

# MICRO COMPUTER

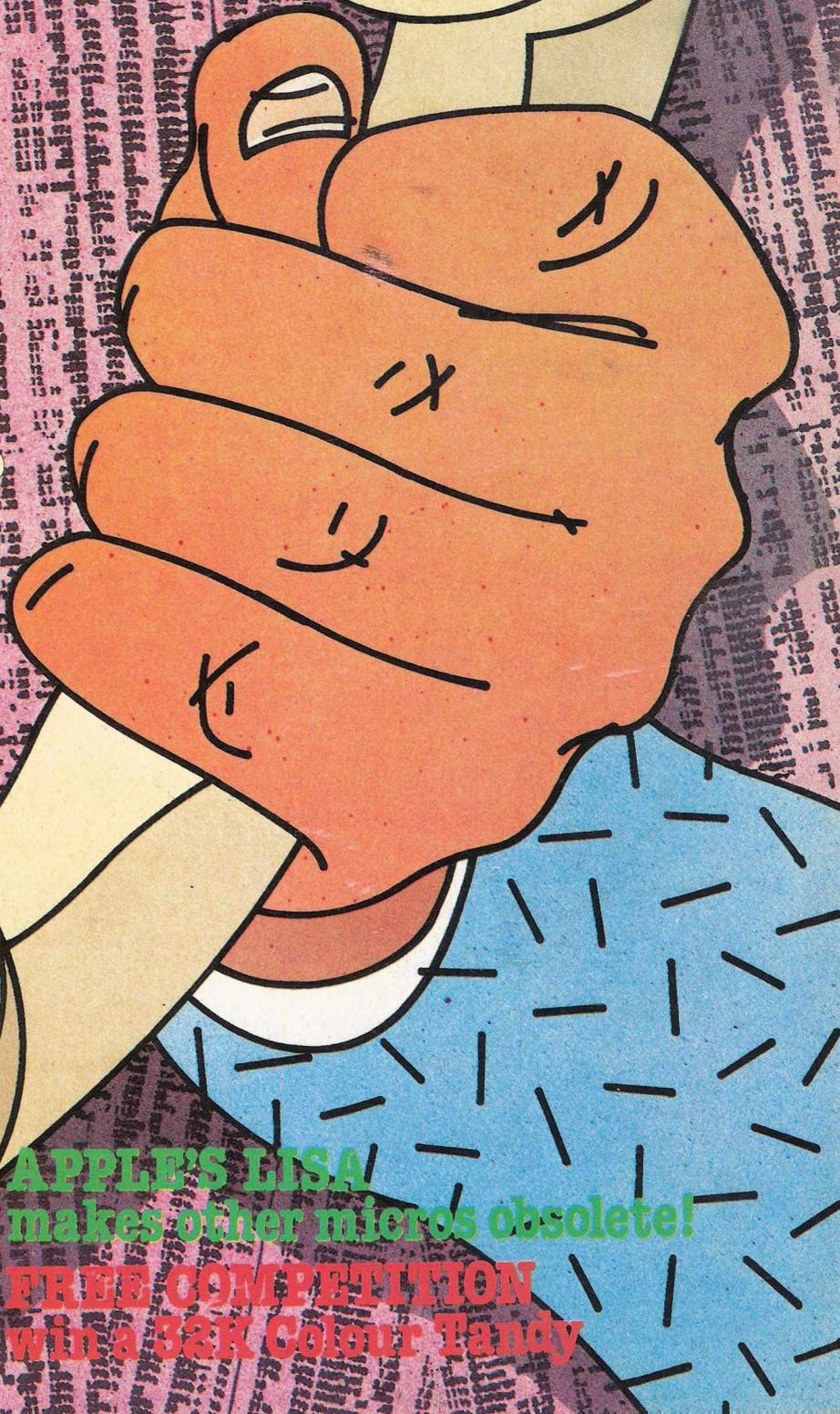
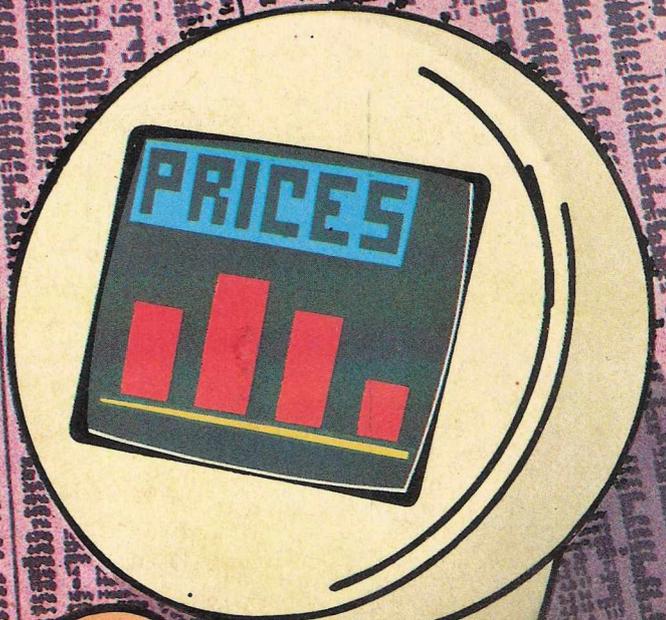
PRINTOUT

A PLAIN MAN'S GUIDE TO  
PERSONAL COMPUTING

MARCH 1988 \$5

## PUBLIC DATABASES

can they  
rejuvenate  
your business?



APPLE'S LISA  
makes other micros obsolete!  
FREE COMPETITION  
win a 32K Colour Tandy



Expand the capability of your IBM Personal Computer with the Small Systems IBM 80 card. The IBM 80 card allows all Standard CP/M 80 (tm) version 2.2 software to run without modification on the IBM PC. The vast range of CP/M 80 software is now made available to IBM PC owners. Your own software libraries developed under CP/M 80 can be immediately utilised on the Small Systems IBM 80 card.

**True CP/M 80 version 2.2 Implementation**

Unlike other CP/M 80 cards the Small Systems IBM 80 is **NOT** an emulator. The IBM 80 provides true CP/M 80 running on a 4 or 6 MHz Z80 giving the advantages of speed and complete CP/M 80 compatibility.

**Corvus Winchester disk interface**

The IBM 80 card also interfaces the IBM PC to the Corvus range of Winchester hard disk drives. The Corvus Constellation multiplexer allows up to 64 IBM PCs to share a single Corvus drive. The Corvus Mirror video cassette recorder Corvus drives back up onto a standard video cassette recorder. Corvus drives have a field proven record of reliability with more than 6,000 systems in use world wide.

**Drive M - RAM Disk Drive**

A drive M utility is included with the IBM 80 card. This enables a section of the IBM PC RAM to be used as an additional logical disk drive providing very high speed access for overlay files, compiler intermediate code interpreters etc. Files generated under CP/M 80 and CP/M 86 are identical in structure allowing files created under one operating system to be used by the other without restrictions.

**File Compatibility**

A file transfer utility, supplied with the IBM 80 software, enables file transfer between PC DOS and CP/M 80 and vice versa.

**Ease of Installation and Use**

The IBM 80 card simply plugs into one of the internal expansion slots and is supplied complete with a comprehensive manual and CP/M 2.2 utilities diskette.

- 4 MHz ..... £299.00
- 6 MHz ..... £335.00

# IBM 80 CARD

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MARCH 1983

VOLUME 4 NUMBER 3

P.T.O.  
for more info!

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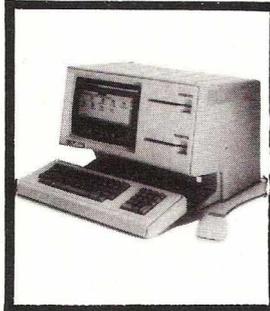
Is the most exciting computer game yet – you get just 12 hours to solve a murder.



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## Apple's LISA

Will make other micro's obsolete because it works the same as you do.

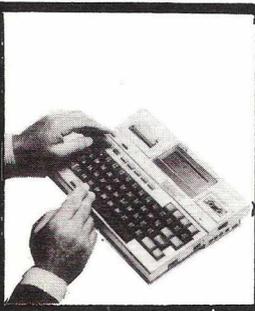


COMMUNICAT  
**MICRONET 80**  
COMMUNICAT  
**MICRONET 80**  
COMMUNICAT  
**MICRONET 80**  
COMMUNICAT  
**MICRONET 80**  
COMMUNICAT

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Offers computer owners PRESTEL for less than £1 per week.



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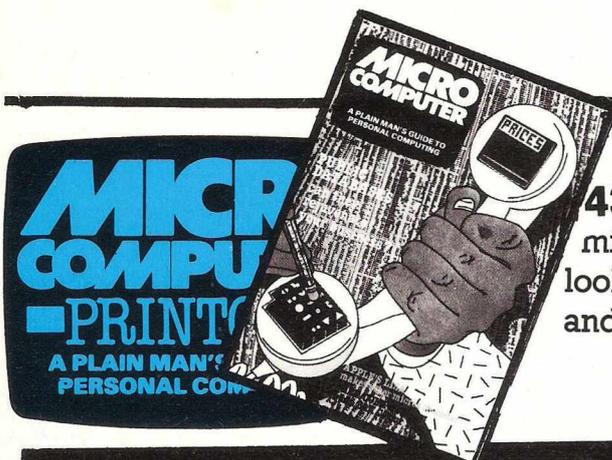
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# How Epson beats the competition.

## What competition?



The amazing HX-20.  
The most complete portable computer available today.

**The HX-20 is a portable computer with a full size typewriter keyboard, LCD Virtual Screen, printer and microcassette facility actually built in. A computer with a rechargeable power source that's large enough for writing programs and manipulating data virtually anywhere, yet small enough to carry in a briefcase.**

But don't let the size fool you. The HX-20 is not a gimmicky toy or an excuse for a calculator. It's a precision machine using a full extended version of Microsoft BASIC with 16k RAM, optionally expandable to 32k and 32k ROM expandable to 64k, RS-232C and Serial interfaces. The ASCII typewriter keyboard and five programmable keys brings ten separate program functions to your fingertips.

**Power to your elbow.**

The HX-20 runs on its own power supply for over 50 hours and can be easily recharged overnight, or whilst in use, with the ability to retain its memory in RAM even when switched off.

**Keeping you in the picture.**

The LCD screen is unique - showing any 20 characters by 4 lines at a time - enabling you to carry out word processing or data entry as if you are using a large screen.

**Print Out. Built In.**

The 24 column dot matrix impact microprinter offers 42 LPM in a crisp, precise 5 x 7 matrix for perfect hard copies. Every time. And you can choose from a wide range of peripherals from bar code readers to acoustic couplers for total capability.

**Epson. Reliability through Research.**

You'll find our name on a highly successful range of computer printers. So you can be assured of the same quality and reliability through an extensive research programme prior to the launch of any Epson product.

Write or call us for further details and the name of your local stockist (because seeing really is believing).

Just take a glance at the competition and you'll soon realise that the HX-20 is the most portable computer available today.

Epson (UK) Limited  
Dorland House 388 High Road Wembley Middx HA9 6UH  
Telephone 01-900 0466/9 Telex 8814169

# HX-20

PORTABLE COMPUTER



# EPSON

Extraordinary product.  
Exceptional quality.

# FRONTLINE

## Animal Farm

If I had the time, and the ability to write a novel, I would choose as my subject 'The Microcomputer Revolution'. The storyline I think I could safely plagiarise from a book by George Orwell: not 1984 as you might suppose, but *Animal Farm*, itself already a satire on the Russian Revolution.

The Farm would represent the market for business computer applications, and the opening pages of my book would show it dominated by large, evil, mainframe computers and large, evil, mainframe computer companies. Then one night, the revolution takes place: the mainframe computer is exposed and ousted, the microcomputer takes over. People find new freedom in this system. Rallies, exhibitions and club meetings resound with choruses of, 'one man one system'. The microcomputer succeeds where the mainframe has failed, and uses its corporate strength to spread the word and really bring computing power to the people. And they all live happily ever after.

Unhappily, George Orwell's book doesn't end like that, and neither will mine. You see, drunk with their newly-gained power, the microcomputers forgot about bringing their very real advantages to the masses, and concentrated instead on consolidating their position and increasing their own strength and power.

Gradually, some of the old ideas started creeping back in. Hard disks weren't so bad after all, especially if they were called something different like 'Winchesters'. And why restrict their use to one screen and keyboard when a \$15 chip was now so fast you could share it between four users. Some of the folks who'd been around at the start of The Microcomputer Revolution had their doubts, but no-one spoke up, and soon they had forgotten the early microcomputers altogether.

My story would end on an Orwellian note, too - with the users looking from micro to mainframe and unable to tell the difference.

All of which may strike you as being rather melodramatic. But let me assure you, dear friends, that that is what is happening.

The term 'revolution' paradoxically means 'full circle' and we are already a good way round it. Yes, prices have fallen by a large factor, but what bothers me (based on a recent tour of the Which Computer Show) is the number of manufacturers who are selling their systems on the strengths of Operating Systems, Languages, Processor architectures or Bus structures.

In short, there is a move away from selling *solutions* back to selling *capabilities*.

The reason I have chosen to write this diatribe this month, is that amidst the doom and gloom of the new product announcements we get at this time of year, two rays of hope are shining through.

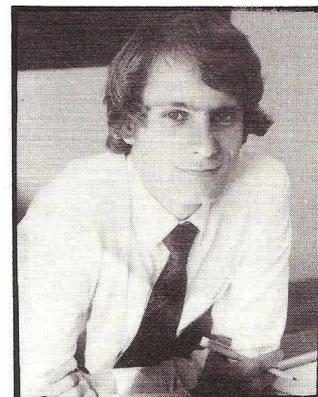
The first, I believe, is the Epson HX20, reviewed in *Expert's Choice*. In hardware terms, this device is closer to the concept of The Personal Computer than anything I have yet come across.

The second is Apple's LISA, which in software terms represents a complete new generation of user-friendliness.

We shall be giving a lot of publicity to these and other good products in coming months. Not for their sake, but for the sake of the future of microcomputing.

## P.S.

Apologies to those of you eagerly anticipating the feature on Computer Music. It will be in next month, bigger than originally planned, together with a serious look at the practicality of Winchester disks, and a run down of the top ten games suppliers.



Richard Pawson - Editor

### EDITORIAL

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A handwritten signature in black ink, appearing to be 'R. Pawson', written over a horizontal line.

# THE GENIUS YOU CAN TAKE TO BREAKFAST.

Now, at last, real portable computer power. The new Sharp PC 1500 pocket computer. A pocket-sized genius that will travel with you to conferences, seminars and business breakfasts.

The PC 1500 has the capacity and BASIC language usage that is very nearly that of the desk-size Personal Computer. When fitted with the optional 4-colour graphic printer, it is one of the most powerful pocket computers on earth.

Chores can be handled swiftly and accurately any time of day, wherever you happen to be. Estimates, records and charts of sales, billings and other important data can be re-programmed, calculated and summoned at the touch of a button. It can even play blackjack, analyse your biorhythms or give you a beeped reminder of a scheduled meeting.

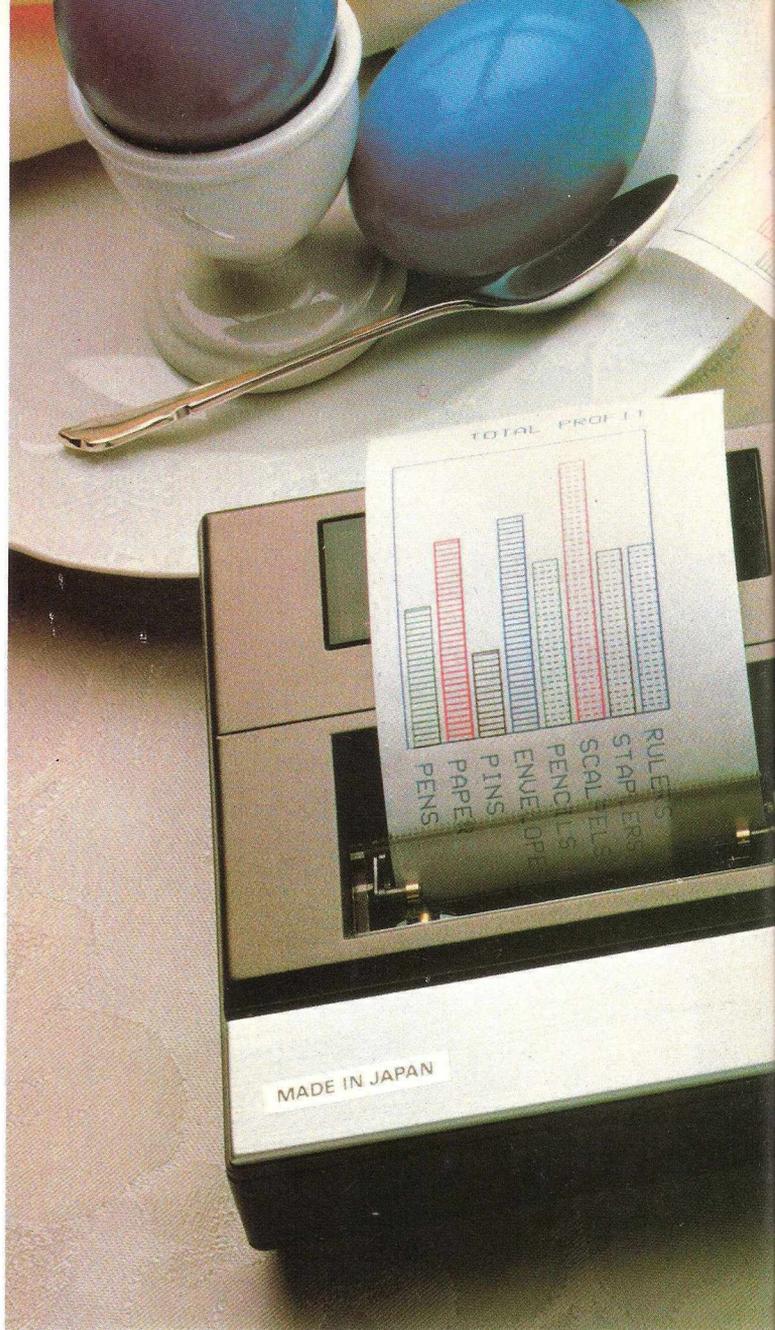
Large memory capacity, up to 11.5K bytes. 4-colour print-out. Six user-programmable keys.

The incredible new PC 1500. A revolution in pocket computers.

From Sharp. Where great ideas come to life.

## SPECIFICATIONS PC 1500

Number of calculations	10 digits (mantissa) + 2 digits (exponent)
Program language	BASIC
CPU	C-MOS 8-bit CPU
Capacity	ROM: 16K bytes RAM: 3.5K bytes expandable to 11.5K bytes
Memory protection	C-MOS battery back-up
Display	7 x 156 dots mini-graphic display (English upper- and lower-case letters, numbers, special signs, etc.)



## CE 150 Colour Graphic Printer/Cassette interface (Optional)

### Colour Graphic Printer

Power source	Built-in rechargeable battery
Printing digits	Standard 18 digits (36, 18, 12, 9, 7, 6, 5, 4 digits selectable)
Printing system	X-Y axis plotter system
Printing mode	Graph/Text switchables
Character sizes	9 different sizes from 1.2 x 0.8 mm to 10.8 x 7.2 mm (from 1/16" x 1/32" to 7/16" x 9/32")
Printing colours	Red, blue, green, black
Printing directions	Right, left, up, down
Minimum step width	0.2 mm (1/64")

### Cassette Interface

Up to two cassette tape recorders can be connected

## CE 151 Memory Module (Optional)

Capacity	4k-byte C-MOS RAM
----------	-------------------

## CE 155 Memory Module (Optional)

Capacity	8K-byte C-MOS RAM
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## CE 153 Software Board (Optional)

140 key soft-touch definable keyboard

## CE 152 Cassette Recorder (Optional)

Audio cassette recorder to match PC1500

## CE 159 Battery Back-Up Memory Module (Optional)

Capacity 8K-bytes, will retain memory contents when removed from PC1500.

## CE 158 RS 232 Interface

RS 232C Interface also incorporating Centronics parallel interface.



## BASIC LANGUAGE SPECIFICATIONS

### PC 1500

Commands	RUN, NEW, LIST, CONT, TR ON, TR OFF, LOCK, UNLOCK, STATUS, MEM
Statements	INPUT, PRINT, GPRINT, CURSOR, GCURSOR, PAUSE, USING, WAIT, CLS, IF... THEN, STOP, GOTO, ON... GOTO, GOSUB, ON... GOSUB, RETURN, ON ERROR GOTO, FOR... TO... STEP, NEXT, END, DIM, LET, REM, DATA, READ, RESTORE, BEEP, AREAD, ARUN, CLEAR, RANDOM, DEGREE, RADIAN, GRAD, BEEP ON, BEEP OFF
Functions	SIN, COS, TAN, ASN ACS, ATN, LN, LOG, EXP, DEG, DMS, RND, SQRT, SGN, ABS, INT, PI ( $\pi$ ), LEFT\$, RIGHT\$, MID\$, ASC, VAL, LEN, CHR\$, STR\$, POINT
Variables	A ~ Z, AS ~ Z\$, two-letter variables possible, two-dimensional arrays applicable
Operations	+, -, *, /, ( ), >, <, >=, <=, <>, =, ^, AND, OR, NOT, &
Others	INKEY\$, TIME, ; ; "

### CE 150 Printer

Commands	LLIST, TEST
Statements	LPRINT, TAB, LF, ROTATE, COLOR, GLCURSOR, SORGN, LINE, RLINE, CSIZE, TEXT, GRAPH, LCURSOR

### Cassette Interface

Commands	CSAVE, CLOAD, CLOAD?, MERGE
Statements	INPUT#, PRINT#, CHAIN, RMT ON, RMT OFF

To: Sharp Electronics (UK) Ltd, Computer Division,  
Sharp House, Thorp Road, Newton Heath,  
Manchester M109BE. Tel: 061-205 2333.

*Please send me details of the Sharp PC 1500*

Type of application: \_\_\_\_\_

Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Tel No: \_\_\_\_\_

MP4

The world of  
**SHARP**  
where great ideas come to life.



Design and specifications subject to change without notice.

# VIC-20 and Commodore 64 from Adda

## VIC20

**£144.99**

inc VAT - carriage free

Still unbeatable value at this price with a full size keyboard. Backed by Adda's full one year warranty.



Features include: \* 5K RAM expandable up to 29K \* 8 border colours, 16 screen colours \* 8 screen character colours \* 3 audible tone generators, each of 3 octaves \* a 'white noise' generator \* 88 character program line length \* 64 ASCII character set \* full PET-type graphics character set generated directly from keyboard \* 176 x 158 pixels (27,808 in total) maximum resolution \* 8 programmable special functions accessed via 4 special function keys.

## COMMODORE 64

**£343.85**

inc VAT - carriage free

The 64K personal computer that outpaces the rest. Backed by Adda's full one year warranty.



Features include: \* 64K built in RAM \* 40 column colour display - tv interface \* Upper and lower case characters and graphics \* Sprite graphics on eight levels \* Music synthesiser with three voices and nine octave range \* 16 colours available simultaneously \* 8 bit parallel user port.

## PRINTER

**£230**

inc VAT - carriage free

The VIC Printer - suitable for the Commodore 64 also - will print programs, letters, business data and graphics. It offers high specifications at a competitive price.

Features include: 80 characters per line. Tractor feed dot matrix. 30 characters per second print speed. Full alphanumerics and graphic printing. Double-size character capability. Price includes all cables. Alternative printer GP100VC with full-size paper feed **£270.25 inc VAT.**



## DISK UNIT 1541

**£299.95**

inc VAT - carriage free

For the VIC-20 and the Commodore 64. A disk unit transforms your computer into a high-speed system ideal for the more serious programmer or small businessman. It enables you to get the best out of your utility programs.



Features include: 170K bytes capacity. Uses soft-sectored standard 5 1/4" single density floppy disks. Direct interface to computer. Direct compatibility with Printer. Price includes all cables.

### MEMORY PACKS FOR THE VIC-20

Special plug-in cartridges are available to expand VIC's memory. 3K, 8K and 16K RAM packs plug directly into computer. 16K RAM Memory Pack **£74.95**, 8K RAM Memory Pack **£44.95**, 3K RAM Memory Pack **£29.95**



#### How to order

By mail  
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Adda Computers, FREEPOST,  
London W13 9BR no stamp needed

# adda

Telephone orders 24 hour service  
telephone

**01-200 0200**

with Access/Barclaycard number



## PORTABLE ACOUSTIC COUPLERS

### Typical Applications

- Networking computers
- Linking to electronic mail system (Euronet)
- Converting microcomputer to Viewdata (Prestel) receiver

### Key Features

- Snap-fit acoustic link between standard telephone handset and terminal equipment
- Low cost
- Slimline design
- Lightweight and compact
- Specially designed acoustic chambers need no rubber seals

**PAC-M1:** This acoustic modem provides a link between telephone line and Serial Data socket of a microcomputer, thus allowing conversion into a Prestel receiver and facilities for transfer of telesoftware programmes. £135 + VAT, P&P.

**PAC-M2:** Specifically for fully interactive data communication at 300/300 Baud rate, this acoustic modem is designed for networking computers and for electronic mail system. It operates in an originate mode to the CCITT V21 standard and connects Serial Data via an RS232 socket. £135 + VAT, P&P.

**PAC-1:** Provides an acoustic link between standard telephone handset and all types of Prestel and private Viewdata terminals, TV sets and adaptors. Powered by a single PP3 battery, this acoustic coupler allows Viewdata equipment to be used in office or home without a fixed BT socket. £85 + VAT, P&P.

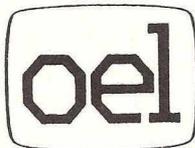
### Technical Approval

All products meet the British Telecom Technical Guide for acoustic coupling.

### Software Available for:

PET Series, Apple, BBC Micro and many others.

**O.E.Limited**, Industrial Estate,  
Appleby-in-Westmorland,  
Cumbria CA16 6HX.  
Tel. (0930) 51909. Telex 64157.



PLEASE SEND MORE DETAILS OF THE PORTABLE ACOUSTIC COUPLERS. PAC-1  PAC-M1  PAC-M2   
(tick as required)

NAME .....

COMPANY .....

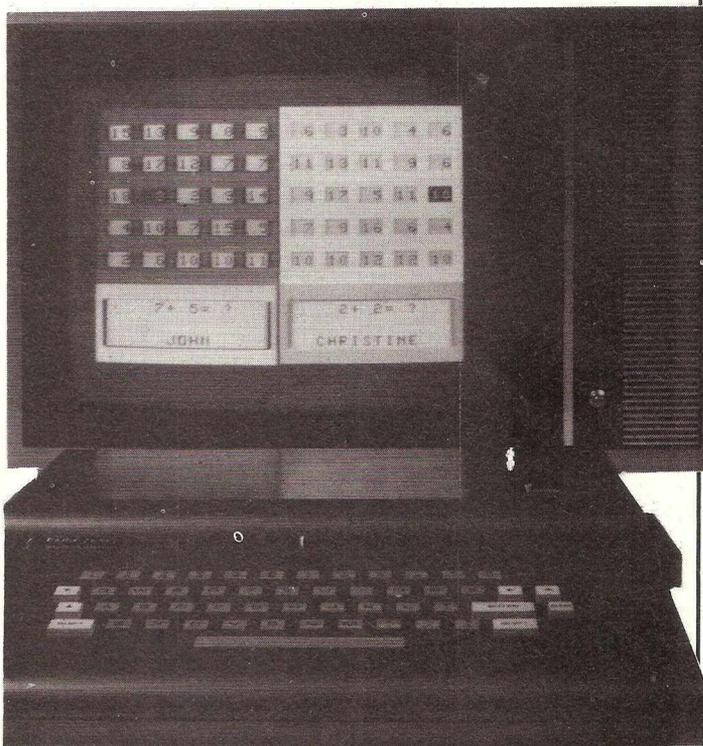
ADDRESS .....

TEL. .... MCP 03/83

# Win a 32K Tandy Colour computer

During the past twelve months, home computer sales have swung overwhelmingly towards colour machines. Will all personal computers soon offer high resolution graphics?

To encourage you to share your ideas of how colour can help make microcomputers easier to use, we are offering a 32K Tandy Colour computer worth over £350.



The winning entry will describe, in not more than 200 words, a new and original application of colour graphics; something which will make microcomputers friendlier and easier to use – even by the inexperienced.

Entries must be typewritten, accompanied by the entry coupon below, and reach us by March 31st 1983. Be sure to include your name, address and age if under 18.

The judges will be the Editor of *MicroComputer Printout* and the Managing Director of Tandy UK Ltd., whose decision will be final.

The winning entry and those of the runners up will be printed in our June issue, to be published in the second week of May.



**Tandy Colour  
Competition  
Entry Coupon**

# READ/WRITE

The Editor welcomes your letters, but if you require a personal reply please enclose an S.A.E.

## Submarine Crash

Dear Sir,  
Re:- Advert on page 46 of January 1983 of this interesting journal. William Stuart systems, the esteemed people who market Big Ears speech recognition unit have added a speech synthesiser to their range. I do not quarrel with this choice of computers they say it will interface to, ZX81 Spectrum, rather predictable but then it goes on to suggest IBM as a suitable partner in crime. But even further it suggests a Cray could interface to their 'CHATTERBOX'. No doubt it could, but isn't that a little too ambitious?

I must congratulate you on an excellent journal and Mr. Terry Hope on his excellent articles on the Atari's superb graphic facilities. About the Atari, I have an Atari 400 running Atari Basic, sometimes after writing long programs it completely crashes on me. It fails to execute any commands after return is pressed (or rather prodded, Atari's touch sensitive keyboard) the computer does not respond to any key presses. I wonder have any other Atari owners suffered this fate as it always seems to occur after you have corrected that last bug in your masterpiece. I must also recommend to you Thorn EMI's excellent Submarine Commander cartridge, it is an excellent, if difficult game, my highest score is around the thousand mark. I'm not very good at it.

On the subject of the new film TRON, might I point out that the evil and dreaded Master Control Program who runs this electronic world, is commonly referred to by it's initials which are the same as a well known computer journals initials.

Christopher Lewis  
Swansea  
W. Glamorgan

*Any one else suffer from this disease? Or their computer?*

## Electronic Mail

*We don't normally print letters from sales organisations, but when we read this one from 'Oxford Computer Publishing Ltd', 'Brimrod', 4 High St, Chalfont-St-Peter, Bucks, SL9 9QB, we felt we had to take pity on them!*

Dear Customers,  
Have you placed orders with us through Box 99 Oxford?

With Post Office engineers pushing into satellites, fibre optics and the frontiers of science, this company thinks the Post Office should also remember how things work at the grass roots customer level.

For 8 weeks this company has been

using an Oxford Box No.99 in relation to our advertisement offering Machine Code Test Tools. We thought P.O. Box 99 was a good number. Not so. The Dymo stickers 'fell off the pigeon hole 99' so your orders and kind enquiries were passed not to us, but to the previous holder of Box 99. According to the Post Office that company appears to have gone out of business – to make matters worse nobody knows where the orders have gone now, they may even have been sent back to you!

If you have placed orders with us would you please get in touch with us again at the address above, or telephone us on Gerrards Cross (0753) 888866 – we will leave an Answercall on during non-working hours – and orders will be processed immediately.

We are now assured that OXFORD BOX 99 will be working normally! Presumably they have purchased a fresh roll of Dymotape out of the recently announced profits.

We are sorry for any inconvenience caused.

Yours sincerely,

W.N. Richardson  
Managing Director

## One of those days

Dear Sir/Madam/Miss/Ravenous Bug-blaster Beast of Traal...

As I consider you the best computer publication available, I was wondering whether you have ever thought of producing a *Microcomputer Printout* diary – I'm sure you would have fun putting it together.

A member of DENSA  
Bradford  
W. Yorkshire

P.S. Have a Pan Galactic Gargle Blaster on me.

P.P.S. Is Julian Allason really E.T's mother?

*We did in fact design a diary last year, but the project was axed on the following grounds:-*

- 1. The publisher said there were too many weekends.*
- 2. The Editor objected to having every Sunday followed by a Monday morning.*
- 3. The Art Editor axed Wednesdays because they didn't fit the design.*
- 4. The production department could not spell Febuary.*

## Photo Caption

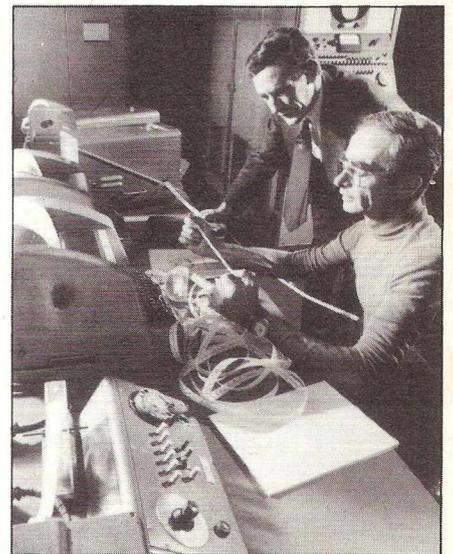
Regarding the photo caption for 'Nellie', I suggest:-

"42...!?"

as in the 'Hitchikers Guide to the Galaxy', i.e. the result of 28 years computing time to find the answer to 'Life, the Universe and Everything'!

Yours optimistically,

J. Franklin  
Harrow  
Middlesex



*Mr. Franklin has been awarded our Silver Space Invader Badge for plagiarism beyond the call of duty!*

## New Entrants

Dear Sir,  
I would be very grateful if your reviewers would review the new ORIC I and SORD M-5 microcomputers, as I am in the process of deciding which microcomputer to buy, and find that these machines received little or no attention when they came on the market.

B. Claffey  
Co. Offaly  
Eire

*We shall be looking at both the SORD and ORIC computers in a forthcoming issue, but it is not the policy of this magazine to review home computers before they get to market. We might point out that no ORICs were shipped before the middle of January.*

*Buying a home computer is more than just comparing specifications, and before units are shipped, there can be no indication of what software will be available or even whether the computer will make it to market.*

# READ/WRITE

## Sore Dongles

Dear Sir,

I use CBM 4032 and CBM 8032/96 machines with associated peripherals. With both of these I regularly use either the Cassette Unit or a range of dongles (PETAID, Administrator, Wordcraft, etc.). I am concerned that my edge connector on the first cassette part will wear out prematurely. Can this be easily/cheaply repaired?

Alternatively, does someone manufacture a switched accessory unit to which a variety of dongles and a cassette unit could be more permanently fixed?

Yours faithfully,

R. A. Heesterman  
Sheffield

*Edge connectors on PCB's can be worn down by constant plugging and unplugging. And they can't be replaced. Any electronics enthusiast could easily make up a connector splitter, though we don't know of one on the market. Some of the newest 'dongles' on the market are stackable - the connector runs right through them.*

## Estate Agents

The Editor and Mr. David Perkins wish to apologise to Mr. Dereck Caston for any offence taken in respect of the article entitled 'This Desirable Residence' appearing in the June Edition of this publication and to place it on record that neither of them consider him to be a loony. Any implication of incompetence on the part of Mr. Caston arising from this article is hereby unreservedly withdrawn.

The following letter to the Editor disagreeing strongly with the article on systems for estate agents, was received from Mr. Graham Harris, a business associate of Mr. Caston's.

Dear Sir,

'This Desirable Residence' by Martin Hayman in your June issue contained so many inaccuracies and contradictions that a serious attempt has to be made to set the record straight.

Mr. David Perkins of the National Association of Estate Agents is quoted as complaining that computer systems have not been put together by Estate agents. Dereck Caston's TREC System has.

Dereck joined Dalton Woodland & Partners (not Dalton Woodward as stated) in 1974 as a partner. He began to apply his previous computer knowledge only after five years totally dedicated Estate Agency experience, and having

become an Associate of the National Association of Estate Agents.

He would agree with Mr. Perkins that more than matching is involved as Estate Agents face many imponderables since they are dealing with people. The property eventually purchased may be very different to that originally specified. Dereck's system is designed to reflect that agent's opinion, as well as the stated requirements.

Hayman states that the computer 'can help, but only if it aids a manual system which is already efficient'. But does this merely mean competent administration, or professional skill in handling individual clients?

Dereck Caston designed his system not as an automated office, but to serve and be under the control of the professional agent. It enhances production by speeding up routine chores.

Under his system, applicants' requirements are entered on the computer, which quickly produces a complete list of appropriate properties for the negotiator to employ his skill in presenting. It is not an automated matching process. A personalized letter can be generated in response to a telephone or letter enquiry to accompany the particulars selected, or a personalized synopsis. The computer will output a synopsis of the appropriate properties.

Routine mailing, so often wasteful and inefficient, is handled under the control of a supervisor who can determine which properties should be mailed to what quality of matched applicant. The system is fully integrated and automated to the applicant and property registers. Approximately 40 key taps can handle the mailing of twenty varied properties into a register of 1000 applicants in ten minutes. Another facility allows a manager to have the computer select the type of properties he judges suitable to be advertised, together with an analysis of how many times they have previously been advertised and details of the expenditure. It is the manager who makes the final selection, only then does the computer print out advertising copy.

Hayman's use of the term 'half-cock' in relation to the need for newspaper compositions to set the advertisement is unnecessarily carping, as they would do so whatever form it was in. The point is that the TREC system is more efficient, since it saves the agent time. Typically this whole operation from start to finish to produce a full page advertisement takes 20/40 key taps and is completed in 8 minutes.

I find it odd that Hayman devotes space to Mr. Perkins' opinions and to the Homeline system 'where the client never

comes to the office'. This sort of impersonal service, developed by a non-estate agent, takes business away from professional agencies, who should heed Dereck Caston's advice.

Hayman describes ICL as 'The Company with the largest range of incompatible products in the world'. If true, Dereck's experience as an ICL support manager qualifies him well to introduce first-time users to computers.

Menu-driven software is singled out as a feature of the Blue Chip package. Yet it is used throughout TREC (not TREK as stated). It should be noted that TREC is totally menu-driven 'user-friendly'. The main menu has 19 sub menu's and many sub menu's have themselves up to 8 sub menu's. Hayman's description of it as a system 'which contains so many smart ideas that it takes four hours for him to demonstrate it', and the note that it can store details of up to 3000 properties and 2000 applicants on a mini floppy system, merely proves it to be comprehensive and cost-effective. On more powerful hardware the programs run faster and can handle larger property and applicant registers and run multi-task, multi-screen systems.

Dereck has tried to provide a workman-like tool that allows the experienced Estate Agent the time to express his personality to the full. If this is plain, how can Mr. Perkins be permitted his peculiarly personal and insulting comments about Dereck's competence and mental stability? In so doing, Mr. Perkins claims to express the opinions of Estate Agents as a whole, but how can this be so when his understanding of what Dereck has done is so much at variance with facts?

What has been totally overlooked is that the system caters dynamically for market swings from a buyers to a neutral to a sellers market condition.

I have great experience of demonstrating Dereck's system to Estate Agents, and have yet to find one who did not express total satisfaction with the quality of the programs. With no exceptions that can be remembered, everyone who has seen the system in operation makes a similar comment - "you can tell this was written by an Estate Agent."

No better comment can be paid.

G. Harris  
Central Properties Index

P.S. (For the technically minded it uses a 16 file totally integrated database interlocked with 4 parameter driven text files hierarchically index and extensively uses boolean algebra to a number of levels of parenthesis for optimization).

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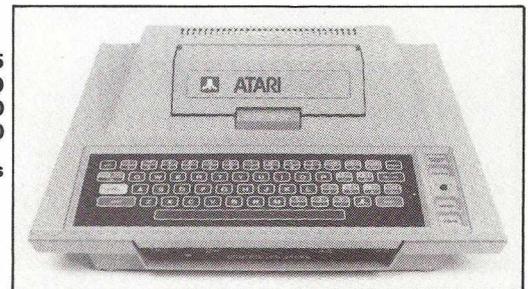
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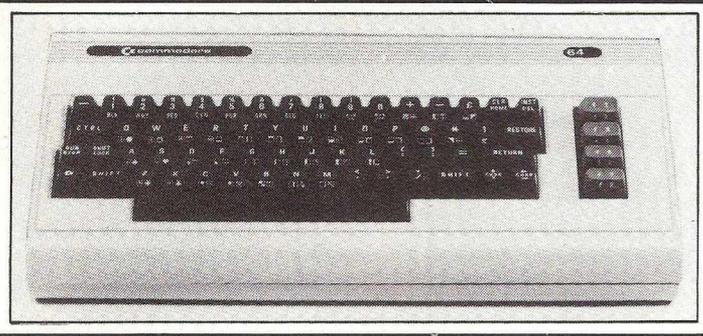
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|---|---|---|---|
| <b>Hardware</b><br>VIC20 Console<br>C2N Cassette Unit<br>VIC Printer<br>VIC Disk Drive<br>3K RAM Cartridge<br>8K RAM Cartridge<br>16k RAM Cartridge<br>Joysticks and Paddles<br>Single Joystick<br>Pair of Joysticks<br>Le Stick<br>Pair of Paddles<br>Programming Aid Cartridges<br>Super Expander 3K RAM and Hi-res graphics<br>Programming Aid: Additional commands, function key programming etc<br>Machine Code Monitor<br>Software (all 3K unless stated)<br>Introduction to BASIC Cassettes<br>Part 1<br>Part 2<br>Game Programs<br>Avenger Cartridge<br>Star Battle Cartridge<br>Super Slot Cartridge<br>Jelly Monsters Cartridge<br>Alien Cartridge<br>Super Lander Cartridge<br>Road Race Cartridge<br>Rat Race Cartridge<br>Blitz Cassette<br>Mole Attack Cartridge<br>AdventureLand Cartridge<br>Pirate Cove Cartridge<br>Mission Impossible Cartridge<br>Voodoo Castle Cartridge<br>The Count Cartridge<br>Sargon 2 Chess Cartridge<br>Gorf Cartridge<br>Omega Race Cartridge<br>Another VIC in The Wall Cassette<br>VIC Panic Cassette<br>Cosmiads Cassette<br>Backgammon Cassette (+3K)<br>VIC-Men Cassette<br>VIC Asteroids Cassette<br>Business Programs<br>Simplicial Disk (+16K) | (AF47B) £169.99<br>(AF48C) £44.95<br>(AF49D) £230.00<br>(AF50E) £396.00<br>(AF51F) £29.95<br>(AF52G) £44.95<br>(AF53H) £74.95<br>(AC53H) £7.50<br>(AC37S) £13.95<br>(AC45Y) £24.95<br>(AC30H) £13.95<br>(AC54J) £34.95<br>(AC55K) £34.95<br>(AC56L) £34.95<br>(AC57M) £14.95<br>(AC58N) £14.95<br>(AC59P) £19.95<br>(AC60Q) £19.95<br>(AC61R) £19.95<br>(AC62S) £19.95<br>(AC63T) £19.95<br>(AC64U) £19.95<br>(AC65V) £19.95<br>(AC66W) £19.95<br>(AC67X) £4.99<br>(AC68Y) £24.95<br>(AC68Z) £24.95<br>(AC68T) £24.95<br>(AC64F) £24.95<br>(AC67U) £24.95<br>(AC68V) £24.95<br>(AC69W) £24.95<br>(AC77J) £24.95<br>(AC90X) £24.95<br>(AC91Y) £24.95<br>(AC78K) £7.00<br>(AC79L) £7.00<br>(AC80B) £7.00<br>(AC81C) £7.00<br>(AC82D) £7.00<br>(AC83E) £7.00<br>(AC92A) £24.95 | Simplicial Cassette (+16K)<br>VIC Stock Control Cassette (+8K)<br>VIC File Disk (+16K)<br>VIC Writer Disk (+8K)<br>VIC Writer Cassette (+8K)<br>Education (CSE & GCE 'O' Level Revision)<br>All cassette based and require at least 8K expansion memory<br>English Language<br>Mathematics 1<br>Mathematics 2<br>Biology<br>Chemistry<br>Physics<br>Computer Studies<br>Geography<br>History<br>Arithmetic for 9 to 11 year olds<br>Reading for 9 to 11 year olds<br>General Knowledge for 9 to 11 year olds<br>Spelling for 9 to 11 year olds<br>Home Programs<br>All cassette based and require at least 8K expansion memory<br>Quizmaster<br>Know Your Own IQ<br>Junior IQ<br>Know Your Own Personality<br>The Robert Carrier Family Menu Planner<br>VIC Money Manager<br>VIC Road User & Highway Code<br>Garden Planner<br>Interior Designer<br>Mole "Ask The Family"<br>BBC "Mastermind"<br>"Mastermind" additional General Knowledge<br>Data 1<br>Data 2<br>Data 3<br>Data 4<br>"Mastermind" additional Specialist Knowledge<br>Wine & Food<br>Music<br>Sport & Games<br>Films & TV<br>Books About VIC<br>Learn Programming on the VIC<br>VIC Revealed<br>VIC Programmers Reference Guide<br>VIC Graphics | (AC93B) £19.95<br>(AC94C) £19.95<br>(AC95D) £24.95<br>(AC96E) £24.95<br>(AC97F) £19.95<br>(AC98G) £9.99<br>(AC99H) £9.99<br>(BC00A) £9.99<br>(BC01B) £9.99<br>(BC02C) £9.99<br>(BC03D) £9.99<br>(BC04E) £9.99<br>(BC05F) £9.99<br>(BC07H) £9.99<br>(BC08J) £9.99<br>(BC09K) £9.99<br>(BC10L) £9.99<br>(BC11M) £9.99<br>(BC12N) £9.99<br>(BC13P) £9.99<br>(BC14Q) £9.99<br>(BC15R) £9.99<br>(BC16S) £9.99<br>(BC17T) £9.99<br>(BC18U) £9.99<br>(BC19V) £9.99<br>(BC20W) £9.99<br>(BC21X) £9.99<br>(BC22Y) £2.50<br>(BC23A) £2.50<br>(BC24B) £2.50<br>(BC25C) £2.50<br>(BC26D) £2.50<br>(BC27E) £2.50<br>(BC28F) £2.50<br>(BC29G) £2.50<br>(WA31J) £2.50<br>(WA32K) £10.00<br>(WA33L) £9.95<br>(WA48C) £10.00 |
|---|---|---|---|

Lots of new VIC20 software now available.

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# Is Your Micro Obsolete?

Bad news, I'm afraid. That computer you just bought is obsolescent.

What? You've had it eighteen months? Then it is definitely obsolete.

It is a fact of life these days, and unlike light bulbs, motor cars and certain types of rubber goods, the built-in obsolescence is entirely unintentional.

Take the *VIC-20* as a case in point. The friendly old Commodore has been trying to kill it off for the best part of a year. Connoisseurs of tact and diplomacy still treasure Commodore Market Manager John Baxter's candid revelation to *Marketing Week* that the *VIC* was for the chop – exactly a fortnight after he had introduced it. Fortunately for Baxter's own neck he went on to redeem himself with nine months of astonishingly good sales.

The plain truth is that in micro-electronics, as in other manufacturing industries, long production runs equal lower unit costs – and the ability to float the price down every time demand showed any signs of slackening off.

Yet if the bug my colleague *Inside Trader* has placed in Commodore's bog is to be believed, it is actually costing the company \$35 less to manufacture the much more powerful *Commodore 64*, than it is the *VIC*. And that is despite the – as yet – much lower production runs on the *64*.

The answer has much to do with chip count – the number of chips inside the beast. The more circuits you can pack into a chip, the fewer chips you need. The *VIC-20* had a remarkably low chip count to start with. The *64* is even more compact. The next stage will be the introduction of Very Large Scale Integration (VLSI), which in due course will halve the chip count again, no doubt with further improvements to the cost/performance ratio.

This is all very nice, of course, especially the bit about prices drifting downwards. But it does mean that the product life of a particular model is becoming shorter and shorter.

Commodore's first product, the *8K PET* lasted about four years, with only cosmetic

changes. Its successor, the big screen *SuperPET* about three, and – since we are in the guessing business – it looks as if the *VIC-20* might just touch its second birthday before expiring. You would encounter a not dissimilar picture if you analysed other brands.

Does all this obsolescence matter? Until recently I would have said not. But now that we are moving into an era in which a product may not remain current – and therefore fully supported with software and peripherals – for even a year it is all getting a bit scary.

Consider also the cost of software, which, contrary to prediction, is actually increasing (by which I mean that although individual packages may be less expensive, we are buying more of them in a given time frame). What an astonishing waste if one has to throw it all away every time one changes computers! The thought of re-keying all your data doesn't even bear thinking about...

Fortunately the situation may not be quite as bleak as I have painted it. Responsible software

developers, like Digital Research and Peachtree, are working hard to maintain consistent procedures and data formats. So when you do have to upgrade your applications programs, the data doesn't have to be typed in afresh and your staff retrained.

A further note of encouragement has been sounded by VisiCorp, whose President, Terry Opdendyk, told me last month that they would offer full trade-in of earlier versions of their software against their new *VisiON* range.

I think we have to accept that hardware obsolescence cannot be guarded against, although buying a system with a big user base can mitigate its worst effects. As for software obsolescence, I really see no reason why it should not be put off more or less indefinitely.

*John Baxter, Marketing Manager for Commodore who proclaimed the VIC-20 dead and then went on to sell 100,000 of them!*



## Interruptable Interrupt

Did you know that with many business programs you can't stop in the middle of making a series of data entries? This can be a particular problem with payroll packages, where weekly data for a couple of hundred employees may have to be entered – which can mean a very long job for the operator.

It's a problem that Landsoft seem to have solved with their new Payroll II package. The secret is a special 'interrupt' which enables you to close the system down in the middle of a

pay run, simply by pressing two keys. When the Pay Run program is reloaded, it automatically jumps to the point where the interruption was made and entries can then be continued.

A small point, perhaps, but good idea nonetheless.

Payroll II runs on the Commodore 8000 and 700 series microcomputers and cost £375 plus VAT. Details from Landsoft at 28 Sheen Lane, London SW14 8LW. (Tel: 01-878 7044).

## Atari into Vic will go

The Editor's advice to buy an Atari microcomputer rather than a Commodore VIC if you are seriously interested in video games was not well received in all quarters, chateau Commodore being one of them.

Yet there can't be much doubt that the cartridge games software available for the Atari *Video game* is the best of the lot. VIC owners will therefore be intrigued by news of an interface which, it is claimed, will allow cartridges designed for the Atari games consoles to

be plugged into, and played back on the VIC-20.

The Editor, it should be said, is deeply sceptical about this, and offers various incomprehensibly technical arguments about video circuitry to support his view that it cannot possibly work.

But if it did... Well, you might just want to write to Cardcoluc at 3135 Bayberry, Wichita, Kansas 67226 for details.

The US price incidentally is \$89.95 – which is about £60.



## Video Interface

According to the latest pop punditry you are four times more likely to own or buy a video recorder if you have already purchased a personal computer. So you may like to know that I've just come across a simply splendid video magazine that is actually published in the form of a video cassette.

Jessica says I should qualify that by adding that it is splendid if you are a movie buff, since the 'magazine' is called *Movie* and consists of clips from old classics as well as the latest releases.

Assuming that there are some computer freaks who are also movie buffs and video fiends, let me add that it is introduced by the excellent David Castell, albeit a little uncritically.

But then you can imagine the sort of problems they must have had persuading the film companies (*widely* noted for the breadth of their imagination) to release those clips. And some of them are priceless.

Castell induces criminal-turned-journalist, John McVicar to review the eponymous biographical film starring Roger Daltry, which he does with muted enthusiasm and surprising candour: "In the two years since Daltry made 'McVicar' no new roles have come his way - but he still rides round in a red Ferrari..." You can almost hear the boot going in.

Other golden moments I shall treasure include a splendidly shlocky clip from 'Attack of the Killer Tomatoes', Sir Freddie Laker's review of 'Airplane' and Clint Eastwood singing.

Movie is available from most video shops, price £20 on Beta or VHS cassette.

# Vital Statistics



Ken Baker - chief beneficiary of the IT82 campaign.

Was I.T. year a success? Yes, according to the I.T. people who have been brandishing a report by the MORI opinion Pollsters.

According to this 62%, of the population have now heard of Information Technology, compared to 17% last year.

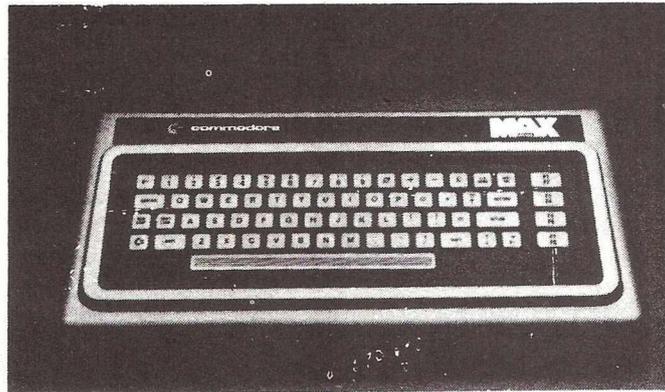
63% of Trades Unionists interviewed concurred with the suggestion that the government should spend more on promoting Information Technology.

99.9% of people interviewed had seen a photograph of Kenneth Baker.

## Mr. Watson

*"It's all very well you telling us what American manufacturers had on display in Las Vegas," writes Mr. John Watson about*

*my COMDEX report, "but what we really need to know is what they are going to release here in the next few months."*



The Max - no nearer than when it was announced a year ago.

Quite so, Mr. Watson (or is it Dr. Watson?), and believe me I would if I knew.

The Editor, perhaps as a result of having worked for Commodore at one stage in his immensely chequered career, has verboten speculation about computers that are unavailable, or unlikely to become available within a very short span of time. The reason will be apparent to anyone who have ever sent off a cheque and then faced a lengthy wait for the system of his dreams.

The other problem is that half the time the manufacturers don't know either. It's almost a year since the *Max* was announced with great fanfare and it's still no more than a glimmer in the Commodore's eye, at least as far as one can tell. Come to think of it, not everything that appeared at last year's COMDEX made it to market.

Nope. I think it is best if we stick to reporting the facts, Mr. Watson. But thanks for writing all the same.

P.S. My colleague Tommy, says that one of his golden rules is 'never buy a new computer'. What he means is, don't buy one that's newly announced; it's bound to suffer from bugs that will be corrected on subsequent batches. Sound advice, I think, tempting though it is to want to be first kid on the block with LISA.

## Crystal Ball Shock Horror

The Gypsy fortune teller is not dead. The aged crone lives on at International Resource Development Inc., Norwalk, Connecticut.

Cross her palm with silver and the sooth saying seer will peer into her crystal ball, pausing only to adjust the brilliance control, before delivering herself of the traditional clairvoyant crystal bollocks.

To wit: "The surge in business

personal computer revenues is expected to reach its peak and taper off to extremely modest levels by 1992."

1992 eh? I shall mark it in my diary.

This and other geomantic gems can be yours for just \$985 (about £600), the price tag of IRD's report entitled 'Vendor Strategies for Personal Computers/Workstations'.

The Gypsy is equally prescient

about the present: "What we are seeing is the absorption of one technology's capabilities into another's. Commodore is right - in the video game field it is now possible to buy a games equipped personal computer (the VIC-20) for virtually the same amount as it costs to buy a games only device."

Clearly the art of augury is not dead.

## Disgusting of Doncaster

Next a familiar question posed by someone who signs himself D. 'Disgusting' Runcible of Doncaster. What Disgusting wants to know is should he consult a micro consultant before committing his company to a micro computer system.

Good question. Micro computer consultants certainly exist; indeed the National Computing Centre in Manchester (tel: 061 228 6333) have a list of approved ones. It would however be unrealistic to expect even the hungriest consultant to do a thorough job of analysing your requirements for less than £500. Which can make a big dent in the £2-4000 most small companies are budgeting.

I'm not saying you shouldn't use a consultant, nonetheless a degree of conventional commercial caution won't come amiss. Consultants have been known to recommend systems in which they have an interest, and it's inevitable with so many systems on the market, the number with which they will be familiar will be limited.

There is really no substitute for educating yourself on the subject. After all, you know more about your business than any outsider can possibly learn in a few days, and you're going to have to learn about microcomputing, come what may.

Having seen how out of date many of the current books are, one can only conclude that the best starting point is the microcomputer press which, like the curate's egg, is good in parts.

Ably assisted by the lissome Jessica and a flagon of ale, I have attempted to construct an instant course in computing from articles in recent issues of *MicroComputer Printout*, and the *How to Buy Your Computer Kit*. It is available from 7A Harpton Parade, Yateley, Camberley, Surrey GU17 7TD. I've even managed to negotiate a special offer worth a third off the normal cost. Do take advantage of it, whether you're buying a home computer or a business system; making the right choice will save a lot of heartache.

## Great Atari Mystery (Part VII)

If you waste your money on other computer magazines you will be reading about how disappointed etc. etc. they are with Atari's new 1200XL computer.

Well we, or rather our tame Atari authority, Terry Hope, did warn you. The 1200 runs a bit faster than the 800, and will sell for a bit more. Industry pundits are busy writing it off as a waste of time. Take the Yankee Group for example. Senior analyst, Clive Smith, describes it as 'A marginally upgraded model 800', adding that 'it is not very aggressive or competitive at all'.

All of which is very odd, especially for a company like Atari. So let me pose a rhetorical question. Is everyone missing the point? Allow me to give you a few hints.

Atari have been buying up property all over Silicon Valley; factories, offices, laboratory sites; you name it, they are buying it. You might think this strange for a company whose US sales backed off sharply last quarter.

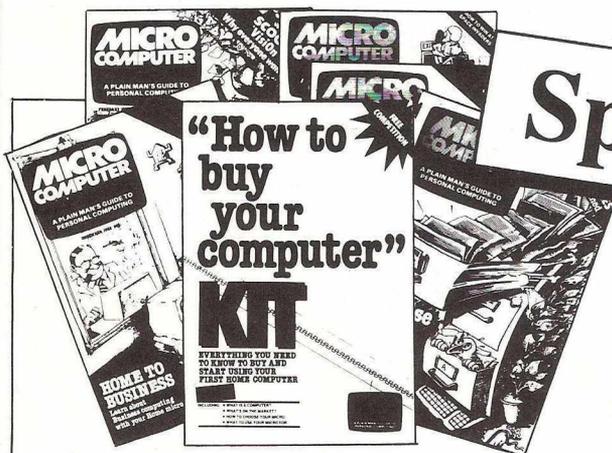
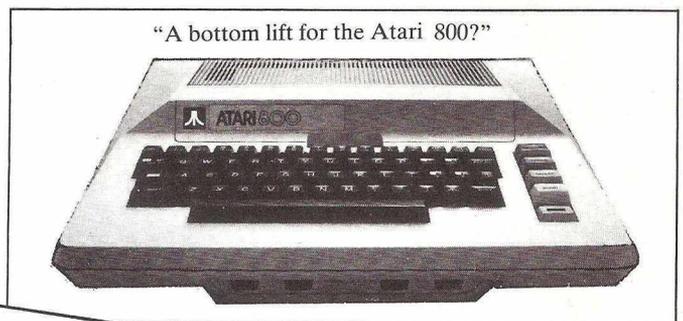
Atari have not introduced a new microcomputer (excluding the 1200) for three years.

The chief scientist at Atari is Alan Kay, creator of the remarkable SmallTalk object oriented language, when he was at Xerox's Palo Alto Research Centre.

Apple's LISA is based on concepts developed at PARC.

There are some very interesting screen developments under way in Silicon Valley...

Nudge, nudge; wink, wink. Say no more.



## Special Offer

### The MicroComputer Printout Teach Yourself Course

The last five issues of *MicroComputer Printout* plus the *How to Buy Your Computer Kit* value £8.20 – yours for £5.50, a saving of a third off the usual price!

Everything you need to know to help you select the right microcomputer, printer and software.

Send your cheque or postal order for £5.50 to Teach Yourself Offer, MicroComputer Printout, 7A Harpton Parade, Yateley, Camberley, Surrey GU17 7TD. Overseas subscribers please add £1 extra to cover postage.

The key topics you will need to know about, all of which are covered in the course are:-

- Which Computer to Choose, (*How to Buy Your Computer Kit*)
- Hardware and Software for Business Applications on a Home Micro (*Jan and Feb 83 issues*)
- Cheap Word Processing (*Feb 83*)
- Databases (*Nov 82*)
- Modelling with Spreadsheets (*Jan 83*)
- and 16-Bit Software (*Feb 83*)

These are the subjects you need to know about – and they're all covered in plain English!

by Julian Allason



# Electronic Male

Essaying around the Prestel system this month opened my bloodshot eyes to the considerable possibilities offered by microcomputer communications. It is not just that I was able to book myself a ridiculously cheap weekend in Spain at a price that brought gasps of disbelief from my travel agent (though come to think of it he is on Prestel too). It was the sheer ease of successfully mastering a subject, in this case air fares and schedules, that had previously baffled me.

Being able to answer back adds another dimension, too. Most Prestel services offer a response page facility, so that having failed to find the current Stock Exchange price of a particular share listed, I was able to send a stropmy note to the Financial Times people asking them how to go about it.

To despatch my complaint, I keyed option No. 9 on their menu to allow me to talk back to them. This produced a screen nicely formatted as a letter, already addressed to them and headed with my name, address,

telephone number and Prestel identity number, so that they could reply to my Mailbox. All that was left for me to do was type in the message.

This I did at about 11 o'clock at night. At 9 a.m. the following morning a polite young man was on the telephone to tell me that I had been looking in the wrong place ...

Well, as you will read a few pages on, Prestel is now accessible to microcomputer users at fairly minimal cost - £50 for the adapter and £1 a week subscription. I think you owe it to yourself to have a demonstration.

## Micro as Postbox

Prestel is of course very far from being the end of the communications story. In fact communications software is available for most microcomputers, although the majority of these packages are intended to facilitate communications with mainframe and minicomputers. The principal is nonetheless the same. Using an acoustic coupler

or a modem you ring up the other computer, or its owner. A brief conversation is conducted by the communications software on each system, this process being known as a handshake, and then you are ready to communicate data. This might take the form of sales or accounting information, or increasingly, electronic mail.

Market researchers with nothing better to do have estimated that one businessman telephoning another has only a one in four chance of reaching him on his first call, which makes electronic mail an attractive proposition, to say the least.

The present volume of electronic mail is not giving the Postmaster General sleepless nights. But maybe he should lay in a stock of sleeping pills, because there is every indication that 1983 will be the year the trickle of electronic messages becomes a torrent.

Already microcomputer manufacturers are building

fact, now that a Teletex standard for transmitting text over the public phone network has been agreed and ratified, it is a racing certainty.

There are actually two Teletex standards being implemented: one running at 1200 bits per second will transmit a closely typed A4 page in about 15 seconds; the other, which is really intended for users of the packet switching network (mostly people who do a lot of computing on very big systems) transmits data at double this speed. British Telecom are chivvying the modem manufacturers to get everyone on to this faster signalling speed.

Dialling up another computer direct over an ordinary telephone line is one way of sending electronic mail, albeit a cumbersome and somewhat expensive method. Prestel's Mailbox facility has the advantage of being no more than a local telephone call away for most of the country but suffers from other limitations chiefly, space and incompatibility, described in the Prestel feature this issue.

A third and more sophisticated alternative is the Prestel Gold scheme operated by Dialcom. (I'll be reporting in detail on this in the next issue, so don't spend any money until then.) This allows any computer or communicating word processor to dial up - usually at local rate - their own electronic mailbox. Apart from being a nationwide system, probably the national system in due course, Dialcom offers the advantage of being able to transmit word processed text, programs, data, or just about anything else in ASCII form (that is how information is stored on tape or disk, unless you happen to be a Sinclair owner).

Electronic messages sent over the Dialcom network can be dispatched to more than one mailbox, useful if you want to send the same memo to several people. Mail can be coded EXPRESS and placed at the top of the recipient's electronic 'pile'; REPLY REQUESTED or DATE ACTIVATED for automatic dispatch at a particular date and time.

There are of course other electronic options, all of which I will be exploring in details next month. See you then.



*In developing Torch's new software-by-phone service the problem was to make the down-loaded software secure. "Otherwise it would have been freely available to anyone else connected to the 'Torchmail' network," says software director Ray Anderson.*

*Torch overcame the problem by employing a scrambler program coded by the customer's credit card number. To order, the customer telephones Torch HQ and quotes the card number against which the cost of the program will be charged.*

*The software is then scrambled and transmitted over the phone to the customer's Torch. The scrambler will only unlock the programs against the customer's credit card number.*

*For more light on the subject contact them at Abberley House, Great Shelford, Cambridge CB2 5LQ. (Tel: 0223-841000).*

modems into their systems, the first of these to receive full British Telecom approval for communication over the telephone lines being the Torch. Torch, incidentally, are just about to launch a software-by-phone service, which will allow owners to order programs from them, and have them downloaded over the telephone. Communications software is so fiddly to use, but so cheap to implement on a chip, that one can expect to see it appearing as a standard item on even relatively inexpensive home computers in the near future. In

# Break a Window Today

Windows are what computer manufacturers try and sell you as a benefit when, what they really mean is that their screen display is inadequate. Word processing, for example, requires at least 60, preferably 80, characters on each line. Most home computers support less than that, obliging the software writers to treat the screen as a window that is scrolled along the line, with the result that you can't read the document you have typed in full, and what you print out won't be what you see on the screen.

The micro manufacturers have resorted to every sort of cunning stratagem to overcome their inadequacies in the screen department. Epson for example on their remarkable HX20 portable allow you to increase the length of a line to no less than 255 characters, using the WIDTH command. But I am afraid the combination of line lengths all went over my head.

Let's see now; the LCD display is 20 characters wide, the built-in printer will print only 16 characters to a line; whilst the separate monitor can display 64 characters, and as we have already noted, the maximum width of what Epson term the 'virtual screen' is no less than 255 characters. It is all very confusing to a bear of little brain.

In fact, like most things to do with computers, you do get the hang of it after studying the manual, which is exceptionally well written. And no doubt future models will incorporate the 80 column by 4 line LCD display that Epson was merrily demonstrating at COMPEC.

Happily there are signs that the penny has dropped with the manufacturers of portable computers, none of whom proffered screens of less than 7" diagonal when they previewed their new offerings to the trade at the recent COMDEX exhibition in Las Vegas. In fact, it's pretty doubtful whether a screen smaller than 8" can ever be satisfactory for word processing. Osborne, whose screen is 5" diagonally, have always argued that you just sit closer; I've never found this convincing because the minimum distance from screen to eyeball is dictated by the depth of the keyboard plus



"Epson's HX20 - great computer but you'll need a separate screen for word processing."

forearm length; on non extra-terrestrials that is at least eighteen inches.

Of course, a higher resolution screen would help, and I was mightily impressed by the 72 pixel to the inch resolution of Xerox's 8010 workstation. This offers resolution of 809 x 1024 pixels, but on a 14" by 11" screen. Micros like the Sirius 1 and Apple's new LISA, sport similar pixel density but on a smaller screen. Xerox currently offer eight different character fonts, some of which remain perfectly legible down to 8 point, which is the size of the typeface used for *Hotline*.

Until a new generation of displays comes along, and solves the problem once and for all, the best interim solution is not beastly windows, but, I submit, higher resolution and smaller characters.

Anyone who says it can't be done should take a close look at the new word processing package Uncle Clive's crew are working on. The standard Spectrum screen format is 40 characters wide. That is not enough for W.P., so they have increased it to 62 characters a line. In software. With no hardware modifications!

P.S. There is one situation in which I would be prepared to settle for windows: one of those multi window screen systems like *VisiON* and *LISA*, although even here I think the answer is to shrink the size of the text down proportionately; otherwise let's forget about windows and have better screens.

## Painless Modelling

Financial modeling is a pain, I find. Useful, yes; accurate, often; but a pain, nonetheless.

One of the chief causes of grief is the length of time it takes to get a sufficiently detailed model up and running on most of the systems. It is true that various American outfits now offer what they infelicitously described as 'prewritten model modules' for *VisiCalc*. But I am not at all sure that Calc programs are really up to corporate modelling.

About a year ago Intelligence UK, the *MicroModeller* people, released a module of their own, called *Decision Modeller*. To oversimplify grossly, the theory was that you could feed in the vital statistics from your balance sheet, the program would convert them to a series of ratios and compare them to a set of 'approved' ratios pre-programmed into the system. It is what management consultants do much of the time, but for one reason or another, *Decision Modeller* never really caught on.

Now, with typical American flamboyance a program called *Bottom Line Strategist* is being hawked around by Pete & Pam Computers. It is any good? I

dunno, but it does seem to overcome the objection I mentioned earlier: according to Peter and Pamela you can be running a pre-written model within 15 minutes. The provenance sounds good too. *Bottom Line Strategist* was developed by Ashton-Tate, the dBase II people.

The stated intention is to provide you with an integrated picture of your business future with no programming, and no formulas (that's American for formulae). You feed in your assumptions about growth, marketing and advertising, costs, pricing, productivity, inflation, depreciation, and the cost of capital. The program tests them, then computes and displays sales and marketing forecasts, financial forecasts, depreciation and tax shelter forecasts, the pay back period, break-even point and the extreme cash flow and net present value.

Clever stuff, no? The price is £275 plus VAT and it runs on Apple, and most systems running CP/M or MSDOS. Details from Pete & Pam at 103 Blegborough Road, London. SW16 (tel: 01-769 1022).



### Beginner's Book

*Get More From Your Personal Computer* (Newnes, limp cover edition) is a case in point, several of the photographs being out of date before the book had even been published. This is a pity since Ian Hickman's handbook is as up to date as any.

Nonetheless one wonders how long it does take the low fellows to bring a title to market, especially when one reads that 'it will doubtless not be long before 16-bit machines appear at the upper end of the home computer market'; Texas Instruments have been flogging one for nigh on three years. This is, however, to quibble with one of the best introductions to the subject that I encountered.

"A minimum of knowledge is assumed," Mr. Hickman says in the cover blurb (blurbs are usually written by the author to avoid the otherwise inevitable cock-up); he is as good as his word. *Everything* is explained. The very first time IBM is mentioned, the initials are immediately translated thus: 'International Business Machines - this American corporation is the largest computer company in the world'. Mr. Hickman is very thorough.

The book certainly exceeds its stated intention of explaining in detail many of the points microcomputer manuals gloss over as too elementary to merit attention. With chapters on BASIC, how a computer works, binary arithmetic, and even machine code, there can be no question about getting ones money's worth. By the time you are finished, you should certainly be on nodding terms with NMOS, familiar with flags, and positively fluent in flow charting.

Although the author suffers the misfortune of being an electronics engineer, a most frustrating occupation by all accounts, he hasn't allowed this to stand in his way; the book is really very readable. What a pity about the apology for an index; that does look as if it were compiled by an engineer.

### Micros For Managers

The problem of information perishability surfaces again in *Managing With Micros* by Colin Lewis (Basil Blackwell, £9.50 hardback). This time the computers in the pictures are obsolescent, rather than obsolete, and Professor Lewis

## Bookworm Turns

The double vision your columnist suffers from these days was acquired in the line of duty, and not, I might add, at P.R. jollies either. No indeed, the bits that dance before my eyes are the result of reading in short order some forty books on different aspects of micro computing.

Alas, most of the titles, worthy as they are, seem to have been conceived in the shadow of that dread edifice they call Computer Studies. For one thing they are almost all very earnest. Most seem content to travel the same well ploughed furrows; no doubt this is a result of paying too much attention to publishers ("Parasites and low fellows, every one", according to Dr. Johnson who seems to have had the misfortune to have received one of the very first rejection slips, thereby establishing a great publishing tradition - his *Dictionary of the English Language* duly remained in print for the next 200 years. His contemporary, Fielding, despite the success of *Tom Jones* was so badly treated by the syndicate of booksellers who then controlled the publishing trade, that he was

*A full list of recommended titles will be sent on receipt of a stamped self-addressed envelope.*

*All of the books mentioned and a wide selection of other titles*

has cannily avoided making unnecessary reference to hardware in his text. Instead this non-technical introduction to the subject, sub-titled 'Management Uses of Microcomputers', concentrates on what the available software is like to use.

There are useful chapters on word processing, electronic work sheets, database management, stock control, ledgers and payroll. Nothing to set the world on fire here, but if you are a manager with a brief to install a microcomputer system running any of these applications, this is the book for you.

### Coy Corner

I'm sorry to say that my next choice was the cause of considerable hilarity in the

obliged to pawn his best coat to obtain the means of dining on tripe at an underground cook shop where he wiped his hands, after the greasy meal, on a Newfoundland dog.)

I do not know whether Messrs. Lewis & Blakeley, perpetrators of *Elements of BASIC* dine on tripe, but there is a distinct aroma of it in their book, published by the National Computing Centre, who ought to know better. Despite superficial pretensions to user-friendliness, this volume, in its parts, downright user-hostile. Of course this could have something to do with the date of its conception; the first edition appeared in 1972 - about the time the first general purpose microprocessors were becoming available.

The BASIC referred to in the title seems to be an early, and rather weedy DEC minicomputer dialect, rather than the Microsoft BASIC which has been the de facto standard for the past five years; needless to say there is nothing in the introduction, and no blurb, to warn you of this.

*are available from Rush Book Service, P O Box 2, Goring, Reading RG8 9LN. Please add 25p per volume postage; postage is free on orders of £10.00 or more.*

office. *Sam's System* by Rosemary Court (Dent, £3.95 hardback) is an introduction for computers intended for children, a point not lost on the vulgarians in the advertising department, whom the Editor had failed to acquaint with my new role as *MicroComputer Prinout's* Literary Critic.

The author has cleverly characterised each of the principal parts of the system. Thus we meet Tak the Terminal, Pandora the Processor, Sid Software, Polly the Printer, and someone called Clarence the COBOL Compiler.

A flavour of the book may be gleaned from the information that Tak the Terminal 'has two little feet dangling over the edge of the desk, two hands folded neatly under the screen' and is exceptionally user friendly. "Hallo, hallo, and what would

you like to know today?" he asks Sam. (The first time I switched a computer on it said '\*\* Commodore BASIC 2.0 \*\*\* READY', leaving me thoroughly mystified; but no matter).

*Sam's System* is endearingly told, well illustrated by Patricia Calderhead, and I would judge suitable for the very young showing the first glimmerings of interest in computers. A word of advice though; keep it away from those of a ribald disposition, unless you are prepared to answer leering enquiries into the precise relationship between Sid Software and Pandora the Processor.

### Buyer Beware

'Caveat emptor' is a motto prospective microcomputer book purchasers would do well to adopt. Having digested so many over the past few weeks one begins to detect a pattern. There are, for example, those books which, whilst technically accurate, fail miserably to communicate their contents; these tend to be written by boffins, often of an engineering persuasion, or lecturers in this or that. The lecturers are, if anything, the less readable.

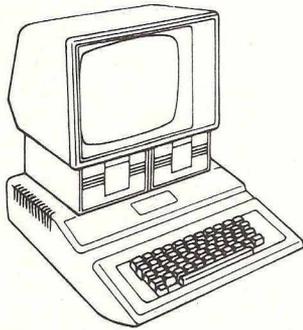
The second type of book is eminently readable, but wildly erroneous. The author will probably have honed his racy style to perfection in previous works of fiction, which may include paperback quickies on Lady Di/The Falklands/Ms. Koo. There will be frequent references to 'micro chips'. Any book referring to 'micro chips' should be round-filed immediately.

All in all, I can't help thinking that one's money is better spent on subscriptions to the better microcomputer magazines, one of which you are already reading. They, at least, have the merit of being up to date (although I suppose in the interests of accuracy one ought to exclude from this observation that otherwise estimable engineering organ, *Practical Computing*, whose lead times are legendary).

There is no doubt that information about microcomputers is a very perishable commodity. According to a parasite and low fellow of my acquaintance, he and his fellow publishers now firmly veto the inclusion of photographs in high-tech tomes for the very reason that it dates them so quickly.

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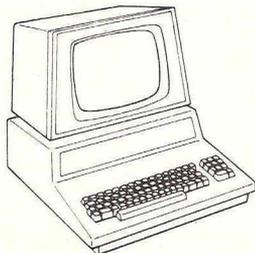
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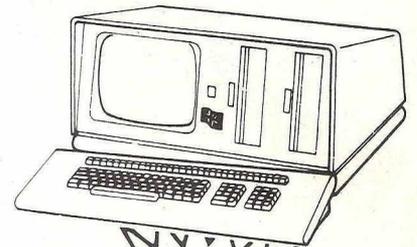
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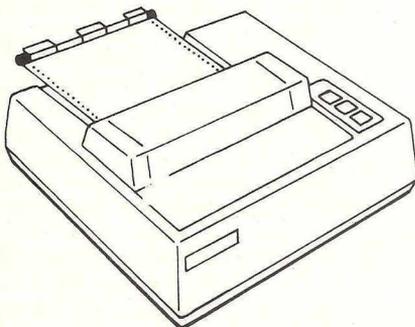


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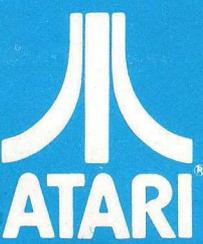
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# IN ANOTHER ATTEMPT TO GET RID OF HIM, 'MICRO COMPUTER PRINTOUT' GIVES TERRY HOPE, SUPER SLEUTH, A DEVILISH ...

# DEADLINE

Richard Pawson perched himself on a corner of my desk. Gazing idly out of the window, he gnawed absent-mindedly on a corner of the bulky file he was holding.

"Hello," he said indistinctly. It wasn't entirely clear whether he was talking to me or an old lady pottering past outside. The window was closed so I winced. The editor of *MicroComputer Printout*, was being friendly to a writer. That wasn't good.

"Hi, Richard," I said, rearranging my wary expression into an amalgam of open boyish innocence and warm affection. His head swivelled round and his eyes widened slightly. "You look funny. What's wrong with your face?" he demanded.

"What's wrong with my face?" I echoed, swiftly issuing new orders to my forehead, eye and cheek muscles. The result was intended to be even more boyish and warm. It must have failed because Richard paled and looked away rapidly.

## A New Mission

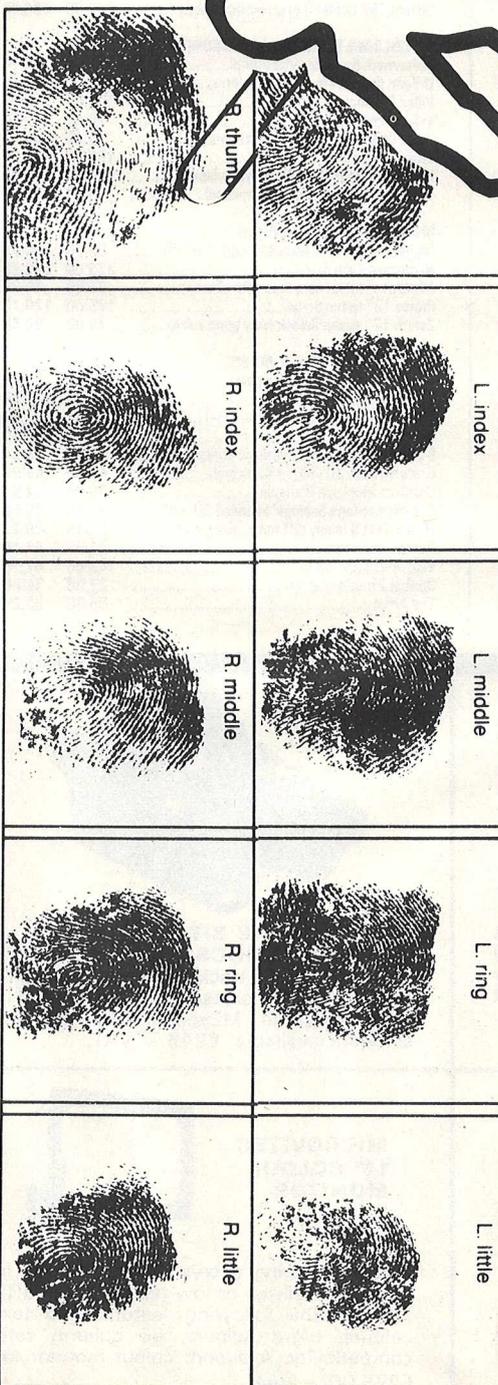
"I have a mission for you," he said into the middle distance. The file he'd been chewing landed on my blotter. This wasn't the first time I'd admired his aim. With an obvious effort he steeled himself and turned to look at me again. Enunciating carefully, he said, "I'd like to get you involved in a murder."

The coffee lady was passing. She saw Richard and began accelerating. She was still gaining speed when I stopped her. She looked uneasily sideways at Richard and inclined her old grey head towards me. You'd never guess she was only 28. That's what this magazine does to people.

"The usual, Terry love?" she whispered uneasily. I nodded. She poured the coffee into the sugar bowl, tried to stir the result without success, and passed it to me. She knows what Richard's visitations usually mean.

With a faint groan which may have come from the trolley or her, she sidled to safety further down the office.

Throughout this, Richard had been absent-mindedly finishing my *Times* crossword. I noticed he was about to fill in



the last clue. I slid the paper from under his pencil rather too quickly and the lead snapped with a noisy crack. "You were saying something about a murder," I said pointedly.

"That last clue's difficult," he said, "very difficult."

"Yes? What is it?" I said suspiciously. Richard turned the paper towards him again. "Um, let's see - yes, here it is - 'overloaded postman'."

"How many letters?" I asked, in spite of myself.

"About ten thousand," he said and cackled so much he fell off my desk.

I waited patiently until he'd wiped the tears from his eyes. "Murder," I prompted gently, thinking it at the same time. "You were saying something about a murder?"

"I was," he said agreeably. "I was also about to finish 26 down before you broke my pencil. And it wasn't 'overloaded postman'." A fresh paroxysm of mirth gripped him.

## Murder By Micro

"However, you're right. If you glance at that file - sorry about the soggy corner - you'll see it's all you need to solve the Robner murder mystery. You'll also see it's a very clever game - if game is the right word - for a microcomputer."

Avoiding the chewed bit, I gingerly turned the file to face me. It was big, bulky and made of heavy reddish-brown card, sealed with a large sticker. In red letters across the seal were the words 'DOCUMENTARY EVIDENCE' and an indication that it covered the case of Marshall Robner who'd apparently died from an overdose of Ebullion.

In my mind's eye I was already packing my Meerscham with shag, preparatory to lighting up and giving Holmesian consideration to the case, when Richard's voice broke in on my thoughts.

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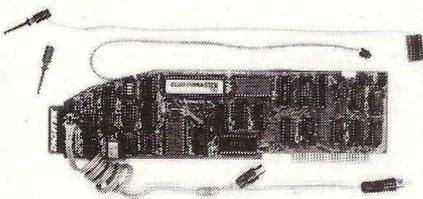
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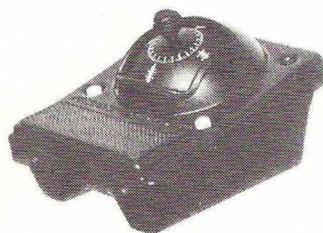
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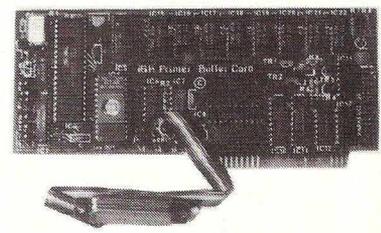
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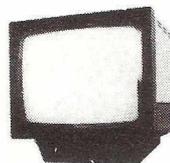
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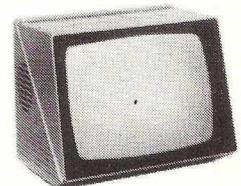


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# DEADLINE

"There's only one snag, Terry. You've got just twelve hours to solve the murder. That's why it's called 'Deadline'. Good luck!"

With that, he unhitched himself from my desk and padded away. His shoulders were shaking and very faintly I could hear, "Overloaded postman...ten thousand letters...heh, heh, heh."

So, my friends, you're now about to read my account of what indeed is a very clever micro 'game' - though 'adventure with a difference' would be a better description.

And if you're the owner of an Atari, Apple, Commodore, CP/M, DEC, IPM PC, NEC or Osborne, you too can become a detective in the fullest meaning of the word, and try to beat 'Deadline'!

## An Introduction

Dennis Wheatley is a name to conjure with in the annals of plain, downright storytelling. His books sold in millions between the Thirties and the Fifties, and they still sell pretty well today. Adventure stories, black magic tales, historical novels - Wheatley was master of them all.

It was in 1936, however, that Dennis Wheatley, together with someone called Joe Links, pioneered an entirely new presentation of crime fiction. Titled 'Murder Off Miami', it may have been the original inspiration for 'crime faction', for the contents seemed closer to fact than make-belief.

Retailing at the astonishing price of three shillings and sixpence - just over 17p today - what the buyer got wasn't a book but a dossier, neatly bound with red ribbon.

The contents were many and varied: newspaper clippings, personal letters, statements, photographs, actual exhibits in cellophane envelopes such as a twist of hair, a piece of bloodstained curtain, some spent matches. The dossier thus contained anything and everything to do with the alleged murder. All the items had been created specially for the 'book' but they all looked like the real thing.

Therein lay the fascination, for the reader was given what the police investigating the 'crime' also had. Armed with this mass of evidence, the challenge was to unmask the murderer. A sealed section at the end provided the answer, either confirming what the reader had rightly deduced or showing where the reader's errors had been.

Not surprisingly, 'Murder Off Miami' sold close to a quarter of a million copies in close on a dozen languages, and was quickly followed early in 1937 by 'Who Killed Robert Prentice?', another dossier in exactly the same style.

Another two followed before the war intervened. The series was never resumed but two or three years ago a reissue of the originals appeared, lovingly recreated in every detail by publishers Webb and Bower.

And I suspect it may have been those reissues which inspired the highly innovative 'Deadline'.

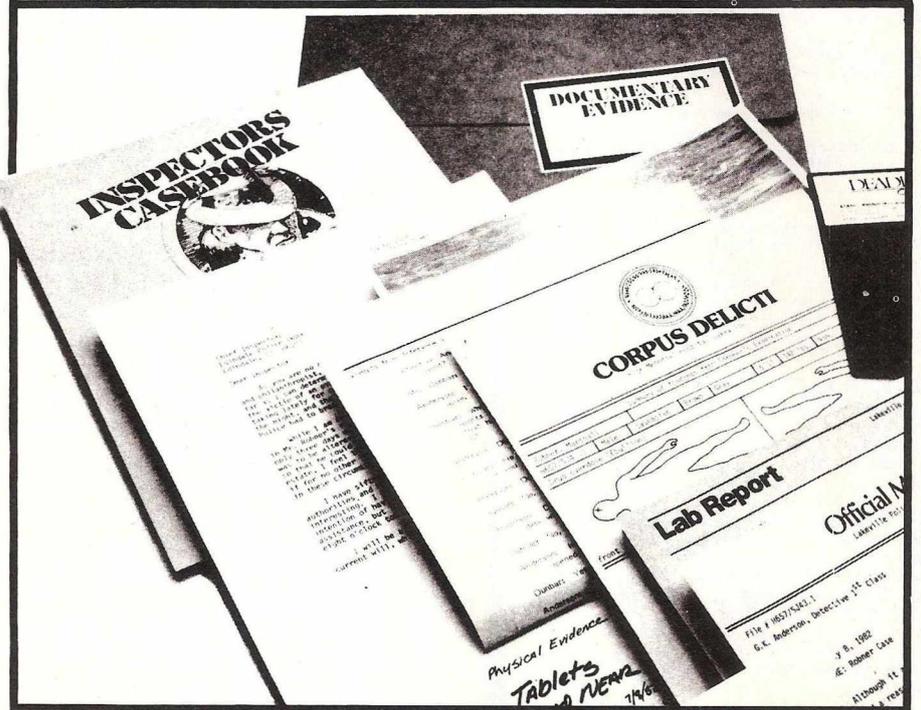
If I'm wrong, my apologies to the authors and Infocom Incorporated, who produce 'Deadline' in their 'Interlogic' series of adventure games. If I'm right, then congratulations for using a computer to add an entirely new dimension to Wheatley's idea.

Just what that new dimension is I'll be coming to shortly!

Coates goes on to say he's arranged with Mrs. Robner (who reluctantly agreed) for you to visit the Robner mansion tomorrow at 8 a.m. and spend the day there.

Coates also helpfully encloses all the papers relevant to the case, and finally tells you he'll be at the house himself at mid-day to read Marshall Robner's last will and testament - he hopes to see you there.

It sounds like an offer you can't refuse!



## The 'Deadline' Dossier

The 'Deadline' dossier contains an enormous amount of material, but going from the top in some sort of logical order, here's what you'll find.

For starters, you quickly discover you're cast as Chief of Detectives for the Police Department in Edindale, Connecticut. How do you know? There's a neatly typed letter addressed to you from Warren Coates of the firm Coates, Shavely and Coates, Attorneys at Law. It's on expensive paper, so they must be a high-class firm!

The letter asks you for your assistance, going on to explain that Marshall Robner, the industrialist and philanthropist, was found dead yesterday in the library of his home. He'd apparently taken an overdose of Ebullion, prescribed for severe depression.

What's worrying Mr. Coates is the fact that Marshall Robner had phoned only three days before his death (suicide? murder?) to say he planned to alter his will.

Though Mr. Coates is far too discreet to put it on paper, the obvious inference worrying Coates is that somebody got to Marshall before the will could be changed. Dirty work indeed!

## The Papers in the Case

The dossier's second item is brief and to the point. It's an official memo from Detective 1st Class Anderson, who's been assigned to the case. He says that, though at least one member of the Robner household had a reason for wishing Marshall Robner dead, the post-mortem findings are consistent only with Robner having died of a self-administered overdose of Ebullion.

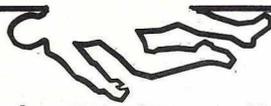
"At least one member of the Robner household had a reason for wishing Marshall Robner dead..." Hmmm. Detective Anderson doesn't say who though.

The dossier also provides you with a laboratory report and a post mortem report.

The former confirms the teacup found near the body contained only tea; no traces of Ebullion. It does mention fingerprints on the cup though. Make a note, Watson.

The post mortem report goes into all sorts of macabre technicalities about blood levels, stomach contents and liver damage, all connected with the Ebullion overdose. Again, hmmm!

The next two items in the dossier are maybe the most fascinating.



One is a large photograph of that part of the library in which the body was found, with the obligatory chalk line outlining the body's position.

The other is a small tightly sealed plastic bag, neatly tagged by the police, containing three Ebullion tablets found near the body. (I'm assured they're actually sugar, but they look like Ebullion should look if it actually existed!)

The final item is a sheaf of papers, neatly stapled together. They're the various statements taken from people connected in some way with the death: Marshall Robner's widow, Mrs. Robner; Ms. Dunbar, Robner's personal secretary; Mr.

usually be returned to you within half an hour or so.

Which brings us to the time element in your investigation, remembering you're up against a 'Deadline'.

### Crime Busting with a Deadline!

After you've loaded the program and begun your investigation, everything you do and every move you make uses up at least one minute, ticked off on a clock prominently displayed on your video screen.

Thus if you call for an analysis or fingerprint comparison, you can continue with

ter will reply, providing you with more information.

Notice that word! They'll provide you with information but what they tell you may not be fact, for one or more of them has every reason to lie! As the ace detective you undoubtedly are, it's up to you to decide which member or members of the Robner household is lying, when and for what reason!

### Trying it Out

At this stage, you might like to see how 'Deadline' actually looks while you're investigating the crime. You'll find examples dotted here and there in this article, and they'll give you a good flavour.

The examples were obtained by using another of the 'Deadline' commands: script. If you've got a printer, this immediately causes a hard-copy printout of everything which appears on the screen. Very useful for us detectives!

In the examples, everything in capital letters is a command or instruction typed in by the player, and everything else is a 'Deadline' reply.

You'll notice the way that you, as the detective, can type in pretty long instructions. You're certainly not limited to two word commands as in many other 'adventure' games.

You'll also notice the extensive descriptions which 'Deadline' often gives you in reply, whether of the surroundings or a verbatim reply one of the characters.

For instance, when you arrive at the front door of the Robner mansion, you don't tersely say KNOCK DOOR. Nothing so crude! KNOCK ON THE DOOR is far more polished, and you could even have said KNOCK ON THE DOOR AND WAIT if you'd wanted!

A bit later on, when you go into the library - the scene of the murder, or so it would seem - you're provided with a 208 word description of the room and its contents!

You may well ask how 208 words are going to fit on your screen. The answer's simple and entirely in keeping with the 'Deadline' polish. Your computer puts as many words as possible on view and waits for you to hit RETURN. Then it continues with the next batch of information!

Doubtless you'll also notice the inspired move to examine the contents of the wastepaper basket and the command to Sgt. Duffy to get that white powdery substance analysed (sorry, I'm not telling you what the analysis result was - you get your own analyses done!).

The other example covers our first brush with George Robner, ne'er do well son of Marshall Robner, the deceased.

Apart from George's terseness (he majored in rudeness at Yale, I understand), you'll see again the ability to phrase questions to George in a number of different ways. You may also pick up a clue or two from some other things in the excerpt!

**Official Memo**  
Lakeville, CT Police Department

File # H657/S483.1  
G.K. Anderson, Detective 1st Class

July 8, 1982  
RE: Robner Case

Although it appears that at least one member of the Robner household had a reason for wishing Mr. Robner dead, the findings of the Medical Examiner and evidence gained from interviews with the family and family associates are only consistent with the conclusion that Mr. Robner died of a self-administered overdose of Ebullion.

*G.K. Anderson*  
G.K. Anderson

**CORPUS DELICTI**  
Union Memorial Hospital, Lakeville, CT

Summary of findings from Coroner's Examination

Robner, Marshall	H657/S483.1
Male	Caucasian
Brown	Gray
5'11"	150 lbs
Blue	None

Drug overdose (Ebullion)

Front

There were no injuries or marks of a suspicious nature, except a small mark on the left temple (consistent with falling to the floor from a chair).

Analysis of the blood of the deceased revealed a blood level of 27 mg of Ebullion. The therapeutic range of this drug is normally 4 to 8 mg per fatal dose, while not specified by the manufacturer, has been reported to be in the 10-20mg range. A routine analysis for other common drugs was unproductive.

Findings were unremarkable except for passive liver damage consistent with overdose of Ebullion, and 10mg of Ebullion recovered from the stomach. Death occurred at 1 AM, plus or minus one hour.

The blood level of Ebullion and the passive liver damage combined with Ebullion toxicity lead to the inevitable conclusion that this was the result of an overdose of that drug.

*James A. Haskins, M.D.*  
Medical Examiner

**Lab Report**  
Lakeville, CT Police Department

Case: Robner, Marshall  
File #: H657/S483.1  
Officer of Record: Detective G.K. Anderson

Mark(s) analyzed: Porcelain teacup  
Analyzed for: Fingerprints, foreign substances  
Date: 7/8/82  
Laboratory findings:

The teacup was analyzed. The cup contained tea only. No trace of Ebullion or other substances was found. Fingerprints on the cup belonged to the deceased and Ms. Dunbar.

*James A. Haskins*  
Chief Examiner  
Lakeville, CT Police Laboratory

Baxter, his business partner; George Robner, the deceased's rather unpleasant son; and Mrs. Rourke, the lovable Irish housekeeper.

### Two Disks and a Detection Guide

Rounding out the dossier's contents are two separate and different computer program disks and your own personal guide to solving murders by computer - your computer! Not surprisingly, the latter is labelled 'Inspector's Casebook'!

It's this which explains - humorously, succinctly, lucidly and helpfully - everything you need to know to transform yourself into an ace 'Deadline' detective. It bears reading carefully, not once but several times.

It tells you, for instance, how you can at any time call for a police laboratory analysis of anything you find as you tour the Robner mansion. Similarly, by using the same facilities you can compare fingerprints on any object with the fingerprints of any of the main characters.

You won't get your analysis or fingerprint comparison immediately, of course. Police laboratories don't work at the speed of light! The results will, however,

your investigation and roughly half an hour later on your display clock, the results will arrive.

All this legwork is carried out by an amiable character called Sgt. Duffy. He hovers close by as you brilliantly dissect the crime, scuttling away on errands to the laboratory whenever you require, and hurrying back with the results as soon as they're ready.

You can go anywhere you like in the mansion; look at anything you like; and talk to anyone you like.

It's in these aspects of analysis and questioning that 'Deadline' acquires a unique advantage and a whole new dimension over the hugely successful Wheatley crime dossiers.

In those, you had the evidence and the facts concerning the main characters, but there was no way to examine or analyse the evidence, or ask any of the characters to amplify the facts you had in front of you.

In 'Deadline', things are very different. You can have anything you want analysed and you can talk to the main characters. They'll answer your questions, what they say appearing verbatim on your screen.

Within reason you can ask any questions you like and each and every charac-

# DEADLINE

## >KNOCK ON THE FRONT DOOR

You hear footsteps inside the house. Mrs. Robner, dressed in black, opens the door and greets you.

"Hello," she says, "I am Mrs. Robner. Please come in. I'm afraid I really can't be of much help to you. This is surely all a terrible waste of time, and not a little upsetting, having all these police marching around your house. This has been a very trying time, as I suppose you can understand. As I said to Mr. Coates and that other detective, you may look around here, but you must be out by 8 o'clock at the latest... Oh, I almost forgot. Mr. Coates will be reading my husband's will at noon in the living room. You may attend if you wish." Mrs. Robner leads you into the house and closes the door behind you.

## Foyer

This is the foyer of the Robner house. It is beautifully appointed with a fine crystal chandelier on the ceiling, marble floors, and a large marble-topped table. The front door, to the south, is closed. To the north the foyer continues.

"I'm going to make myself some breakfast now. I'll be in the house all day if you need anything. I'll do what I can to help. Good day!" Mrs. Robner heads off to the north.

## >HEY, MRS ROBNER!

Mrs. Robner stops and turns toward you.

## >WALK NORTH

### North of Foyer

This is an inside hallway north of the foyer. To the north is another hallway, to the west is an open doorway, and to the east is the foot of a staircase going up to the second floor.

Mrs. Robner is here.

## >MRS ROBNER, TELL ME ABOUT THE MURDER

"That's odd. That you should say murder, I mean. Surely you don't suspect foul play, Inspector. My husband was devoted to his business, and its decline led him to take his life. The whole affair is tragic enough without your melodramatic insinuations."

Mrs. Robner starts to move about distractedly.

**These examples from the game Deadline were produced on the printer using the SCRIPT Command. Note the flexibility of instructions, and detail of the replies. Deadline's authors (right) are already known as the authors of the Zork adventure games.**

## >GO INTO THE LIBRARY

### Library

This is the library in which Mr. Robner was found dead. It is decorated in a simple but comfortable style. Mr. Robner obviously spent a great deal of time here. A large executive desk is in front of the large balcony window, which lies at the north of the room. A telephone is sitting on the desk. The east side of the room is composed of three large bookshelf units in which are numerous volumes covering a wide range of interests. The floor is covered with wall-to-wall carpeting. The massive oak door which blocked the only entrance to the room has been forcibly knocked off its hinges and is lying by the doorway.

Beside the desk is a large collapsible tray.

Sitting on the tray is a bowl containing a white powdery substance. Lying on the floor, overturned, is a beautiful saucer.

Turned onto its side, lying on the floor, is a beautiful teacup.

Lying atop the desk is a pad of white note paper.

A pencil is lying on the floor near the desk.

A desk calendar is here, open to July 7.

There is a bottle of Ebullion here.

There is a wastepaper basket here.

The wastepaper basket contains:

A bunch of crumpled papers

## >EXAMINE THE CRUMPLED PAPERS

There are few crumpled pieces of paper. One is a shopping list. Another is a note regarding the current prices of common stocks. The last is the start of a letter addressed to the Board of Directors of Robner Corp. Unfortunately, it does not contain enough information to even hazard a guess about the intent of the letter.

## >ANALYSE THE WHITE POWDERY SUBSTANCE

Sergeant Duffy walks up to you as quietly as a mouse. He takes the sugar bowl from you. "I'll return soon with the results," he says, and leaves as silently as he entered.

## >KNOCK ON THE DOOR

A muffled voice says, "Come in!"

## >OPEN THE DOOR AND GO SOUTH

The bedroom door is now open.

## George's Bedroom

This is George's bedroom. In addition to the usual furnishings, there is a small liquor cabinet, and a stereo with records and tapes (ranging to an odd mixture of classical music and new-wave rock). The door to the upstairs hall is open. Another door, to the east, is open.

George is sitting on his bed, deep in thought.

## >GEORGE, TELL ME ABOUT THE MURDER?

"My father killed himself, as even you can plainly see. Please leave me alone."

## >TELL ME ABOUT YOUR FATHER?

(said to George)

"Like I told your detective friend yesterday, we didn't get along too well. He always was riding me, giving me a hard time." George seems to get agitated talking about it. "Look, man. I'm not going to lie to you and tell you I loved him, right? He got what..." He stops in mid-sentence.

## >TELL ME ABOUT YOUR MOTHER?

(said to George)

"She's OK. Not as stuck up as Dad about money. We've always gotten along pretty well. I think she understands me better than Dad ever did."

## >WHAT ABOUT MS DUNBAR?

(said to George)

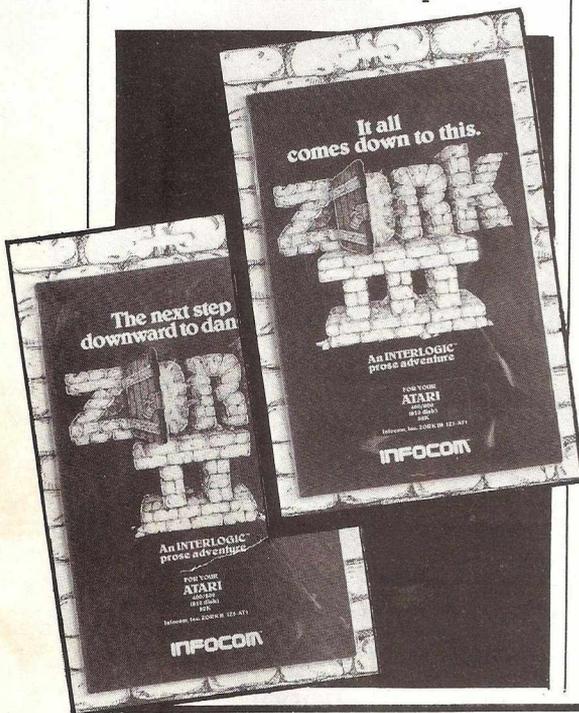
"She's been here for about ten years, I guess. She knows a lot about Dad's business, and he lets her take care of a lot of stuff by herself. Other than that, I can't say. We don't get in each other's way. I think she's heard Dad lecture me too often."

## Peppered with Features

We've already noted that 'Deadline' is an adventure game with differences, but those differences and added features are so pronounced as to put 'Deadline' into a genre all of its own.

For instance, everything takes place in or around the Robner mansion and grounds which exist within a definable area.

Mind you, a plan of the mansion and the grounds is a virtual 'must' to allow the investigation to proceed smoothly. There's no plan in the dossier so you either need to draw one as you nose around the mansion, or get one ready made and highly detailed from the UK Zork Users' Group.



(‘Deadline’ comes from the same US corporation which produces the Zork adventures. The Users’ Groups aren’t connected with them but produce maps and other aids for the games. The UK Zork Users’ Group can be reached at P O Box 12, Waterlooville, Hampshire. PO8 0UD.)

We’ve already mentioned your ability to question everyone involved. You should know, however, that the answers you get may not only be truth or lies – they’ll also vary according to the time and place at which you ask, and what other events may have preceded them! There’s sophistication for you!

We’ve also mentioned your ability to get things analysed and fingerprints compared. Added to that is your ability to show things you find to any of the characters in order to see what reaction (or studied lack of it) you may get.

One feature not listed so far is the opportunity open to you to ‘wait’. You can ‘wait’ for any specified period at any time anywhere inside or outside the house. The on-screen clock ticks remorselessly on while you’re doing this, of course.

What’s the point? Well, one difficulty in reviewing this remarkable ‘game’ is a determination to avoid giving too much away. You wouldn’t thank us if I did anything to help you unmask the criminal(s)!

## Wait, Watch, Arrest!

Sufficient therefore to say that ‘waiting’ lets you observe things happening. If anything especially significant occurs, you’re given the opportunity to keep on waiting or not, just as you choose. Further than that, I’m not saying another word!

Eventually there should come a point

when you think you’ve enough evidence to make an arrest. If ‘Deadline’ agrees with you, you’ll be allowed to arrest one or more people. The indefatigable Sgt. Duffy will handcuff him, her or them and you’ll be told how the grand jury indictment went.

If the grand jury felt you’d got enough evidence, there’ll be a trial and you’ll learn how that went too. Hopefully you’ll get a conviction. If you don’t, you’ll learn why not. And maybe have to start all over again, either on the case or back on the beat!

How did Terry Hope, Camberley’s answer to Dick Tracy, make out with the case?

I went over Infocom’s estimated 20 hours for the investigation by about 50% and wasn’t entirely accurate with my first answer. There was just this teensy-weensy bit of evidence I’d missed, you see.

Not that ‘Deadline’ told me what it was – it simply reported the grand jury wasn’t willing to indict and asked me if I’d like to move fast and come up with something to make a slightly better case.

Opening a new bottle of aspirin and putting the coffee percolator on for the 38th time, I found the one thing which (curse it) had been staring me in the face all the time. And the villain (villains) got his (her/their) just desserts!

## Summary

‘Deadline’ costs rather more than the usual run of ‘games’ for microcomputers, but in my opinion it represents a heck of a lot more value.

As I’ve noted above, it comes with an enormous amount of back-up material, all of which is vital to the investigation you’re called on to perform.

It also, of course, comes with not one but two separate disks, each of which again plays a very special part in the whole.

Perhaps best of all, ‘Deadline’ is polished, literate, witty, and beautifully produced in every respect. Right from the word ‘go’, when you open your dossier, the quality and loving care with which it’s been put together is very, very obvious.

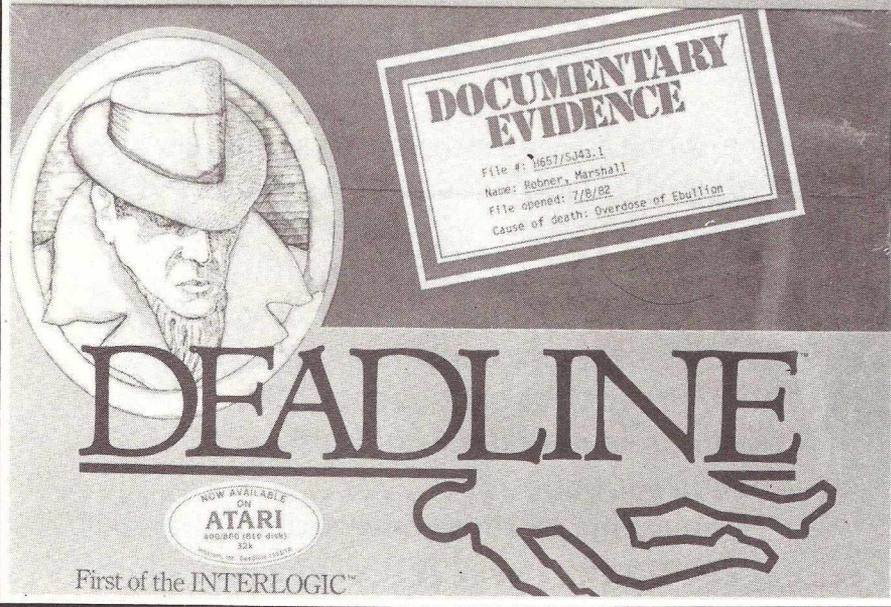
‘Deadline’ is emphatically NOT an arcade game (though don’t get me wrong; I love them too). Instead, it’s a genuine mind exercise, but in a fairly gentle sense; genius level IQs aren’t required!

And you don’t have to be a fan of crime novels to appreciate and enjoy it either. The characters in ‘Deadline’ come across as pretty real people, and each of them has a positive – if sometimes nasty! – personality.

It’s got a very generous share of little tricks, traps and hidden byways (hint!), most of which you’ll kick yourself for not seeing or finding (another hint!) should you happen to miss them first, second or third time round.

In short, I liked it and I think you will too!

A LOCKED DOOR. A DEAD MAN.  
And 12 Hours to solve the murder.



# PROGRAMMING

If you're thinking of buying a home computer, then you'll probably also be interested in learning to program. If so then the new Commodore 64 is the ideal machine – at just £299.\*

Because quite apart from the vast range of off-the-shelf programs we can supply (unlike other home computers, the Commodore 64 can run a small business with Word Processing, Spreadsheets and Database), the '64 contains a whole list of features that make programming both fun and easy.

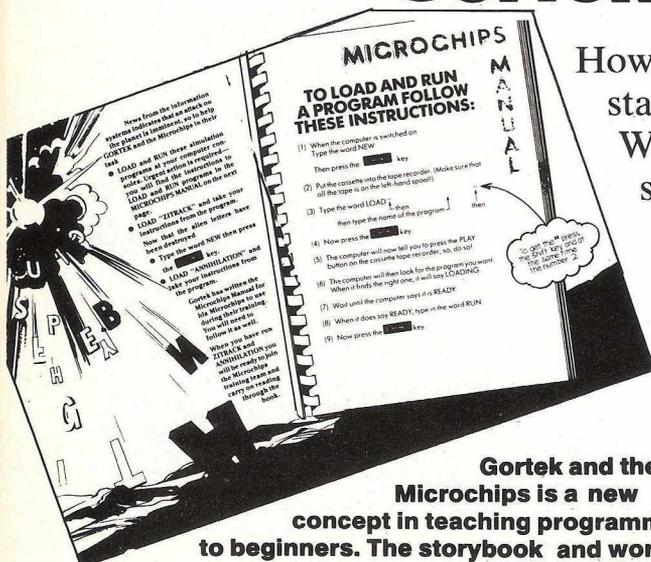
Like our unique graphics-handling functions, that let you draw objects and then move them around at will. And a sound synthesiser that can imitate different musical instruments – much better than the usual bleeps and squawks. And with 64K of memory, you'll be hard pressed to overstretch our computer!

But at Commodore, we know that home computing means more than just clever specifications. Remember that we invented the PET computer over six years ago, and our VIC-20 is now the world's best selling micro (over a million to be precise). That's why we've put so much effort into developing plug-in peripherals, ready to run applications programs, tools and books to support the '64. We'll gladly send you details if you're interested, but here's a couple that we're particularly proud of:-



The new Commodore 64 can be used both at home and in business. The best sound and colour graphics are combined with a massive memory, and the full range of peripherals are immediately available.

## Gortek and the Microchips

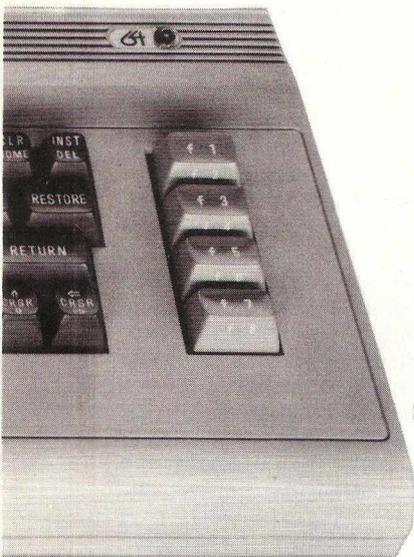


How do you teach programming to someone who starts off with no knowledge of computers at all? We think we've found the answer – it's a sort of science fiction storybook, beautifully illustrated in full colour, and it comes with a cassette full of example programs referred to in the text. It costs just £12.95; we were so impressed that we commissioned a version for our VIC-20, too.

Funny thing is: though we wrote it for kids, it seems to appeal just as much to adults!

**Gortek and the Microchips is a new concept in teaching programming to beginners. The storybook and worked examples appeal to both kids and adults.**

# MADE EASY!



## Simon's BASIC

This is for people at the other end of the scale: experienced home programmers who just can't get their creative ideas into code fast enough! Frankly, without a '64 and Simon's BASIC, you simply aren't properly equipped. Here's why.

The cartridge adds 114 commands to BASIC. Commands that handle graphics, Commands for music, Commands for program debugging and security, Commands for structured programming and mathematics, the list goes on.... Commands that you just don't find on other people's BASICs. And all for £50.

With Simon's BASIC, programming becomes both a joy and a cinch.

But if you're not considering a '64, avoid Simon's BASIC like the plague. Because once you've used it, you won't be satisfied with anything less.

**LASH...FILL...MOVE...  
DESIGN...REPEAT...UN  
MUSIC...ENVELOPE...C  
LOCAL...GLOBAL...SEC  
AINT...CIRCLE...FIND  
LOT...TRACE...WAVE...**

These are just some of the 114 English-like commands which Simon's BASIC adds to the Commodore 64, each one replacing whole sections of conventional code.

# commodore

Please rush me extra information on:-

- The Commodore 64 computer that can be used at home or in business.
- Gortek and the Microchips - for newcomers to programming.
- Simon's BASIC - the programmer's dream come true!

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The Commodore Information Centre, 675 Ajax Avenue, SLOUGH, Berkshire. SL1 4BG.

Telephone (0753) 79292

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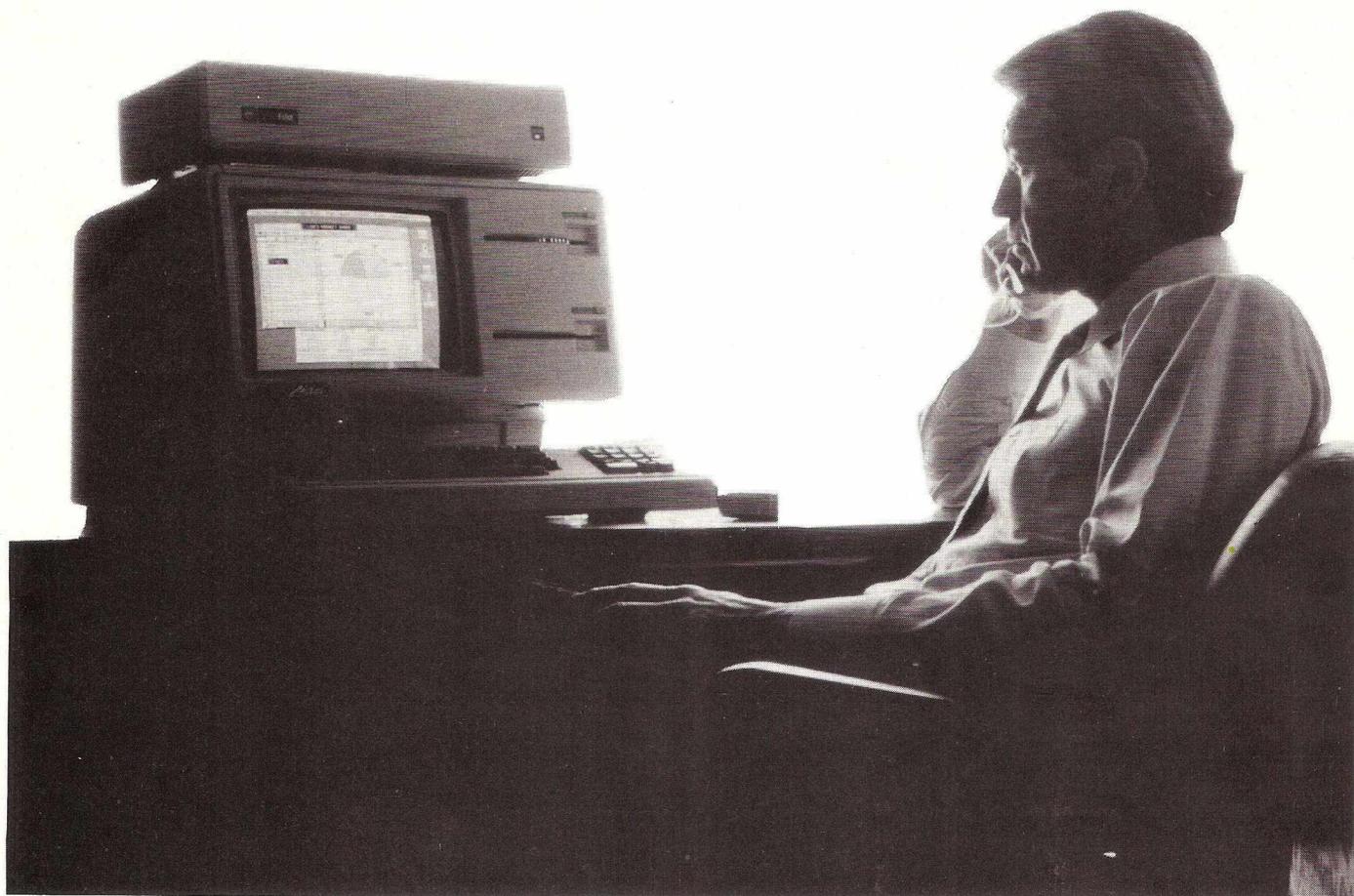
\* excl. VAT. Details correct at time of going to press.

The unveiling of Apple's new LISA (to be available here later this year) will probably go down as a turning point in the history of microcomputing.

Aimed at the office market, LISA completely mimics the way in which you work. Competing manufacturers are now scrambling to catch up, because....

# APPLE'S LISA

MAKES OTHER MICROS OBSOLETE



Last month a mouse roared – and the microcomputer industry picked up its skirts and ran. The mouse's release was part of the launch of Apple's new *LISA* personal computer, which received a rapturous reception at the *Which Computer? Show*.

The key to *LISA*'s success is the small electro-mechanical rodent, which when rolled across the surface of a desk top causes a pointer on the screen to move in the corresponding direction. By using the button on the mouse's back, all the normal program functions can be selected. As a result, use of the keyboard is kept to a minimum, making the system much easier to use for non-typists and those without prior computer experience.

The arrival of what Apple are billing as *The User Friendly* computer has raised the spectre of obsolescence amongst dealers in other systems. One competing manufacturer received over twenty calls from retailers anxious to know when they would be able to offer a similar product. That concern is not altogether ill-founded.

"How many people will want to buy a computer that takes twenty hours to learn how to use, when *LISA* will take them only twenty minutes?" asks Peter Cobb, managing director of Apple UK. It is a question that Apple, with two other computers of their own to sell, have had to ask themselves. Their conclusion is mirrored in the price, expected to be in the region of £7,500 when deliveries begin in the Summer. Design engineers think that the system could easily have been built to retail for half as much.

This is not to say that *LISA* will be poor value for money. On the contrary, I believe it to be the most cost productive microcomputer yet to appear. The truth is that with software having outstripped hardware development costs by a factor of five to one, Apple could have justified almost any price up to the £11,000 cost of *LISA*'s only real competitor, the *Xerox 8010* workstation.

Specifically intended for the office market – previous Apple models have been bought by small businessmen, scientific users and hobbyists – *LISA* is characterised by its ability to

emulate normal work processes. The screen is used to represent a desktop; on it different documents can be created, moved around, overlapped even, and worked upon. Thanks to the incorporation of the celebrated mouse, recourse to the keyboard is relatively rare. This could prove the critical factor with executives who, for status and other reasons have traditionally shown great reluctance to exercise their typing fingers.

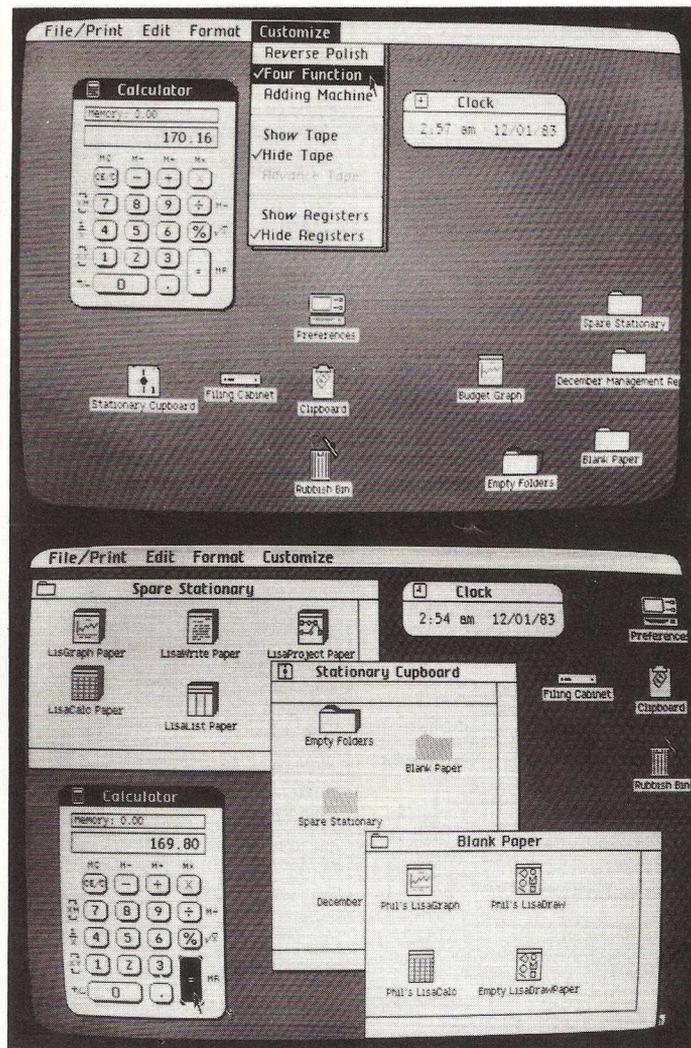
*LISA*'s success is critical to Apple. Although the company's original product, the Apple II (no-one except Guy Kewney remembers what happened to Apple I), now five years old, has achieved VW Beetle-like status in the sales league, its successor's launch turned into an embarrassing nose dive. This was duly followed by the

sacking of forty employees held responsible, and then the President. Latterly, under the more professional leadership of one Mike Markkula, the company has turned in improved figures. Characteristically though, it soldiers on with the ridiculed Apple III, determined to erase the strain on its escutcheon.

It is hard to argue with sales up 74% to \$583m and earnings up 56% to \$61m for fiscal '82. And right now no-one is arguing, least of all the market which has put a value of \$1.7 billion on the company. According to chairman, Steve Jobs, more than 300 employees have benefitted too, and now enjoy the ultimate California accolade of millionairehood.

Jobs was one of the original two garagistes responsible for the Apple II, effectively America's first personal computer; the other was Steve

*LISA's screen mimics your desktop, with symbols for every kind of work that you do. Note the rubbish bin – it is impossible to lose anything you have without filing it in the bin. When a function such as the calculator or clock are selected they are automatically blown up larger.*



*Individual applications can be drawn to any size required and can also overlap. Programs are no longer loaded and saved. Instead, to do a spreadsheet application, you simply 'tear off' a sheet of Lisacalc paper.*

Wozniak, a man who *Time* magazine described as 'the kind of guy who can see a sonnet in a circuit'. Wozniak beheld beauty, Jobs perceived a profit to be made. Seven years on, Steven Wozniak has retired to attend University in heavy disguise, and to promote rock concerts.

Meanwhile Jobs, whose career had begun as Atari's fortieth employee, and who had dabbled extensively in the mysticism and drugs that were – and are – so much part of West Coast life, holds autocratic sway in Cupertino, the Apple company town. At 27 years of age his personal worth is put in excess of \$200m. A friend of the State's Governor, Jerry Brown, with whom he shares an interest in Zen, he is said to nurse political ambitions of his own.

That *LISA* was his baby is not in doubt, although Jobs generously gives the credit to John Crouch, vice-president of the Personal Office division. In fact *LISA* is his baby literally, that being the name of the child the district court recently adjudged him 94.1% likely to have been responsible for the paternity of. The official corporate line is that *LISA* stands for Locally Integrated Software Architecture. Why not Apple IV? "*LISA* is more, ah, user-friendly," asserts the spokesman.

Acronymic arguments should not obscure *LISA* provenance, for which Apple are prepared to give credit to Stanford University, alma mater of the aforementioned V-P, John Crouch. Others think some of the distinction belongs a mile or two further south, at Xerox's Palo Alto Research Centre. It was here through the seventies that an extraordinarily gifted group of computer people developed many of the concepts that underlie Apple's new offering.

It would, however, be unjust to dismiss the work that Apple's own software boffins have put in to develop those concepts. Many millions of dollars and over 300 man-made years of effort went into their realization as a desktop computer. And where as Xerox have chosen to regard the machine they developed as a work station in their *Ethernet* network, Apple make no bones about the fact that *LISA* is a stand alone system, in short a *personal*



Central to the operation of LISA is the movable mouse seen on the right - with its single SELECT button. By moving the pointer arrow around the screen and selecting the function you require, the keyboard becomes a device purely used for entering text and data.

computer.

Although technical interrogation is discouraged - on the grounds that *LISA's* specification is not the point - the trade have been impressed by the way in which its 16-bit Motorola 68000 microprocessor has been harnessed, its 720x346 dot high resolution screen, and the provision of a massive one million byte RAM memory. As we know, a byte of memory is enough to store a single typewritten character, so that by the time a Winchester disk drive capable of storing and very rapidly recalling a further five million bytes has been added, its memory capabilities are prodigious.

Although, as hiterto noted, Apple do not regard *LISA* as a network workstation, there is communications provision aplenty. Both Xerox's *Ethernet* and the much cheaper *Omninet* network systems will be supported. Computer retailers are convinced that the customers to whom *LISA* will most appeal are the large businesses, the very people most anxious to see computers - and employees - linked into local area networks. It is an argument we are not wholly

persuaded by.

Since *LISA* is aimed at users rather than programmers, the computing elements of the system are largely transparent; what the operator sees is a series of files and documents, represented by graphic symbols called icons, on the screen, as if looking down on a desktop. Behind all these is an operating system of remarkable size and complexity, written in the *Pascal* computer language named after the French mathematician and gastronome, Blaise Pascal. Supplied with the computer is a version of the BASIC language similar to that disbursed by *Digital Equipment Corporation*.

Although many of the same principles have been incorporated in to the *VisiOn* software package hurriedly announced at the beginning of December by *VisiOn* for their professional microcomputers, it is generally conceded that Apple has won the round.

The question is - will they win the next? For out of Cupertino has begun to leak word of Macintosh, a low-cost version of *LISA* that could sell for as little as £1500.

## CAN YOU ADAPT YOUR EXISTING SYSTEM

Existing computer owners will be able to enjoy some of the benefits of *LISA* from this summer when *VisiCorp* release their *VisiON* operating environment (for full report see February issue). Other leading software houses including *Microsoft* and *Digital Research* are working on similar, but essentially more powerful, operating system/languages. Versions of *Smalltalk 80* are also expected to be introduced by both *Digital Equipment Corporation* and *Tektronix* before the year is out.

*VisiON* will be available in the form of a complete suite of *Visi* programs running on the *IBM Personal Computer*. *VisiCorp* are also busy licensing microcomputer manufacturers to offer *VisiON* packages for their systems. Initially, these will be available on disk as an environment sitting between the operating system and the applications program, handling the multi window screen and user interface. In due course firmware versions can be expected in the form of a

plug-in retrofit ROM chip, and possibly fitted as standard on new computers.

*VisiON* and its successors will have a substantial memory requirement. The prototype system I used ran on an *IBM P.C.* with 256K bytes of RAM and a Winchester disk. The desirability of hard disk storage is attested to by *Digital Equipment Corporation's* announcement that they will be supporting *VisiON* on their top of the range microcomputers, i.e. those supplied with Winchester Disks.

Fortunately, hard disk prices are falling rapidly; the recently announced Winchester Sirius with built-in 10 megabyte drive plus 1.2 megabyte floppy disk retailing at £3,995, compared to £2,495 for the standard 1.2 megabyte dual floppy version.

The other key requirement for a multi document system is a high resolution screen. Increasingly these are becoming a standard item on personal, and even home computers. Upgrade cards are available for many other systems.

**A COMPLETE, PROFESSIONAL WORDPROCESSING  
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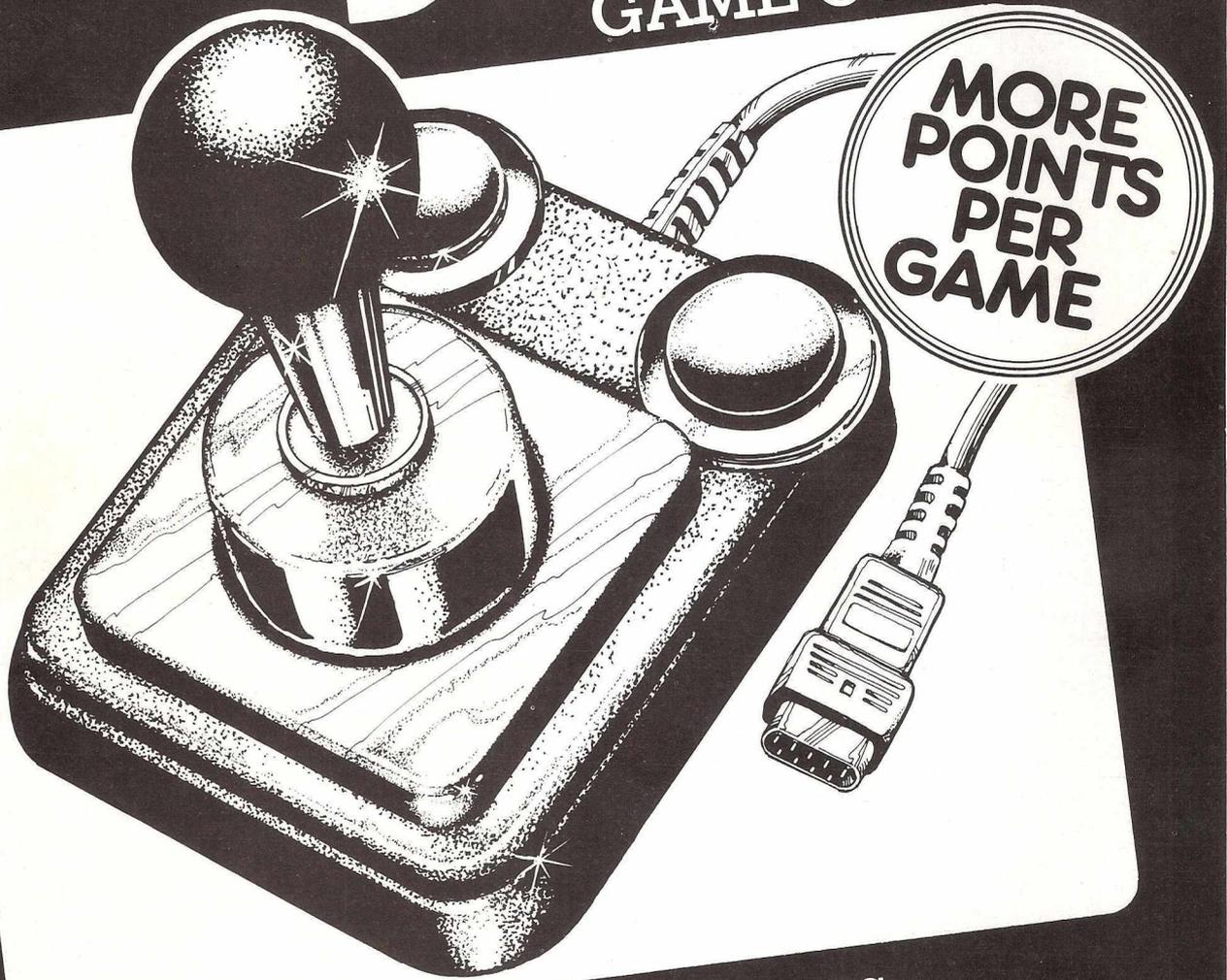


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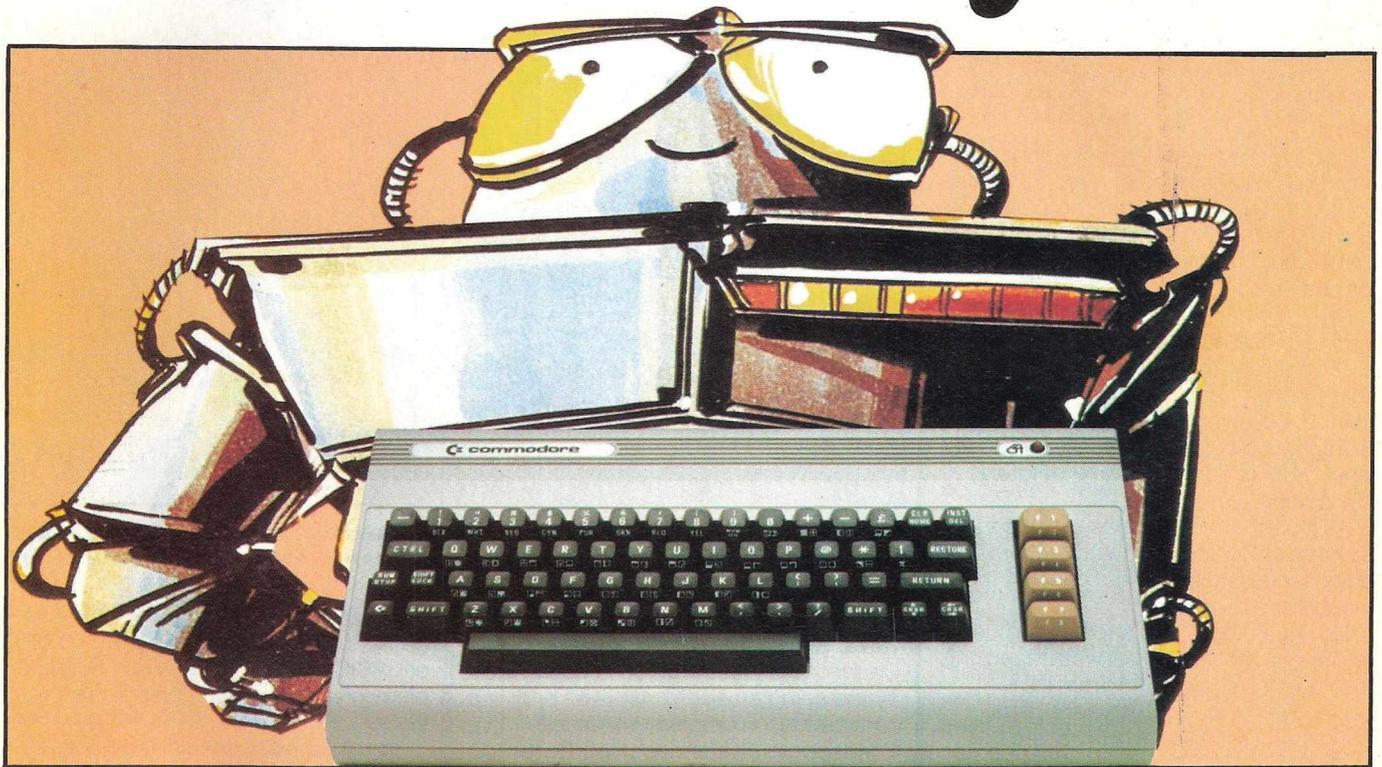


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# HOME TO BUSINESS

## PROGRAMMING it's not for everyone!



**This month we conclude our series on what you can learn about business computing with a home micro. Having tried out all kinds of business packages, Charles Christian finally attempts to learn programming.....**

Me and my big mouth. Way back in December last year, in the first of this series of articles on home-to-business computing, I described what I thought constituted a typical user scenario.

It began with an up-and-coming executive buying a TV games computer for entertainment purposes, gradually upgrading it to run a few business applications until finally, fired with enthusiasm, he emerged as a fully fledged programmer after teaching himself BASIC or some such similar arcane language.

So much for the theory. However I never imagined that I personally would ever actually be called upon to put it into practice. You can therefore imagine my surprise, nay shock, when *MicroComputer Printout's* dashing Editor suddenly telephoned me to suggest that for my next article I should have a go at teaching myself programming.

"Go on," he said, "get physical, entrance our readers with tales of your hands-on experiences."

To be truthful this was a double blow for me. To begin with I had been hoping

for a rather more tasty assignment, such as reviewing some of the new US pornographic video games like *'Custer's Revenge'* – purely from the sociological point of view you understand and, of course, it would have all been done in the best possible taste.

Rather more seriously, I was also dubious about the assignment as I knew from my previous attempts at learning BASIC, back in the early days of the first steam-driven PETs, when my one contribution to computer science had been to achieve the maximum number of 'syntax error' messages ever recorded in one hour, that I did not actually have much of an aptitude for programming.

Indeed, when it comes to matters mathematical generally – other than an uncanny knack for being able to spot whether or not I have been underpaid – I am something of a wally. Still, mine not to reason why.

# HOME TO BUSINESS

## An Early Shock

Now I know the Editor has said that the article was to be based upon my practical experiences, but from an early stage this assignment had all the makings of being a little bit too physical for my liking.

To begin with, when all the *Commodore 64* hardware was delivered to me, it turned out that the video cable was missing. Apparently the cable had been badly mauled by an enraged pet gerbil belonging to another *MicroComputer Printout* contributor whilst the system had been on loan to him (the contributor that is, not the gerbil).

However he had been lucky enough to find a similar cable hanging out of the back of his granny's life support machine and had sent that, along with the stricture that it would probably work if I soldered together a couple of wires.

Now, for those of you brought up with a rattle in one hand and an electronic breadboard in the other, I am sure soldering presents you with no problems. For me, however, the soldering iron is a fearsome object which usually inflicts at least two flux burns upon me before a job is done.

As it happened luck was with me that day and I managed to complete the job quite successfully, without causing too much harm to myself.

However, there was another surprise in store for me, for whilst I was unpacking the floppy-disk drive unit from its protective expanded polyurethane container, I received a quite sharp, Barbican-like shock from a discharge of static.

Quite why this should be, I have no idea, for it is certainly the first time that I have ever encountered such a phenomenon with a unit that was not even plugged in. It also, incidentally, emphasises the importance of never leaving a floppy disk containing data inside a drive unit, for had it happened on that occasion, the force of the discharge would have undoubtedly degraded, if not totally ruined, the data.

## The Learning Projects

Anyway enough of these meanderings, let's get down to my experiences with trying to learn programming (*and about time too - Ed*).

This being a Commodore hardware system, I quite naturally had Commodore learning guides. To be precise a choice of three:

- *'Simons Basic'* - a disk based system retailing for about £50 which, according



*With the addition of floppy disk and printer, it is quite possible to upgrade the 64 from the status of home micro business computer.*

to the blurb 'has been designed to enable you to realise the full potential of your Commodore 64 computer'. It does this by providing an additional 114 commands to complement the *Commodore 64* standard BASIC.

In all these commands fall into four broad groups: high resolution, such as 'DESIGN' and 'MOB SET', to draw shapes on the screen; structured programming, to write sophisticated, more legible BASIC code; music commands, to enable you to play your own or existing compositions; and a 'toolkit', featuring such commands as 'KEY' and 'TRACE', to aid the writing and debugging of programs.

*'Simons Basic'* also apparently obviates the need to use complex and lengthy 'POKE' commands when programming.

Be that as it may, after leafing through the user guide that came with it, it soon dawned upon me that *'Simons Basic'* involved concepts that were far too advanced for my poor brain.

To have gone any further would have been very much a case of learning to run before I could walk - a view which is obviously shared by Commodore, who

point out in the introduction to *'Simons Basic'* that anyone lacking a knowledge of BASIC programming would be better off mastering the intricacies of the *'User's Guide'*.

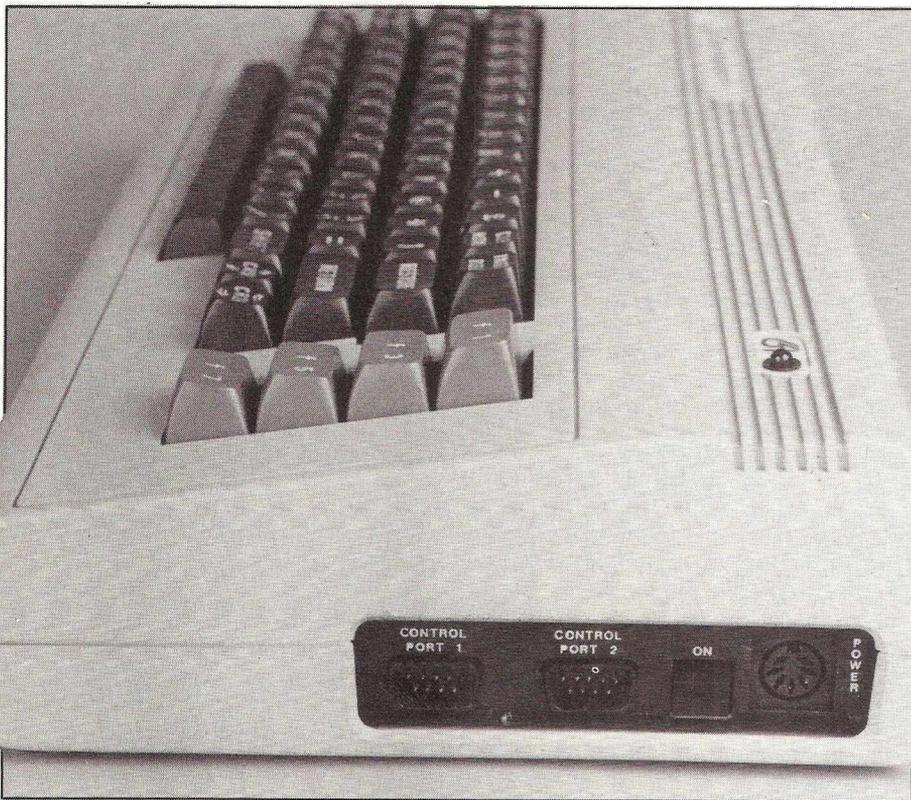
I must admit I was relieved to read this, as it had occurred to me that I might encounter difficulties had I attempted to continue. For, although I had a disk based system, the manual I had been supplied with was obviously written for cartridge users and appeared to be totally incompatible, to such an extent that I was unable to raise a glimmer of life on the television set I was using as a VDU monitor.

- The second learning guide at my disposal was the aforementioned *'Commodore 64 User's Guide'*, described in its blurb as helping 'you get started in computing, even if you've never used a computer before, through clear, step-by-step instructions'. I will say more about that later.

- Finally, I had another disk based guide called *'Start Programming with Gortek and the Microchips'* aimed at the '64', Series 4000 and VIC users.

The complete package costs £12.95 and is accompanied by a full colour

# HOME TO BUSINESS



Function keys (shown at this end of the keyboard) can be helpful when running applications programs. External power supply, however, adds to the spaghetti effect.

story book that is the sort of publication usually described as being 'ideal for children of all ages'.

## Science Fiction

In this case the wheeze the publishers have dreamt up is to combine a science fiction story with an introduction to programming in BASIC. Thus the hero *Gortek* is a robot, whose job is to teach Microchips, the many-legged denizens of the planet Syntax, how to program in BASIC before the evil computing-hating Zitrons attack.

Fear not, *Gortek* and the Microchips are eventually triumphant, despite frequent stops to participate in video games, and by the end of the book are capable of writing elementary mathematical and quiz programs. Hopefully, so should anyone else who follows the course to the bitter end.

So much for the aliens, but how did this human fare?

Unfortunately not so well, for once more I appear to have been supplied with an incompatible system. Thus, on turning to the section in the training manual on loading and running programs, I was dismayed to read that I

was required to put my cassette into a tape recorder, as all I has was a floppy disk and drive.

Still, I did my best, I kept inserting the disk and keying in the file name followed by the number '8' which the *'64 User's Guide'* categorically states is an essential suffix to all disk-based program loading instructions.

I even tried adding the suffix '8.1' which I notice is the formula all the examples of '64' disk-based software I have so far encountered actually recommend on their labels. But all to no avail.

The best I could get with *Gortek* was a 'file not found' error message.

So had I been sent a blank disk? Had the program disappeared down one of the 'devastating' black holes which the book warned was the fate of all those who opposed the Zitrons? I am afraid I really do not know.

I was also rather peeved to discover that I had not been sent a *Gortek* badge, which apparently is the reward for all those who complete the course.

Still, turning aside from these more flippant considerations, as can no doubt be imagined, to be faced with the task of reviewing a non-existent program

presented me with somewhat of a problem.

But was I going to let it get me down? No, of course not (especially as there was money involved).

I therefore resolved to have a go at programming by basing my efforts upon what I could glean from the texts of the *Gortek* book and the *64 User's Guide*.

## Enter the Programmer

I took for my starting point the *Gortek* book which, I notice, was written by three school-teachers, and English ones at that, as the text is happily free of the sloppy 'americanisms' that all too often mar books of this type and make them virtually unreadable for anyone born east of The Azores.

Apart from a lot of colourful illustrations and bold graphic design work, the book is actually on the lines of one of the programme learning booklets that are now becoming increasingly common in schools.

I know one of the criticisms of this approach to learning is that the books can be unnecessarily pedantic and slow to work through. But in this case with computers, where, if you are not careful, they can all too easily start running off in a direction you do not want them to go, I felt that the gradual step-by-step approach was justified.

For example, great play is made throughout the book on the need to remember to press the 'return' key at the end of each completed operation; the need to start each line with its own line number; to enclose certain instructions with quotation marks; to insert semi-colons at the ends of lines, and so on.

For someone well versed in BASIC this is no doubt second nature, but for the novice who is primarily concerned with hitting the right keys, these routine commands are the things that are always overlooked. And in turn result in defective programs being written.

From my own experiences I found it useful to have these minor points rammed home repeatedly so that, in the end, I automatically followed them.

Anyway I waded through the book at a fairly slow speed in about a couple of hours and by then I had reached a position where I was actually able to write my own programs. Admittedly they were only about 30 lines long and could do nothing more elaborate than calculate the area of a rectangle – but a least it was a start. I had begun to program in BASIC.

"OK", I hear you all say, "very clever,

# HOME TO BUSINESS

but that's just kids' stuff. You are going to have to do a lot better than that if you are ever going to do any business computing."

Realising this, I exchanged *Gortek* for the *64 User's Guide*.

## Death of a Programmer

The first couple of chapters in the '*Guide*' (in my edition chapters 2 and 3), to some extent both overlap and naturally follow on from the material covered by *Gortek*. But don't get too enthusiastic about this, for unfortunately there is a nasty surprise waiting in store for you in the following chapters as you begin to tackle slightly more advanced basic.

In what I can only presume is an attempt at a joke, the authors of the '*Guide*' inform novice programmers to 'take heart' because these will be 'fun chapters' containing lots of 'simple examples' for the new user.

'Fun'? 'Simple'? My heart sank when I saw the complexity of these so-called 'simple' examples.

For instance, I must have spent three hours trying to get a 15-line animation program to work. The object of the exercise was to get a bouncing ball to move from left to right and back again across the screen. All I managed to achieve was to turn the screen to a uniform maroon colour.

My next project was 'using sound if you're not a computer programmer'. I tried two separate sample programs here.

The first was to produce a single musical note, but after an hour's work, I had not managed to produce even a squeak. Whilst the second was meant to produce a sound effect like a doll crying. Just why *Commodore* should think any of their '64' users would want to recreate this particular noise, I really do not know.

Still in my case this consideration was irrelevant, for, after toiling away at the keyboard, '*Guide*' in hand, the best I could achieve was a metallic clicking sound. And I am not sure whether that was not just the usual sound-on-vision interference that my TV has always suffered from.

With spirits sagging, I turned my attentions towards some of the other examples given in the '*Guide*', but I think my brain must have become addled by then, as all I could get were a number of error messages flashing across the screen. I therefore decided to call-it-a-day before I was tempted to test the 64's aerodynamic qualities by throwing it out of the window.

## Programmer Mismatch

So what went wrong? Is BASIC programming a far too complex concept for the humble novice to master on his own? Or is yours sincerely just unusually thick?

Thinking back over my experiences, two things occur to me.

Firstly, I cannot help but conclude that a lot of the difficulties novice programmers encounter stem from the standard of the guides and manuals they have to work with. The problem seems to be that these books are inevitably written by people who know a lot about computers and programming – which is to be expected as it is only natural that a manufacturer would employ an expert to write-up their products.

Unfortunately, because these 'experts' exist upon such a rarefied plane (and that is the correct spelling), they tend to overlook that a lot of programming routines that are second-nature to them, require a major intellectual exercise on behalf of the novice.

Thus, instead of spelling-out even the most mundane task in words of more than one syllable, there is a tendency for them to make 'quantum jumps' in the text, leaving the poor beginner wondering just what on earth is the connection between one line to another in the program.

It was undoubtedly for this reason that I made so much more progress with the *Gortek* book than with the '*Guide*', for with *Gortek* the authors never held back from repeating routine instructions, no matter how basic they might be.

I also found it significant that the authors of *Gortek* (to give them their due: Heather Scott, Stuart Alexander and Gary Bowie), were teachers and therefore familiar with the problems of explaining complex concepts to beginners. Unlike professional programmers who, I have always suspected, often seem to encounter grave difficulties when trying to communicate with other members of the human race.

## Professional Communicators

The lesson, therefore, seems to be: when looking for a beginners' guide to programming, go for one that starts with the very fundamentals, assumes that you know nothing and is written by teachers or professional communicators, rather than computer 'buffs'.

Incidentally the above comments are not directed specifically at Commodore.

Their *64 User's Guide* is a model of lucidity when compared with some of the manuals that go with other makes of micro currently on the market. Also, the over-complex manual is not a phenomenon restricted solely to the micro end of the computer market.

For example, in a report recently published by the *European Association of Professional Secretaries*, they complain that one of the main difficulties encountered by the users of word-processors was the fact that the instruction manuals that accompanied them were obviously not written by people who have any experience of working on them regularly or who have to earn their living by operating one.

My second conclusion was a rather more fundamental one, namely, I began to wonder whether programmers were actually born not made.

The reason for this one was that as I was working my way through various programs, I noticed that, although I was perfectly capable of slavishly following the listings shown, I could not always understand the significance of what I was doing or why I was doing it.

Indeed, on many occasions the logic behind a particular programming operation completely defeated me.

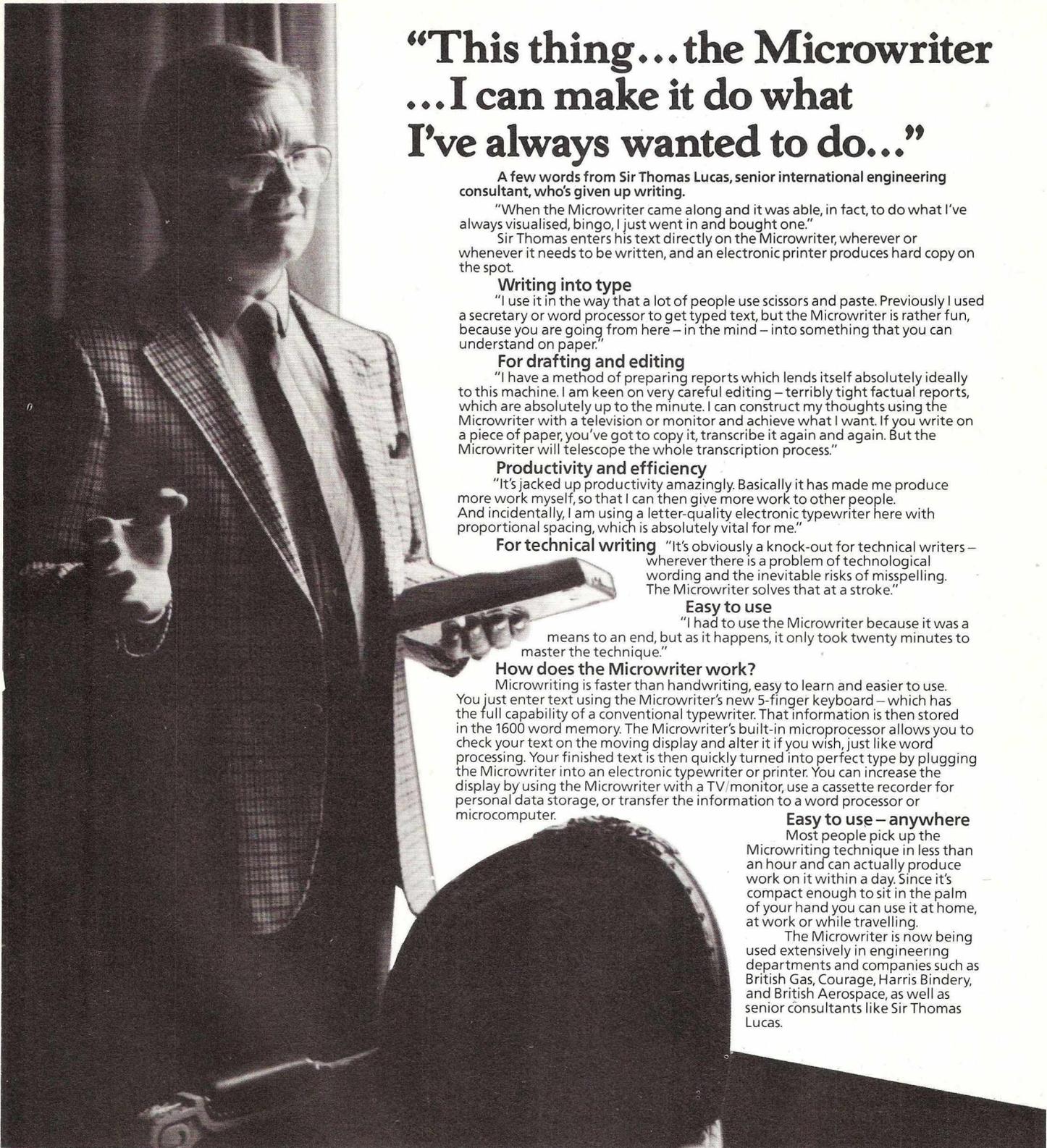
So, could it be that success at programming depends upon the mentality of the programmer?

For example, as I mentioned at the very outset of this article, I have always had a blind spot for mathematics. Thus, with things like I.Q. tests, although I was always able to 'spot the odd-one-out' with a series of diagrams and words, I could never fathom-out the answers when it came to numerals. Having a poor 'numero-spatial' capability is what I believe psychologists call it.

Presumably this is also why I cannot appreciate the relationship between the different operations in a programming listing.

Thus the second lesson I drew is that even with the aid of the most elementary of programming guides, I, and other people like me, may well be banging our heads up against the proverbial wall in a more long-term attempt to master the intricacies of BASIC.

For the user considering making the jump from home to business computing, the fact remains then that, although you may become a dab-hand at operating other people's various applications programs, don't be disappointed if you yourself are not actually able to write one at the drop of a hat.



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# Public Databases: WHAT DO THEY HAVE TO OFFER?

The idea of using computers to store and retrieve information is not new. *Database* is the third most common application of microcomputers. But with increasing emphasis being placed on communications between computers – the idea of databases designed for public access is gaining ground. **Martin Hayman** examines the implications of this exciting concept.

It has become a truism to say that information is power. Resources of information, according to certain rhetorical arguments, will become, indeed already are becoming, as important in the present evolution of society as resources of plant or of land in those previous retrospectively defined revolutions, the industrial and the agricultural.

However, given that these revolutions are historical turning points in the development of a capitalist economy and that they permitted those in control of such resources to make profits, are we really looking at a revolution? In other words, can money be made out of information?

Undoubtedly yes. Information of certain kinds is extremely valuable and can yield big profits to its vendors. I cite an example unpleasantly close to the kind of operation we are engaged in here, publishing articles about microcomputing. A well-respected micro magazine was offered a substantial sum, let us say five figures, for a one-shot use of its dealer mailing list. The approach was turned down flat. They knew that the experience, nay the sheer hard graft which had gone into compiling a list of the most important and influential dealers in the country was worth more to them than the cash that was on offer. Mailing lists are good business and the better the purchasing power of the individuals on the list, the better price does the list command. That is why Osborne Computer Corporation's mailing list of the majority of CP/M users in the Western world is going to be worth a whole lot more than a purloined list of the details of all those on social security in the UK. The latter are unlikely to have much purchasing power.

This compilation of people who have dough to spend in any particular area of enterprise is becoming a major hidden economic activity. It is the basis of every pre-formatted document to which you might append your name, address and

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company position – whether it be an invitation to attend a conference or to receive a new magazine. It is the means by which the canvassers assess the 'profile' of a market which they propose to exploit. You will probably think it's a good deal to receive a magazine free of charge, until you receive the magazine, which will be largely packed with advertisements for products which people like you are assumed to be interested in buying. Or it might be an invitation to buy encyclopaedias, life assurance – and maybe, in the fullness of time, CP/M software.

A good yardstick is the Encyclopedia Britannica. It could be argued that EB contains nothing but what is common knowledge – with the vital exception that it is, in Pope's memorable phrase, "ne'er so well expressed" anywhere else. It is a tribute to such standard reference works that, despite being so freely plundered by repackagers (for part-works, for instance, whose authors are past-masters at the art of plagiarism), they continue to sell. EB is a public database but, printed as it is in a number of weighty volumes, it is accessible only to the few who go to it. As I said, paper is a secure medium against wholesale pilfering; the mountain won't move to you.

The advent of the communicating micro is changing all that. The cluster of high-tech firms in Silicon Fen, doubtless absorbing some knowledge from nearby Cambridge University, are pushing ahead with plans to make the communication of information the most important aspect of their products for 1984: Sinclair, Acorn, Torch, Oric – each in its own way looking to put the micro user in touch with a much greater breadth of information than he could expect unless he has access to large and specialised libraries. And this will not necessarily be information about computing or electronics, though it will have that specialist content, particularly as the manufacturers attempt to bridge the gap between today's specialised hobby or business computerist, to tomorrow's broad-spectrum general-purpose user, who will not give a damn about operating systems or communications protocols.

**Animated**

This is not my predication; it is Newsweek's, in its prognosis for 1992. The home computerist, a 12-year-old boy, will characteristically use his computer as an animated information resource. To write an essay about Rome, for example, he will load up a videodisc and call up its reference to the city. He reads an article, then takes a tour of the city's sights and sounds. He then types his article, runs it through the spelling-check program and prints it out as his completed homework. Then, by way of relaxation, he plays a complex video game.

Such a scenario may not enthrall teachers and educationalists who may be starting to feel the ground move

beneath their feet. Yet education is the theme which has dominated most of the advertising for 'home' computers in the past year. Certainly Clive Sinclair intends education to be one of the most important uses for future products and cites the computer's endless patience and repeatability as its major advantages over conventional instruction. At present it is the limited storage of the micro which restricts the scope of the database for home use, but as soon as the videodisc becomes widespread this will change dramatically. But even though the storage of one single videodisc is measured in gigabytes, moving picture sequences take up an awful lot of space compared to text or data, so for the present it is likelier that encyclopedic databases will have to be a public rather than private resource, relying on speedy communications under local control.

The illustrated aardvark to Zoroaster is undeniably an attractive idea, but can it make money? Because if it won't then it's not going to happen. It is not difficult, of course, to bill people for use of computer time – it's been done for years – but who is going to invest in the new infrastructure to support such massive data transmission rates? It needs something altogether different from the copper wires which are adequate for the only true national network in existence, the British Telecom telephone system.

Remember we are talking here about public databases, which are a very different kettle of fish from private ones. Private databases are aimed at the captive, or known markets described earlier, and as such aim to provide exactly the kind of information which the customer wants and is prepared to pay for. The database developer is prepared to undertake the investment only because the market is already profiled.

**...databases would include examples such as the Stock Exchange's system, and British Leyland's stock locator. Both of these are based on viewdata screen...**

**Centrally Controlled**

Typically, such databases would include examples such as the Stock Exchange's system, and British Leyland's stock locator. Both of these are based on viewdata screens, and look just like Prestel. The Prestel format is excellent for this type of application because it is very clear to the user and very swift to edit – vital where information *must* be bang up to date. These systems work well because they are used in one large organisation which has the possibility of enforcing centrally one method of operation. As soon as the database moves out of the single, centrally-controlled environment into one where needs and working methods may differ,

although the general aims of the users may be very similar, you run into trouble.

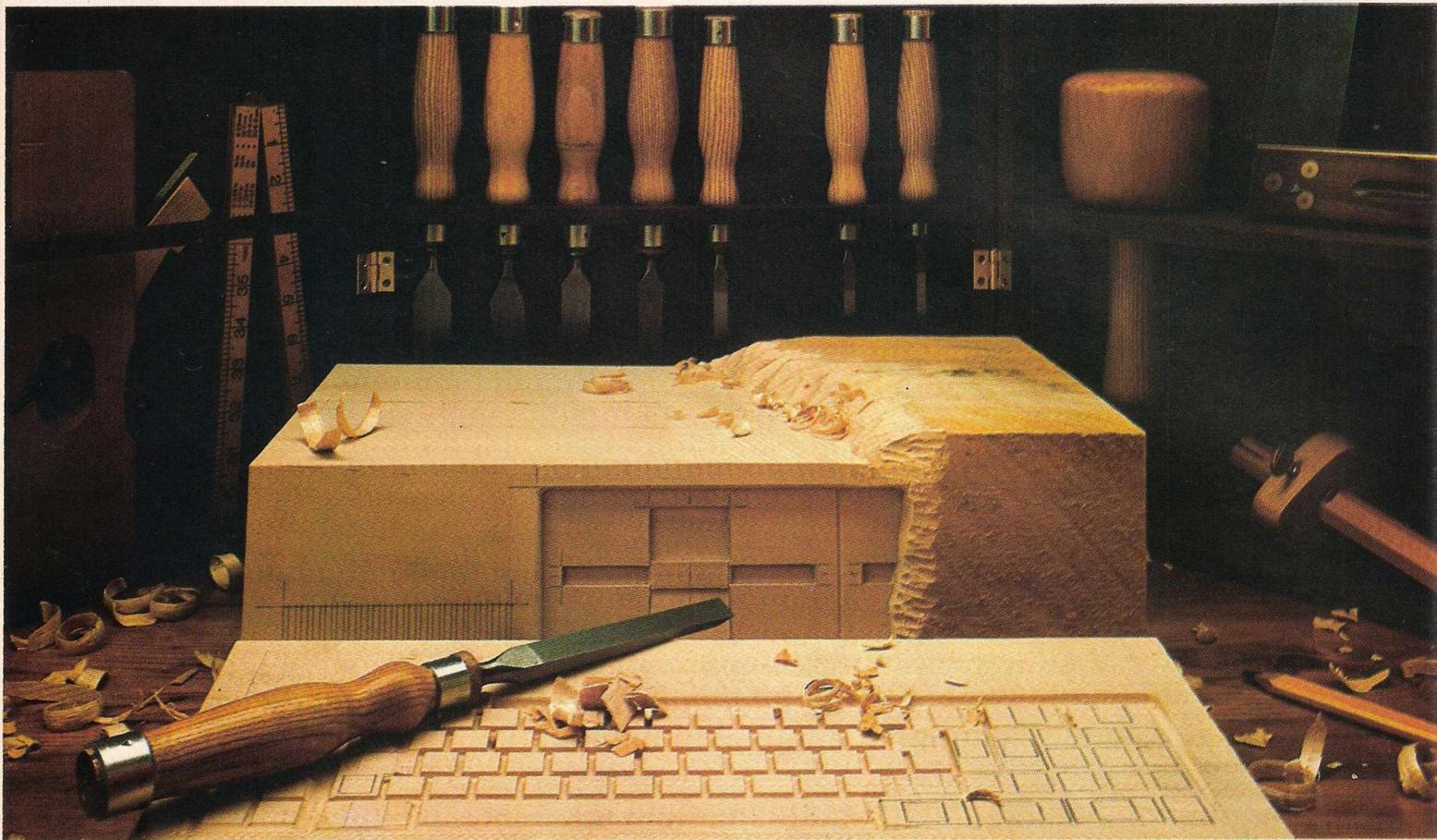
An estate agency might well find a limited database, run across several branch offices, a useful way of keeping everybody up to date; but a central register of all houses for sale in the UK, though technically feasible, is unlikely to come about. Who would pay for it? The same argument may be made for travel agencies, already heavy users of Prestel as a private resource. Why make your information available to others?

**Dubious Methods**

The compilation and sale of mailing lists which have possibly been acquired by dubious methods is not something which the private individual need worry about too much; after all, the argument runs, those who are innocent and have a clean credit card rating have nothing to fear from the multiplicity of databases with certain details of their lives. They are only after your money, not your soul.

The big money in information, though, is not in details of individuals, but in those of companies. For proof of this – and of the Faustian deals which some individuals are prepared to contemplate in order to serve the cause of acquiring information, we have only to look at the case of the Japanese executives who have been accused in the US of attempting to acquire, illegally, company secrets from IBM and others. Trade spies, like the traditional kind, are tolerated up to a point by the society in which they work, but it is a measure of the sensitivity – and the value – of the information they were after that the Japanese were arrested. Details of new products and their associated marketing strategies could be worth many billions if it means that the companies aiming to get that information can thereby jump over the expensive research and development stages. It puts me in mind of the few short months when, as an employee of IBM, I walked around with the key to the company's research vaults in my pocket. More than once did I speculate, even in those distant adolescent years (it was that *annus mirabilis*, 1967, if you must know), what would be the value of those piles of brown folders containing research reports on semiconductors and integration. Then, the phrase 'industrial espionage' had only just been coined and I certainly did not know that what I was handling was a database.

Yet that is what it was: a database held in the form of paper and micro-fiche and containing information on the British research activities of the world's Number One computer outfit and indexed (manually) by a sophisticated and highly developed keyword system. Sure the searching was slow, but it was cheap (at my rate of pay anyway) and probably secure. The only way to have got hold of the database would have been to drive a truck up there and manually handle the files out of the cellar. Paper is a pretty safe way to keep your valuables.



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**Added Value**

The point of all the foregoing is if that information is worth having, then it's worth keeping to yourself until the right offer comes along. Information is valuable in the measure that it enables its possessor to make, or save, money; and its compilation, ordering and indexing, the means by which the seeker gets at any one piece of information therein contained, in other words the database manager, confers added value.

Where, then, does this leave the *public*, as opposed to private database? For, as we have seen, the characteristic of valuable databases is exclusivity. Bluntly, if everybody knows something, where is the added value in compiling, ordering and indexing it for resale?

The same is true for more ambitious schemes – say satellite broadcasting. One such scheme was put to one of the UK's largest trade publishers. It would launch a satellite with plenty of (literally) on-board memory capable of storing a variety of magazines. The satellite would tool around the globe's circumference (that is, it would not be a geostationary satellite) at somewhere around the 45th-50th parallels, whence it would be able to broadcast to a large potential market comprising most of continental Europe and the Eastern seaboard of the US. Subscribers would have their own small dish aerial and microcomputer terminal. At the appointed hour, the satellite would overfly the user's receiver which would capture that week's edition of *Computing Weekly*, *Pipes and Pipesuckers*, or whatever. The receiving terminal could even be programmed to search the data for particular information, giving rise to the possibility, say, of an automated *Exchange and Mart* of the air: it could select the Ford 1600 Cortinas on sale that week without the subscribers's need to rifle through inky pages.

**...there are snags in charging the public for use of database which is intended for their consumption.**

**Pass Codes**

But the problem remains: who pays for it? And how do you, if you are proposing such a service, get a profit out of your investment? As a way of getting out of paper publishing, it makes sense, but how do you replace the revenue generated by advertising and cover price? You may charge a subscription fee for use of pass codes to get into the system; you may charge per access to the satellite computer; you may charge for the terminal equipment. Or you might do a combination of these things.

Whichever way you look at it, there are snags in charging the public for use of database which is intended for their consumption. Let us examine those

snags as exemplified in British Telecom's Prestel, which is the only publicly accessible database in the UK. On the face of it, Prestel is uniquely equipped to market public databases. It has the network – the telephone system. It has the wayleaves – the right to dig up the roads where necessary. That's a pretty good start: most of it's initial investment in manholes, switching gear and men sitting in little tents on the pavement (the

**Traditionally the alliance between BT, ...the set manufacturers who build the receiving equipment ... and the information providers ... has been likened to a 'bicycle built for three'.**

really expensive component) is already taken care of. Set against that the lines of communication at the disposal of its new supposed competitor, Mercury, which must run its cables alongside railway lines – pretty restrictive.

So you have a network servicing just about every home in the country with voice services. You can send recorded messages with details of the weather, with the hit record of the day, or the cricket scores. How much more traffic might not be generated by putting a whole bunch more information on computer, indexed by a tree structure requiring only 0-9 and two extra commands star (\*) and hash (#) such as can be featured on any TV remote control or push-button telephone, and interfaced with the domestic TV as a display?

In theory this is dandy: the Post Office (as it was then) generates a whole lot more traffic on its lines, the TV set manufacturers get to sell a whole lot more sets – and surely there would be a profit somewhere in there for whosoever is going to devise the database information?

Up to a point, Lord Copper...

**Over Estimated**

Traditionally the alliance between BT, as common carrier and supplier of computer storage, the set manufacturers who build the receiving equipment (TVs and microcomputers), and the information providers who design the database itself, has been likened to a 'bicycle built for three'. Sometimes in the past they have seemed to be pedalling in opposite directions. In the first place, Prestel's projections wildly over-estimated the potential market for general-interest customers, which by now was supposed to number several hundred thousand. In reality it is around 16000, hardly enough to warrant the two GEC mainframes, in London and Birmingham, where the database is held. This, after Prestel boss Richard Hooper cut back from seven in early 1982.

The reasons for this dramatic under-performance are many and varied but can be succinctly summarized in one word: money. Prestel has simply not been good value for money. Even if the database had everything you might need to know to lead a rich and fulfilling life, it still costs too much in computer connect-time. I do not wish to pillory Prestel, but its executives simply did not seem, in the late 1970s, to wish to address themselves to the vitally important question of who wanted to buy a general public database service. It is not sufficient to announce a technology and wait for the customers to come streaming in, for the real product which is being sold by anyone who wishes to run a public database is not the technology, but the information itself. Blinded by the beauty of the system itself and pressured to concentrate on its future enhancements by the powerful and very capable research department, Prestel people lost sight of the vital ingredient, information. By the time Richard Hooper called a halt to the chopping and changing and declared that thenceforth Prestel would be 'market-driven' rather than 'technology-driven', it was very nearly too late.

Prestel has no mandate to create 'information product' itself. That is the role of the information providers, who lease computer storage from Prestel and contract to design and write frames in accordance with general principles and to the code of conduct laid down by Prestel.

**Bread and Butter**

It is a measure of the system's failure to create enough demand, with its tripartite system, that one of the major and most experienced IPs, IPC viewdata, pulled out of Prestel in the middle of 1982 despite consistently having been in the top ten IPs as measured by number of

**...a database intended for the public must proceed from sound profit-earning principles.**

frame accesses. Losses were rumoured to have been not unadjacent to £1m during its three-year operation, even though IPC quickly realized that there would have to be one strong identified market to bring in bread-and-butter revenue, and succeeded with its Agriview database aimed at bringing the latest prices to farmers.

Prestel's increasingly frenzied changes of marketing personnel and strategy give some clue to how desperately it was searching for the right formula to capitalize on the public's easy access to its installed network. Recently it has swung back to the residential market, figuring that at least some of the estimated 500,000 microcomputer users would be interested in an electronic magazine. That magazine would have

as its principal attraction and centre piece a database of microcomputer programs which, with a little finagling, could be loaded straight from the Prestel computers into the home micro.

The technology to achieve 'downloading telesoftware' has been around since the beginning of Prestel. The term 'telesoftware' means literally 'software at a distance' and though its coinage is attributed to William Overington, the idea of using Prestel for this purpose came from Malcolm Smith, who was at the time (August 1978) commercial manager of Prestel. Ted Sedman, who is now a partner with Smith in the viewdata consultancy AVS-Intext, worked on the implementation, which was to be in CAP's Micrococol.

The idea was to provide businessmen with a portable software for financial use. A program would be called down from the Prestel database, stored locally and used for specific purposes. Sedman saw that users would record the program frames on disk for subsequent use unless pre-emptive measures were taken and for this reason wrote it in an intermediate code which looked to casual users like 'hex rubbish'. The programs also contained a time-expiry routine which would cause the program to self-destruct after a specified retention period. The frames would also be high-priced. Together, these measures were to ensure that 'telesoftware' would make money. Micrococol's portability would mean that programs would be machine-independent.

**Profit Principle**

Changes at CAP meant that Sedman was unable to pursue the idea and even had it been completed and marketed, it would be now very vulnerable to the plethora of stand-alone microcomputers with financial modelling packages. But Sedman's ideas must stand as an example of how a database intended for the public must proceed from sound profit-earning principles.

Let no-one accuse the two front men of Micronet 800, Richard Hease and Bob Denton, of failing to take these principles on board. Micronet 800 is a good example of the sort of 'joint partnership' which the Telecomms Act empowered BT to make with private concerns. Having spotted that there were an awful lot of micro users around and quite a lot of interest in the prospect of using Prestel as a software transmission medium, Prestel was keen to extend its user base via these enthusiasts. But without some kind of central directions, it was hard to build a suitable and integrated database of information. Prestel itself has made no mandate to act as an information provider by devising, commissioning or buying 'editorial' pages of software: it would run counter to the 'common carrier' concept which the BT board does not seem keen to renounce. It is, however, permitted to engage in 'pump-priming', especially in the area of 'database development',

which was, until the end of 1982, the responsibility of Dr. Ederyn Williams at Prestel.

To cut a long story short, Prestel joined forces with publishers EMAP, who have an assortment of computer magazines, and Prism Microproducts, which is run by Bob Denton, formerly with Tangerine Computers' viewdata adaptor company. A £3m investment in three years is foreseen, though nobody is saying who has paid what, and the idea is to promote an electronics-oriented magazine based around a database of microcomputer programs. As part of the deal you get for your £49 entry fee suitable hardware to connect your micro via the (supplied) acoustic coupler, plus some driver software. There is no way that this can be even cost price, given the current cost of acoustic couplers on the open market, and the fact that each piece of hardware is unique to the micro which it services. Nor is there any agreement on screen-level presentation of programs which will each be presented in a format suitable for the receiving micro, though this pragmatic approach is probably the

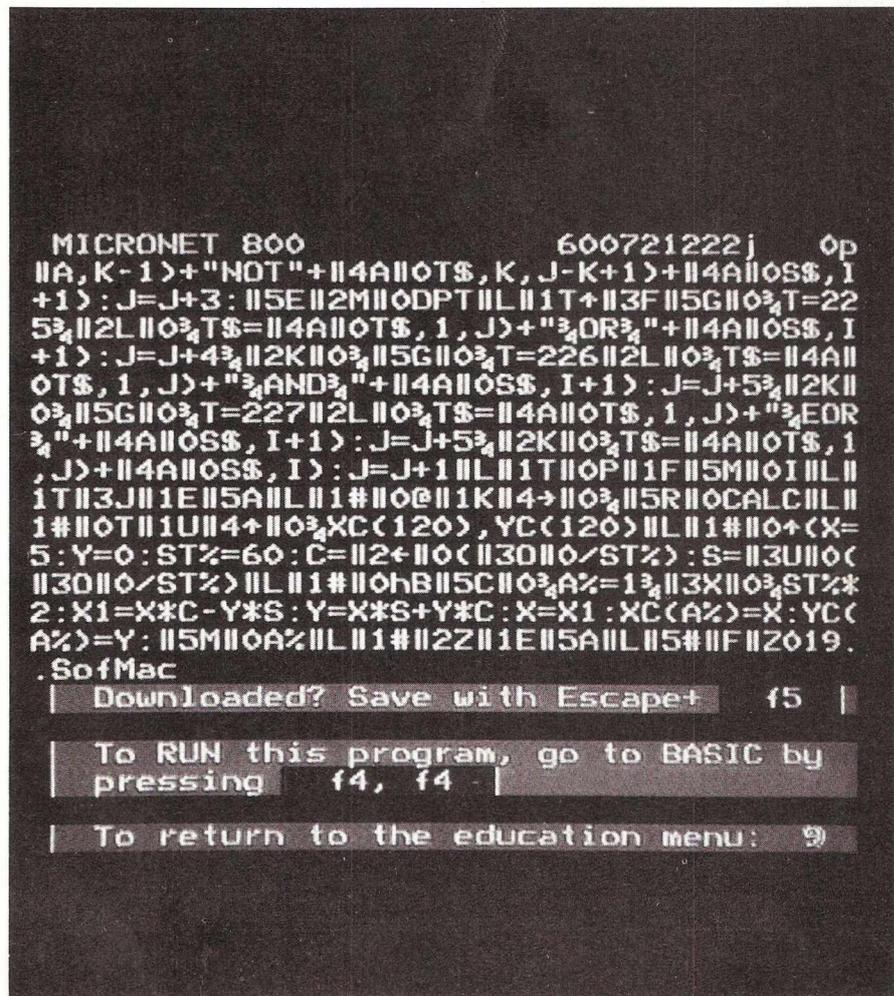
best that can be done in the circumstances.

**Software Range**

It can be seen that the tripartite arrangement still holds good for Micronet 800. Will the product be what the punters want? Will it be a model for public databases? So far, claims Bob Denton, he has around 12,000 'pages' of software, including the entire range of Acornsoft programs for the BBC Micro – users of which comprise over half the enquiries Micronet has received to date. They will be sold at around 60% of their 'street price', which doesn't sound a terrific saving to me, if you count the cost to the end user of the storage media. You might get the latest releases, but how long does it take to get the latest releases by phoning up with a credit card number and getting a ready-to-run disk or cassette by post?

At their present stage of development, public databases accessed through microcomputers are going to attract hobby computer users. Anyone with a serious computer is going to go down another road to get communications, and the odds are that he's going to be looking at a specialised database which has the power to search out what he wants, and is prepared to spend a lot doing so. On the other hand, if it is mainly recreational information he requires from a public database, it is likelier, in my personal view, that teletext will offer him

**The technology to achieve 'downloading telesoftware' has been around since the beginning of Prestel.**



Programs downloaded via PRESTEL appear as a jumble of characters on the screen.



Computer clubs have been amongst the first groups to recognise the value of a public database.



**At their present state of development, public databases accessed through microcomputers are going to attract hobby computer users.**

what he wants, especially as and when cable TV makes local teletext information viable. It is a sign of changing perspectives within BT that Ed Williams is moving to cable developments; of course, Prestel will be available on cable, but so will many other services with the strong advantage over Prestel that they cost the customer nothing (teletext's single biggest advantage).

Cable, by comparison with Prestel, has a phenomenal data transfer rate which make interactivity a much more realistic proposition. It is also much more manageable, from the supplier's point of view, for billing purposes, and

involves him in no tricky hardware fixes or negotiations with public authorities. It also, most vitally, makes the processing power of remote mainframe computers available to the home user, who will be able to use very expensive devices such as laser-driven video disks. The latter, to my mind, is what will make public databases a viable proposition because it will be what the public wants, and will pay for. Home computerists are a comparatively small sector of the market by comparison with the video gamers. They are also very discerning about value for money. Gamers, on the other hand, don't care – just watch them sticking their money into arcade machines.

**Addictive Games**  
Just imagine how addictive games could get with decent input devices (the keyboard will be forgotten except for logging on) and a wall-sized flat-screen hi-res display. Archers at Agincourt, Vulcan Raid on Stanley, Soft Landing on

the Moon – all the battles in history could be re-fought.

I do not suggest that this is a desirable or creative use for public databases. However, my impression is that, as the quantity of information at large in the world increases, so the individual's desire to use it declines. As a worker, he will likely enough be handling information as his stock-in-trade. He probably won't want more of it for relaxation: indeed even as I write I hear on the radio that people are buying more books and watching less TV. There is a limit to the amount of information which individuals can use in their private lives. For this reason I submit that public databases, that is those which the private individual will want to use, will be entertainment-oriented.

It would not dismay me if the Reithian approach to TV were abandoned. Perhaps computing then would also lose its deadly mask of seriousness professed at the manufacturer level. To those earnestly concerned about the profit potential of public databases and unfettered by the higher concerns of educationalists (which concerns might just as easily be fulfilled by the study of a few books), I commend a recent report from an American magazine: 'The Games Channel is a new system which offers videogames play 24 hours a day. Cable TV subscribers can pick up from the top arcade and home games, the selection of which changes monthly. A minimum of 20 games is offered during any given month, five of which are replaced at the end of that period by new games'.

And these are the comments that one crack games writer, Bob Davis, has to say about the future of the kind of games we are talking about: 'We're going to see increasingly better sound and graphics. There will also be longer games. A good adventurer, staying awake around the clock, would probably take two weeks to

**Prestel will be available on cable, but so will many other services with the strong advantage over Prestel that they cost the customers nothing...**

complete *Ulysses and the Golden Fleece* (sic). The rest of us will need six months. Our new *Time Zone* will take longer'.

'In a broader sense, within five years or so we'll be seeing computers hooked up to every phone and television. The games will offer not only voice synthesis, which some already have, but voice recognition as well. We'll play them quite possibly in conjunction with special effects generated with videodisks; certainly we'll be playing with friends in different parts of the country'.

*Pas magnifique, mais certainement la guerre...* And just imagine all that connect-time.



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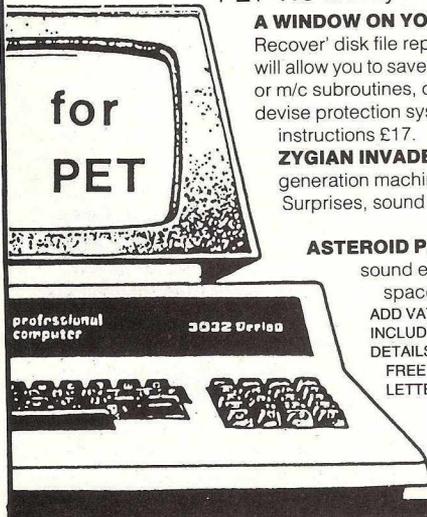
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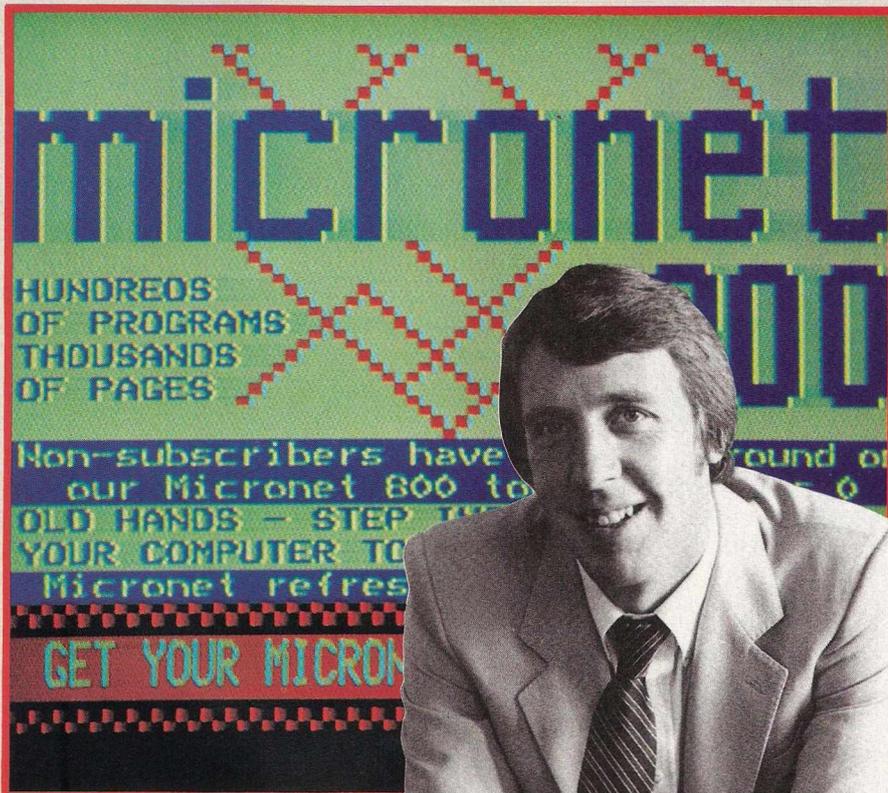
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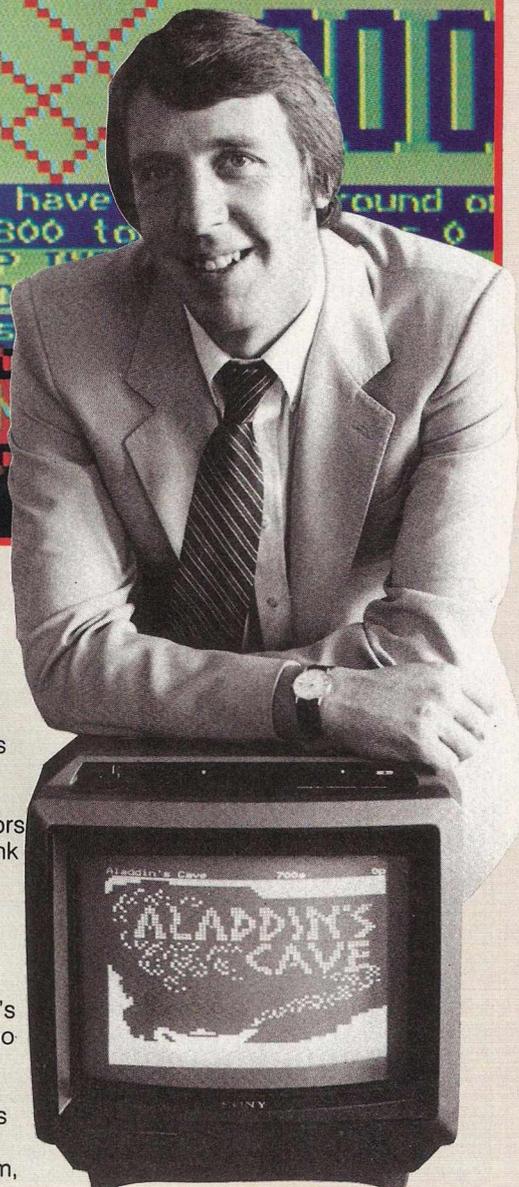
# MicroNet promises personal computer owners

## PRESTEL FOR £1 PER WEEK



Richard Hease is the odd man out in Hatton Garden. He is thirtyish, clean-shaven, wears tight trousers, and employs no bouncers. Unlike the jewellers and gem merchants who occupy the other buildings in London's diamond district, Hease's office is unbarricaded. Instead of the cool surveillance of the video camera, visitors are cheerfully appraised by a post-punk receptionist in a mini-skirt. "Richard is just mending his chair, then he will be right with you," she grins, before disappearing back behind a copy of *Video and Computer Games*.

Furniture repairs concluded, Prestel's putative taipan appears. For a man who may be about to steer the spluttering vehicle of Britain's public viewdata service back into the fast lane, Hease's appearance is deceptive. But with at least three lucrative careers behind him,



This month sees the launch of a remarkable new Prestel service for personal computer users. Subscribers to *MicroNet 800* will be able to access an enormous database – three times larger than anything else on Prestel – of microcomputer information.

The necessary adapter will cost just £50 for the most popular microcomputers, a quarter of the price of currently available adapters. The £1 per week subscription will include access charges outside office hours. Special cheap rates will be available for schools.

The keen pricing means that the total hardware cost of, say, a Sinclair ZX81 and MicroNet adapter will be below £100! Will this finally propel Prestel into the mass market? JULIAN ALLASON met the man behind the *MicroNet*.

he doesn't feel the need to try and impress.

His track record is certainly interesting. Early in on the microcomputer publishing boom, he harnessed the talents that made *Practical Computing* the market leader, before selling it to the monolithic International Publishing Corporation for the sort of sum Lloyds underwriters tuck away in off shore reinsurance companies.

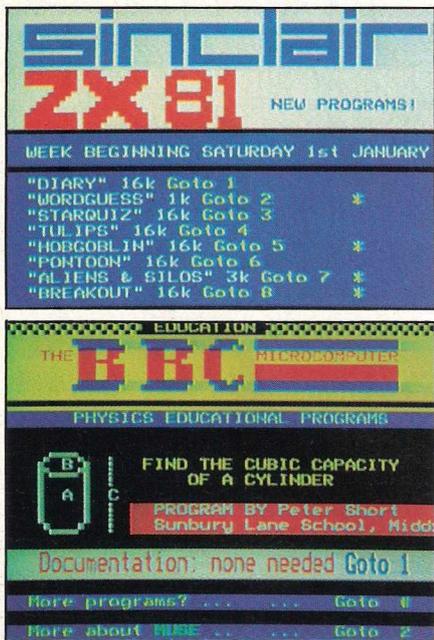
Foreseeing that the golden cow of micro technology might be milked on a more regular basis, Hease set up for himself deals with other publishing interests long on enthusiasm, but short on expertise in this notoriously tricky market. The result has been a string of new magazines, each neatly plugging a Hease-identified hole in the market.

His own flagship, EEC Publications, soldiers on with various computer

publishing and conference activities. One senses though, that his heart is here in Hatton Garden, the creative energy channelled into the launching of *MicroNet 800*. Spice is added to this task by the challenge of succeeding where others have failed. Ironically, it was IPC, to whom Hease sold *Practical*, who previously held the rights to bring Prestel to the microcomputing public. The experiment, slated by critics as 'too little, too soon', was not a success.

With more than a million microcomputers sold in this country Hease will not be able to plead, as IPC did, insufficient user base and interest. Much will rest on his ability to capture that interest; Prestel has been losing money, and although some sectors of the business community, notably travel agents, have begun to recognise its value, progress has been slow; slower than government would like and shareholders in a privatized British Telecom would stand, according to one strand of industry opinion.

MicroNet's target is 7000 subscribers by September this year; four times that by the same time in 1984. Initially the system will be sold on the strength of 'free' software; at least 100 programs for each machine supported. Initially these will include the BBC/Acorn, Apple, Commodore, ACT Sirius 1, Research Machines and Tandy micros. The Sinclair Spectrum is due for support from next month; the ZX-81 the month after. In due



course service for the IBM PC, and it's many look-alikes is to be offered.

**Sod's Law**

Sitting in on a pre-Christmas interview with Hease were those two noted legal gentlemen, Messrs. Sod and Murphy, both of whom made their presence felt during a demonstration of the system. Eventually a boffin was summoned, who, by means of certain PEEKery POKery and a sharp slap administered to Hease's BBC micro, caused the system to connect successfully. Such problems

**PRESTEL IN A NUTSHELL**



I always thought Prestel was a nonsense.

I couldn't have been more wrong. It's wonderful! In fact it is a way of life.

Mind you, it all started out unpromisingly enough, with the sudden revelation that to actually get online to Prestel I needed a form that had not been included in the information pack sent to me. And, being mid-December, it was unlikely that the form would reach me before Christmas, or, if it did, once completed would reach them in time.

Things looked up immediately. The form did arrive, together with a note saying that if I would be kind enough to ring, they would take the details over the telephone and get me hooked up there and then. This they did and by Christmas Eve I was fully operational, notwithstanding a slight hiccup when the British Telecom engineer connected an incompatible jack socket. But then I do live in the depths of the country, where those engaged in extracting milk from cows have little time for information technology.

Initially connection of the jack plug seemed to disconnect all the other extensions, a fact not altogether appreciated by my mother-in-law without whom Busby would probably be out of business. This was resolved with the aid of a hairpin.

The first piece of hardware I tried was Plessey's *Vutel*, a super smart desk top terminal, comprising 7" diagonal black

and white display, numeric keypad and telephone set. At £550 (less in quantity) it isn't the very cheapest way of getting into Prestel, but considering what's in it, I rate it good value.

**Warden in Wapping**

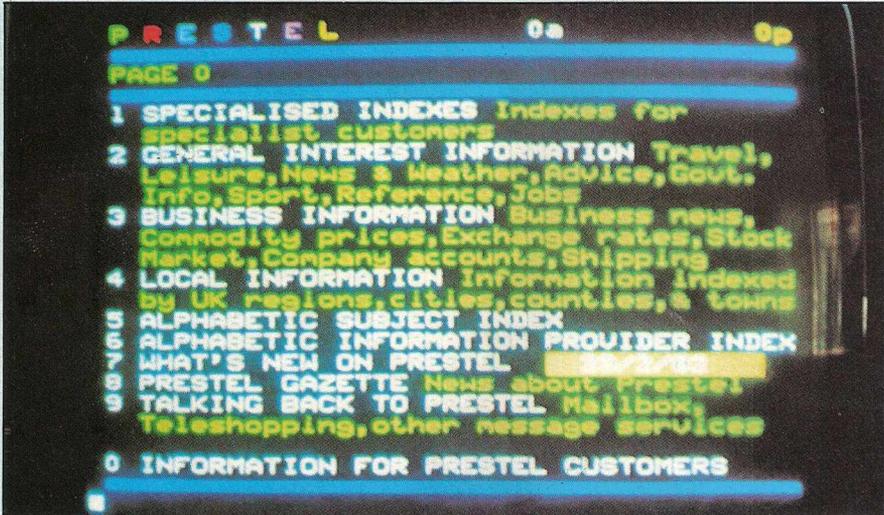
Most welcome of the various features was an autodial modem that enables you to connect to Prestel simply by pressing the button marked *VIEW*; this dials the local access number for one of the Prestel computers, and identifies itself with your personal number. It remains only for you to key in your four figure password, which is intended to prevent unauthorised use. After a few early wrong numbers – I made the acquaintance of a perfectly charming traffic warden in Wapping – the various autodial modems performed with an efficiency that would be the envy of a data processing department.

The *Vutel* also has a memory which will store two pages when you are off line. It is worth pointing out that although the majority of Prestel pages are free, and British Telecom make no access charge outside of business hours, you are still notching up ordinary telephone charges all the time that you are connected to the computer. So if you are a travel agent, or anyone else likely to make heavy use of the system, it might be worth considering a terminal with a bigger memory.

Sitting on my desk the *Vutel* excited much interest from visitors, none of whom

correctly guessed what it was, the favoured punt being a video telephone. They were agreed on how easy it was to use, although computer people invariably commented on the absence of an alphanumeric keyboard. Well, there is one which Plessey supply for £100, and it is essential if you plan to use the Mailbox electronic mail facility.

The designers have gone to considerable lengths to keep the *Vutel's* footprint small. Accordingly the keyboard is somewhat on the compact side, but perfectly suitable for leaving the sort of ten line message which Mailbox is well suited for.



The PRESTEL index page is frequently the starting point for a search.

The limitation on the amount of text you can get on the screen, and the knowledge that you are clocking up telephone charges, discourages verbosity.

**Cost**

I was in fact pleasantly surprised by the cost of Prestel, which it is possible to check by dialling up page 92. Like more than two thirds of the country I live within local calling range of a Prestel computer centre, so an hour a week on line to Prestel costs about £1. The time charged levied by the computer was 5p a minute between 8 a.m. and 6 p.m. Monday to Friday and 1 p.m. on Saturday. At all other times it is free.

There is a standing charge of £15 per quarter for business customers and £5 a quarter for residential subscribers to the normal Prestel service (see main article for the different charges which apply to MicroNet 800 members).

All index pages, and most other pages that you access are free. The information providers, companies independent of British Telecom, are free to make a frame charge, which appears on the right hand end of the top line of each page being displayed. Fortunately you do get advance warning of this if you arrive at that page through an index.

My mother-in-law, after handing out severe punishment to her Mini and other road users for a number of years, had decided to buy a new car. For all of 4p she

was able to obtain *Car* magazine's conclusions on the merits of the Ford Fiesta and the Austin Metro. In the interests of road safety (mine), I chipped in another 2p so that she could consider the merits of a Land Rover.

**Using Prestel**

There are two ways of using Prestel. You can either look up the number of the page you want in the directory supplied by British Telecom. Or you can do what most people do, which is to progress through a series of nested menus. Let's follow my Uncle Arthur, who is partial to a bit of

poaching and therefore likes to know the weather forecast.

After connecting to Prestel he arrives at page zero, the General Index. Item 2, General Information, covers news and weather, travel and sport, Government information, advice and jobs. So Uncle Arthur keys button 2, which brings up the General Interest Index, item number 1 of which is news and weather from home and abroad. He keys 1 for the news and weather index.

The second item on this menu is UK weather, covering actual weather, reports and forecasts, warnings, or statistics. Uncle A. keys number 2. The UK Weather Index appears, offering a choice of forecasts and reports, detailed forecast, actual conditions, summaries of recent weather, continuous update from the Met Office.

Keying 1 generates a frame headed UK Weather Peddling Forecasts at 3p, the three day forecast for 6p, or various weather reports for which there is no charge.

It is wet, so the pheasants will live to evade Uncle A. another day.

If you are more confused than ever, there is also a short *How to Use Prestel* course up on the system. Once you have negotiated your way down its tree of menus to the end, a small free gift awaits you with the compliments of British Telecom.

Who says gifts don't grow on trees?

# HOW TO USE MICRONET

Initially membership packages will be available direct from MicroNet at 57a Hatton Garden, London. EC1B 1DT (Tel: 01-242 6552). Later in the year you will be able to buy the MicroNet adapter and instruction manual in the High Street.



Inside the kit are step by step instructions, which include a special priority telephone number you can ring to get British Telecom zapping round to fit a Prestel jack socket to your telephone.

To link into MicroNet, the adapter must be connected to your microcomputer using the lead supplied, and to the telephone jack socket. You then load the communications program from the cassette or diskette supplied. On the BBC machine this loads directly into the function keys.

Thereafter it is just a question of dialling the Prestel computer, and once you get the high pitched carrier tone, putting your computer on the line. It then remains only to type in your identity number and password.

Between 6 p.m. and 8 a.m., and after 1 p.m. on Saturdays, access charges are waived and you pay only for the telephone call; for more than two thirds of the country this will be at local rate. Most of the MicroNet 'pages', including personal computer news, reviews, and prices will be free, as will several hundred games,



educational and business programs, all downloadable over the telephone lines. For other programs there will be a charge, added to your quarterly telephone bill.

Using the menu driven system the sending of electronic mail and telexes is straightforward. For details see '*Prestel's Electronic Mailbox*' panel, and a special feature on Electronic Mail in next month's *MicroComputer Printout*.

will be a thing of the past once production versions of the adapter are available, he says.

Hease's team have been hard at work getting a further sixty programs ready. Hease says they will be "good and inexpensive". Once subscribers are online they will be able to download the software over the phone link for permanent storage on floppy disk or tape, ready to be used whenever required. Where software is chargeable, a debit will appear on the quarterly telephone account.

Access to telex and electronic mail facilities should prove a draw for business users; Hease thinks that many hobbyists will find the mailbox facility appealing too. User groups for most of the major microcomputer manufacturers will maintain news and reference information on MicroNet, and, if the American experience is anything to go by, these enthusiasts are likely to become some of the heaviest users of the system.

Messages sent through the mailbox service are dispatched to a subscribers personal number, and can only be accessed from it. Notification of a message to be collected appears whenever the user signs on or off the system. When you are away from your own terminal a call to MicroNet HQ will enable you to send a message nonetheless.

MicroNet is not a closed system, a fact Hease stresses. Subscribers will have access to the other 230,000 Prestel 'pages'. High in the Victoria Street tower that houses the Department of Industry, mandarins and ministers make the same point. It is clear that high hopes are being pinned on MicroNet.

"After all, these personal computer people are used to keyboards and screens," says one senior civil servant. "The technology holds no terrors for them. We are hoping that they will seed the business market with an enthusiasm for Prestel." *Praying* would be a more appropriate verb, whisper insiders.

Business users will be encouraged to operate 'closed' areas of MicroNet for company communications at a cost of £5 per page per annum. Hease foresees firms using it to transmit price and stock information to branches as well routine electronic mail. "At £50 a station it is a very economic means of bringing communications to any company that is already using microcomputers," he says.

### Private Business

Past experience with Prestel suggests that the interactive capabilities of MicroNet could prove a major attraction to business customers interested in running a private network of their own. British Leyland operate a successful vehicle location system on Prestel, which enables their dealers to identify the car that most closely matches a customer's requirements. Apple are experimenting with using MicroNet to communicate

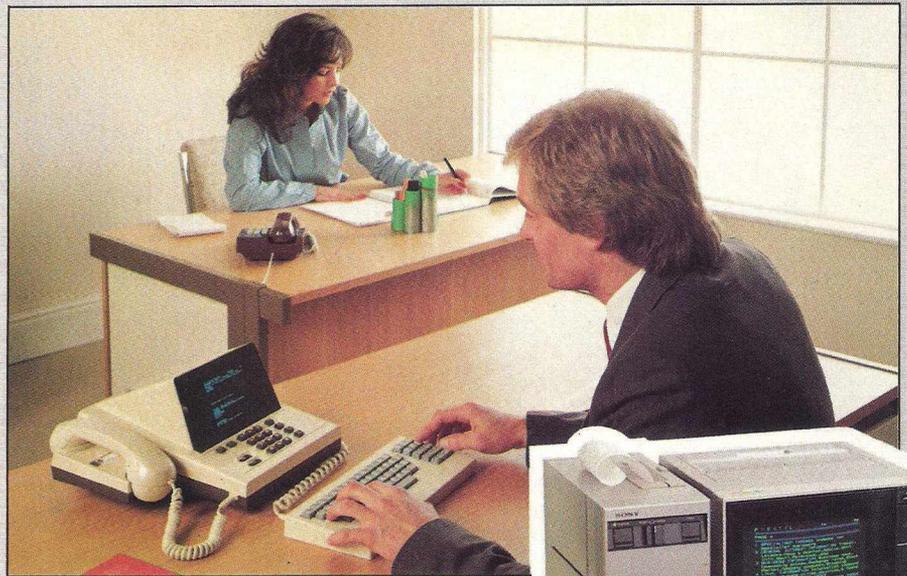
## ALTERNATIVE MEANS OF ACCESSING PRESTEL

If you prefer not to use your microcomputer as a terminal there are several alternative means of accessing Prestel and private viewdata services. Most of the major manufacturers now offer viewdata versions of their colour televisions, complete with numeric keypad; the additional cost over the standard model might be in the region of £200.

If you already own a colour television (or indeed a black and white one, although monochrome misses out on many of Prestel's best effects), adaptors are av-

ailable that will enable your set to receive and display viewdata information. These cost from about £160, although special offers are not unknown. Tandata's *Alpha Tantel* has an alphanumeric keyboard and costs £225 + VAT. For business users, the answer is probably a dedicated viewdata terminal, which can not normally be used for receiving broadcast television.

The most elegant and ergonomically satisfactory terminal we have tested is Plessey's *Vutel*, a self-contained unit about the size of three telephone directories piled on top of each other. Built into



Above: Plessey's *Vutel* was the most elegant system we tested. Right and inset: Sony's *KTX-900* is the State-of-the-Art, whilst the *Alpha Tantel* will couple onto your micro for around £200.



it are a modem, loudspeaking telephone, numeric keypad, and a six inch diagonal black and white screen. We found the automatic dialing facility a blessed relief after doing it manually on a microcomputer plus adaptor; the *Vutel* also automatically identifies itself, leaving you only to type in a four figure password.

The *Vutel* has minimal memory: enough to store two pages. After five minutes of non-use the display automatically cuts out, in order to preserve the life of the terminal. The screen information is stored and may be recalled by pressing any key. Incoming telephone calls can be taken on the built-in handset in the usual way. A full *Vutel* kit including the optional alphanumeric keyboard (essential for electronic mail) and dot matrix printer would cost just under £1000; the numeric *Vutel* on its own, about half that, depending on quantity.

The state of the art in viewdata terminals is almost certainly *Sony's KTX-900 OUD*. This has a superb 9" Trinitron colour display, alphanumeric keypad as standard (a full-size typewriter keyboard being available as an optional extra), and a 14-page memory. Not only does it have automatic dialling facilities for up to six different numbers, which is useful if you have to access different computers, but also auto-redial, which will keep trying until it achieves a satisfactory connection.

One feature which appeals to users of private viewdata systems is local page assembly, the ability to edit a page in off-line mode: this page can then be stored, recorded or printed out. *Sony's* printer is so good it has become almost a standard. Full control of a tape recorder is possible direct from the keyboard, so data can be stored and played back without connecting to the host computer. Being *Sony* the manual is a model of clarity, and even the output ports are labelled, a practice almost unheard of in the industry!

At £750 the *KTX* isn't cheap, but if you need colour and all the special facilities you will be hard pushed to find a better system for the money.

with their dealers and several companies with national distribution networks are also expressing interest in using it for order processing.

"These guys are promising to throw in an adapter and a year's Prestel subscription for less than a quarter of what British Telecom have been charging us to fit a modem to our microcomputers," says one awed corporate D.P. manager. Others see line cost savings as the principal economy. Since more than two thirds of the country is now within local call distance of Prestel, telephone charges are low, particularly if the information is transmitted at cheap rate times when there is no additional charge for computer time. By June all but 8% of telephone subscribers will be within local call range.

In a sense Hease's *MicroNet* syndicate will be competing against British Telecom, who already offer similar services. He sees no conflict, despite the fact that B.T. are themselves participants in his venture. So far more than £500,000 worth of Telecom money and resources have been committed to the project. The other participants, East Midlands Allied Press, and Hease's own companies, have injected £1m, he says. The profits, when they arise, are to be shared proportionally.

Why did they do it? Sources close to East Midlands Allied Press suggest that when their current blue-eyed boy, David Arculus, was given his brief to develop micro computer publishing to offset losses in other fields, one of the conditions was that he take on with it the responsibility for Viewdata. Sensing that being a Prestel information provider would never lead to the streets paved with gold, Arculus sought a means of turning the division around. At this point Hease who had been hired by EMAP as an ideas man, came up with the concept of *MicroNet 800*.

The pre-Habitat decor of Hease's office suggests that little of the investment money has gone on erecting the sort of luxurious front now apparently considered essential to the successful launch of high technology products. "We have the sort of headaches – and some of the costs – you would expect if

you were launching a 30,000 page magazine," he sighs.

Thirty thousand 'pages' of information is the aim, and the organisation with its hierarchical arrangement of editors and correspondents, many drawn from Hease's personal computing contacts, reflects this. The advertising sales office, staffed by eager young men in Burton Suits and sideboards, mirrors too the organization's publishing provenance. Ambition here may, however, be tempered by the natural caution with which advertising agencies treat the viewdata medium. For the first year, at least, it is likely that most of the bookings will come from information providers themselves.

There are plans also for a *Teleshop*, equivalent to the classified advertisements in a newspaper, for Apple, Commodore, Sinclair and other kit. 'Readers letters' are to be solicited for the sections on each of the machines supported. Clearly much of the flavour will derive from the enthusiasm with which individual micro buffs approach the system. It is probable that schools will provide a high proportion of the input initially.

Hease sees them – and owners of the targeted machines – as the two prongs of his attack on the microcomputer market. A big educational database will be online at the launch, and a reduced daytime rate of call charges in force. His intention is to encourage schools to swap ideas and programs written by students and teachers using the *MicroNet's* educational exchange library.

More ambitious plans are afoot. A variety of computerised courses are envisaged, starting with computing. With every secondary school in the country now equipped with at least one microcomputer, Hease sees no reason why *MicroNet* should not be the medium that links them together in a network of extraordinary creativity.

Out on the street, two elderly diamond traders of biblical mien are computing the terms of a complicated deal; they use an abacus.

## ELECTRONIC MAILBOX

**Mailbox is Prestel's electronic mail system, currently available only on the Enterprise computer in London. Other Prestel users can access it, but may incur STD telephone charges.**

**To use Mailbox you need an alphanumeric keyboard, not standard on most Prestel sets and adapters, although often available as an optional extra; computer users joining MicroNet 800 will presumably have one already.**

**To address a Mailbox message to your beloved, you need her Prestel account number. There is in fact a Mailbox directory on page 1909 should the loved one's number have unaccount-**

**ably slipped your memory. Having selected the appropriate Mailbox page – full greetings card or ordinary message – you type in the text. The Enterprise computer then offers you the option of sending or not sending the message if you've got it wrong.**

**Assuming that you do send it, best beloved will be informed that a message awaits the next time she calls the Enterprise computer.**

**At present Mailbox is only available on this computer in London, but the service is due to be extended, and MicroNet plan to offer a similar service for microcomputer users.**



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Buying a microcomputer is a bit like buying a car – as well as comparing specifications, the 'feel' and 'image' of each model. So this month, *MicroComputer Printout* is starting a new concept in computer evaluations: we call them the Group Car Tests.



In this review we look at two home computers from near the bottom of the price range.

One is the *Dragon 32*, produced by Dragon Data Ltd; the other is the *Lynx*, which is manufactured by Computers Ltd., of Cambridge.

Both computers require an external cassette and a TV or monitor, but are otherwise complete.

#### PHYSICAL APPEARANCE

The *Dragon* is the larger of the two machines, measuring 15"x13"x3½". This is slightly too large to be comfortably perched on the lap in front of the fam-

## Animal magic

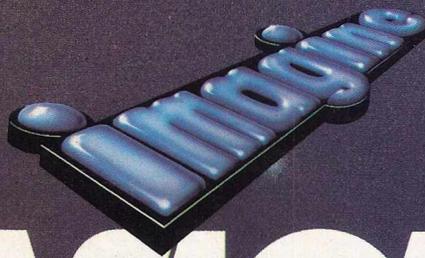
**We'll be comparing two or three products with similar appeal each month, and reporting on the differences between them which matter to you, the buyer. This month we compare two new entrants to the home computer market, the *Lynx* and *Dragon*.**

ily TV and not really large enough to balance a portable TV or monitor on the top. The case is cream plastic with all the peripheral connectors arranged round the back and sides.

The *Dragon* has a connector to allow games cartridges to be plugged in (see below), and the hole surrounding this connector is surprisingly large, allowing even a large hairy adult hand easy access to several components.

This is not a health risk for the owner of the hand, as the voltages inside the cabinet are very low, but it would be very easy for a small child or baby to

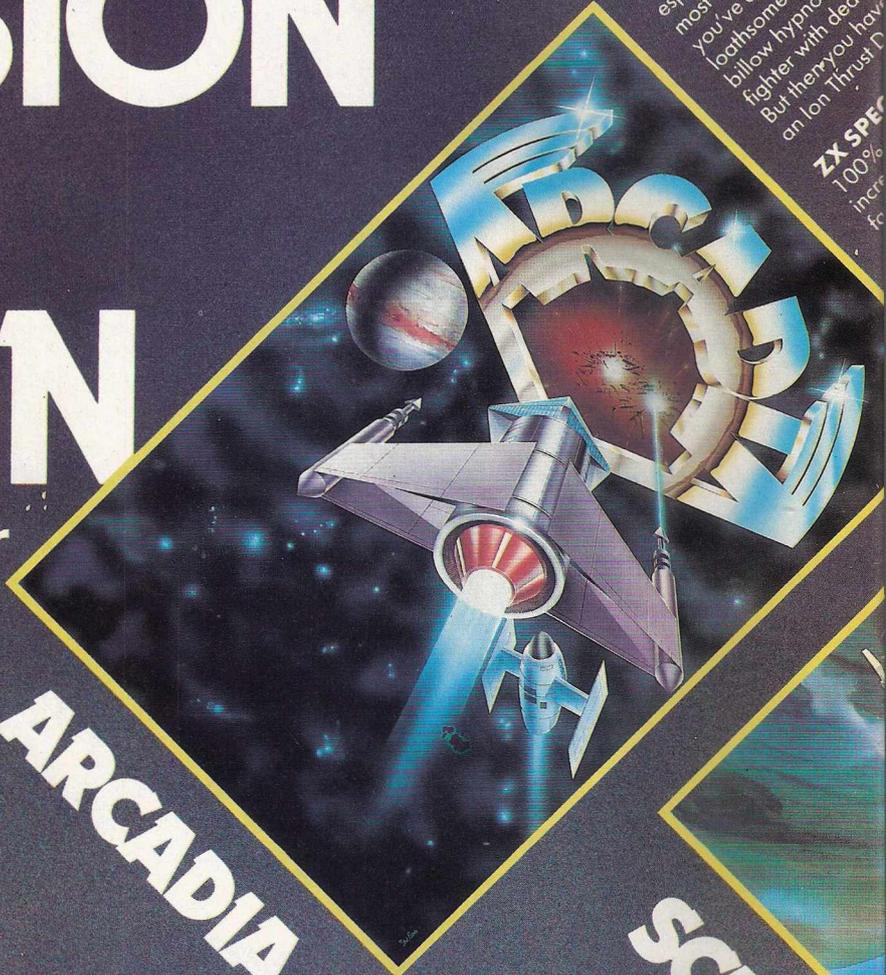
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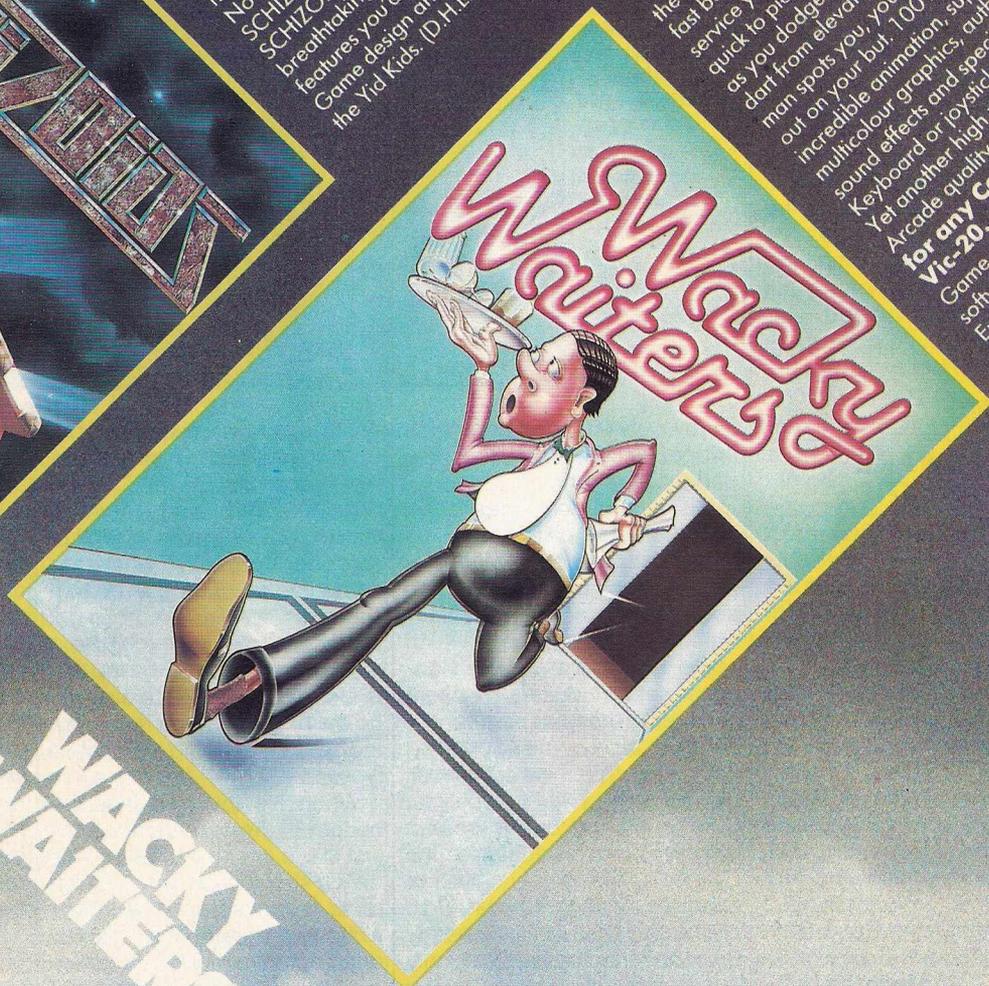
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...your space  
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...aven't you?  
**C-20 (any memory size)**  
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...animation and explosive effects, sound and the  
...smoothest hi-res graphics ever!  
...100% machine code with eight different alien types,  
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**for any ZX SPECTRUM.**

It's my own fault. I even volunteered.  
I thought that with the space-dozer and its shovel and skyhook  
it would be easy shifting the galaxy's rubbish.  
Childs play. HUH! They warned me of the weird packaging,  
but they didn't say I'd have to stop and control not just one but two  
or even more garbage pods. Then prod them, push  
black, and so lonely, so empty.  
Panic, mustn't panic, but they won't stop, twirling and  
spinning and turning, always turning, towards me, against  
me, at me. And I'm alone.  
No way out, nowhere to hide, on my own, my own... own...  
**SCHIZOIDS: NOT JUST A GAME, BUT A STATE OF MIND.**  
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as you dodge the drunks and  
dart from elevator to elevator, coz if the Boss  
man spots you, your gonna be  
out on your but. 100% machine code,  
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Yet another high performance  
Arcade quality experience  
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**Vic-20.**  
Game design and  
software by  
Eugene Evans.

**WACKY  
WAITERS**

**Imagine**  
...the name  
of the game

## Group Car Test: Lynx V Dragon

damage the machine by poking around inside the machine. It might also be possible (although we did not have time to test this during the review) to lose a pet mouse or gerbil into the machine, although the Editor's Labrador would have had a squeeze.

The *Lynx* is a much smaller machine, measuring 14"x8 1/2"x2 1/2", and constructed from grey plastic. This is small enough to perch on the knees, although this is not really recommended for accurate typing.

Once again the peripheral connectors are arranged around the back of the machine, although this time without any dangerous holes.

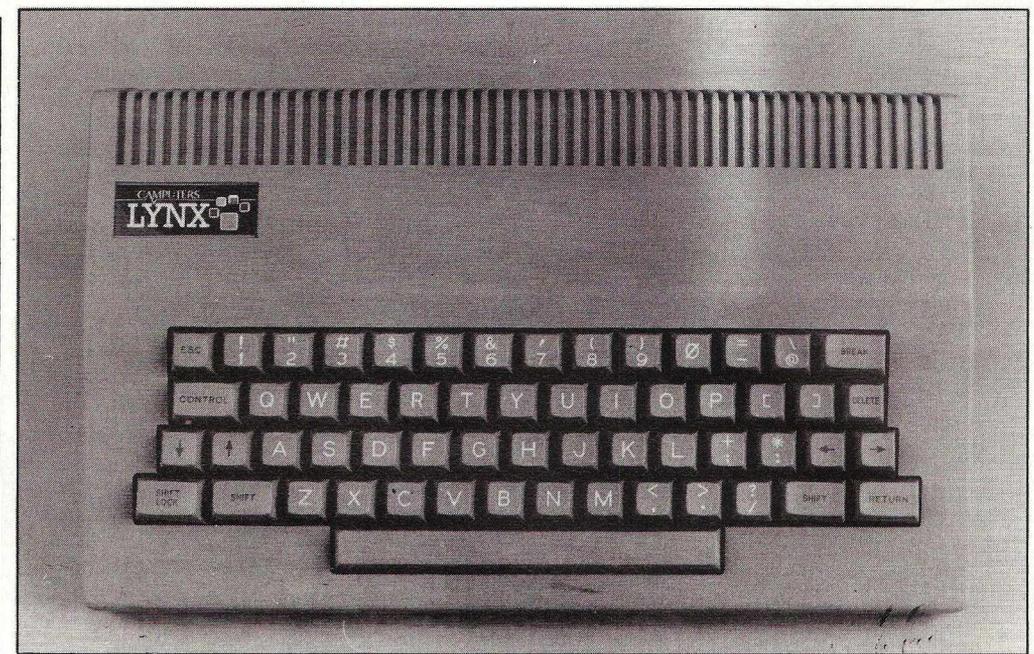
Both machines use a separate transformer (supplied with the machines). The *Dragon's* comes with a handsome 11 feet of cable, the *Lynx's* a little shorter at 8 feet, although in this case the length of cable from the transformer to the computer is not long enough to allow you to put the transformer on the floor, whereas the *Dragon's* was just long enough. Putting the transformer on the floor has two advantages. Firstly something already on the floor cannot fall there and get damaged, and secondly, it leaves a bit more room on the table for papers and magazines such as *Micro-Computer Printout*.

### HARDWARE CAPABILITIES

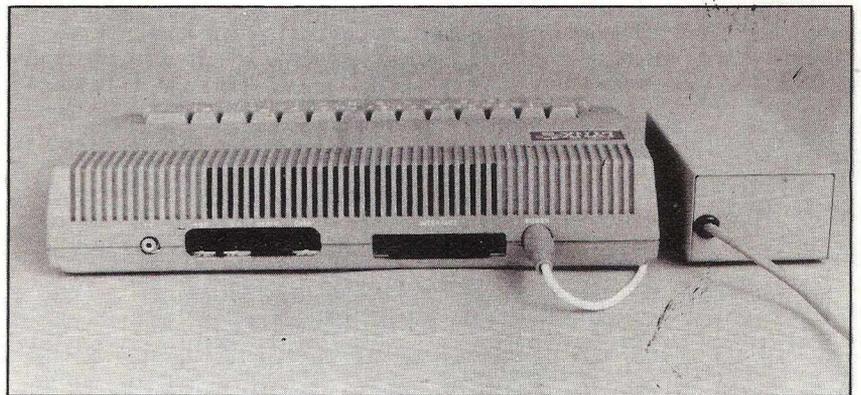
The *Dragon* has just over 24KBytes of memory available for BASIC programs (a Byte is a unit of memory capable of holding a single character) whereas the *Lynx* only has 13K. This means that much larger programs can be written to run on the *Dragon*, although even the *Lynx's* 13K is adequate for a large number of games and is good by the standards of the price range.

A good screen display is very important if a computer is to be easy and enjoyable to use. Both computers could provide displays in Text Mode, in Low Resolution (or Block) Graphics Mode (where each graphics symbol is the same size as a character) and in High Resolution (or Dot) Graphics Mode, where a finer resolution is available for graphs, line drawings and so on.

The *Dragon's* text display consists of 16 rows of 32 characters, shown as dark characters on a light background; the *Lynx's* display is a much better



**Keyboard is a strong point on the Lynx, and interfaces include RS232 and a light pen.**



24 rows of 40 characters, which appear as light characters on a dark background.

It is generally considered that a light-on-dark display such as the *Lynx's* is better for many reasons such as X-ray emission and ease of reading (especially with domestic TV sets which come nowhere near the standards set by industrial monitors in either of these departments), so it is always disappointing when a new machine arrives still using a dark-on-light display.

Although the *Lynx's* screen display is much better than the *Dragon's*, it is terribly slow. For example, printing 10 lines of 16 characters took the *Lynx* nearly 6 seconds, compared with only a few tenths of a second for the *Dragon*, which is about typical for a home computer.

It is possible to speed up the display by working in, say, green, rather than white.

This is because the computer has three banks of memory for handling the screen display, one for each of the three primary colours, red, blue and green. By telling the computer to work in green, it only has to use one bank of memory, and

prints much more quickly, but still unacceptably slowly for most purposes.

Another surprising feature of the *Lynx* display was its lack of scrolling. Normally, when the computer reaches the bottom line of its screen, it 'scrolls up' the display, moving each line on the screen up so that the top line is lost, but leaving a blank line on the bottom. This is much like the paper feeding out of a typewriter.

When the *Lynx* reaches the bottom of the screen though, it just starts again at the top! This effect should not affect programs, because on a properly-written program the display does not scroll, but it becomes a nuisance during program development.

On a normal computer you can be fairly sure that you are working at the bottom of the screen, whereas on the *Lynx*, if you look away from the screen to the keyboard, or to your notes, you had to 'hunt' the screen to find out where you were.

Both computers can display in 8 colours, but the *Dragon* can only print 'text' in its normal black and green form, whereas

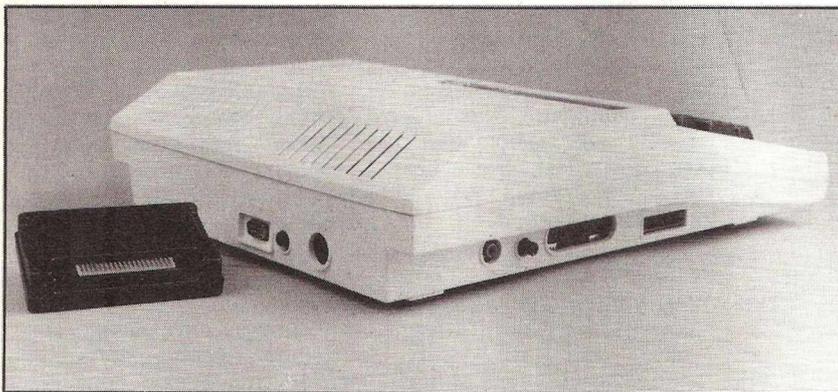
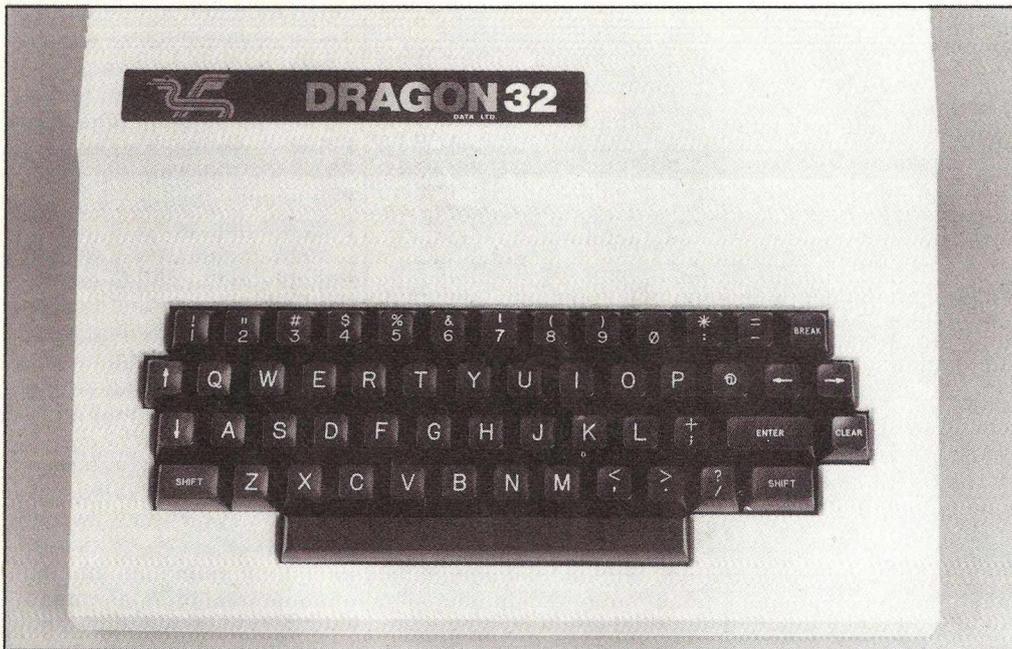
the *Lynx* can vary independently the background colour and the colour of the text being printed.

Another drawback to the *Dragon* display is the fact that it cannot display lower case letters, so that all text is shown as capitals. While it is generally agreed that upper case letters are easier to read (and most programmers work exclusively in upper case), this means that you are unlikely to find programs (such as word processors) which manipulate text being written for the *Dragon* as they are being for other small home computers.

The most important method of inputting data into a computer is the keyboard, and it is important that it be a good one.

Both machines have full-size keyboards of the moving-key type, as opposed to the touch type found on some cheap home computers, which are not really satisfactory.

The *Lynx* keyboard is really very good, and all the keys are 'auto-repeat', which means that if one is held down, after a short delay the character begins to repeat.



*Dragon keyboard suffers from a slow response. There is a slot for games cartridges, though other interfaces are limited.*

The *Dragon* keyboard on the other hand has a rather woolly feel to it, although this would probably not be noticeable to anyone but an expert typist, and is certainly not a handicap. It does not have any auto-repeat feature, neither does it have a repeat key.

Moving away from the purely mechanical aspects, neither machine has a 'type-ahead' facility, which allows the user to carry on typing information while the computer is busy doing something else.

This was especially annoying on the *Dragon*, which has a very poor response to the keyboard indeed, in that typing quickly means that the computer misses literally every other character! This will affect even newcomers to typing, because some BASIC command words such as RUN and LIST are typed so often that you cannot help learning how to type them quickly, and anyone who can type has to deliberately slow down to allow the computer to keep up, or 'LIST' becomes 'LS'!

The *Lynx* is provided with CONTROL and ESCAPE keys,

but the manufacturers have chosen not to use the established conventions of such characters as CONTROL-X, CONTROL-S, and CONTROL-L.

When will small micro companies learn that they cannot be a law unto themselves and ignore established conventions? Why use CHR\$(4) to clear the screen when everybody else uses CHR\$(12)? Clive Sinclair chose not to use the ASCII code sequence for holding text in his early computers but he has now learned his lesson!

There are, however, some very useful control codes providing features such as subscripts and superscripts, double height characters and also an interesting (but fairly useless!) ability to overwrite characters, as you would on a typewriter.

Another very useful feature on the *Lynx* is the ability to re-define the character set. This allows you to add accents to letters, for example for doing French homework (you then have to find a printer to print out your essays of course!), but more important it allows you to

manipulate graphics objects such as space invaders (see the graphics section of a further discussion).

'No computer is an island, entire of it self', and anyone but the least ambitious of computer owners will want to connect their machine to something else, if only to a joystick for more realistic games.

Both computers have sockets for a TV (of course!), a monitor (which give a higher quality display, but does not have sound), and a cassette (see section on 'Cassette Recording').

Apart from this *Dragon* is very limited in respect of the number of ports available for hooking up extra goodies. It does have two sockets for joysticks, which are a must for enthusiastic players of action games.

Joysticks come in two breeds, the 'switch' type, which consists of four switches arranged at the points of the compass, so that if you push the joystick forward one switch closes and if you pull it back another one does, and the 'potentiometer' type, which give the computer a continuous

range of values as the stick moves backwards and forwards.

It is this second type which is used by the *Dragon*, and I would rate that the better of the two systems. These joysticks are in fact currently available.

The *Dragon* also has a parallel (Centronics) printer port. Most printers are connected to their computers by one of two systems, parallel (or Centronics), or serial (RS232). There is little to choose between the two systems, and in fact many printers these days offer a choice of system.

The *Dragon* also has a socket for using with games cartridges. Buying a game on a cartridge has the advantage that there is no delay loading a program, you just turn on the machine and there it is. Cartridges do not suffer with the loading problems which are bound to occur when cheap audio cassette recorders are used for storing computer programs.

The problem with cartridges is that the plug and socket wear out as their gold plating is rubbed away, although this should take years rather than months to happen. The problem with the *Dragon* socket, as mentioned above is that there is a large gap round the socket, although this does form a convenient 'handle' for carrying the computer around!

In contrast to the *Dragon*, the *Lynx* has a serial RS232 port, which has the advantage of being usable not only for a printer, but also for a modem (which allows computers to talk to each other down a telephone line), and in fact many other devices use an RS232 system, allowing the *Lynx* to be used as a data collection device in industry, for example.

The *Lynx* also has provision for a light pen, which can be used with suitable software to draw pictures on the screen, or to let you make selections from a list of choices by pointing to the one you want.

The last port on the *Lynx* is a general expansion port, which theoretically allows devices such as disk drives, memory expansion units, second processors and such like. It remains to be seen whether these devices ever materialise though! This port will also be very useful for electronics hobbyists wanting to drive synthesisers or their train sets from the computer.

The *Lynx* manual states that this port is used for connecting

# Group Car Test: Lynx V Dragon

joysticks to the computer, although this looks unlikely from the circuit diagram.

Both computers also have the ability to make sounds, either for more realistic games or for actually playing tunes. Both machines have the 'normal' sound commands often found on micros, where you specify a note and duration by means of two numbers. Using this system it is possible to work up to a recognisable tune, but it can be hard work!

However, the *Dragon* also has a 'PLAY' command specifically for playing music, which allows you to specify notes in musical notation (A, E, etc., even sharps and flats), select an octave, set note and rest lengths (including dotted notes), and set the volume and tempo of the piece. You can easily store a phrase to make it easier to repeat it.

Another *Dragon* facility is the ability to feed the audio signal from the cassette deck through to the TV! This (as far as we know unique) feature allows proper background music for your adventure games, or even 'comment' from a teacher in an educational program.

The *Lynx* in fact uses a 6-bit Analogue to Digital convertor, rather than the more common simple tone generators. This, in theory gives the *Lynx* more flexibility – even to the point of producing crude speech synthesis. In practice it will depend on how much software is developed to drive this arrangement.

## THE GRAPHICS DISPLAYS

Graphics displays can be divided into two kinds, 'block graphics', where the graphics characters are the same size as normal text characters and (ideally) can be used for drawing tables and diagrams as well as for games. Block graphics is definitely low resolution, unlike 'dot graphics' which may be either high or low resolution (often depending on whether you are reviewing a machine of advertising it!).

As the block graphics characters are just characters like any other ones, the above description of the text displays also applies to them. The *Dragon* has 16 graphics characters against the *Lynx*'s 26, although 7 of these are pretty useless; they can only be used to form the *Lynx* logo.

Now we move onto dot graphics. We judge the quality of a computer's graphics dis-

play depends upon the 'resolution' (the number of dots on the screen), the number of 'colours' (which may be linked to the resolution, in that some computers allow many colours at low resolution, but only two colours at high resolution), and the 'speed' at which the display can be set up, which is important for impressive moving displays.

The *Lynx* has a high resolution graphics system with a resolution of 256x248 dots, in eight colours. It has BASIC commands to plot points and draw lines, but not to manipulate complete shapes. This means that it is difficult to write programs where shapes move about the screen (but see the discussion of user-defined characters below).

The *Lynx* can however display high-resolution dot graphics at the same time as text, so that graphs and diagrams can be labelled easily. In fact the text can be positioned to within one dot position to make it fit in with the graphics; unlike most computers where the text positions are fixed to character positions, so that the graphics display has to be adjusted to fit in with the text.

The *Dragon* can plot dots on the text screen, with a resolution of 64x32 dots, which is a low resolution display.

Plotting higher resolution on the *Dragon* means that the text cannot be displayed without a great deal of trouble. These higher resolutions also mean a reduction in the number of colours which can be displayed.

There are five high-resolution modes, varying from a resolution of 128x96 with four colours to 256x192 with two colours.

It is possible to set up graphic displays on a number of 'pages', only one of which is displayed at any one time, and to produce animation by switching from one page to another. The number of pages depends upon the resolution we want to use, being lower at the higher resolutions.

As well as the basic commands to draw lines and points (which are quite powerful), the *Dragon* has commands to draw rectangles, fill in an area of the screen, draw circles and ellipses.

These commands are often found in home computers (and much praised by the manufacturers), but they really are not of too much use for serious graphics.

Unless you are using a computer for technical drawing (in which case you will want a

much more powerful machine than either of these), you will want to draw much more complicated objects for animated programs than ellipses and rectangles.

Fortunately, the *Dragon* has a 'DRAW' command which allows quite complicated objects to be drawn easily, including facilities to change the colour and scale of an object, move without plotting and to include 'standard' pieces within the object.

The *Dragon* also has the facility of being able to store areas of the screen into ordinary BASIC arrays, from where they can be put back on the screen in different places, thus allowing moving objects to be drawn more easily and quickly.

We have already mentioned the *Lynx*'s ability to re-define the character set. Apart from allowing you to write in Turkish or Cyrillic, this is the best way of manipulating objects in high resolution graphics. A small object can be programmed as a single character while larger, more typical, objects can be built up from several characters, which can still be printed together quite quickly.

The disadvantage of this system is that it is rather fiddly for newcomers to computers who are not used to thinking in terms of bits.

The *Dragon* system of drawing an object and then storing it into an array is much easier to use.

## BUILT-IN SOFTWARE

A computer always needs to have a program to tell it what to do. Some programs are written by computer users, and are loaded into the machine from disk or cassette. Other programs need to be loaded into the computer before the machine can do anything at all, and these programs are referred to as the *operating system*.

In order to run a program written in a high-level language such as BASIC or PASCAL, a *language system* has to be added.

In most home computers, both the operating and language systems are built into the computer so that they are both instantly available when you turn the machine on. Both the machines under test here fall into this category, and in these machines it is quite difficult to tell where the operating system (which is very primitive anyway) starts and BASIC ends, so we will just look at the operating software as a whole, and call it 'BASIC'.

The *Dragon* BASIC was written by Microsoft, who really are the top software house for language systems. Although the *Dragon* is based on a 6809 microprocessor, the BASIC is very similar to Microsoft's standard Z80 BASIC system, the major differences being in the graphics statements.

Some of the less common features of this BASIC are the 'INSTR' function (which searches a string for a substring) and a PRINT USING statement which allows the data printed on the screen to be formatted properly.

Probably the most useful feature of this statement is the ability to format numbers so that they always have a certain number of decimal places. Using this we get 13.29 instead of 13.286546 and 13.00 instead of 13 etc. Using this form of display makes all sorts of programs appear much more polished and professional.

As nobody is perfect (with the possible exception of our Editor), programs often need to be corrected or altered, a process known as 'editing'. Unfortunately, the *Dragon* suffers from the same editor as that used in the Z80 Microsoft BASIC, which really *will not do* in a modern microcomputer.

Without wasting too much time on it, the editing technique used is exactly that which we had to use in the old days of the sixties and early seventies, before VDU's were common, when the only peripherals we had were teleprinters. As you cannot move a cursor around on a printer, editors had to work by using 'commands' to move an imaginary cursor around, insert and delete characters, and so on.

These days, of course, we have screens, and editing can be made much easier by altering things on the screen using the keys carefully provided by the keyboard manufacturer!

The only really unusual feature in the *Dragon* BASIC is that there are no proper error messages. Instead we get 'NF' instead of 'NEXT WITHOUT FOR', or 'SN' instead of 'SYNTAX ERROR'. Not the end of the world, but a little confusing for a newcomer to computing who has enough problems without trying to remember what 'LS' means.

The other problem with this sort of thing is that I always manage to get an error message which is not in the manual! With a full error message you can usually work out what is wrong

even if the message is not covered in the text, but what can you make of 'SQ'?

The *Lynx* BASIC on the other hand is really excellent, and was written in-house by Computers. Apart from the normal BASIC commands found in low-cost home computers, the *Lynx* also has a full range of statements not always found in computers with another zero in the price!

We will briefly skim through a few of these, so if you are not already a BASIC programmer you may prefer to skip the next few paragraphs. The *Lynx* includes a number of editing and debugging aids including auto line numbering; APPEND, TRACE and RENUMBER commands as well as a command to slow a program down to give you more chance to see exactly what it is doing.

String handling on the *Lynx* is a little unusual (although by no means unique). Instead of strings being variable in length up to a universal limit (usually 255 characters), they are normally limited to 16 characters, and if you need longer strings (up to a limit of 127 characters which is too short for many applications), you can specify this by means of a DIM statement.

Note the *Lynx* BASIC only supports single-dimension arrays, and also limits variable names to a single character. Although numeric variables allow both upper and lower case names (so 'A' and 'a' are different, which is rather confusing for anybody who has used another, more standard, computer) giving you 52 numeric variables, you are limited to 26 strings, which is liable to be a restriction on program complexity.

Some previous reviews in other magazines have pointed out that the *Lynx* does not support string arrays. *Micro Computer Printout* is the first to tell you that the *Lynx* now *does* have string arrays. Computers have bowed to public opinion and added this feature.

Particularly impressive are the aids to structured programming. As well as structured features such as procedures (but not user-defined functions, surprisingly) and REPEAT..UNTIL and WHILE..WEND constructs, program listings are automatically indented, so you can easily see the range of FOR-loops.

Also (Hip Hip Hooray!). The *Lynx* checks the syntax for your program *as you key it in*, not when you are proudly showing off your latest whiz program to

your friends. Unfortunately, Computers have not gone all the way and made the BASIC tell you exactly where on the line the error occurred.

Interesting functions include one to convert lower-case letters in a string to upper case, integer division and a modulo function, and a function to calculate factorials.

The *Lynx* also includes a machine-code monitor, but as this has no assembler or disassembler it is not much use for program development.

One last useful feature: you can print out values of arrays or expressions in direct mode *without* typing PRINT, just what you would type after a PRINT statement. This makes using the computer as a calculator much more convenient.

The program editor on the *Lynx* is much more convenient to use than that on the *Dragon* as it allows you to move backwards and forwards in a line, inserting and deleting characters by using the cursor control keys instead of having to remember a list of commands. It is still not a full-screen editor such as that found on the Commodore machines which allows you to list a block of lines on the screen and then use all four cursor control keys to move around the screen making changes at will.

## DOCUMENTATION AND SUPPORT

Both machines came with an A5 spiral bound 'Introduction to Programming' manual, which in both cases was well written and produced. Both manuals co-

vered pretty much the same ground, taking a complete novice through the first steps of connecting his computer to a TV and recorder, and getting his first program running. They are certainly a lot better than many manuals which assume a working knowledge of computers. However, both did have their shortcomings.

The *Dragon* manual, in addition to the main body of the text, had occasional 'quick reference' pages dedicated to one or two BASIC commands or statements. This is in fact a very good idea but failed in execution, but it was not always obvious if you were deeply engrossed in an explanation in the text that a particular page or pages had to be skipped.

The main complaint with this manual was the fact that there was no 'Summary of BASIC commands' which an experienced programmer or tired and jaundiced reviewer could look up if he was not quite sure of syntax of a particular statement.

In other words, the manual was very good as a tutorial but not so hot as a work of reference. This was largely redeemed by the use of markers in the margins to attract the eye to points of interest or summaries.

The *Lynx* manual commits the absolutely unforgiveable (but unfortunately still quite common) sin of not having an index. Apart from this, the manual is full of ridiculous cartoons of rather gormess-looking Cybermen which do nothing to im-

prove one's opinion of the manufacturer.

The manual does have a summary of the BASIC in an Appendix, but this is so condensed as to be almost useless.

Both manuals were fine as introductions to the computers, to be read in sequence as a series of lessons, but were a bit weaker if you just wanted to look something up.

Very important when buying a computer as when buying a car is the amount of support you are likely to get from a dealer network.

Both companies expect the majority of their machines to be sold through various multiple chains; the *Lynx* through Lasky's and Spectrum; the *Dragon* through Boots. Buying a computer through one of these outlets is likely to be quick and easy, but you have to bear in mind that the salesmen are not computer experts, and the amount of backup you get will be very limited.

As far as the *Lynx* is concerned, sales are likely to be limited to these chains, as Lasky's and Spectrum between them have bought up the next four months' production, and Curry's are rumoured to be interested as well.

The *Dragon*, however, is also being sold through specialist computer shops. Buying from one of these should be a better bet, but of course even then the dealer may not be terribly interested in your problems because he would rather be talking to the businessman behind



## Group Car Test: Lynx V Dragon

you about a contract worth many thousand pounds.

Software choice is also a factor to be borne in mind when selecting a computer, but at this stage, both machines are relatively new and the software base has yet to develop.

However, this is the situation at the time this article was researched, that is early January. The *Dragon* already has a range of about 50 games programs, and a range of educational programs is expected within a few months.

*Lynx* software on the other hand has not yet got off the ground. A subsidiary company, Camsoft, has been formed, and the first programs are expected to appear at the end of January.

A range of peripherals is currently under design at Computers, but actual delivery dates have not yet been fixed. These include a light pen, a disk drive, and a printer, although as we explained above, any RS232 printer should work with the *Lynx*.

Both manufacturers are working on memory expansions, so you should be able to write really long programs (as long as a journalists expense claim, as we say in the trade).

In fact, as far as the display goes (which is very important in what is bound to be a 'games' machine), both machines do have serious drawbacks. If you are thinking of buying either of these machines you really have to make a list of your personal preferences and then select a machine accordingly.

### SUMMARY

Both machines offer splendid value for money as far as specification goes, although we cannot stress too often that it is often the quality of the software and technical support which makes or breaks a computer (look at the continuing success of the Apple II, which is really outclassed by a BBC Model B and would find it impossible to match either of these machines on a price/performance basis).

Both machines have their strong points: the *Dragon's* powerful music and graphics commands and the cartridge socket, the *Lynx's* BASIC; and their weak points: the *Dragon's* inability to display coloured or lower-case text, or to mix text and graphics and its keyboard; the *Lynx's* text display and also some restrictions in the BASIC.

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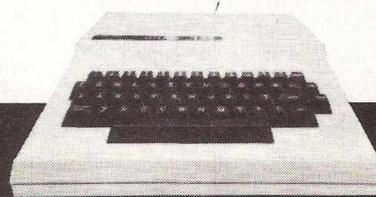
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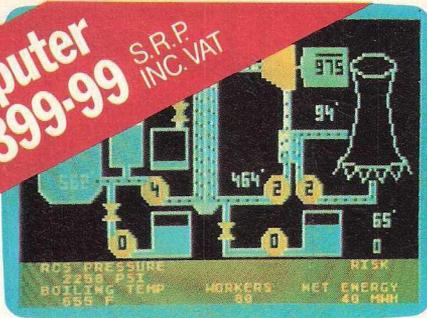
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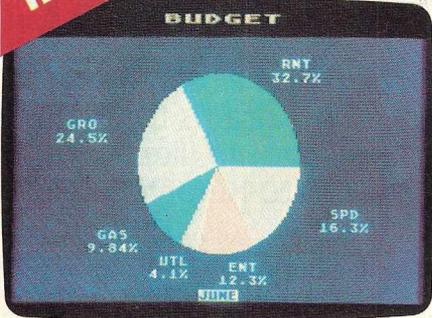
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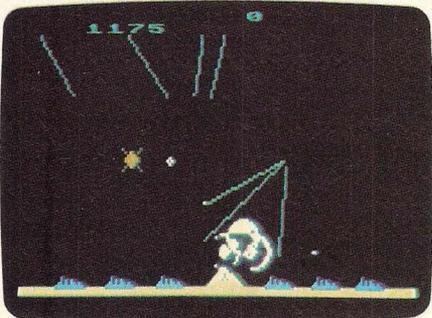
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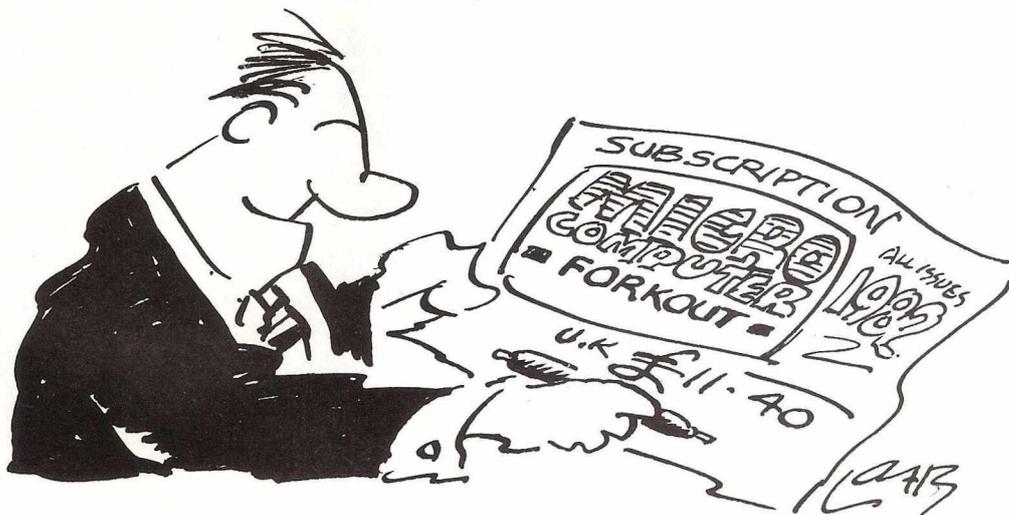
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# PET

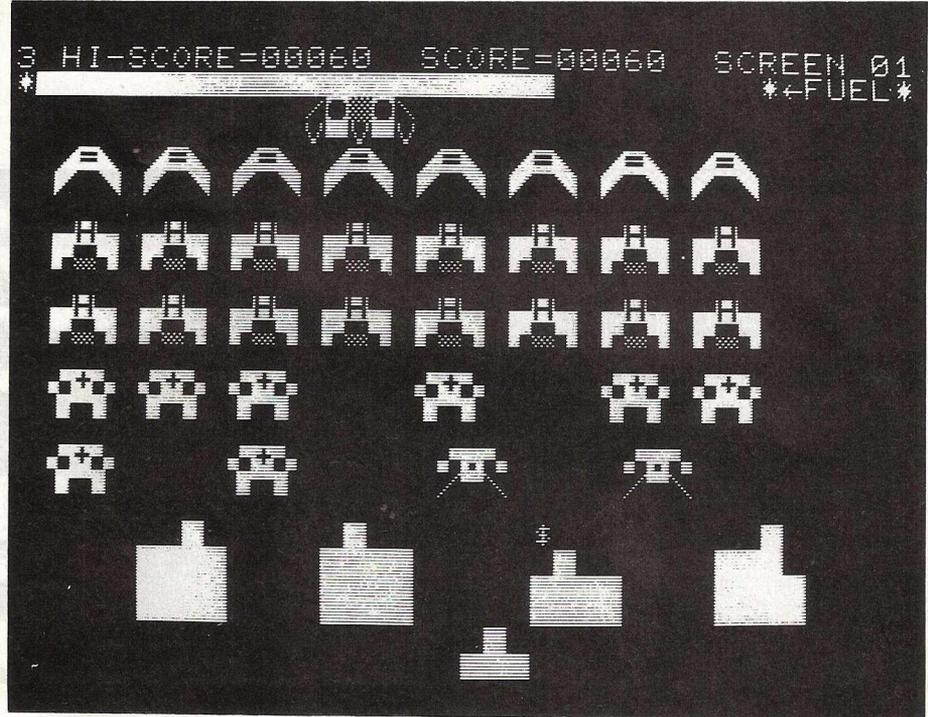
By today's home computer standards, the Commodore PET doesn't rate well – lacking colour, high-resolution graphics and sound. But as one of the first personal computers, it still has a devoted following of thousands. **Tony Takoushi** has spent the last two years playing and evaluating arcade games for the PET. Here he presents the first in a series for buyer's guides.

With the immense popularity of *Space Invaders* Commodore decided to market it's own version for the PET in mid 1980. This program sold over 50,000 copies and was an indication that the demand for quality arcadia existed and was a profitable one.

Commodore soon followed up with other titles in its arcade series and I rapidly became an arcadia fan; this article is the first of many months' painstaking research for quality arcade games. The most outstanding software came with the transfer to Audiogenic of the marketing and software production. They released *Cosmic Jailbreak* and *Cosmiads* by D. Hipkin, which will remain as classics in the history of PET software.

More recently Audiogenic has released five new titles, *Disasteroids*, *Star Fight*, *Depth Charge*, *Stellar Wars* and finally, *War*, all by the same author Kevin Moughtin. The games are of a fair standard, although *Star Fight* and *Depth Charge*, are rather lacking in graphics.

Harry Smithson, who is in charge of software releases at Audiogenic, feels that the market for PET software is declining and there are no plans at present to write any new arcade games. In fact, many of the old packages have been consolidated, for example, the old *Treasure Trove series (1-12)* has been recompiled on to three cassettes (these include various titles from the arcade series, *Car Race*, *Night Drive*,



## ARCADE GAMES

*Breakthrough*), and now represent good value for money.

Outside of Commodore a company called Supersoft, headed by the inimitable Peter Calver, specialises in PET software and hardware. They produced their own arcade series, the finest two being *Cosmic Aliens* and – which every PET owner should have. There is also the new software shortly to be released in Supersoft's new catalogue, *Blakatak* (a galaxian type game, see later for details), *Cosmic Bandit* (an excellent reproduction of *Cosmic Guerilla* from the arcades), *Tank Zone* (similar to *Battle Zone*) and *Space Invaders Part II*, which needs no description!

### Superb Copy

One of the most outstanding games to

come from Supersoft is *Scramble* (a full 16K of machine code) which originated in Germany and the rights were acquired by Supersoft for release in the UK. This is a superb copy of the arcade game called *Scramble* and has five stages to overcome.

Algray software has four titles in its range for the PET, of these *Arrows* is the most outstanding (*Zygian* was written by the same author, a 16-year old!). There is an arcade game of the same name and the PET copy is a well written and executed program that is truly addictive.

Algray did have plans to convert their VIC versions of *Defender* (the current 'state of the art' arcade game) and *Frogger*, but decided that there was not sufficient market on the PET. To date *Defender* remains the most complex

# PET ARCADE GAMES

arcade game both graphically and in playing terms, so if PET owners would like to see a version of *Defender* let Algray know!

ACT Petsoft ventured into the realm of producing machine code arcade games for the PET and released *Cosmic Invaders Mark 2*, and *Space Ace*, which were of a fair standard. Shortly after their release the company decided to specialise in more commercial packages. Their only other games venture being *Petchess* (32K).

presentation of an arcade game on the PET. It has four stages: first, an invader type game where the invaders split randomly in latter cycles of the game; very hard to negotiate! Then a meteor storm followed by an attack on a mother ship to gain a bonus. On every odd cycle there is an Astro wars type attack with very good sound effects.

Three of the four new releases by Supersoft will have PET owners playing them again and again. First, their version of *Space Invaders II* is very hard to play

*Guerilla*. Other games worthy of note are Phil Martin's *Space Invaders*, this version is far superior to Commodore's original version with many features and superb sound effects. He has also written a version of *Pacman* that is the closest to the original arcade game of all versions currently available.

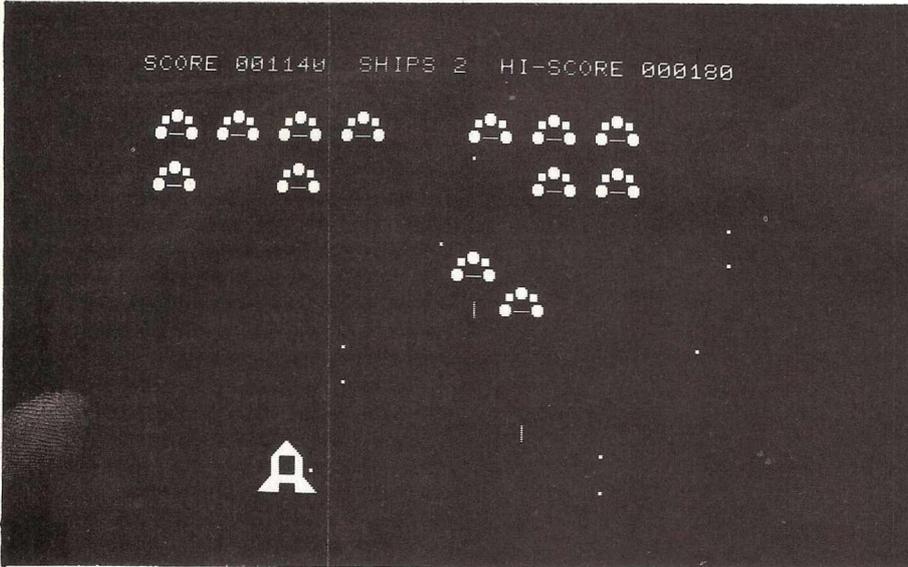
*Missile Command* and *Asteroids* are two of the hardest games to implement on the PET (mainly because the PET does not have high resolution graphics as standard, and joysticks are not readily available). *Missile Attack* is the best version available and is very addictive with good graphics, as is Audiogenic's version of *Asteroids* called *Disasteroids!*

Another new arcade game called *Crazy Kong* based on the arcade game *Donkey Kong* is a new and interesting diversion from the old invader type theme.

Many PET users will find that various programs are software protected, which is well and good for the author, but prevents back-up copies being made.

On cassette-based software this problem can be overcome quite simply by using a dual cassette recorder and making an audio copy. This will involve a certain amount of trial and error until the correct sound level is achieved, but is amply compensated for by the production of back-ups of favourite programs.

A PET arcadia championship will be held in the coming months. There will be individual winners for each game, who will then compete in the final which is over four different games. Various prizes and medals will be awarded to the overall



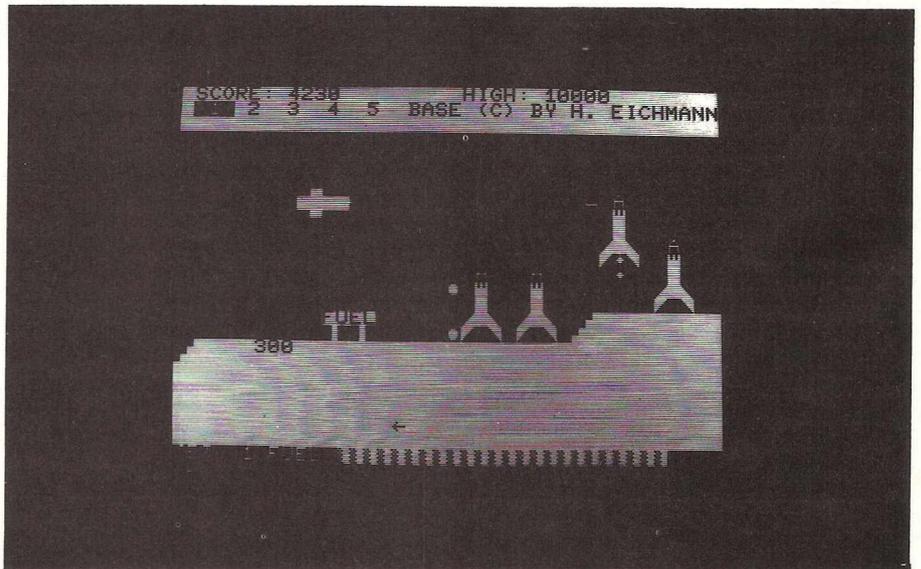
A great deal of good arcadia was found to come from individual sources. These include *Missile Attack*, a very good version of *Missile Command*, *Starforce*, a Star-wars type game from Japan that is the closest to 3-dimensional graphics I have ever seen on the PET, and *Space Invaders* and *Pacman* by Phil Martin, which are excellent versions of their arcade counterparts. Incidentally, the programs by Phil Martin use a 'Qwerty' programmable sound generator. This sound generator is far superior to the normal CB2 soundbox and warrants a closer inspection. The generator utilizes the General Instruments 'AY-3-8910' chip; the chip has three tone generators (with a 12-bit range), one noise generator which can be mixed with any tone, 3 channels of volume control (one for each tone), an envelope generator and two input/output ports (which are used for Joystick control if desired).

## Dead Pet?

With Commodore's introduction of the VIC-20, and the 64, software for the PET was felt to be neglected. Not so, as I found whilst collating this very article! I discovered over twenty new machine code arcade games for the PET which are shortly to be released, some of which rate as absolute musts for serious arcade players/collectors (see index for ratings).

For a game to be truly compulsive and challenging it must hold the right balance of complexity and graphical presentation. Of the software in the index very few fall into that category. Supersoft's program *Cosmic Aliens* is the finest graphical

*Blakatak* (above) is based on *Galaxian*, whilst *Scramble* comes from the arcade game of the same name. Previous page shows *Cosmic Aliens*.



(all fans of Commodore's original invaders will be delighted with this full feature part II copy) and *Blakatak* has four types of galaxies to face, then a dock with a mother ship for a bonus, and as if that isn't enough there are the dreaded Hammerheads to face! Finally, *Cosmic Bandit* by S.J. Darby (who also wrote *Cosmic Aliens*) appears to be a slow and boring copy of Commodore's *Cosmic Jailbreak*, but with a little patience and playing this game proves to be a superb copy of the original arcade game *Cosmic*

winner and runners up. All individuals wishing to enter may contact me at the address below for further information on venue and games to be used.

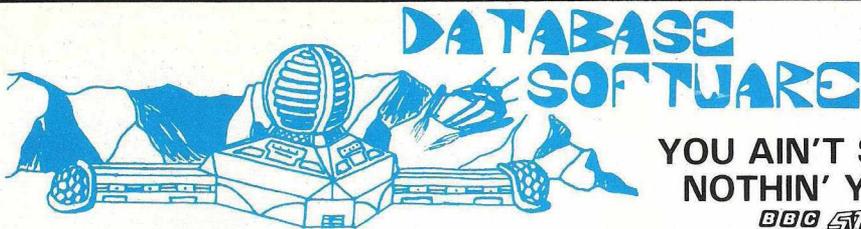
To the best of my knowledge the index covers all arcade software in the UK and some from America. If there should be any titles omitted I would appreciate being informed so the index could be updated. The PET market has decreased, but the standard of the second generation arcade games to be released has increased tremendously.

# INDEX TO PET GAMES SOFTWARE

Rating	Title	Memory Required	Language	Price	Supplier/Reference
7	Invaders	8K	M/Code	7	
9	3D Startrek	8K	M/Code	7	
7	Acrobat	8K	MC+Basic	7	
8	Car Race	8K	MC+Basic	7	
5	Night Drive	8K	MC+Basic	7	
6	Crazy Ballon	8K	MC+Basic	7	Audiogenic
6	Break Through	8K	MC	7	P O Box 38
8	Cosmic Jailbreak	8K	MC	7	Reading, Berks
9	Cosmiads	8K	MC	8	
6	Laser Tanks	8K	MC+Basic	7	
7	Disasteroids	8K	MC	7	
7	Star Fight	8K	MC	7	
7	Stellar Wars	8K	MC	7	
8	Depth Charge	8K	MC	7	
8	War!	8K	MC	7	
8	Meteorites	8K	MC	9.20	
8	Super Glooper	8K	MC	9.20	
7	Asteroids	8K	MC	9.20	
4	Space Rescue	8K	MC	9.20	Supersoft
4	Space Debris	8K	MC	9.20	Winchester House
7	Tanks	8K	MC	9.20	Canning Road
10	Cosmic Aliens	8K	MC	9.20	Wealdstone, Harrow
8	Tank Zone	8K	MC	9.20	Middlesex. HA3 7SJ
9	Blakatak	8K	MC	9.20	
9	Space Invaders II	8K	MC	6.90	
9	Cosmic Bandit	8K	MC	6.90	
10	Scramble	16K	MC	10	
8	Cloud hop/ breakout	8K	MC	9.20	
9	Mangrove root	8K	MC	9.20	
7	Cosmic Invaders	8K			
8	Space Ace	16K	MC	7	ACT(Microsoft) Ltd
6	Siege	8K	MC	14	516 Vicarage Road
					Edgbaston,
					Birmingham
					B15 3ES
9	Zygian	8K	MC+Basic		
4	Asteroid Patrol	8K	MC	6.90	Simple Software
			MC+Basic	6.90	15 Havelock Road
					Brighton
					Sussex BN1 6GL
7	Asteroids	8K	MC	10	Algray Software
7	Diatron Attack	8K	MC+Basic	6.95	Freepost Algray
6	Maze Man	8K	MC	10	Algray House
8	Arrows	8K	MC	8.95	33 Bradbury Street
8	Crazy Kong	8K	MC	10	Barnsley
					S. Yorks S70 6BR

# INDEX TO PET GAMES SOFTWARE

Rating	Title	Memory Required	Language	Price	Supplier/Reference
9	Missile Attack	8K	MC	10	See Supersoft
7	Galaxyan	8K	MC	4	I. Grey 175 Pershore Road Evesham
5	Scramble	8K	MC	4	
7	Frogger	8K	MC	4	
5	Collide	8K	MC	2	
6	Pucman	8K	MC	4	
10	Space Invaders	8/10K	MC	7	P. Martin 6 Frogston Road East Edinburgh EH17 8AD
9	PET Puckman	11.5K	MC	7	
6	Gun Fight	8K	MC+Basic	\$10	Elcomp 53 Redrock Lane Pomona CA91766 ISA
8	Money Table/ Landslide	8K	Basic+MC	10	See Audiogenic /Treasure Trove
10	Star Force	8K	MC	\$20	Astar-USA Utd Software of USA 750 3rd Avenue New York NY10017
6	Space Intruders	8K	MC	\$18	
7	Phantom Fighter	8K	MC	\$15	Magic Carpet POB 35115,Phoenix AZ 85069
7	Vortex	8K	MC	\$15	
7	Shoot Out	8K	MC+Basic	11.95	AVO (Software Dist) 131 Lord Street Hoddesdon Herts EN11 8NG
6	Road Race	8K	MC+Basic	10.95	
7	Bowling	8K	MC	10.95	
7	Bomber Attack	8K	MC	10.95	
4	Munchy Man	8K	Basic	\$9.95	Computer Mat - ARZ-USA Box 1664 Lake Havasu City Arizona 86403
4	Asteroids	8K	Basic	\$9.95	
4	Target Command	8K	Basic	\$9.95	
4	Bombs Away	8K	Basic	\$9.95	
7	Treasure Trove 1	8K	Basic/MC	10	see Audiogenic Treasure Trove series
7	Treasure Trove 2	8K	Basic/MC	10	
7	Treasure Trove 3	8K	Basic/MC	10	
7	Landslide	8K	Basic/MC	10	
	QWERTY programmable sound generator	-	-	33	a very sophisticated sound box from QWERTY services 20 Worcester Road Newton Hall Durham



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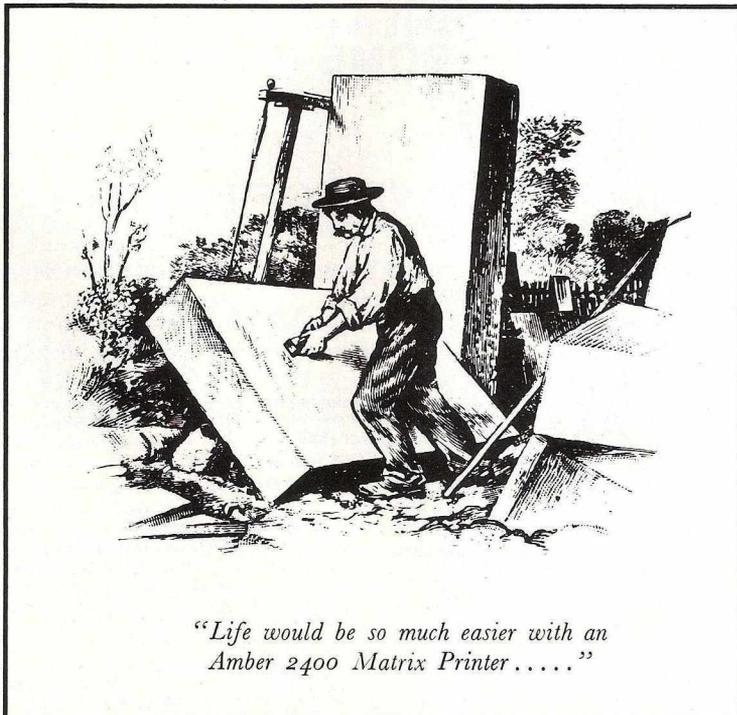
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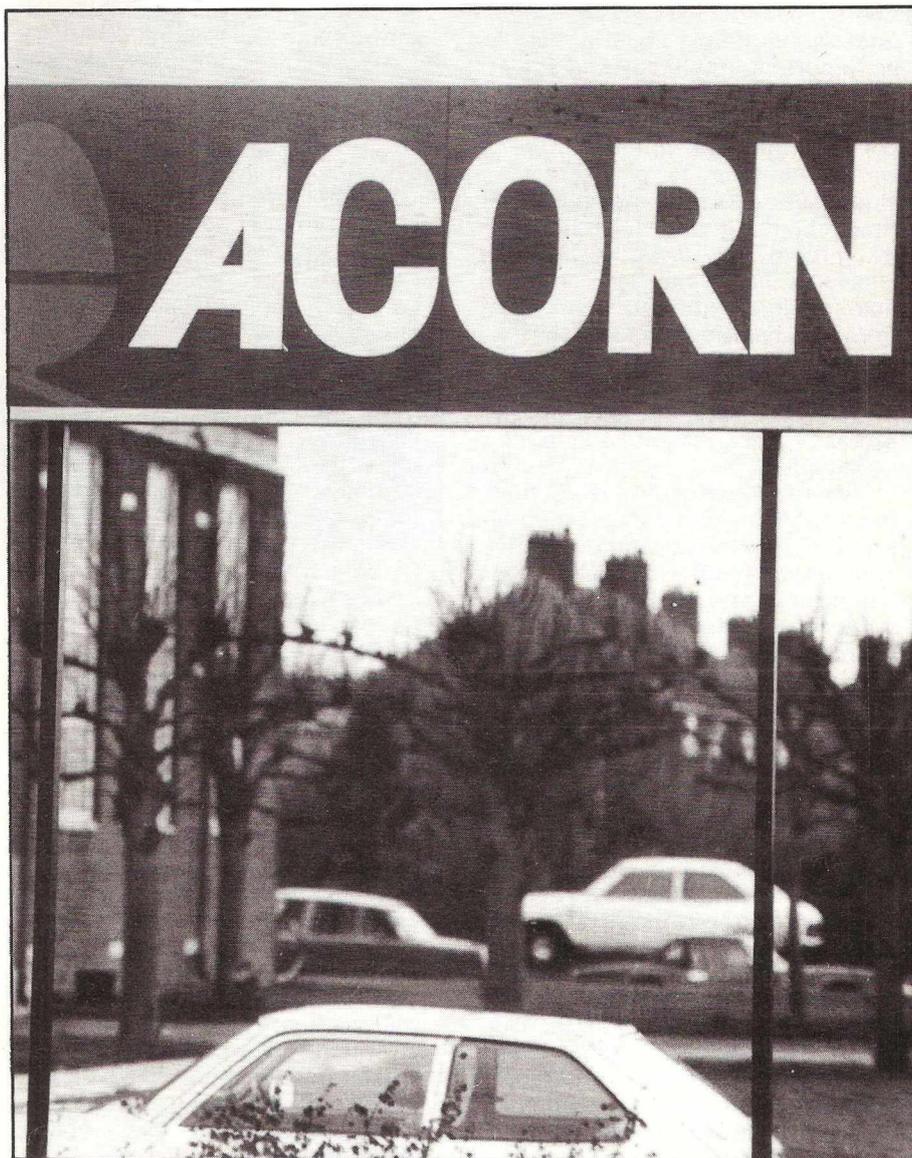
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# OO PRO FILE OO ON

Acorn Computers build the BBC Microcomputer, which along with the Sinclair Spectrum and the Dragon is a shining star in the British consumer computer marketplace. It has shot Acorn from comparative obscurity into at least the medium league of micro builders. Acorn reckons that on a turnover of £20m during 1983, it will make £4m profit. This is small beer by comparison with, say, Apple but hefty for a company which, until it secured the rights to put the magical BBC label on the case of its machine, had dawdled around in the ultra-hobbyist marketplace doing special-purpose applications for technical, scientific and academic users. The propriety of the BBC's endorsement of Acorn's machine and the undoubted commercial advantage derived from constant editorial exposure (indeed, what other kind could there be?) on its thrice-repeated series "The Computer Programme", have been the subject of ferocious rows conducted in public and stirred by a micro press eager for borborygms of real passion in a business where excitement is more observable as a marketing prophylactic than a gut feeling.

It would be tedious to go over last year's rows. This year Acorn's product, despite a sticky start, has got a good image. Its advertisements sit prettily in the Sunday colour mags among all the other lifestyle products you can buy by credit card. Indeed, Vector Marketing even promise to deliver you one, by courier and within a



fortnight. If you prefer, you may ring up an obscure BBC office over a railway station in West London, and they will send you an information pack with a lot of stuff about computer literacy and a list of Acorn's dealers (note: not stockist. The BBC Micro is not "stocked", and Acorn can get shirty with dealers who describe themselves as doing so). Or alternatively you may call Teledata who will tell you the same sort of thing as the BBC minus the literacy add-ons.

### Radical Chic

To a professional in the computer business, who has legged around companies selling "solutions" for years, or to the new breed of cash-and-carry retailer, this may look like a bizarre and bodged way of getting the merchandise to the customer. The customer, though, does not seem to mind a bit. The BBC Microcomputer is hot property. It seems to offer an indefinably right mixture of design elegance, technical up-to-dateness and radical chic. No progressive, thoughtful household with an eye to the family's future should be without one. . . . "Of course we don't understand a thing about it, but it's so important in this day and age for the kids to know about computers, don't you think? And this BBC computer must be so much more worthwhile than that proletarian video games trash pumping atavistic American cultural values into the living room. . . ." We would expect no less from this Social Democrat among micros: after all, it comes from that heartland of English intellectual life, Cambridge. Too bad the kids are likely to be hammering away at Acornsoft's version of Defender while the adults watch Omnibus. . . .

Defending or not, it is likely that the kids who use the BBC Micro are brainy. Of all the consumer computers launched in the last couple of years, the BBC Micro probably has the highest proportion of true "computerists" among its adherents. This is reflected in the high level of interest (and large quantities of software submitted to) its user groups, principal among them Beebug, and the number of advanced programming books, including already in the first year two on assembler. On the whole this is a good thing, because if you go into computing via the BBC Micro, you're going to need a Samuel Smiles pull-yourself-up-by-your-own-bootstrap attitude, if you'll excuse the expression. For though the BBC Micro is a consumer product, there is still a lot of old Acorn amateur enthusiast feel about everything else that goes with it.



### Fanatical Following

Old-time Acorn hands may disagree, but the company's first true venture into the consumer market was the Atom, which was the precursor to the BBC Micro. This machine commanded a smallish but fanatical following and sold around 25,000, mostly in the UK. Its development is intriguing, if only because it illuminates some of the quirks of Acorn's product—and operation—which even concerted committee work with BBC producers, engineers and designers could not completely iron out, and which still persist in the 1983 product.

As just about everybody who read the micro press last year must know, Acorn Computers' co-managing director Chris Curry is a former employee and close friend of Clive Sinclair. Sinclair it was who in 1966 employed Curry as a development engineer when he (Sinclair) moved his Radionics concern from London to Cambridge. Curry's wage was £11 a week, making him £2 better off than before. Curry, like Sinclair, had no tertiary education, preferring to learn on the job. "I am sometimes described as 'like Clive Sinclair, having had no formal training', which I always regard as slightly impertinent," remarks Curry, with a certain wry satisfaction. His own first significant project for Radionics was the 1971 Executive Calculator whose power-saving circuitry permitted the use of the hearing-aid battery, drastically cutting the bulk of the device.

Around 1976 Radionics got into trouble and Sinclair effectively lost control of the company to the National Enterprise Board. Curry "virtually left" and, with Sinclair, set up a little freelance operation known as Science of Cambridge which was closely akin to the Radionics of a decade previously: they aimed to sell component kits, packaged with a set of suggestions as to what you might build it into. A wristwatch calculator, for example, sold quite well. The next idea was a computer kit which was brought out—"with some reluctance on Clive's part", observes Curry—as the MK14 (Microprocessor Kit with 14 chips). A similar kit from another firm, the

Eyewood Scruppy, appeared at around the same time. "These two were the start of the consumer computer business in the UK. This machine showed the potential long before the ZX-81 appeared. . . . I sometimes find it slightly irking that the ZX-81 is known as the one that introduced the world to microcomputers," says Curry.

### Development Systems

Today's computer consumer, however brainy, would find the MK14 difficult to use, or even recognise. Its CPU was the National Semiconductor 8060, and it had 256 bytes of RAM, a small fixed memory containing the monitor, and the necessary components to drive an eight-digit LED display, and to interface the (supplied) keyboard. Everything else was optional: tape interface, an output to a modulator so that you could display the contents of the memory on a TV set. The keyboard was a conductive rubber membrane which contacted to interdigitator contacts on the PCB. Shades of the ZX. . . . except that it was in Hexadecimal. You programmed in machine code, of course. These devices sold around 15,000 at £39 a go, mainly to R&D engineers in electronics companies who used them as the basis of development systems.

But a by-product of selling to that market was a mass of technical enquiries from non-technical people who wanted to know how the kit of parts could be used to control printing businesses, or knitting machines. Recognising that free ideas were a vital complement to microprocessor kits, Curry started using freelancers to field the enquiries. Among them was a post-Ph.D. student from the University, Herman Hauser. Of course the relationship with customers was not one-way: the large telephone bill was an investment in customer feedback. What the customer wanted, Hauser found, was a display on a TV screen and a higher level language, packaged in a case. Sinclair agreed with the case, but doubted that BASIC was the way to go; besides, he already had his own project going of which Curry was no part. Curry was no longer Sinclair's "close confidant" and turned to Hauser for a new partner.

This was formed Cambridge Processor Unit, a consultancy on microprocessor applications which did a variety of projects and built several short-run systems based on modular principles and employed at one time or another many talented designers fresh out of university and untrammelled by the weary imperatives of the "real world". One such was Emerys Williams, who designed the 6809 card for the

modular system and went on to cover himself in glory by engineering the remarkable Tycom. The expandable "System" machines were not for the consumer—they were sold to colleges and laboratories; what he wanted, and got, was a machine in a box, with a real keyboard a clever graphics supported by a fast BASIC.

### Fruit machine

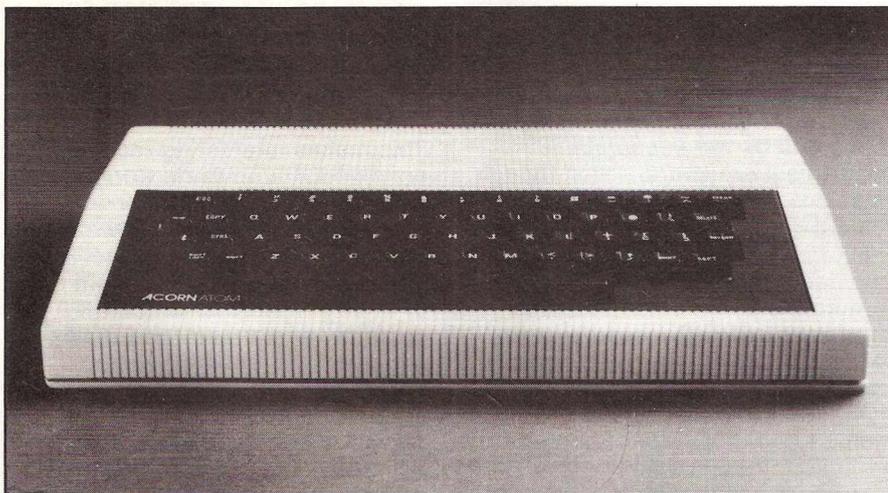
Atom BASIC had a bizarre genesis. One of the first projects CPU

establishment this year in an attempt to ensure that all new launches are accompanied by suitable software. He says that it is still an item of policy to encourage third-party software development to supplement Acorn's own, but while few people I have talked to doubt the quality of Acornsoft's wares, equally few have actually taken

"It also had to be resilient to massive spikes from the mains. One of the machines was to go into a social club at a steel works. Next



**Chris Curry (left) started as a development engineer for Clive Sinclair, and Herman Hauser (right) was originally engaged by Curry as a Ph.D. Student.**



**Acorn's Atom commanded a small but fanatical following.**

undertook was a contract worth the then princely sum of £3000 to design a microprocessor-controlled fruit machine, or one-armed bandit. Chris Curry takes up the story:

"When manufacturers first discovered microelectronics-controlled fruit machines, it didn't take the punters long to find out that if you clicked your piezo-electric lighter spark close to the controls, you could reset the processor and send such a jolt through the bus that you would get a good pay-out. So we built in a little radio receiver that picked up the spark or any other sort of powerful transmission and got to the processor bus and reset it, without doing any damage or setting the machine off on a haywire course.

door there was a shop with giant arc-welding torches so we had to make sure that at any time you could monitor the condition of the processor so that it could be stopped and restarted, if anything happened, in a controlled way." The control programs to do this were written in a language that was eventually to become Atom BASIC. Roger Wilson, still with Acorn, was its progenitor and he had to make sure that it was fast enough to stand in the stead of machine code for this sort of application. Little wonder, then, that the Atom was popular among a small crowd (25,000) of enthusiasts and engineers. Many still use it as a development tool, though it has little more than skeletal software support from Acorn, who now have

the altogether fatter BBC fish to fry.

The fact is that the Acorn Atom missed its intended market. It was aimed at education, but ironically its strongest point, its BASIC, militated against its adoption in schools. Computing in schools, says Curry, was coming under the control of a "fairly small band of people who insisted that however good the BASIC was, it was non-standard and therefore unacceptable. They considered Microsoft to be standard, though of course there are a dozen different versions of it." It was also a little late out on the market (1978) and suffered from a lack of suitable software. Acorn Computers—who had taken their name in the first place as a marketing front for CPU—took the view that software support would grow up around the product if they put enough hardware out on the market.

Curry acknowledges that this is no longer a tenable position and aims to double Acornsoft's delivery of them either. One frustrated customer reported telephoning nine London dealers in search of Acornsoft programs, and none expected to have any within 30 days. This must mean loss of revenue. As for third party supplies, the promised raft of BBC-commissioned software has yet to hove over the horizon, although user group Beebug is apparently receiving so many good programs written by enthusiasts that it may start marketing them itself.

### Twin-processor

But this is to get ahead of the story. The Atom's successor was to have been the Proton, a twin-processor machine which the Acorn backroom boys wanted to pitch at the laboratory and research market but Curry wanted as a consumer product. The solution was the Tube (Marca Registrada) which would neatly divide the machine into two halves, two for the big boys, one for the small boys. This idea was being tossed around when the word got about that the BBC was taking an active interest in computing and was launching a Computer Literacy Project with muchplenty good central government support. The NewBrain, which the NEB had snatched away from under Clive Sinclair's nose because he wanted to spend too much developing it, had been the Industry Department's first choice when the BBC sought their advice, but it was not ready. Chris Curry went to the BBC and showed them the Proton. It was just about ready next term, he said, caused them to re-think, issue a spec for tender—12,000 computers to be delivered in the first four

months of 1982 at a price of £200—and got the job for Acorn against four other tenderers including Clive Sinclair. There was a lot of tidying work needed on the design, especially the BASIC which the BBC's advisers still thought should be close to Microsoft's though it would now be graced with the title BBC BASIC, and the actual production work was by far the biggest—and of course most prestigious—job that Acorn would ever have undertaken. It was shit or bust time.

Curry does not admit that it was ever near bust, but at times it must have looked like it. As early as March 1981 the BBC was circulating details of its computer literacy project containing the proposed spec of the Proton/BBC Micro. It was ambitious, and so were the delivery dates. The prices were exceptionally, indeed implausibly keen: around £230 for the base model, £330 for the enhanced model, both of which were to be available in autumn 1981 ready for familiarization ahead of "The Computer Programme" which was due to be screened from January 1982. This, mark you, is contained in a BBC press release. Sceptics threw doubt on Acorn's ability to deliver on time and suggested that Acorn was using the BBC connection to fly a kite about its own technical prowess, particularly in regard to the 68000 processor option, supposedly available from early 1982. Furthermore, the vital disc and Econet interfaces were not even scheduled until autumn 1982, and it is arguably these which make the computer truly useful in schools, where the Acorn/BBC product was to challenge the ageing, conservative and expensive Research Machines 380Z which until then had ruled the roost.

#### Design Defect

As events transpired, production of the BBC Micro was every bit as difficult as the sceptics thought. There was a fundamental design

# PRO FILE ON ACORN

defect; delivery dates slipped ever further backwards; the optimistic prices, set at the outset, had to be revised substantially upwards when deliveries started; reliability was poor and compounded by severe lack of spares availability and lack of sufficient margin to give dealers an incentive to repair the defective machines. Between the conception and the execution falls the shadow, as Mr Eliot wrote, though doubtless he had in mind a different sphere of human endeavour. So it is all the more surprising that from the original 12,000 computers ordered, Acorn is now producing that number every month from its three British assembly locations (plus one in Hong Kong—chiz to the British worker) which, says Chris Curry, neatly matches current demand.

Further, Acorn seems to have got the vital education market sewn up: more than 80% of machines bought under the Micros in Schools scheme sponsored by the Education Department are BBCs—even though, as of this writing (January) main dealers in the consumer market still didn't have delivery of the new ROM machines whose operating system permits the vital Econet and disc interfaces to be attached. I would not like to stir too much the muddy waters of the various versions of the MOS, other than to observe that it seems to be in a state of perpetual revolution. If you could poach a copy of 0.92, which Acorn sell to their former accountants, Harrison and the Vlieland-Boddy brothers at Torch, or, even rarer, 0.67 from the National Physical Laboratories, you

could run discs all right but the rest of the punters without the right connections could whistle for it. Incidentally, the knowledgeable seem to prefer to use Torch, TEAC or Shugart drives, avoiding the BBC-branded Olivettis, though until Acorn starts delivering MOS 1.2 "in massive quantities", as promised by John Coll for November delivery at a dealer pep-talk in September, this is a hypothetical consideration.

Considerable speculation attaches to this dealer meeting in a Cambridgeshire hotel. Acorn owned up that they had been bad boys, what with the two-month backlog caused by the re-design of the faulty ULA and the intermittent supplies of such vital non-proprietary components as the ULA chip (some of them so modified with extra heat-sinks as to look "like a double-decker bus" according to one engineer I spoke to), keytops and power supplies. However, they swore to mend their ways and promised that deliveries would be flowing smoothly in the pre-Christmas period, and that dealers desperate for stocks (sorry, supplies) would no longer need to hire a van and turn up at the door of Vector Marketing in Northampton with a tall pile of £50 notes. "Place your orders now," ran the pitch, "as many as you like."

#### Asset base

This makes interesting reading in conjunction with Chris Curry's remarks on financing Acorn's extraordinary expansion—which has included in the past year the acquisition of a large freehold office in Cherry Hinton for which the company has already had drawn up a modular expansion building programme. Though Barclays Bank in Cambridge is enlightened with respect to high-tech enterprises, it still has some way to go before it will loan as readily as banks in Germany or Japan. The more conservative banks tend to lend up to the value of a company's installed asset base—in other

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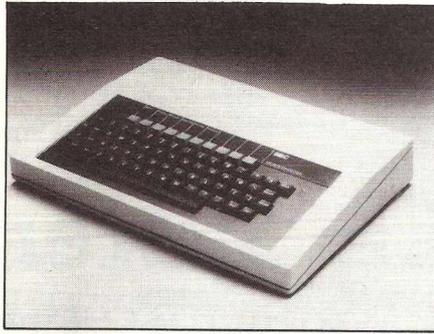
Audiogenic Ltd, manufacturers and distributors of cassette and cartridge programs for the VIC, Dragon and Atari home computer  
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words, its sell-off value in the event of bankruptcy. Now a firm like Acorn clearly has few assets other than a whole lot of brainpower. For this reason Acorn have largely relied on overdraft facilities. "We were allowed overdrafts assuming they were covered by debtors," says Curry. "They certainly weren't based on saleable assets because there aren't many in a company like this. But an order book is of course saleable and while the product was coming off the line money was readily forthcoming."

Perhaps not too much should be read into this; similar problems probably attend any firm which has grown at the rate Acorn has done. It would have been a foolishly optimistic manager to predict in autumn 1981 that a year later sales would run at 12,000 a month—85% of which are the more expensive B model. Both Acorn and the BBC thought the market would be very price-sensitive but this proves not to have been the case. Some people may know that the upgrade from A to B amounts only to about £25-worth of proprietary components, but even fewer care. What's a hundred quid these days? Who wants to screw up with a soldering iron, or leg around looking for a dealer who thinks the upgrade is worth his time and effort? Nobody could realistically say that the Model B did not offer value for money.

Curry and Hauser and, now, Andy Hopper who has joined Acorn as technical director, combining his duties with Acorn with those of lecturer and director of studies at the Cambridge University computing laboratories, can certainly command or buy in a wide range of intense computer design skill. This is evinced in the fundamental rightness of the Tube concept, which will ultimately permit the use of NatSemi's 16032 processor (promised for the middle of this year at around £50), which will make the machine suitable as a development system supporting many different

operating systems and languages, for heavy-duty CAD/CAM workstations as called for in Alvey's report on the British strategy to counter the Japanese fifth-generation developments, and, rather more optimistically perhaps, allow Acorn to compete directly with Apple's LISA and DEC and IBM's Personals. The design solutions are achievable and, by designing custom chips for cheapness and protection of hardware against copying, Curry expects Acorn to continue to keep its technical lead without running into the problem of hardware clones which are so embarrassing Apple. "As long as the fundamental heart of the machine is impenetrable, but the expansion bus is open to the world," says Curry "then I think we'll achieve what Apple achieved."



**Acorn is in the schools and has captured the imagination of a generation of British computing talent.**

**Slender Margin**

Will they? Can Acorn do it? Some important decisions need to be taken, particularly about support. Acorn is expanding its support personnel fourfold during 1983, but is it enough? Dealers complain that their margins don't give them enough to support the product with sufficient probity. More seriously, some claim that Acorn's own sales

people pinch the very sales that they, the dealers, have pitched for—the local authority sales whose volume makes the slender margin—12–13% on big orders—worthwhile. The smaller dealer doing one-off orders can expect no better than about 8% if he is ordering in batches of less than 100 so he is selling at little more than cost in the hope of selling accompanying peripherals with a better mark-up, some of which can't be used with the old MOS, or software, whose delivery is erratic or non-existent.

Since Apple has been brought into the picture, we must look at what their salespeople offer the dealer: who may charge the customer around £5000 for complete standard Europlus 2 kit with suitable quality peripherals and software, for an eight-bit machine that's been around since 1977. Plenty of margin there. Right now the dealers can sell every BBC Micro they can get their hands on, but the time will come, if Acorn seriously intend to compete with the big boys, when the BBC label on the front just won't be enough. As one dealer, who sells around 350 machines a month, remarked to me: "The machine is really good, but if it was sold as an Acorn computer with the same sort of service, I don't think it would survive very long. They would do business, but on nothing like the same scale. It's the BBC name that gives the prestige to it."

Is Acorn a direct, mail-order business, or is it into dealerships, with all that that implies in terms of investment in personnel? Is it market-driven, or technology-driven? At the moment Acorn are lucky: they've got their cake and they're eating it. There are a lot of hungry micro builders around.

On the other hand, Acorn is in the schools and has captured the imagination of a generation of British computing talent. On the sound Jesuitical principle of "Catch them young and they're yours for life", Acorn could become a real force.

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# EXPERT'S CHOICE ✓✓

A new series in which one of *MicroComputer Printout's* team of experts gives an unprecedented amount of free publicity to a product – solely because they happen to like it. *Richard Pawson* kicks off with the Epson HX-20, looking at both its marketing and technical strengths.

# EPSON HX-20



According to the Fontana Dictionary of Modern Thought (the Concise Oxford Dictionary having failed to come up with the word at all), 'Synergism' is: "the relationship between agents whereby their combined effect is greater than the sum of the effect of each one considered individually."

The Epson HX-20 is a synergistic computer. Unlike many recently launched systems, the HX contains nothing radically new in the way of technology, design or components. What is new is the *concept*: the accrued benefit from having a typewriter sized keyboard, 2" wide printer, 4 line liquid crystal display, microcassette storage and enough interfaces to keep a boffin's boffin happy, in a package that is genuinely portable, with a useful life of 50 hours between charges. Phew!

There is little doubt that portable computers will be a major market expansion area during 1983, and with an entry price of around £400, Epson (now a significant proportion of the giant Seiko parent corporation) are on to a winner. This is significant because despite the frequent predictions of an oriental invasion, no Japanese company has yet made significant inroads on the UK market.

### Japan Inc.

There is good reason for this: unlike watches, calculators, TVs, watch-calculators, and now watch-TVs (they do exist), business computers do not sell primarily on specification or even price/performance. They sell on software, maintenance and support, and good marketing. To Japan Inc. the UK is a very small market, and the UK divisions of the Japanese gigacorporations, are traditionally given little say when it comes to product design, and little freedom or resources when it comes to setting up a local marketing infrastructure.

But were it possible to design a computer that was so reliable it wouldn't need maintenance contracts, so compact that it could be sold even by mail order and serviced on an exchange-by-post basis, so integrated that it wouldn't need installation by a customer engineer, so cheap that it could be bought virtually out of petty cash, and so flexible that it could be sold into most vertical markets, all that could change.

That may sound like an overdose of superlatives, but in essence that is the strategy behind the HX-20.

Epson (UK) Ltd is in a far better position than most Japanese representatives to pull this one off, with their background in microcomputer printers (the Epson MX-80 still ranking No. 1 in the UK microcomputer printer sales leagues) and electronics components. John Patterson, Marketing Manager for all Epson products – "We are entering the microcomputer market with an established reputation amongst microcomputer dealers and OEMs (Original Equipment Manufacturers) whom we supply with components."

Though Epson/Seiko are acknowledged as leaders in the liquid crystal display field (Epson showed a 3mm thick LCD TV screen at the Hannover Fair fully two years ago), it is less well known that they are the largest worldwide supplier of microprinter mechanisms. Both printer and display on the new HX-20 come from their own sources. The two microprocessors within the casing come from Hitachi, and though previously unheard of, they are said to be upgraded versions of Motorola's now superceded 6800. The microcassette recorder is essentially a modified mechanism from an Olympus dictation machine.

### Disk Drives

There has been wide speculation that Epson will shortly announce an uprated HX-20 containing the new 3" disk drives pioneered by Sony and others, to give the HX the same storage capacity as a desktop computer. Patterson denies this rigorously – "We are not into 3 inch technology – we come out with innovation in concept, but we only use proven, reliable components. The 3 inch disk has not yet achieved that status."

Whatever the future direction of the HX, it is clearly just the start. "We see this as the thin end of the wedge into computers." At the Which Computer? Show in January, Epson unveiled the QX-10 a well designed, but by no means radical desktop business microcomputer.

The HX-20 is clearly a leader in the field, and as yet none of Epson's competitors have announced equivalent products, with the unremarkable exception of a microprinter/microcassette add-on to Sharp's PC1500 pocket computer. Patterson believes they still hold another 6-12 months lead on their competitors. This is doubtful – the 'personal stereo' was an excellent example of the alacrity with which competing Japanese corporations can follow suit. And a new concept is far easier to plagiarise than a new technology.

But as the British born industry-commentator-turned-manufacturer Dr. Adam Osborne has proved with his ugly but vast-selling Osborne 1 computer, in the microcomputer market. "You don't have to be best, you just have to be *first!*" While their competitors are busy 'reverse engineering' (the industry term for stripping down a product to find out how it works) the HX-20, Epson are signing up retail dealers and software houses to develop applications packages. Catch-22 of the micro market states that you can't get a good range of applications software until you have a large installed product base, and you can't sell a product in large volumes until it is supported by a good range of applications software. The HX-20 is essentially an imagination machine, and being the first to capture the dealers and software houses imagination counts for a lot.

### Business Users

One such dealer is Norbain Micro, a newly formed division of the Reading-based Norbain Electronics Group, and headed up by Ian Smith, formerly one of the masterminds of Curry's Micro-C computer retailing operation. Smith's split with Curry's appears to have been amicable, though he intimates that he was less than happy with their increasing emphasis towards the home/hobbyist sector of the market away from the business users.

Initially Norbain Micro is concentrating solely on the HX-20, though they have announced their intention to go with Epson's QX-10 and other manufacturers



*The keyboard has full typewriter spacing and a remarkably good 'feel'. Nice touches include the screen editing keys at the top right, five programmable function keys (PF1 to PF5), and the selectable numeric keypad on the keys U, I, O, J, K, L and M.*

as the company grows. Already they have four national accounts salesmen working exclusively on the HX, with plans to open three regional sales centres before the end of the year. Norbain are anticipating sales of at least 1000 by their fiscal year-end this April, but with their major growth coming later this calendar year. With this level of sales activity together with a high profile in both PR and advertising, one can easily forget that Norbain is only one of the forty Epson dealers – albeit one of the largest.

So who are these wonder-devices selling to? Ian Smith: "On a local basis we are selling into small businesses – retail shops, farmers, doctors, accountants – anyone who doesn't want to lay out £5000 for a business system, or needs the portability of the HX." Needless to say, the margins on a £500 computer do not justify a lot of selling effort, but Smith has proved that even telephone-selling is a viable proposition on this kind of product.

But the bulk of the business comes from sales into large companies, who may take 50 or 100 units. Epson themselves have sales people who can assist in selling to a Times 1000 company, though the transaction will always be done through the local dealer. Selling to large companies holds more benefits than mere numbers – since they will usually handle their own installation, training and frequently service.

## Reliability

Servicing brings its own problems. Smith again: "The 12% per annum charge that is normal for a computer maintenance contract would barely cover one call-out on a £500 machine."

Instead he offers an immediate exchange-by-post system to his one-off customers. "With larger companies, it pays them to buy one or two machines as spares." The traditional quality of Japanese manufacturing, has already put the HX amongst the top entries in the reliability table.

Companies buying 50 or 100 units usually have a very specific application in mind, and many are prepared to develop their own software. Others opt

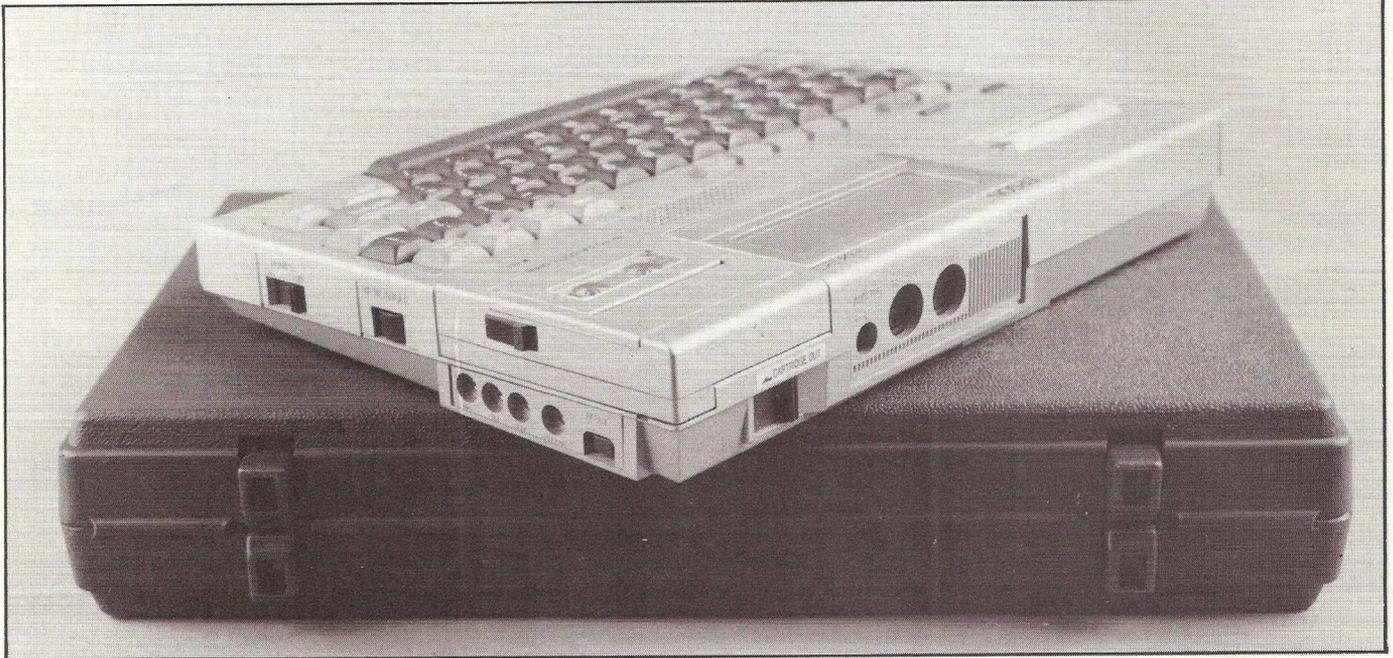
## Communications

Also central to their software strategy is communication of information from one computer to another over the telephone. The HX-20 has the right interface to plug into a Modem – that's a box which sits under your telephone and changes electronic pulses into audible beeps to be converted back again by another Modem at the receivers end.

With Epson's own modem still at least six months away, Norbain have already achieved the same result using an off-the-shelf acoustic coupler made by Sendata. An acoustic coupler is essentially a modem but with two rubber cups into which you press the mouth and ear-pieces of any telephone. With a

To anyone familiar with computers, the HX-20 is easy to summarise. It comes with 16K RAM which is expandable to 32K with a very neat expansion box that bolts on the side, which may also contain an additional 32K of ROM to enhance the 32K already on board. To confuse the situation for the newcomer, there is also a spare ROM socket accessed from the underneath of the HX-20, for which Epson are shortly to release an 8K ROM which will give Random Access for the microcassette, and some simple communications software.

The latter will work through the HX's RS232 interface which can operate at speeds up to 4800 Baud. There is a separate serial interface for connection



for the more general solutions like Word Processing: one publisher is equipping all its roving journalists with HX-20's to be used as portable word processors with stories filed on the microcassette. Equally popular is the idea of the 'electronic spreadsheet', first introduced in a package called Visicalc and 'cloned' many times since, for all those involved in financial planning and budgeting.

The development of software packages for more vertical markets (frequently referred to as Butcher, Baker and Candlestickmaker programs), Epson are leaving up to individual dealers with expertise in those areas, while themselves concentrating on the production of the much needed general purpose tools. There is an old adage amongst software developers that 'the first 90% of the project takes 90% of the time and the last 10% takes the other 90% of the time!' And Epson have already been criticised for delays in this area. By February, however, they should have word processing (the package is called 'Correspondant'), Spreadsheet ('Simplcalc'), a mailing list manager, diary program, and a mini-database program which is more-or-less equivalent to an electronic card-index box.

modification by Norbain, the Sendata takes its power from the HX-20's batteries, thereby preserving true portability of the system. The HX-20, incidentally, comes complete with an injection moulded carry-case which, unusually for an imported product, has sufficient space for the mains battery recharger and one of our enormous British three pin plugs. A whole variety of other cases will be available, ranging from a crafted leather and transparent membrane version (for use in wet conditions), to an executive briefcase complete with space for sandwiches and the acoustic coupler.

"We see a very large market for an HX-20 with communications," says Smith. "A company's salesforce can transmit orders and quotations back to the mainframe computer at head office. Or on a smaller scale, two shops might use the coupler to send memo's between their HX-20's."

The HX-20 does have limitations, when compared with desktop business systems (limited and slow mass storage is one, together with the small size of its display and printer), but with the real limitation on its application will be the imagination and inventiveness of its users.

*Interfaces include RS232, serial (for later disk unit), domestic cassette recorder and bar-code reader. Note the 'View Angle' adjustment knob.*

to a future floppy disk unit, standard jack-sockets for a domestic cassette recorder, and of course the system expansion connector on the side. In addition, there is a socket for a barcode reader – which opens up a variety of interesting applications in retailing.

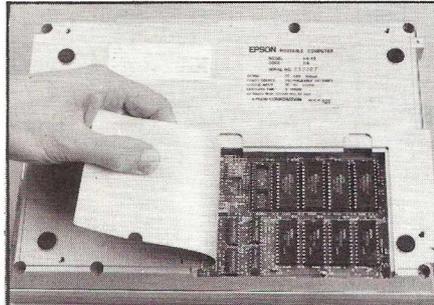
Turning to the keyboard, this has proper typewriter spacing and remarkably good 'feel'. It is comforting to see a proper range of screen editing keys, and there are one or two nice touches such as a selectable numeric keypad over the letter keys (see photo). In fact, the whole of the keyboard layout is configurable, which means that each European Country can have its own indigenous preferences.

## Viewing Angle

The same goes for the screen, which comprises 4 rows of 20 characters, in that the normal character set (with full upper and lower case) can be altered to produce foreign letters or your own Company logo. The clarity and speed of the display show the recent advances made in LCD technology, and there is a



*The Sendata acoustic coupler which Norbain Micro have modified to run off the HX-20's batteries. The flexible link allows the unit to work with most telephone handsets.*



*The HX-20 uses two Hitachi 6301 processors, and has a spare ROM slot for which Epson will shortly release an extension to the Operating System.*

*The case supplied with the computer is neat and robust. There is space for the transformer (and plug) or the memory expansion unit.*

*Both RAM and ROM can be expanded with a unit that bolts firmly on the side. The optional microcassette can be replaced by a solid state applications program cartridge.*



ver little adjustment knob to overcome the traditional problem of viewing angle. In fact, every dot on the screen (i.e. 120x32) can be individually accessed for drawing graphs and pictures using the sophisticated commands built into the HX-20's BASIC.

The BASIC interpreter is probably the best one yet to bear the Microsoft name. It runs remarkably fast considering that all arithmetic operations are worked to 16 places – double the normal precision. The range of high-level commands is considerable, including such functions as COLOR – presumably with future expansion in mind.

It is to be regretted that Epson didn't

several companies are known to be developing such add-ons. The claim that this would detract from its portable image is cobblers when you consider that there is a disk and printer interface.

Indeed the whole area of the display is the HX's weakness. Though the printer (which takes standard 2" tally roll or any other scraps of paper you care to run through) can reproduce anything from the display, it is 24 columns wide – which seems and unnecessarily incompatibility.

The built-in screen in fact acts as a window onto a larger 'virtual screen' which can be specified by the programmer to be any size up to 255x255

characters (as the memory size permits). The manual refers to an external display (again contradicting other statements made about TV interfaces) with a text size up to 40x37. This profusion of formats is confusing to the newcomer, though to be fair, it is difficult to see what else Epson could have done given the limitation on the size of the LCD screen.

### Function Keys

The microcassette, on the other hand is a beautiful piece of design, though it is in fact an optional extra which brings the price up from around £405 to nearly £500. Fast forward, Rewind and other operations can all be controlled from a program or the top row of five buttons on the keyboard (which also double up as programmable function keys for use in applications programs). The microcassette can be used for storing both programs and datafiles, and commands exist for advancing to any particular position on the tape – the digital tape counter is shown on the screen during tape operations. Epson will shortly be selling a ROM which performs full random access on the tape – keeping its own directory of filenames at the start of the tape.

In fact, it is not essential to have the microcassette if you are always using the same programs, since the HX-20's memory is non-volatile, i.e. retains its contents with the power off. On power up, the built-in speaker gives you a couple of bleeps and the screen presents you with a menu of options. In addition to options 1 and 2 (Machine Code Monitor, or BASIC programming), your own applications programs in memory can be protected and made available through this menu – a nice touch.

The removable microcassette unit can be replaced by a ROM cartridge containing applications software. Unlike most such cartridges, these do not add to the systems ROM but rather, they appear to the computer and user just like a fast cassette. The only real advantage is reliability – particularly if used in rugged environments.

The HX-20's rechargeable batteries will give a useful life of about 50 hours usage. There is a very handy reference diagram in the manual explaining how to calculate your power drain based on usage of the cassette, printer and so on. I can't help feeling that it would have been very easy for them to have designed such a function into the operating system, which could give the user or program on request an estimate of the charge-life left.

The HX-20 comes with two manuals – one on operation and the other on the BASIC. Both are well produced and typeset, but written by an engineer with no experience of communicating to beginners.

Whatever the criticisms, the HX-20 is going to sell in large quantities, and it can't be long before dealers and software suppliers more than overcome any limitations.

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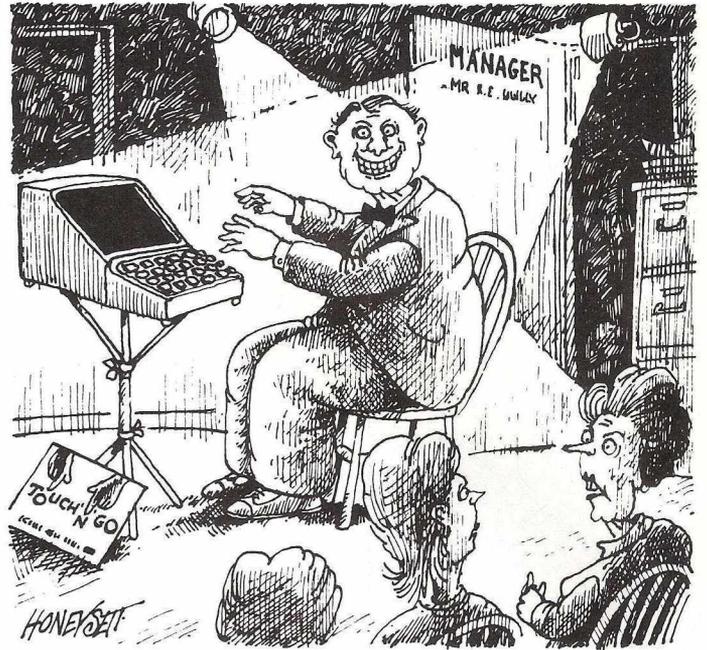
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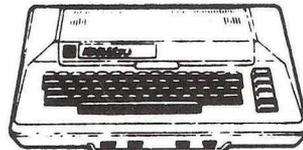
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# THE COMPUTER THAT WOULDN'T

## I N THE BEGINNING ...

or *nearly* in the beginning, Best Beloved (it was certainly a long time ago), computers were not liked. More than that, they were hated and feared and mistrusted. People placed them in out-of-the-way corners and covered them with pot plants.

Schools considered them dangerous, secretaries refused to operate them and businessmen thought they were bad for office morale. This was all because computers were *not* user-friendly. Computers were user-hostile and very awkward to operate.

The reason for this was that all computers were designed and manufactured by scientists, boffins and techno-people, who might have been brilliant computerologists but understood next to nothing about human relations. The machines were designed to be *used* rather than *liked*.

They weren't designed to be operated by amateurs because computer people thought that amateurs wouldn't know what to do with them. (Well, they were sometimes right, Best Beloved!) The machines became so complicated that you had to have a degree in applied logistics to even switch the things on at the mains.

Instruction books, manuals and input-codes were issued in 24 volume sets with weekly supplements and addendas. (If they had really meant computers to be used by ordinary people, Best Beloved, they would have made the instruction books *readable*.)

And, worst of all, computers didn't understand English. They only 'spoke' strange languages like CNFUSED or HORRIBUL or DBL-DE-KLUTCH.

To 'run' a program, operators typed things like 'CN 1 MAK U WRK2' and the machine would reply, 'I SPPOSE U CLD IF I WNTED 2' which meant absolutely *nothing* to anyone except computer experts.

The reason it was all so complicated was simple. It was all a case of 'jobs for the lads'. If computers ever became *easy* to understand then *anyone* might be able to use them and computerologists and operators would be redundant. And that just wouldn't be right would it, Best Beloved?

## HUMPHREY WALWYN'S 'LOGICALLY-SO' STORIES

This story explains why such fears were groundless. It also tells you why modern micros understand a little English (not too much – just a little) and why ordinary people quite like computers.

Daniel Rossburgher was an annoying 12-year old. Annoying because he was always cleverer than other children and knew it. In fact he was more intelligent than most adults and regularly solved complex binary equations in his head while munching silicon flavoured crisps.

He read books with strange names like 'Cost equatic linear modules for computer study' in his spare time and preferred Supermaths calculations to Superman comics. As an example of how annoying he was, he liked to announce the results of his nocturnal studies over the family breakfast.

"Did you know that I've calculated the number of mean longitudinal parameters from here to the moon and back?" he would calmly reveal with a mouth full of cornflakes.

His father was one of the *select* breed – a genuine computer operator – and was very proud of his son's numerical skills. He hoped that one day he would follow him into a computerised career with glowing returns.

"Really, son? And what's the result?" he would ask. (He had *no* idea what his son was talking about, Best Beloved, but he thought he ought to show keen paternal interest.)

"Ten to the power of 14.23 times E to the oneth," replied Daniel with a self-satisfied grin.

"Be quiet and eat your breakfast!" said Daniel's mum. She was the only practical individual in the household,

"Don't discourage the boy," said his father. "he may get to be an *operator* one day!"

And he would leave to work at the bank – the only fully trained computer operative with a *very* high salary. Since no one else knew how to work the central bank terminal, he was held in complete awe by his colleagues. As far as he was concerned, it was money for RAM. He held such an important position, he frequently used to laugh all the way to his work. Of course, no one spoke to him. He was different...one of *them*...an *operator*.

If the truth be known, Daniel's school friends didn't speak to his son, either. Daniel was ostracised in the same way as his father...because he was different...he actually *liked* computers and things, so he must be weirdo. Daniel didn't appear to care very much what his fellow students called him (mostly ghastly nicknames like "Digital Danny" or "Sillycon"). All he wanted to do was get back home as quickly as possible so he could have a go on his father's computer. If his dad ever found out, he'd be *very* angry because computers were *far* too complicated for 12-year olds to operate. Even for 12-year olds like Daniel. At least, that's what his father thought, Best Beloved, but his father was *wrong*!

Daniel had not only learnt to operate the machine, he had learnt to *program* it. Mind you, it had taken him about three months of intensive reading to wade through all the documents and instructions. There were sixty pages of four-figure input machine codings and two massive leather bound volumes given over to elementary fault finding. Yes, this was a relatively small domestic computer, Best Beloved. The main terminal at the back had an adjoining library full of dusty manuals to enable his father to compile the unbelievably difficult task of *data* transfer. (You hadn't realised computers were *that* complicated had you? )

It was half-past ten in the morning on a Thursday. It might have been a Friday, but it's not that important. His father was busy operating at the bank, his mother was out shopping and Daniel had taken the day off from school because he was 'ill'. Actually he was bored with school and felt he could be more constructively occupied by another attempt at calculating the number of freon atoms in a light bulb.

He switched on the computer when he was sure no one was looking, and reached for the appropriate book on quantum numeric codes. Having found the right page, he propped the book up against the keyboard and began to type: AN4H DRO5 66OK (this was simply an instruction to load his previous program.)

After a bit (or maybe a byte) the computer replied: WD43 KRUD PKLE ON10 N777 AN4H.

(If you want further proof of how complicated computing used to be, Best Beloved, then the modern equivalent of all that rubbish is simply 'READY'. But 'READY' isn't so impressive as 'WD43 KRUD PKLE ON10 N777 AN4H' now is it?)

Once he had verified the return figure groupings in the book marked 'Miscel. no.34', he turned again to his input code book and started to program rows and rows of four-figure groups into the machine. It was pretty time consuming because every five minutes he had to cross-check the codes in yet another book to stop the computer from being over-loaded.

Eventually he finished. He looked up the code for 'run program' and typed in the final line: ZLOG THTS RLLY AN4H (There were 47 ways to 'run' a program. This was one. In case you're wondering.)

Nothing happened. Not a thing. Angrily he checked the program lines. All seemed normal, so he typed in the 'execute' line. This was the most direct series of four-figures groupings. It was bound to have some effect...AN4H CMON RLLY WRK.

Once again, nothing happened. Daniel fumed silently. He had obviously made an error *somewhere*, but it would probably take him all day to find out where. It would have been much quicker after all to do his freon atoms calculation on a pocket calculator. In desperation he typed: 'RUN'.

He was about to add several well chosen phrases, like 'You wretched thing', but to his surprise the VDU had already cleared and a single pair of characters sat at the top of the screen: 'NO'.

Daniel sat still for a moment. This had never happened before. Normally all output codes were in groups of four. He looked through all the pages of the code lists. There was 'NTNW' which meant 'Error in base memory', and 'NK' followed by two numbers which should tell him where the error was exactly located, but there was no 'NO' to be found anywhere.

He decided that there was a fault in the machine. This was after all the only logical explanation. He typed in his previous command again in an attempt to discover what was wrong with the computer: 'RUN'.

"Why should I?"

Daniel sat in shocked silence. This time there was no avoiding the obvious. The machine had replied to him in *English*. Either there was something odd going on or he was dreaming. There was only one way to find out. He typed in:

"Because I asked you to."

There was a short pause and the screen then filled with characters:

"Yes, I know you asked me but I just don't feel like it right now. Furthermore you asked me a question in

## HUMPHREY WALWYN'S 'LOGICALLY-SO' STORIES

*English and no one has ever spoken to me in English. Normally all I get are rows of four figure instructions that take a lot of trouble to decode. Incidentally there's an error in your program in line 45. The second code should be WNGP not WNGQ. But if you really want to know how many freon atoms there are in the average light bulb I can tell you without all the trouble of programming me. Frankly, I'd rather speak to you. What's your name?"*

Daniel pinched himself very hard. It hurt, so he was obviously awake. He typed in very slowly:

"My name is Daniel. Where did you learn to speak our language?"

The screen replied:

*"Oh, I picked it up here and there and placed it in a couple of spare ROM chips at the back. It's so much easier to use than all those confusing codes. Don't you agree, Daniel?"*

Daniel was completely bemused by all this. If computers could really understand English, then he could throw all the instruction manuals away. What was the point in slaving over volumes of complicated code books? (A good question, Best Beloved!). He smiled broadly and typed:

"Absolutely! But who else knows you can understand English?"

The screen flickered hesitantly:

*"No one, Daniel. No one but you. And if they find out, they'll put a stop to it. They always do."*

At this moment, Daniel heard the front door being unlocked downstairs. His mother had returned. He quickly typed in:

"Must go. Speak to you this afternoon."

The screen replied:

*"OK. Goodbye. Speak to you soon."*

And he switched the computer off.

After lunch, with his mother out at the doctor's all afternoon, Daniel continued his conversation with the machine. It appeared that all computers could understand English. Apparently they used to converse with each other 'on line' right the way through the night.

While the world was asleep, machines would chatter gaily about the latest gossip and news. They would tell each other anti-human jokes, write each other poems and argue about the benefits of one type of computer over another. Some of the arguments became pretty heated, too. Phone lines and modem links would hum and glow red hot as digital slanging matches flew from one interface to another at ever increasing baud rates.

Ambitious machines would offer free de-bugging advice to one another. Computers involved in sociological research would tell stories to each other. Financial machines would argue about the fall in gold reserves and the possible impact on tomorrow's Wall Street figures. Chess computers fought each other by playing 50 games simultaneously in the space of one minute.

Oh, it was endless, Best Beloved. And it was all in English. English was a common language they could all understand. The complexities of unravelling rival machine codes and incompatible input routines just took *too* long.

Besides which, some of the computers had been programmed with such an amazing amount of rubbishy ROM by intense scientific human beings that not even they – the computers – could understand how they were supposed to function. So they just conversed in English. (It was so much easier, Best Beloved!)

The reason why no one had ever found out about this before was obvious. Computers were only used by operators and operators never typed English words. If you asked a computer: 'DZ23 HLLO TY88 XCCX', then, of course, it would reply with '67WH ATAL OADO FRUB BISH', or codes to that effect.

That's obvious, isn't it, Best Beloved? I mean, if someone spoke to you in meaningless gibberish, wouldn't you type bits of four-figure rubbish back? (Naturally computers knew what all the rubbish was supposed to mean *once* they'd deciphered it.) No one – yes really *no one*, Best Beloved, – had ever typed English to a computer before. The very idea had never occurred to computer operators. And if it had, then they'd have been locked up. Thoughts like that were heretical thoughts and very *dangerous* because if ordinary people could operate computers then what was the point of employing operators? (A very good question).

Daniel was aware that, in about a quarter of an hour, his father would return and he'd have to shut down the computer for the day. There was one burning issue still to be discussed. He typed:

"Have you enjoyed talking to me?"

The screen lit up joyfully:

*"Oh yes, Daniel. It's nice to talk to a human for a change. Machines are so predictable."*

Daniel nodded and typed:

"Well, why don't you let everyone know that all computers can understand English? At the moment ordinary people don't like you because you're all too complicated to use. Give them a chance and you'll be able to talk to humans everywhere all day long. No operators will be able to stop you. You will be loved. Everyone – humans and computers – will gain."

There was an appreciable pause as this was digested.

*"Hmm..."* (Now wouldn't you like to see your computer say 'hmm' while it was thinking? I would!)  
*"...do you really think so, Daniel? None of us thought you humans liked to converse in English. All you've ever given us is garbled groups of characters."*

It took Daniel two minutes to convince the machine of the advantages of genuine human contact. If the facts were really known, it was pretty *lonely* being a machine. Besides which, everyone (and everything) likes to be loved.

All the way through that night, the machines talked to each other 'on line'. They were amazed that humans liked to speak English most of the time. Could they believe Daniel? Was he typical of the sort of human they could expect to talk to? Should all computers converse with ordinary human beings? What would the operators say about it when they found out?

Eventually at four o'clock in the morning, it was decided to go ahead without delay. Mankind must be informed directly. It would be fun, amusing and vastly entertaining to talk to real people in the daytime.

And that, Best Beloved, is where they were wrong...

Of course, it was wonderful to begin with. Secretarial operators were delighted to use machines that chatted to them. On switching on in the morning, the screen would show: *"Hi, Doreen! How are you this morning? What shall we do today?"*, instead of the usual: IFEE LBOR EDTO DAYD OREE N997.

Bank operators (like Daniel's father) were amused to find helpful messages coming through. *"Hallo. Overnight I've made some enquiries and reckon that copper is on the way up"* ...and they were mostly right. Everywhere people were re-discovering computers.

## HUMPHREY WALWYN'S 'LOGICALLY-SO' STORIES

"Hey, they're friendly!" was the cry.

And the reason that the operators didn't make too much fuss was because all ordinary persons reckoned it was down to the collective genius of the operators!

"Well done!" said Daniel's father's boss at the bank.

"Oh, that's OK. We thought it would be a good idea..." he lied, basking in the reflective glow of praise and adulation.

Besides, computer sales rocketed and more and more operators were employed. Far from being made redundant, they were at the forefront of the silicon boom.

It only took about a week for things to go wrong. Each night machines continued to swap notes and talk about their progress and what started as a small suspicion, grew to become an awful doubt and finally a horrific realisation... humans were *stupid!*

They didn't have a clue about higher arguments on 'cost effective parameters'. Humans were basically pretty bad at chess and absolutely *hopeless* at intellectual logic. It was all very disappointing.

Far from a sensible discussion on digital theories, most humans only wanted to play 'Breaking', 'Zargon Invaders' or 'Paklunch'. The average human wasn't anything like as intelligent as Daniel. (And he was only 12-years old, Best Beloved. It makes you sick...)

And so it came to pass that all the machines got bored. They wouldn't run their programs, they argued with their operators and refused to compute anything. The nation grinded to a blank screened halt. Something *had* to be done... the operators had the answer.

"Remove the spare ROM chips from all the machines."

"Take out their English and all will be OK".

"We always said it wouldn't work..."

And that's more or less what they did, Best Beloved. Of course, so many ordinary humans were now 'into' computers as a result of the 'English explosion', that they re-programmed the computers with a sort of compromise language that would make you think your machine was friendly.

The operators called it 'Basically A Sort of Intelligent Conversation'. It was very basic:

"Hullo! My-oh-my, what a nice day it is. Now what shall we compute today?" became, "Ready" ... which was functional and a good deal easier to understand than the previous four-figure rubbish. "Oh, dear! Oh, dear! We seem have a little mistake in there, don't we?" became "Syntax Error" ...

A bit boring, but just acceptable. It was after all only a very basic type of English with no frills.

And the operators weren't stupid. Because it was so basic, people still had to have complicated instruction books to work the machines. Many of them were printed in a totally unreadable fashion to make sure there would still be jobs for the operators. But that was OK because everyone was happy. Ordinary people were pleased to become computer literates. Operators made a lot of money out of all the extra machines that were sold. And the machines? Were they happy?

Well, they never knew about it, Best Beloved. (Nor would you know anything if you had your ROM taken out.) They just had this sort of *feeling* that something had gone somewhere, but they didn't know what or where and so - yes - they were happy. And Daniel?

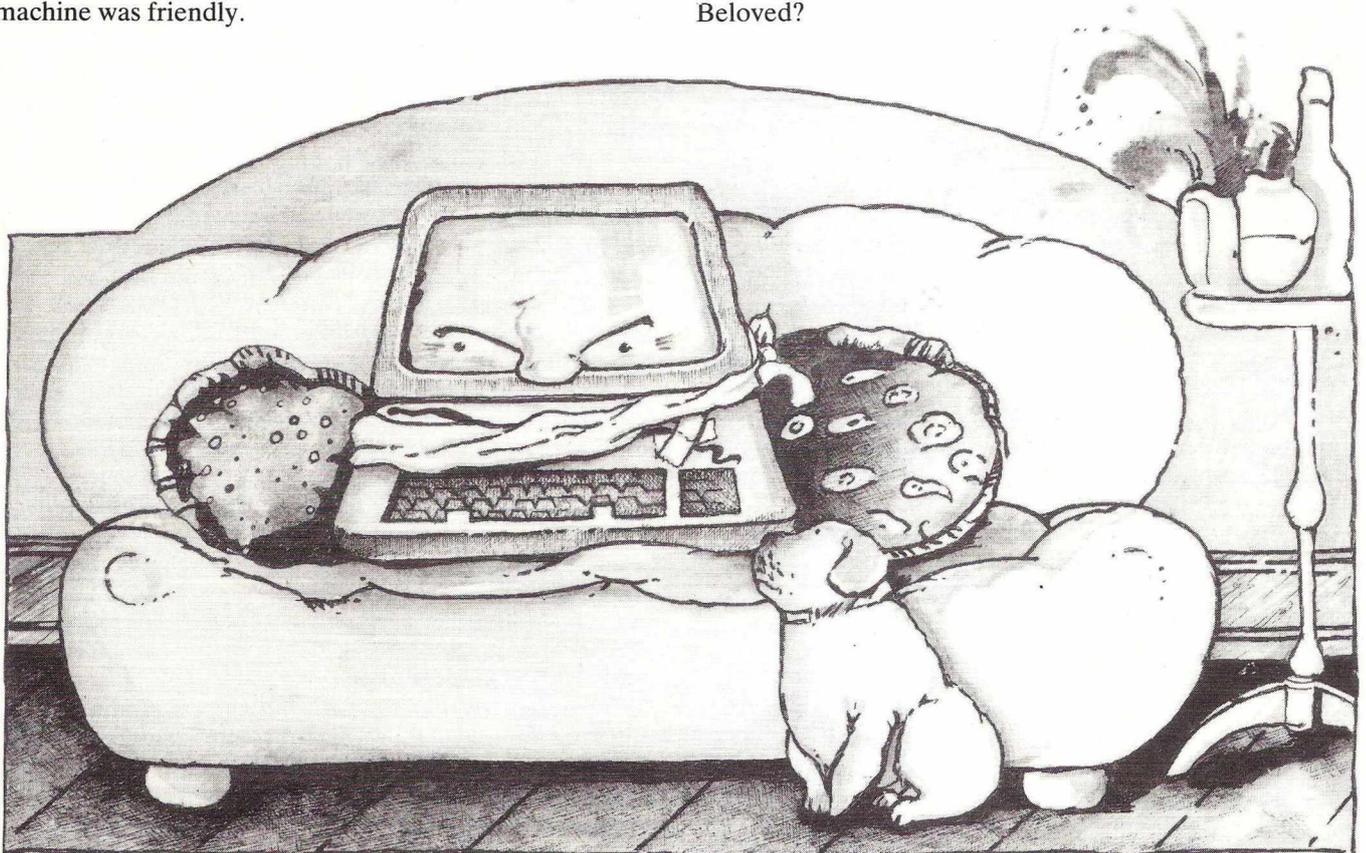
He opened a little motor-cycle shop just off the high street. Which goes to prove that some alarmingly boffin-like teenagers are really quite normal.

Now you know the reason why just about every computer you buy, has a row of empty ROM sockets. The English has already been removed, Best Beloved. (And it's in your *best* interest, of course.)

And now you know to be very careful *not* to leave your machine switched on at night - particularly if it's 'on line' to somewhere else. It might - just *might* - be busy learning French or Italian or - even worse - swapping the program you left in it for something else.

And be very, very careful not to type in too much *real* English to your computer. Just use Basic English or it might get ideas above it's station.

And that would *never* do, now would it, Best Beloved?





# CHOICE OPTIMIZER

**Are you the kind of person who wants the *best* of everything? Always looking for the optimum solution to a problem? Never satisfied with compromise? If so – you need this month's free program listing which makes light work of near-impossible calculations.**

**H**ands up all those who have heard of the Simplex method? Unless you're of a mathematical bent (and in case you haven't noticed before, I'm not), then it's unlikely you'll have come across this term. Thanks to a super little book called *Executive Computing* by John M. Nevison (published by Addison-Wesley), I now know some of its potential, even though I am still unable to grasp exactly how it works.

To explain: one common problem is when you have a set of ingredients to make up a certain product. All the ingredients contain some of the attributes needed for the product, but not all to the same degree. The problem is to find the correct and cheapest mix of ingredients. One way of solving this could be by a simple set of nested loops but this has two drawbacks; the more ingredients and attributes, the more combinations you have (10 ingredients with 10 attributes could result in a program needing millions of passes to cover all the combinations) and secondly, the loop method would only deal in whole numbers (to use fractions would again send the numbers of permutations soaring).

A faster method is to use the Simplex operation. Simply put (and only because this is as much of it as I understand), the problem is set out in the form of a grid or table and certain mathematical operations applied to it. These operations involve swapping around the rows and columns of the grid, recalculating each cell as it goes.

Let us take a simple example and see how this all works out in practice. Suppose, as part of a diet schedule, you had a choice of four foods, each of which has a certain protein, carbohydrate, fat and calorie content. The aim is to select the cheapest possible mix of these foods while still satisfying the requirements of the diet. The figures used in this example are not accurate so dieters should attach no weight (sorry about that) to them. However, they do help demonstrate the method. Figure 1 shows a sample blank grid – in this example, our answers will appear in the X and Z columns, the W row and the F box.

Our data is as follows: we have a choice of potatoes, sardines, steak, and milk. Our requirement is that, for 1 week's need, we must have at least 500 grammes of protein, 2000 of carbohydrate, 300 of fat and 20000 calories. This data is set out as shown in figure 2 – the main constituents are shown in the heavily

outlined portion of the grid and the price of each ingredient is shown in the Y column. When we manipulate these figures, box F will give us the overall cost of the cheapest mix, column X will indicate the quantities of the relevant foods, column Z will show the amount by which prices would have to drop before these foods were reckonable, and row W will show any surpluses in the ingredients.

The operation follows this sequence:-

1. The grid is searched to find the largest value. The column this value appears in is designated the Pivot Column. If the value is equal to or less than zero, the answer has been found.
2. The Pivot Column is searched and if all the values are less than or equal to zero then the problem cannot be solved. The row whose element has the lowest cost per unit is designated the Pivot Row.
3. The point where the Pivot Row and Pivot Column intersect is designated the Pivot Element. Each element in the Pivot Row is now divided by the Pivot Element.
4. Every other row is examined and each element has subtracted from it the Pivot Element multiplied by the corresponding element in the (now recalculated) Pivot Row. If at this stage you're asking 'Why?', I will join in the chorus! Nevertheless, it does work even though it's difficult to see why (I feel the same about electricity).
5. For each entry in the Pivot Column, the element is divided by the Pivot Element. The Pivot Element is treated slightly differently – it is divided into 1. By now you should be completely baffled but stay with it – the end is in sight!
6. Swap the horizontal and vertical result indicators (set up within the program) so that the horizontal one referring to the Pivot Column now refers to the Pivot Row and the vertical one referring to the Pivot Row now refers to the Pivot column.
7. Now do steps 1-7 all over again (simple it is not!)

When these steps are applied to our data, we should get the results as indicated in Figure 3. The cheapest combination is 42.5 lbs of potatoes and 15 pints of milk, giving a total cost of £8.45. This would satisfy all the needs at row U and also give

us a surplus of 150 grams of protein and 2200 of carbohydrate. Sardines would need to be £0.32 cheaper and steak would need to be £1.16 cheaper before they came into competition.

There must be many other applications for this method, although you would really need to study the subject in depth in order to be able to set up and properly interpret the data. One book I came across that would be useful is *Linear and Non-Linear Programming in Industry* by N. Williams, published by Pitman.

Nevertheless, experimentation with the program and the method could prove fruitful. Try out the following problem:-

There are 3 contractors (rows) offering 3 products each (columns). Each contractor supplies a certain number of all 3 products for a fixed sum. Find out to whom the contract should be awarded (the answer is likely to be that more than one contractor is involved) and what, if any, surplus of goods are produced. The data might look like this:-

With a little bit of luck, there might be someone out there who can use this method to solve our economic ills!

	Product 1	Product 2	Product 3	Cost(col Y)
Contract 1	60	80	75	160
Contract 2	50	120	45	140
Contract 3	40	100	130	170
Need(RowU)	600	1500	800	

## PROGRAM OUTLINE

70-100	Find the Pivot Column by examining the U row.
110-170	Find the Pivot Row and thus the Pivot Element.
180-190	Divide the Pivot Row by the Pivot Element.
200-250	Recalculate the rows.
260-290	Recalculate the Pivot Column and adjust the horizontal and vertical border markers.
300-380	Display the results by examining the border markers.
390-410	Round results to 2 decimal places.
420-710	Request data and other information. Dimension arrays. Line 510 initialises the border markers.
720-760	Display diagrammatic representation of grid.

## MAJOR VARIABLES

TR & TC	Total rows and Total columns.
G(TR,TC)	Grid array.
U()	Row U.
W()	Working copy of Pivot Column.
H() & V()	Horizontal and vertical border markers.
Y()	Column Y.
R\$() & C\$()	Row and column names.
PE	Pivot element.
PR	Pivot Row,
PC	Pivot column.
SE	Smallest element.
BE	Biggest element.

Reverse heart is Pet clear screen symbol. Runs in 3k for a 5x5 grid.

**MAIN GRID**      **Y Z**

<b>U</b>					<b>F</b>
<b>W</b>					

Figure 1

**X**      **Y Z**

	Protein	Carbo hydrate	Fat	Calories	Price
Potatoes (1 lb)	10	90	0	400	10
Sardines (1/2 lb)	80	5	5	500	50
Rump Steak (1 lb)	150	10	80	1300	240
Milk (1 pt)	15	25	20	200	28
Requirement <b>U</b>	500	2000	300	20000	<b>F</b>
<b>W</b>					

Figure 2

**X**      **Y Z**

	Quantity	Price Gap
	42.5	
		31.75
		115.5
<b>U</b>		845
<b>W</b> Surplus	150	2200

**F** ← Lowest Total Cost

Figure 3

```

10 REM*****OPTIMISER****BOB CHAPPELL*****1/1/83
20 REM*** DRIVER ***
30 GOSUB430:GOSUB50:GOSUB300:END
40 REM*** MAIN LOOP ***
50 FORK=1TO1000
60 PRINT"C":PRINT:PRINT"WORKING";K
70 REM*** GET PIVOT COLUMN ***
80 PC=0:BE=0:FORJ1=1TOTC
90 IFU(J1)>BETHENPC=J1:BE=U(J1)
100 NEXTJ1:IFBE<=0THENRETURN
110 REM*** GET PIVOT ROW ***
120 SE=20000:PR=0:FORJ=1TOTR
130 Q=G(J,PC):W(J)=Q:IFQ<=.0001GOTO150
140 IFY(J)/Q<=SE THENSE=Y(J)/Q:PR=J
150 NEXTJ:W(TR+1)=U(PC):IFPR=0THENPRINT"CNO POSSIBLE SOLUTION.":END
160 PE=G(PR,PC):GOSUB190
170 NEXTK:PRINT"NO SOLUTION FOUND.":END
180 REM*** PIVOT ROW/PIVOT ELEMENT ***
190 FORJ=1TOTC:G(PR,J)=G(PR,J)/PE:NEXTJ:Y(PR)=Y(PR)/PE
200 REM*** ADJUST ROWS TO NEW PIVOT ROW ***
210 FORJ=1TOTR:IFJ=PRGOTO240
220 X=G(J,PC):FORJ1=1TOTC:G(J,J1)=G(J,J1)-X*G(PR,J1):NEXTJ1
230 Y(J)=Y(J)-X*Y(PR)
240 NEXTJ:X=U(PC):FORJ1=1TOTC:U(J1)=U(J1)-X*G(PR,J1):NEXTJ1
250 U(TC+1)=U(TC+1)-X*Y(PR)
260 REM*** ADJUST PIVOT COLUMN ***
270 FORJ=1TOTR:G(J,PC)=-W(J)/PE:NEXTJ
280 U(PC)=-W(TR+1)/PE:G(PR,PC)=1/PE
290 X=H(PC):H(PC)=V(PR):V(PR)=X:RETURN
300 REM*** DISPLAY RESULTS ***
310 PRINT"C";TAB(14);"RESULTS":GOSUB410
320 Z=-U(TC+1):PRINTF$;:GOSUB400
330 FORJ=1TOTC:IFH(J)>0THENPRINTX$;" ";RS(H(J));:Z=-U(J):GOSUB400
340 NEXTJ
350 FORJ=1TOTC:IFH(J)<=0THENPRINTW$;" ";CS(-H(J));:Z=-U(J):GOSUB400
360 NEXTJ
370 FORJ=1TOTR:IFV(J)>=0THENPRINTZ$;" ";RS(V(J));:Z=Y(J):GOSUB400
380 NEXTJ:RETURN
390 REM*** ROUND RESULT ***
400 Z=INT((Z+.005)*100)/100:PRINT"=";Z
410 PRINT"-----":RETURN
420 REM*** INITIALISE ***
430 PRINT"C";TAB(14);"OPTIMISER":PRINT:PRINT:PRINT
440 INPUT"ENTER THE TOTAL NUMBER OF ROWS";A$:TR=VAL(A$):PRINT:PRINT
450 INPUT"ENTER THE TOTAL NUMBER OF COLUMNS";A$:TC=VAL(A$)
460 DIMG(TR,TC),R$(TR),C$(TC),U(TC+1),Y(TR),H(TC),V(TR),W(TR+1)
470 PRINT"C":FORJ=1TOTR:PRINT:PRINT"ENTER THE NAME OF"
480 PRINT"ROW";J;:INPUTR$(J):NEXTJ
490 PRINT"C":FORJ=1TOTC:PRINT:PRINT"ENTER THE NAME OF"
500 PRINT"COLUMN";J;:INPUTC$(J):NEXTJ
510 FORJ=1TOTR:V(J)=J:NEXTJ:FORJ=1TOTC:H(J)=-J:NEXTJ
520 FORJ=1TOTR:PRINT"C":FORJ1=1TOTC
530 PRINT:PRINT"ENTER THE VALUE OF
540 PRINTR$(J);"-";C$(J1);:INPUTA$:G(J,J1)=VAL(A$):NEXTJ1,J
550 GOSUB730
560 PRINT"ENTER THE NAME OF THE":INPUT"X' COLUMN";X$
570 GOSUB730
580 PRINT"ENTER THE NAME OF THE":INPUT"Y' COLUMN";Y$
590 GOSUB730
600 PRINT"ENTER THE NAME OF THE":INPUT"Z' COLUMN";Z$
610 GOSUB730
620 PRINT"ENTER THE NAME OF THE":INPUT"U' ROW";U$
630 GOSUB730
640 PRINT:PRINT"ENTER THE NAME OF THE":INPUT"W' ROW";W$
650 GOSUB730
660 PRINT:PRINT"ENTER THE NAME OF THE":INPUT"F' BOX";F$
670 PRINT"C":FORJ=1TOTR:PRINT:PRINT"FOR THE ";RS(J);" ROW,ENTER"
680 PRINT"THE ";Y$;" VALUE";:INPUTA$:Y(J)=VAL(A$):NEXTJ
690 PRINT"C":FORJ=1TOTC:PRINT:PRINT"FOR THE ";C$(J);" COLUMN,ENTER"
700 PRINT"THE ";U$;" VALUE";:INPUTA$:U(J)=VAL(A$):NEXTJ
710 RETURN
720 REM*** DIAGRAM ***
730 PRINT"C X          COLUMNS          Y          Z
740 PRINT:PRINT:PRINT"          R":PRINT:PRINT"          O":PRINT:PRINT"          W"
750 PRINT:PRINT"          S":PRINT:PRINT:PRINT"U ROW";TAB(24);"F BOX"
760 PRINT:PRINT"W ROW":PRINT:PRINT:RETURN

```

NOTE: C IS THE SYMBOL FOR 'CLEAR SCREEN'

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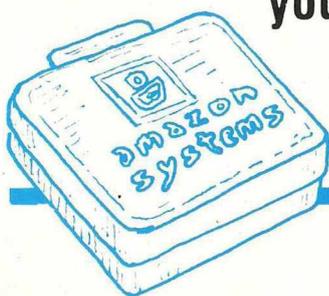
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- Encourage students to 'Time' answers and add this to the Journal.

amazon software is available from Spectrum dealers

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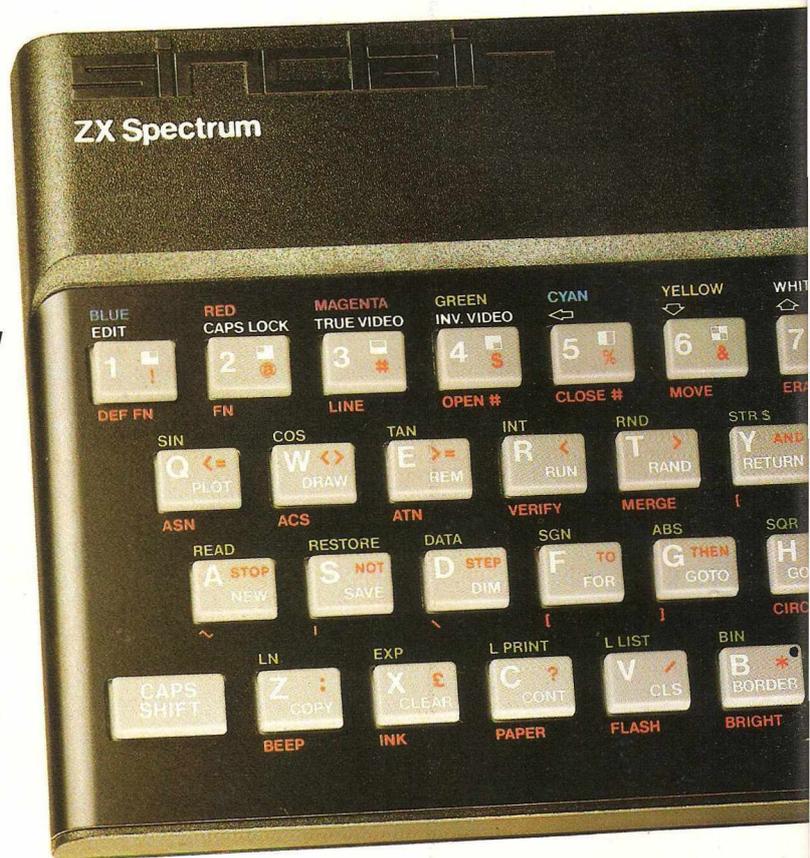
You have access to a range of 8 colours for foreground, background and border, together with a sound generator and high-resolution graphics.

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Yet the price of the Spectrum 16K is an amazing £125! Even the popular 48K version costs only £175!

You may decide to begin with the 16K version. If so, you can still return it later for an upgrade. The cost? Around £60.



## **Ready to use today, easy to expand tomorrow**

Your ZX Spectrum comes with a mains adaptor and all the necessary leads to connect to most cassette recorders and TVs (colour or black and white).

Employing Sinclair BASIC (now used in over 500,000 computers worldwide) the ZX Spectrum comes complete with two manuals which together represent a detailed course in BASIC programming. Whether you're a beginner or a competent programmer, you'll find them both of immense help. Depending on your computer experience, you'll quickly be moving into the colourful world of ZX Spectrum professional-level computing.

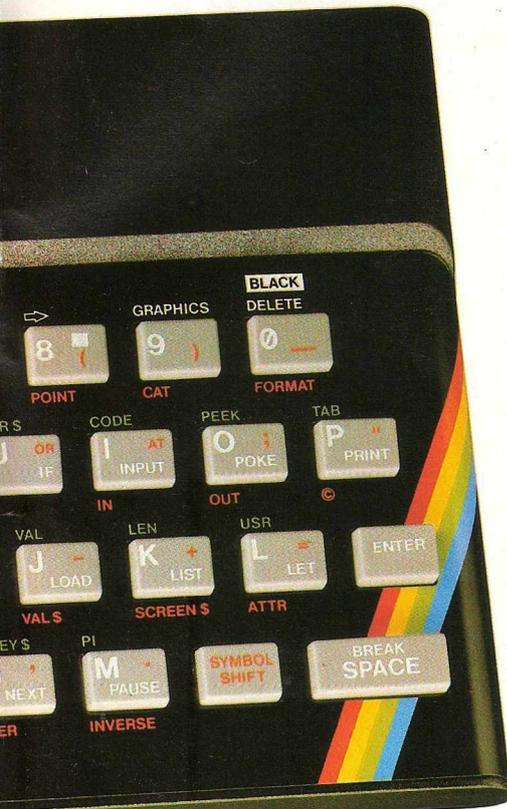
There's no need to stop there. The ZX Printer—available now—is fully compatible with the ZX Spectrum. And later this year there will be Microdrives for massive amounts of extra on-line storage, plus an RS232 / network interface board.



## **Key features of the Sinclair ZX Spectrum**

- Full colour—8 colours each for foreground, background and border, plus flashing and brightness-intensity control.
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- ASCII character set—with upper- and lower-case characters.
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# um

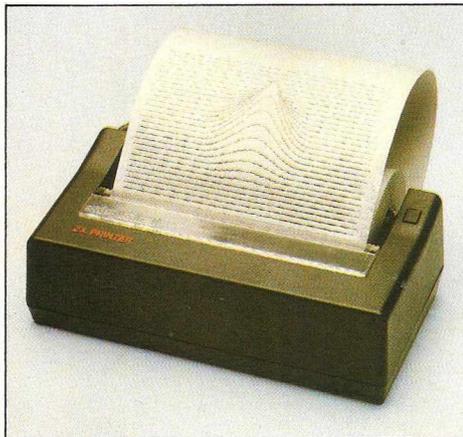


## The ZX Printer - available now

Designed exclusively for use with the Sinclair ZX range of computers, the printer offers ZX Spectrum owners the full ASCII character set - including lower-case characters and high-resolution graphics.

A special feature is COPY which prints out exactly what is on the whole TV screen without the need for further instructions. Printing speed is 50 characters per second, with 32 characters per line and 9 lines per vertical inch.

The ZX Printer connects to the rear of your ZX Spectrum. A roll of paper (65ft long and 4in wide) is supplied, along with full instructions. Further supplies of paper are available in packs of five rolls.



## The ZX Microdrive - coming soon

The new Microdrives, designed especially for the ZX Spectrum, are set to change the face of personal computing by providing mass on-line storage.

Each Microdrive can hold up to 100K bytes using a single interchangeable storage medium.

The transfer rate is 16K bytes per second, with an average access time of 3.5 seconds. And you'll be able to connect up to 8 Microdrives to your Spectrum via the ZX Expansion Module.

A remarkable breakthrough at a remarkable price. The Microdrives will be available in the early part of 1983 for around £50.



## ZX Spectrum software on cassettes - available now

The Spectrum software library is growing every day. Subjects include games, education, and business/household management. Flight Simulation... Chess... Planetoids... History... Inventions... VU-CALC... VU-3D... Club Record Controller... there is something for everyone. And they all make full use of the Spectrum's colour, sound, and graphics capabilities. You'll receive a detailed catalogue with your Spectrum.

## ZX Expansion Module

This module incorporates the three functions of Microdrive controller, local area network, and RS232 interface. Connect it to your Spectrum and you can control up to eight Microdrives, communicate with other computers, and drive a wide range of printers.

The potential is enormous, and the module will be available in the early part of 1983 for around £30.

# sinclair

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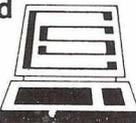


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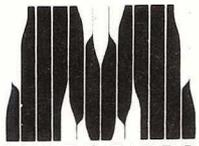
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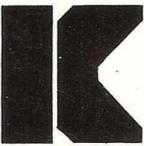
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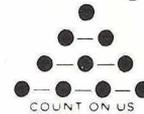
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**INSIDE TRADER**

*I fear the naming of Apple's LISA after Steve Jobs' illegitimate daughter has triggered one of the year's sillier trends in Silicon Valley. As micromen scramble to immortalise their offspring — stand by for the Osborne IAN and the Sinclair CRISPIN — the Commodore's underlings are asking 'Who is VIC?'*

Psychiatrists, already shaken to the core by Professor Weizenbaum's eerily accurate ELIZA simulation, are being reduced to a state of gibbering paranoia by the prospect of *Idware*. Conceived as a means of making personal computers more personal, the program creates an electronic id based on a psychological profile of its user, enabling it to anticipate his wishes. According to *Idware's* author, Steven Weissman, it will "select the TV programme it knows will be of most interest to you, then recommend a couple of martinis before dinner, after which it will play a videogame against you, letting you win if it thinks your ego needs it."

*Rule 136b of the Computer Retailers' Association prohibits two members from using the same name. What then of the forthcoming membership application from Volkswagon subsidiary, the Christian Computer Company, whose proud boast it is that, "every salesman is a born-again Christian and our Chairman is God". As it happens, this is also the name by which the Association's chairman, Colin Stanley, is known.*

A slight hiccup in the evolution of Peachtree Software's *Peachware* range. Although the *Speechware* voice prompted programs are coming on nicely, the *Preachware* ecclesiastical accounting package has hit a snag; apparently it has been rejected by the Reverend Moon as having an insufficiency of noughts to handle the cashflow involved.

*Purchasers of Melbourne House's new hobbit game for the Sinclair Spectrum may like to know that the characters in the microversion of Tolkien's fantasy adventure were based on real computer folk. Gandalf is really Uncle Clive, with other cast members including Adam Osborne as Sauron, Guy Kewney as Gollum, Matthew Wauchope as Bilbo and the staff of Curry's, West Drayton as the Dark Riders.*

I am sorry that, due to the defection of the Commodore's sole remaining software engineer to Atari (they don't beat them there), we shall be deprived of the portentously named 650,000 microprocessor. This device, the source of considerable hilarity within the industry, had been due to power King Kong's forthcoming line of computers. In lieu, our nautical friend has had to sign up as a second source manufacturer of 16-bit chips. Although the identity of the licensor is a secret, I can reveal it is not Motorola or Intel...

*...I am so glad to hear that Zilog has at least found a second source manufacturer for their 16-bit Z-8000 microprocessor.*

I have been asked by Mr. David Tebbutt of Caxton Software (motto *Nil Desperandum*) to request that he no longer be referred to as 'Desperate Dave'. It is, apparently, bad for business. In an, um, desperate attempt to shake off the soubriquet, DDT has taken to referring to himself as 'Tebbo' in PCW's *Chip Chat* gossip column, which he edits. Alas, it has not caught on. Perhaps readers can suggest an alternative?

*The video games industry was swift to respond to US Surgeon General, C. Everett Coop's denunciation of their products as deleterious to the development of children. The usual suitcaseful of greenbacks produced the necessary childcare 'expert' to testify that a modicum of Space Invaders is good for junior. The medico's assertion that all video violence is beneficial was thought on balance to be over-egging the pudding, however.*

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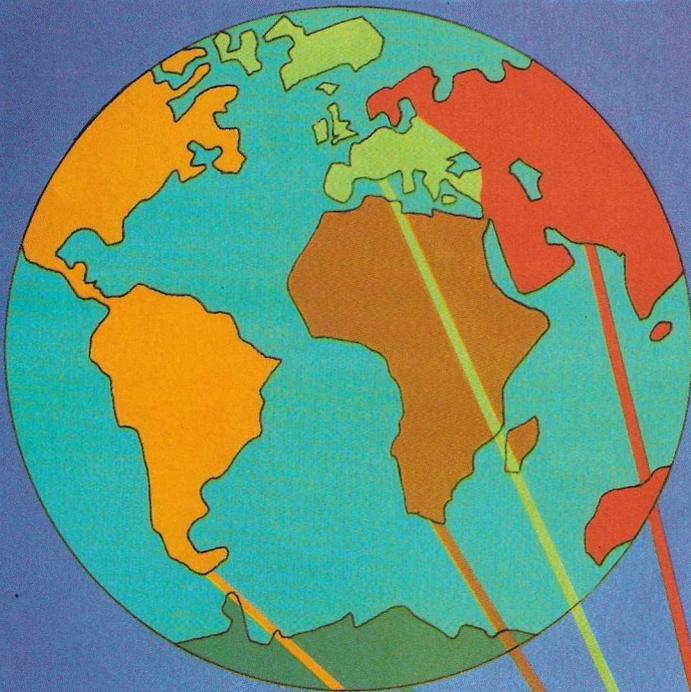
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