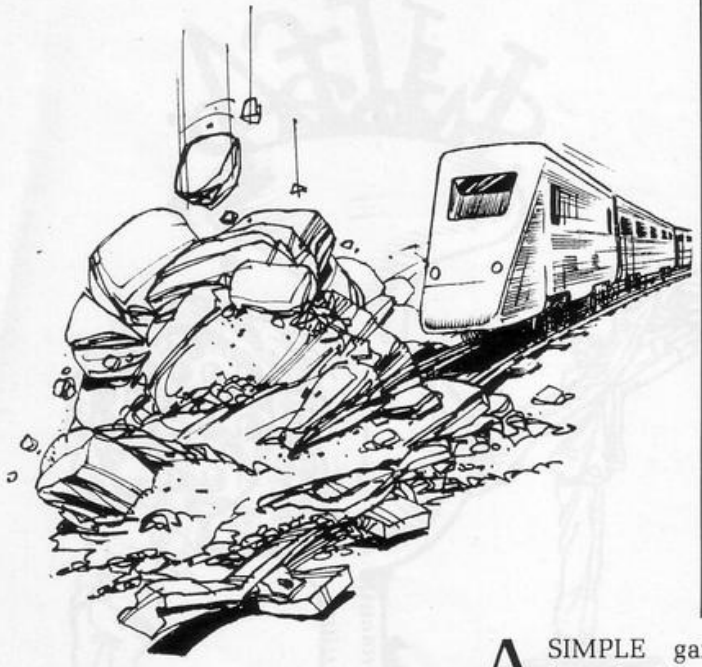


EDIT, which brings up a list of print options. A further warning is that once an option has been chosen there is no chance to change it until listing or printing has finished.

One problem when entering text is that the space key doubles as the BREAK, which will stop the program running. Within that system the space key is NEWLINE. It is also worth noting that the typing must be done at the normal speed for acceptance by the ZX-81, which can seem slow. While it is possible to correct letters, ones which have been missed cannot be inserted without repeating a good deal of text.

To make the listing clearer, in lines 1080, 5020 and 5050 are inverse K, G and K again.

```
5100 PRINT AT 14,0;"SELECT PROC
ESSING CHOICE"
5110 INPUT D
5120 IF D<1 OR D>6 THEN GOTO 601
0
5125 IF D>4 THEN LET P=1
5130 CLS
5135 IF D>4 THEN LET D=D-4
5140 LET PR=6200+(100*D)
5150 GOTO PR
5300 IF P=0 THEN PRINT AT 2,0;"1
. LIST SCREEN N"
5305 IF P=1 THEN PRINT AT 2,0;"5
.PRINT SCREEN N"
5310 PRINT AT 4,0;"ENTER N"
5340 INPUT X
5345 IF X<1 OR X>10 THEN GOTO 63
40
5350 LET Y=X
5355 LET Z=1
5360 GOTO 6000
5400 IF P=0 THEN PRINT AT 2,0;"2
. LIST SCREEN N UNTIL Z"
5405 IF P=1 THEN PRINT AT 2,0;"6
.PRINT SCREEN N UNTIL Z"
5410 PRINT AT 4,0;"ENTER N"
5415 INPUT X
5417 IF X<1 OR X>10 THEN GOTO 64
15
5420 LET Y=X
5425 PRINT AT 4,0;"ENTER Z"
5430 INPUT Z
5440 IF Z<1 THEN GOTO 6430
5450 GOTO 6000
5500 IF P=0 THEN PRINT AT 2,0;"3
. LIST SCREEN X THRU Y"
5505 IF P=1 THEN PRINT AT 2,0;"7
.PRINT SCREEN X THRU Y"
5510 PRINT AT 4,0;"ENTER X"
5512 INPUT X
5515 IF X<1 OR X>9 THEN GOTO 651
0
5520 PRINT AT 4,0;"ENTER Y"
5522 INPUT Y
5523 IF Y>10 THEN GOTO 6520
5525 IF Y<=X THEN GOTO 6520
5530 LET Z=1
5540 GOTO 6000
5600 IF P=0 THEN PRINT AT 2,0;"4
. LIST SCREEN X THRU Y UNTIL Z"
5605 IF P=1 THEN PRINT AT 2,0;"8
.PRINT SCREEN X THRU Y UNTIL Z"
5610 PRINT AT 4,0;"ENTER X"
5612 INPUT X
5615 IF X<1 OR X>9 THEN GOTO 661
0
5620 PRINT AT 4,0;"ENTER Y"
5622 INPUT Y
5625 IF Y<=X THEN GOTO 6620
5626 IF Y>10 THEN GOTO 6620
5630 PRINT AT 4,0;"ENTER Z"
5635 INPUT Z
5640 IF Z<1 THEN GOTO 6630
5645 GOTO 6000
6000 CLS
6005 IF P=1 THEN GOTO 6100
6010 PRINT AT 2,0;"DO YOU WANT:"
6020 PRINT AT 4,0;"1. A CONTINUO
US LISTING OR,"
6030 IF P=0 THEN PRINT "2. A PAG
E BY PAGE LISTING ?"
6040 PRINT AT 9,0;"ENTER CHOICE"
6050 INPUT Q
6060 IF Q<1 OR Q>2 THEN GOTO 604
0
6070 GOTO 6200
6100 PRINT AT 2,0;"DO YOU WANT P
AGE SEPARATORS ?"
6110 PRINT AT 6,0;"ENTER "Y" OR
"N"
6120 INPUT S$
6130 IF S$<>"N" AND S$<>"Y" THEN
 GOTO 6120
6200 FOR R=1 TO Z
6210 FOR S=X TO Y
6220 CLS
6230 IF Q=2 AND P=0 THEN PRINT A
T 10,5;"SCREEN ";S
6240 CLS
6250 IF P=1 AND S$="Y" THEN LPRI
NT
6260 IF P=1 AND S$="Y" THEN LPRI
NT "----------------------------
----"
6270 IF P=1 AND S$="Y" THEN LPRI
NT
6280 FOR T=1 TO 22
6290 PRINT A$(S,T)
6300 NEXT T
6310 IF Q=2 AND P=0 THEN INPUT U
$
6320 IF P=1 THEN COPY
6330 NEXT S
6340 NEXT R
6350 LET N=Y
6360 IF P=1 AND S$="Y" THEN LPRI
NT
6370 IF P=1 AND S$="Y" THEN LPRI
NT "----------------------------
----"
6380 IF P=1 AND S$="Y" THEN LPRI
NT
6390 RETURN
```



```
  1 LET K=156
  2 LET C=0
  3 LET D=0
  4 LET Q=K
  5 LET P=4
  6 LET S=4
 20 FOR T=D TO 23
 30 PRINT AT S,T;"■■■■"
 35 PRINT AT P,27;"■■";CHR$ Q;C
HR$ K
 45 LET V=0
 50 IF INKEY$="Q" THEN LET V=-4
 60 IF INKEY$="A" THEN LET V=4
 65 IF INKEY$="P" AND P=S THEN
GOTO 200
 70 IF P+V<=3 THEN LET V=0
 85 CLS
 90 LET P=P+V
100 NEXT T
105 LET C=C+1
107 IF C=3 THEN GOTO 2000
110 LET S=INT (RND*4)*4+4
120 IF S>=16 THEN LET S=4
130 GOTO 20
210 LET K=K+1
212 IF K=166 THEN GOSUB 1000
215 LET D=D+.5
220 GOTO 110
1000 LET K=156
1010 LET Q=Q+1
1020 RETURN
2000 PRINT CHR$ Q;CHR$ K
2010 STOP
```

TRAIN BLOCK

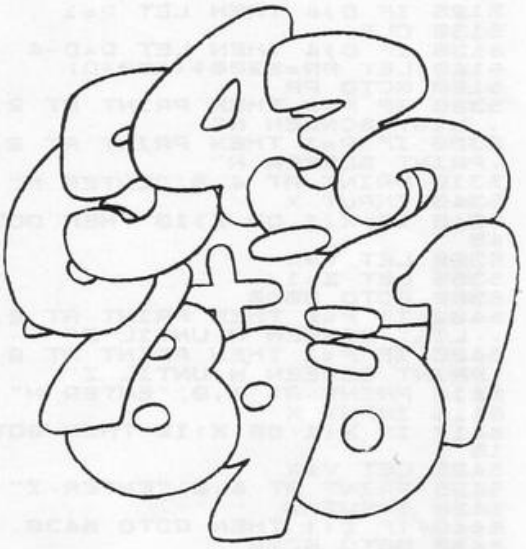
A SIMPLE game with some ingenious graphics has been produced by Ian Johnston, of Newmarket, Suffolk.

A train moves across the screen from left to right and the object is to block it, using a large buffer on the right-hand side of the screen. The train arrives at varying heights and the buffer must be moved up and down to stop it, using the Q for up and the A for down. When the train nears the buffer it is necessary to press P to stop it.

Each time a train is blocked, one is added to the score, which is shown on the buffer. The game ends when three trains have passed the buffer.

The graphics shown in line 30 of the printout are from left to right, shifted E,H,M,G and in 4Ø, again both shifted, N and L.

```
 10 CLS
 20 PRINT "WHAT SORT OF SUMS DO
 YOU WANT TO DO?"
 30 PRINT " "
 40 PRINT "ADDING?(=+)",,,"TAKI
NG AWAY?(=-)"
 50 PRINT "TIMES?(=*)",,,"SHARI
NG?(=/)"
 60 INPUT N$
 70 CLS
 80 PRINT "ENTER YOUR FIRST NUM
BER"
 90 INPUT P
100 PRINT P
110 PRINT "ENTER YOUR SECOND NU
MBER"
120 INPUT T
130 PRINT T
140 PAUSE 100
150 CLS
160 IF N$="+" THEN LET Z=P+T
170 IF N$="-" THEN LET Z=P-T
180 IF N$="*" THEN LET Z=P*T
190 IF N$="/" THEN LET Z=P/T
200 PRINT P;N$;T;"=";Z
210 PRINT " "
220 PRINT "DO YOU WANT ANY MORE
?"
230 INPUT B$
240 IF B$="YES" OR B$="Y" THEN
GOTO 10
250 CLS
260 IF B$<>"YES" AND B$<>"Y" TH
EN PRINT "GOODBYE"
270 STOP
```



SUMS

WE RECEIVED a letter from R G Searle of Salisbury, Wiltshire, complimenting us on our first edition but complaining that few programs catered for those under the age of eight. "Yet that age group is fascinated by the ZX-81," he wrote.

To help to remedy that he included a simple program which we print.

As he said: "It does not really do anything but I think it does what it does nicely."

It is called **Simple Sums** because that is what it does, taking young children through the steps of simple arithmetic in a friendly way.

PONTOON

THIS VERSION of the card game **Pontoon** requires a minimum of 4K RAM on the ZX-81. The program is a very good simulation of the game which is played with the computer as the dealer.

S is pressed for stick and T for twist, with the answer as to whether you wish to play again after the end of a game being a Y or N. No betting is involved—only the satisfaction of having beaten the computer.

To help with the graphics for the card designs, on lines 30 to 100 there are five spaces between the quotes.

Pontoon was sent by Paul Mapstone, of London N7.

```
  1 REM  **ZX81   PONTOON**
  2 REM  **BY  P.MAPSTONE**
  5 RAND
 10 DIM  A$(8,5)
 20 DIM  T$(11,6)
 30 LET  A$(1)="┌─┐     "
 40 LET  A$(2)="│ │     "
 50 LET  A$(3)="│ ▪ ▪   "
 60 LET  A$(4)="│ ▪ ▪   "
 70 LET  A$(5)="│ ▪ ▪   "
 80 LET  A$(6)="│ ▪ ▪   "
 90 LET  A$(7)="│ ▪ ▪   "
100 LET  A$(8)="└─┘     "
110 LET  T$(1)="188882"
120 LET  T$(2)="168682"
130 LET  T$(3)="176872"
140 LET  T$(4)="148842"
150 LET  T$(5)="146642"
```

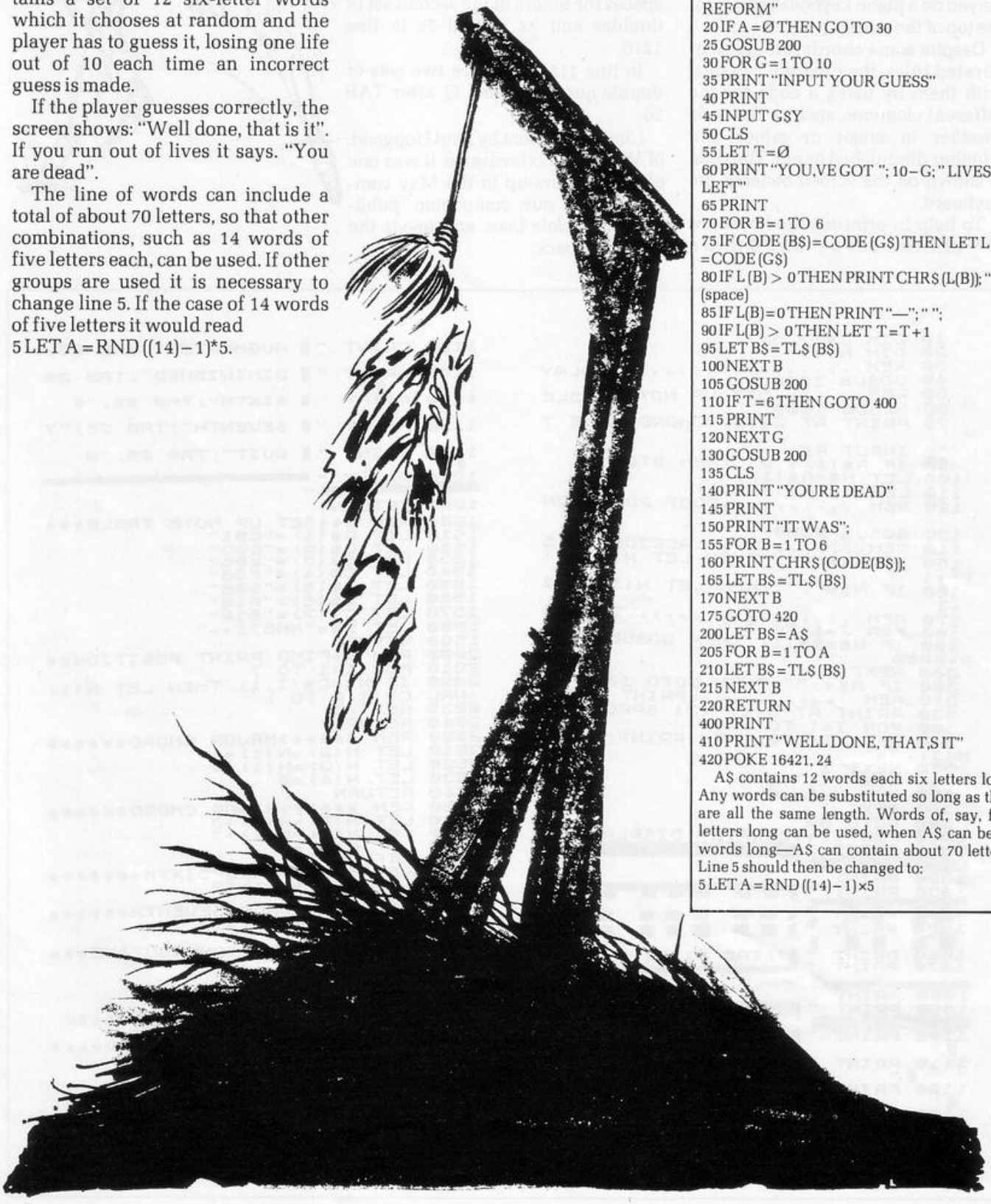
```
  160 LET T$(6)="145842"
  170 LET T$(7)="135842"
  180 LET T$(8)="144442"
  190 LET T$(9)="143442"
  200 LET T$(10)="134342"
  210 LET T$(11)="166662"
  280 PRINT AT 21,20;"CREDITS:10"
  290 LET CR=10
  300 DIM P(6)
  310 DIM D(6)
  320 FOR N=1 TO 5
  330 LET P(N)=0
  340 LET D(N)=0
  350 NEXT N
  360 LET L=0
  370 LET C=1
  380 LET NP=2
  400 GOSUB 2000
  410 LET DS=N
  420 LET D(1)=N
  430 PRINT AT 7,1;"DEALERS SCORE
=";DS
  440 LET L=8
  450 GOSUB 2000
  460 LET P(1)=N
  470 LET L=0
  480 LET C=6
  490 LET N=1
  500 GOSUB 2020
  510 LET L=8
  520 GOSUB 2000
  550 LET P(2)=N
  560 PRINT AT 15,1;"PLAYERS SCOR
E="
  570 PRINT AT 17,1;"STICK OR TWI
ST?"
  600 LET PT=P(1)+P(2)+P(3)+P(4)+
P(5)+P(6)
  610 IF PT=21 AND NP=2 THEN GOTO
 2100
  620 IF PT<22 THEN GOTO 685
  629 REM SETS ACE=1
  630 LET N=1
  640 IF P(N)<>11 THEN GOTO 670
  650 LET P(N)=1
  660 GOTO 600
  670 LET N=N+1
  675 IF N=7 THEN GOTO 2200
  680 GOTO 640
  685 PRINT AT 15,15;PT
  690 IF NP=6 THEN GOTO 2300
  700 IF INKEY$="" THEN GOTO 700
  710 IF INKEY$="S" THEN GOTO 100
0
  720 LET C=C+5
  730 LET NP=NP+1
  740 GOSUB 2000
  750 LET P(NP)=N
  760 GOTO 600
 1000 IF NP=5 THEN GOTO 2400
 1009 REM ***DEALERS TURN
 1010 LET ND=1
 1020 LET L=0
 1030 LET C=1
 1040 LET DT=D(1)+D(2)+D(3)+D(4)+
D(5)
 1050 IF DT=21 AND ND=2 THEN GOT(
 3000
 1060 IF DT<22 THEN GOTO 1135
 1070 LET N=1
 1080 IF D(N)<>11 THEN GOTO 1110
 1090 LET D(N)=1
 1100 GOTO 1040
 1110 LET N=N+1
 1120 IF N<6 THEN GOTO 1080
 1130 GOTO 3100
 1135 PRINT AT 7,15;DT
 1140 IF ND=5 THEN GOTO 3200
 1150 IF DT>=PT THEN GOTO 3500
 1160 LET C=C+5
 1170 LET ND=ND+1
 1180 GOSUB 2000
 1190 LET D(ND)=N
 1200 GOTO 1040
 1999 REM PICK RANDOM CARD
 2000 LET N=INT (RND*13)+2
 2010 IF N>11 THEN LET N=10
 2019 REM PLOT RANDOM CARD AT L,C
 2020 FOR W=1 TO 6
 2030 PRINT AT L+W,C;A$(VAL T$(N,
W))
 2040 NEXT W
 2050 RETURN
 2100 PRINT AT 15,15;"***PONTOON*
**"
 2110 LET N=2
 2150 GOTO 3600
 2200 PRINT AT 15,15;"BUST"
 2210 GOTO 3500
 2300 PRINT AT 15,15;"SIX CARD TR
ICK"
 2310 LET N=4
 2330 GOTO 3600
 2400 PRINT AT 15,15;"FIVE CARD T
RICK"
 2410 LET N=2
 2420 GOTO 3600
 3000 PRINT AT 7,15;"***PONTOON**
*"
 3010 GOTO 3500
 3100 PRINT AT 7,15;"BUST"
 3110 LET N=1
 3120 GOTO 3600
 3200 PRINT AT 7,15;"FIVE CARD TR
ICK"
 3500 LET CR=CR-1
 3510 PRINT AT 19,5;"YOU LOSE 1 C
REDIT"
 3530 IF CR>0 THEN GOTO 3700
 3540 PRINT AT 21,28;"0"
 3550 PRINT AT 17,1;"YOU HAVE RUN
 OUT OF CREDITS,    WOULD YOU LI
KE TO TRY AGAIN?"
 3560 IF INKEY$="" THEN GOTO 3550
 3570 IF INKEY$="N" THEN STOP
 3580 CLS
 3590 RUN
 3600 LET CR=CR+N
 3610 IF N>1 THEN PRINT AT 19,5;"
YOU WIN ";N;" CREDITS"
 3620 IF N=1 THEN PRINT AT 19,5;"
YOU WIN 1 CREDIT"
 3700 PRINT AT 21,28;CR;" "
 3710 PRINT AT 17,1;"(16 SPACES)"
 3725 PRINT AT 21,1;"DEAL?"
 3730 IF INKEY$="" THEN GOTO 3720
 3740 IF INKEY$="N" THEN STOP
 3750 CLS
 3760 PRINT AT 21,20;"CREDITS:";C
R
 3770 GOTO 320
```

HANGMAN

GILL of Westerham, Kent has produced a game of **Hangman** which can be played on the ZX-80. The program, as written, contains a set of 12 six-letter words which it chooses at random and the player has to guess it, losing one life out of 10 each time an incorrect guess is made.

If the player guesses correctly, the screen shows: "Well done, that is it". If you run out of lives it says. "You are dead".

The line of words can include a total of about 70 letters, so that other combinations, such as 14 words of five letters each, can be used. If other groups are used it is necessary to change line 5. If the case of 14 words of five letters it would read
5 LET A = RND ((14) – 1)*5.



```
5 LET A = RND ((12) – 1)×6
10 DIM L (6)
15 LET A$ = "LETTER NORMAL BATTLE
VISION MUTINY BARREL VOYAGE
RETURN DEVOID MUTTON BOTTOM
REFORM"
20 IF A = Ø THEN GO TO 30
25 GOSUB 200
30 FOR G = 1 TO 10
35 PRINT "INPUT YOUR GUESS"
40 PRINT
45 INPUT G$Y
50 CLS
55 LET T = Ø
60 PRINT "YOU,VE GOT "; 10 – G; " LIVES
LEFT"
65 PRINT
70 FOR B = 1 TO 6
75 IF CODE (B$) = CODE (G$) THEN LET L (B)
= CODE (G$)
80 IF L (B) > 0 THEN PRINT CHR$ (L(B)); " ";
(space)
85 IF L(B) = 0 THEN PRINT "—"; " ";
90 IF L(B) > 0 THEN LET T = T + 1
95 LET B$ = TL$ (B$)
100 NEXT B
105 GOSUB 200
110 IF T = 6 THEN GOTO 400
115 PRINT
120 NEXT G
130 GOSUB 200
135 CLS
140 PRINT "YOURE DEAD"
145 PRINT
150 PRINT "IT WAS";
155 FOR B = 1 TO 6
160 PRINT CHR$ (CODE(B$));
165 LET B$ = TL$ (B$)
170 NEXT B
175 GOTO 420
200 LET B$ = A$
205 FOR B = 1 TO A
210 LET B$ = TL$ (B$)
215 NEXT B
220 RETURN
400 PRINT
410 PRINT "WELL DONE, THAT,S IT"
420 POKE 16421, 24
```

A$ contains 12 words each six letters long. Any words can be substituted so long as they are all the same length. Words of, say, five letters long can be used, when A$ can be 14 words long—A$ can contain about 70 letters. Line 5 should then be changed to:
5 LET A = RND ((14) – 1)×5

CHORDS

FOR ALL who are trying to master a musical instrument, **Chords** is a good learning aid. By entering the name of a chord, the notes which comprise it are displayed on a piano keyboard shown at the top of the screen.

Despite some chords having complicated titles, the program can deal with them by using a code for the different elements, such as the note, whether in major or minor and whether diminished or not. The code is shown on the screen beneath the keyboard.

To help in printing, the keyboard line 1030 contains a shifted 8 then a shifted 7 and a shifted space followed by alternate shifted 7s and spaces.

Line 1070 is made up of a shifted 8,30 shifted 6s and a shifted 5, and in lines 1100 to 1200 there are six spaces for letters in the second set of doubles and 32 shifted 7s in line 1210.

In line 1110 there are two sets of double quotes, shifted Q, after TAB 26.

Chords was sent by Paul Hopgood, of Wantage, Oxfordshire. It was one of the runners-up in the May competition in our companion publication, *Sinclair User*, and needs the 16K RAM pack.

```
  10 DIM C$(7,3)
  20 DIM N(4)
  30 REM ..................DISPLAY
  40 GOSUB 1000
  50 REM .......SET UP NOTE TABLE
  60 GOSUB 1500
  70 PRINT AT 21,0;"CHORD NAME ?
"
  80 INPUT A$
  90 IF A$(1)="0" THEN STOP
 100 LET N$=A$(1)
 110 LET A$=A$(2 TO )
 120 REM ..........ROOT POSITION
"
 130 GOSUB 2000
 140 REM ..............ACCIDENTALS
 150 IF N$="" THEN LET N(1)=N(
1)+1
 160 IF N$="-" THEN LET N(1)=N(1
)-1
 170 REM ..................CHORDS
 180 FOR I=1 TO 7
 190 IF N$=S$(I) THEN GOSUB I*50
0+2000
 200 NEXT I
 300 IF A$<>"" THEN GOTO 100
 310 REM ..............PRINT CHORD
 320 PRINT AT 5,1;"(31 SPACES)"
 330 FOR I=1 TO 4
 340 IF N(I)<>0 THEN PRINT AT 5,
N(I);"*"
 350 NEXT I
 360 FOR I=1 TO 4
 370 LET N(I)=0
 380 NEXT I
 390 GOTO 80
1000 REM ****CREATE  DISPLAY****
1010 PRINT "   CHORD FORMATION C
ALCULATOR   "
1020 PRINT
1030 PRINT "■■■
```

TREASURE HUNTER

TREASURE HUNTER is a clever little game in which a hunter, denoted by an asterisk, has to find treasure which is hidden at a random position on the screen. The only assistance given to the hunter is that he is told when he is getting warmer.

It can be very annoying when, whichever way you move, you seem to be getting warmer but cannot find the exact location of the treasure. When the correct spot is found, the number of steps taken is shown on the screen, along with the program's idea of the optimum number.

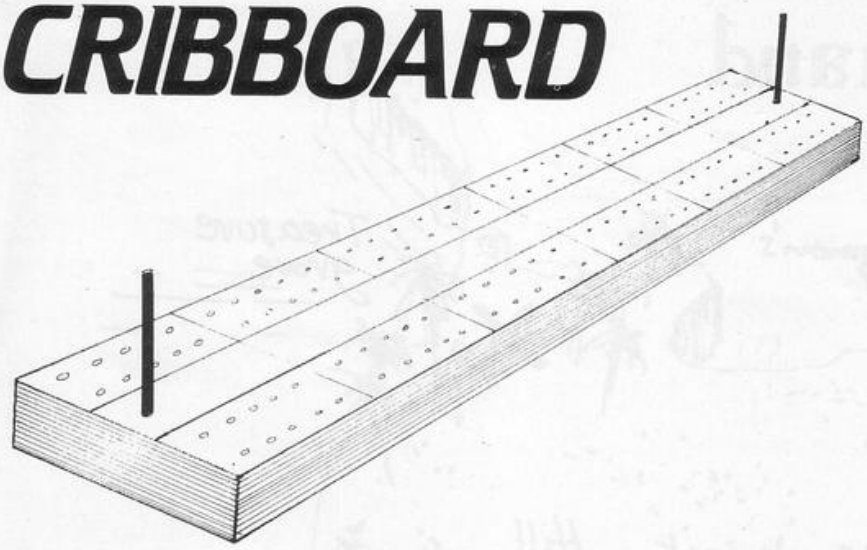
The first attempt by the *Sinclair Programs* reviewer resulted in 453 steps taken against an optimum of five. That later improved to 84 against an optimum of 30.

The hunter is moved by using the cursor keys but an added difficulty is that if you go to the edge of the screen you bounce back so that the left and right keys and the up and down keys can become reversed.

Treasure Hunter was sent by P Brown of Charlesworth, Derbyshire.

```
   10 REM TREASURE HUNT BY P AND
A BROWN
   20 LET P=PI/PI
   30 LET Q=PI-PI
   40 LET L=INT (RND*VAL "15")+VA
L  "2"
   50 LET C=INT (RND*VAL "27")+VA
L  "2"
   60 LET S=Q
   70 LET OP=P
   80 LET OQ=Q
   90 LET P=P+(INKEY$="6")-(INKEY
$="7")
  100 LET Q=Q+(INKEY$="8")-(INKEY
$="5")
  110 CLS
  120 PRINT AT P,Q;"*"
  130 LET S=S+PI/PI
  140 IF P=L AND Q=C THEN GOTO VA
L  "210"
  150 LET D=L-P
  160 LET E=C-Q
  170 LET F=L-OP
  180 LET G=C-OQ
  190 IF ABS D+ABS E<ABS F+ABS G
THEN PRINT AT 0,0;"WARMER"
  200 GOTO VAL "70"
  210 PRINT AT L,C;"X"
  220 PRINT "LOOT FOUND IN ";S;"
STEPS"
  230 PRINT "OPTIMUM ";L+C-VAL "1
"
```

CRIBBOARD



CRIBBOARD, as the name suggests, is a scoring system to use while playing cribbage. A board is displayed on which the state of the game is shown by the blanked-out hole on the board and the numerical total is shown. The result in the number of games is also given.

When run, the players are asked if they are playing a bust or no-bust game and the game is recorded as required. A maximum score of 29 is allowed on each turn and the impossible figure of 19 cannot be entered. The score is entered by giving the letter of the player, followed by his score.

The program was sent by M J Bennett of Jeddah, Saudi Arabia. It requires the 16K RAM pack.

```
    1 REM CRIBBOARD
    2 REM EACH PLAYER ENTERS HIS
LETTER (A OR B), FOLLOWED BY HIS
SCORE, FOLLOWED BY NEWLINE.
    3 REM AN ENTRY GREATER THAN
29 WILL NOT BE ACCEPTED.
    4 REM THE FIRST PLAYER TO
SCORE 121 OR MORE IS THE WINNER.
    5 PRINT "DO YOU WANT TO FINIS
H ON          EXACTLY 121? IF YES
PRESS ""Y""     ELSE PRESS ""NEWLI
NE"" ."
    6 INPUT B$
    7 IF B$="Y" THEN GOTO 4000
    8 IF B$<>"Y" THEN CLS
   10 LET C=0
   15 LET D=0
   20 GOSUB 9000
   30 GOSUB 9500
   40 INPUT A$
   41 PRINT AT 15,4;"          ";AT 1
5,21;"      "
   45 IF VAL A$(2 TO )>29 OR VAL
A$(2 TO )=19 THEN GOTO 40
   50 IF A$(1)="A" THEN GOTO 1000
   60 IF A$(1)="B" THEN GOTO 2000
   70 IF A$(1)<>"A" AND A$(1)<>"B
" THEN GOTO 40
1000 IF (VAL A$(2 TO )+A)<=121 T
HEN PLOT X,Y
1005 LET A=A+VAL A$(2 TO )
1011 IF A<31 THEN GOTO 1020
1012 IF A>30 AND A<61 THEN LET X
=2+(A*2-62)
1013 IF A>60 AND A<91 THEN LET X
=2+ABS (A*2-180)
1014 IF A>90 AND A<121 THEN LET
X=2+(A*2-182)
1015 IF A>120 THEN GOTO 1100
1020 IF A<31 OR (A>60 AND A<91)
THEN LET Y=37
1030 IF (A>30 AND A<61) OR A>90
THEN LET Y=34
1055 IF A<31 THEN LET X=62-(A*2)
1060 UNPLOT X,Y
1070 PRINT AT 13,5;A
1080 GOTO 40
1100 UNPLOT 62,36
1110 UNPLOT 62,35
1111 PLOT X,Y
1120 PRINT AT 13,5;"121"
1130 PRINT AT 15,4;"WINNER"
1131 LET C=C+1
1132 PRINT AT 17,5;C
1133 GOTO 3000
1200 LET A=A-VAL A$(2 TO )
1210 PRINT AT 15,5;"BUST"
1220 PRINT AT 13,5;A
1230 GOTO 40
2000 IF (VAL A$(2 TO )+B)<=121 T
HEN PLOT V,W
2005 LET B=B+VAL A$(2 TO )
2011 IF B<31 THEN GOTO 2020
2012 IF B>30 AND B<61 THEN LET V
=2+(B*2-62)
2013 IF B>60 AND B<91 THEN LET V
2013 IF B>60 AND B<91 THEN LET V
=2+ABS (B*2-180)
2014 IF B>90 AND B<121 THEN LET
V=2+(B*2-182)
2015 IF B>120 THEN GOTO 2100
2020 IF B<31 OR (B>60 AND B<91)
THEN LET W=27
2030 IF (B>30 AND B<61) OR B>90
THEN LET W=30
2055 IF B<31 THEN LET V=62-(B*2)
2060 UNPLOT V,W
2070 PRINT AT 13,23;B
2080 GOTO 40
2100 UNPLOT 62,29
2110 UNPLOT 62,28
2111 PLOT V,W
2120 PRINT AT 13,23;"121"
2130 PRINT AT 15,21;"WINNER"
2131 LET D=D+1
2132 PRINT AT 17,23;D
2133 GOTO 3000
2200 LET B=B-VAL A$(2 TO )
2210 PRINT AT 15,22;"BUST"
2220 PRINT AT 13,23;B
2230 GOTO 40
3000 PRINT AT 20,0;"DO YOU WANT
ANOTHER GAME?  (Y/N)"
3003 INPUT C$
3006 IF C$="Y" THEN CLS
3010 IF C$="Y" THEN GOTO 20
3020 STOP
4000 CLS
4010 LET E=1
4020 GOTO 10
9000 FAST
9010 FOR X=0 TO 63
9030 PLOT X,39
9040 NEXT X
9050 FOR X=0 TO 63
9070 PLOT X,25
9080 NEXT X
9100 FOR Y=26 TO 38
9110 PLOT 0,Y
9120 NEXT Y
9140 FOR Y=26 TO 38
9150 PLOT 63,Y
9160 NEXT Y
9170 FOR X=2 TO 60 STEP 2
9190 PLOT X,37
9200 NEXT X
9210 FOR X=2 TO 60 STEP 2
9230 PLOT X,34
9240 NEXT X
9250 FOR X=2 TO 60 STEP 2
9260 PLOT X,30
9270 NEXT X
9280 FOR X=2 TO 60 STEP 2
9290 PLOT X,27
9300 NEXT X
9310 PLOT 62,36
9320 PLOT 62,35
9330 PLOT 62,29
9340 PLOT 62,28
9350 PRINT AT 11,4;"A=TOP";AT 11
,20;"B=BOTTOM"
9360 PRINT AT 13,12;"(SCORE)"
9365 PRINT AT 17,12;"(GAMES)"
9370 SLOW
9380 RETURN
9500 LET A=0
9510 LET B=0
9515 LET V=60
9516 LET W=27
9517 LET X=60
9518 LET Y=37
9520 PRINT AT 13,5;A;AT 13,23;B
9525 PRINT AT 17,5;C;AT 17,23;D
9530 RETURN
COPYRIGHT M.J.BENNETT.
          1982
```

ALIEN LORE

A GAME which links the bug-baiting type of program with a battle against alien invaders has been produced by Sanath Yogàsundrum of Ashton, Preston, Lancashire.

When the game begins, the player is asked for a skill level, A or P, which stand for amateur or professional. It is advisable to start on the amateur level while the player begins to understand this complex game.

A small grid is shown in the bottom left-hand corner of the screen in which there are four aliens, shown as X and $, with a soldier (*). The soldier has to dig a hole (O) and then lure the aliens into it, scoring 100 points for every X and 200 for every $.

The hole is dug by going into dig mode, pressing 2, and pressing the cursor key for which side of the soldier you wish to place the hole. The soldier can then be moved by pressing 01 to return to movement mode, and using the cursors in their normal directions.

A soldier can be killed either by falling into his own hole or being eaten by an alien. The game lasts for the lives of three soldiers, although an extra soldier can be gained by scoring more than 3,000.

Two other limitations are that only one hole can be dug at a time and a hole cannot be dug beneath an alien. Once an alien has fallen into a hole it is filled immediately and the game continues.

Even after playing for more than an hour at the amateur level, no-one at *Sinclair Programs* managed to score more than 1,300.

```
    1 LET BEST=0
    2 PRINT "SKILL LEVEL?(A/P)"
    3 INPUT A$
    5 CLS
   10 LET SO=2
   15 LET S=0
   20 PRINT """FILLED UP"""
   21 PRINT AT 14,15;"LEVEL:";A$
   22 PRINT AT 16,10;"HIGH SCORE:
";BEST
   23 PRINT AT 18,0;" ■ ■ ■ ■  YO
UR SCORE:";S
   30 PRINT AT 20,0;" ■ ■ ■ ■   S
PARE MEN:";SO
   40 LET X=17
   50 LET Y=0
   60 LET A=17
   70 LET B=8
   80 LET U=21
   90 LET V=4
  100 LET G=1
  110 LET HX=15
  120 LET HY=0
  130 LET C=17
  140 LET D=4
  150 LET E=19
  160 LET F=2
  165 LET GG=19
  170 LET HH=6
  195 PRINT AT U,V;"*"
  200 PRINT AT X,Y;"$"
  210 PRINT AT A,B;"$"
  220 PRINT AT C,D;"X"
  230 PRINT AT E,F;"X"
```

```
  240 PRINT AT GG,HH;"X"
  300 LET Q=141
  305 LET M=X
  310 LET N=Y
  320 GOSUB 2000
  322 LET W=345
  325 GOTO 6000
  335 LET X=M
  340 LET Y=N
  345 PRINT AT X,Y;"$"
  347 GOSUB 2430
  350 LET M=A
  360 LET N=B
  370 GOSUB 2000
  375 LET W=410
  380 GOTO 6000
  400 LET B=N
  405 LET A=M
  410 PRINT AT A,B;"$"
  415 GOSUB 2430
  417 LET Q=189
  420 LET M=C
  440 LET N=D
  460 GOSUB 2000
  470 LET W=510
  475 GOTO 6000
  500 LET D=N
  505 LET C=M
  510 PRINT AT C,D;"X"
  515 GOSUB 2430
  520 LET M=E
  540 LET N=F
  560 GOSUB 2000
  570 LET W=610
  580 GOTO 6000
  600 LET F=N
  605 LET E=M
  610 PRINT AT E,F;"X"
  615 GOSUB 2430
  620 LET M=GG
  640 LET N=HH
  660 GOSUB 2000
  670 LET W=710
  680 GOTO 6000
  700 LET HH=N
  705 LET GG=M
  710 PRINT AT GG,HH;"X"
  720 GOSUB 2430
  770 GOTO 300
 2003 IF INKEY$="1" THEN LET G=1
 2004 IF INKEY$="2" THEN LET G=2
 2005 LET R=RND
 2010 LET Z=RND
 2020 PRINT AT M,N;" "
 2090 IF M=18 OR M=20 OR N=V AND
A$="P" AND (N=0 OR N=2 OR N=4 OR
 N=6 OR N=8) THEN GOTO 2120
 2100 IF R<=.5 OR M=U OR N=1 OR N
=3 OR N=5 OR N=7 THEN GOTO 2300
 2120 IF M=21 OR U<M AND A$="P" T
HEN LET Z=.7
 2122 IF M=17 OR U>M AND A$="P" T
HEN LET Z=.5
 2125 IF Z<=.5 THEN LET M=M+1
 2140 IF Z>.5 THEN LET M=M-1
 2160 GOTO 2340
 2300 IF N=0 OR N<V THEN LET Z=.5
 2305 IF N=8 OR N>V THEN LET Z=.7
 2310 IF Z<=.5 THEN LET N=N+1
 2320 IF Z>.5 AND N>0 THEN LET N=
N-1
 2340 IF M=U AND N=V THEN GOTO 70
00
 2400 IF INKEY$="2" THEN LET G=2
 2410 IF INKEY$="1" THEN LET G=1
 2420 RETURN
 2430 IF INKEY$<>"5" AND INKEY$<>
"6" AND INKEY$<>"7" AND INKEY$<>
"8" THEN RETURN
 2440 IF G=2 THEN GOTO 2590
 2460 PRINT AT U,V;" "
 2520 IF INKEY$="5" AND V>0 AND (
U=17 OR U=19 OR U=21) THEN LET V
 2520 IF INKEY$="5" AND V>0 AND (
U=17 OR U=19 OR U=21) THEN LET V
=V-1
 2540 IF INKEY$="8" AND V<8 AND (
U=17 OR U=19 OR U=21) THEN LET V
=V+1
 2560 IF INKEY$="6" AND U<21 AND
(V=0 OR V=2 OR V=4 OR V=6 OR V=8
) THEN LET U=U+1
 2580 IF INKEY$="7" AND U>17 AND
(V=0 OR V=2 OR V=4 OR V=6 OR V=8
) THEN LET U=U-1
 2585 GOTO 3005
 2590 PRINT AT HX,HY;" "
 2597 IF INKEY$="5" AND V>0 AND (
U=21 OR U=19 OR U=17) THEN GOTO
 2700
 2600 IF INKEY$="8" AND V<8 AND (
U=21 OR U=19 OR U=17) THEN GOTO
 2750
 2620 IF INKEY$="6" AND U<21 AND
(V=0 OR V=2 OR V=4 OR V=6 OR V=8
 2620 IF INKEY$="6" AND U<21 AND
(V=0 OR V=2 OR V=4 OR V=6 OR V=8
) THEN GOTO 2800
 2640 IF INKEY$="7" AND U>17 AND
(V=0 OR V=2 OR V=4 OR V=6 OR V=8
) THEN GOTO 2850
 2660 GOTO 3005
 2700 LET HX=U
 2710 LET HY=V-1
 2720 GOTO 3000
 2750 LET HX=U
 2760 LET HY=V+1
 2770 GOTO 3000
 2800 LET HX=U+1
 2810 LET HY=V
 2820 GOTO 3000
 2850 LET HX=U-1
 2860 LET HY=V
 3000 IF HX=X AND HY=Y OR HX=A AN
D HY=B OR HX=C AND HY=D OR HX=E
AND HY=F OR HX=GG AND HY=HH THEN
 LET HX=15
 3003 IF HX<>15 THEN PRINT AT HX,
HY;"O"
 3020 IF HX=U AND HY=V OR U=X AND
 V=Y OR U=A AND V=B OR U=C AND V
=D OR U=E AND V=F OR U=GG AND V=
HH THEN GOTO 7000
 3030 PRINT AT U,V;"*"
 3040 RETURN
 6000 IF M=X AND N=Y OR M=A AND N
=B OR M=C AND N=D OR M=E AND N=F
 OR M=GG AND N=HH THEN GOTO W
 6005 IF M=HX AND N=HY THEN GOTO
 6020
 6010 GOTO W-10
 6020 IF Q=141 THEN LET S=S+100
 6035 LET S=S+100
 6040 PRINT AT M,N;CHR$ Q
 6044 IF S/3000=INT (S/3000) OR (
S-100)/3000=INT ((S-100)/3000) T
HEN LET SO=SO+1
 6045 PRINT AT 18,21;S
 6047 PRINT AT 20,21;SO
 6050 LET HX=15
 6060 GOTO W-10
 7000 PRINT AT U,V;"■"
 7010 LET SO=SO-1
 7030 PAUSE 100
 7032 IF SO=-1 THEN GOTO 8000
 7035 CLS
 7040 GOTO 20
 8000 FOR N=0 TO 21
 8010 SCROLL
 8020 NEXT N
 8030 IF S>BEST THEN LET BEST=S
 8040 PRINT AT 0,0;"GAME OVER, AL
L YOUR MEN ARE DEAD"
 8050 GOTO 2
```

WIPE OUT

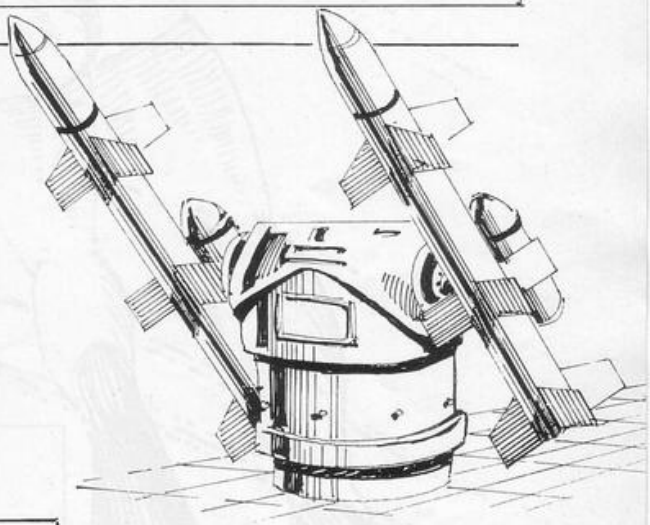
A DECEPTIVELY simple but frustrating game has been sent by Keith Paterson of Newmarket, Suffolk. When run, two walls are displayed with an O between them. The O can be used to eliminate the walls but as it does so it leaves a trail of Os behind it when moving vertically. No trail is left when moving horizontally.

The object is to finish with only one O on the screen. Despite a lengthy attempt by the *Sinclair Programs* reviewer, that proved impossible but Paterson maintains that it can be done with a little thought and concentration.

The O is moved by the cursor keys in the usual directions. It can run on the 1K ZX-81.

```
   2 PRINT "USE 5,6,7,8 TO  CLS
"
   3 PAUSE 200
   4 CLS
   6 FOR X=1 TO 6
   7 PRINT TAB 0;"█"
   8 PRINT TAB 16;"█"
   9 NEXT X
  10 LET A=10
  20 LET B=10
  25 LET D$=" O "
  30 PRINT AT A,B;D$
  40 IF INKEY$="8" THEN LET B=B+
1
  50 IF INKEY$="5" THEN LET B=B-
1
  51 IF INKEY$="6" THEN LET A=A+
1
  52 IF INKEY$="7" THEN LET A=A-
1
  53 PRINT AT A+1,B;" "
  54 IF B>16 OR B<0 THEN LET B=0
  55 IF A>12 OR A<0 THEN LET A=0
  56 PRINT AT A-1,B;" "
  60 GOTO 30
```

SHIPS



```
   1 LET C=0
   2 LET A=0
   3 RAND
   4 FOR A=1 TO 10
   5 CLS
  40 LET M=18
  92 LET F=2*(INT (RND*8))
  95 FOR B=0 TO 20
 100 PRINT AT F,B;"▄▄"
 125 PRINT AT 19,15;"▄▄▄"
 130 IF M<F THEN LET M=18
 140 IF INKEY$="P" OR M<18 THEN
PRINT AT M,16;"."
 150 IF B=15 AND M=F THEN GOTO 1
500
 160 IF INKEY$="P" OR M<18 THEN
GOSUB 1000
 300 PRINT AT F,B;"   "
 370 NEXT B
 500 NEXT A
 700 PRINT AT 20,16;C
1000 PRINT AT M,16;" "
1010 LET M=M-2
1020 RETURN
1500 PRINT AT M,B;"BANG"
1700 PAUSE 50
1750 LET C=C+1
1800 NEXT A
2000 PRINT AT 20,16;C
```

FOR THE 1K ZX-81, **Ships** is a simple type of missile game in which a target moves at various distances from the gun across the screen and the objective is to hit it. Ten ships pass and the score is shown at the end of each game.

Only one shot can be made at a time, so the skill is in judging when to fire, so that the missile and ship coincide. When a hit is made in the middle of the ship, BANG is shown on the screen.

Press RUN and NEW LINE to start each game and P to fire the missile. The *Sinclair Programs* reviewer managed a top score of four.

The graphics in line 1ØØ are, all shifted, 3,6 and 4 and line 125,Q,F and W. Ships was sent by Ian Johnston, of Newmarket, Suffolk.

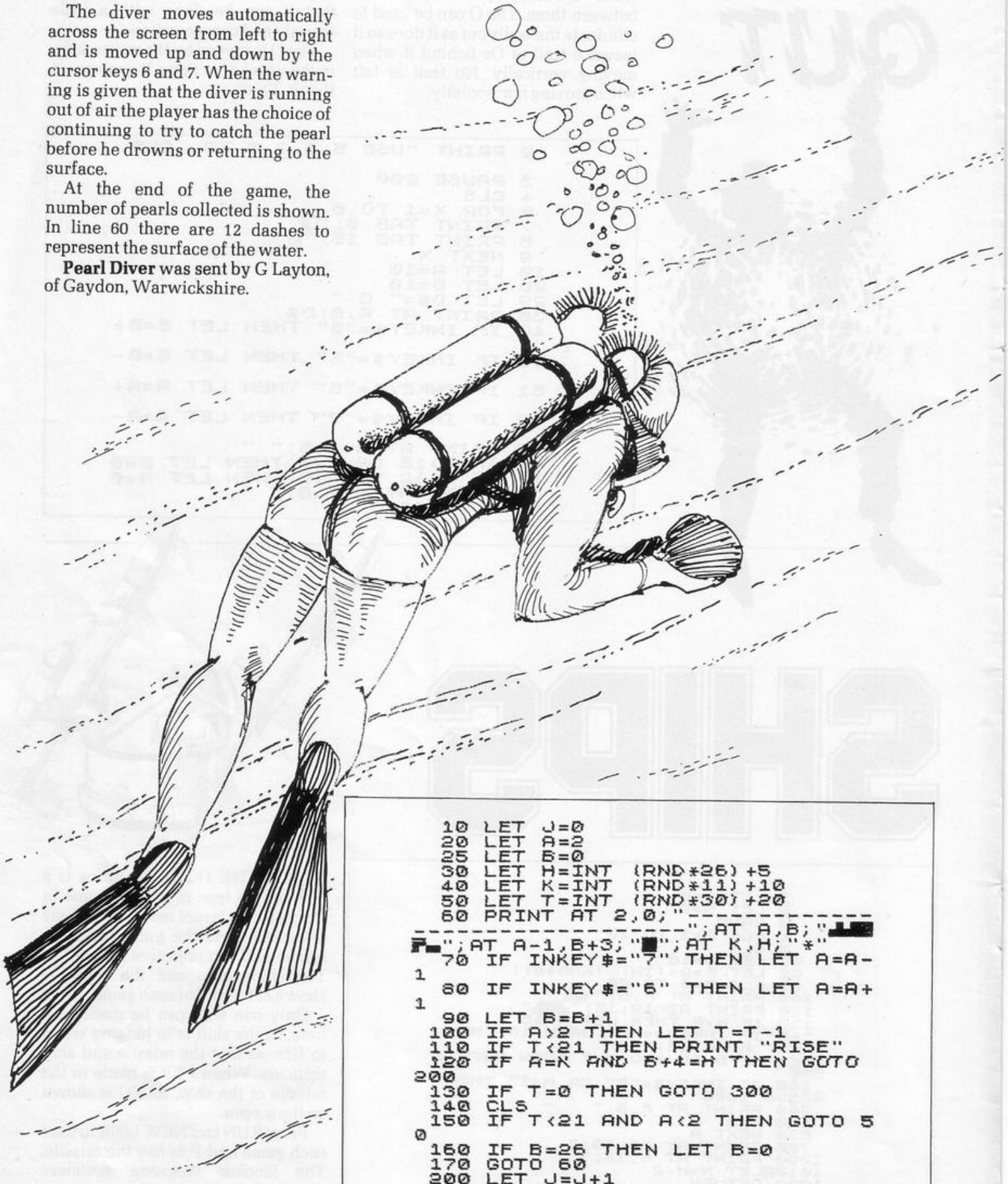
PEARL DIVER

PEARL DIVER will fit on the 1K ZX-81 and, as the name suggests, involves a diver attempting to pick up a pearl before he runs out of air.

The diver moves automatically across the screen from left to right and is moved up and down by the cursor keys 6 and 7. When the warning is given that the diver is running out of air the player has the choice of continuing to try to catch the pearl before he drowns or returning to the surface.

At the end of the game, the number of pearls collected is shown. In line 60 there are 12 dashes to represent the surface of the water.

Pearl Diver was sent by G Layton, of Gaydon, Warwickshire.



```
  10 LET J=0
  20 LET A=2
  25 LET B=0
  30 LET H=INT (RND*26)+5
  40 LET K=INT (RND*11)+10
  50 LET T=INT (RND*30)+20
  60 PRINT AT 2,0;"----------
----------";AT A,B;"▟▙
▜▛";AT A-1,B+3;"▀";AT K,H;"*"
  70 IF INKEY$="7" THEN LET A=A-
1
  80 IF INKEY$="6" THEN LET A=A+
1
  90 LET B=B+1
 100 IF A>2 THEN LET T=T-1
 110 IF T<21 THEN PRINT "RISE"
 120 IF A=K AND B+4=H THEN GOTO
200
 130 IF T=0 THEN GOTO 300
 140 CLS
 150 IF T<21 AND A<2 THEN GOTO 5
0
 160 IF B=26 THEN LET B=0
 170 GOTO 60
 200 LET J=J+1
 210 PRINT AT 0,0;"PEARLS COLLEC
TED=";J
 220 GOTO 20
 300 PRINT AT 0,0;"YOU RAN OUT O
F AIR"
```

CONSTELLATIONS

CONSTELLATIONS is a program specially for all avid stargazers. After the lengthy process of entering it, press RUN and NEW LINE and a menu is provided, listing 10 groups of stars. Pick which one you wish to see and the group of stars is shown, along with its name.

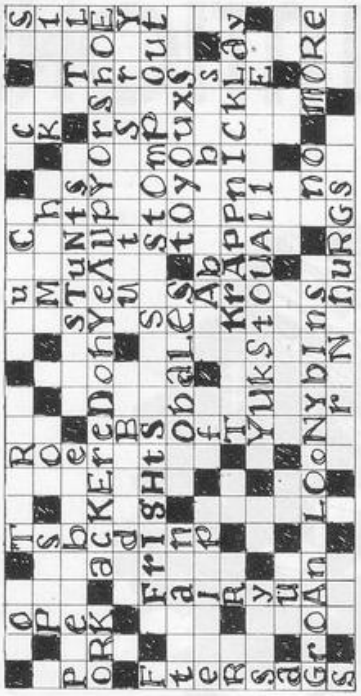
The list available is the same as that sent by the writer of the program but others can be added or substituted according to taste.

The main idea is to provide some kind of record of a particular constellation, so it is essential to save the program on cassette.

Kevan Cheyne, aged 10, of Hartlepool, Cleveland, wrote the program for a school project on stars. No doubt the next project will be to draw a picture of Patrick Moore.

```
 10 PRINT "CONSTELLATION MENU"
 15 PRINT "                   "
 20 PRINT "1. DELPHINUS"
 30 PRINT "2. LYRA"
 35 PRINT "3. BOOTES"
 36 PRINT "4. LEPUS"
 40 PRINT "5. PEGASUS"
 41 PRINT "6. CANCER"
 42 PRINT "7. LIBRA"
 43 PRINT "8. CETUS"
 44 PRINT "9. AURIGA"
 45 PRINT "10. THE LITTLE DOG"
 46 FOR F=1 TO 9
 47 PRINT "                   "
 48 NEXT F
 50 INPUT A
 60 IF A<1 OR A>10 THEN GOTO 9
 70 GOTO A*100
100 CLS
105 PRINT TAB 1,"DELPHINUS"
110 PLOT 21,42
120 PLOT 46,43
130 PLOT 26,22
140 PLOT 51,22
150 PLOT 56,0
151 GOTO 1100
200 CLS
205 PRINT TAB 20,"LYRA"
210 PLOT 31,30
215 PLOT 36,32
220 PLOT 56,36
225 PLOT 54,9
230 PLOT 45,2
235 PLOT 31,15
240 PLOT 16,3
245 PLOT 12,8
250 PLOT 7,37
251 GOTO 1100
300 CLS
305 PRINT TAB 20,"BOOTES"
310 PLOT 32,23
320 PLOT 35,38
325 PLOT 30,33
330 PLOT 22,36
335 PLOT 25,21
340 PLOT 29,4
350 PLOT 24,3
360 PLOT 34,2
370 GOTO 1100
400 CLS
401 PRINT TAB 20,"LEPUS"
410 PLOT 32,10
420 PLOT 42,14
425 PLOT 47,12
430 PLOT 45,22
435 PLOT 46,27
440 PLOT 42,27
445 PLOT 37,20
450 PLOT 27,24
455 PLOT 24,26
460 PLOT 23,23
465 PLOT 28,13
470 GOTO 1100
500 CLS
501 PRINT TAB 20,"PEGASUS"
510 PLOT 32,15
515 PLOT 30,10
520 PLOT 28,3
525 PLOT 45,3
530 PLOT 7,30
535 PLOT 25,43
540 PLOT 45,33
545 PLOT 48,33
550 PLOT 47,29
555 PLOT 49,27
560 GOTO 1100
600 CLS
602 PRINT TAB 20,"CANCER"
610 PLOT 32,37
620 PLOT 42,39
630 PLOT 57,43
640 PLOT 10,39
645 PLOT 22,22
650 PLOT 42,25

660 GOTO 1100
700 CLS
701 PRINT TAB 20,"LIBRA"
710 PLOT 32,37
720 PLOT 42,27
730 PLOT 24,27
740 PLOT 26,9
750 PLOT 24,7
760 PLOT 36,14
770 GOTO 1100
800 CLS
801 PRINT TAB 20,"CETUS"
810 PLOT 39,17
820 PLOT 54,15
830 PLOT 43,13
835 PLOT 49,2
840 PLOT 35,5
845 PLOT 16,30
850 PLOT 31,10
855 PLOT 14,34
860 PLOT 14,36
865 PLOT 18,42
870 PLOT 25,39
875 PLOT 21,37
880 PLOT 18,34
890 GOTO 1100
900 CLS
902 PRINT TAB 20,"AURIGA"
910 PLOT 32,21
920 PLOT 26,41
930 PLOT 18,22
940 PLOT 14,9
950 PLOT 39,0
960 PLOT 39,18
970 PLOT 42,18
971 PLOT 41,22
980 GOTO 1100
1000 CLS
1002 PRINT TAB 18,"THE LITTLE DO
G"
1010 PLOT 10,10
1090 PLOT 40,40
1100 PRINT AT 21,0,"TO HOLD:H"
1104 FOR S=1 TO 100
1105 IF INKEY$="H" THEN LET S=0
1106 IF INKEY$="Z" THEN COPY
1110 NEXT S
1111 RUN
1120 SAVE "CON"
1121 RUN
```



WORD

WORD PUZZLER is not so much a game as a game generator.

The object is to make word puzzles like those which appear in puzzle magazines, where a series of words is hidden in a grid of random letters.

The words can be vertical, reversed or diagonal, but rarely obvious.

The ingenious program requires a list of up to 15 words each of up to 12 letters, in order of length and pressing NEWLINE TO to start. The screen goes blank as the computer goes into fast mode to re-arrange the

```
  10 REM *WORDSQUARE GENERATOR*
  20 REM (C) A.BLACKBURN 1982
  25 REM
  26 REM
  30 PRINT "          WORDSQUARE GEN
ERATOR          "
  40 PRINT '''''"THIS PROGRAM G
ENERATES","WORDSQUARE PUZZLES",,,
,"PLEASE INPUT THE NUMBER OF WOR
DSYOU HAVE..(YOU CAN USE UP TO 1
5)"
  50 INPUT N
  55 IF N>15 THEN GOTO 50
  60 DIM X(12)
  70 DIM Y(12)
  80 DIM D(16)
  90 DIM G$(15,15)
 100 CLS
 110 PRINT "PLEASE INPUT YOUR ";
N;" WORDS NOW","IN ORDER OF LENG
TH (LONGEST","FIRST,SMALLEST LAS
T)"
 120 PRINT ,,"YOU CAN USE UP TO
12 LETTERS PERWORD"
 125 PRINT
 126 INPUT A$
 127 DIM W$(15,LEN A$)
 128 LET W$(1)=A$
 129 PRINT A$,
 130 FOR M=2 TO N
 140 INPUT W$(M)
 150 PRINT W$(M),
 160 NEXT M
 170 PRINT AT 17,0;"IT WILL TAKE
 ME A FEW MINUTES","TO SORT THE
WORDS OUT",,,"**PRESS NEWLINE TO
 START"
 180 INPUT U$
 190 CLS
 200 FAST
 210 REM ** MAIN LOOP **
 215 LET D(1)=0
 220 FOR M=1 TO N
 230 REM **RANDOM DIRECTIONS+STA
RTING POINTS**
 240 LET D(M+1)=INT (RND*8)+1
 245 IF D(M+1)=D(M) THEN GOTO 24
0
 250 LET L=INT (RND*15)+1
 260 LET C=INT (RND*15)+1
 280 FOR A=1 TO LEN W$(M)
 290 GOSUB 1000+D(M+1)*20
 300 IF L<1 OR L>15 THEN GOTO 25
0
 310 IF C<1 OR C>15 THEN GOTO 25
0
 320 LET A$=W$(M,A)
 330 IF G$(L,C)<>" " AND G$(L,C)
<>A$ THEN GOTO 240
 340 LET X(A)=L
 350 LET Y(A)=C
 360 NEXT A
 370 REM **OK WE HAVE A WORD FIT
SO PUT IT IN THE GRID**
 380 FOR K=1 TO LEN W$(M)
 390 LET G$(X(K),Y(K))=W$(M,K)
 400 NEXT K
 410 REM **GET NEXT WORD**
 420 NEXT M
 425 REM ** WORDSQUARE COMPLETE
**
 430 SLOW
```

letters and hide the words in a square of 15 by 15 letters.

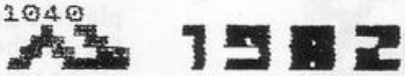
Eventually the word puzzle is shown on the screen and the game is to find the input words which are listed by the side of the square.

The grid can be printed so that a number of puzzles with different words can be made at the same time.

The dimensions of the square are set by the variable G$(15,15) which can be altered to provide other sizes.

Word Puzzler is from Andrew Blackburn, of North Hykeham, Lincoln.

```
  450 FOR D=1 TO 10000
  455 LET A$=INKEY$
  460 PRINT AT 5,0;"[illegible]
[illegible]"
  470 PRINT AT 20,0;"PRESS ""C""
TO CONTINUE"
  480 IF A$="C" THEN GOTO 495
  488 PRINT AT 5,0;"* O.K. WORD5Q
UARE IS COMPLETE *"
  489 NEXT D
  495 CLS
  500 PRINT "PLEASE INPUT THE TIT
LE OF YOUR","WORDSQUARE"
  505 INPUT T$
  506 CLS
  510 PRINT AT 0,5;T$
  515 FOR S=1 TO LEN T$
  520 PRINT AT 1,4+S;"■"
  525 NEXT S
  526 PRINT
  530 FOR A=1 TO 15
  535 FOR B=1 TO 15
  540 IF G$(A,B)=" " THEN LET G$(
A,B)=CHR$ (INT (RND*26)+38)
  550 PRINT G$(A,B);
  560 NEXT B
  570 PRINT "(4 SPACES)";W$(A)
  590 NEXT A
  600 PRINT AT 21,0;"INPUT ""C""
TO COPY THE SCREEN"
  610 INPUT U$
  620 PRINT AT 21,0;"(32 SPACES)"
  630 IF U$="C" THEN COPY
  640 GOTO 600
1000 REM ** DIRECTIONS **
1020 LET C=C-1
1030 RETURN
1040 LET C=C+1
1050 RETURN
1060 LET L=L+1
1070 RETURN
1080 LET L=L-1
1090 RETURN
1100 LET L=L+1
1110 GOTO 1040
1120 LET L=L-1
1130 GOTO 1020
1140 LET L=L+1
1150 GOTO 1020
1160 LET L=L-1
1170 GOTO 1040
D834 REM
E090 REM
```



```
     BITS "N" BYTES
```

```
ASBITTUJUAWRXNI    COMPUTER
VWDIHGJPMUEEAZK    SOFTWARE
YJLYKCONQTRIBLE    HARDWARE
WXETRNHGUAQYQHV    KEYBOARD
GPAHIOUPWDTGTCY    PRINTER
SQNJRCMDJESNQUV    SILICON
BTEKYOREMBJPRRN    MEMORY
SSEECAFHMFQLISO    SCREEN
SCRYHKYWORCIMOC    CURSOR
EVCBZEECIXEESRI    MICRO
NFSOFTWAREPPQAL    BYTE
UIQAJCHIPAHOZVI    CHIP
RUURCNPWDOGMRKS    STOP
FWYDHLUUSGMIVXG    BIT
AOTVGRETNIRPIUA    RUN

EXAMPLE WORDSQUARE USING THIS
PROGRAM
```

```
 10 DIM A$(10)
 20 FOR A=1 TO 10
 30 LET A$(A)=CHR$ (INT (RND*35
)+29)
 40 NEXT A
 50 PRINT "PRESS NEWLINE TO STA
RT."
 60 INPUT I$
 70 CLS
 80 FOR B=0 TO 6
 90 FOR C=1 TO 10
100 PRINT AT 10,C*3;A$(C)
110 NEXT C
120 NEXT B
130 FAST
140 FOR D=0 TO 30
150 FOR E=1 TO 10
160 IF A$(E)=INKEY$ THEN LET A$
(E)=" "
170 PRINT AT 10,E*3;A$(E)
180 NEXT E
190 NEXT D
200 SLOW
210 RUN
```

MEMORY

AS ITS NAME suggests, **Memory** is a game for remembering things. When run, a series of 10 random characters, both letters and numbers, is displayed for about four seconds. The screen then goes blank, during which time you have to enter as many characters as you can remember.

After another six seconds, the characters which you did not type-in are displayed on the screen.

The game can then be repeated by pressing RUN and NEW LINE, when another series of characters appears.

It is a simple but absorbing game which can be played for hours. It was sent by C J Barnatt, of Fernhill Heath, Worcester.

FIRE ESCAPE

FIRE ESCAPE, which can fit into 1K ZX-81, is a variation of the catcher type of game. When run, a block of flats is simulated on the left-hand side of the screen from which a figure, denoted by a bracket, jumps, and the object is to catch the figure before it hits the ground.

The catching blanket is moved from side to side by the cursor keys 5 and 8.

The game is made more interesting and difficult by a 'wind' moving the figure in the air, which makes constant adjustment of the blanket necessary. The concentration needed to do it makes it difficult to play the game for long, as the flashing of the figures hurts the eyes after a time.

After 10 people have jumped, your score, showing how many you saved, is shown and you can start the game again.

Fire Escape was sent by Roy Hair, of Kilmarnock, Scotland.

```
 1 REM FIRE ESCAPE
 2 REM BY ROY HAIR
 3 LET P=CODE " "
 4 LET E=CODE "▗"
 5 LET S=P
 6 LET F=4
 7 LET G=2
10 FOR X=5 TO 18
20 PRINT AT X,0;"▒▒▒"
30 NEXT X
40 PRINT AT F,G;"("
50 PRINT AT 21,E;"▀▀"
51 FOR N=0 TO 4
52 NEXT N
55 PRINT AT 21,E;" "
60 IF INKEY$="8" THEN LET E=E+
1
 70 IF INKEY$="5" THEN LET E=E-
1
 80 PRINT AT F,G;" "
 90 LET F=F+1
100 LET G=G+INT (RND*2)
105 IF F=21 THEN GOTO 170
110 GOTO CODE "C"
170 IF G=E THEN LET S=S+CODE "▗
"
175 LET P=P+CODE "▗"
176 PRINT AT 10,15;S
177 IF P=CODE "▒" THEN STOP
180 PAUSE CODE "M"
190 CLS
200 GOTO CODE "▗"
```

KNIGHT'S MOVE

KNIGHT'S MOVE uses the movement pattern of the Knight in chess to try to cover every space in a square. The program asks where you wish to start on the board, giving the vertical co-ordinate first, and then marks the moves as you make your way round the board.

There is a check routine to make sure you cannot cheat by making an incorrect move or land more than once on the same square. When no more squares can be visited, enter Ø as the number for the next square.

Press NEW LINE to replay the game or any other key and NEW LINE to end the game.

The graphics in line 20 are the capital I reversed with two reversed dashes, shifted J, between each. In line 3Ø the dashes are replaced by reversed spaces.

Knight's Move was sent by K M Godolphin, of Camborne, Cornwall, and needs 16K RAM.

```
  10 DIM B(8,8)
  20 LET A$="I--I--I--I--I--I  I
--I--I"
  30 LET B$="I  I  I  I  I  I  I
  I  I"
  40 CLS
  50 FAST
  60 PRINT TAB 6;"1  2  3  4  5
 6  7  8"
  70 PRINT TAB 5;A$
  80 FOR L=1 TO 8
  90 PRINT TAB 3;L;" ";B$;TAB 5;
A$
 100 NEXT L
 110 FOR L=1 TO 8
 120 FOR C=1 TO 8
 130 LET B(L,C)=0
 140 NEXT C
 150 NEXT L
 160 LET M=0
 170 SLOW
 180 PRINT AT 20,0;"WHERE DO YOU
 180■PRINT AT 20,0;"WHERE DO YOU
 WISH TO BEGIN"
 190 INPUT C$
 200 GOSUB 410
 210 IF L=9 THEN GOTO 180
 220 LET M=M+1
 230 PRINT AT L*2,C*3+3;M
 240 IF M<10 THEN PRINT AT L*2,C
*3+4;" "
 250 LET L1=L
 260 LET C1=C
 270 LET B(L,C)=1
 280 IF M<64 THEN GOTO 310
 290 PRINT AT 20,0;"CONGRATULATI
ONS"
 300■GOTO 490
 310 PRINT AT 19,0;" 10 SPACES "
 320 PRINT AT 20,0;"WHERE DO YOU
 WISH TO GO NEXT"
 330 INPUT C$
 340 IF C$="0" THEN GOTO 490
 350 GOSUB 410
 360 IF L=9 THEN GOTO 320
 370 IF L=L1-2 OR L=L1+2 AND C=C
1-1 OR C=C1+1 THEN GOTO 220
 380 IF L=L1-1 OR L=L1+1 AND C=C
1-2 OR C=C1+2 THEN GOTO 220
 390 PRINT AT 19,0;"IMPOSSIBLE"
 400 GOTO 320
 410 PRINT AT 20,0;" 28 SPACES
"
 420 IF LEN C$<>2 THEN GOTO 470
 430 LET L=VAL C$(1)
 440 LET C=VAL C$(2)
 450 IF L<1 OR L>8 OR C<1 OR C>8
 THEN GOTO 460
 452 IF B(L,C)=1 THEN GOTO 460
 454 RETURN
 460 LET L=9
 470 PRINT AT 19,0;"IMPOSSIBLE"
 480 RETURN
 490 PRINT AT 21,0;"NL TO REPLAY
"
 480■RETURN
 490 PRINT AT 21,0;"NL TO REPLAY
"
 500 INPUT C$
 510 IF C$="" THEN GOTO 40
```

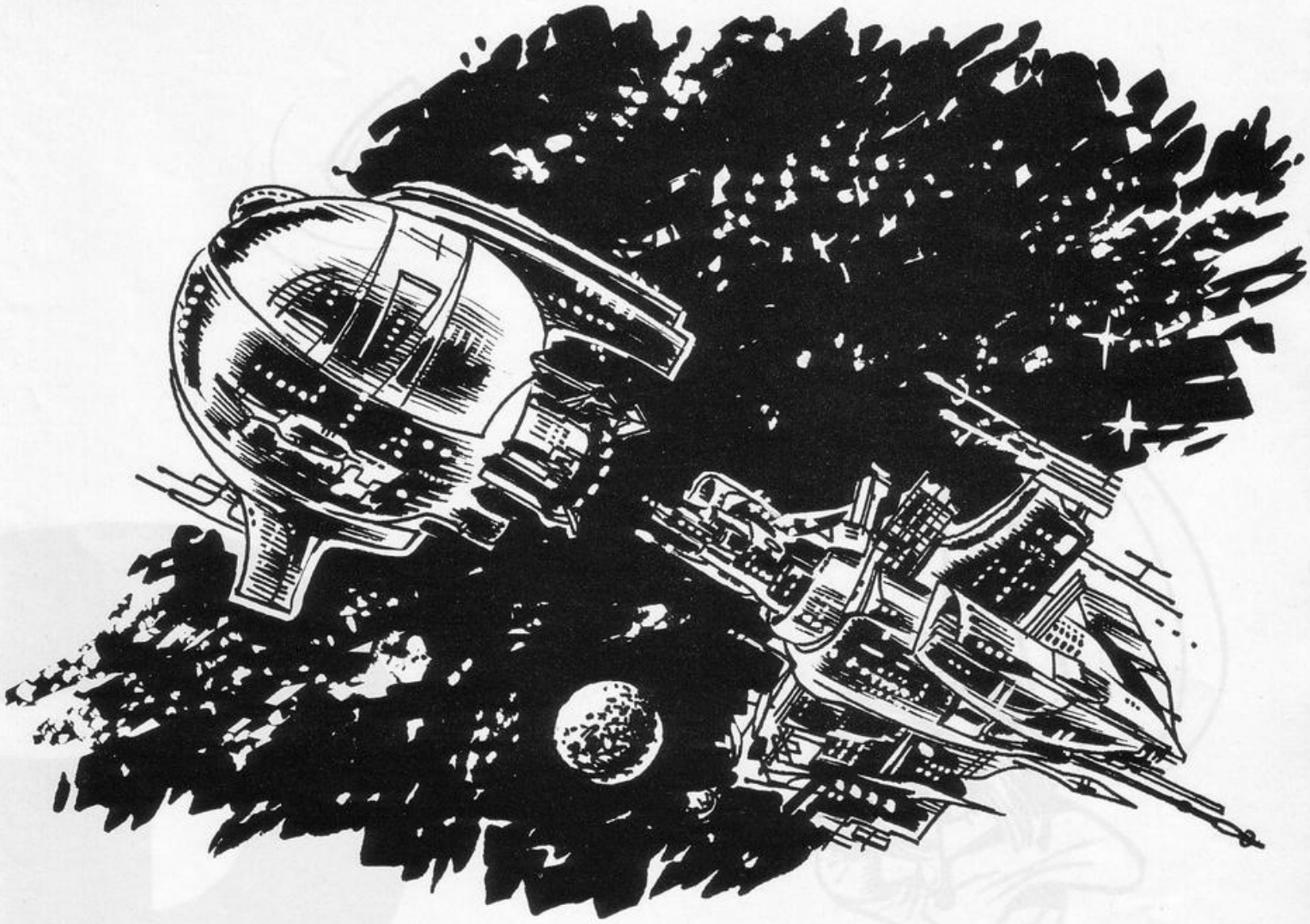
STUNT RIDER

STUNT RIDER simulates a motor-cyclist of the Evil Knievel variety jumping a series of barrels. The J key is pressed to jump and if it is not held down long enough the cyclist falls into the barrels, bringing a CRASH on the screen.

It is a very simple program. It does not take long to enter and can provide some enjoyment. To help with the design in line 30 there are 32 dashes and in lines 45 and 80 there are four spaces between each set of quotation marks.

Stunt Rider was sent by Paul Richards, of Swindon, Wiltshire.

```
   5 PRINT "*****STUNT RIDER*****
*"
  10 LET A=CODE " "
  20 LET B=CODE "="
  30 PRINT AT CODE "+",CODE " ";
"--------------------------------
-"
  40 PRINT AT B-1,A;"▄) ";AT B,A;
" O▄▄O"
  45 PRINT AT B-1,A;"     ";AT B,
A;"    "
  50 PRINT AT 19,10;" /";AT 20,1
0;"/"
  60 IF INKEY$="J" AND A>=6 AND
B>17 THEN LET B=B-1
  62 IF INKEY$<>"J" AND B<20 THE
N LET B=B+1
  70 LET A=A+1
  71 PRINT AT 20,14;"000000000"
  74 IF A>13 AND A<22 AND B=20 T
HEN PRINT AT 20,A;"CRASH"
  75 IF A>13 AND A<22 AND B=20 T
  75▌IF A>13 AND A<22 AND B=20 T
HEN STOP
  80 IF A=29 THEN PRINT AT 19,A;
"    ";AT 20,A;"    "
 100 IF A=29 THEN LET A=0
 110 GOTO 40
```



DOCKING

```
   1 RAND
  11 LET X=INT (RND*50)
  20 LET Y=INT (RND*30)
  30 LET A=CODE " "
  40 LET B=A
  41 LET S=A
  45 CLS
  46 PLOT A,B
  47 PLOT X-1,Y+1
  48 PLOT X,Y+1
  50 PLOT X-1,Y
  51 IF A=X AND B=Y THEN GOTO 10
0
  53 LET X=X+2*(RND<.5 AND X<60)
-2*(RND>.5 AND X>0)
  55 LET Y=Y+2*(RND>.5 AND Y<40)
-2*(RND<.5 AND Y>0)
  56 LET A=A+(INKEY$="8" AND A<6
0)-(INKEY$="5" AND A>0)
  57 LET B=B+(INKEY$="7" AND B<4
0)-(INKEY$="6" AND B>0)
  59 LET S=S+1
  60 IF S>300 THEN GOTO 103
  61 GOTO 45
 101 PRINT AT 21,0;"DOCKED IN ";
S;" MOVES";END
 103 PRINT "NO ENERGY"
```

DOCKING, from J Smith of Coulsdon, Surrey, is like many of the Lunar Lander types of games where a craft has to be manoeuvred to land safely. The added spice to this version is that, in the words of its creator, "the space station is infested with 'space virus' which creates havoc and sends people mad. The station therefore is out of control".

The landing must be made as the station is moving about the screen in a random fashion with a limited amount of fuel remaining.

As usual, movement is controlled by the cursor keys and if a safe landing is achieved the number of moves taken is recorded.

G

```
   10 LET T=0
   15 LET M=0
   20 LET A=1
   25 IF A=10 THEN GOTO 600
   30 LET D=(INT (RND*200)+200)
   40 LET B=0
   45 PRINT
   50 PRINT "HOLE NO. ";A;" ";D;"
 YARDS"
   55 GOSUB 800
   56 PRINT
   57 PRINT "PAR ";P
   58 LET M=M+P
   60 PRINT
   70 PRINT "PLAY YOUR STROKE,STR
ENGTH 1 TO 9"
   80 INPUT J
   83 CLS
   85 LET B=B+1
   87 LET T=T+1
   90 IF J=1 THEN LET K=1
   91 IF J=2 THEN LET K=INT (RND*
3)+2
   92 IF J=3 THEN LET K=INT (RND*
2)+4
   93 IF J=4 THEN LET K=INT (RND*
3)+8
   94 IF J=5 THEN LET K=INT (RND*
4)+22
   95 IF J=6 THEN LET K=INT (RND*
5)+46
   96 IF J=7 THEN LET K=INT (RND*
8)+96
   97 IF J=8 THEN LET K=INT (RND*
```

ON THE RARE occasions when the weather is too bad to play **Golf,** fanatics may care to try the computer version. It requires the 16K RAM pack and can be as frustrating as the real thing—but not so tiring or expensive.

For each of nine holes the program selects a random distance between 200 and 400 yards and displays it with the par value. The player is invited to play strokes at strengths from one to nine and after each stroke the distance remaining is displayed, with the number of strokes taken at the hole, and a further request to choose a shot.

That continues until the ball is in the hole, when the comparison with par is shown.

At the end of the nine holes the par for the course is shown, with the score for that game and some advice about the future of your game.

The numbers for strength of shot do not correspond to the numbers of real clubs. The best guide to the distance which can be expected can be obtained from lines 90 to 98. Although each distance is chosen at random, they are in the region of the last figures. The exception is shot one, which always moves the ball one yard.

That random element is the cause of the frustration, particularly when the ball is less than four yards from the hole. The choice must always be between taking the safe method and playing a series of one-yard shots, and the two, which can give two, three or four yards.

With a little concentration, a good level of skill can be achieved and you can avoid being told to sell your clubs at the end of the nine holes.

Golf was sent by R A Lean of St Austell, Cornwall.

GOLF

```
9)+145
  98 IF J=9 THEN LET K=INT (RND*
11)+195
  99 IF D=K THEN GOSUB 500
 100 IF D=0 THEN GOTO 25
 101 IF D<K THEN GOTO 105
 102 IF D>K THEN GOSUB 400
 103 IF D>0 THEN GOTO 60
 105 GOSUB 300
 106 IF D>0 THEN GOTO 60
 300 LET D=(K-D)
 305 IF D=1 THEN PRINT "YOU ARE
ONE YARD PAST THE HOLE"
 310 IF D>1 THEN PRINT "YOU ARE
";D;" YARDS PAST THE HOLE"
 311 PRINT
 312 IF B=1 THEN PRINT "ONE STRO
KE PLAYED"
 313 IF B>1 THEN PRINT B;" STROK
ES PLAYED"
 320 RETURN
 400 LET D=(D-K)
 405 IF D=1 THEN PRINT "YOU ARE
ONE YARD FROM THE HOLE"
 410 IF D>1 THEN PRINT "YOU ARE
";D;" YARDS FROM THE HOLE"
 411 PRINT
 412 IF B=1 THEN PRINT "ONE STRO
KE PLAYED"
 413 IF B>1 THEN PRINT B;" STROK
ES PLAYED"
 420 RETURN
 500 LET D=(D-K)
 505 IF (P-B)=1 THEN PRINT "HOLE
D FOR A BIRDIE"
 510 IF B>P THEN PRINT "HOLED, "
;B-P;" OVER PAR"
 520 IF P=B THEN PRINT "HOLED AT
 PAR"
 530 IF P-B=2 THEN PRINT "HOLED
FOR AN EAGLE"
 540 IF P-B=3 THEN PRINT "HOLED
FOR AN ALBATROSS"
 550 PAUSE 50
 560 POKE 16437,255
 570 LET A=A+1
 580 RETURN
 600 CLS
 610 PRINT "SCORE FOR THE COURSE
 ";T
 615 PRINT
 620 PRINT "PAR FOR THIS COURSE
";M
 625 PRINT
 626 PRINT
 700 IF T<=M THEN PRINT "SEE YOU
 AT GLENEAGLES NEXT YEAR"
 710 IF (T-M)<=10 THEN PRINT "KE
EP PRACTISING"
 720 IF (T-M)>10 THEN PRINT "SEL
L YOUR CLUBS"
 730 STOP
 800 IF D>=200 AND D<=275 THEN L
ET P=3
 810 IF D>275 AND D<=350 THEN LE
T P=4
 820 IF D>350 THEN LET P=5
 830 RETURN
```

DUEL

DESPITE the two guns in this game looking more like machine-guns, they fire only one at a time. They are even gentlemanly about refusing to fire a shot until the previous shot has either missed or found its target.

The duel is fought against the computer, which seems to have an uncanny sense of when to shoot. The player has to put the gun into the correct position by using D for moving up, G for down and F to fire.

Duel, which can fit on to the 1K ZX-81, was sent by Mark Beard of Hilsea, Portsmouth.

```
 10 REM "DUEL"
 20 LET A=10
 30 LET B=INT (RND*21)
 40 PRINT AT A,5;CHR$ 133;CHR$
7;CHR$ 7
 50 PRINT AT B,23;CHR$ 132;CHR$
 132;CHR$ 5
 60 LET C=INT (RND*3)
 70 IF C=2 THEN GOSUB 260
 80 IF INKEY$="F" THEN GOSUB 19
0
 90 IF INKEY$="D" THEN LET A=A-
1
 100 IF INKEY$="G" THEN LET A=A+
1
 110 IF C=0 THEN LET B=B-1
 120 IF C=1 THEN LET B=B+1
 130 IF A<=0 THEN LET A=0
 140 IF A>=21 THEN LET A=21
 150 IF B<=0 THEN LET B=0
 160 IF B>=21 THEN LET B=21
 170 CLS
 180 GOTO 40
 190 FOR D=8 TO 22
 200 PRINT AT A,D;">"
 210 NEXT D
 220 IF A=B THEN GOTO 240
 230 RETURN
 240 PRINT AT B,23;"SHOT"
 250 STOP
 260 FOR D=22 TO 8 STEP -1
 270 PRINT AT B,D;"<"
 280 NEXT D
 290 IF B=A THEN GOTO 310
 300 RETURN
 310 PRINT AT A,5;"SHOT"
```

HAPPY FACE

AN ATTEMPT is made by Martin Bushell, of Wokingham, Berkshire, to bring a little happiness into the lives of readers of *Sinclair Programs* by producing a smiling face.

When running, two eyes appear first on the screen, look around, and are then followed by the nose and a smiling mouth. The left eye then winks and continues winking until the program is stopped by pressing the BREAK key.

It is a very simple program, with little sophistication, but it can provide some scope for making alterations to the graphics.

Bushell sent it as an entry for the May competition in *Sinclair Programs* companion publication, *Sinclair User*.

To help with the graphics shown on the printout in line 1 1Ø they are all shifted, T,7,7,7,Y, four spaces,T,7,7,7,Y. In line 2Ø they are shifted 5,space,O,space,shifted 8, four spaces, shifted 5,space,O, space,shifted 8. In line 3Ø, all shifted, Y,6,6,6,T,four spaces, Y,6,6,6,T. In line 14Ø they are shifted T,7,Y, in 15Ø shifted T,three spaces,Y and in 16Ø shifted 6,7,6,7,6.

In line 17Ø the graphics are shifted Y followed by 12 spaces and shifted T with in line 18Ø a row of 12 shifted sevens.

```
 10 PRINT AT 10,7;"▛▀▀▀▜     ▛▀▀▀▜
 "
 20 PRINT AT 11,7;"▌ O ▐     ▌ O ▐
 "
 30 PRINT AT 12,7;"▙▄▄▄▟     ▙▄▄▄▟
 "
 40 PAUSE 25
 50 PRINT AT 11,9;" "
 60 PRINT AT 11,18;" "
 70 PRINT AT 11,10;"O"
 80 PRINT AT 11,19;"O"
 90 PAUSE 25
100 PRINT AT 11,10;" "
110 PRINT AT 11,19;" "
120 PRINT AT 11,9;"O"
130 PRINT AT 11,18;"O"
140 PRINT AT 14,12;"▝▀▘"
150 PRINT AT 15,11;"▗▀▀▀▖"
160 PRINT AT 16,11;"▀▄▄▄▀"
170 PRINT AT 18,7;"▚
 ▞"
180 PRINT AT 19,8;"▀▀▀▀▀▀▀▀▀▀▀▀
 "
190 PRINT AT 11,8;"---"
200 PAUSE 25
210 RUN
```

FOR ANYONE who wants to keep records of league tables, as in football or cricket, this program is ideal. Once the teams and the system of scoring for wins, draws and losses have been entered, all you have to do is enter the results and the league table is updated automatically.

The new league table can then be recorded on tape and called-up when more results are to be entered.

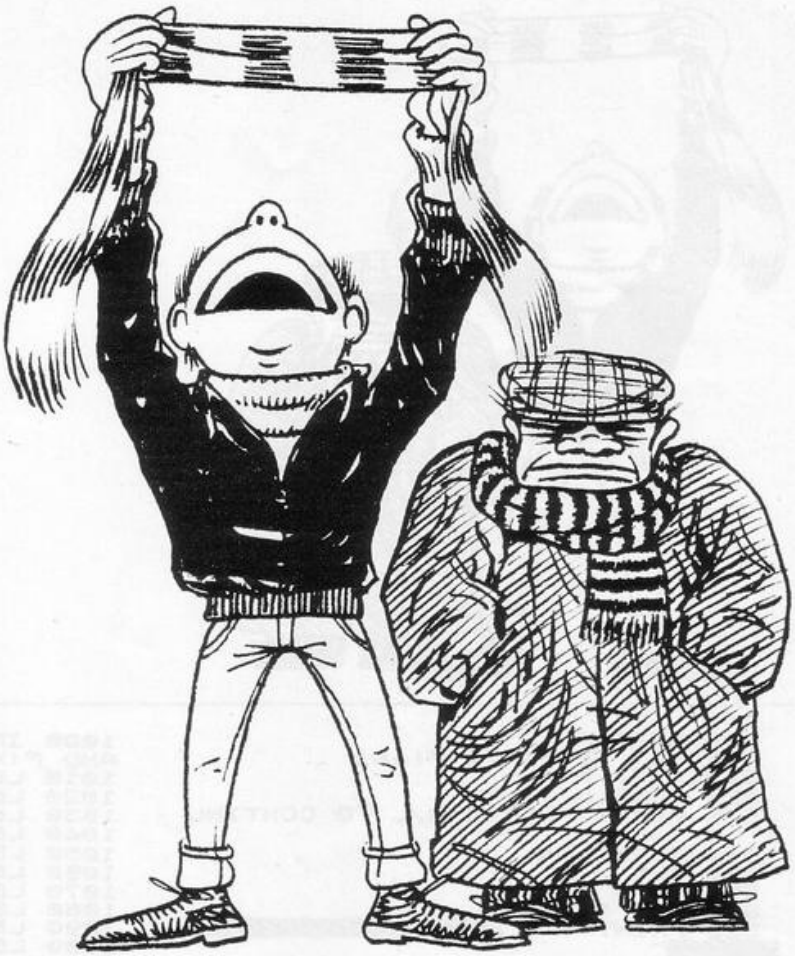
The system in this listing is that of English league football but the values for the results can be altered in lines 150 to 170. When entering the scores, the sequence can be halted by pressing S and NEWLINE.

If the league has been re-loaded from tape, the menu is displayed first, asking whether you wish to enter new teams or the results or display the league table.

There are two notes of warning. If the program has been interrupted by BREAK, do not press RUN or CLEAR as all the variables will be cleared. If an error has been made and put on file it is better to re-load the initial program and begin entering the information again.

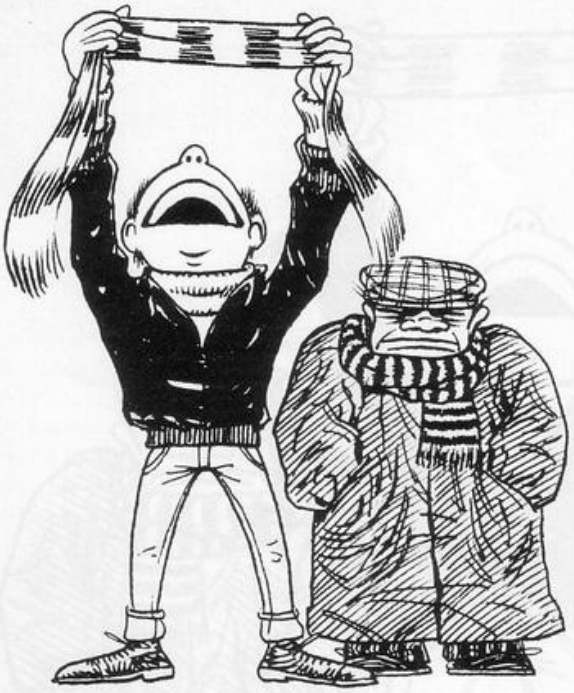
The program uses almost 3.5K of memory and was sent by Stephen Cowlishaw of Nottingham. It was a runner-up in the May competition in our companion publication, *Sinclair User*.

The graphics include 10 spaces in line 200, 31 spaces in line 590, four spaces in line 600 and 32 spaces in line 730. In line 1340 there are 11 shifted 6s, followed by a shifted Q, two more shifted 6s, a shifted Q and so on.



LEAGUE TABLES

```
   10 REM LEAGUE
   20 GOTO 200
   30 PRINT " ENTER NUMBER OF TEA
MS"
   40 INPUT NT
   50 LET Y=9
   60 DIM P(NT)
   70 DIM W(NT)
   80 DIM L(NT)
   90 DIM D(NT)
  100 DIM F(NT)
  110 DIM A(NT)
  120 DIM G(NT)
  130 DIM N(NT)
  140 DIM T$(NT,Y)
  150 LET W=3
  160 LET D=1
  170 LET L=0
  180 CLS
  190 GOTO 400
  200 PRINT "          LEAGUE";
  210 PRINT
  220 PRINT
  230 PRINT "YOU HAVE THE FOLLOWI
NG OPTIONS"
  240 PRINT
  250 PRINT "1. ENTER DETAILS OF
TEAMS "
  260 PRINT "2. ENTER AND UPDATE
SCORES"
  270 PRINT "3. PRINT LEAGUE"
  280 PRINT "4. SAVE LEAGUE ON TA
PE"
  290 PRINT
  300 PRINT
  310 PRINT " INPUT CODE NUMBER T
O CONTINUE"
  320 INPUT P$
  330 IF P$<>"1" AND P$<>"2" AND
P$<>"3" AND P$<>"4" THEN GOTO 32
0
  340 CLS
  350 IF P$="1" THEN RUN 30
  360 IF P$="2" THEN GOTO 570
  370 IF P$="3" THEN GOTO 940
  380 IF P$="4" THEN GOTO 1540
  390 PRINT "      DETAILS OF TEAM
S"
  400 PRINT " ENTER EACH TEAM FOL
LOWED BY N/L"
  410 FOR F=1 TO NT
  420 LET A$=""
  430 INPUT T$(F)
  440 PRINT AT 21,0;T$(F)
  450 SCROLL
  460 IF (LEN T$(F))-Y=0 THEN GOT
O 510
  470 FOR A=0 TO (LEN T$(F))-Y
  480 LET A$=A$+CHR$ 0
```



```
  490 NEXT A
  500 LET T$(F)=T$(F)+A$
  510 NEXT F
  520 SCROLL
  530 PRINT "PRESS N/L TO CONTINU
E"
  540 INPUT Z$
  550 CLS
  560 GOTO 200
  570 LET S$=""
  580 PRINT "    ENTER AND UPDATE
SCORES"
  590 PRINT AT 1,0;"
  600 PRINT AT 2,0;"HOME TEAM?
"
  610 INPUT R$
  620 IF R$="S" THEN CLS
  630 IF R$="S" THEN GOTO 200
  640 GOSUB 1450
  650 PRINT "GOALS SCORED?"
  660 INPUT R
  670 PRINT AT 3,0;"
  680 PRINT AT 2,0;"AWAY TEAM?
"
  690 INPUT S$
  700 GOSUB 1450
  710 PRINT AT 2,0;"GOALS SCORED?
"
  720 INPUT S
  730 PRINT AT 2,0;"
                    "
  740 SCROLL
  750 FOR F=1 TO NT
  760 IF T$(F)<>R$ AND T$(F)<>S$
THEN GOTO 900
  770 LET P=L
  780 IF T$(F)=R$ AND R>S OR T$(F
)=S$ AND S>R THEN LET P=W
  790 IF S=R THEN LET P=D
  800 LET N(F)=N(F)+P
  810 IF T$(F)=S$ AND R>S OR T$(F
)=R$ AND S>R THEN LET L(F)=L(F)+
1
  820 IF T$(F)=R$ AND R>S OR T$(F
)=S$ AND S>R THEN LET W(F)=W(F)+
1
  830 IF S=R THEN LET D(F)=D(F)+1
  840 IF T$(F)=R$ THEN LET F(F)=F
(F)+R
  850 IF T$(F)=R$ THEN LET A(F)=A
(F)+S
  860 IF T$(F)=S$ THEN LET A(F)=A
(F)+R
  870 IF T$(F)=S$ THEN LET F(F)=F
(F)+S
  880 LET P(F)=P(F)+1
  890 LET G(F)=F(F)-A(F)
  900 NEXT F
  910 PRINT R$;":  ";R;",";S;S$;":  "
;S
  920 LET S$=""
  930 GOTO 600
  940 FAST
  950 FOR X=1 TO NT-1
  960 FOR N=X+1 TO NT
  970 IF N(X)>N(N) THEN GOTO 1280
  980 IF N(X)=N(N) AND G(X)>G(N)
THEN GOTO 1280
  990 IF N(X)=N(N) AND G(X)=G(N)
AND F(X)>F(N) THEN GOTO 1280
 1000 IF N(X)=N(N) AND G(X)=G(N)
AND F(X)=F(N) THEN GOTO 1280
 1010 LET E1=P(X)
 1020 LET E2=W(X)
 1030 LET E3=L(X)
 1040 LET E4=D(X)
 1050 LET E5=F(X)
 1060 LET E6=A(X)
 1070 LET E7=G(X)
 1080 LET E8=N(X)
 1090 LET E$=T$(X)
 1100 LET P(X)=P(N)
 1110 LET W(X)=W(N)
 1120 LET L(X)=L(N)
 1130 LET D(X)=D(N)
 1140 LET F(X)=F(N)
 1150 LET A(X)=A(N)
 1160 LET G(X)=G(N)
 1170 LET N(X)=N(N)
 1180 LET T$(X)=T$(N)
 1190 LET P(N)=E1
 1200 LET W(N)=E2
 1210 LET L(N)=E3
 1220 LET D(N)=E4
 1230 LET F(N)=E5
 1240 LET A(N)=E6
 1250 LET G(N)=E7
 1260 LET N(N)=E8
 1270 LET T$(N)=E$
 1280 NEXT N
 1290 NEXT X
 1300 SLOW
 1310 SCROLL
 1320 PRINT "P";TAB 2;"TEAMS
P  W  D  L  F  A  PT"
 1330 SCROLL
 1340 PRINT "
                    "
 1350 SCROLL
 1360 FOR N=1 TO NT
 1370 PRINT N;TAB 2;T$(N);TAB 11;
" ";P(N);TAB 14;" ";W(N);TAB 17;
" ";D(N);TAB 20;" ";L(N);TAB 23;
" ";F(N);TAB 26;" ";A(N);TAB 29;
" ";N(N)
 1380 SCROLL
 1390 NEXT N
 1400 SCROLL
 1410 IF INKEY$="" THEN GOTO 1410
 1420 CLS
 1430 GOTO 200
 1440 STOP
 1450 LET B$=""
 1460 IF (LEN S$)-Y=0 OR S$="" AN
D (LEN R$)-Y=0 THEN GOTO 1530
 1470 IF S$="" THEN FOR F=0 TO (Y
-LEN R$-1)
 1480 IF S$<>"" THEN FOR F=0 TO (
Y-LEN S$-1)
 1490 LET B$=B$+CHR$ 0
 1500 NEXT F
 1510 IF S$="" THEN LET R$=R$+B$
 1520 IF NOT S$="" THEN LET S$=S$
+B$
 1530 RETURN
 1540 PRINT "WHEN CASSETTE IS REA
DY TO RECORD PRESS N/L"
 1550 INPUT R$
 1560 SAVE "LEAGUE"
 1570 CLS
 1580 GOTO 200
```

Prime Numbers

```
  10 LET L=2
  20 SCROLL
  30 PRINT 2
  40 LET K=3
  50 IF L/2=INT (L/2) THEN GOTO
120
  60 IF L/K=INT (L/K) AND L<>K T
HEN GOTO 120
  70 IF K*K>L THEN GOTO 100
  80 LET K=K+2
  90 GOTO 60
 100 SCROLL
 105 SLOW
 110 PRINT L
 120 LET L=L+1
 130 GOTO 40

   5 FAST
  10 LET L=1000000
DELETE LINE 30
```

THE Prime Number Calculator was written by Mark Colson of Horncastle, Lincolnshire as a quick program for working-out high prime numbers. He has incorporated parts of other similar programs to achieve his objective and the result is that, once run, a series of prime numbers is printed at the bottom of the screen with the others scrolling upwards.

The program will continue until BREAK is pressed. If very high prime numbers are required, alter the listing by the three instructions and the first seven-digit prime number will be worked-out in about 13 seconds. Unfortunately the program then returns to slow mode and the second number takes much longer. Perhaps someone could produce a slight adjustment to overcome that?

Tug

THE AIM of **Tug** is to make as high a score as possible before a line which moves from right to left across the screen reaches the end. To stop the line moving it is necessary to match a random number which appears on the screen. Each incorrect answer allows the line to advance.

The program has nine skill levels, running from one to nine, with nine being the easiest. The most difficult is almost impossible, as the time allowed for entering the number is so short.

Tug will fit into the 1K ZX-81 and was sent by Peter Brett, of Swindon, Wiltshire.

```
  10 REM TUG GAME
  20 PRINT "TUG:LEVEL   1 TO 9(9
 IS EASIEST)"
  30 INPUT S
  40 SCROLL
  50 LET S=S*25
  60 LET A$=CHR$ 128
  70 LET B=0
  80 PRINT AT 19,14;"INPUT";AT 2
1,14;"YOURS"
  90 LET A=31
 100 PRINT AT 10,A;A$
 110 LET B$=CHR$ INT (RND*10+COD
E "0")
 120 PRINT AT 19,20;B$
 130 PAUSE S
 140 POKE 16437,255
 150 LET D$=INKEY$
 160 PRINT AT 21,20;D$
 170 IF NOT D$=B$ THEN LET A=A-1
 180 IF D$=B$ THEN LET B=B+1
 190 PRINT AT 5,5;"RIGHT=";B
 200 IF NOT A=0 THEN GOTO 100
 210 PRINT AT 20,5;"END"
 220 STOP
```

```
  10 LET X=100
  100 PRINT AT 0,0;"
  110 PRINT AT 20,0;"
  120 GOSUB 1000
  130 GOSUB 2000
  140 FOR J=1 TO 5
  150 PRINT AT A,B;"■";AT C,D;"■"
;AT E,F;"■"
  152 NEXT J
  153 IF A=1 AND B<9 THEN GOTO 30
00
  160 IF C=1 AND D<20 AND D>11 TH
EN GOTO 3010
  165 IF E=1 AND F>22 THEN GOTO 3
020
  170 PRINT AT A,B;" ";AT C,D;" "
;AT E,F;" "
  190 GOTO 130
1000 PRINT AT 20,4;"■";AT 20,16;
"■";AT 20,26;"■"
  10 LET X=100
  100 PRINT AT 0,0;"
  110 PRINT AT 20,0;"
  120 GOSUB 1000
  130 GOSUB 2000
  140 FOR J=1 TO 5
  150 PRINT AT A,B;"■";AT C,D;"■"
;AT E,F;"■"
  152 NEXT J
  153 IF A=1 AND B<9 THEN GOTO 30
00
  160 IF C=1 AND D<20 AND D>11 TH
EN GOTO 3010
  165 IF E=1 AND F>22 THEN GOTO 3
020
  170 PRINT AT A,B;" ";AT C,D;" "
;AT E,F;" "
  190 GOTO 130
1000 PRINT AT 20,4;"■";AT 20,16;
"■";AT 20,26;"■"
1010 PRINT AT 8,10;"PIGEON-RACE"
1020 PRINT AT 12,2;"YOU HAVE UP
TO ";X;" POUNDS";AT 13,2;"TO
BET ON THE BIRD OF YOUR ";AT 1
4,2;"CHOICE, FIRST,ENTER PIGEON
";AT 15,2;" ""A"","B""OR ""C"""
1030 INPUT A$
1031 IF A$="A" OR A$="B" OR A$="
C" THEN GOTO 1040
1035 LET A$=""
1036 GOTO 1010
1040 PRINT AT 12,2;"HOW MUCH MON
EY DO YOU(6 SPACES)";AT 13,2;"WA
NT TO BET ON PIGEON ";A$;"?(7 SP
ACES)";AT 14,2;"(30 SPACES)";AT
15,2;"(25 SPACES)"
1050 INPUT Z
1051 IF Z<=X THEN GOTO 1055
1052 LET Z=0
1053 GOTO 1040
1055 PRINT AT 12,2;"(60 SPACES)"
1060 PRINT AT 8,10;"(12 SPACES)"
1070 PRINT AT 20,4;"■";AT 20,16;
"■";AT 20,26;"■"
1500 RETURN
2000 LET A=INT (RND*19)+1
2100 LET B=INT (RND*30)+1
2102 LET C=INT (RND*19)+1
2103 LET D=INT (RND*30)+1
2104 LET E=INT (RND*19)+1
2105 LET F=INT (RND*30)+1
2110 RETURN
3000 LET B$="A"
3005 GOTO 3500
3010 LET B$="B"
3015 GOTO 3500
3020 LET B$="C"
3025 GOTO 3500
3500 IF B$=A$ THEN LET X=X+Z
3510 IF B$<>A$ THEN LET X=X-Z
3520 IF X=0 THEN GOTO 3600
3530 PRINT AT 10,0;"PIGEON ";B$;
" WAS THE WINNER"
3540 PRINT AT 12,2;"YOU HAVE ";X
;" POUNDS(6 SPACES)";AT 13,2;" A
NEW RACE WILL BEGIN SHORTLY"
3545 FOR J=1 TO 250
3550 NEXT J
3555 PRINT AT 10,0;"(34 SPACES)"
3558 PRINT AT A,B;" ";AT C,D;" "
;AT E,F;" "
3560 GOTO 100
3600 PRINT AT 10,0;"PIGEON ";B$;
" WON ...YOU ARE BROKE PRESS
ANY KEY FOR A NEW GAME"
3610 PAUSE 4E4
3615 CLS
3620 GOTO 10
```

PIGEON RACE

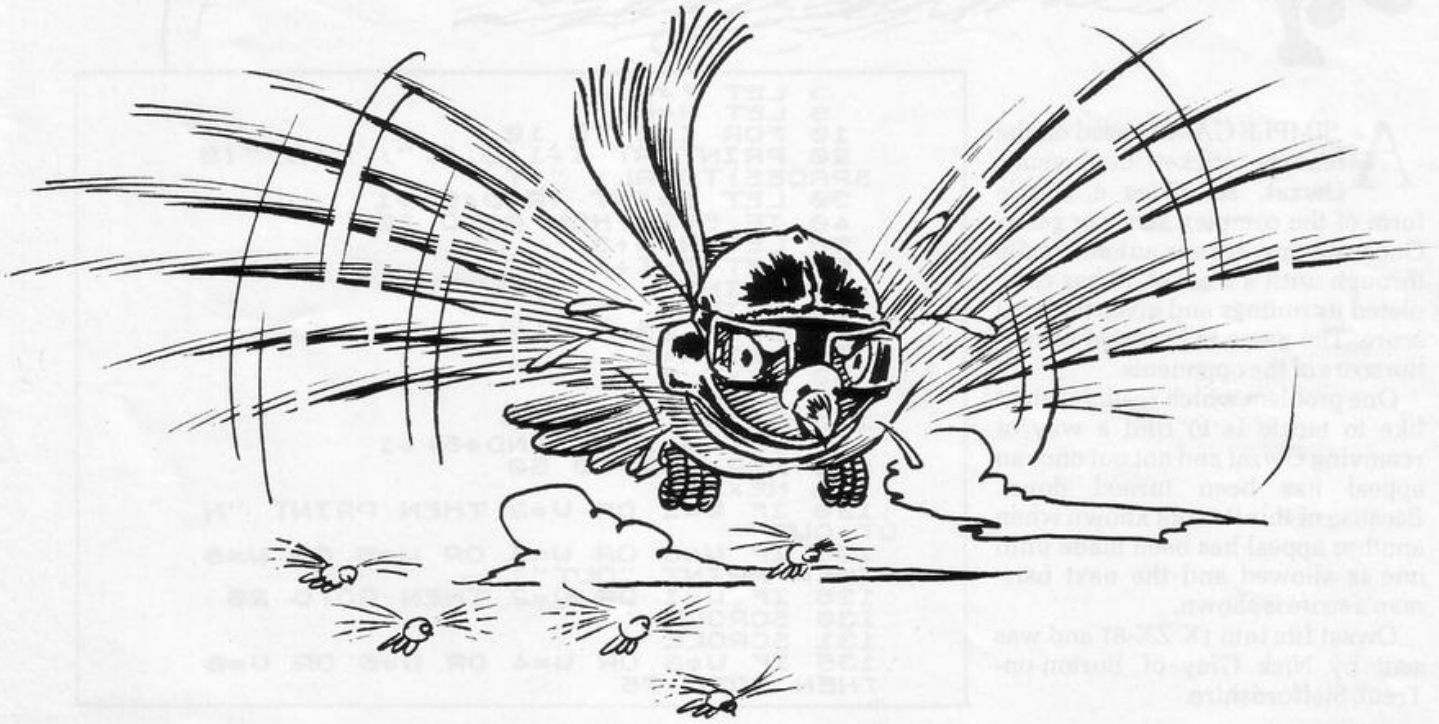
IF YOU want a program to send you mad, **Pigeon** must be one of the contenders. it simulates a pigeon race with a set of three somewhat erratic pigeons which any self-respecting fancier would probably have put out of their misery long ago.

The object is to start with £100 and make more by backing the winning pigeon in each race. According to the writer, Roy Kay, of New Ferry, Wirral, Merseyside, it is possible to be successful with a little intuition and a good deal of luck. The emphasis is on the luck.

The pigeons start the game at the bottom of the screen and are put to flight by the player first entering the bird which he will back and then the size of the bet. The game ends when one of the drunken birds arrives at the corresponding coop at the top of the screen.

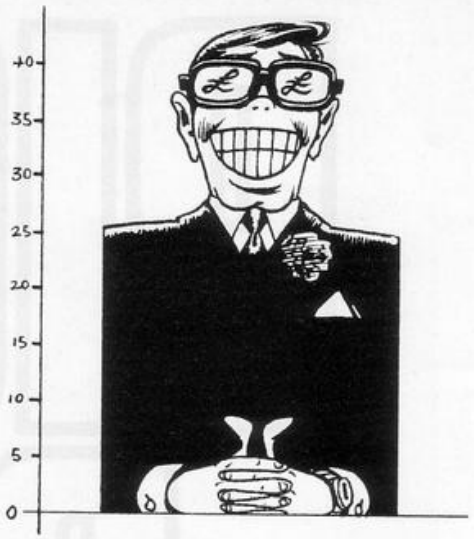
Because of the random element, some races can finish in a few seconds, while others seem to continue all day.

The graphics in line 100 are obtained by using the shifted E, eight shifted 7s and a shifted R, with the W and Q used in line 110, and it needs 16K to work.



COMPOUND INTEREST

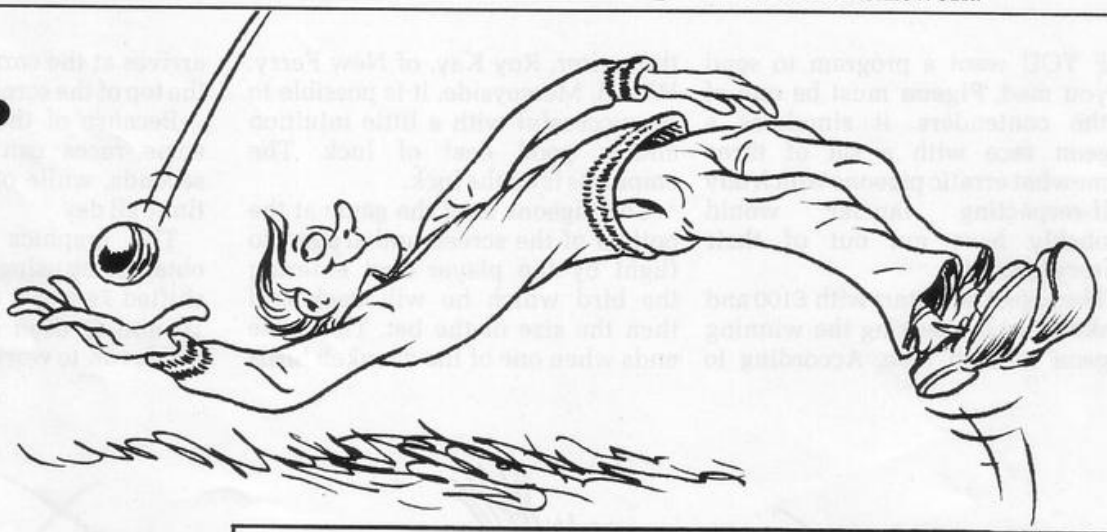
```
    5 CLS
   10 PRINT "ENTER PRINCIPLE IN P
OUNDS"
   20 INPUT P
   30 PRINT "ENTER TIME IN YEARS"
   40 INPUT T
   50 PRINT "ENTER RATE PER ANNUM
"
   60 INPUT R
   70 PRINT
   80 PRINT "ENTER ""SI"" FOR SIM
PLE INTEREST"
   85 PRINT
   90 PRINT "ENTER ""CI"" FOR COM
POUND INTEREST"
  100 INPUT A$
  105 CLS
  110 IF A$="SI" THEN GOTO 150
  120 LET I=P*((1+R/100)**T)-P
  130 GOTO 200
  150 LET I=(P*R*T)/100
  200 PRINT "INTEREST=£";I
  202 PRINT
  205 PRINT "TOTAL=£";I+P
  206 PRINT
  210 PRINT "IS THAT ALL?  Y OR N
"
  220 INPUT B$
  230 IF B$="N" THEN RUN
```



IF YOU detest having to work out compound interest, this program is for you. It works out the compound interest automatically once it has been told the principal, the rate of interest, and the number of years to be considered. It can also work out simple interest problems.

A short program, fitting into the 1K ZX-81, it was sent by Stephen Booth, of Barnsley, South Yorkshire. He said it is useful helping him with his homework.

OWZAT



A SIMPLE GAME based on the famous cricket dice game, **Owzat,** simulates a simple form of the complex summer game. Once running, it runs automatically through until a team of 10 has completed its innings and gives the total score. The game is repeated to find the score of the opponents.

One problem which readers might like to tackle is to find a way of removing Owzat and not out once an appeal has been turned down. Because of this it is not known when another appeal has been made until one is allowed and the next batsman's score is shown.

Owzat fits into 1K ZX-81 and was sent by Nick Gray of Burton-on-Trent, Staffordshire.

```
    0 LET T=0
    5 LET N=0
   10 FOR I=1 TO 10
   20 PRINT AT I+1,0;I;":  ";N;"(5
SPACES)TOTAL:  ";T
   30 LET S=INT (RND*6)+1
   40 IF S=5 THEN GOTO 100
   50 LET N=N+S
   60 LET T=T+S
   65 PRINT
   66 PRINT
   70 GOTO 20
   75 LET N=0
   80 NEXT I
   90 STOP
  100 PRINT "OWZAT"
  110 LET W=INT (RND*6)+1
  115 FOR Z=1 TO 50
  116 NEXT Z
  120 IF W=1 OR W=2 THEN PRINT "N
OT OUT"
  123 IF W=3 OR W=4 OR W=5 OR W=6
 THEN PRINT "OUT"
  125 IF W=1 OR W=2 THEN GOTO 20
  130 SCROLL
  131 SCROLL
  135 IF W=3 OR W=4 OR W=5 OR W=6
 THEN GOTO 75
```

FAITHFUL

THIS IS one of two programs included in this collection for ZX-80 users. It is a very simple, user-friendly program intended for young children.

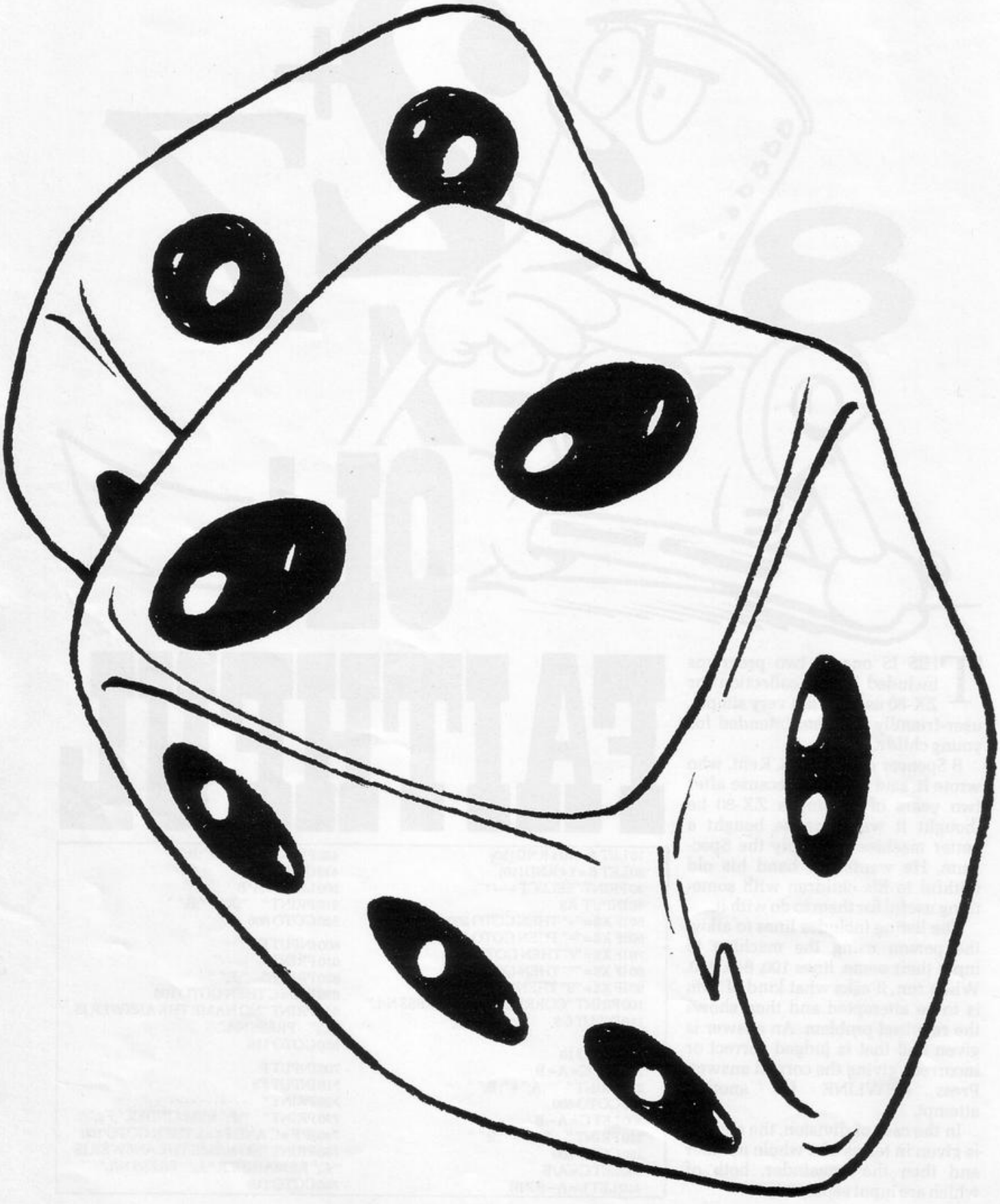
B Spencer of Chatham, Kent, who wrote it, said he did it because after two years of owning a ZX-80 he thought it was time he bought a better machine, probably the Spectrum. He wanted to hand his old faithful to his children with something useful for them to do with it.

The listing includes lines to allow the person using the machine to input their name, lines 100, 640, 750. When run, it asks what kind of sum is to be attempted and then shows the required problem. An answer is given and that is judged correct or incorrect, giving the correct answer. Press NEWLINE for another attempt.

In the case of division, the answer is given in terms of a whole number and then the remainder, both of which are input separately.

```
10 LET A=10+RND(50)
20 LET B=1+RND(10)
30 PRINT "SELECT +-/*"
40 INPUT X$
50 IF X$="+" THEN GOTO 200
60 IF X$="-" THEN GOTO 300
70 IF X$="/" THEN GOTO 400
80 IF X$="*" THEN GOTO 500
90 IF X$="S" THEN STOP
100 PRINT "CORRECT NAME PRESS N/L"
110 INPUT G$
120 CLS
130 GOTO 10
200 LET C=A+B
210 PRINT "  ";A;"+";B;" "
220 GOTO 600
300 LET C=A-B
310 PRINT "  ";A;"-";B;" "
320 GOTO 600
400 LET C=A/B
410 LET L=A-(C*B)
420 PRINT "  ";A;"/";B;" "
430 GOTO 700
500 LET C=A*B
510 PRINT "  ";A;"*";B;" "
520 GOTO 600
600 INPUT E
610 PRINT "  ----"
620 PRINT "  ";E;" "
630 IF E=C THEN GOTO 100
640 PRINT "NO NAME THE ANSWER IS
";C;"  PRESS N/L"
650 GOTO 110
700 INPUT F
710 INPUT F2
720 PRINT "  ----------"
730 PRINT "  ";F;" REMAINDER ";F2;" "
740 IF F=C AND F2=L THEN GOTO 100
750 PRINT "NO NAME THE ANSWER IS
";C;" REMAINDER ";L;" "PRESS N/L"
760 GOTO 110
```

COVER T



THE BOX

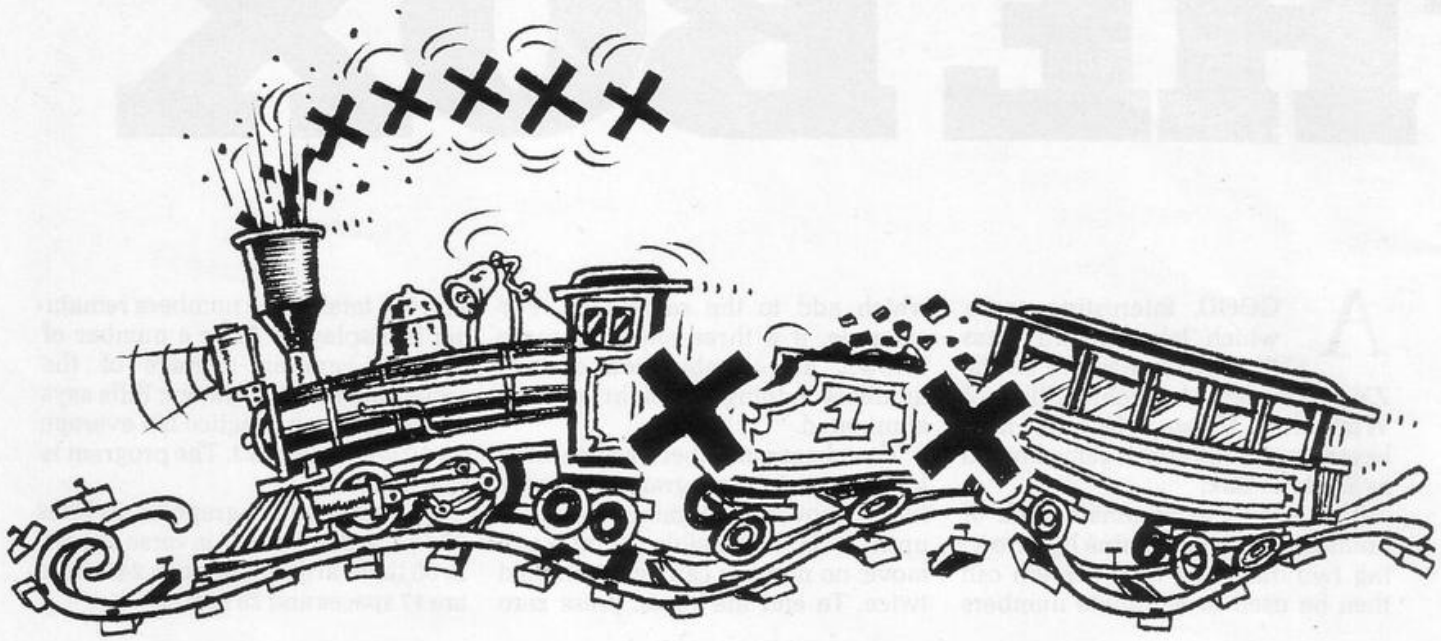
A GOOD, interesting game, which takes slightly less than 3K of memory on the ZX-81 is sent by John Ellis, of Wimborne, Dorset. He says it is based on an old French game known as **Shut the Box.**

The aim is to eliminate each of numbers from one to nine by throwing two dice. The total thrown can then be used to eliminate numbers which add to the same total. For example, if a three and a five are thrown, any combination of two numbers adding to eight can be eliminated.

The chosen numbers are entered together and the program checks for illegal moves. The game continues until it is impossible to make a move; no number can be eliminated twice. To end the game, press zero and the total of the numbers remaining is displayed. After a number of plays a running average of the remaining totals is shown; Ellis says that after much practice his average for 10 games was 8.3. The program is user-friendly.

To help with the graphics, in lines 30 and 50 there are 27 inverse spaces; in 80 there are 23 spaces; in 240 there are 17 spaces and 26 spaces.

```
  1 SLOW
  2 LET TOT=0
  3 LET G=0
  4 GOSUB 9000
  5 PRINT "GAME ";G+1
 10 LET N$="123456789"
 20 PRINT AT 1,2;"          SHUT T
HE BOX          "
 30 PRINT TAB 2;"
                          "
 40 PRINT TAB 2;" 1 2 3 4 5
 6 7 8 9 "
 50 PRINT TAB 2;"
                          "
 60 IF N$(7 TO 9)<>"   " THEN G
OTO 140
 70 FOR O=10 TO 13
 80 PRINT AT O,0;"
                "
 90 NEXT O
100 PRINT AT 7,7;"HOW MANY DICE
? "
110 INPUT A$
120 IF A$="1" THEN LET W=0
130 IF A$="1" THEN GOTO 190
140 PRINT AT 7,7;"    YOU ROLLED
:"
150 LET Q=INT (RND*6)+1
160 LET Z=9
170 GOSUB 900
180 LET W=0
190 LET Z=18
200 LET Q=INT (RND*6)+1
210 GOSUB 900
220 PRINT AT 17,2;"WHAT DO YOU
WANT TO COVER?"
230 INPUT G$
240 PRINT AT 19,8;"
    ";AT 17,2;"
                "
250 IF G$="0" THEN GOTO 480
260 LET T=0
270 FOR Y=1 TO LEN G$
280 LET T=T+VAL G$(Y)
290 NEXT Y
300 IF T=Q+W THEN GOTO 330
310 PRINT AT 19,8;"YOU CANT DO
THAT"
320 GOTO 220
330 FOR Y=1 TO LEN G$
340 IF N$(VAL G$(Y))=" " THEN G
OTO 310
350 NEXT Y
360 FOR Y=1 TO LEN G$
370 LET N$(VAL G$(Y))=" "
380 PRINT AT 3,3*VAL G$(Y);" "
390 NEXT Y
400 IF N$="          " THEN GOTO
420
410 GOTO 60
420 PRINT AT 7,0;
430 FOR I=1 TO 14
440 PRINT "CONGRATULATIONS ";
450 NEXT I
460 LET T=0
470 GOTO 520
480 LET T=0
490 FOR I=1 TO 9
500 IF N$(I)<>" " THEN LET T=T+
VAL N$(I)
510 NEXT I
520 PRINT AT 16,7;"YOU HAD ";T;
" LEFT"
530 LET TOT=TOT+T
540 LET G=G+1
550 PRINT AT 18,5;"YOUR AVERAGE
IS ";INT (1000*TOT/G)/1000
560 PRINT AT 20,1;"PRESS ANY KE
Y FOR ANOTHER GO."
570 IF INKEY$<>"" THEN GOTO 570
580 IF INKEY$="" THEN GOTO 580
590 CLS
600 GOTO 5
900 PRINT AT 10,Z;"
          "(4*Q-3 TO 4*Q)
910 PRINT AT 11,Z;"
          "(4*Q-3 TO 4*Q)
920 PRINT AT 12,Z;"
          "(4*Q-3 TO 4*Q)
930 PRINT AT 13,Z;"    "
940 RETURN
9000 PRINT TAB 8;"SHUT THE BOX"
9010 PRINT TAB 8;"=============="
9020 PRINT "THE OBJECT OF THE GA
ME IS TO",,,"COVER AS MANY OF TH
E NUMBERS",,,"(1-9) AS POSSIBLE.
"
9030 PRINT ,,"ADD THE DICE SCORE
S AND COVER",,,"ANY COMBINATION
OF NUMBERS THAT",,,"GIVE THIS TO
TAL."
9040 PRINT ,,"E.G. IF YOU THROW
SIX AND ONE",,,"YOU CAN COVER E
ITHER 7 OR 1 AND",,,"6 OR 3 AND
4 OR 2 AND 5 OR",,,"1,2 AND 4."
9050 PRINT AT 21,10;"PRESS ANY K
EY"
9060 PAUSE 4E4
9070 CLS
9080 PRINT "YOU CAN ONLY USE EAC
H NUMBER ONCE.",,,
9090 PRINT "IF YOU WANT TO COVER
 6 AND 1,YOU",,"SHOULD ENTER ""1
6"" OR ""61"".",,
9100 PRINT ,,"WHEN YOU HAVE COVE
RED 7,8 AND 9",,,"YOU CAN USE EI
THER 1 OR 2 DICE."
9110 PRINT
9120 PRINT "PRESS ""0"" WHEN YOU
 CANT GO."
9130 PRINT AT 15,12;"GOOD LUCK."
9140 PRINT AT 21,10;"PRESS ANY K
EY"
9150 PAUSE 4E4
9160 CLS
9170 RETURN
```



MULTIPLICATION TRAIN

A GOOD, simple game for testing a variety of abilities with multiplication sums has been sent by James Hurrell, of Knutsford, Cheshire. The aim is to take a train to the end of a track by giving the correct answers to multiplication problems given at random.

The program makes good use of the random function to produce different problems and it contains alternative levels of difficulty.

To start the game, press RUN and NEWLINE; the player is asked which level of difficulty is wanted, either one or two. A problem is then shown to which the player gives an answer. If correct, a train moves along a track with a puff of smoke from its funnel.

When the train reaches the end of the track, a buffer appears with "Well done".

Alternative difficulties can be obtained by changing the lines 50 to 80.

To help with the graphics in line 100 they are, all shifted, keys R, 3, unshifted space, 8 and unshifted space; in line 110 they are 8, three spaces, and 5; and in line 120 R, E, space, R, E. In line 130 there are 14 dashes.

```
  10 LET Y=10
  20 LET X=0
  30 PRINT AT 3,0;"SKILL 1 OR 2?
"
  40 INPUT A$
  50 LET A=INT (RND*20)
  60 LET B=INT (RND*20)
  70 LET C=INT (RND*10)
  80 LET D=INT (RND*10)
  90 CLS
 100 PRINT AT Y,X;"▜▗ ▟"
 110 PRINT AT Y+1,X;"▟▀▀▀"
 120 PRINT AT Y+2,X;"▀▀▀▀"
 130 PRINT AT 13,0;"-------------
--"
 140 PRINT AT 0,0;"GET TO THE EN
D"
 150 IF A$="1" THEN PRINT AT 5,0
;A;"*";B
 160 IF A$="2" THEN PRINT AT 5,0
;C;"*";D
 170 LET H=A*B
 180 LET K=C*D
 190 INPUT Z
 200 IF A$="1" AND Z=H THEN GOTO
 250
 210 IF A$="2" AND Z=K THEN GOTO
 250
 220 PRINT AT 15,0;"WRONG"
 230 PAUSE 100
 240 GOTO 50
 250 PRINT AT 9,X+2;"▒▒"
 260 LET X=X+1
 270 IF X<10 THEN GOTO 300
 275 PRINT AT 12,15;"▌"
 280 PRINT AT 13,15;"▌ WELL DONE
"
 290 STOP
 300 PAUSE 150
 310 GOTO 50
```

ZOMBIES

ZOMBIES is a version of the lure type of game where a number of attackers converge on a target. As they approach it they can hit various obstacles. The attackers are Zombies, shown as Zs chasing the players, an X, with potholes, Os, as obstacles.

The difference between this and other games is that there is a random number of Zombies chasing the player.

When a Zombie falls into a pothole, the event is marked by an announcement on the screen "Splash goes a Zombie". Should you lure all of them to their doom you are told, cheerily, that you may have won on that occasion but you cannot win in the end.

When a Zombie strikes you the screen is filled with sickening munches, gobbles and burps. You can move in any direction by following the positioning of numbers shown in a box beneath the game display.

Zombies was sent by Christopher Smith, of Christchurch, Dorset and requires the addition of a RAM pack. In line 2 there are 25 spaces and 20 in line 524.

```
  1 REM **ZOMBIES**
  2 PRINT AT 11,12;"ZOMBIES
                    ========"
  3 FOR 0=0 TO 14
  4 SCROLL
  5 NEXT 0
  9 RAND
 15 LET CHECK=0
 20 LET NZ=INT (RND*10)+1
 30 DIM A(NZ)
 40 DIM B(NZ)
 50 DIM D(5)
 60 DIM X(5)
 70 LET PA=INT (RND*10)+1
 80 LET PB=INT (RND*20)+1
 90 FOR N=1 TO 43
100 PLOT N,42
110 PLOT N,21
120 IF N<21 THEN PLOT 1,N+21
130 IF N<21 THEN PLOT 43,N+21
140 NEXT N
150 FOR S=1 TO 5
160 LET D(S)=INT (RND*10)+1
170 LET X(S)=INT (RND*20)+1
180 PRINT AT D(S),X(S);"O"
190 NEXT S
200 PRINT AT 12,0;"123"
210 PRINT "456"
220 PRINT "789"
230 FOR I=1 TO NZ
240 LET A(I)=INT (RND*10)+1
250 LET B(I)=INT (RND*20)+1
260 PRINT AT A(I),B(I);"Z"
270 NEXT I
275 PRINT AT PA,PB;"X"
280 LET A$=INKEY$
285 IF A$="" THEN GOTO 280
286 PRINT AT PA,PB;" "
290 IF A$="1" THEN LET PA=PA-1
300 IF A$="1" THEN LET PB=PB-1
310 IF A$="2" THEN LET PA=PA-1
320 IF A$="3" THEN LET PA=PA-1
330 IF A$="3" THEN LET PB=PB+1
340 IF A$="4" THEN LET PB=PB-1
350 IF A$="6" THEN LET PB=PB+1
360 IF A$="7" THEN LET PA=PA+1
370 IF A$="7" THEN LET PB=PB-1
380 IF A$="8" THEN LET PA=PA+1
390 IF A$="9" THEN LET PA=PA+1
400 IF A$="9" THEN LET PB=PB+1
402 IF PA>10 THEN LET PA=10
404 IF PA<1 THEN LET PA=1
406 IF PB>20 THEN LET PB=20
408 IF PB<1 THEN LET PB=1
410 PRINT AT PA,PB;"X"
412 FOR J=1 TO 5
414 IF PA=D(J) AND PB=X(J) THEN
 GOTO 3000
416 NEXT J
420 FOR F=1 TO NZ
430 IF A(F)=0 THEN GOTO 590
435 PRINT AT A(F),B(F);" "
440 IF PA>A(F) THEN LET A(F)=A(
F)+1
450 IF PA<A(F) THEN LET A(F)=A(
F)-1
460 IF PB>B(F) THEN LET B(F)=B(
F)+1
470 IF PB<B(F) THEN LET B(F)=B(
F)-1
480 IF PA=A(F) AND PB=B(F) THEN
 GOTO 1000
490 FOR T=1 TO 5
500 IF A(F)<>D(T) OR B(F)<>X(T)
THEN GOTO 530
510 PRINT AT 12,5;"SPLASH GOES
A ZOMBIE"
513 FOR G=0 TO 50
517 NEXT G
520 LET A(F)=0
524 PRINT AT 12,5;"(20 SPACES)"
525 GOTO 590
530 NEXT T
540 IF A(F)>10 THEN LET A(F)=10
550 IF A(F)<1 THEN LET A(F)=1
560 IF B(F)>20 THEN LET B(F)=20
570 IF B(F)<1 THEN LET B(F)=1
580 PRINT AT A(F),B(F);"Z"
590 NEXT F
600 FOR C=1 TO NZ
610 IF A(C)=0 THEN LET CHECK=CH
ECK+1
620 NEXT C
630 IF CHECK=NZ THEN GOTO 2000
640 LET CHECK=0
650 GOTO 280
1000 PRINT AT 0,0;"GOBBLE GOBBLE
 MUNCH CHEW BURP"
1010 PRINT "GOBBLE GOBBLE MUNCH
CHEW BURP"
1020 GOTO 1010
2010 PRINT AT 16,0;"YOU WON THIS
 TIME BUT"
2020 PRINT "THE ZOMBIES WILL GET
 YOU"
2030 PRINT "IN THE END"
2040 STOP
3010 PRINT AT 16,0;"IDIOT,YOU JU
ST WALKED INTO"
3020 PRINT "A POTHOLE"
```

```
  10 LET X=0
  20 LET Y=0
  30 PLOT X,Y
  40 LET X=X+(INKEY$="8")-(INKEY
$="5")
  50 LET Y=Y+(INKEY$="7")-(INKEY
$="6")
  60 IF INKEY$="U" THEN GOTO 80
  70 GOTO 30
  80 PLOT X,Y
  85 UNPLOT X,Y
  90 LET X=X+(INKEY$="8")-(INKEY
$="5")
 100 LET Y=Y+(INKEY$="7")-(INKEY
$="6")
 110 IF INKEY$="P" THEN GOTO 30
 120 GOTO 80
```

A SIMPLE sketching program has been produced by Stuart Foley, of New Duston, Northampton. Using the cursor keys, simple drawings can be made which still require a fair amount of skill and can be really entertaining.

Once started, by pressing RUN and NEWLINE, the blip in the screen begins drawing automatically. If you wish to erase anything or move to another design without leaving a trail, press U, and a flashing blip erases anything it passes over. Pressing P will return the program to drawing mode.

One thing of which to beware is that if the blips hit the edge of the screen the program stops and cannot be re-started without losing everything which has been drawn. To avoid that, start by drawing a border round the screen. **Sketcher** fits into a 1K ZX-81.

SKETCHER

MORSE CODE

A PROGRAM for the radio enthusiast has been written by R S P Humpleby, of Heckmondwike, West Yorkshire. It involves inputting the alphabet in Morse code and then displaying the codes in random order and asking the player to give the correct letter.

After the whole of the alphabet, the total of correct answers is given. For anyone who does not know Morse, the codes in the listing are given in alphabetical order.

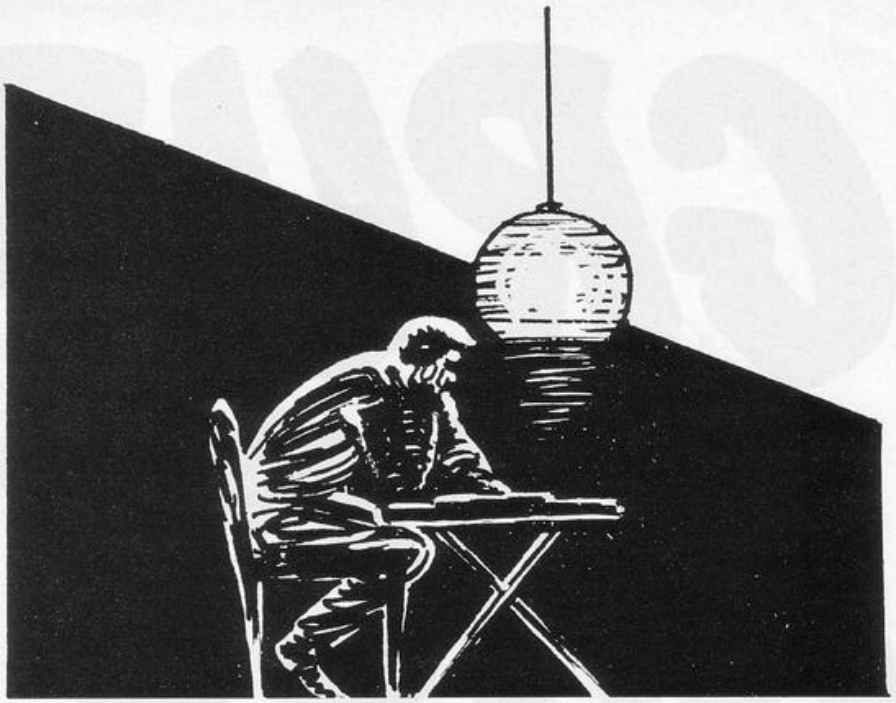
It is a simple but effective program which can fit into 1K RAM.

```
  10 CLS
  20 LET S=0
  30 LET C$=".-    -... -.-. -..
 .    ..-. --.  .... ..   .--- -
.-  .-.. --   -.   ---  .--. --.
- .-.  ...  -    ..-  ...- .--
-...--.-- --.. "
  40 FOR V=1 TO 26
  50 LET A=INT (RND*25)+1
  60 LET B=A*130/26
  70 LET C=A+38
  80 LET D=B+5
  90 LET D$=C$(B TO D)
 100 PRINT "WHAT IS ";D$;"?"
 110 FOR E=1 TO 3
 120 INPUT F$
 130 IF CODE F$=C THEN GOTO 160
 140 NEXT E
 150 NEXT V
 160 LET S=S+1
 170 PRINT "CORRECT"
 180 PAUSE 150
 190 NEXT V
 200 PRINT S;" OUT OF 26"
```

THIS is a 16K ZX-81 representation of the popular game of **Solitaire,** where the game begins with a number of pegs in a cross formation and one missing in the middle. The object is to clear the pegs by jumping over them and leaving one peg in the middle hole.

In this version, from Frank Webster, of West Kirby, Wirral, Merseyside, the pegs are shown by Os and the holes by stars. The board has vertical and horizontal co-ordinates and a move is made by entering the description of the peg being moved, with the vertical figure first and the description of the hole to which it is being moved, and pressing NEWLINE.

The program eliminates cheating by recognising invalid moves. When a player can no longer move the F is pressed to end the game.



SOLITAIRE

```
  1 REM "SOLITAIRE"
 10 PRINT "SOLITAIRE:-TO PLAY T
YPE NEWLINE"
 20 INPUT Z$
 30 CLS
 40 FAST
 50 REM FORM SQUARE***********
 60 DIM A$(12,16)
 70 LET A$(1)="THE AIM IS TO"
 80 LET A$(2)="REMOVE ALL BUT"
 90 LET A$(3)="ONE ZERO AND TO"
100 LET A$(4)="LEAVE THAT IN"
110 LET A$(5)="SQUARE 44"
120 LET A$(6)=""
130 LET A$(7)="REMOVE ZEROS BY"
140 LET A$(8)="JUMPING TO * BUT
"
150 LET A$(9)="NOT DIAGONALLY"
160 LET A$(10)=""
170 LET A$(11)="INPUT SQUARE NO
S"
180 LET A$(12)="ON REQUEST"
190 DIM O$(79)
200 FOR C=1 TO 79
210 LET O$(C)="▒"
220 IF C>12 AND C<16 OR C>22 AN
D C<26 OR C>30 AND C<58 OR C>62
AND C<66 OR C>72 AND C<76 THEN L
ET O$(C)="O"
230 IF C=44 THEN LET O$(C)="*"
240 IF C=40 OR C=50 OR C=38 OR
C=48 THEN LET O$(C)="▒"
250 FOR D=1 TO 7
260 IF C=((D*10)+9) THEN LET O$
(C)=""
270 NEXT D
280 NEXT C
290 LET N$=" 1234567 "
300 LET X=32
310 LET B$="CONGRATULATIONS"
320 PRINT AT 21,0;"IF YOU CANT
MOVE TYPE ""F""."
330 REM SET SCREEN***********
340 SLOW
350 PRINT AT 0,9;"SOLITAIRE"
360 IF X=1 AND O$(44)="O" THEN
PRINT AT 19,2;B$
370 LET E=1
380 LET F=2
390 PRINT AT F,2;N$
400 LET F=F+1
410 PRINT AT F,2;
420 FOR C=E TO E+9
430 PRINT O$(C);
440 NEXT C
450 PRINT AT 3,11;" "
460 LET E=E+10
470 PRINT
480 IF E=80 THEN PRINT AT F+1,2
;"▒▒▒▒▒▒▒▒▒"
490 IF E=80 THEN GOTO 520
500 IF E=11 THEN LET E=10
510 GOTO 400
520 LET F=2
530 FOR C=1 TO 9
540 LET F=F+1
550 PRINT AT F,1;N$(C)
560 NEXT C
570 LET D=2
580 FOR C=1 TO 12
590 PRINT AT D,16;A$(C)
600 LET D=D+1
610 NEXT C
620 IF X=1 AND O$(44)="O" THEN
GOTO 950
630 REM TEST VALIDITY*********
640 PRINT AT 16,2;"FROM ?   TO
?      (23 SPACES)"
650 INPUT X$
660 IF X$="F" THEN GOTO 940
670 LET A=VAL X$
680 IF A<13 OR A>75 THEN GOTO 7
90
690 PRINT AT 16,7;A
700 INPUT B
710 PRINT AT 16,13;B
720 IF ABS (A-B)=2 OR ABS (A-B)
=20 THEN GOTO 740
730 GOTO 790
740 IF O$(A)="▒" OR O$(B)="▒" T
HEN GOTO 790
750 IF O$(A)<>"O" OR O$(B)<>"*"
THEN GOTO 790
760 IF O$((A+B)/2)="▒" THEN GOT
O 790
770 IF O$((A+B)/2)="*" THEN GOT
O 790
780 GOTO 850
790 PRINT AT 16,16;"INVALID INP
UT"
800 PRINT AT 17,16;"PRESS NEWLI
NE"
810 INPUT X$
820 PRINT AT 17,16;"(16 SPACES)
"
830 GOTO 640
840 REM PLAY***************
850 LET O$(A)="*"
860 LET O$((A+B)/2)="*"
870 LET O$(B)="O"
880 LET X=X-1
890 GOTO 350
900 FOR C=13 TO 75
910 IF O$(C)="O" AND O$(C+1)<>"
O" OR O$(C+10)<>"O" THEN GOTO 94
0
920 NEXT C
930 GOTO 350
940 PRINT AT 19,2;"HARD LUCK ";
X;" LEFT"
950 PRINT AT 21,0;"(31 SPACES)"
960 STOP
1000 SAVE "SOLITAIRE"
1010 GOTO 10
```

GRUB RACE

GRUB RACE involves a race between three good representations of caterpillars. The progress of the race is decided by random elements in the program and the player places bets on the likely winner, starting with a total of £100.

The race is complicated by the fact that at any moment the caterpillars may turn into butterflies which, after fluttering on the screen for a time, return to being caterpillars and have to start again. Complete instructions are included in the program once it is run.

The graphics in lines 60, 70, and 80 are 30 shifted Ss and two shifted As and the butterflies in lines 1061, 1071 and 1081 include two shifted As.

Grub Race was sent by Roy Kay of Wirral, Merseyside and requires a RAM pack.

```
    1 PRINT AT 1,10;"GRUB RACE"
    2 PRINT AT 4,3;"WILL YOUR CHO
SEN GRUB ";AT 5,3;"BE FIRST TO R
EACH THE ";AT 6,3;"SAFETY OF THE
 CABBAGE PATCH?";AT 7,3;"IF HE I
S TRANSFORMED ";AT 8,3;"INTO A B
UTTERFLY THEN HIS ";AT 9,3;"LIFE
 WILL BE SPECTACULAR";AT 10,3;".
..BUT SHORT...";AT 12,3;"EACH BU
TTERFLY ";AT 13,3;"IS RESSURECTE
D AS A GRUB ";AT 14,3;"AND BEGIN
S AGAIN "
    3 PRINT AT 18,4;"PRESS ANY KE
Y TO START"
    5 PAUSE 4E4
    6 CLS
   20 LET M=100
   50 REM GRUB RACE
   60 PRINT AT 12,0;"SSSSSSSSSSSS
SSSSSSSSSSSSSSSSSSSSSS
```

```
1064 LET Y=0
1065 RETURN
1070 FOR J=1 TO 50
1071 PRINT AT 11,Z;"▒▒▒▒"
1072 PRINT AT 11,Z;"    "
1073 NEXT J
1074 LET Z=0
1075 RETURN
2000 REM
2010 PRINT AT 15,0;"YOU HAVE UP
TO ";M;" POUNDS TO BET"
2020 PRINT AT 16,0;"FIRST ENTER
GRUB 1,2 OR 3"
2030 INPUT A$
2035 IF A$<>"1" AND A$<>"2" AND
A$<>"3" THEN GOTO 2010
2040 PRINT AT 15,0;"GRUB ";A$;"
IT IS....(16 SPACES)"
2050 PRINT AT 16,0;"HOW MUCH MON
EY ARE YOU BETTING?"
2060 INPUT K
2065 IF K>M THEN GOTO 2040
2070 GOSUB 6000
2080 GOTO 90
3000 LET X=X
3010 LET Y=Y
3020 LET Z=Z
3040 IF X=29 AND A$="1" THEN GOT
O 4000
3045 IF Y=29 AND A$="2" THEN GOT
O 4000
3050 IF Z=29 AND A$="3" THEN GOT
O 4000
3055 LET M=M-K
3060 IF M=0 THEN GOTO 5000
3100 PRINT AT 15,0;"BAD LUCK...Y
OU HAVE ";M;" POUNDS"
3110 PRINT AT 16,0;"A NEW RACE B
EGINS SOON                "
3120 PAUSE 150
3125 PRINT AT 3,X-1;"    ";AT 7,Y
-1;"    ";AT 11,Z-1;"    "
3128 GOSUB 6000
3130 GOTO 85
4000 LET M=M+K
4010 PRINT AT 15,0;"YOU GOT A WI
NNER...(12 SPACES)"
4020 PRINT AT 16,0;"YOU NOW HAVE
  ";M;" POUNDS,A NEW    RACE BEGI
NS SOON"
4030 PAUSE 150
4031 PRINT AT 3,X-1;"    ";AT 7,Y-
1;"    ";AT 11,Z-1;"    "
4035 GOSUB 6000
4040 GOTO 85
5000 PRINT AT 15,0;"YOU HAVE NO
MONEY LEFT"
5010 PRINT AT 16,0;"PRESS ANY KE
Y TO PLAY AGAIN"
5020 PAUSE 4E4
5030 CLS
5040 GOTO 20
6000 PRINT AT 15,0;"(32 SPACES)"
6020 PRINT AT 16,0;"(64 SPACES)"
6030 RETURN
```

SINCLAIR USER - the best enhancement yet for the ZX enthusiast. Make sure you get it monthly!

What is the best way to guarantee that you never become bored with your Sinclair computer?

The answer is to subscribe to Sinclair User ... written specifically for owners of ZX 80's and ZX 81's. Sinclair User is the latest monthly from ECC Publications - pioneers of Practical Computing, WHICH COMPUTER?, and Computer & Video Games. Whether you bought your system yesterday or are an old hand, you are probably an enthusiast for your machine. And your biggest problem is likely to be obtaining all the information to satisfy your interest. We promise that Sinclair User will be devoted entirely to quenching your thirst for information.

As the name suggests, the content will be geared specifically to helping you, the user. There will be pages of information on available hardware and software. Our expert writers will analyse established products to help you make the right choice. There will be exclusive pre-release snippets on products which are about to hit the market. Our aim is to make Sinclair User invaluable and we will chronicle applications which are of special interest.

Each month we will carry pages of programs. Another must for every user is our first-rate helpline service. And we intend to carry as much information as possible about clubs. Last but not least let us say that the best way you can guarantee you like the magazine is by participating yourself. Don't forget to ask us your queries; send in your programs - for which we will pay £10 if we publish - and be sure to tell us if you are using your ZX 81 in a special way. Send in your club news and tell us of any interesting people out there in userland. And just in case you need further convincing, look at our forthcoming editorial plans.

Can you continue to get the most out of your ZX without reading the Sinclair User every month? So why not fill in the subscription order form **today?**

sinclair user

ECC PUBLICATIONS
30/31 ISLINGTON GREEN LONDON N1 8BJ

Overseas rates: Europe £18. Outside Europe £24 (Including air-mail postage) Cheques should be made payable to ECC Publications.

Subscription Order Form

I wish to start a subscription to Sinclair User. I understand that I may cancel my subscription at any time and you will refund the balance.

☐ I enclose a cheque for £9 for 12 issues (UK only - including postage)

☐ Please charge my credit card.

No.

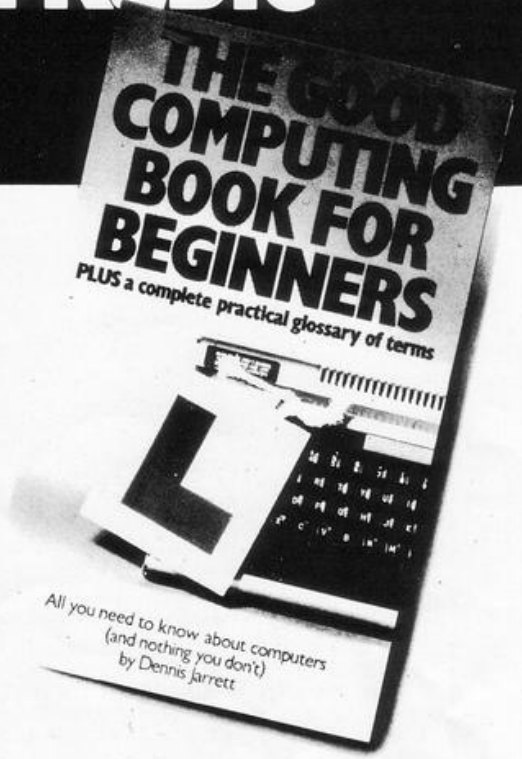
Card Name

Name

Address

Signed Date

Learn all about computers through a remarkable new language.



Simple English.

At long last, someone has written a book on computers that even Aunt Emily can understand.

That someone is none other than Dennis Jarrett: doyen of simple English and former Managing Editor of WHICH COMPUTER? and *Practical Computing*. And his book is called The Good Computing Book for Beginners.

If you're not a beginner, don't let the title put you off. Because this book provides a wonderful opportunity of clearing up any grey areas of your knowledge.

And a glance at the chapter headings down below may well give the impression that this book is fun to read. You would be right. It's the brightest way imaginable of learning all about computers.

There's also a complete language guide to computer-jargon mumbo-jumbo in a glossary of terms that's as comprehensive as you'll find anywhere.

All in all, you'll find this book does for computers what Berlitz did for languages. In 304 pages. And at a modest £1.95.

Your course in computers.

1 *Introduction to the introduction – computer myths, why they are being dispelled, and the truth about computers.*

2 *What goes on inside – a swift canter through the heavy technology, avoiding irrelevant and/or difficult ideas: processors, chips, memory, I/O.*

3 *Programmes – what makes the computer tick, or at least where the noise comes from: system software, applications, the pleasant and unpleasant faces of programming.*

4 *What's a personal computer? – new readers start here, because this is all you need to know: what can it do? What's available? And where do you buy a computer?*

5 *What to look for – how to buy a small computer, or at least how to avoid complete disappointment.*

6 *A practical glossary – facts, opinions, references and a few personalities.*

7 *Now read on – recommended reading, with notes.*

Enrol here!

Please send me ____ copy(ies) of the Good Computing Book for Beginners at £1.95 each plus 50p for postage and packing.

☐ *I enclose cheque for £ ____ made payable to ECC Publications.*

Name _____

Address _____

_____

☐ *Please charge my credit card the sum of £* _____

Name of credit card _____

Number _____

Signed _____

Now post please to ECC Publications, 30-31 Islington Green, London N1 8BJ. Telephone enquiries: 01-359 7481.

KAYDE Electronic Systems

ZX80/1
ZX KEYBOARD WITH REPEAT KEY

£37.95 inc VAT

Fully cased keyboard £37.95
Uncased keyboard £27.95
Keyboard Case £10.95

This is a highly professional keyboard using executive buttons as found on top quality computers. It has a repeat key and comes complete in its own luxury case. This is a genuine professional keyboard and should not be confused with toy keyboards currently available on the market.

KAYDE 16K RAM PACKS

£29.95 inc VAT

The 16K RAMPACK simply plugs straight into the user port at the rear of your computer. It is fully compatible with all accessories and needs no extra power and therefore it will run quite happily on your Sinclair power supply. It does not over-heat and will not lose memory at all. As you may know some makes go down to 11K after being on for a while.

This 16K RAMPACK is very stable and will not wobble or cause you to lose your programme. It comes fully built and tested with a complete money back Guarantee.

KAYDE FLEXIBLE RIBBON CONNECTOR

£12.95 inc VAT

Stops movement of RAM PACK and other accessories
(Not needed with a *KAYDE* RAMPACK)

KAYDE 4K GRAPHICS BOARD

£29.95 inc VAT

The *KAYDE* Graphics Board is probably our best accessory yet. It fits nearly inside your ZX81. It comes complete with a pre-programmed 2K Graphics ROM. This will give nearly 450 extra graphics and with there inverse makes a total of over nine hundred.

The *KAYDE* Graphics Board has facilities for either 2K or RAM (for user definable graphics) 4K of ROM or our 4K Tool Kit Chips that will be available shortly. All the graphics are completely software controlled, therefore they can be written into your programmes. Here are a few examples: **A full set of space invaders — Puckman — Bulits, Bombs — Tanks — Laser Bases and Alien Ships.**

NO EXTRA POWER NEEDED

KAYDE 16K GRAPHICS BOARD SOFTWARE

£5.95 EACH

Peckman: The only true ZX version of the popular arcade game.
Centipede: "In all I think this is the best presented moving graphic program I've yet seen" Phil Garratt, Interface.
Space Invaders: The best version available anywhere.
Graphic Software can only be used with a Graphics board.

KAYDE 16K 81 SOFTWARE

£5.95 EACH

Centepede "In all I think this is the best presented moving graphics program I've yet seen" Phil Garratt Interface.
3D/3D Labyrinth. A Cubit Maze that has corridors which may go left, right, up, down.
Peckmen (the latest addition in 81 games).

WHY WAIT TO PAY MORE
FAST IMMEDIATE DELIVERY

Post to:
Dept SU
Kayde Electronic Systems Ltd
The Conge
Great Yarmouth
Norfolk NR30 1PJ
Tel: 0493 57867 (Dept SU)

Access

VISA

Don't Forget you can always order on the telephone with your credit card

All products include VAT are fully built and tested and come with a COMPLETE MONEY BACK GUARANTEE

I enclose £.....
Name.....
Address.....
.....
.....

Please add £1.50 P/P for all hardware and 50p for all software.
Please make cheques payable to Kayde Electronic Systems Ltd.