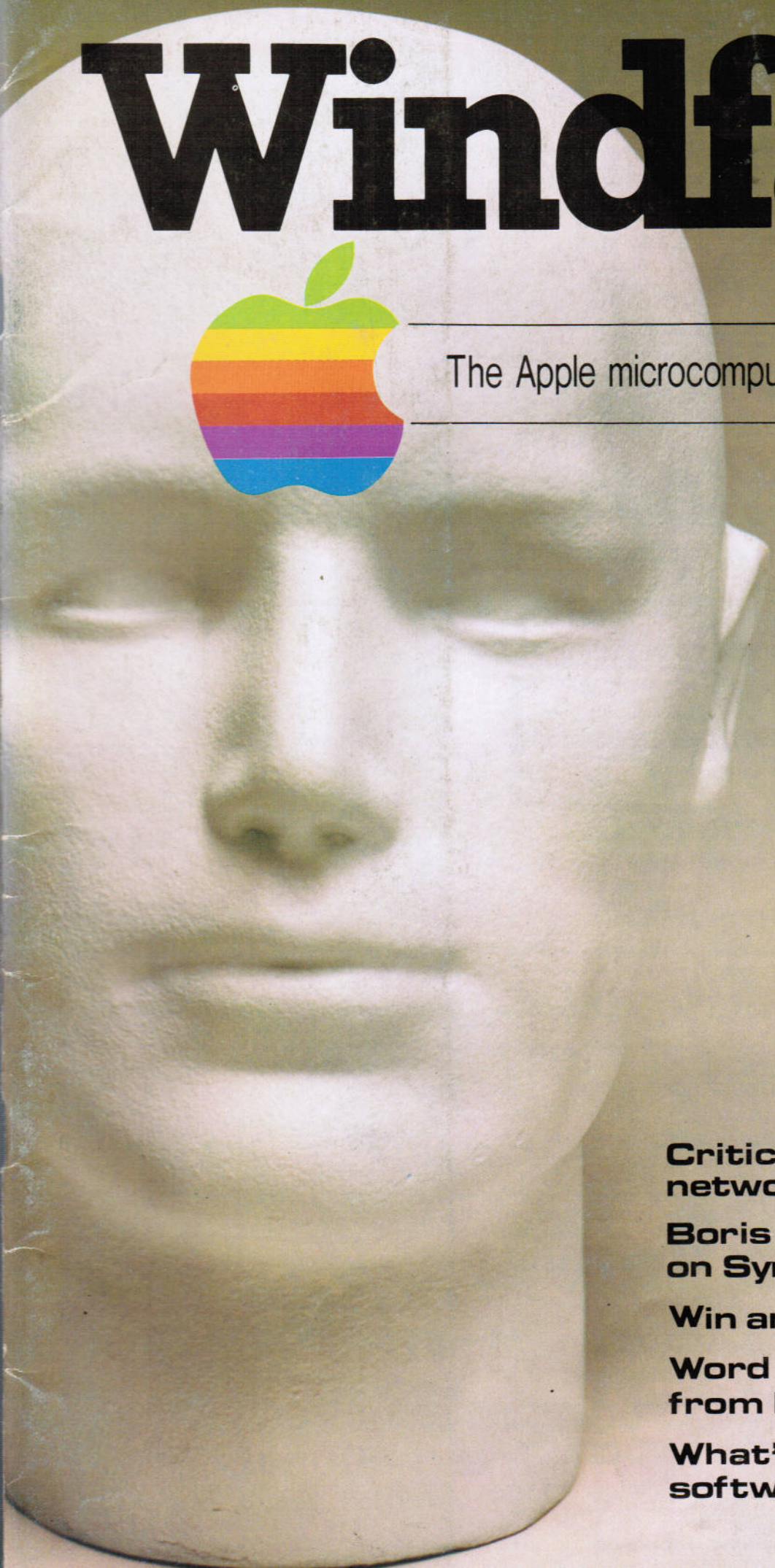
Windfall

No. 2 August 1981 £1

The Apple microcomputer users' magazine



Critical look at networking systems

Boris Allan on Symbolism

Win an Apple

Word processor from Down Under

What's new in Apple software/hardware

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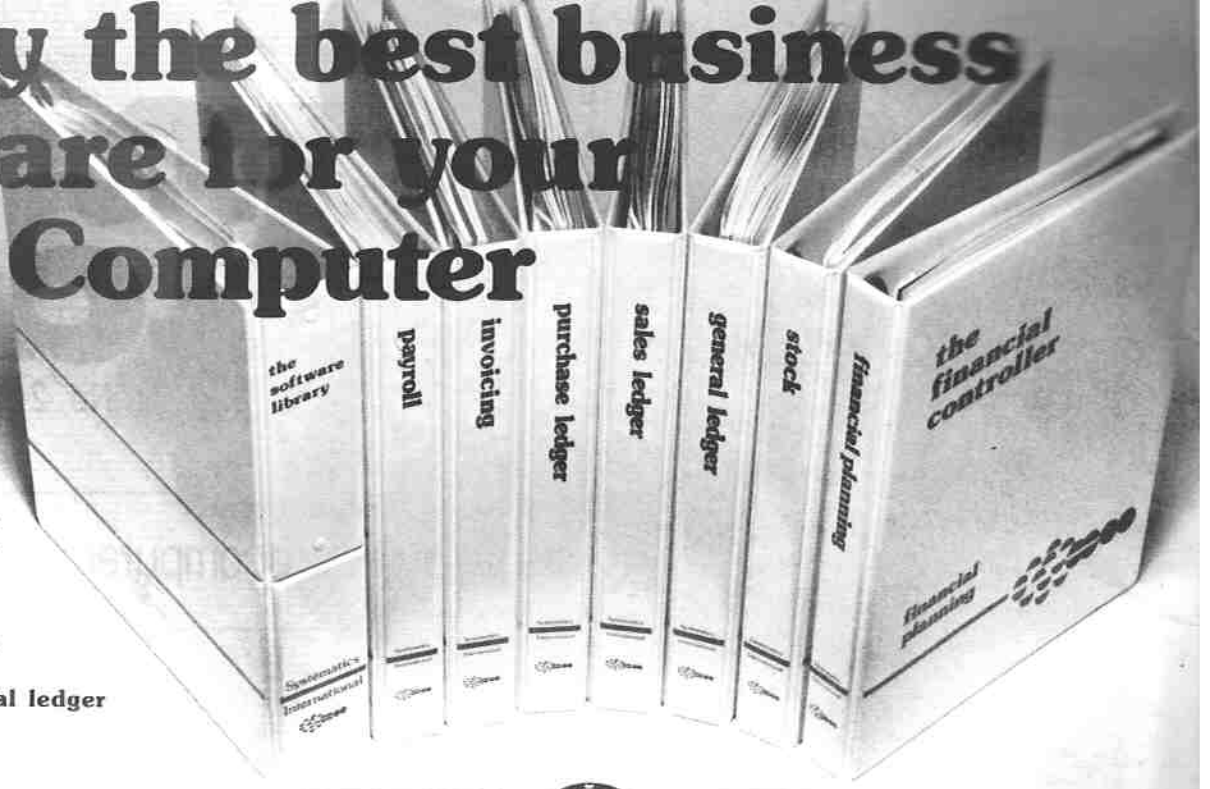

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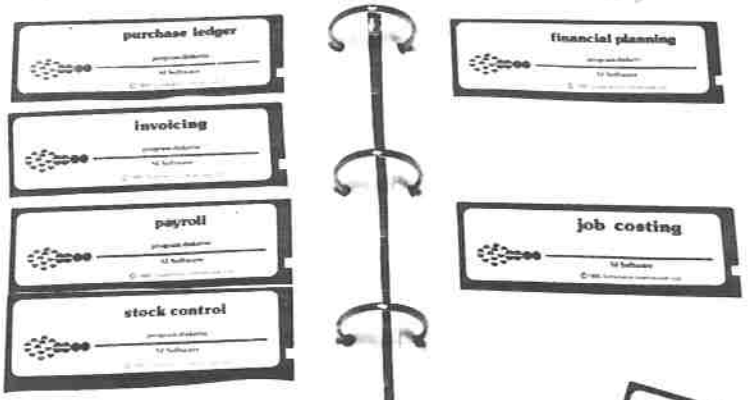

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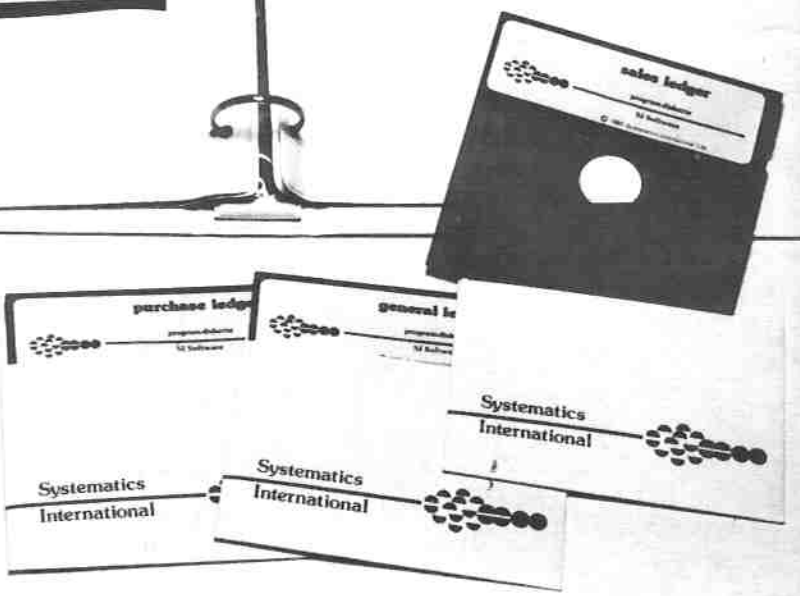

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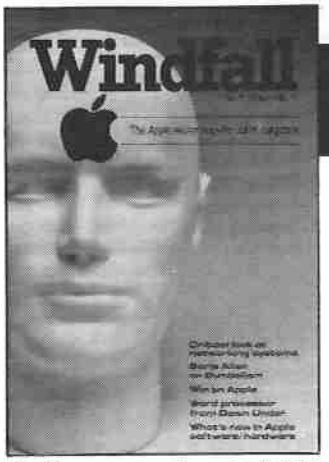

LISTING

No 2 August 1981

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Writing for Windfall: Articles and programs relating to the Apple are welcome. Articles should preferably be typed or computer-printed, using double spacing. Unsolicited manuscripts, discs, etc, should be accompanied by a self-addressed stamped envelope, otherwise their return cannot be guaranteed.

Teach your Apple to sing!

WINDFALL is organising a Music and Speech Synthesiser Workshop, to be held in Manchester on Saturday, September 26. While primarily designed for Apple users, it will be open to anyone interested in this fascinating subject.

The music side of the workshop will be the responsibility of Dr David Ellis, who runs the London-based Apple Music Synthesis Group.

The speech synthesis section is in the hands of a number of experienced users, including a team from Salford University.

Aim of the workshop is to create a greater awareness of the remarkable developments now being made in music and speech synthesis systems.

There will be lectures on various technical aspects of using a computer to create music or speech, as well as a general "hands on" session where you can try out the equipment and talk to the experts. Several Apple-based systems will be represented, including an Alpha-Syntauri keyboard.

More details will be given in the next issue of Windfall. But as it is expected that a lot of Apple users will want to attend the workshop we urge any readers interested in this subject to write to us now to reserve a place.

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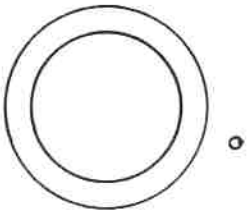

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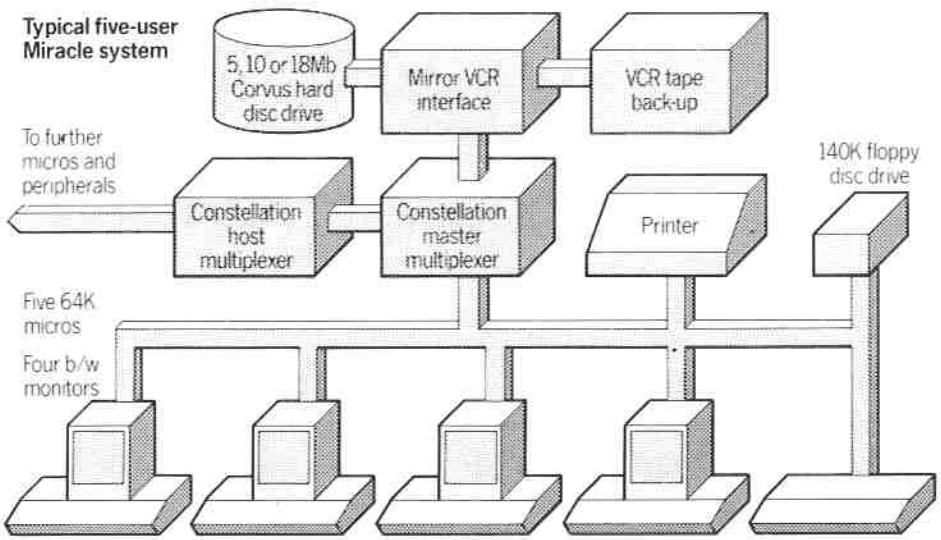

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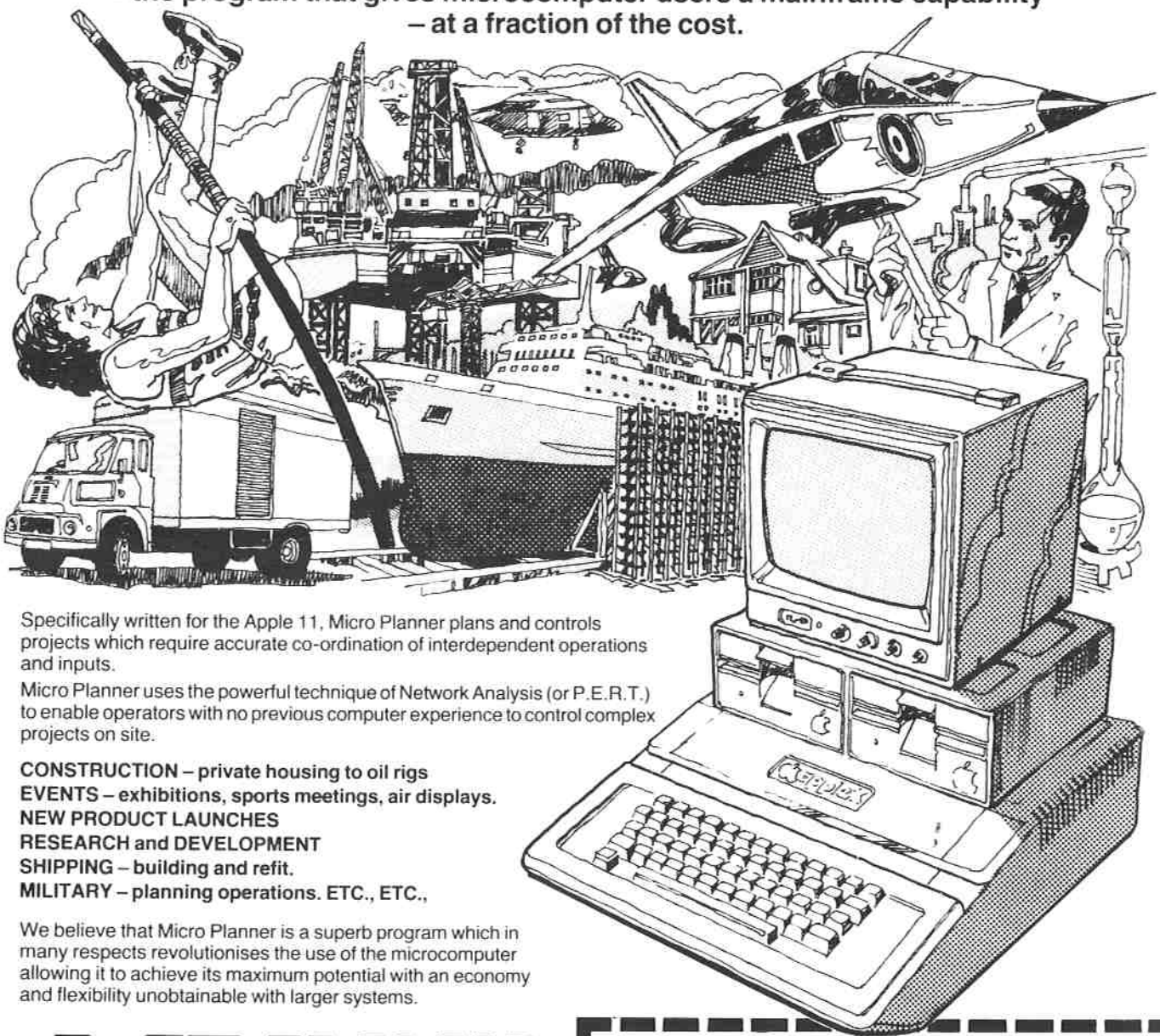

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ALL right, so you have got yourself an Apple. Don't just sit there playing with it all by yourself. Be sociable. Talk to another Apple. Share some data with it. And if you really feel liberated, talk to a different class of computer altogether.

Microcomputers have really hived off computing power from those first dolers out of data processing facilities, the mainframe computer. Instead of a few people queueing up for a share of the action on an enormously expensive central computer we now have many more people with all the computing power they need on their desk, and ready at the touch of a button.

The big multi-terminal systems had benefits, however, which up till recently were not available for the desktop computer. You were able to access, along with all of the other users, a vast amount of storage, dipping into common files and using common facilities like printers and plotters. Software, unless locked for restricted use, was accessible to everyone and operating messages could be flashed to any terminal in the system.

We believe that Apple users should now take advantage of current developments and start using Apples in local networks, where they can have the same facilities available to them, and ultimately to become involved in the national networks, using the Apple as a means of communication as well as a local processor.

It is our intention over the next few months to look at different aspects of communications using the Apple, starting with two products currently being sold as 'Apple networks' and briefly mentioning a third which will supplement these two. Next month, we will be looking at using the Apple as a means of communicating with another computer or as part of a time-sharing network. Finally we will look at more esoteric uses of the Apple in communications using radio satellites and outlining a philosophy for possible future development.

The two systems chosen for closer scrutiny in this issue are already well established in a number of commercial, financial and government sites. They use different technologies to achieve their aim, which is to allow up to 64 Apples or peripherals to communicate with each other, or to access a central file store on hard disc.

The more common of the two, possibly because of its lower initial starting price, is the Constellation system marketed by Keen Computers of Nottingham. This system has been installed in 200 sites in this country and is currently being marketed abroad with considerable success. The other major system is the Nestar Cluster One from Zynar, a subsidiary of Rank Xerox, operating out of Uxbridge. Zynar have about 20 sites in this country, and are also having a great deal of success in their efforts to export the system.

The third system, which has only just arrived in Britain, is Omminet, which is also to be marketed by Keen Computers.

CORVUS have developed their Constellation system to enable a large number of computers, of mixed parentage, to use their disc drives. It is essentially a multiplexed network of computers, each group of eight being controlled by a host multiplexer. Eight host multiplexers can be controlled by one other multiplexer, which is designated the master multiplexer. Up to 64 computers can therefore be linked in a system, all of them being polled in turn, in round robin fashion, for data.

The multiplexers work in conjunction with the Corvus disc system, controlled by the Z80 processor. The multiplexer controls the information flow to and from the computers in its network, and the Z80 controls direct memory access to the disc, the multiplexers themselves, and the Mirror Winchester back-up system.

A network is basically a means of passing data from one computer to another, onto or off a disc to serve a file, or onto a printer to be printed out. The Constellation achieves this by splitting the data up into finite portions, and feeding them down pipes.

A pipe is a fixed length channel of information with an input and an output end or, to use another term, a FIFO buffer (first-in-first-out) which can be held in an assigned area of the disc and be managed by the controller.

The computer writes data to the input end of the pipe, and it is held there until it is read, is output onto another computer, or is spooled out onto a printer. After the data has been used, the resources allocated to that particular pipe are released to be used by another parcel of information.

Individual computers within the network can send commands to read and write from pipe files, and there can be a maximum of 62 active pipes in the Constellation network at any one time.

Each pipe has a pipe name which can be up to eight characters, and a pipe number from 1 to 62. As each pipe has a unique number, however, several pipes may have the same name.

The major advantage of these pipes is that they are all held in identical format whatever the originating computer. This means that different makes of computer can communicate or access the same data, and printers can be attached to serve the whole range. There is no risk of incompatibility between different operating systems. Indeed, each computer retains its own operating system within the network.

Printers, linked to computers which become dedicated printer servers during printing operations, have data spooled onto them by their computer, searching the pipes to find those which have been called 'Printer'. When it finds one, it directs the contents of the pipe to the printer, and continues searching the pipes until there are no more to be called. It then continues to make periodic checks to see if any new printer pipes have been created.

Pipes can also be used as a means of creating a mail or message system for the network. Individual computers can search the disc for pipes bearing their identification name, and when one is found can print the contained message on the screen.

As pipes are the means of transporting data to and from the disc system, so the mount table is a means of determining which part of the disc each computer in the network is allowed to access. The Constellation provides each operating system with an I/O driver, which contains a mount table specifying the areas of the disc which the computer is allowed to access.

There are three types of volume on the disc – a system volume which can be read by all computers but not written to, a personal volume which can be accessed by a specific computer for both read and write operations, and a shared volume which can be read to or written from by more than one computer.

An obvious corollary to such a flexible and open network is that it must contain a measure of security, or restricted access. Constellation has several means of providing this.

One method is to use access control, and an example of this is the CP/M system, where each computer utilises a floppy disc drive, the user having to boot the system directly from floppy disc to gain access. This serves as a physical key.

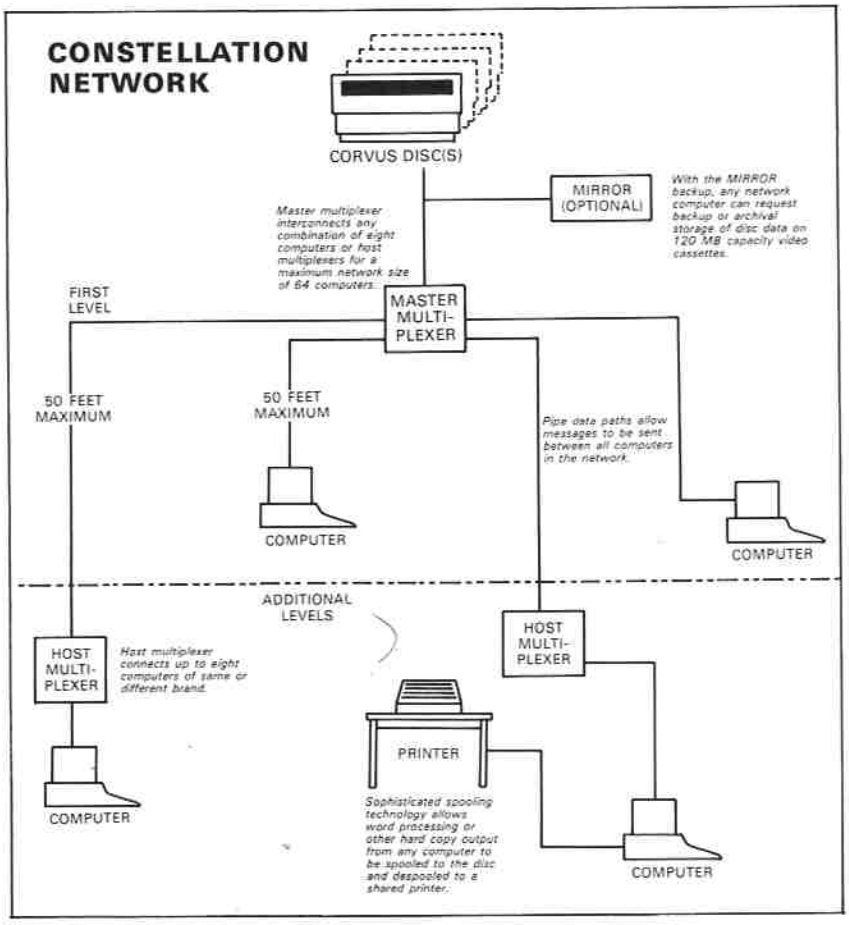
Another method is to allow access by passwords, utilities which modify the mount table. This then increases the level of security from the computer to individual persons. A special file lists who can access which volumes. The only person who can change the privileges of users is the one who acts as system manager.

A further level of security is provided for shared volumes. Where a volume needs to be accessed by more than one operator for both read and write functions there has to be a system for locking out a file while retaining access to other users.

This is done by using semaphores. Any computer can ask to lock a semaphore to limit access, which is normally granted if no other computer is already locked in. This can prevent two computers trying to update a record at the same time.

The speed at which data can be transferred around the network is 60 Kbytes per second, and the maximum length at

Be sociable, talk to another Apple



which a computer can be located from the multiplexer is 50 feet.

Application packages available on the Constellation system obviously depend on the types of computers within the network. Each computer functions as a independent processor, and the only constraints occur where different computers want to access data from the same shared volume for a particular application.

Where there are a number of common machines, however, it is easy to see which systems provide the greatest benefit.

Word processing systems find such a network extremely useful. All of the stations can share a printer yet retain independent processing power. This is especially relevant where during operation there is a high degree of interchange between the processor and the operator.

For general commercial accounting, the benefits of handling an integrated system on a network are obvious. Different operations can be maintained on different computers, yet all update the same files, such as sales order processing or stock recording. One operator is constantly requiring information from an up to date stock file, while the store clerk enters stock as it arrives in the warehouse. Information held on file, such as customers credit ratings, can also be accessed by individuals throughout the company whenever necessary.

The advantages of installing networks in schools are obvious, although with the present cutback in resources this is probably something for the future. Using such a system a teacher would be in a position to monitor and control students far more effectively, and course preparation would be simplified.

The Corvus Constellation system is at the cheaper end of the network systems based on the Apple, but it provides a very cost effective and efficient system for the customer who does not want more than about eight computers in a network. Beyond that, the concept of daisy chaining the multiplexers must start degrading the system response and reliability.

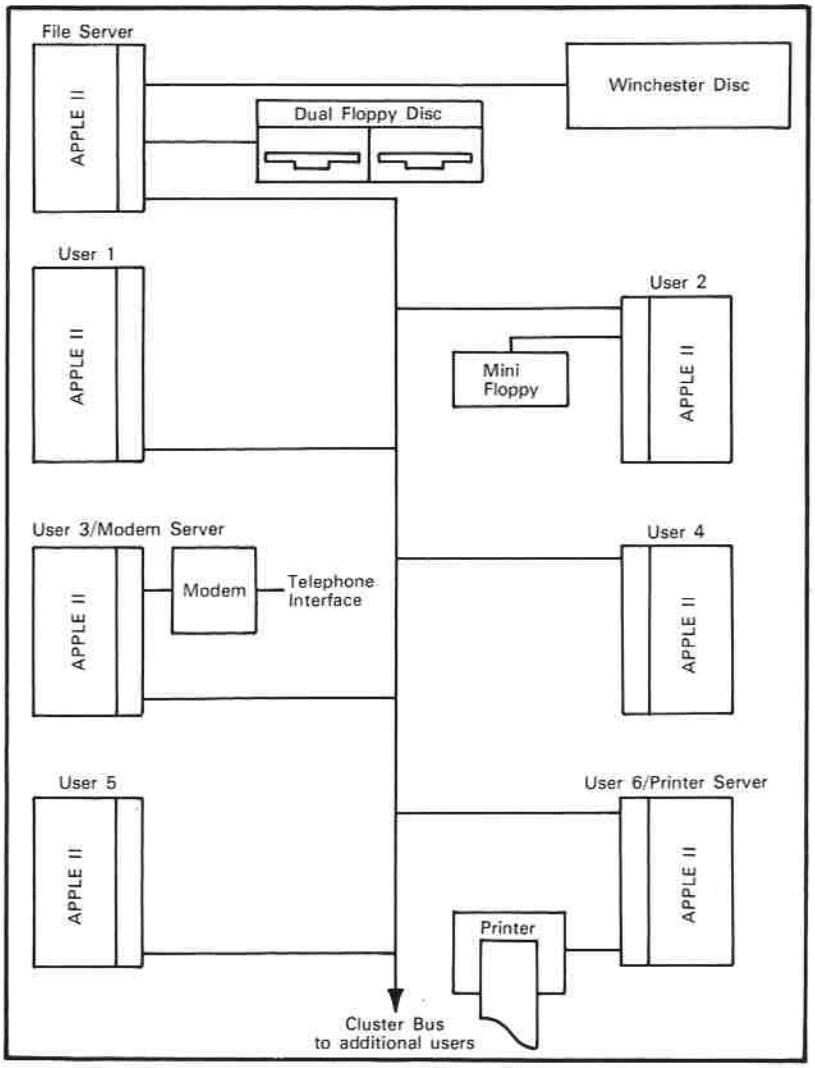
Finally, initial reliability problems that Corvus had with their disc systems have been completely ironed out, and they are now the world's largest suppliers of Winchester discs.

SOLE importers and distributors of the Corvus hard disc system is Keen Computers of Nottingham, who have been engaged in selling Apples for the last three years. Under the direction of Dr. Tim Keen they have developed rapidly, building up a company with an expanding reputation for technical expertise and reliability. They have also been involved in the design and manufacture of additional Apple components, such as their colour card, and have developed a considerable amount of software. They play a leading role in importing equipment from the United States for sale to other dealers and their own customers in this country. The major peripheral in this bracket is the Corvus hard disc system.

The Corvus is based on the eight-inch IMI-7720 Winchester disc drive, housed in a sealed environment for improved reliability. It is supplied with an intelligent controller based on the Zilog Z80 microprocessor, which gives it its speed and flexibility. Each disc system also contains an intelligent personality module for each computer.

The standard size of Corvus disc is 10Mb, but recently additions to the range have provided the 5Mb disc and the 20Mb disc. As four disc drives can be run from one controller, the maximum capacity of the system is 80Mb. The extra discs are added on in a daisy chain fashion.

Cluster One ...links up to 64 Apples



A typical Cluster One network

THE Nestar Cluster One system, marketed by Zynar, was developed by Dr Harry Saal, late of IBM and Stanford Institute and an original researcher with Ethernet. He decided that the Ethernet principle could also be applied to smaller computer systems and therefore scaled down the necessary components to the appropriate price level and built a system for linking Apples.

Cluster One received a lot of publicity recently, notably in one case where it was used to link 20 Apples monitoring the use of buses ferrying people to see the Pope during his visit to the States.

Meanwhile in Britain Colin Crook, who previously had been involved in heading the development and marketing of the Motorala 68000 processor, and who subsequently became MD of Rank Precision Industries, was busy setting up Zynar as a wholly owned subsidiary of Rank Xerox.

The link up with Nestar was established at an early stage, and now Zynar own one half of Nestar, and have exclusive rights to sell Cluster One throughout Europe. There are now 20 people at Uxbridge supporting the installation of current systems and working on new developments together with Nestar, which has a R & D section in the States.

Zynar is selling Cluster One as a data processing facility and has established an efficient organisation to ensure that it works. A welcome sight at their own offices in Uxbridge is the fact that they are developing a philosophy on the correct operation of an electronic office and that is very much in evidence by the total lack of extraneous paperwork on desks. All standard interoffice communication, including letters and memos to Nestar in the States, is handled totally by computer.

Cluster One is a true network system. Up to 64 Apples can be linked together, sharing common discs, printers and communications facilities.

At the heart of the system – although being a modular system it can run without one – is an Apple which is linked to the disc storage system, and which is called the Network File Server. This system hangs onto a spur from the central 15 wire flat cable. On other spurs hang the remainder of the Apple systems, acting either as work stations or servers to peripherals.

The file server provides two virtual channels for its clients, the work stations. One channel is for manipulating the file system, such as creating, deleting, mounting and unmounting files, and locking shared data during simultaneous updating.

The other channel is used for passing I/O requests and data. As it has a dedicated processor it can handle an enhanced set of I/O facilities. Where the normal operating system restricts the user to two mounts per channel, the file server allows up to 255 simultaneous mounts in Basic, and six with Pascal.

The file server is also faster than standard local disc drives, allows controlled sharing of data with other work stations, and provides protection of private data.

The system is not a rigid one. To use a beautiful bit of terminology it is topologically unrestrained, and Apples and peripherals can be laid out in tree structures of daisy chains.

As stated before, there is no central control. Each Apple in the network is either a user or a server. The users are the work stations, and the servers provide services for other users of the network. The server functions available are:

- ☐ File system
- ☐ Print spooler
- ☐ Time of day clock
- ☐ Data base management system
- ☐ Gateway to other networks
- ☐ Other specialised hardware

Print servers are normally run without screens, although a screen can be added to allow the Apple to have a dual function and act as a workstation when printing is not required.

Communication servers have access to software to act as emulators, using IBM 2780 and 3780 protocols or as remote Apples to other computers, or as originators of an electronic mail system.

The interface card incorporated into each Apple listens to the network to check whether it is busy or not. If not it sends

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LOCAL DEALERS

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194 Union Street
London SE1 0LH
Tel: 01-928 5322/3

Lion House (Retail) Limited
227 Tottenham Court Road
London W1P 0HX
Tel: 01-637 1601

Personal Computers Limited
194–200 Bishopsgate
London EC2M 4NR
Tel: 01-626 8121

S. W. Winter & Co. Limited
101 Westminster Bridge Road
London SE1 7HR
Tel: 01-633 9611

PROVINCES

Avon
Microstyle
29 Belvedere
Lansdown Road
Bath BA1 5HR
Tel: 0225 334659

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7 Amersham Hill
High Wycombe HP13 6NQ
Tel: 0494 20416

Cornwall
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25 Fore Street
Callington PL17 7AD
Tel: 05793 3780

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Letchworth SG6 3ET
Tel: 04626 73301

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Currie (Business Equipment) Limited
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Claughton
Birkenhead L41 0DF
Tel: 051 658 5111

Business Equipment Centre (Liverpool) Limited
31/35 Edge Lane
Liverpool L7 2PA
Tel: 051-263 5783/4421/5738/6683

Norfolk
Anglia Computer Centre
88 St. Benedicts Street
Norwich NR2 4AB
Tel: 0603 29652

Oxfordshire
Alphascan Limited
Little Bourton House
Southam Road
Banbury OX16 7SR
Tel: 029 575 8202

Surrey
T & V Johnson Limited
(Microcomputers Etc.)
Johnson House
75-79 Park Street
Camberley GU15 3XE
Tel: 0276 20446

Warwickshire
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16 The Square
Kenilworth CV8 1EB
Tel: 0926 512127

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1 Bilton Road
Rugby CV22 7AA
Tel: 0788 74442/3

West Midlands
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462 Coventry Road
Small Heath
Birmingham B10 0UG
Tel: 021 773 8240

C.P.S. (Data Systems) Limited
Arden House
1102 Warwick Road
Acocks Green
Birmingham B27 6BH
Tel: 021 707 3866

Worcestershire
Arrow Business Computers Limited
Royal House
11 Market Place
Redditch B98 8AA
Tel: 0527 62733

SCOTLAND

Strathclyde
Turnkey Computer Technology Limited
23 Calderglen Road
St. Leonards
East Kilbride G74 2LQ
Tel: 03552 39466

Video Vector Dynamics Limited
39 Hope Street
Glasgow G2 6AE
Tel: 041 226 3481/2

WALES

South Glamorgan
David Potter Office Equipment Limited
164 Richmond Road
Cardiff CF2 3BX
Tel: 0222 496510

West Glamorgan
Croeso Computer Services
516 Mumbles Road
Mumbles
Swansea SA3 4BV
Tel: 0792 60624

data in packets up to 255 bytes in length to its chosen destination. Each packet has a recognisable start and end, and cyclic redundancy checks are carried out during transmission. The interface also has the ability to retry and switch itself off after timeout. This type of system is termed packet switching.

The method of handling the data on the disc and through the system involves complex file-naming conventions and protection procedures. The file server creates virtual mini-diskettes (when DOS is being used) on the central storage system, although this is transparent to the user, who operates as he would do with a stand alone computer.

The system can handle large numbers of virtual mini-diskettes in this fashion, or it can allow the user to manipulate the diskettes operating at a local level, where he uses the Apple as a stand alone computer. At Cluster level he involves the network.

Each disc unit is given an assigned name or a unit number, and at the Cluster level on the disc a number of these discs can be held supported by a root directory, sub-directories and Cluster utility programs.

The root directory points directly, or through the sub-directories, to every virtual diskette, utility program, or sub-directory on that unit. The size of the directory is managed by the file system.

Pathnames are created to identify individual packets of data. These contain unitnames, filepaths, filenames and passwords, and are used to enable data to be held on directory, and transported to individual units or servers. When you want to address a Cluster file on the system, you have to specify by explicit names (or defaults) the physical disc unit (i.e. its root directory), intermediate sub-directories, and the desired Cluster file.

To cut down on the number of characters to be typed when addressing files, a default directory can be set to be accessed automatically.

Security on the system is provided by two different software mechanisms. Cluster file protection is provided by a system of passwords and access rights for different classes of users.

This controls access to diskettes, but does not control access to resources which is provided by a system of locks. Locks, acting on a mutual convention, return information to a requesting computer that a particular resource is occupied, and cannot be accessed at the current time.

The operating system to run Cluster One works under Pascal, using the M&R 80 column card as standard. The system can obviously run DOS 3.2 and 3.3, and currently a limited version of CP/M. The system software is held in the network file server.

A major part of the Nestar system however consists of the discs used in the central file store. These are 14in. Winchester discs with a capacity at the bottom end of 16½ Mb formatted single density and 33 Mb formatted double density. These discs are industry standard and apart from being well tried and tested and in use in many other systems are being operated at the bottom end of their capabilities – 70Mb and 256 Mb systems are envisaged next year.

The discs are backed up onto a digital tape cartridge which has a capacity of 20 Mb. A 16½ Mb backup will take eight and a half minutes. In addition to this, a clock/calendar card will archive files incrementally, assigning a time and date to each file and only backing up those files not backed up since the last operation.

All networks can obviously run most standard Apple software without modifications. The exception tends to be 5in. disc based software like Visicalc, where modifications are necessary to allow the program to be loaded onto the Winchester discs. Cluster One works without floppy discs, although there is usually one drive in the system for loading diagnostics and other software.

Software provided by Zynar includes:

- ☐ Network File Server.
- ☐ Messenger – the mailing system.
- ☐ DFPS – Distributive Financial Planning System, a development of Micromodeller.
- ☐ Viewdata – Developed in conjunction with Mike Gardner of Owl Computers, who wrote Appeltel.
- ☐ 2780 and 3780 Emulators, also from Mike Gardner.
- ☐ UNIX – about which more in a later issue – and Wordstar, the CP/M based word processor.

An interesting point about Viewdata is that the system can create Viewdata frames, or use frames as input devices to other applications.

Among the users of Cluster One are people like CCTA – the Post Office telecommunications agency – and Citibank, who use this system in a complicated foreign exchange system in London.

Future development will include the ability to link into the Post Office's X25 system, perhaps emphasising the view that Zynar see the Apple essentially as a human interface to local and national computing networks.

Omninet...compatible with Constellation

CORVUS have recently launched a new networking system called Omninet, which like Cluster One is closer to Ethernet principles. Keen Computers are again the suppliers.

Designated a low cost Carrier Sense Multiple Access (CSMA) network, the system is designed around an interface consisting of a Motorola 6801 microprocessor, a custom Omninet gate array and associated support components. The transporter is interfaced directly to the microcomputer in the network and supervises the transfer of variable length records around it.

The transporter requires no software assistance from its microcomputer, its processors being sufficiently intelligent to handle the detection of carrier space on the data highway and to direct its data to the required destination.

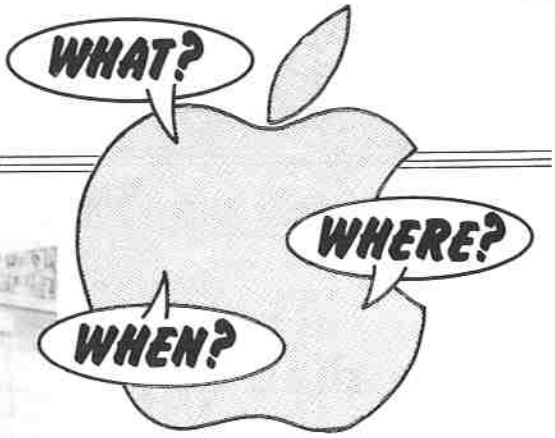
The data path is low cost shielded twisted pair cable, instead of costly and bulky coaxial cable. It allows computers to work at distances up to 4,000 feet in a serial link, instead of the 50ft maximum of the Constellation network.

The Omninet system is obviously similar in many respects to Cluster One and will be sold at a similar price. It will, however, link in to the Constellation network its software being fully compatible. It can utilise their piped system of passing data and operate within their security systems.

This is achieved by passing data through a gateway to other networks. This will be the door through which Omninet will be able to link into regional and national networks, such as Ethernet and SNA, scheduled for 1982. As with the Cluster One system, discs are supported through disc servers, and modems and printers require computers with dedicated servers for their operation.

The concept employed in designing Omninet and Cluster One is to provide a relatively low priced system which can be started with one or two computers and a disc drive and which can be expanded easily, as and when necessary. Almost as an aside, it provides additional security by giving the user a multi-processor system, where inoperative computers can be extracted from the network without affecting the operation of the rest.

Omninet, like the Constellation system, is not restricted to Apple computers, and at the moment can be used to link to Apple II, Onyx C8000 and the Digital Equipment Corporation LSI-11, as well as to any existing Corvus peripheral.



An Apple for the farmer

THE Royal Show at Kenilworth, which is the most prestigious and well attended agricultural show in Europe, is helping to highlight the growing need and use of microcomputers in farming. Now it has a permanent location, at the National Agricultural Centre, there are a number of permanent buildings, one of which is the Electronics and Conference Centre. It was here that a small exhibition was recently held on electronics aids to farming.

There are very few microcomputer companies who specialise in farming applications, but by far the best established is Farmplan, of Ross-on-Wye, Hertfordshire, who have developed all of their systems around Apples.

Their staff all have a wide knowledge of farming as well as computing, and have produced a whole range of accounting packages designed to be used by farmers, as well as applications dealing with more specific management of farm products such as pig breeding management, crop management, dairy herd management and a development of the ubiquitous Visicalc program called Agricalc.

Farmplan have already installed Apples in more than 130 farms and are now seeking pastures new. Apparently the States haven't yet linked Apples into farming so they are setting up an office over there. They are already involved in the European market.

An interesting aside from one of Farmplan's staff: "British farmers are among the world's best at farming, and worst when it comes to accounting. Our job deals as much with teaching farmers basic accounting as it does with installing an efficient computer system".

Program for thrills

IS the life of the Apple dealer so boring and lacking in excitement that he has to go out and risk life and limb in hair-raising sports just to get a bit of enjoyment? Mike Lloyd, of County Business Machines in Guildford, isn't content with sitting behind his Apple every weekend.

He bought a 26ft motor cruiser earlier this year which he has been using to race around the South Coast in whatever weather he can find. Running such a boat is an expensive business, and he has persuaded County Business Machines to be one of his sponsors.

The boat is a Fairline Fury named Pent-Up-Fury. It is fitted with twin Volvo 145hp engines, and although remaining unmodified to comply with the racing rules of the sports' governing body, requires every spare moment of Mike's to keep it in top condition for racing. It races in the national cruiser class, and four races have been held so far this year. At Fowey in May the boat won its class, at Hamble a month later it came fifth and at Poole, on two different occasions, it had to retire.

The first of these occasions was particularly hairy. Anybody who knows Poole knows that the weather can turn the bay into a particularly nasty bit of water. The wind was blowing at force 5-6 , and there was a heavy swell. This was Mike's first

race in the boat, and it was quite an introduction.

He had never been out in such conditions before, let alone raced in them. Forty boats shot off from the start hurtling all over the place, but Mike quickly pushed into the lead. Then his navigator fell and broke his wrist. As he could only hold on with one hand, he was roped in and they continued going. Entering the last lap, however, the navigator had had enough and lapsed into unconsciousness, and Mike had to retire the boat to get him to hospital.

Mike is now looking for a large Apple sticker to go on his boat. It needs to be quite tenacious, as the weather it will meet could be quite atrocious.

Calling home-based programmers

PROGRAMMERS with experience in the commercial marketplace are wanted by Ram Computer Services to assist them in setting up a homebased programming circuit.

Jeremy Hope, Ram's managing director, says there must be many programmers currently residing under the banner of the unemployed, or running a home as a housewife, or even some in full time employment, who would be very interested in working from home, at whatever time of the day they choose, and with the prospect of turning their efforts into a fulltime occupation.

Ram have many customers who, having bought the latest and best programs, are still interested in getting them modified further to suit their own needs.

Ram undertake to guarantee at least a year's supply of work to suitable applicants on equipment which can be leased or purchased from them, and the work will be supervised at every stage to ensure that it meets the company's own high standards.

If you are in such a position yourself, and would like to get involved in the scheme, give Jeremy Hope a ring on 0274 391166, or go to see him at Ram Computer Services Ltd., 15-17 North Parade, Bradford, West Yorkshire.

COMPUCOPIA

Video disc breakthrough

ANOTHER first for Personal Computers comes with the news that they are to introduce Britain's first videodisc player to interface with the Apple II. It will cost around £1,500, but the double-sided discs themselves, which give up to an hour's video and sound information, will sell for less than £5.

Personal Computers will be promoting this major development as an ideal training tool. To demonstrate the player they have an introductory training disc featuring both the Apple and Visicalc.

The Apple operator can control the speed of the disc and can review it frame by frame. Each disc holds up to 54,000 tracks, allowing the recall of 54,000 visual images, plus sound.

The disc rotates at 1,800 rpm, and the information it carries is interpreted by means of a helium-neon laser.

The player, called Discovision, is believed to have considerable potential in education, both in the classroom and in business offices. It should also be useful for demonstration purposes at exhibitions and seminars. In fact its first users are expected to discover for themselves applications which are not even envisaged at this stage.

Contact Mike Sterland, Personal Computers, 194 Bishopgate, London EC2 4NR (tel: 01-626 8121).

Widget watches it

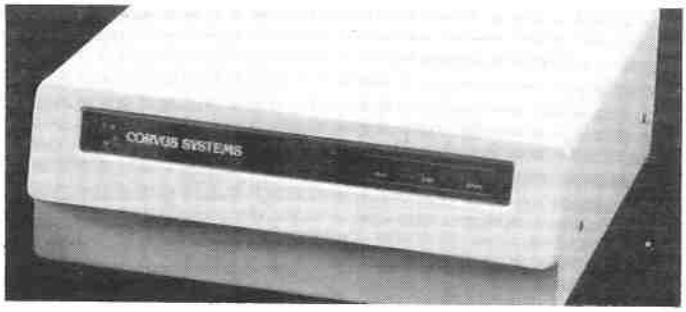
PROTECT your Apple Pascal software with the Widget. You can prevent people copying your software without authorisation by installing one in your Apple.

This is a micro PCB containing a unique user identification code, preventing Apples without your particular Widget from executing your programs. Software supplied with a Widget will return an error condition if called when the Widget is not present, allowing your program to take protective action, such as re-formatting the unauthorised user's disk.

To become a Widget user, you buy 10 Widgets with a unique identification code, plus copies of the Binary Widget procedures on disk, for £500. Additional Widgets can be purchased at £25 each for 10 off, or £15 each for 100 off.

For a device of this type, Robin Hills obviously insist on establishing the authenticity of potential users, and ask you to sign declaratory documents protecting all copyrights.

Contact Robin Hills (Systems) Ltd., 48/49 High Street, Exeter, Devon (tel: 0392 38991).



Smart new Corvus

CORVUS have redesigned the external appearance of their fixed disk system and improved the technical specification to provide a much smarter, more dependable method of mass storage.

The latest model, which complements the already existing 10 and 20 Mb range, is the 5 Mb hard disc system. It is designed specifically for Apple computers, and is now available from Keen Computers of Nottingham. The disc is completely compatible with the other discs, and up to four discs of mixed size can be used in a system.

Hard discs are principally used to provide an on-line centralised file with immediate access. The systems are fast in operation, and interface with the Mirror video tape system for backup, and the Constellation network, which enables from two to 64 computers to share information.

Intelligence and power of the controller is provided by the Z80 microprocessor. This will handle four drives, with a total data storage range of 5 to 80 Mb. Reliability has been improved by the use of low-mass read/write heads, and head to surface distance is reduced for greater data capacity per rotational inch.

Contact Keen Computers, Minerva House, Spaniel Row, Nottingham NG1 6EP (tel: 0602 412777). Note the new address and telephone number.

Instant hues

IT is not necessary to buy a colour card to get decent colour with the new colour monitor from Portatel of Sunbury-on-Thames.

This 14in monitor, based on the Luxor range of colour TV from Sweden, needs neither modification, adjustment or a modulator. It accepts direct video input from the computer.

The set produces high resolution colours on a precision in-line graphics quality tube, and incorporates an automatic colour killer for text-only.

Contact Portatel Conversions Ltd, 25 Sunbury Cross Centre, Sunbury-on-Thames, Middlesex (tel: 09327 88972).

Cover up

A WHOLE range of acoustic covers for dot-matrix printers normally used with Apple computers is available from Thorpe Management Technology of Barnet.

The covers are ideal for office use, both reducing the noise of the printer by up to 90 per cent and improving the appearance of the computer system.

Printers catered for include Centronics 737, Epson MX80, Microline 80/82, Anadex DP8000 and Integrex CX80. The price is £200.

Contact Thorpe Management Technology, 171 High Street, Barnet, Herts (tel: 01-449 1334).

Hi-Res graphics

SYSTEMICS Limited (not to be confused with Systematics International) have developed a new all purpose high resolution graphics package for the Apple.

It is written in machine language, accompanied by Basic routines to make it simple to incorporate into other programs, for engineering, architectural, chemical and electronic users and to create games and produce animation effects.

The software, written by Paul Norris, allows upper/lower case, two-way scrolling, mixed graphics and text, user shape definition and many other functions. The routines which make up the High-Res Graphics Problem Solver run on the second high resolution page of the Apple. It offers:

- Fast print routine – 940 cps printing can fill the screen in about a second. This can even be done in inverse or lower case text. The Apple can also be instructed to copy any portion of a text screen directly to the graphics screen.
- Screen blocking for printing in black on white.
- Standard shape definition using Basic programs which can then be loaded, edited and compiled into a specially adapted character matrix. The user needs no knowledge of machine code.
- Standard shape output. This allows any shape, once defined, to be printed or transformed.

The Hi-Res Graphics Problem Solver is available with full documentation for £45 from Systemics Limited, 21-23 The Bridge, Harrow, Middlesex HA3 5AG (tel: 01-863 0079).

Taking stock

MICROS have got in the front door with Alien Invaders, and now micros can get in the back door with the Licensed Trade Stocktaking and Retail Analysis System.

This integrated package allows the manager of licensed premises to maintain an accurate record of stock and to analyse sales, produce percentage profit figures for sales and print stock reports.

The package, CCS-Stocktakers, has been designed to be simple to operate on a standard 48k Apple. All file handling is automatic. A general update facility has also been included to amend the stock file to reflect new trading patterns.

Up to 150 stock items can be catered for in nine groups, such as draught beers, bottled beers, etc, although this can be increased by request. The facility for measuring stock in multiples, such as crates of 12, is also included.

Price, including manuals is £375. Available from Croeso Computer Services, 516 Mumbles Road, Mumbles, Swansea (tel: 0792 60624).

Sorting out samples

A STATISTICAL interface for Appleplot is now available from Gate Microsystems, Dundee. It enables the user to key in large numbers of values quickly to be used with the plotting facilities without needing an indepth knowledge of how to operate the program. This applies especially with bar charts where class intervals are being used and the data needs to be sorted.

Using a simple menu format the package allows you to:

- Calculate mean and standard deviations of samples.
- Produce statistical distribution curves.
- Calculate a control distribution for comparison purposes.

Available in DOS 3.2 and 3.3 from Gate Microsystems, The Nethergate Centre, 35 Yeaman Shore, Dundee (tel: 0382 28194) at £50.

Magic is easy

WORD processing systems score highest if they are easy to use. The Magic Window has been designed to be as simple as possible for both the novice typist and the professional secretary. All the basic features of a typewriter have been maintained, supplemented by complete editing facilities.

Magic Window is an 80 column word processor on a 40 column screen. Four way scrolling allows you to view all of your text, which is formatted as it is inserted. Your letter, or text, is displayed on the screen in the format in which it will be ultimately printed.

The system is unique in the way in which it handles text in that the cursor remains in the centre of the screen while the text develops around it. This is surprisingly effective and easy to use.

Although text is in upper case in standard operation, by adding the Dan Taymar LCA2 lower case adaptor – a small chip – you can have lower case characters too.

Apart from the LCA, there are no more add-ons to buy. With the disc containing the program you are in business.

Functions available on the system include: Type ahead buffer; on screen formatting; centreing; justification; custom printer interface; global search; single key commands. Price is £79.95.

Contact SBD Software, 15 Jocelyn Road, Richmond TW9 2TJ (tel: 01-948 0461.)

FAST FACTS

GRAPHICS software is now available for Paper Tiger 445, 460 and 560, Anadex and DP 9500 and DP 9502 printers. Cost is £20 per package.

□ □ □

THE Anadex-Graphics Interface card is now being supplied to dealers by Microsense. Retailing at £140, it has many good features.

□ □ □

THE Go-between Package links Applewriter to a Centronics 737/739 for cost-effective text processing. It costs £26.50.

□ □ □

PRICES for the 9000 range of Anadex printers are from £795 to £995. Used with the graphics interface card, these dox-matrix printers are excellent dual-purpose machines.

□ □ □

NEW Apple booklets now available from dealers catalogue all the latest software and peripherals. There are four of them – Apple software; Accessories and peripherals; Authorised dealer list and price list, and Apple Prints, which features all printers which interface to the Apple.

□ □ □

IEEE-488 interface card conforms to IEEE-488 general purpose instrument buss (GPIB) standard. Particularly suitable for use in industry and research, up to 14 external devices can be connected to a single card for control, communications, data logging, etc. Price: £239.

□ □ □

LANGUAGE card from Language Systems is now available as a separate item, price £105.

□ □ □

PASCAL software is now on sale for the Speechlink H2000, allowing you to access the voice recognition capabilities of Speechlink using Pascal. Price is £28.

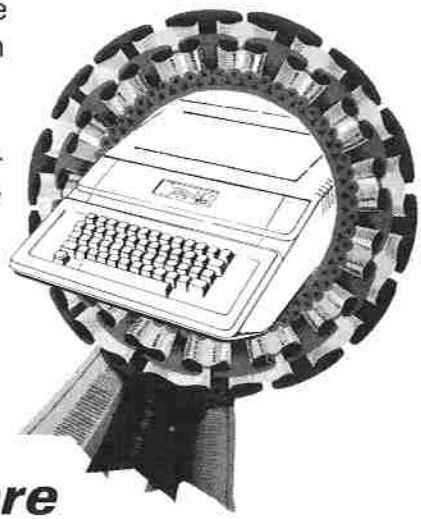
The Computer Shop Group

announce a great summer contest – with hundreds of pounds to be won!

All you have to do is select the six most important reasons for buying an Apple from the ten listed below, and then complete the phrase: "The Computer Shop and Apple are a great team because . . ." in twenty words or less.

Complete the coupon at the foot of this page. Write in for one if you don't wish to deface your copy of Windfall, or just photocopy the page.

Then send to: **The Computer Shop Group Ltd, 7/9 Gosbrook Road, Caversham, Reading, Berks to arrive no later than last post on September 30, 1981.**



Ten good reasons for buying an Apple:

1. **It is so versatile.**
2. **It has colour and sound available.**
3. **There is a large range of software available.**
4. **It is very reliable.**
5. **It has Pascal, Fortran and Cobol programming languages available.**
6. **It is portable and lightweight.**
7. **There is excellent back-up support available.**
8. **It's fun to use.**
9. **Large storage devices can be easily attached.**
10. **It has the largest range of peripherals available.**

These are the prizes

Prizes will be awarded to the best correct answers and will be from one of the following lists, dependent upon whether you are an existing or present customer of The Computer Shop (in which case your prize will be from List A) or if you are not a customer (in which case your prize will be from List B)

– LIST A –

1st prize: *48K Apple II with TV Mod (just plug in your TV and cassette player and go) OR £750 in vouchers.*

2nd prize: *Epson MX80FT dot matrix printer OR £350 in vouchers.*

3rd prize: *Sub-Logic Flight Simulator Disc and year's free subscription to Windfall OR £50 in vouchers.*

– LIST B –

1st prize: *Epson MX80FT dot matrix printer OR £350 in vouchers.*

2nd prize: *Supertext word processing package OR £125 in vouchers.*

3rd prize: *Sub-Logic Flight Simulator Disc and year's free subscription to Windfall OR £25 in vouchers.*

RULES

1. All entries must be on official entry coupon and are the property of The Computer Shop Group, to whom copyright passes on entry.
2. Qualifying entries must be received by last post September 30, 1981, and proof of posting is sufficient to claim.
3. Judges decision will be final and no correspondence can be entered into in conjunction with this contest.
4. Prizewinners will be notified by post in due course.

My six reasons for buying an Apple are:

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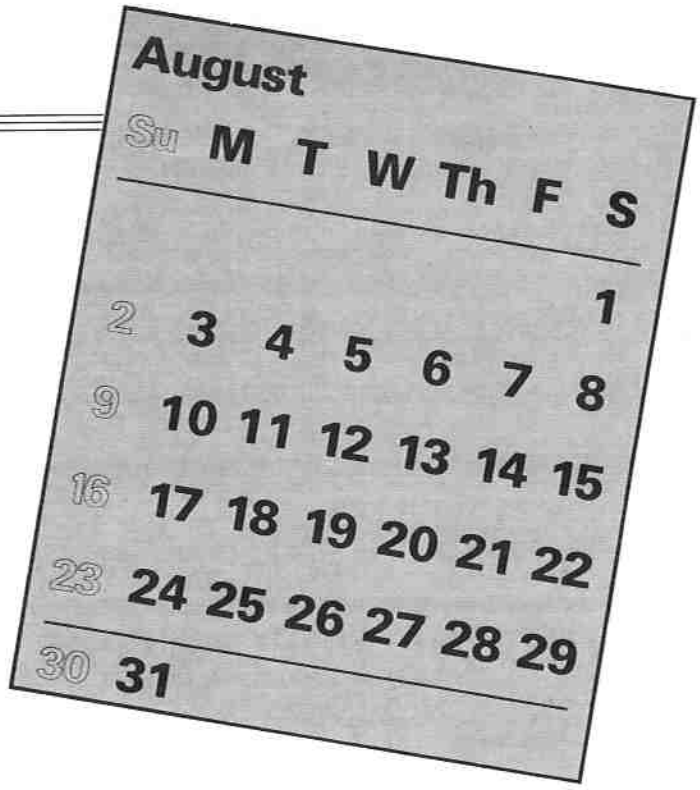
25 Havelock Street Swindon Wiltshire SN1 1SD Tel: 0793 694061 *Ann Booth*	54 High Street Banbury Oxon OX16 8JY Tel: 0295 3477 *Ron Gorton*	105 Whitecross Street London EC1Y 8JE Tel: 01-588 5557 *Ian Kent*

All previous customers are welcome to contact their branch managers for the issue of the seven digit code needed to identify them as customers and therefore able to choose from List A.



Let's make a date..

HERE are some routines that will not only check dates for validity but also work out the full date given a numeric input. For instance, 04/07/81 becomes SATURDAY 4TH OF JULY 1981.

They can also be used for finding the date of the last day of the month (including leap years) and calculating the number of days between dates.

Date validation is done in a slightly unorthodox manner. Sub routine 610 first calculates a day number from D,M,Y and then asks sub routine 600 to calculate D1,M1,Y1 from this day number. As 600 will always return with a valid date we can compare D with D1, etc., and set an error flag EF if there is a difference.

Part of the fun in life is fooling computers and the routine in 20300 does just that. If you pass the 0th of a month to 600, 610 will return with the valid last date of the month before. Sub routine 630 is a fun way of deciding whether to append "th", "st", etc, as in 1st or 11th.

Take care in line 6 to get DW$ right. There are three spaces before MON and two before TUES, so that each day occupies exactly six characters.

Mike Glover

```
6 FY = 365.25:FM = 30.6001:DW$ = "   SUN
   MON  TUESWEDNES THURS   FRI SATUR":DE
$ = "THSTNDRD": DIM MN$(12): FOR I = 1 T
O 12: READ MN$(I): NEXT
99  GOTO 20000
599  REM

*CALC DATE FROM DAY NUMBER*

600 Y1 =  INT ((D1 - 122.1) / FY):M1 =
INT ((D1 -  INT (FY * Y1)) / FM):D1 = D1
 -  INT (FY * Y1) -  INT (FM * M1):M1 =
M1 - 1:Y1 = Y1 + (M1 > 12) * 1:M1 = M1 -
 (M1 > 12) * 12: RETURN
609  REM

*CALC DAY NUMBER FROM DATE*

610 Y = Y + (Y < 100) * 1900:Y1 = Y - (M
 < 3) * 1:M1 = M + ((M < 3) * 12) + 1:D1
 =  INT (FY * Y1) +  INT (FM * M1) + D:D
N = D1: GOSUB 600:EF = D <  > D1 OR M <
 > M1 OR Y <  > Y1: RETURN
619  REM

*CALC DAY OF WEEK*

620 DW =  INT (((DN - 2) / 7 -  INT ((DN
 - 2) / 7)) * 7 + .05): PRINT  MID$ (DW$
,(DW * 6 + 1),6) + "DAY";: RETURN
629  REM

*PRINT TH ST ND RD AS REQUIRED*

630  PRINT  MID$ (DE$,( VAL ( RIGHT$ ( S
TR$ (D1),1)) * 2 - (( VAL ( RIGHT$ ( STR
$ (D1),1)) > 3) * ( VAL ( RIGHT$ ( STR$
(D1),1)) * 2))) + 1 - ((D1 > 10 AND D1 <
 14) * ( VAL ( RIGHT$ ( STR$ (D1),1)) *
2)),2);: RETURN
659  REM

*DATE INPUT SUBROUTINE*

660  HTAB HT: VTAB VT: PRINT "../../..";
: HTAB  POS (X) - 7
661  FOR I = 1 TO 3:A = 0
662  GET A$: IF A$ =  CHR$ (8) THEN 660
663  IF  ASC (A$) < 48 OR  ASC (A$) > 57
 THEN  PRINT  CHR$ (7);: GOTO 662
664  PRINT A$;:A = A +  VAL (A$) * 10
665  GET A$: IF A$ =  CHR$ (8) THEN 660
666  IF  ASC (A$) < 48 OR  ASC (A$) > 57
 THEN  PRINT  CHR$ (7);: GOTO 665
667  PRINT A$;:A = A +  VAL (A$): HTAB
POS (X) + 2
668  IF I = 1 THEN D = A
669  IF I = 2 THEN M = A
670  IF I = 3 THEN Y = A
671  NEXT
672  HTAB 12: VTAB 23: PRINT  CHR$ (7);:
 PRINT  CHR$ (7);: FLASH : PRINT "VERIFY
 (Y/N)";: NORMAL : GET A$: HTAB 12: CALL
  - 868: IF A$ <  > "Y" THEN 660
673  GOSUB 610: IF EF THEN EM$ = "INVALI
D DATE": GOSUB 700: GOTO 660
674  RETURN
699  REM

*PRINT ERROR MESSAGE*

700  FLASH : VTAB (23): HTAB (21 -  LEN
(EM$) / 2): PRINT EM$ + "";: FOR D = 1 T
O 1000: NEXT : HTAB 1: CALL  - 868: NORM
AL : RETURN
1999  REM

 *DEMO PROG MENU*

20000  HOME : PRINT : PRINT "SELECT ROUT
INE": PRINT : PRINT "1-CHECK DATE ": PRI
NT "2-CONSECUTIVE DATES": PRINT "3-FIND
END OF MONTH": PRINT "4-CALCULATE DAYS B
ETWEEN DATES": PRINT "5-END"
20005  GET A$: ON  VAL (A$) GOTO 20100,2
0200,20300,20400,20900
20010  GOTO 20005
20099  REM
*VALIDATE DATE*

20100  HOME :VT = 6: VTAB VT: PRINT "INP
UT DATE (DD/MM/YY)";:HT = 25: GOSUB 660
20110  HOME : VTAB 8
20125  PRINT "DN= ";DN,"DATE= ";D1;"/";M
1;"/";Y1
20130  PRINT : GOSUB 620: PRINT  RIGHT$
(" " +  STR$ (D1),3);: GOSUB 630: PRINT
 " OF ";MN$(M1);" ";Y1
20135  PRINT : PRINT "PRESS ANY KEY TO C
ONTINUE-X TO EXIT ";: GET A$: IF A$ = "X
" THEN 20000
20140  HOME : GOTO 20100
20199  REM

*PRINT CONSECUTIVE DATES*

20200  HOME :VT = 8:HT = 18: VTAB VT - 1
: PRINT "INPUT START DATE(DD/MM/YY)";: G
OSUB 660:D2 = D
20210 N = 20
20220  HOME
20230  FOR D = D2 TO D2 + N - 1: GOSUB 6
10
20250  GOSUB 620: PRINT  RIGHT$ ("  " +
 STR$ (D1),3);: GOSUB 630: PRINT " OF ";
MN$(M1);" ";Y1
20270  NEXT
20275  PRINT : PRINT : PRINT : PRINT "PR
ESS ANY KEY TO CONTINUE-X TO EXIT ";: GE
T A$: IF A$ = "X" THEN 20000
20280  PRINT :D2 = D: GOTO 20230
20299  REM

*FIND END OF MONTH*

20300  HOME : PRINT : PRINT : PRINT : IN
PUT "INPUT MONTH ";M: INPUT "INPUT YEAR
 ";Y
20310 N = 20
20320 D = 0:M = M + 1
20330  FOR I = 1 TO N: GOSUB 610
20350  GOSUB 620: PRINT  RIGHT$ ("  " +
 STR$ (D1),3);: GOSUB 630: PRINT " OF ";
MN$(M1);" ";Y1
20360 M = M + 1: IF M > 12 THEN M = M -
12:Y = Y + 1
20370  NEXT
20375  PRINT : PRINT : PRINT : PRINT "PR
ESS ANY KEY TO CONTINUE-X TO EXIT ";: GE
T A$: IF A$ = "X" THEN 20000
20380  PRINT :M2 = M: GOTO 20330
20399  REM

*CALC DAYS BETWEEN DATES*

20400  HOME :VT = 12:HT = 30: VTAB VT: P
RINT "INPUT FIRST DATE(DD/MM/YY)": GOSUB
 660:FD = DN
20420  HOME
20430  VTAB VT: PRINT "INPUT SECOND DATE
 (DD/MM/YY)": GOSUB 660
20450  VTAB 19: PRINT "NUMBER OF DAYS =
"DN - FD
20475  PRINT : PRINT : PRINT : PRINT "PR
ESS ANY KEY TO CONTINUE-X TO EXIT ";: GE
T A$: IF A$ = "X" THEN 20000
20480  GOTO 20400
20900  END
30006  DATA  JANUARY,FEBRUARY,MARCH,APRI
L,MAY,JUNE,JULY,AUGUST,SEPTEMBER,OCTOBER
,NOVEMBER,DECEMBER
54321  REM          ********************
54321  REM          *  COPYRIGHT 1980   *
54321  REM          *   MIKE GLOVER     *
54321  REM          *    LEICESTER      *
54321  REM          *  COMPUTER CENTRE  *
54321  REM          *    0533-556268    *
54321  REM          ********************

]
```

STACK 6522 VIA CARD

A general purpose prototyping board for the Apple, with a 6522 VIA chip already installed, giving two 8 bit parallel TTL I/O ports, 4 handshaking lines, Counter - timer, plus a generous area for prototyping custom circuitry.

Nett	VAT	Total
£39.00	£5.85	**£44.85**

FULLVIEW 80 Col. CARD

The Fullview 80 is a powerful new 80x24 video board for the Apple user.
-Fully compatible with Apple II -On board switch between Apple video and 80x24 video under software control -Fully follows Pascal protocols, no system reconfiguration needed -Low power consumption -Full keyboard editing, cursor control, tabbing -2k on-board firmware -compatible with BASIC, Pascal, CP/M -On-board crystal, excellent picture quality

Nett	VAT	Total
£240.00	£36.00	**£276.00**

STACK VIDEOSWITCH

A plug-in board for the Apple Game I/O socket that permits switching between the normal Apple video output and the output of one of the 80 col. cards under software control - no more juggling of video leads every time you execute a different program. An on-board Game I/O socket is available so you can still use your paddles, Versawriter etc.

Nett	VAT	Total
£40.00	£6.00	**£46.00**

80 character boards with softswitch

	Nett	VAT	Total
Double-vision	175.00	26.25	**201.25**
Omni-vision	205.00	30.75	**235.75**
Videx Videoterm	205.00	30.75	**235.75**
Super-terminal	205.00	30.75	**235.75**

STACK RELAY BOARD

8 relays on a single Apple compatible card. Software timeout 'watchdog' protection feature. Screw terminal outputs permit easy connection to outside world.

Nett	VAT	Total
£99.00	£14.85	**£113.85**

STACK D/A CARD

A 4 channel, 8 bit Digital to Analogue converter, 0-10v output 3 micro-second settling time. Four general purpose TTL I/O lines available off 6522 VIA (eg. 'panic lines'). Screw terminal permit easy connection to outside world.

Nett	VAT	Total
£99.00	£14.85	**£113.85**

ANADEX GRAPHICS CARD

Our own printer card designed specifically for the Anadex DP9500/1 and new DP9000/1 printers. The card behaves as a normal Apple centronics interface but also includes powerful graphics dump software on the ROM permitting dot-for-dot reproduction of a hi-res image on the printer with almost any imaginable format - either hi-res, page, normal or inverse, expanded in X or Y directions with varying scale factors, left, right or centre justified across page.

Nett	VAT	Total
£140.00	£21.00	**£161.00**

THE DOS TOOLKIT (3.3 req.)

The latest System Software package from Apple. An integrated 6502 Editor/Assembler, High resolution character generator, Applesoft Programmers assistant and a number of demonstration programs on a DOS 3.3 diskette with extensive documentation.

Nett	VAT	Total
£35.00	£5.25	**£40.25**

AI-13 12 BIT A/D CONVERTER

A new, high speed analogue to digital converter from Interactive Structures. FEATURES:

- 12 bit resolution, 16 independently addressable input channels
- 20 microsec conversion time. Maximum practical sampting rate is 20KHZ.
- 8 Software selectable input ranges:
  0 to 5v — 5 to 5v
  0 to 1v — 1 to 1v
  0 to .5v — .5 to .5v
  0 to .1v — .1 to .1v
- External trigger facility
- Includes its own precision reference system for complete isolation from variations in the Apple power supply or ambient temperature.
- Easily used from BASIC, assembly language, Pascal etc.
- Supplied with full documentation and software on diskette.

Nett	VAT	Total
£370.00	£55.50	**£425.50**

RAM CARDS

Expand your Apple to 64K programmable memory. Behaves as an Apple language card. Permits the use of Integer BASIC, compiled Pascal or FORTRAN programs on an Apple-II plus. Visicalc, Lisa V2.0, and Z-80 softcard make use of the additional space (gives a 56K CP/M based system). In addition you can easily modify existing Apple firmware and use the patched versions 'insitu'. Software selection of main board ROMS or Romcard through control locations.

	Nett	VAT	Total
Andromeda Ramcard	105.00	15.75	**120.00**
Microsoft Ramcard	105.00	15.75	**120.00**
Computer stop Ramcard	95.00	14.25	**109.25**

Centronics Aristocard

This is a customised low cost centronics interface that comes complete with cable and connector. Suitable for use with any Centronics-style parallel printer, we recommend this card particularly for use with the Microline and Epson printers as you can toggle the status of bit 8, allowing access to the graphics facilities of these printers.

Nett	VAT	Total
£65.00	£9.75	**£74.75**

SERIAL ARISTOCARD

A low cost RS232c interface with hardware handshaking, switch/software selectable baud rates, parity, data bits and powerful firmware on a paged 2708 Eprom.

Nett	VAT	Total
£65.00	£9.75	**£74.75**

WORDSTAR the prince of wordprocessors

Wordstar on Apple! Micropro's newly released custom Wordstar for the Apple. Requires a minimum 48K Apple (64K Recommended), Z-80 softcard, Super-terminal, Videx, or similar 80 col. card.

Nett	VAT	Total
£250.00	£37.50	**£287.50**

The Mill 6809 Pascal speedup kit

Using Apple Pascal/FORTRAN for number crunching, system programs or computation - bound work? The Mill 6809 Pascal speedup kit dramatically improves the performance of Apple Pascal/FORTRAN whilst maintaining compatibility with the existing system. The 6809 processor on the Mill handles the interpretation of P-codes while the 6502 continues to do the input/output and assembly language library work.

Nett	VAT	Total
£220.00	£33.00	**£253.00**

AVAILABLE SHORTLY (CALL FOR DETAILS)
Double Hires card 560x192 resolution MH CPS card - Parallel, serial, and real time clock on a single card. Applesoft compiler.

APPLE SERVICE
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Mountain Hardware Expansion Chassis

Eight more slots for your Apple! Now you can bank - select eight more peripheral slots with immediate or deferred software commands: ● Eight mirror image I/O slots of the Apple. ● Fully buffered, bi-directional data lines. ● Apple II compatible interface card. ● Dual selection - hardware or software. ● Immediate or deferred selection in software. ● In BASIC, a single POKE turns the chassis ON and OFF. ● Compatible with all software. ● Separate power supply for expansion chassis. ● Up to four expansion chassis off a single Apple!
We have limited quantities of 240v version ex-stock!

Nett	VAT	Total
£375.00	£56.25	**£431.25**

VERSAWRITER

The Versawriter is a low cost solution to the problems of graphic input on the Apple. It consists of a Mylor plotting board with a clear plastic overlay. Attached to this board is the drawing arm, which has a magnifying lens at its end. You simply place any graph, picture or drawing (up to 8½'' x 11'') under the plastic overlay and 'trace it' with the drawing arm. As you trace the drawing appears on the video screen. The Versawriter software then allows you to manipulate this drawing, adding text, scaling, rotating, filling areas with colour etc.

Nett	VAT	Total
£117.00	£17.55	**£134.55**

SSM A488 Interface

Based on Motorola's 68488 IEEE chip, the A488 is a powerful IEEE-488 interface for the Apple II. On board is 2K of firmware that links with Applesoft's string handling routines. Control and interface programs are easily coded in Applesoft without the need to resort to 6502 Assembly language.

Nett	VAT	Total
£250.00	£37.50	**£287.50**

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Telephone: **051-933 5511.**

The limits of my world

DR G.J. BORIS ALLAN

School of Sociology, Manchester Polytechnic, considers mathematical languages

MATHEMATICS is a language, or set of languages, and it is the most social of all human constructions. Mathematics is totally invented by Man, to serve all manner of divers purposes.

The idea that languages structure thought has a broad relevance in that the questions we ask, and the ways in which the answers are obtained, depend upon the symbols we are able to use. The symbols we use are those we derive from our languages, and the ways in which we use the symbols depend upon our languages.

The reason why the use of 'structured' programming languages is so popular in teaching is that it is hoped to make the student programmers think in a 'structured' manner using a 'structured' vocabulary – with GOTO not part of that vocabulary.

Structured thought is just as likely to arise if the person in question thinks in a structured way about life in general. The total environment in which students are taught should encourage structured thought, but more importantly it should encourage original thought.

It is reported of Archimedes that, after his discovery of the mathematical equations describing the operation of levers, he claimed: "Give me where to stand, and I will move the earth." Such is the power of the imagination unleashed through a few simple equations.

Einstein found that the symbolism of the tensor calculus gave rise to new insights and results when applied to gravity fields in the General Theory of Relativity – some might never have been unearthed without the tensor symbolism. Dirac in his description of atomic structure found the use of a matrix symbolism productive of new results, and new insights. Both Tensor Calculus and Matrix Algebra were mathematical languages which had been around for some time before their sudden new relevance was found.

This process, of invention of a symbolism for one purpose with its subsequent highly illuminating application for another purpose, has recently been illustrated in computing. It is of note that the symbolism was invented outside computer science and the report of the new application appeared outside the bounds of traditional computing periodicals.

First, I will describe a function – Ackerman's function – which is used to test the efficiency of programming languages which have recursive facilities – I give Pascal and Basic routines. Second, I discuss a new mathematical symbolism – designed to make the description of large numbers more manageable. Third, I show how the symbolism can be used to give an exact (nonrecursive) solution of the function – the derivation of general equation being by bottom-up methods of analysis.

CALL	EXPANSION	CONDITION	STACK
1	A(2,1)	0	SS(1)
2	A(1,A(2,0))	3	SS(2)
3	A(1,A(1,1))	2	SS(2)
4	A(1,A(0,A(1,0)))	3	SS(3)
5	A(1,A(0,A(0,1)))	2	SS(3)
6	A(1,A(0,2))	1	SS(2)
7	A(1,3)	1	SS(1)
8	A(0,A(1,2))	3	SS(2)
9	A(0,A(0,A(1,1)))	3	SS(3)
10	A(0,A(0,A(0,A(1,0))))	3	SS(4)
11	A(0,A(0,A(0,A(0,1))))	2	SS(4)
12	A(0,A(0,A(0,2)))	1	SS(3)
13	A(0,A(0,3))	1	SS(2)
14	A(0,4)	1	SS(1)
x	5	1	x

Table 1: Expansion of A (2, 1)

Ackerman's function

The factorial function can be described recursively by two conditions:

(1) If $N \geq 1$ then

FACTORIAL (N) = N*FACTORIAL (N–1)

(2) If $N \leq 0$ then

FACTORIAL(N) = 1

and it is called a primitive recursive function, in that it is determinate in execution. It can also be easily expressed in a nonrecursive form:

FACTORIAL (N) = 1x2x . . .x(N–1)xN

for $N \geq 1$. Many recursively defined functions and recursively defined procedures have nonrecursive forms which can be used to calculate the value of the function. Ackerman's function, however, does not seem to have an effectively computable non recursive form and is what is termed a general recursive function.

The difference between the factorial function and Ackerman's function is very important in computing, eg:

Of course, computing the factorial function recursively is inefficient and

pointless, but there are algorithms which are essentially recursive in nature and some which cannot be carried out in any other way. One example is the computation of Ackerman's function. ***(Meek, 1978:91)***

Ackerman's function can be described by three conditions:

(1) If M = 0 then
A(M,N) = N+1
(2) If N = 0 then
A(M,N) = A(M−1,1)
(3) If M > 0 and N > 0 then
A(M,N) = A(M−1,A(M,N−1))

and to show that Ackerman's function is rather more complex, and less predictable, than the factorial function, A(2,1) is worked out by hand in Table 1. This table has four columns: the 'call' number, the current stage of the expansion of Ackerman's function for that call, the condition ((1) to (3)) used to produce the expansion from that of the previous call, and the depth of nesting of the expression (SS) – ie the numbers of pairs of brackets in the expression.

In a computer SS roughly corresponds to the 'stack' of return addresses and similar items held during the execution of a recursive routine. Think of SS as the subroutine stack. In Table 1 A(2,1) = 5 and the maximum depth of stacking is 4. In general the size of the stack needed is A(M,N)−1.

Ackerman's function is notable because it is believed that there are certain functions which are easily defined recursively but which cannot be defined in terms of ordinary agebraic expressions . . . The nearest one gets to an algebraic definition of [Ackerman's] function contains exponents connected by a string of dots! ***(Higman, 1977)***

The function is used principally to test the extent of the complexity allowed by an implementation of a recursive programming language. A program is written with a recursive function A(M,N) and run with different values of M and N.

Such a program is the Pascal "Program Ackerman". For Apple Pascal on an Apple II, A(3,1) = 13, A(3,2) = 29, A(3,3) = 61, A(3,4) = 125, and when A(3,5) was calculated the system crashed, without an error message, because of a stack overflow.

The pattern 13, 29, 61, 125 is 2^4-3, 2^5-3, 2^6-3, 2^7-3, and so A(3,5) would appear to be $2^8-3 = 253$. This the value of A(3,5) which is calculated by another method. As the subroutine stack is so quickly eaten up by Ackerman's function for even small values of M and N, the other method has to use a non-recursive procedure which copies the way in which a recursive function would be implemented, with a subroutine stack (SS) of 1000 elements. A flowchart for the algorithm is shown in Figure 1.

Use of either program allows a check of the earlier supposition that the depth of stack (Z+1) is always equal to A(M,N) minus unity. Calculation of A(4,1) is impossible using most computers, even with a simulated stack such as SS : A(4,1) = 65 533, so this computation requires a stack of 64k elements, or 128k bytes for the stack alone (at 2 bytes per integer).

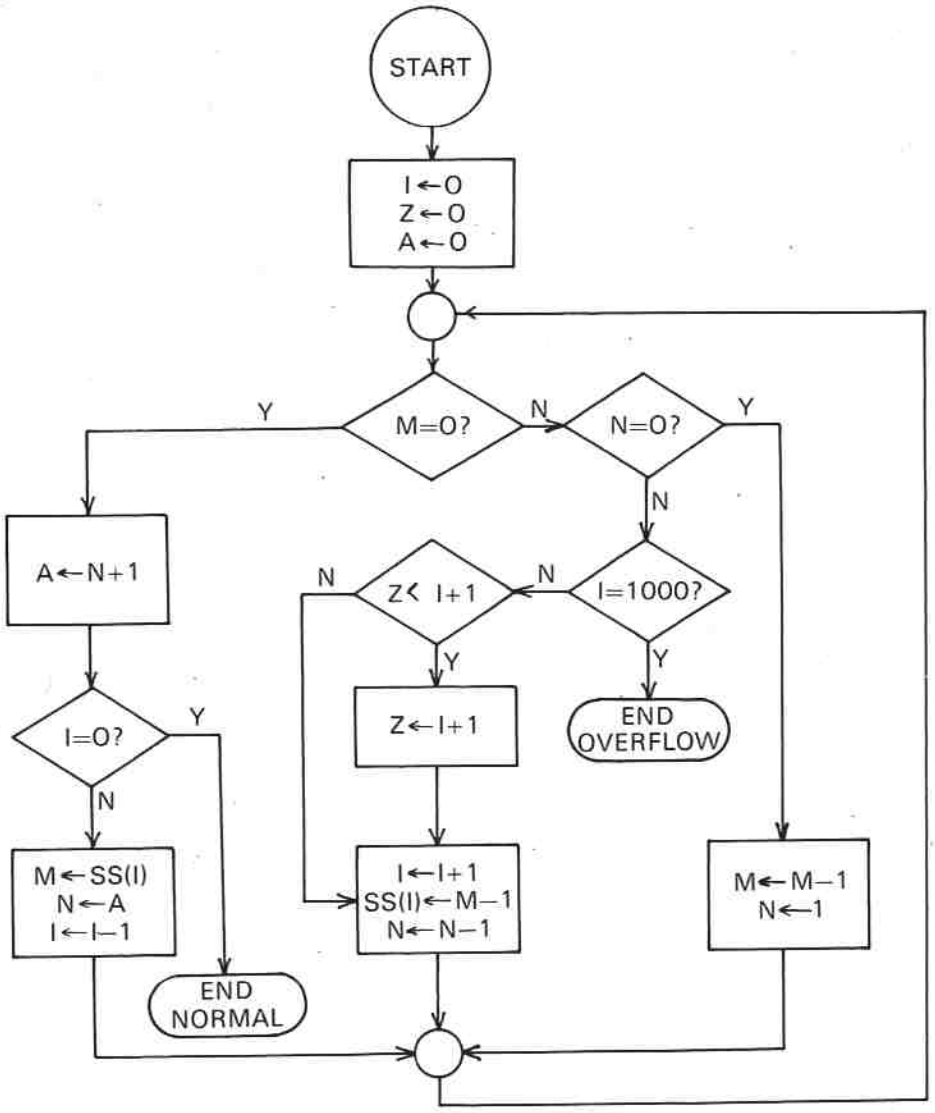

Fig 1: Algorithm for Ackerman's function

With the recursive factorial function we always know beforehand just how large a stack will be needed (N elements for FACTORIAL (N)), and how many calls will be made (again N). This is what I meant earlier when I said that the factorial function was determinate in execution.

In the case of Ackerman's function the maximum depth of stack is not known, nor the number of calls of the function to be made. For the example of A(2,1) in Table 1, the maximum depth was 4 and the number of calls was 14. The corresponding values for A(2,2) are 6 and 27, and the values for A(2,0) are 2 and 5. The expansion of the calls for A(2,2) is shown in Table 2, but the reader might like to try expanding A(2,2) before looking at Table 2.

What has been established is this: There are certain functions – general

SYMBOLISM

CALL	EXPANSION	CONDITION	STACK
1	A(2,2)	0	SS(1)
2	A(1,A(2,1))	3	SS(2)
3	A(1,A(1,A(2,0)))	3	SS(3)
4	A(1,A(1,A(1,1)))	2	SS(3)
5	A(1,A(1,A(0,A(1,0))))	3	SS(4)
6	A(1,A(1,A(0,A(0,1))))	2	SS(4)
7	A(1,A(1,A(0,2)))	1	SS(3)
8	A(1,A(1,3))	1	SS(2)
9	A(1,A(0,A(1,2)))	3	SS(3)
10	A(1,A(0,A(0,A(1,1))))	3	SS(4)
11	A(1,A(0,A(0,A(0,A(1,0)))))	3	SS(5)
12	A(1,A(0,A(0,A(0,A(0,1)))))	2	SS(5)
13	A(1,A(0,A(0,A(0,2))))	1	SS(4)
14	A(1,A(0,A(0,3)))	1	SS(3)
15	A(1,A(0,4))	1	SS(2)
16	A(1,5)	1	SS(1)
17	A(0,A(1,4))	3	SS(2)
18	A(0,A(0,A(1,3)))	3	SS(3)
19	A(0,A(0,A(0,A(1,2))))	3	SS(4)
20	A(0,A(0,A(0,A(0,A(1,1)))))	3	SS(5)
21	A(0,A(0,A(0,A(0,A(0,A(1,0))))))	3	SS(6)
22	A(0,A(0,A(0,A(0,A(0,A(0,1))))))	2	SS(6)
23	A(0,A(0,A(0,A(0,A(0,2)))))	1	SS(5)
24	A(0,A(0,A(0,A(0,3))))	1	SS(4)
25	A(0,A(0,A(0,4)))	1	SS(3)
26	A(0,A(0,5))	1	SS(2)
27	A(0,6)	1	SS(1)
x	7	1	x

Table 2: Expansion of A (2, 2)

recursive without being primitive – which, it would seem, are computable by recursive methods but not by non-recursive methods. If we operate within the mathematical language presupposed by a recursive analysis there is no way in which a nonrecursive solution can appear. We noticed the patterning of values for A(3,N) (13, 29, 61, 125, 253, . . .) so there would seem to be something simple trying to get out, but this pattern appeared out of the imagination and not the recursive language.

A recursive language produces a mode of thought similar to that of a sausage machine (try to make buns with it), and no ingenuity in the design of sausage machines will make further ingenuity unnecessary.

Expressing magnitudes

To exercise ingenuity requires imagination, and Joseph Griffin (Int J Maths Ed 1978) is concerned with imagination. How can we describe "unimaginable" numbers in a simple way? He begins by noting that "big" numbers are hardly exceptional, for at whatever value we start to class numbers as in some way "large", then there will always be more big numbers than small numbers.

Big numbers are remote from our intuition because we are unable to perceive the millions and billions around us as easily as we can perceive the twos and threes. If the earlier quote (above) from Higman ("there are certain functions . . .") is studied we can see that he too identifies large numbers ("exponents connected by a string of dots!") as awesome and out of this world.

The addition operator "+" and the multiplication operator "x" produce results only slightly larger than the two numbers they combine, eg:

$2 + 3 = 5$ $\quad$ $5 + 5 = 10$
$2 \times 3 = 6$ $\quad$ $5 \times 5 = 25$

but for positive integers greater than unity we are able to say:

$$X + Y \leq X \times Y$$

and if + and x are so ordered, the next operator will be the exponentiation operator "↑". The exponentiation operator gives:

$2 \uparrow 3 = 8$ $\quad$ $5 \uparrow 5 = 3215$
$3 \uparrow 2 = 9$

and thus, if $X \geq Y \geq 1$

$$X + Y \leq X \times Y \leq Y \uparrow X \leq X \uparrow Y$$

Once it is realised that:

$a \times b = a+a+a+ \ldots +a+a$ (b "a"s)

and:

$a \uparrow b = axaxax \ldots xaxa$ (b "a"s)

the next operator in the sequence must be G_4, defined by:

$a\ G_4 b = a\uparrow a\uparrow a\uparrow \ldots \uparrow a\uparrow a$ (b "a"s)

to be computed from right to left

$4\ G_4\ 5 = 4\uparrow(4\uparrow(4\uparrow(4\uparrow4)))$

Griffin uses *, in his article, not G_4, but as the operator is 4 th in the sequence and the ideas are due to Griffin, I hope my change is sensible. Later it will be found that this slight change in symbolism makes an equation "look nicer".

We have, therefore:

G_1 is +
G_2 is x
G_3 is ↑

and to use 2,3 and 5,5 as above we find

$2G_43 = 2\uparrow(2\uparrow2)$
$= 2\uparrow4$
$= 16$
$5G_45 = 5\uparrow(5\uparrow(5\uparrow(5\uparrow5)))$
$=$ a very big number

The sequence of G operators is easily extended:

$3G_12 = 5$
$3G_22 = 6$
$3G_32 = 9$
$3G_42 = 27$
$3G_52 = 7\ 625\ 597\ 484\ 987$
$3G_62 =$ an enormous number

and take note of this sequence of 2,3 operations

$2G_13 = 5$	$A(1,0) = 2$
$2G_23 = 6$	$A(2,0) = 3$
$2G_33 = 8$	$A(3,0) = 5$
$2G_43 = 16$	$A(4,0) = 13$
$2G_53 = 65\ 536$	$A(5,0) = 65\ 533$

which differs from the 3,2 sequence, and

seems to have an affinity with the parallel sequence of values of Ackerman's function:

$$(1)\ A(M,0) = 2G_m3 - 3$$

(1) is a distinctly nonrecursive, ordinary algebraic expression (compare Higman) which allows Ackerman's function to be carried out in a nonrecursive manner (compare Meek) for at least one particular case (N =0).

Ordinary Ackerman

The result in equation (1) was produced using a "bottom-up" method of analysis. The simplest of cases were isolated, the pattern found – easily once we were in the posession of a vocabulary enriched by the G operators – and then a general result was found by inductive reasoning, an expression far easier to calculate than the recursive ("top-down") algorithm.

However equation (1) is only part of the story – it is only true for N = 0 – but already we have progressed far beyond the predictions of many, the many who have a restricted vocabulary due to the influence of "top-down" only thinking so popular among computer scientists.

it takes an unthinkable degree of self-esteem on the part of some computer scientists to actually suggest that the use of, say, Basic be banned – and that computer magazines only publish programs in that suspect language, Pascal.

We have come part of the way in clarifying Ackerman's function. How much further can we get with bottom-up methods?

Earlier we found a pattern for A(3,N), and this pattern will be written using G operators

$$\begin{aligned} A(3,0) &= 5 &&= 2G_3 3 - 3 \\ A(3,1) &= 13 &&= 2G_3 4 - 3 \\ A(3,2) &= 29 &&= 2G_3 5 - 3 \\ A(3,3) &= 61 &&= 2G_3 6 - 3 \\ A(3,4) &= 125 &&= 2G_3 7 - 3 \\ A(3,5) &= 253 &&= 2G_3 8 - 3 \end{aligned}$$

(remember $2^5 = 2\uparrow 5 = 2G_3 5$). With a small dose of imagination – and a glance at equation (1) – we can produce an ordinary algebraic expression using G operators

```
  10 REM ACKERMAN'S FUNCTION
  20 REM INTEGER BASIC FOR APPLE II
  30 REM BY
  35 REM
  40 REM C J BORIS ALLAN, 1981
  45 REM ----------------------
  50 REM
  60 REM ALGORITHM IS BASED ON A
  70 REM FORTRAN ROUTINE IN
  80 REM "PROGRAMMING AND ALGORITHMS"

  90 REM BY A J GUTTMAN (1977:P111)
 100 REM
 110 REM
1010 DIM STACK(1000): REM  SOFTWARE S
     TACK
1020 INPUT X,Y: REM BECOME M,N
1030 M=X:N=Y: PRINT : PRINT
1040 GOSUB 2000
1050 PRINT "A(";X;",";Y;") = ";A
1060 PRINT : PRINT : PRINT "MAX DEPTH
      OF STACK IS ";Z+1
1070 GOTO 1020
1080 END
1990 REM
2000 A=0:I=A:Z=A: REM INITIALIZATIONS
      OF ACKERMAN'S FUNCTION, STACK C
     OUNTER, MAX STACK DEPTH
2010 IF M>0 THEN 2040: REM CONDITION(
     1) CHECK
2020 A=N+1: IF I>0 THEN 2100: REM CHE
     CK TO SEE IF STACK EMPTY
2030 RETURN
2040 IF N>0 THEN 2060: REM CONDITION(
     2) CHECK
2050 M=M-1:N=1: GOTO 2010
2060 IF I<1000 THEN 2080: REM IS STAC
     K FULL?
2070 PRINT "STACK OVERFLOW":A=0:
      RETURN : REM EXIT ON STACK OVER
     FLOW
2080 IF Z<I+1 THEN Z=I+1
2090 I=I+1:STACK(I)=M-1:N=N-1: GOTO
     2010: REM CONDITION(3) IS OPERAT
     IVE GOING DOWN
2100 M=STACK(I):N=A:I=I-1: GOTO
     2010: REM GOING BACK UP THE STAC
     K
2110 PRINT "IMPOSSIBLE BRANCH": REM W
     E SHOULDN'T BE HERE !!
2120 END
```

$$(2)\ A(M,N) = 2G_m(N+3) - 3$$

and this expression (2) allows us to carry out the computation of Ackerman's function in a nonrecursive manner.

It might be argued that the derivation of (2) is ingenious but has no mathematical basis. There is no mathematical proof, merely a series of imaginative guesses. Unfortunately for those who would wish to argue this way, Kapur and Kapur (1981) have provided a mathematical derivation of (2). The Kapurs use Griffin's original symbolism and in that notation.

$$A(M,N) = 2^*_{m-3}(N+3) - 3$$

which is why I say equation (2) "looks nicer".

The Kapurs' article is an example of how a powerful result can appear relatively unheralded. I cannot claim any originality on my own part in the derivation of (2), as my ideas came from the Kapurs' work. They deserve much credit for realising the latent power of the Griffin approach.

The method of proof used in their article is similar to mine above, in that they establish results for simple cases, and then by mathematical induction derive their general result.

Conclusions

The upshot of the above is that I am convinced there is something wrong with computer studies education. Too many students are being taught "good programming practice" by means of a structured language, too few are being taught to exercise their ingenuity.

One reason why so many good programmers are young in years is that they have not had the originality knocked out of them by a "proper" course. They enjoy programming in hex or using assemblers despite being told by spoil-sports in the over-selfconscious parts of the media that nobody programmes in hex these days, and that such programming leads to poor programming styles. School teachers often know less than their pupils, and so are unable to direct their pupils into "structured" channels – thankfully.

This is not to say that people should not try to develop an efficient and effective programming style. If computer scientists program as well as they write English – given the general calibre of computing texts – then they must have many incoherent and verbose programs. Style comes with experience, but style without originality is arid.

Ackerman's function has lost its mystique. It has been reduced to a simple equation without conditionals. If one were to believe computer scientists the impossible has been made possible. Wittgenstein wrote in the Tractatus Logico-Philosophicus:

The limits of my language stand for the limits of my world.

The world of nonrecursive algorithms has increased its limits to include Ackerman's function, and who knows what else?

SYMBOLISM

```
PROGRAM ACKERMANINVESTIGATION;

(* A PROGRAM TO SIMULATE A
   SOFTWARE STACK APPROACH TO
   THE SOLUTION OF ACKERMAN'S
   FUNCTION.  THE ALGORITHM IS
   BASED ON THAT GIVEN IN THE ARTICLE

   "THE LIMITS OF MY WORLD ".

   (C) G J BORIS ALLAN, 1981  *)

VAR M,N,I,A,Z,X,Y,EXIT : INTEGER;
    SS : ARRAY[1,.1000] OF INTEGER;

PROCEDURE ONE;FORWARD;
PROCEDURE TWO;FORWARD;
PROCEDURE THREE;FORWARD;
PROCEDURE FOUR;FORWARD;
PROCEDURE FIVE;FORWARD;
PROCEDURE SIX;FORWARD;
    (* TO SAVE PROBLEMS ABOUT ORDER *)

PROCEDURE ONE;
  BEGIN
  A:=N+1;
  IF I)0 THEN THREE
         ELSE EXIT:=1
  END;

PROCEDURE TWO;
  BEGIN
  IF N=0 THEN FOUR
         ELSE FIVE
  END;

PROCEDURE THREE;
  BEGIN
  M:=SS[I];
  N:=A;
  I:=I-1
  END;

PROCEDURE FOUR;
  BEGIN
  M:=M-1;
  N:=1
  END;

PROCEDURE FIVE;
  BEGIN
  IF I=1000 THEN EXIT:=1
            ELSE SIX
  END;

PROCEDURE SIX;
  BEGIN
  IF Z(I+1 THEN Z:=I+1;
  I:=I+1;
  SS[I]:=M-1;
  N:=N-1
  END;


BEGIN (*MAIN PROGRAM*)
  M:=0;
  WHILE M=M DO
  BEGIN
    I:=0;
    Z:=I;
    A:=I;
    EXIT:=0;
    WRITELN;WRITELN;READLN(M,N);
    X:=M;Y:=N;
    REPEAT
      IF M=0 THEN ONE ELSE TWO
    UNTIL EXIT=1 ;
    WRITELN('A(',X,',',Y,') = ',A);
    WRITELN;
    Z:=Z+1;
    WRITELN('MAX DEPTH OF STACK IS ',Z)
  END
END.


PROGRAM ACKERMAN;

(* AUTHOR - G J BORIS ALLAN *)

VAR M,N,ANS : INTEGER;

FUNCTION A(M,N : INTEGER) : INTEGER;
BEGIN
  IF M=0 THEN A:=N+1
    ELSE
    IF N=0 THEN A:=A(M-1,1)
      ELSE A:=A(M-1,A(M,N-1))
END;


BEGIN(* OF MAIN PROGRAM *)
  M:=1;
  WHILE M)=0 DO
  BEGIN
  WRITELN;WRITELN;
  READLN(M,N);
  ANS:=A(M,N);
  WRITELN('A(',M,',',N,') = ',ANS);
  WRITELN
  END

END.
```

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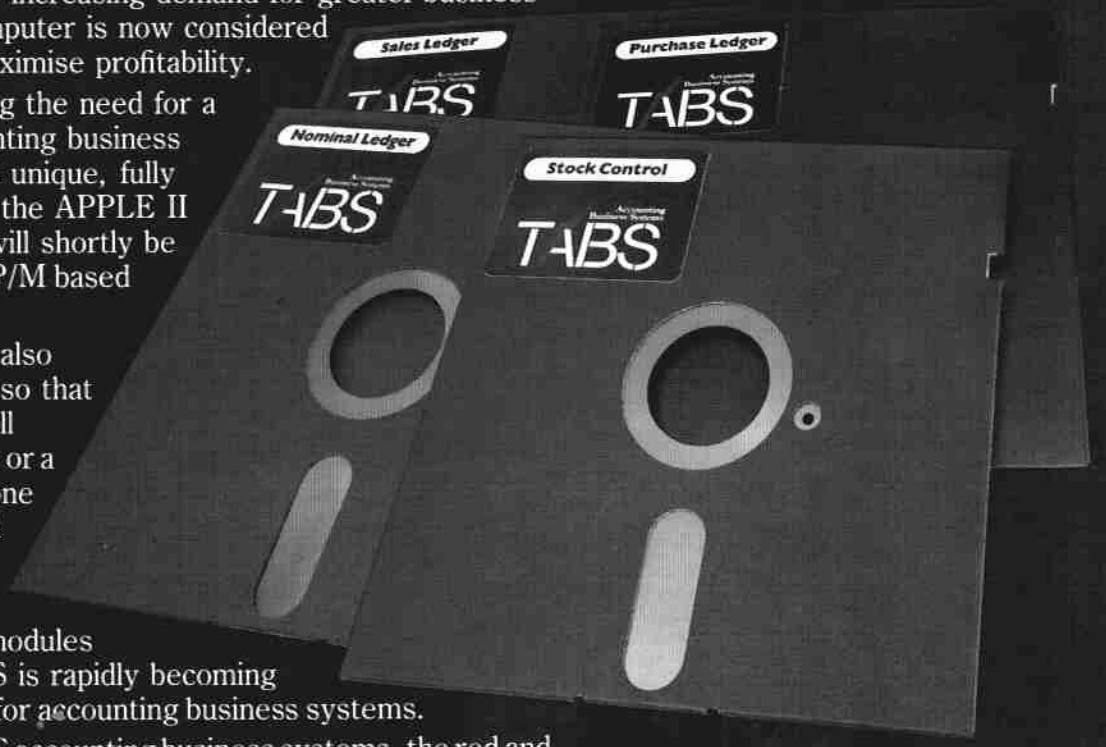

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Text Master: Down Under design comes up trumps

ONE of the main requirements of a word processing system is that it should be easy for users to adapt to it. Plus the absence of any annoying little features which they might be able to overlook if it was only used to type a few letters, but could become very annoying for anyone using the system day in, day out.

The system has to be fast as well, because typists develop a natural speed which, if slowed down while certain functions are being carried out in editing or inserting text, can deteriorate to an unpleasant level, resulting in lapses of concentration and a feeling of disatisfaction with the work.

The Australian CS Text Master system has been developed with these considerations in mind, and the end result goes a long way to justifying its claims to be easy and efficient.

Marketed in this country by Rocon of Oxford it is an 80 column system using the Zev 80x24 video card as standard, although the package will support other common 80 column cards. It will also support a full range of printers.

In order to ensure that computer response is fast the package has been written in 6502 assembler, and all main menu and inner menu commands are by single key operation. Editing commands are accessed by use of the CTRL key in conjunction with the initial letter of the action required.

The simplicity of this approach is marred, however, by the use of the REPT key which, when required, needs three fingers on the keyboard at one time. Another most important feature, the use of the shift key alone to produce capital letters, can be achieved by a simple modification to the Apple.

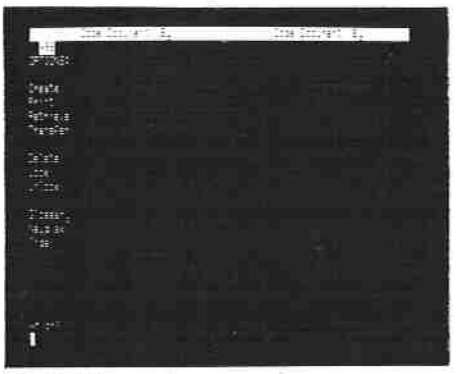

Fig 1: The main menu

```
Each of the following commands should appear in your
document preceded by the special character (CTRL-ZERO):

PWn     PageWidth n characters  (Preset:64 Maximum:255)
MAn     MArgin n characters  (Preset:0)
INn     INdent n characters  (Preset:0)
FLn     FormLength n lines  (Preset:66  Maximum:127)
PLn     PageLength n lines  (Preset:54  Maximum:127)
NP      NewPage: go to next page after current line
JU      JUstify the right margin
NJ      NoJustify the right margin (preset)
CS      CutSheets: using separate sheets of paper
CO      COntinuous: using continuous stationery (preset)
CE      CEnter short lines
NC      do Not Center short lines
TAn     TAb to nth position
PIn     PItch (10 or 12) NEC Spinwriter Model 5510 only
DS      DoubleSpace (NEC Spinwriter Model 5510 only)
SS      SingleSpace
PNm.n   PageNumbering starting at page m, at nth position
NN      NoNumbering
FD      FooterDefine
FO      FooterOn
NF      NoFooter

Any control code letter can be sent to your printer by
preceding the letter by the special code (CTRL-SHIFT-*)
```

Table 2: Printer commands

One of the most pleasing aspects of using the Text Master is the initial introduction. The documentation that is provided is very concise and easy to follow and is designed to enable even the most complete novice to start using the system.

It leads you quite smoothly through booting up the system into getting your first document into the computer, editing it and saving it. It then goes on to personalising your documents by the use of the mail-merge facilities, and explains how you can use the printer facilities to create the document you require, including the use of headers, footers, numbering and other printer functions.

The first display on the screen is the main menu *(Fig. 1)*. This shows the various options available from this menu. It also lists the documents stored on the text disk, and the amount of free space available in sectors.

Documents are stored as sequential text files, and can be up to 14,000 characters in length. Document names can be up to eight characters in length, and are suffixed by the name of the author (3 chars). The system itself will add a further two digit code to the text for ease of retrieval. '

On the main menu, Newdisk initialises new discs, Index lists all documents stored, and Lock obviously locks a file, preventing you from accidentally erasing it until it is unlocked. Glossary refers to a sub-file of phrases which you can create, such as greetings, headings or standard text which can be called for insertion in your document.

When you choose the Create function, you are asked for the new document name, which will appear at the bottom of the screen, and will remain there while the document is being created. A number also appears which changes to keep count of your position within the paragraph.

Entering text is straightforward. You will notice, however, that wraparound does not automatically occur while text is being entered. This is because the printout

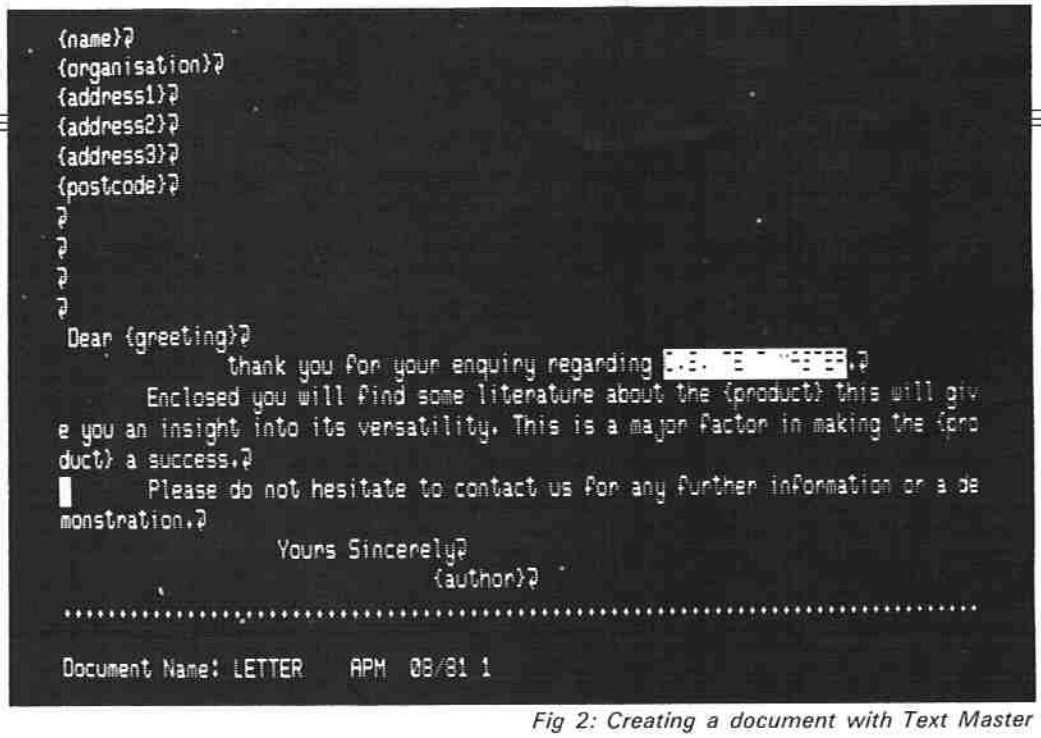

Fig 2: Creating a document with Text Master

facility will ask for the width of document required, and formatting will be amended on printout. A document 255 characters in width can be created with this system. The CTRL key can be used as a shift lock in this mode.

After entering text you can jump to the inner menu by pressing the ESCAPE key. This provides further facilities, such as Save, Change, Rename, Print, Draft and Videoprint.

Save saves the text file to disc. Rename changes a modified version of the text, so it can be saved without destroying the original. To edit documents, you must first return to the main menu, which clears the computer, retrieve the original document using the computer created code, and then use the facilities listed in Table 1, all of which are accessed by using the CTRL key and the initial letter of the command.

To make the system easy to use the designers of the package have ensured that wherever possible the key matches the action, so that you have U for up, B for beginning, E for end and so on. This is great until you want to use the REPT key, although this could become easy with practice.

The text handling facilities with this package are good. An important function of a word processor is the ability to move paragraphs around, and 'cut-and-paste' paragraphs to create a single document. This can be achieved quite easily, although the paragraphs required for this operation must be composed as complete documents.

Using CTRL-I (I for Insert) you position the cursor where you want the insert and are then shown a list of documents available for insertion. Pressing the code for the paragraph will automatically cause it to be inserted.

Printing documents is straightforward for standard text. If, however, you wish to use the formatting commands for printing you can do this by using CTRL-ZERO followed by the two character command *(Table 2)*. This gives very flexible control over the document being printed, and can be related to specific documents rather than as preset printer commands.

For printing personalised documents, such as mailshots or legal documents, the text is created with the part to be personalised surrounded by 'curly brackets' (CTRL-8 and CTRL-9). These labels will then correspond to labels and data in a further text file.

When writing or changing a document, the following keys may be pressed together with the CTRI key:

U	up one line
D	down one line
R	right one place
L	left one place
^	up ten lines
v	down ten lines
B	beginning of document
E	end of document
F	find (and replace) a word or phrase
T	tab to next tabstop
S	set a tabstop
C	clear a tabstop
M	move paragraph up or down
W	wipeout part of the document
I	insert a document from diskette
G	insert a glossary item
Z	Underline
Y	remove underline
ESC	go to inner menu
Arrows	destroy characters behind or in front of the cursor

Table 1: Edit controls

The data files are restricted in their use, however, and cannot be used for sorting purposes, although extractions can be made from the labels provided. A Find instruction within the Edit facility will, however, extract a name and address from these data files for use in a letter.

This disadvantage is only temporary, as a proper Sort facility is under development and could be made available at very short notice to anyone who wants to use it. A further useful facility within this package is the ability to access text files created by other programs.

Conclusions are:

- Text Master is a well presented word processing package, incorporating all of the standard features necessary for the task. It is easy to use, even for complete novices.
- The screen layout is straightforward. There is no extraneous information wasting space on the screen as with some other systems.
- The use of single key commands in main menu mode is good. However it would have been advantageous to have this facility extended to editing.
- The paragraph handling facilities are useful, and should be incorporated in all word processing systems. The ease of utilising this facility is a welcome change from the mental dexterity required in some systems to create the same effect.
- The ability to format documents at the time of printout is very useful, giving the ability to create extra wide documents. The actual design of these documents on the screen is not so easy. This could only be improved by lateral scrolling, a major modification.
- The mail/merge facility needs the Sort routine to compete with similar products from other suppliers, and to enable the package to be used as an effective producer of mailshots, etc.

Overall, this is a very effective system and many people would be quite happy to use it full time. It is also good to see software emanating from Australia, as they have quite a dynamic computer industry over there, producing some very effective programs.

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PIPPED
AT THE

D
E POST

THE Apple racing car is doing for the racing circuits what the Apple computer is doing in the world of data processing – proving that it is a force to be reckoned with.

And while the Apple was pipped at the post at its last race – it came in second overall at a meeting at Mallory Park – only a few days earlier it had won its class in the 24-hour production car team race at Snetterton.

Intelligence UK's Scirocco, wearing its distinctive Apple colours, was driven over the finishing line by Stirling Moss. Its other drivers in the race had been Tony Lanfranchi, that fast South African lady Desiré Wilson, and Ashley Ward. The car came home in third position overall.

Getting started with machine code

By MIKE GLOVER
Leicester Computer Centre

THIS is the first of a series of articles designed to help the reasonably experienced Apple Basic programmer get started with machine code programming.

It is not intended to go into depth in 6502 programming techniques as there are many books on that subject, but rather by use of examples show you how you can actually get machine code programs into your Apple, and how to run them.

If you don't have a book on 6502 programming I recommend 6502 Software Design by Leo J. Scanlon.

Several assumptions are going to be made:-

- You have an Apple with at least 32k of memory and one disc drive.
- You are familiar with Basic.
- You have an assembler.

This series will be based on the assembler in the DOS Toolkit. As it is an Apple product it should be generally available.

This month we are going to look at OUTPUT. In future articles we will look at Input, Binary/Hexadecimal/Decimal Conversion, Dumping the screen to a printer and Sorting.

The Apple screen is memory mapped, that is to say that the value in a single memory location controls the appearance of a fixed location on the screen.

Try this experiment from Basic.

```
HOME
]POKE 1024,1
```

You should have an inverse 'A' in the top left hand corner of your screen.

Now let's add 39 to the previous location and . . .

```
]POKE 1063,2
```

We now have an inverse 'B' in the top right hand corner of the screen.

Let's now add one more to the last location and . . .

```
]POKE 1064,3
```

If the 'C' that appeared in column 1 line 9 surprised you then have a good look at the 'map' of the text screen in the Apple II reference manual, and try the following short program.

```
NEW
100 FOR SP = 1024 TO 2039
110 FOR D = 1 TO 100: NEXT D : REM
DELAY
120 HTB 12: VTAB 12: PRINT SP
130 POKE SP, 1: NEXT
```

By now you should have a fair idea of how to place characters on the screen from Basic using Pokes. Now let's do the same thing in machine code.

To duplicate our first example using machine code we need to LOAD the 6502 accumulator with 1, and then store the contents of the accumulator into memory location 1024 (HEX $400). The coding for this would be A9 01 for load accumulator with the immediate (next memory location) value of 1, followed by 8D 00 04 for store contents of accumulator into location $0400. Note the 6502 stores the two bytes of an address, known as the high and low order bytes in reverse order.

Try loading this short machine code program by first typing CALL – 151 to enter the monitor, then typing FC58G. *Look up this address in your Apple II reference manual page 164.* The 'G' means GOTO this address and execute the program or subroutine there. Now type 300: A9 01 8D 00 04 60.

The 60 is the code for RTS (return to subroutine). Press RETURN after you have typed in the 60 and follow this with *300G.

You will now see the inverse 'A' back in the top left of the Apple screen. If you now type 300L (L for list) you will see a disassembly of our short program.

Ignore everything except for the first three lines. In column one we have the memory location. The next group of three columns have the hexadecimal values in the memory locations, the first column having the 6502 instruction code, and the next one or two a value or memory location.

The next group of two columns has the instruction mnemonic followed by either a value or an address with an indication of the addressing mode. This is assembly language and it is the function of an assembler to let us write our programs in these mnemonics and then assemble them into the machine code the Apple understands.

Written in assembly then our short program looks like this:-

```
LDA # $01
STA $0400
RTS
```

The '#' sign is shorthand for 'Immediate' and tells the assembler to place the value 1 in the next location after the LDA code. It also informs the assembler that the correct op-code for LDA, in this instance is A9 and not A5,B5 etc.

Refer to page 123 in the reference manual for a full list of LDA op-codes.

Using the assembler

BEFORE starting to use the assembler it would be useful to initialise a new disc, and assuming you are using Apple's DOS Toolkit transfer the following files using FID:

```
] – EDASM
] – EDASM.OBJ
] – INTEDASM (If you are using integer BASIC)
] – EDITOR
] – ASSM
] – ASMIDSTAMP
```

Now type RUNEDASM, alter the ID stamp as described on Page 2 of the Assembler/Editor manual, and you will arrive at the Command interpreter prompt, which is a colon followed by a flashing underscore for the cursor.

Type ADD followed by RETURN and you will see the number 1 appear on the screen followed by the flashing cursor with one space between it and the first of the four fields used in assembly language programming. *See Table 1.*

Field 1 is used for 'labels', which we will use as convenient references when we make branches. For example, in Basic

Table 1.

FIELD 1 Label field	FIELD 2 Operational code or mnemonic field	FIELD 3 Operand or address field	FIELD 4 Comment field
START	LDA	#$C1	;LOAD AC WITH A

you may say GOTO 100. In assembler this could be JMP START. If we don't want to label a line, then we simply press the space bar.

Field 2 is separated by a space from Field 1 and contains the operation code or mnemonic.

Field 3 is again separated from the op-code by a space and contains the operand or address field.

Field 4 contains an optional comment and it is normal to separate this with a space and a semi-colon.

Let's make a mistake to make a point. Assuming you still have the cursor one space removed from the number 1.

Type the following:

```
1 START LDA#$01
2 STA $400
3 RTS
```

Don't forget to have just one space between fields and terminate each line by pressing RETURN. To leave the Input mode, type CTRL – Q or CTRL – D after the line number – in this case 4.

Now type 'L' (for list) and you will see that something is wrong. In both lines 2 and 3 the op-code is in the label field. Type E2,3 to tell the Editor that you want to Edit lines 2 and 3. Press RETURN and you will see line 2 displayed with the cursor over the S of STA.

Type CTRL I for insert and press the space bar to insert a space. The op-code will move to its proper place. Hit RETURN to accept the line and do the same thing to line 3. (There is no need to type the entire line using this Editor.) Now the List should be all right.

There must be an easier way to send characters out to the screen rather than place them in specific memory locations and of course there is. The Apple's monitor contains many useful routines which we can use, and the routine for output to the screen is located at $FDED. Try the following example taken from Page 48 of the Apple reference manual:

Type NEW and then A(dd).

The example shows the code starting in location $300 (Dec 768). We must inform the assembler, so type SPACE to skip the label field and type ORG $300.

Now let's do something a little different. The routine at $FDED is used a lot and it will make our listing much easier to read if we give it a name and tell the assembler what it is at the beginning of the listing. This routine sends C(haracters) OUT and is called COUT. So now type COUT EQU $FDED to equate all references to COUT to $FDED.

Separate these two lines from the rest by typing '*' in the label field to improve readability. The assembler will treat everything on that line as a comment field.

Now we can type in the program. You need not type in the comment field.

```
      LDA#$C1  ; Put code for 'A' in Accumulator.
LOOP  JSR COUT ; Print it on screen.
      CLC      ; Clear carry flag prior to ADD.
      ADC#$01  ; ADD 1 to make A into B etc.
      CMP#$DB  ; Have we passed Z?
      BNE LOOP ; No, then go to beginning.
      RTS
```

Don't forget to press the space bar where there is no label field. Now your listing should look like this:

```
 1          ORG $300
 2  COUT    EQU $FDED
 3  *
 4          LDA#$C1
 5  LOOP    JSR COUT
 6          CLC
 7          ADC#$01
 8          CMP#$DB
 9          BNE LOOP
10          RTS
```

When you are satisfied that the listing is correct save it on disc by typing SAVE EXAMPLE 1. Once the file is on disc we can ask the assembler to get to work.

Type ASM EXAMPLE 1 and press a key where requested. The output to the screen should look like this:

```
SOURCE FILE: EXAMPLE 1
----- Next object file name is EXAMPLE 1.OBJ0
0300:            1          ORG $300
FDED:            2 COUT     EQU $FDED
0300:            3 *
0300:A9 C1       4          LDA#$C1
0302:20 ED FD    5 LOOP     JSR COUT
0305:18          6          CLC
0306:69 01       7          ADC#$01
0308:C9 DB       8          CMP#$DB
030A:D0 F6       9          BNE LOOP
030C:60         10          RTS
*** SUCCESSFUL ASSEMBLY: NO ERRORS
FDED COUT          0302 LOOP
```

On your disc will be a new binary file called EXAMPLE 1. OBJØ.

Leave the assembler by typing END and BLOAD EXAMPLE 1.OBJØ. Now type CALL 768 ($300) and with any luck you should see all the letters of the alphabet on the screen.

To conclude this month's article, here is a small program in Basic which demonstrates how to position the output from COUT ($FDED):

```
 5 HOME
10 FOR I = 1 TO 20
15 CALL 768
20 POKE 36, I * 2 : REM CH $24
30 POKE 37, I : REM CV $25
40 CALL 64546 : REM VTAB $FC22
50 NEXT
```

To use it put the character print routine we used above in Page 3 ($300) as follows:

```
]CALL -151
*300: A9 01 20 ED FD 60
*3D0G
]RUN
```

As an exercise you might like to rewrite the routine in assembly code. Also look at $FD8E (CROUT) – Page 166 in your reference manual – and work out what it does.

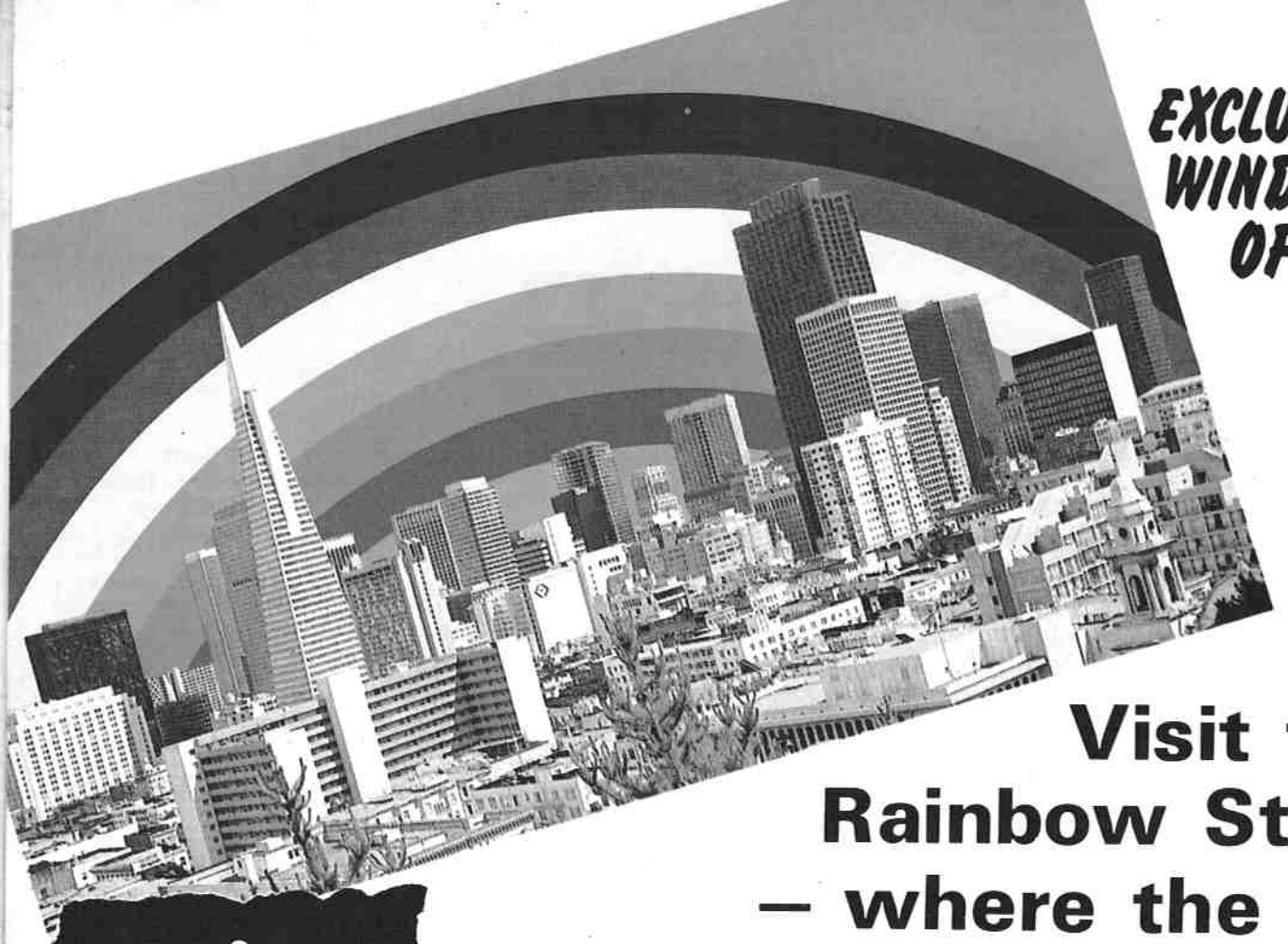
● *Next month we will finish dealing with output and also cover input. In particular we will look at the much published 'Input Anything' subroutine, which will enable us to force Basic to accept strings containing any characters, without having to use slow and tiresome GET statements.*

Appletips

There are two ways to use DOS from machine language, Read Write Track Sector and the normal commands. The other way is to send the normal DOS commands, one character at a time in the 6502 accumulator, to $FDED. Remember to precede the commands with a RETURN and CTRL-D and follow it with another RETURN. Here is a short-cut if you have ROM Applesoft.

```
300:LDA  $20
302:LDY  $03
304:JSR $DB3A ;Applesoft's string printing routine
307:RTS
320:0D 04 43 41 54 41 4C 4F 47 0D 00
    C A T A L O G
```

If you use the indirect only commands you must also convince DOS that Basic is running. From Applesoft $76 must not contain $FF and $33 must not contain $DD. From Integer $D9 must be greater than $7F.



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Yes, California is waiting to welcome Windfall readers on a holiday with a difference. Stay in exciting San Francisco.
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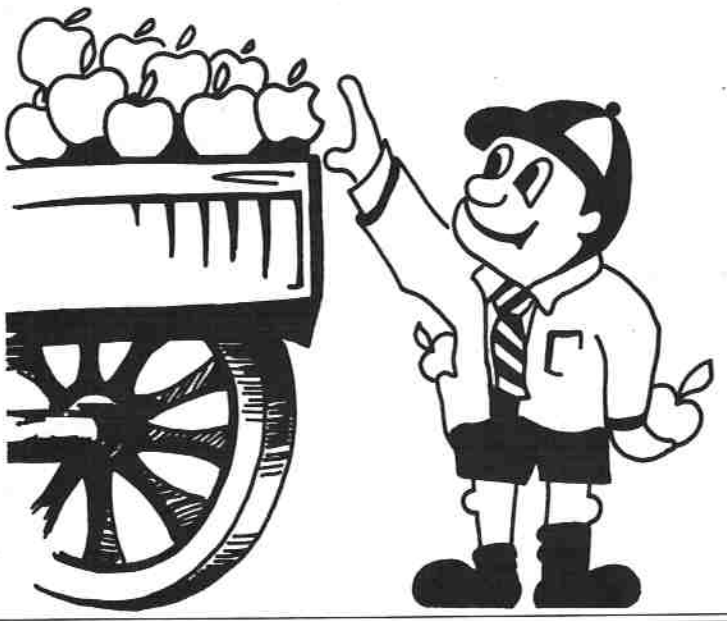
The dates we suggest are early November or in February or March 1982. You don't have to book now, but if you're interested let us know and we'll send you further details.
Write to: Holiday Offer, Windfall, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.



Applecart

Monthly review of
Apple in education

THE National Education and Training Exhibition at the NEC in Birmingham last month was the first national exhibition of its kind to be held in the UK. It was also our first major opportunity to demonstrate the Apple to the education community and show its suitability for use in schools, colleges and in higher education.

Our theme was: "Apple across the Curriculum".

The exhibition provided for the Apple team at Microsense an interesting diversion from the traditional presentation format for other exhibitions. We were fortunate enough to have secured two large stands situated side by side.

Stand One was sub-divided into four major areas comprising computer literacy, the arts, maths and sciences, and schools administration. This stand proved to be a great attraction and on all three days we were inundated with enquiries and were very impressed with the sheer volume of visitors, especially since Day 3 also happened to coincide with the Wimbledon Finals. Items of particular interest proved to be the graphics tablet, the music system, Appletel, Z80 softcard, Apple Pilot, Apfeldeutsch and the schools administration package.

The neighbouring Apple stand heralded a new approach to exhibitions and was entitled the Apple Education Workshop. Five complete Apple systems with printers and colour were on display for visitors to gain hands-on experience of the Apple, as well as many of the accessories. Having made available for review purposes a large selection of educational programs many visitors were quick to take the opportunity to obtain first-hand experience of the potential of good quality educational software.

The workshop area became the focal point of the whole exhibition and reinforced my view that the most effective way to acquaint teachers from all areas of the curriculum with microcomputer power is to sit them in front of a keyboard with a piece of software which has a degree of relevance for them.

The first edition of the Apple Educational Software Handbook for the UK was available for the first time at the exhibition and we took great pride in being the first microcomputer company in the country to provide a manufacturer-sponsored guide to education software. I anticipate that future editions will include a much larger number of programs as further good quality CAL software is being developed for the Apple by organisations currently writing a variety of programs.

Any school or college interested in having their own copy of this handbook or interested in submitting programs for possible inclusion in future editions should contact the educational services department at Microsense.

The success of the exhibition had depended on a great many factors and a major contribution to its success was made by five of the Apple educational dealers whom we had invited to assist us at the exhibition and whose experiences with the educational community within their respective geographical area proved to be invaluable. As the machine population of Apples within schools, colleges, polytechnics and universities continues to grow, it is most reassuring for me to know that the needs and expectations of our educational customers are being fulfilled by a professional band of committed educational dealers.

Local support is an important, though often ignored, aspect of microcomputer ownership and a great deal of credit must go to the Apple dealer base in this respect.

Those people who were not able to attend this particular exhibition may be interested to know that a sizeable portion of our stand at the International Business Show will be devoted to the use of Apples in Education. This event will take place at the NEC in Birmingham in late October 1981 and will certainly be of interest to teachers whose interest in computer literacy extends into the important area of specific business applications software for the Apple.

I look forward to meeting you there.

David King

● *David M. King, BSc (Hons), Cert Ed (Loughborough), is manager for educational and scientific services with Microsense Computers (Apple UK).*

Apple takes homework out of running a preparatory school

A SUITE of programs designed to simplify the complexities of administering a preparatory school has been put on the market by Deverill Computers, one of the West Country's leading Apple dealers. The programs were written with the active co-operation of a 101-year-old boarding and day preparatory school at Fordingbridge in Hampshire, where it has been satisfactorily tested for the last seven months.

Called the Administration Package for Preparatory Schools, it caters for all the school's administration and accounting needs. The system caters for up to 350 pupils and 400 names and addresses.

Deverill's accountants, Malpas Simmons & Co. aware of their growing reputation for expertise and service, introduced one of their client's, John Marjorbanks, headmaster of Sandle Manor school, to the company. He was then introduced to Lee Jackson, a professional systems consultant and now a director of Deverill Computers.

Lee, having spent nine years as a systems programmer on IBM mainframe computers and reaching the top of his field, signed a contract with the government of Kuwait to become their systems programming manager where he spent 15 months. On returning to the UK he was contracted to an international bank to implement a major database system and is now controlling the software section of Deverill's.

Until March of 1980 John Marjoribank's knowledge of computers was non-existent. Then there came through the post a complimentary copy of 'Educational Computing' and details of a schools' offer from Microsense, the UK distributors for Apple. He was also becoming aware that increased numbers were putting unacceptable pressure on his secretary, especially at the end of term. Could a computer help?

There followed a month of active investigation during the Easter holidays, at the end of which he knew what he wanted. He had been put in touch with Deverill's to write the necessary programs and it only remained to persuade the governors that the money would be well spent.

Their accountant was very much in favour of the idea and pointed out that using a form of leasing for three years would cost no more termly than the additional secretarial help that was going to be required. By the end of June the governors had agreed and the order was placed.

Much of the Christmas term was spent liaising with Lee Jackson who was to provide the software, but by early December everything was sufficiently far advanced for them to produce all the end-of-term accounts for parents, with full details and in a format which was almost identical to that of their existing printed account sheets.

At the beginning of the Easter term age order lists, number lists, alphabetical lists, address lists and form lists were all produced by the computer, as were the account details required by the accountant. The school secretary found she liked using the Apple system, as did their matron. The parents liked what they received and so did the accountants.

Initially there was a lot of work involved in entering all the data into memory and saving it onto disc for later recall, but once done the time-saving became enormous: nearly two days on end of term accounts and at least three days on the beginning of term lists.

The printer is operating for a longish time while it spews out 140 accounts, but the secretary is now doing something more useful than entering figures onto paper and balancing columns to check her addition, only to spend half an hour more finding a missing 3p.

John Marjoribanks commented: "Enthusiasm is essential, as is the ability to think clearly. A knowledge of mathematics is not. APPS is a good, well documented program written in a user friendly fashion and gives clear instructions on the monitor screen and is so designed that it becomes virtually impossible to make a mistake. Even if you do, the worst that can happen is that one session's work is lost."

APPS-1 includes the following main functions:

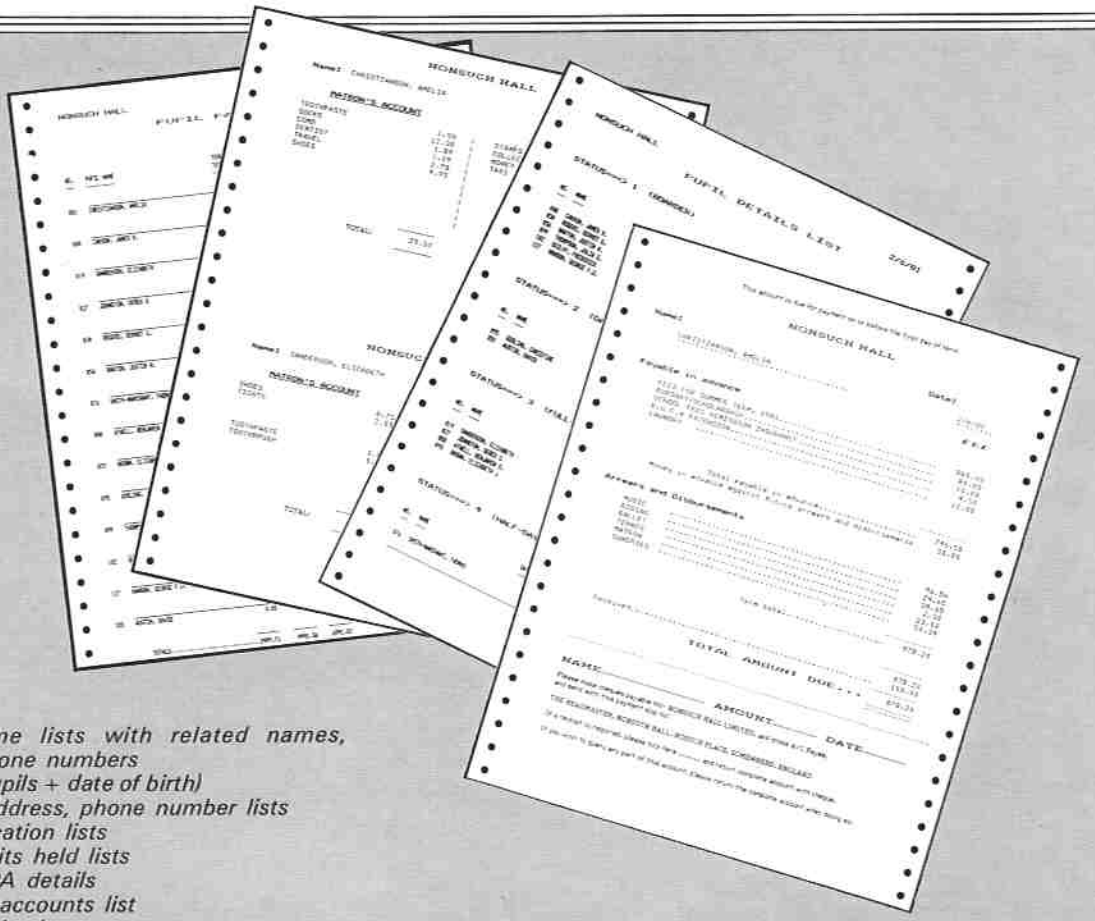
Registration of pupils:

- *entry of pupils's details record*
- *display of pupils' details record*
- *deletion of pupils' details record*
- *renumber pupils' details record.*

Entry/deletion and display of names and addresses of persons related to pupils.

Utilities to produce the following comprehensive reports (with sort options) and some split between MAIN and PRE-PREP:

- *Full pupils' details lists*
- *Pupils' age order lists*



– Pupils' name lists with related names, addresses and phone numbers
– Form lists (pupils + date of birth)
– Name and address, phone number lists
– Fees classification lists
– Extras deposits held lists
– SFRI & BUPA details
– Outstanding accounts list
– Address label print

Accounting functions for:
– Entry of pupils payments (advances and arrears)
– End-of-term invoicing
– Pupil payment records
– Fees ledger summary

Maintenance functions include:
– Entry of school name
– Entry or suppression of password
– User definition of field names for pupil details and accounts record
– User definition of up to 26 fees classifications (fee, SFRI & BUPA)
– VAT rate (if applicable) for use with end-of-term invoicing
– Entry of last term's invoice totals (initial run of system only).

APPS-2 covers the matron's and sundries accounts. This program can only be used in conjunction with APPS-1. it allows for up to 12 individual items and amounts to be entered for each pupil's, matron's and sundries accounts in order that this 'breakdown' of payments may be appended to the pupil's end-of-term accounts produced by APPS-1.

Functions include:

Update of pupil's, matron's and sundries accounts.
Display pupil's, matron's and sundries accounts.
Clear files for new term.
Print matron's and sundries account details.
Transfer individual totals to APPS-1 accounts file.

The whole system is menu driven for ease of operation and all errors result in an audible warning as well as screen messages. Comprehensive and easy to follow documentation is also supplied.

The minimum hardware configuation is: Apple II with 48k memory, two Apple mini floppy disc drives, one Centronics 737 printer, one video monitor, continuous plain fan-fold paper (size 9½ x 12 ins).


Tom Snape


Lee Jackson


Elizabeth Sansom


Barbara Holman

DEVERILL Computers have been in the computer business for 15 years, entering the micro market in 1979. Barbara Holman, the company's managing director decided that Apple was the microcomputer to market and that professional staff were essential to its success.

Elizabeth Sansom joined Deverill as systems consultant having had 12 years experience with IBM and is currently spending about 18 months in California working for Deverill as consultant to Apple Inc. and setting up a branch office on the west coast of California.

Tom Snape joined the company just prior to Elizabeth's departure. He is a highly qualified electronic/software engineer with degrees in computer science and electronics. He organised the opening of Deverill Computer's service centre which is now the Apple computer service centre for Dorset.

Software swap shop would aid juniors

MY congratulations on Windfall. This magazine should prove to be very popular with Apple users everywhere. I found the articles informative and the content well balanced, which is a refreshing change.

Although I have only recently been introduced to the Apple I have been involved with computers for the past ten years, both mainframes and micros. I have noticed that there is a great deal of enthusiasm in the micro field, both on the professional and hobbyist level. With this in mind I would like to take the opportunity to ask if you could use the Education section of Windfall to promote an idea of mine.

I am interested in contacting people who are interested in producing software for the primary and junior school age group on a purely interest basis. I am not trying to make money – just to make people aware, both parents and teachers, that the very young of today will be the users of tomorrow, and the sooner they use this kind of machinery the better equipped they will be to deal with technological change.

My main aim in writing to Windfall is to try and establish a link with people who think in a similar way, who would be interested in swapping ideas for programs, etc. I am also hoping that pressure can be put on local education authorities to try and get some resources channelled into the primary and junior schools. I do know that some parent teacher associations have paid for micros to be used in junior schools, but there is still a long way to go before the new type of computers can be made available where they are needed.

I have two sons, aged five and three, both of whom use the Apple with small programs I have written. Some of the programs are obviously game oriented, but I also try to increase their awareness of numbers, language, etc.

I am sending a copy of the first program I wrote for my eldest boy, which is still one of his favourites. Instead of typing in the words to copy it would be possible to have a READ statement on line 120 with the words on a DATA line.

All the programs I have devised are designed to allow a great deal of flexibility in the approach. By changing the program slightly it maintains the child's interest. A further addition to the use of the program is that random characters can be typed instead of a word and this will ultimately help the child to familiarise himself with the keyboard. Michael, my eldest boy, now has acquired a considerable amount of keyboard skill and I feel that this will be of great benefit to him in the future as he will, no doubt, be using keyboard equipment at school.

Obviously it depends on the approach of the particular child as to whether the computer is a tool to aid his learning processes. Most of the children, ranging from three to 14 years of age, have been more than happy to "play" with the computer.

It is for this reason that I am writing to Windfall. I feel that the computer can be used to great effect in the teaching of language, numbers, etc., as long as there is a controlled environment. Too many people, teachers and parents alike, seem to think that the computer will replace them in the "teacher" role, but it is purely and simply a teaching aid. By sitting down at the computer with my children we are all involved in the operation of the machine.

The Apple, with its wide variety of accessories, excellent graphics and easy to learn Basic, is a wise choice for any school. Let's just hope that more and more schools will take the plunge. – **Jeff Turner.**

● Mr Turner can be contacted at 5 Willow Drive, Odsal, Bradford, West Yorkshire. His evening telephone number is 0274-603506. This is the program he sent:

```
 10 REM WORD COPYING PROGRAM FOR AGE 4+
 20 REM WRITTEN BY JEFF TURNER
 30 REM THIS VERSION USES WORDS TYPED I
    N BY PARENT/TEACHER
100 TEXT: HOME
110 INPUT "CHILD'S NAME ";A$ : PRINT
120 INPUT "WORD TO BE COPIED?" ; W$
130 LW=LEN(W$)
140 HOME : VTAB3
150 PRINT " IN THIS PROGRAM THE CHILD HA
    S TO COPY"
160 PRINT " THE WORD CHOSEN BY THE PAREN
    T/TEACHER " : PRINT
170 PRINT "WRONG LETTERS WILL NOT BE SHO
    WN ON SCREEN "
180 PRINT "BUT WILL BE REGISTERED..."
185 PRINT "HOW MANY WRONG LETTERS TO BE
    ALLOWED?" ;
190 INPUT CT
200 FOR T=1 TO 500 : NEXT : HOME
210 PRINT " NOW COPY THIS WORD..."; A$
220 VTAB6 : HTAB5 : PRINT W$ .
230 Z$="" : WR=0 : Y=0
300 FOR X=1 TO LW
310 VTAB10 : HTAB5
320 PRINT Z$
330 GET T$ : REM CHILD INPUT RESTRICTED
    TO ONE KEY
335 IF T$="" THEN 310
340 IF T$=MID$(W$,X,1) THEN 510
350 GO TO 600
500 REM ROUTINE TO BUILD COPY WORD LETT
    ER BY LETTER
510 Z$=Z$+T$ : IF Z$=W$ THEN VTAB10 : HT
    AB5 : PRINT W$ : GO TO 1000
520 NEXT
530 GO TO 1000
600 Y=Y+1 : REM ADDING TO WRONG ATTEMPT
    REGISTER
610 GO TO 310
1000 FOR T=1 TO 1000 : NEXT : HOME
1010 PRINT "WELL " ; A$
1020 PRINT "YOU COPIED THE WORD WITH "; Y
     ; " WRONG LETTERS."
1030 IF Y>CT THEN PRINT "BETTER LUCK NEXT
     TIME..." : GO TO 1040
1035 PRINT "WELL DONE... WITHIN THE LIMIT
     S"
1040 PRINT : PRINT " ANOTHER GO? (Y/N) ";
1050 GET Q$ : IF Q$ ="" THEN 1050
1060 IF Q$<>"Y" THEN 2000
1070 PRINT " SAME PERSON? (Y/N) "
1080 GET QT$ : IF QT$="" THEN 1080
1090 IF QT$="N" THEN 100
1100 IF QT$<>"Y" THEN 1080
1110 GO TO 120
2000 END
```

Synthesiser as a teaching aid

IT would probably not occur to most music teachers to look to advances in the field of microchip technology for teaching aids in their own subject. We are usually too busy with rehearsals and the nitty-gritty of teaching to have the time as well, I suspect, as often being rather insular and having a pathological mistrust of gimmicks.

So when a colleague passed me an article from a computer magazine describing the Alf synthesiser I was initially as sceptical as any other music teacher may be who is reading this article. I was, however, in the process of planning a new fourth year general course in creative studies so I decided to investigate.

The ALF synthesiser works as an interface for the Apple and outputs to an external amplifier and speakers. Music is written on the screen in orthodox notation or at least the transatlantic equivalent.

The notes' duration is first selected from a menu by using one of two game paddles, then placed at the correct pitch on a double stave with treble and bass clefs using the second paddle. With practice music can be written quite quickly and it is quite simple to correct mistakes by back-spacing and deleting or inserting notes.

The usual parameters of key and time signature, tempo and volume are easily available and with a little practice it is also possible to write in crescendos and diminuendos, accelerandos and rallentandos. It is also possible to alter the type of sound being produced by control of the sound envelope.

Alf's envelopes are quite complicated and call for much patient reading of the manual (which is not always very clearly written) and much experimentation. For those without a degree in mathematics Alf will play music using a pre-set envelope, which sounds like an electronics harpsichord, until the user feels fit to experiment with his own settings.

Each note is played as it is written and Alf automatically inserts bar lines in the correct places. At any time the instruction 'Play' will allow the user to hear what has been written. On playback the music is displayed as a moving marker on a single horizontal line for each part.

The current model will write and play in up to nine parts and the overall sound can be very impressive. Each part has to be written independently and the biggest drawback to the system is that existing parts are not displayed when you add additional parts. In practical terms this means that children using Alf need to have their music written down first on manuscript if they are working polyphonically.

I have used Alf with mixed ability fourth year groups and the majority seem to have enjoyed it and to have learned a fair amount about notation in so doing.

At its simplest level it can be used just for copying and playing back tunes. In that respect it is a useful tool for teaching notation and for aural practice, since every note is automatically heard as it is entered.

At its most complex Alf is an electronics instrument which deserves to be taken seriously and will reward much study of the relationships between attack, decay, sustain and release envelope settings and the manipulation of these to produce orchestral harmonics by doubling of parts at different octaves and the use of subroutines, by which means one can produce a canon in up to nine parts yet only write out the tune once.

There is certainly sufficient scope for the budding young composer looking for a modern medium or for the 'A' level music candidate.

The current price of the synthesiser is under £100 – a fraction of the cost of a conventional synthesiser. For a school which already has an Apple this makes the unit a very attractive proposition indeed – **Lindsay Robertshaw,** *Head of Music, Ecclesfield School, Sheffield.*

Help for the handicapped

THE growing role being played by the Apple in helping disadvantaged members of the community is expressively documented in the first edition of a newsletter produced by the newly formed Technology and Disability Group. Called ACE – "Aids Communication and Electronics" – the four times a year newsletter is designed to act as a clearing house for the latest information and also as a forum for discussion on the effectiveness and design of aids which use modern technology. Their ultimate aim, they say, is to enable handicapped people to achieve greater independence.

One of the people mentioned in the first issue is Keith Anderson, who works at an adult training centre in Yorkshire and is a prolific writer of Apple programs. They cover number recognition, a large-size print routine, spelling exercises using high resolution graphics to illustrate the object being spelt, and recognition of signs such as toilets.

Written in simple language, ACE aims to help the handicapped person, families, teachers, occupational therapists, speech therapists and other caring professionals who want to know if the chip can help and where to go to find out more. The group are already talking about developing a register of technical specialists who are willing to volunteer to help tailor equipment to meet individual needs.

Applecart recommends any reader interested in this highly rewarding field of education to take out a subscription to ACE. It only costs £2.50 a year. Write to: The Group for Technology and Disability, Neath Hill Professional Workship, 1 Fletchers Mews, Neath Hill, Milton Keynes, Bucks.

Applecart

Apple Crumble

PROSPECTIVE customers in schools and colleges often ask me to comment on the Apple with specific reference to reliability. And all Apple owners are in total agreement (aren't they?) that the Apple is renowned world-wide (and in other areas) for its outstanding performance characteristics.

"Ah", says the inquisitive head teacher as the PTA chairman looks on in anguish, "but will it stand the rigours of a classroom environment?"

If by that he means: "Will it still work?" if a teacher mistakes the Apple for a board rubber and throws it the length of a classroom at Willy Armitage as he nods off, then I guess the answer may be "No".

But if he means: "Can we subject it to normal classroom wear and tear and expect good reliability", then my response is an unequivocal "Yes".

"What evidence do you have?" enquires the suspicious academic.

Thereby hangs just a couple of interesting stories relating to reliability.

Quite recently a colleague of mine showed me a photograph of what appeared to look like an ice-cream cake recently emerged from a sauna. In actual fact it was an Apple topped by a melted moulded video monitor which had been salvaged from an overnight fire in an office block where the Apple had apparently had a ring-side seat.

Before depositing this distorted data processor into the dustbin, someone had the foresight to replace the melted power cable and switch on the Apple. "Whirr, Clank, Clonk" went the disc drive and up came the menu on a newly provided monitor, bold as brass.

Reliability? – no problem!

Then there was the Apple dealer in Kent who loaned an Apple to his parish council for use at a weekend flower festival where the intention was to raise funds by charging 10p a go for children wishing to play Stellar Invaders.

Never before in the history of microelectronics has so much space been invaded in such a short time. That poor Apple spent the entire weekend in a tent powered by an extension lead running from the Vicar's garage and being pounded by hundreds of kids.

The Apple stood up to the task admirably and only once did it fail to perform. This circumstance was soon rectified when it was discovered that an unsuspecting visitor had tripped over the power cord on the way to the loo. Everyone's faith in the reliability of the Apple was soon restored.

David King

Listing

APPLE has broken new ground again by producing Britain's first educational software handbook.

It covers a variety of applications for computer literacy, detailing computer discovery programs and computer languages. Also included are a wide selection of CAL (Computer Assisted Learning) software packages covering science, mathematics, music, economics, modern languages, geography, social studies, technical and design studies, art and business studies. A special section covers primary and middle school software, applications for special schools and programs for school administration.

The new booklet, which will be updated on a regular basis because educational software is constantly being written gives immediate access to what is available and where to get it. A spokesman said: "In the United States Apple is the highest selling micro in schools where it offers unequalled accessories and software. Now we want to make it No. 1 in the UK as well."

For a free copy of the booklet write to: Microsense Computers, Finway Road, Hemel Hempstead, Herts, HP2 7PS.

Speeding

JOHN Giem has developed a communication program for his son Chris, who has cerebal palsy. Giem's original design used a joystick to control a cursor on the screen, picking out letters one at a time from a matrix.

"That worked out great for Chris in the training stages," says John. "But it pretty quickly got to the point where his capabilities required more speed." Chris is now using an oversized, 10-key board which he can operate with elbow or balled fist.

He can add one character to the message with two key punches, one for the row number and one for the column number of the character. "He can whip things out in nothing flat now," says Chris's mother, Linda.

Like the other communication systems that use matrix displays, Giem's Handiterm program can display only a few lines of text. That is adequate for 10-year-old Chris, who never needs to write more than one sentence at a time. But as he gets older his needs will expand, and Giem wants to have a system that can keep up.

"By the time he starts writing paragraphs in school I'm going to have to have a text editing system ready for him," Giem says.

He plans to replace the matrix display with a reference card which sits next to the monitor, freeing up most of the screen for text.

CONVERSION

Exit Integer Basic... Enter Applesoft

By GREG WATSON

THIS Applesoft program converts Integer Basic programs into Applesoft programs.

Type in the program listing as shown, and SAVE it to tape or disc as usual. To use the program with a tape system simply RUN the converter but have your Integer program at hand on tape. The converter will supervise the loading of the Integer program.

If you are using a disc system things are a little more complicated. LOAD the Integer program from disc (your Apple will go into Integer mode for this.) Now type in PRINT PEEK (202) + 256 * PEEK (203). If you get a >32767 ERR you will have to PRINT PEEK(202),PEEK(203) and calculate the number yourself.

WRITE THIS NUMBER DOWN – YOU WILL NEED IT!

Next LOAD the converter (you will go into Applesoft). Now RUN it. Disc and tape users are now at the same point. You will be asked if you want information on the program, and then whether you are using a disc system or not. If not the converter will LOAD the Integer program from tape itself and start converting it, providing there isn't a bad load from tape.

If "yes", then you will be asked if you have already loaded the Integer program from tape. If not, when loading note the starting byte (the PEEK routine above). If you have loaded from tape you will be asked for the starting byte. This is the number you wrote down earlier. The program will now start converting it to Applesoft.

Disc and tape users are again at the same stage. As the program is running numbers will appear on the screen. These are the line numbers that you will have to correct yourself due to various reasons. If the number is printed in normal text it is because of some variation in operation between Integer and Applesoft. For example, if an IF ... THEN statement is evaluated as false by Applesoft it will ignore future statements in that line. However Integer will go on to the next statement in the line if the IF statement was false.

If the number is printed in inverse text it means that a command has been encountered in Integer that has no similar statement in Applesoft. By far the most common such statement is the MOD function in Integer. When MOD is encountered by the converter it will replace it with HCOLOR= and it will be left to you to make the necessary alterations. Further details are given in the information section at the start of the program.

The program takes about nine minutes to convert 13k of Integer to Applesoft. When it has finished the screen will clear and you will be asked to type over a series of POKEs. You will also be asked for a program name if you are using disc. These POKEs fool the Apple into thinking that the newly-converted program is the present Applesoft program and not the converter. Once you have typed over the POKEs you will type over the SAVE command.

Do not try to run the new program at this stage, as it will probably crash. If you have more Integer programs to convert from tape type over the remaining POKEs as these restore the converter to Applesoft control. Repeat the procedure.

Once you have your new Applesoft program on tape or disc you can LOAD it as would any other Applesoft program. At this point you must make any changes to the program that were printed during the conversion process.

A few points:

- The converter is in memory from $800 to $2600 Hex. The Integer program is from XXXX to HIMEM. The new Applesoft program starts at XXX-1000 decimal. Thus if the new Applesoft program is longer than 1000 bytes it will start to overwrite the Integer program. This doesn't matter, since that portion has already been converted.

However, XXXX-1000 must be higher than $2600 Hex or you will damage the converter and lose everything. The 1000 byte leeway is determined in line 5550. You might like to increase this for a large program or decrease it in order to keep the converter intact.

The average Applesoft line requires more memory than the same line in Integer, hence the leeway is essential else the new Applesoft program will catch up to the Integer program, overwriting portions that haven't been converted.

- The converter automatically compensates for the RND function, which is different in structure between the two

CONVERSION

Basics. Thus RND(8) is automatically converted to INT(RND(1)*(8)) in Applesoft.

- The comma after an INPUT statement in Integer is automatically changed to the semi-colon required by Applesoft.
- DIM statements are unaltered and must be checked by you.
- When first RUN the program will appear to HOME and end. This is because it deletes line 1 when run. Simply RUN it again.

```
0  HOME
1  POKE 2, PEEK (115): POKE 3, PEEK
     (116): DEL 1,2
3 S2 =  PEEK (2) + 256 *  PEEK (3
     ) - 1: REM  OLD HIMEM:
9  HIMEM: 9728: REM $2600
10  GOTO 5000
100  REM
110 S3 = S: REM  S3=LOC OF POINTE
     R TO NEXT LINE WHICH WILL BE
      USED AT END
115 EL =  PEEK (P) + P - 1: REM
     POINTER TO END OF LINE
120 S = S + 2:P = P + 1: REM  SKI
     P £ OF BYTES IN LINE BYTE
122 I1 = 0
125 LI =  PEEK (P) + 256 *  PEEK
     (P + 1)
130  POKE S, PEEK (P):S = S + 1:P
      = P + 1
140  POKE S, PEEK (P):S = S + 1:P
      = P + 1
150  REM  NOW WE ARE UP TO PROG P
     ART OF LINE
160 Z =  PEEK (P)
170  IF Z > 127 THEN 1000: REM  I
     TS A 'NEXT TWO BYTES ARE A N
     UMBER ' BYTE
175 VA = 0: REM  IT'S NOT A VARIA
     BLE SO SET VAR COUNTER TO ZE
     RO
176  IF Z = 96 THEN I1 = 1
180  IF Z = 1 THEN 1100: REM  END
      OF LINE
185  IF (Z = 3 AND I1 = 1) OR (Z =
     64 AND  PEEK (P + 1) = 42) THEN
      PRINT LI,:L5 = L5 + 1: IF L
     5 = 3 THEN L5 = 0: PRINT
187  IF Z = 47 THEN 2300
190  IF Z = 40 THEN 2000: REM  LI
     TERAL PRINT
192  IF Z = 93 THEN 2200: REM  A
      REM
200 X = T(Z): IF X <  >  INT (X) THEN
     300
205  IF X < 0 THEN X =  ABS (X):
INVERSE : PRINT LI,: NORMAL
210  POKE S,X:P = P + 1:S = S + 1

220  GOTO 150
300  REM  DOUBLE POKE
310  POKE S, INT (X):S = S + 1
320  POKE S, INT (1000 * (X -  INT
     (X)) + .5):S = S + 1
330 P = P + 1: GOTO 150
1000  REM  P IS NOW POINTING AT T
     HE 'THE NEXT TWO BYTES ARE A
      NUMBER' BYTE
1005  IF Z < 176 OR Z > 185 THEN
      POKE S,Z - 128:S = S + 1:P =
     P + 1:VA = 1: GOTO 150
1007  IF VA = 1 THEN  POKE S,Z -
     128:S = S + 1:P = P + 1:VA =
     1: GOTO 150
1010 P = P + 1:N =  PEEK (P) + 25
     6 *  PEEK (P + 1)
1020 A$ =  STR$ (N)
1030 P = P + 2: REM  SET P BACK U
     P
1040  FOR T = 1 TO  LEN (A$)
1050  POKE S, ASC ( MID$ (A$,T,1)
     ):S = S + 1
1060  NEXT T
1080  GOTO 150
1100  REM  END OF LINE
1110  POKE S,0:S = S + 1:P = P +
     1
1112 R2 =  INT (S / 256):R1 = S -
     256 * R2
1114  POKE S3,R1: POKE S3 + 1,R2:
      REM  POINTER TO NEXT LINE
1120  IF P < S2 THEN 100
1125  POKE S,0:S = S + 1: POKE S,
     0:S = S + 1
1130  PRINT "FINISHED IT!"
1135  PRINT "PRESS ANY KEY WHEN R
     EADY": POKE  - 16368,0: WAIT
      - 16384,128: POKE  - 16368,
     0
1140  REM  MUST MAKE CHANGES IN P
     AGE ONE BEFORE IT CAN BE RUN

1145 A1 =  PEEK (103):A2 =  PEEK
     (104):A3 =  PEEK (105):A4 =
      PEEK (106)
1146 A5 =  PEEK (175):A6 =  PEEK
     (176)
1148 ST = ST + 1
1150 R2 =  INT (ST / 256):R1 = ST
     - R2 * 256
1155 R4 =  INT (S / 256):R3 = S -
     R4 * 256
1156  IF DO THEN  INPUT "WHAT NAM
     E SHALL I SAVE IT UNDER";NA$

1157  HOME : PRINT : PRINT
1160  PRINT " TYPE OVER THE FOLLO
     WING": PRINT " POKE103,";R1;
     ":POKE104,";R2;":POKE105,";R
     3;":POKE106,";R4
1162  PRINT
1163  IF DO THEN  PRINT " POKE175
     ,";R3;":POKE176,";R4: PRINT
     : PRINT " SAVE";NA$: GOTO 11
     70
1165  PRINT " POKE175,";R3;":POKE
     176,";R4: PRINT : PRINT " SA
     VE"
1170  PRINT "TYPE OVER THE FOLLOW
     ING": PRINT " POKE103,";A1;"
     :POKE104,";A2;":POKE105,";A3
     ;":POKE106,";A4: PRINT
1172  PRINT " POKE175,";A5;":POKE
     176,";A6: VTAB 3: END
1999  END
2000  REM  LITERAL PRINT
2010  POKE S,34
2020 P = P + 1:Z =  PEEK (P):S =
     S + 1
2030  IF Z <  > 41 THEN 2050
2040  POKE S,34:P = P + 1:S = S +
     1: GOTO 150
2050  POKE S,Z - 128: GOTO 2020
2200  REM  A REM
2210  POKE S,T(Z):P = P + 1:S = S
      + 1
2220 Z =  PEEK (P): IF Z = 1 AND
     P = EL THEN 1100
2230  POKE S,Z - 128:S = S + 1:P =
     P + 1: GOTO 2220
2300  REM  RND
2310  POKE S,211:S = S + 1: REM
     INT
2315  POKE S,40:S = S + 1: REM  (

2320  POKE S,219:S = S + 1: REM
     RND
2325  POKE S,40:S = S + 1: REM  (

2330  POKE S,49:S = S + 1: REM  1

2335  POKE S,41:S = S + 1: REM  )

2340  POKE S,202:S = S + 1: REM
     *
2345  POKE S,40:S = S + 1: REM  (

2350 P = P + 2:VA = 0
2355 Z =  PEEK (P)
2356  IF Z = 114 THEN  POKE S,41:
     S = S + 1:VA = 0: GOTO 150: REM
      WITHOUT UPDATING P
2360  IF Z < 128 THEN  POKE S,T(Z
     ):S = S + 1:P = P + 1:VA = 0
     : GOTO 2355: REM  OPERATOR
2365  IF VA = 1 THEN  POKE S,Z -
     128:S = S + 1:P = P + 1:VA =
     1: GOTO 2355: REM  STILL A V
     ARIABLE
2370  IF Z < 176 OR Z > 185 THEN
      POKE S,Z - 128:S = S + 1:P =
     P + 1:VA = 1: GOTO 2355: REM
      START OF VARIABLE
2375  REM  NEXT TWO BYTES ARE NUM
     BER
2380 P = P + 1:N =  PEEK (P) + 25
     6 *  PEEK (P + 1)
2385 A$ =  STR$ (N)
2387 P = P + 2
2390  FOR T = 1 TO  LEN (A$)
2392  POKE S, ASC ( MID$ (A$,T,1)
     ):S = S + 1
2394  NEXT T: GOTO 2355
5000  REM
5100  DIM T(130): REM  T( ) HOLD
     STHE TRANSFER VALUES FOR KEY
      WORDS
5110  DATA 163,0,201,58,182,183,1
     87,172,172,133,44,191,189,-1
     44,44,-145,163,164
5115  REM  LOMEM:
5120  DATA 200,201,202,203,208,20
     7.209,207.208,207,209.208,20
     7.209,209
5125  REM  <
5130  DATA 205,206,-146,204,200,4
     0,44,196,196,59,59,54,54,40,
     33,33,40,226,219,210
5135  REM  SGN
5140  DATA 212,216,-1,40,200,201,
     198,40,208,209.207,227.04,23
     0.04,215
5145  REM  SCRN(
5150  DATA 44,40,36,36,40,44,44,5
     9,59,59,44,44,44,137,136,140
     ,134,134
5155  REM  DIM
```

CONVERSION

```
5160  DATA 150,128,132,132,132,12
      9,208,193,199,130,44,177,176
      ,178,170
5165  REM  LET
5170  DATA 171,173,186,186,186,18
      5,44,160,141,44,142,44,197,1
      43,44,197
5175  REM  AT
5180  DATA 162,208,208,41,41,188,
      44,188,161,-147,-147,156,-14
      8,-148,155,138,139
5190  REM  IN&
5200  FOR T = 0 TO 127: READ T(T)
      : NEXT
5300  TEXT : HOME
5310  PRINT "DO YOU WANT INFO ON
      THE PROGRAM?": GET A$: IF A$
       <  > "Y" THEN 5500
5320  HOME : PRINT "THIS PROGRAM
      CONVERTS INTEGER BASIC
                                P
      ROGRAMS INTO APPLESOFT PROGR
      AMS.": PRINT
5330  PRINT "THE CONVERTER PROGRA
      M IS FROM $800 TO
                        $2600 AN
      D WILL LOAD THE INTEGER PROG
      RAM.": PRINT
5360  PRINT : PRINT "PRESS A KEY"
      : GET A$
5400  HOME : PRINT "WHEN I ENCOUN
      TER A WORD WHICH HAS NO    C
      OUNTERPART IN APPLESOFT I US
      E THE      FOLLOWING CODE TO
       IDENTIFY WHAT THE     STATE
      MENT SHOULD HAVE BEEN."
5410  PRINT : PRINT "AUTO  -  HGR
      2": PRINT "MAN  -  HGR": PRINT
      "MOD  -  HCOLOR=": PRINT "NO
      DSP  -  HPLOT": PRINT "DSP
      -  DRAW"
5415  PRINT : PRINT "AND THE LINE
       NUMBER WILL BE DISPLAYED IN

      INVERSE TEXT": PRINT : PRINT
      "IF I ENCOUNTER A LINE THAT
      I THINK YOU  SHOULD HAVE A L
      OOK AT, I WILL PRINT IT  IN
      NORMAL TEXT."
5417  PRINT : PRINT "SO RECORD AL
      L LINE NUMBERS THAT ARE
      PRINTED WHILE THE PROGRAM IS
       RUNNING."
5420  VTAB 22: GET A$
5430  HOME : PRINT "     WHEN I H
      AVE FINISHED CONVERTING THE
                                P
      ROGRAM I WILL ASK YOU TO TYP
      E OVER A
                COUPLE LINES HITT
      ING RETURN AFTER EACH
                                LINE.
      "
5440  PRINT "
                THIS IS TO SET
      THE POINTERS TO SAVE
                                THE NEW
      APPLESOFT PROGRAM."
5450  PRINT "
                DON'T TRY RUNNI
      NG IT AT THIS STAGE."
5460  PRINT "
                ONCE SAVED, TYP
      E OVER SOME MORE
                                LINES.TH
      ESE RESTORE THE CONVERTER

          PROGRAM."
5480  PRINT "PRESS ANY KEY": GET
      A$
5500  REM
5510  HOME : PRINT "INTEGER TO AP
      PLESOFT CONVERTER": PRINT : PRINT
      : PRINT
5512  PRINT "        VERSION 1.6"
      : PRINT : PRINT
5515  PRINT "         BY G.WATSON"
5516  PRINT : PRINT : INPUT "ARE
      YOU USING DOS ";A$: IF  LEFT$
      (A$,1) = "Y" THEN 6000
5517  VTAB 10: PRINT "PREPARE INT
      EGER PROGRAM THEN HIT RETURN
      ": WAIT  - 16384,128: POKE  -
      16368,0
5518  PRINT "LOADING INTEGER PROG
      RAM"
5520 K1 =  PEEK (0):K2 =  PEEK (1
      ): POKE 60,0: POKE 61,0: POKE
      62,1: POKE 63,0: CALL  - 259
5522 L =  PEEK (0) + 256 *  PEEK
      (1)
5524 S1 = S2 - L + 1: POKE 0,K1: POKE
      1,K2
5526 K2 =  INT (S1 / 256):K1 = S1
       - K2 * 256: POKE 60,K1: POKE
      61,K2
5528 K2 =  INT (S2 / 256):K1 = S2
       - K2 * 256: POKE 62,K1: POKE
      63,K2
5530  CALL  - 259
5535  HOME : PRINT "CONVERTING IN
      TEGER PROGRAM TO APPLESOFT
            '                   N
      OW."
5540 P = S1
5550 ST = S1 - 1000: POKE ST,0:S =
      ST + 1
5600  GOTO 100
6000  REM
6011  PRINT : PRINT
6111  INPUT "IS THE INTEGER PROGR
      AM IN RAM?";A$: IF  LEFT$ (A
      $,1) <  > "Y" THEN  PRINT "P
      LEASE LOAD INTEGER PROGRAM,
      NOTING THE LOCATION OF THE F
      IRST BYTE.": END
6112  INPUT "WHERE IS THE FIRST B
      YTE OF THE INTEGER  PROGRAM
      (LOCATION NOT VALUE)";S1
6122 DO = 1
6999  GOTO 5535
```

]

Into machine code without too much maths

THERE must be many Apple users who have learnt Basic, are now very familiar with it, who find it a little slow for some purposes and are aware that there is a machine code language behind Basic which might solve their problems.

Unfortunately, after reading the Apple Reference Manual to find out how to enter the monitor, you are lost. You either see a lot of unintelligible numbers or you see a list of three letter codes which clearly mean something to somebody but not to you.

Now there are a number of books on the market with titles like "Programming the 6502" or "6502 Software" which are clearly aimed at your problem but are rather general in nature. It is with some relief then, that you find a book entitled "Apple Machine Language."

If you are in this position then I can recommend this book. The authors, Don and Kurt Inman, assume that you have an Apple II with Basic in Rom and are familiar with the Basic language.

They wrote the book using a card giving them the ability to switch between Integer and Applesoft Basic, which meant they had access to the mini-assembler. However, if you have only Applesoft don't worry. The technique used in the book to introduce you to machine language does not demand the use of the mini-assembler and you can of course buy assemblers. You may even be able to acquire a relocated mini-assembler.

The authors gradually introduce you to most of the op-codes of the 6502, to the use of the mnemonics and to the general 'philosophy' of machine code programming. Right from the beginning they sensibly make use of subroutines available in the monitor rather than duplicate any effort.

Thus you are soon plotting simple graphics and making sounds (sometimes together). Incredibly, it is not until you are towards the end of the book that arithmetic operations appear.

The technique which the authors use to accomplish the bridge between Basic and machine code programming centres around a Basic Operating System which they develop in the second chapter. The idea is good, the program allows easy entering of the machine code program and is adaptable so that the machine code program can be played with, explored, and altered in order to gain maximum knowledge and delight from it.

Unfortunately it is around this Basic Operating System that nearly all the niggling little errors of the book occur. Some of them are typesetting errors, such as a 1 in place of an I. The program works but isn't displaying data correctly. You soon realise the error and remedy the fault.

Others appear to be errors of logic. An occasional GOTO sends the program into the middle of a FOR:NEXT loop with the inevitable error message resulting. Again, you soon realise what's wrong and remedy it.

I should emphasise that these are very minor complaints. A much more serious fault would be errors in the machine code programs themselves as these are much more difficult to find for the beginner.

Mercifully all the programs except one seem absolutely free of error. The exception – the first of chapter 7 – has a gap in the list of memory locations. Now, if you study the program before entering it into memory you realise this. You change the beginning of the program to accommodate the 'missing' two bytes and everything works well.

However if you enter the program into memory via the Basic Operating System without first studying it, it works but plots wrongly. You suspected something was wrong because there were two bytes too many to fill, so even this error is instructive.

My only other complaint with the book centres around the use of the Apple monitor's subroutines. Their use is very sensible indeed, so sensible that I would have liked to have seen more of them located and their addresses and functions tabulated at least, even if examples demonstrating their uses could not be made. I would recommend the interested reader to find a copy of the article by John Crossley in the March/April 1980 issue of Apple Orchard; perhaps Windfall could reprint this article some time.

Overall, then, I would recommend the book to any Apple user who wants to learn machine code programming. The book will not be so useful to anybody practised in machine code who wants to gain experience of the Apple; the little you would learn of the Apple's monitor would not justify the outlay on the book. **MP**

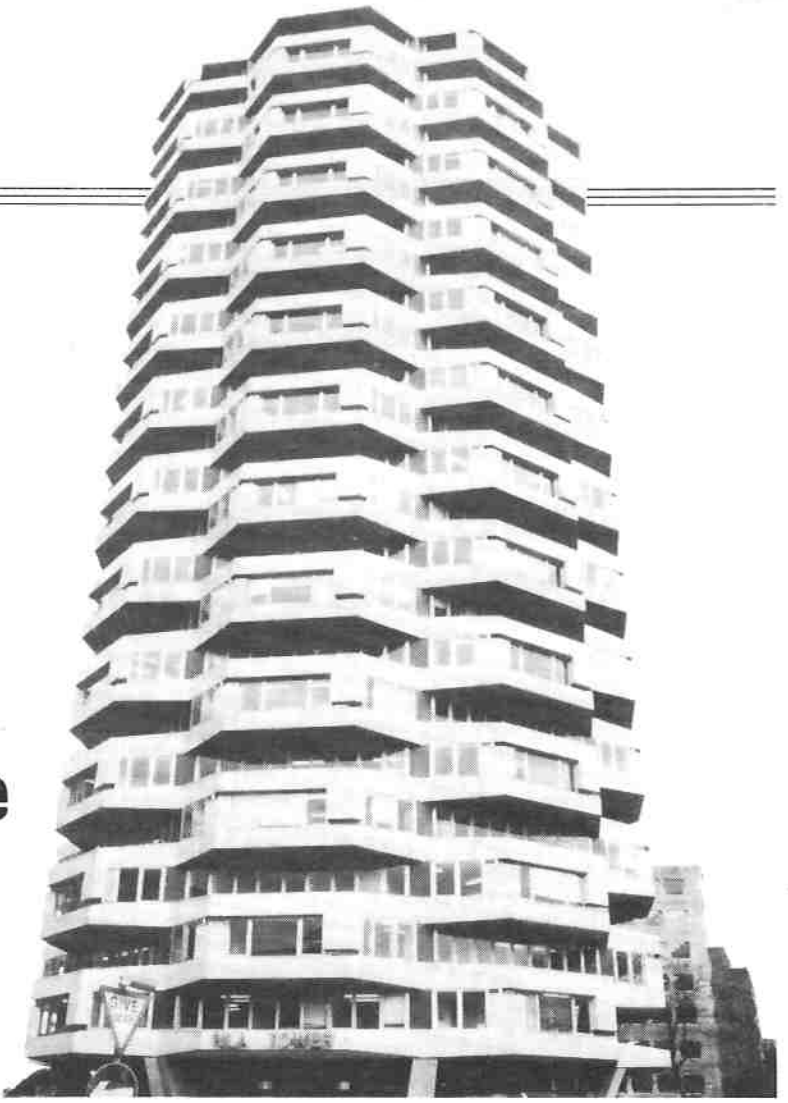
● **Apple Machine Language.** Don Inman and Kurt Inman. *Reston Publishing Company Inc. $9.95 or £9.05 (paperback).*

Appletips

THE following is a short procedure for converting a real number into a string containing the same number resolved to two decimal places.

```
1 REM POUNDS AND PENCE ROUTINE
2 REM
PLACE THE NUMBER THAT YOU WANT
TO PRINT IN POUNDS AND PENCE
FORM IN FV. THEN GOSUB 4100
AND PRINT FV$ WHICH WILL
CONTAIN THE NUMBER WITH TWO
DECIMAL FIGURES.
10 REM SAMPLE MAIN PROGRAM
15 HOME
20 PRINT "GIVE ME A NUMBER" : INPUT X
30 FV = X: GOSUB 4100
40 PRINTB "CONVERTED FORM = " : HTAB 35 - LEN (FV$): PRINT FV$
50 GOTO 20
4100 REM
```

AS part of the Windfall policy to reflect the interests of all Apple users each month we shall have a profile on people or companies who are heavily involved with the Apple. We intend to show how they have incorporated Apples into their working environment, how they have adapted themselves and their staff to its operation, and their current impressions on its use, value and future potential.



Apples rate high in the Wedding Cake

By DAVID CHADWICK

APART from the vague impression most people have that Hill Samuel have something to do with insurance and merchant banking my first acquaintance with the group, and with the fact that they are Apple users, was when I was invited to enjoy their hospitality at a business exhibition in Manchester.

It wasn't the generous portions of whisky they hand out that prevented me from connecting up their Apple to a Telefusion set they had borrowed for the show, and I wasn't the only Apple 'expert' there who retired defeated. A mute Apple didn't seem to harm their activities, however, and the stand turned out to be a comfortable haven during the quieter periods of the show.

Our second get-together turned out to be just as hospitable. It happened at the Royal Windsor Show. Anyone who went there this year will remember the sodden, muddy wastelands between the marquees and the sudden blinding rainstorms. For me the only bright spots were the tackle dealers who sell those funny green wellingtons and my meeting with the chairman of Hill Samuel Life Assurance Ltd, John Marshall, who kindly invited me down to Croydon to talk to the growing band of Apple enthusiasts there.

The company is part of the giant Hill Samuel Group, whose origins go back to a UK-Asia import exchange company formed in 1830. The original company's operations as a merchant bank prospered and developed with the acquisition of other banks until in 1965 Hill Samuel & Co Ltd became one of the largest merchant banks in Europe.

Shortly afterwards the group took over Lambert Brothers Ltd, who dealt in international insurance and shipping, and the Noble Lowndes Group. Last year the group's consolidated balance sheet stood at £1,547 million.

Hill Samuel Life was actually formed in 1960 as Noble Lowndes Annuities Ltd. It started off selling only single premium annuities, but as a result of growth being faster than forecast it diversified into ordinary life assurance and unit trusts.

The company became part of the Hill Samuel Group in 1969 and acquired its present name in 1972. It is now part of Hill Samuel Life and Investment Management, one of the main divisions of the Hill Samuel group.

The Wedding Cake in Croydon is, for those unfamiliar with London's southern skyline, the company's head office. Its real name is NLA (Noble Lowndes Annuities) House, and it has a staff of 300.

The unit-linked and traditional life assurance and annuity policies, as well as pension and investment plans, are marketed through brokers and a direct sales force from eight regional and area offices and 20 direct sales offices located in all parts of the country. About 500 self-employed 'associates' are controlled from these offices. Not all have their own Apple yet, but I hope someone is working on that.

The company's marketing director, Paddie Ross, gave me a brief outline of how the company's Apples were being used as we sat in his 17th floor office with a superb view over the surrounding countryside. They are employed in three main areas – administration, actuarial and sales.

The first Apple was bought in March 1979 from Wego Computers and was used on the company's stand at that year's Ideal Home exhibition. A program was written to provide simple quotations, illustrated by graphs.

Although at that stage the company was impressed by the Apple's capabilities it was felt that it would be of more use in the head office than at exhibitions. It certainly attracted people to the stand, but not the sort who could be persuaded to buy insurance.

Five of the eight regional offices now have Apples working on quotations, and the direct selling office will also take on its first Apple shortly.

Paddie Ross stressed that what delighted him most about the Apple were its ease of use, with a salesman being able to prepare his own quotations in a fraction of the time it would normally take, and the attitude of his staff, who have really taken to them.

Virtually all the software has been written by Hill Samuel staff themselves – some of them absolute beginners – and everyone has been encouraged to become

→

Paddie Ross, delighted by the Apple's ease of use

involved. Some have even been taking Apples home with them. But that, I know, is not an unusual phenomenon!

One of the Apples is used in the administration department, which is run by director Ron Sibthorpe. He was actually chairman of the minicomputer (sic) steering committee which was formed to provide some form of small computing power to back up the IBM 4331 and the ageing Wang machines. The committee looked at three microcomputers, the Apple, Pet and Tandy.

Three departments had three different requirements. Admin, with a need for purely low level calculations and letter production, wanted the cheapest computer and were inclined towards the Pet. The actuarial department felt that mathematical ability put the Pet in third place and the Tandy first, but that there was very little in it. Marketing, however, wanted the Apple for its high level graphics presentation, and being the only department with a marked preference carried the vote to go for the Apple.

Although they have all turned out to be very pleased with their decision there were several minor problems on installation. Phil Bevan and Peter Morriss explained that one of the Apples used in the acturial department to do Gilt edged analysis created complicated maths models which required an accuracy of six places of decimals. This problem was initially overcome by working the model in integer arithmetic and reconverting to Applesoft after the calculations had been performned to give true numerical totals.

This Apple is used for investment research, measuring investment performances on Gilt edged funds and comparing investments against liabilities. A model portfolio has been constructed showing how these two factors could affect profits over the next 80 years. The numerical forecasts are extracted from the IBM 4331, with mortality rates from standard Institute of Actuaries tables.

This work was previously done on a couple of 1972 cassette based Wangs, providing about quarter the performance of the Apple.

Another Apple is used on new business research. It uses a financial modelling package which was developed by Hill Samuel for their Wangs and converted across to the Apple. Visicalc was looked at, but it was found to lack some necessary features. A new project, or plan, is built up and extended over a lifetime, and estimates given of possible profits and losses.

This was developed to become a standard programme, and is used to provide the quotations which you would be given were you to use Hill Samuel's services. Both operations are basically similar, where the facility to vary policy rates, tax rates and other factors affecting performance change fairly regularly. Every time a rate change is made a replacement disc is sent to the regional offices.

> *'Virtually all the software has been written by Hill Samuel staff themselves – some of them absolute beginners'*

The Apples are linked to NEC Spinwriters producing finished quotations on preprinted policy statements. The Spinwriters were chosen for their ability to produce graphs, handle slightly wider stationery than normal, and their four directions feed mechanism.

The third Apple in the actuarial department is used in the valuation section, producing monthly statistics on new business, and for regrouping data produced on the IBM. In addition there are now about 12 people writing software in this department, none of them professional analysts or programmers.

The administration department has 20 people who use the Apple. All of them are capable of writing programs in Basic, with four or five extremely proficient. Among them is Bill Quigley, who demonstrated one of the uses they have for the Apple which I found particularly impressive.

When a new plan is devised and marketed it takes a considerable amount of time to modify the software on the IBM to incorporate the accounting routines for the new business. A temporary program is written on the Apple which handles quotes, payments and initial customer records. These are accumulated, and when the IBM program is ready they are transferred to the mainframe. The only reason they don't keep it all on the Apple is the volume of business which can build up.

Another nice little programme they have developed is an anniversary package which they send to customers using their executive retirement plans. This produces a substantial document, reminding the customer of his contribution levels. It then proceeds to give a revised projection of his future income, where the previous year's figures become actuals. It also details savings which could be made if maximum contributions were made, and what could be achieved with an increased contribution. A page of notes explains how the calculations were made and a covering letter is typed for the trustees of the scheme.

Right at the bottom of the Wedding Cake is the Croydon regional office. Here I met John Prior, another of those who have produced some very useful programs since getting hold of an Apple. Within two months of his first sight of a microcomputer John has written a program to produce acknowledgement letters for new Hill Samuel customers. This has now been developed into a suite of programs producing letters for any type of policy, with a large number of varying factors. John has also developed other programs to provide weekly new business reports and other necessary documents.

The overall impression I came away with was one of the tremendous enthusiasm for the Apple. The staff were encouraged to use them, and to become involved in the development of new applications. The ease of writing simple but useful programs was invaluable for this, with the help of the basic Apple manuals, which were highly rated.

The market for MicroModeller

IN the short time since MicroModeller was released – February, 1981 – it has undoubtedly caused a considerable stir, been eagerly acquired by large numbers of businesses and has been the justification to buy a micro that they were waiting for. It has also led some of the more conservative members of the industry to question its style, its method of distribution and its price.

None of this comes as a surprise to those of us at Intelligence (UK) who have been involved in the exciting and at times very exhausting business responsible for MicroModeller.

The review of MicroModeller in the last issue of Windfall highlighted many of the issues which have caused a certain amount of confusion. The following might help.

The principals and staff of Intelligence (UK) all have experience in the computer service bureau industry – a grand total of 40 man years. The formation of the company, and the introduction of MicroModeller, were the result of a careful analysis of the trends within the micro industry and a commitment to accelerate those trends.

By 1980 the first phase of the micro boom, during which time the innovative technology found serious acceptance as a business tool from its initial use as a hobbyist device, was over. Meanwhile the computer bureau industry, having flourished throughout the 1970s, was at a critical point – faced with declining profits and crippling attrition as major users adopted local processing solutions.

By mid 1980 we felt the moment was right to enter the micro industry in order to respond to, and at the same time force the pace of a polarisation which was taking place. Expressed in its crudest terms the polarisation is between low cost, limited capability, unsupported programs (Visicalc, DeskTop Plan) and higher cost, more powerful "heavyweight" programs.

Somewhere between the desire of the manufacturers to give away software simply to help sell more machines, and the software houses' wish to give away micros with high cost software, is a slot for a powerful program, low enough in price for volume sales, supported by a hot line, training and consultancy and sold by professionals who understand the business problems the software is intended to solve.

This explains the market for MicroModeller. A market which we believe to be the largest growth area in the future.

Your reviewer is correct in his suggestion that MicroModeller is of greatest interest to people who wish to develop quite complex models, for whom clear presentation of data to others is of major importance, and users who want to have the same range of facilities as time-sharing at a fraction of the cost and with far greater independence.

To suggest that a system which provides all these facilities is poor value compared with Visicalc is to miss the point. For people who need these facilities, a product which doesn't provide them isn't value, however low the price.

What MicroModeller has demonstrated is that there are large numbers of people who do require precisely those facilities. These are the people who are being converted to the micro for the first time and who will be instrumental in making micros a vital component in the corporate office.

To cater for the needs of this market a number of highly professional micro outlets are emerging which do not fall into the normal classification of "dealers." They are professional business problem solvers for whom the micro is a tool to do a job and will continue to be until a better one comes along.

The future will see increasing numbers of such operations and a separation occurring from the "bucket shop" style which has characterised the dealer world in the past.

Just a hint of future Intelligence (UK) plans. There will be a number of specialist franchise outlets built around the program to reinforce the success of those dealers who have taken the time to explore the program, understand the correct method to sell it, and achieve very high sales as a result.

Mike Healey
Intelligence UK Ltd.

Appletips

Pretty up your programs with this routine from David Straker of Bite Microcomputing:

```
10 REM
*** CLARIFYING SPACES ***
20 REM STATEMENT ...
30 REM STATEMENT ...
40 REM STATEMENT ...
50 REM STATEMENT ...
60 REM
*** BETWEEN ROUTINES ***
70 REM STATEMENT ...
80 REM STATEMENT ...
90 REM STATEMENT ...
100 REM
*** CAN BE YOURS BY USIN
    G ***
110 REM STATEMENT ...
120 REM STATEMENT ...
130 REM STATEMENT ...
140 REM STATEMENT ...
150 REM
*** LINE FEED (CTRL-J) *
    **
160 REM STATEMENT ...
170 REM STATEMENT ...
180 REM STATEMENT ...
190 REM STATEMENT ...
200 REM
*** IN REM-ARKS ***
210 REM STATEMENT ...
220 REM STATEMENT ...
```

And here are two more useful tips for Apple users from David. Enter

```
POKE 214,128
```

in your program and anyone trying to LIST it will cause it to RUN instead.

Finally a small routine – a variable pitch crosshatch generator, which will allow you to check out your monitor.

```
5 REM
*** CROSS-HATCH ***
10 HGR
15 HOME : HTAB 1: VTAB 24
20 HCOLOR= 3
25 INPUT "STEP VALUE? "; J
30 FOR I = 0 TO 191 STEP J
40 HPLOT 0,I TO 279,I
50 NEXT
60 FOR I = 0 TO 279 STEP J
70 HPLOT I,0 TO I,191
75 HPLOT 279,0 TO 279,191 TO 0,1
   91
80 NEXT
90 POKE – 16302,0
100 GET A$: TEXT
```

The value of a computer to you is only as much as the programs that go with it, because you're buying equipment to solve your problems now – not when you've found the time to become a computer expert, as well as controlling your business.

When you look at our list, you'll find out

Whatever you do do it better with Apple

why 250,000 other people have gone for Apple. Not only is the Apple a thoroughly versatile piece of equipment, growing with you as you need it, but your Apple will be ready to help right from the moment it is installed. Why? Because there are so many readily available proven programs developed specifically for the requirements of many different sections of industry and commerce, scientists and the professions.

So, if you can tick any one of these boxes from the list as an area where you have responsibility, then an Apple computer could help your business be more competitive and help you be more efficient.

What's more, it won't cost as much as you think. Most of the programs will run on an Apple system costing £1700-£2500 – little more than the cost of a photocopier. And if you've got more time, but not that much money, you can start to learn computing with Apple for as little as £800!

Every Apple comes with a One-Year-Warranty as standard, and there's the option of renewing this with Apple's Extended Warranty Plan. Any Apple Dealer will be pleased to give you details, and to show you how an Apple can help solve your problems. There are over 400 Apple Dealers nationwide, so help is never far away.

Now check the list and if you need more details, complete and return the coupon. That first decision could be all that stands between you and a brighter and more successful future.

☐ **Accountancy**
Sales analysis and accounting package which also handles money collection and delivery input. Produces VAT output and Tax and VAT returns.

☐ **Administration**
A database system which can be used to maintain and up-date information on any type of records – personnel, stock, clients, customers, patients, bookings or property.

☐ **Agriculture and Farming**
A financial package for purchase, sales and general ledger plus special programs for Dairy, Arable and Pig farming as well as farm budgeting and cash-flow.

☐ **Antique Dealing**
Prepare accounts for those businesses paying VAT on the difference between purchase and sale price. Stock analysis and search also available.

☐ **Architecture**
Drawing record system records the receipt and issue of drawings from contractors and subcontractors.

☐ **Asset Planning**
Standard fixed planning requirements as well as a range of options including multiple depreciation methods and current-cost accounting.

☐ **Auctioneering**
Covers the main functions of an auction from registration of lots and producing a catalogue through to sale day billing and sellers' accounts.

☐ **Beam Analysis**
Analyse a beam with any loading configuration and display the load, shear force, bending moment and deflection diagrams.

☐ **Bibliographies**
A suite of programs allowing the storage of titles, subjects, authors and dates and the association of keywords with each article for retrieval.

☐ **Building**
Job costing and VAT coding for construction companies. Handles retention certificates for sub-contractors and allows for stage payments based on valuation certificates.

☐ **Cash-Flow Planning**
A general purpose discounted cash-flow program for assessment of capital projects. In use by local authority.

☐ **Construction**
From man hours and disbursements generated against a particular job display work-in-progress figures, (total and against each job) job record sheets etc.

☐ **Contract Costing**
Provides display or hard-copy of current months's material, labour and transport costs together with brought-forward costings since start of contract.

☐ **Credit Control**
Stores details on up to 1000 customers per month so that under or over payment, or requests for supplies while accounts are unpaid can be monitored.

☐ **Critical Path Analysis**
Designed by network engineers for project management to use CPA on any number of projects to control and monitor progress.

☐ **Data Communications**
Convert Apple into a time-sharing terminal. Can be used to replace any teletype compatible terminal operating at 10 or 30 cps.

☐ **Dental Practice**
A system to monitor the administration of dental practices with up to 4 operators and 4000 active patients.

☐ **Design and Graphics**
With the Apple Graphics tablet you can enter pictorial information on Apple directly by sketching from maps and graphs, architectural drawings and other materials.

☐ **Direct Mail**
Stores names, addresses and telephone number on file indexed in various ways for total or selective output onto address labels.

☐ **Doctor's Administration**
Holds up to 20,000 patient's records retrievable by name or NHS number.

☐ **Draughting**
With the use of a stylus and graphics tablet, sketch drawings can be turned into accurate scale drawings and produced on a quality graph plotter.

☐ **Earthworks**
Calculate the cross-sectional area of intersecting ground profiles at given distances. Calculate cut-and-fill volumes.

☐ **Education**
Apple Pilot helps teachers develop their own individually-tailored lessons which can be conducted by the Apple.

☐ **Engineering**
Analyse stress on plane frames consisting of complicated frameworks with repetitive yield and member loads.

☐ **Estate Agency**
Estate agents can quickly match property with prospective buyers or vice versa.

☐ **Financial Planning**
VisiCalc and Micromodeller are essential financial planning tools in use throughout business to examine the implications of future financial policy.

☐ **Frame Analysis**
Analyse any pin-jointed three-dimensional structure. The shape is displayed and can be printed together with forces and displacements.

☐ **Hire Purchase Management**
Handle all aspects of hire purchase agreements and calculations. Statements and audit trials can be printed out.

☐ **Hotel Booking**
Accounts, billing and booking system for small and medium-size hotels with up to 35 bedrooms.

☐ **Hotel Management**
Supports all booking functions over a 400-day period together with non-guest incomes and full analysis of cash-chargeable items.

☐ **Housing Administration**
Rental accounting system designed for professional agents collecting money from tenants on behalf of landlords.

☐ **Indexing**
Sort, amend and index any data base. Facilities for cross-indexing and selective retrieval of specific items.

☐ **Insurance Broking**
A complete system for insurance broker's accounts with analysis and management statistics. Handles 13,500 policies.

☐ **Investment**
Enables the user to record details of share portfolios with pricing to calculate gains and losses.

☐ **Invoicing**
A complete invoicing system with flexibility to take account of varying delivery addresses if necessary. Summaries may be recorded for analysis.

☐ **Job Costing**
Fee and job costing for small to medium-size consultancies. Gives up-to-date information on project or client costs and the financial position of the practice.

☐ **Kitchen Design**
From a kitchen plan, show the units in elevation and in detail and print a listing with costs for different units.

☐ **Legal Fees**
Programs for both solicitors' and barristers' accounting systems are offered.

☐ **Management Information**
A data storage, update and retrieval system designed for the Apple to give managers the information they need – quickly.

☐ **Mathematics**
A series of mathematical tools that give fast answers to a number of common numerical problems.

☐ **Noise Levels**
Data entry for Noise Abatement Zones in the format recommended by the Building Research Establishment.

☐ **Payroll**
All wages, tax, NI and pension details can be calculated and detailed pay slips and summaries printed.

☐ **Personnel**
Maintain an index of personnel/job records which can be expanded, updated and printed in various forms.

☐ **Petty Cash**
Produce accurate day books and VAT analysis for companies even with high levels of petty cash transactions.

☐ **Pharmacy**
Produce chemists labels with details of drug name, dosage details, patient's name and date.

☐ **Pipe Sizing**
Calculate pressure drops in pipe work or find the nearest standard size pipe for a pre-determined pressure drop.

☐ **Prestel**
With the Applelet package, you can access your Apple Computer direct to Prestel.

☐ **Production Planning**
Produce production plans with re-scheduled alternatives based on changing variables.

☐ **Property Management**
A complete system for automatic management of client's accounts from the receipt of rents.

☐ **Purchase ledger**
Open item purchase ledger program to support 1000 transactions and 500 suppliers. Reports of creditors, turnover and VAT can be printed.

☐ **Quantity Surveying**
Calculate all professional fees, forecast increased costs and valuations with an inflation factor.

☐ **Retail Management**
Your Apple can be converted into a multi-total cash till with variable or pre-set prices. Can be linked to stock records.

☐ **Road Haulage**
Facilitate the automatic calculation and printing out of invoices using the Road Haulage Association rate tables. Can be integrated with Sales Ledger.

☐ **Sales Accountancy**
Ledger systems with statements, debtors' reports, turnover and VAT reports. Sales invoicing can be linked.

☐ **Sales Prospecting**
Store suitable prospective customer details and schedule visits by salesman. Mailing list label printing is integrated.

☐ **School Administration**
Assists school staff by maintaining up-to-date and readily accessible basic information on their pupils with cross-referencing and sorting facilities.

☐ **Scientific Analysis**
Collects data from scientific instruments including spectrometers and gas chromatographs.

☐ **Space Frame Analysis**
Analyse any pin-jointed three-dimensional structure with output of the forces and displacements. The structural shape can be displayed and printed.

☐ **Statistics**
Determine means, variants and standard deviation, calculate linear regression.

☐ **Stockbroking**
Prepare contract notes for the buying and selling of stocks and shares. Calculate and print consideration, commission, VAT, contract stamp, CSI Levy and stamp duty.

☐ **Stock Control**
Fast and easy search facilities for stock levels of many different items, even when supplied by many different manufacturers.

☐ **Stress and Structural Analysis**
Perform stress analysis of reinforced concrete sections and foundations under the action of direct loads and bi-axial bending moments.

☐ **TV Rentals**
Store comprehensive client details and use monthly rental, depreciation period, initial deposit and commencement date to print reports.

☐ **Time Analysis and Work Study**
Record job numbers and perform job and time analysis, with cost analysis.

☐ **VAT**
Maintain records of all invoices and payments and calculate all figures for VAT returns.

☐ **Valuations**
Deal with leasehold and freehold valuations with summaries of data based on various standard methods.

☐ **Vehicle Fleets**
Store basic details of each company vehicle together with service records and reminders.

☐ **Word Processing**
Create, edit, sort, amend and finally print letters and reports, including charts and graphs.

This is only a small selection from the vast Apple library of ready written programs.

Imagine what you can do with an apple computer

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☐ Specific Specialist Applications

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Type of Business _____

COURSES

■ Systematics International are running a series of courses entitled "Basics of Microcomputing" aimed at executives who are considering the first time use of microcomputers in their businesses. This single day course assumes little or no knowledge of computers. It will cover all aspects concerning the relevance and profitability for companies who wish to install their own system. Two courses have been planned for August 13 and September 10, to be held at Systematics International's training centre at Haverhill in Suffolk. Cost is £55 each.

■ Two five day training courses in Pascal are also being run by Systematics International from September 14 to 28 and November 16 to 20. They will be informal and in tutorial format and given by John Hutchinson of 21st Computer Systems. He is a computer science graduate of London University and has specialised in the development of Pascal for teaching systems. Location is the same as for the course above, and residential accommodation is also available at a nearby inn. Cost is £300 (non-residential) and £399 (residential.)

Contact: Britt-Marie Young, 0440 61121.

■ The University of Manchester Research Consultancy Service have been running very successful training courses for the businessman for the last two years. They cover two main topics, microcomputer programming – with the emphasis on the Apple computer – and microcomputer applications in a small business. The latter courses are generally held at weekends, and the programming courses during the week.

"Learn Basic, Practical Basic" will next be held from August 2 to 7. Its aim is to teach people to write well structured programs in Basic. The teaching is as practical as possible, with one computer per two pupils. Cost is £125, including full board accommodation and tuition.

"Microcomputer Applications in a Small Business" shows students how computers are used in a small business, with the emphasis on practical use of typical Apple ledger programs, Visicalc and payrolls. The course is intended for managers of small companies who are intent on evaluating computers for their own use. No prior knowledge is assumed. Fees are £83 (residential) and £75 (non-residential), inclusive of tuition and meals. The next will be held from October 2 to 4.

Contact: David Jackson, UMRCS, 061-273 3333, Ext. 3206/3219.

■ Vosper Thornycroft at Cosham in Portsmouth are using the expertise they have developed in teaching their own staff how to use microcomputers in marine engineering by running courses on 'How to drive a micro' for the general public. They are holding five-day courses at Cosham for managers, technicians and technologists who already have some knowledge of microcomputers but need to know about them in greater depth. They also hold three day appreciation courses, and two week courses where the aim is to teach the design of microprocessor based systems.

All are practical in approach and not intended for those seeking qualifications. Instruction is given by people involved in applying microprocessors in an industrial setting and are not oriented towards any particular maker's components.

Contact: Vosper Thornycroft (UK) Ltd., Cow Lane, Cosham, Portsmouth, PO6 3TR (tel: 0705 373511.)

Organisers of courses devoted to the Apple computer or related topics are asked to send details to Windfall for publication in forthcoming issues.

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ACT

User group round-up

WE ARE very pleased to see the successful launch of Windfall in a professional and pleasing format, because it was at one of the first meetings of this group that the idea to produce the magazine was first hatched. We naturally still have strong links with Windfall, although it was felt at the time that to produce a professional magazine was beyond the ability of any user group, no matter how enthusiastic the members.

The group is now well established, holding meetings on the last Thursday of each month in the Staff House at UMIST, whom we must thank for their kind assistance and very reasonable bar prices. Meetings so far have been dedicated to looking at printers, talking about Pascal and Visicalc and other packages, including word processing, and holding general problem solving sessions.

Although we hold our meetings in UMIST, we are by no means all academics and have a good sprinkling of private and commercial Apple users. We also have a small section of amateur radio enthusiasts who are interested in radio communications using Apple computers.

At future meetings we will have invited speakers talking about a variety of interesting topics. We have already involved Boris Allan on Pascal. Others lined up will cover graphics, A/D and D/A applications, assembler programming and, we hope, some amusing subjects as well.

Because of our links with Windfall we also get involved in some of their projects. The most important of these is the workshop on music and speech synthesisers scheduled for the end of September. This is being coordinated by Windfall, Dr. David Ellis, who is heavily involved on the music side, and ourselves. Although the original idea was to provide a talk on music synthesisers for members we felt, as did everyone else involved, that there would be many more people interested in such a workshop, and consequently started making plans to increase the scope of the presentation and to invite other interested groups and members of the public.

The principal officers of the group are Peter Brameld, of the Polymer and Fibre Science department at UMIST (chairman), myself (secretary), also of UMIST Chemistry department, John Watson (treasurer) and Chris Reid (public relations and membership secretary), who are both commercial users of Apple. Like all groups, we are interested in increasing our membership, and so would welcome approaches from any local users.

Our fees are currently being revised to cater for students but they will not be excessive. We feel that the information you could learn by talking to other users at one of our meetings, plus the pleasant sociable atmosphere, pays for itself many times over. — **Dr. Max Parrott, North West Apple User Group.**

Membership pays dividends

Apple Music Synthesis Group: *Contact Dr David Ellis, 22 Lennox Gardens, London SW1 (tel: 01-584 5816).* This is an embryo user group with a big potential. New members from anywhere in the country are welcome, whether they are already in another group or not. Windfall will let you know when they are ready to produce their first record.

BASUG (British Apple Systems User Group): *Contact John Sharp, PO Box 174, Watford, WD2 6NF.* Meets twice a month and arranges demonstrations on new equipment and talks by prominent Apple or other computer specialists. Provides courses at very reasonable rates on languages like Pascal. Has about 300 members. Publishes a bi-monthly newsletter.

BAUD (Bristol Apple Users & Dabblers): *Contact Geoff Symthe, Datalink Microcomputer Systems Ltd, 10 Waring House, Redcliffe Hill, Bristol BS1 6TB. (tel: 0272 213427).* Meets fortnightly at Datalink and anyone interested is welcome to attend. Formed September 1980. About 100 members. Hard core are high flyers from Bristol University and the Polys, and there is a great deal of expertise. No formal membership and no subscription, but charge of 20p per meeting to cover coffee and lighting costs. Publishes a monthly newsletter which details forthcoming events.

● ***As you can see, according to our records many areas of the country are still without Apple user groups. If you are interested in setting one up in your area but need some publicity to get it going, write to us and we will ask potential members to get in touch with you. The address: User Groups, Windfall, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.***

LAUGHS (Leicester Apple User Group for Help and Support): *Contact Hazel Brown, 7 Bude Drive, Glenfield, Leicester (tel: 0533 875252).* This group must be a load of fun. Anyway, they meet on the first Wednesday of each month at the Leicester Computer Centre, 67 Regent Road, Leicester. They have the usual type of group function, where various Apple related topics are discussed in depth, and products or software are demonstrated by members of the group. Membership fee is £5 a year.

North Lancashire User Group: *Contact John Robinson or Julian Morgan, 12 Harold Avenue, Blackpool (tel: 0253 47514).* Meets once a month.

North West Apple Computer Club: *Contact Roy Stringer, Long Lane, Warrington, Cheshire (tel: Warrington 542117).* A fairly new group of about 30 members, based around Warrington and Liverpool. Events include trips to major Apple installations, like at Keele University, and tuition in basic computing techniques.

North West Apple User Group: *Contact Peter Brameld, 35 Whitechapel Street, Didsbury, Manchester (tel: 061-236 3311 ext. 2519).* Meets once a month on Thursday evenings at the Staff House, UMIST, Manchester (with access to one of the cheapest bars in the city). Meetings often devoted to comparing new products. Has about 50 members and expanding rapidly. Publishes a newsletter.

SAPPLE (Southern Apple User Group): *Contact Pauline Martin, Miss Spoules Secretarial College, Winchester (tel: 0962-3393).* Meets about every sixth Tuesday, alternating between Southampton, Titchfield and Winchester. Intends holding organised games tournaments to give light relief at meetings. Plans to publish a newsletter.

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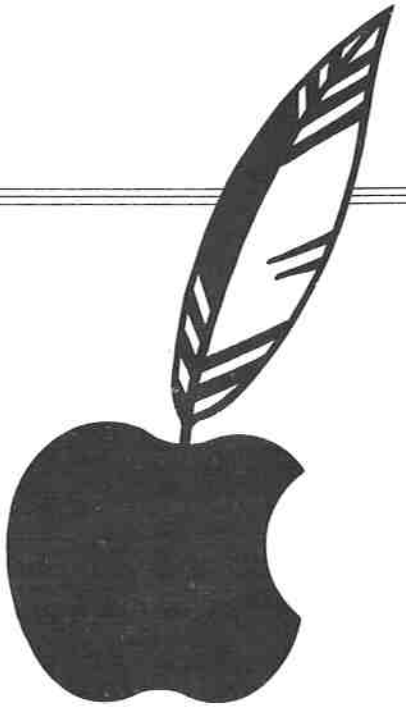

THE interview with Mike Brewer in the first issue of Windfall touched on the thorny question of discounting. This is a subject that should be discussed in greater detail, because the current fierce discount war is bedevilling certain sectors of the Apple dealership.

The people who sell Apples range from small individual companies at the bottom end, financed and run by the main, and sometimes only, working director to multinational organisations and electronic groups who have formed separate divisions to market Apples throughout their multiple outlets.

I do not wish to denigrate any particular group of customers or suppliers, but would like to look at some instances in more depth where large discounts are now a matter of course.

The field of education, both schools and universities, used to be a highly prized market. To install an Apple in a university meant that while a supplier would be expected to look after the system after installation, his customer would most likely be an expert user, who would be developing his own software and be able to find and solve small problems on his own. And in many cases he would also be contributing in no small measure to the future development of the Apple itself.

Compare this to a business system, where the user is approaching computers for the first time and has to lean heavily on the expertise and patience of his supplier.

Whether it is because of financial constraints from the government or because of their own assessment of their honoured status as desirable customers, most educational establishments demand discounts as of right. They tender out to a number of firms and thus secure the lowest possible price.

The supplier having spent considerable time, effort and money in talking to the department, advising them on the system they need and gaining the confidence of the future user, sees all of his efforts being reduced to a contest to see who can cut nearest the bone.

The outcome of this is that those small companies who have patiently developed a market within an educational organisation because of the attention and expertise they have provided for customers — which is an expensive and unpaid commodity — are having to reduce their level of service. The customer is left with a supplier who needs to sell more systems to balance the discount offered, and has no time for much after-sales service.

It's not all black and white, however. Education is also a valuable area because future purchasers of computers are being educated to be accustomed to and faithful to particular products, and as such should be regarded as valuable enough to attract a subsidy. There is a great deal of altruism attached to providing schools with knockdown systems, which could also be said to have a great deal of credit.

Apples by post is another contentious issue, where the supplier can operate on a very small overhead because his sole function is to redirect the equipment to the customer whom he has attracted through extensive advertising and low prices.

Here you will never see a salesman and will have to rely on your own intelligence to set up the system and get it running. But if you are on a limited budget or want to spend money on additional equipment it can often mean the difference between buying a system with or without a colour card.

Commercial users hardly ever become involved in discount wars. A business user is concerned primarily with getting a complete service — hardware, software, extensive and reliable training and backup. The supplier who can convince him that he can give him the support he needs will get the contract at a good price, and should have built sufficient leeway into other parts of the quotation apart from the hardware to ensure that he can provide that service.

Some major organisations, refusing to enter the personal computer market with the Apple, are providing business systems only, with a strict company policy to restrict discounting to a very low level commensurate with other business system suppliers, and match this professional attitude with a sound and efficient organisation to provide all of a customer's requirements. — **Brian Hallworth, Leeds.**

Visicalc memory

IN the article by D C Sutton entitled 'Micromodeller: Crystal Ball of the '80s' he states that it is not possible to consolidate sub-models using Visicalc. It is possible in a limited way as Visicalc does not clear memory before loading a new "electronic sheet".

Visicalc only overwrites memory to the size required by the incoming sheet, leaving the remaining memory unchanged. Therefore it is possible to set up a sheet in memory and to overlay it with previously prepared sheets from disc as long as you ensure that none of the incoming sheets overlap with any sheets already in memory.

I have used this technique successfully to consolidate a number of separately prepared sub-models. — **G.F.W. Goodwin, Wavin Plastics Ltd., Hayes, Middlesex.**

They also served . . .

WHILE every credit must be given to Microsense for all the organisation and planning they put into building up and coping with the tremendous demand there now is for Apples, the article in the July Windfall failed to acknowledge the two other companies who had the foresight to bring Apples into Britain and distribute them when they were just an interesting novelty.

Mike Sterland of Personal Computers and Dr Tim Keen of Keen Computers were the two major distributors of Apples in the late '70s. It is unnecessary to say who was the first, and both are continuing to have a major part in the development of hardware and software for the Apple and in maintaining its reputation as the Rolls Royce of micros. — **Peter Carrow, Ealing.**

Program pointer

I WAS most pleased to see an Apple-dedicated magazine appearing, especially one so well prepared and printed with a range of interesting articles.

However I should like to add a comment to one of the Appletips: the idea of setting the beginning of program pointer (decimal 103,104 : $67,68) to $4000 will only work some of the time. The reason is that Applesoft expects a zero byte before the first line.

Hence for complete safety use POKE 103,1: POKE 104,64: POKE 16384,0 to load a program above Hires page 1. — **M.J. Parrott, Stockport, Cheshire.**

Interface with Ceefax

I WOULD like to thank all concerned for the excellent first issue of Windfall which I read with very keen interest. I am almost literally the "complete novice who bought an Apple yesterday and wants to know how to take a floppy disk out of its black cardboard packet" referred to in your first editorial.

While I've not been cutting open my

→

floppy disks, when I bought my Apple last week my first problem was in discovering how to wire up the plug on the Apple mains lead. As my Apple came packed with a US wired lead I spent a frustrating weekend staring at my expensive new toy unable to connect it up for fear of blowing it and unable to contact the dealer to check on which of the black, turquoise and white mains wires conformed to which UK equivalent.

I hope that future issues of Windfall will include material for complete newcomers to computing who are still very much learning to use their equipment, and I particularly welcome the idea of comparative reviews of Apple software and peripherals. I would be particularly interested to read comparative reviews of the confusing array of dot-matrix printers currently on the market.

One query that you may be able to help with. Is it possible to interface a teletext (Ceefax/Oracle) receiver with an Apple – specifically to use the "Telesoftware" programs on ITV's Oracle and to store Ceefax/Oracle pages on disc?

I have a Sony KV2206UB teletext receiver which does have a teletext output (described as "minijack, 1.0 V p-p 75 ohm terminated") designed for connection to a printer. Any suggestions?

Apple users contemplating a teletext television, by the way, should certainly consider the Sony set as it also has a raw video input which allows it to double as a 26in full-colour monitor – **Selwyn Ward, St Mary Cray, Orpington.**

● A review of dot-matrix printers is scheduled for a future issue. With regard to Ceefax/Oracle, B&B Computers of Bolton have a system called 'The Bee', which is already used to access Prestel, and should be ready to use Ceefax in two to four months.

Auto load Renumber

FURTHER to your Appletip in Windfall Number 1, I have modified my Master Development Disc on a 48k 3.3 Apple to automatically load the 'Renumber' program when the system is booted.

The 'MAKE DOIT' program creates the text file 'DOIT' required for the 'EXEC' command in the modified 'HELLO' program. Line 70 of 'MAKE DOIT' is necessary as the 'Renumber' program requests a RETURN during its operation.

To summarise, the 'HELLO' program must be modified as shown. The disc must contain the 'Renumber' program obtained from the System Master Disc, the Text file 'DOIT' created by 'MAKE DOIT', and the disc must have been initialised as a Master Disc.

Power to the programmer and good fortune – **David Kyte B.Sc.Hons.**

```
'HELLO'
10 HOME
20 PRINT" DOS 3.3 MASTER DISK"
30 D$= " ": REM CNTRL D
40 PRINT D$; "EXEC DOIT"

"MAKE DOIT"
10 D$= " " : REM CNTRL D
20 PRINT D$ ; "OPEN DOIT"
30 PRINT D$ : "DELETE DOIT"
40 PRINT D$ : "OPEN DOIT"
50 PRINT D$ ; "WRITE DOIT"
60 PRINT D$ "RUN RENUMBER"
70 PRINT
80 PRINT "NEW"
90 PRINT D$ ; "CLOSE DOIT"
```

Applesoftware from Leicester Computer Centre

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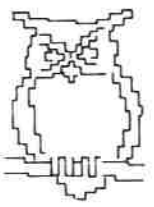

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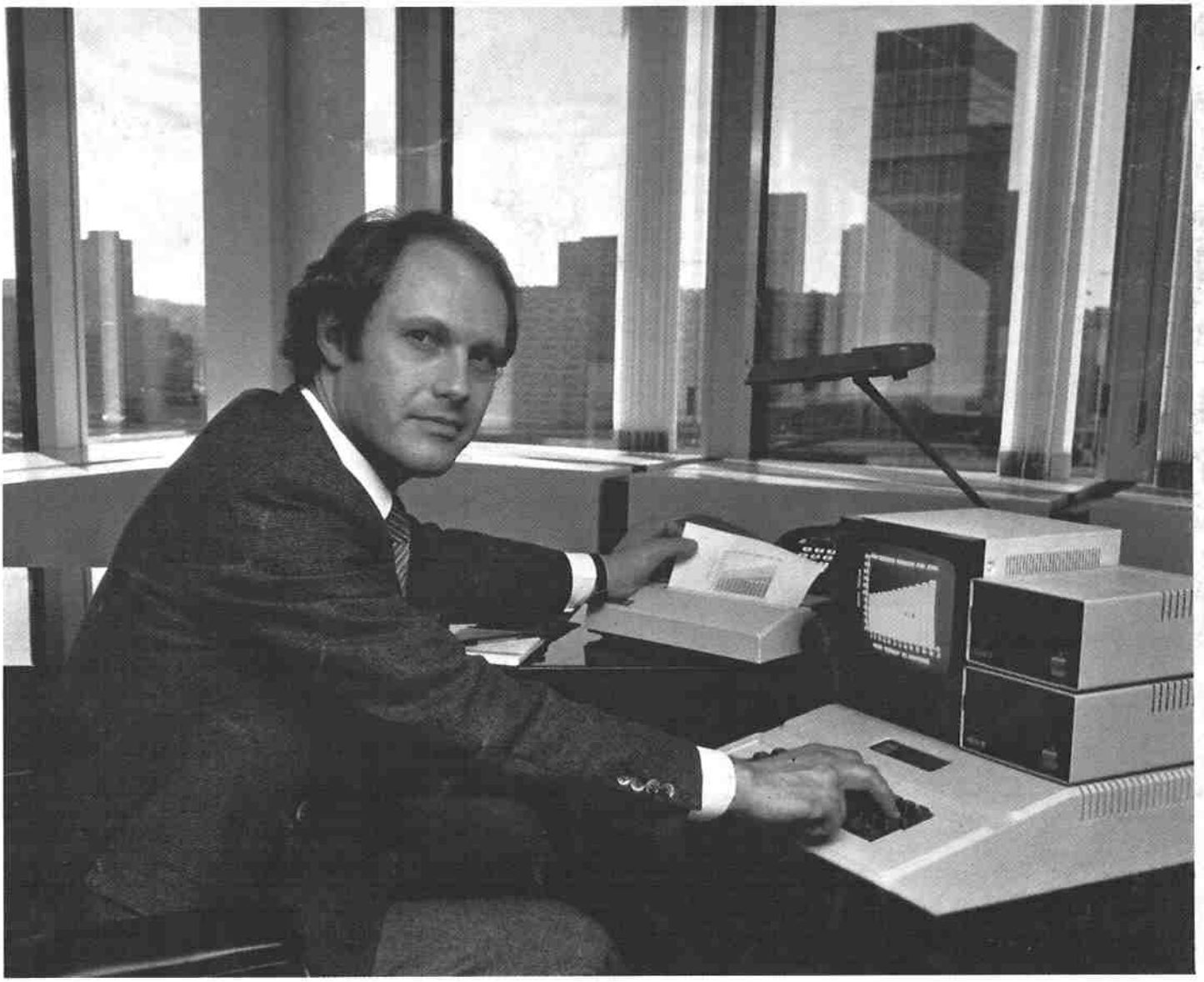

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