

DRAGON



USER

born online

The independent Dragon magazine

June 1988

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Editorial

TRADITIONALLY the editor is the last to know when changes occur in the publishing office. Thus the editor carries the news to the readers. We promised you the big news, and the big news is ... that Dragon User is leaving Sunshine Publications, and taking wing westward to a new team at the premises of the newly hatched Dragon Publications.

Dragon Publications' guardian and governor, however, wasn't hatched yesterday, and is better known to the Dragon World as Bob Harris of Harris Micro Software.

Dragon User is pleased, proud and grateful to Bob for shouldering the load of administering the magazine, as its corner by the chimney stack of Little Westport Street, now full to the gills with journalists of the banking and insurance persuasion, was becoming increasingly untenable. DQ's erstwhile computing relations have left for other establishments or the Outer Darkness. Sunshine, our founders, looked aghast for a long time — now DQ is back in the computing community.

I ask all Dragon Users to join me in wishing Bob the very best in his role as owner and guardian angel of DQ. He has pledged that DQ will remain an independent publication serving the whole DRUG community, as it has always been.

And he does the paperwork. Greater love hath no Dragon user.

Telephone number
(01) 570 8335

Editor
HELEN ARMSTRONG

Production Editor
HELEN ARMSTRONG/JURIST

Administration/Advertising
BOB HARRIS

Publisher
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How to submit articles

The quality of the material we can publish in Dragon (as each month will, but very good) is not dependent on the quality of the discoveries that you can make with your Dragon. The Dragon computer was hatched on to the market with a powerful version of Basic, but with very poor documentation.

Articles which are submitted to Dragon User for publication should not be more than 2000 words long. All submissions should be typed (please letter-wide margins) and a double space between paragraphs. Programs should, wherever possible, be computer printed on plain white paper and be accompanied by a tape of the program.

We cannot guarantee to return every submitted article or program, so please keep a copy. If you email us your program returned you must include a stamped addressed envelope.

Letters

This is your chance to air your views — send your tips, compliments and complaints to Letters Page, Dragon User, 12-13 Little Newington Street, London WC2H 9PP.

Black and white mod

HAVING received my telescopes of DU, April 1988, I received a letter from Ken Smith regarding the display on a black and white TV monitor.

I have three Dragon 64s on monitors which are black and white — the only mod being to remove the LM7818 IC (video modulator) which outputs the colour difference signals and makes a mess of black and white display.

In the 3018 IC is a socket, but in the '84 it is usually soldered into the board. However, if you are reasonable with a soldering iron you can take it out and then replace it with an IC socket. With this IC removed the computer will give a rock steady black and white display (even on a colour TV).

Also, on the subject of notes, how green is my black, DU February 1988 by Paul Field, if you invert the signal going into pin 32, rather than test 30-volts or 5-volts, then the cursor reappears as a flashing white blob. The IC I used to invert the signal is the TTL 7404.

I have had this mod fitted to all three machines over the last month and had no problems, although it is not necessary to have a switch to go back to normal display for the 16k screen.

This can easily be done by using spare ways on the 7404, so this is a good winner.

If anybody is interested, I can supply details. This mod gives excellent display with Commodore/BMx amateur radio software.

David Hughes
26 Asherton Ave,
Birkenhead
Merseyside

Flex plea

PLEASE can you tell me where I can obtain the FLEX Advanced Programmer's Guide. Also, could anyone tell me whether there is a FLEX users group, similar to the OS-9 Users Group.

PO Swin
University Hall
Birkenhead
Merseyside
Gardiner P2508

Every month we will be shelling out a game or two, courtesy of our suppliers, to the reader(s) who send the most interesting or entertaining letters. So send us your thoughts and opinions, send us your hi-scores and suggestions. Send us your best Dragon stories. What if you think we are, mind readers?!



A reviewer's life is a hard one

THESE of you who bothered to read my review of Spy Against Spy (see also the review that I said will have noticed that I was asked for my views on it as a reviewer before it was completed, and I would appreciate feedback on a point that was raised as a result of this.

Originally the game had no scoring feature, and I felt strongly that this should be included, even more so in a two-player game, so I think that players like to know who has won or if they have beaten a previous high-score held by themselves or somebody else.

Maybe I am the one that is wrong but I would like to know whether it does make any difference if the game has a scoring system. Writing reviews is not easy, as I have discovered. One has to try and distance oneself slightly from the personal enjoyment of the game and consider how other people will enjoy it. A reviewer's job is only like that the reader can get of what the game is like. Truth and fairness have to be the main criteria, mentioning good points and bad, without being too personally biased. I am assisted in this task by my two sons aged 14 and 7 who enjoy completely different types of games.

I hope that buyers of software that I review feel that they have bought the same game that they read about in my write up. Nowadays there is not as much software to review as in the past and I wonder how much interest there would be in reviews of older material. Quite often I am at shows and see software on sale, seemingly reasonably priced, but it is something that I have never even heard of and I wonder

whether to take a chance or not. Perhaps readers of Dragon User would like to find out about those games and utilities which they have never seen in review at all.

I know that some writers would write more about software if they had access to what the buying public wants, so if you have a good idea for a game or utility which is written in the software houses and ask them if they are interested in your idea. Let's face it, we could do with much more original software than we have been getting over the last few years. Finally this year is the Chinese Year of the Dragon, so why don't we also entertain a really live one in its name. To the user I say, please try more software rather than buying it, as we need to keep the writers working on fresh software and they need to sell more than just a handful of copies. To the writer and software houses, please give us more original software and not just variations of an old theme (yes, I appreciate that the idea for a new game is often as hard as the programming).

To those of you who have only borrowed this copy why not take your own to a subscription to Dragon User? How many of you have still retained the National Dragon User Group? If not, why not? Most areas have also got computer groups to go along to even if they are not solely for the Dragon. In my area there is the North West T7000 Users Group which has a Dragon/Co-Co membership of about 40% and has meetings at Barton Aerodrome on the last Wednesday of each month. The secretary is Brian Daley

OS-9 group rides again

I recently wrote to you about the OS-9 group and you kindly sent me a copy of the letter from Malcolm Cowen.

I posted a copy of my correspondence to Gordon Twist last last week and when I got home that evening there was — guess what? — a letter from Martin Vernon with apologies to everybody.

Many thanks for your help.
Alec Freeman
2011 Main Road
Chalfont
Northants NN5 6RA

IT sounds as though the chaps are back in business.

and can be contacted on 061-703-9033.

Although I live in Liverpool I find this to be a very convenient meeting place and really enjoy the friendly get-togethers. Why not find out about similar groups in your area. If possible this article has inspired people to do something even if it's only a letter to DU with your views.

Alan Dowd
10A Melton Close
Preston
Merseyside
L35 9AL

IT has been suggested before that we should review older software, and indeed from time to time we do. I am sitting on some retrospective reviews. However, we have had a good supply of new reviews this last year, and I consider these to be more important. Another factor is that I want to give priority to software which is still available from one of the Dragon traders, which means that anybody who sends us reviews of older software should include the name of the current supplier and the price.

I would like to know how Dragon and Tandy owners feel about extending DU's repertoire out into Tandy country — without of course taking over from the Dragon's supremacy. There are many areas where the two machines overlap, that could be exploited to their mutual advantage.

An Announcement

I am very pleased and proud to be given this opportunity to take over the ownership of Dragon User. My commitment to the future of the Dragon is well known, and I believe that I shall be able to continue the important role that the magazine has always played in the development of the computer.

While I shall be assuming overall responsibility for the production of Dragon User, the financial management of the magazine will be handled by a new company, to be called Dragon Publications, quite separately from Harris Micro Software.

Most importantly, the editorial policy of the magazine will remain completely independent, and I am very pleased that Helen Armstrong has agreed to continue as Editor. Together I am sure that we shall be able to maintain the high standard of the magazine, with news, views, help and fun, and above all, to continue to provide a good service to the whole of the Dragon community.

Bob Harris

I AM sure that all Dragon users everywhere will welcome Bob Harris, who as all know as one of the most knowledgeable and most committed of Dragon supporters, to the Govt'manship of Dragon User and look forward to helping it to prosper under his care.

Dragon User's new address will be Dragon Publications, 49 Alexandra Road, Hounslow, Middlesex, TW0 6AF, and all subscriptions and correspondence should be sent to that address.

Many thanks to Sunshine Publications for running Dragon User for the last five years. DU is the best computer rag in their stable, and I'm sure they'll enjoy forwarding our letters and phone-calls for many months to come.

Joysticks from Whitehouse

HAPPY Whitehouse has devised an entirely new type of joystick for the Dragon — the fastest joystick known to man.

"You can operate this as fast as you can think," says Harry. That should speed a few people up — it not everyone.

The touch-sensitive joystick has no moving parts, and responds entirely to the position of the operator's hand on four touch-sensitive, silvered pads. A central pad broadcasts a tiny radio signal, and the finger making contact with the four position-sensitive pads as an aerial to a receiver chip underneath the pads.

The result is instantaneous response from the joystick.

"This time we have made something for the Dragon which is ahead of anything for other computers," says Harry cheerfully, although admitting that he might adapt the design for other machines in demand areas. It's a day-to-day development. As we don't have a production line, each one has to be put together by hand. We shall be selling them for the first time at the Covent Show this weekend, and I think we'll have about time to sell by then."

Not only is this design the fastest, it may be the cheapest

as well. The mail order cost of the joystick from Harry Whitehouse is £295 each, inclusive of VAT and postage.

In recent months, Harry has trimmed back his Dragon trading to concentrate wider markets, but unlike many traders has continued to support the Dragon with his famous At Supercoast power supplies, and now the new joystick.

He did not give Dragon User a name for the new device, but as it has some qualities of a joystick (without the stick) a touchpad and a mouse, we suggest the Joy Touch House Pad, which may have the added advantage of translating easily into Chinese for export purposes.

Orders and enquiries to Harry Whitehouse, 48 Queen Street, Balderton, Newark NG24 3HQ. Tel: 06095 760230.

Computape — a new address

COMPUTAPE's new address is Computape, 27 North End, Southampton, Gosport CM8 7ND. Phone number (0629) 722888 as before.

Quick beam on disc

Orange Software have now signed an agreement with Harry Masson of Compage, which allows Orange to publish disk versions of the Quickbeam software, which is now priced by Compage.

This is an arrangement which suits Compage, who do not want to go into disks, and Orange, who are finding that the discs are selling like hot cakes.

The following Compage titles are available from Orange Software in Dragon

DOC format: Fire Force £295, Superkit £295, 5000 Express £245, Speed Master Plus £245, Dick's Dee £245, Gordon Bower £195, Frankie £250, World of War £245, Star Castle £245, Shunter Scientist £245 and Gordon Wizard £195.

The cassette versions are available from Compage as usual.

Orange Software, The Garth, Star Road, Marton-Derry, Alnwick, North Northumberland. Tel: (0632) 880252.

NDUG woos writers

A NEW copy of Dragon Update has fallen on the mat. The 14 page issue ticks off with Paul Grady trumping his hat about people who don't write articles for DU, and rounds off neatly with editor Stephen Hood trumping his hat about people who don't write articles for DU. This is because all the best articles are in DU, cheap!

Nevertheless, NDUG have come up with the final section of Bob Smith's Toolbox, a page writer. Write2@port.companies

on selling your own software, a screen dump for the DRP2000, some notes on compiling long pieces of music with Composer, a backup disc routine, more on machine code, a boot routine, an appeal for people to contribute to a public domain software library, a letter from a reader wondering what to write about, and the usual cartoons and classified.

Contact the National Dragon User Group via Paul Grady at 5, Navarino Road, Wokingham, Surrey. Phone 0960 297565.

Crossword

The seventh Dragon Crossword is all crossed up and ready to go.

To see the winners of crossword five, see Tenby's *Times*, who wants Wizards Quetz or Horak Facter and D.J. Barnham, who would like a utility or a platform game. Practically minded chap, obviously.

There will be a couple of free tapes from the Editor's Magic Bookless Box for the next consecutive issue out of the Editor's hat each month (see can't put them in the Bookless Box, they fall through). You can even try telling us which tapes you'd like in an ideal world. It all depends on what we can find.

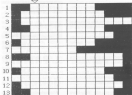
And you don't have to put up your Dragon Mail, either — entries can be written out on a photocopied or plain piece of paper, as long as we can read them.



by Terry and Derek Pringle

All this month's answers are names of Dragon software. When the crossword is complete, the column marked with an arrow will spell out a phrase.

1. Make a lively meal? (7)
- 2 and 4. Jewellery for the night time (3,4,2,8)
3. A nice job lot to reform an astronaut? (3,4,5)
5. Refer to a CB talk to this army (8,3)
6. Information cropping off (4,4)
7. Sounds like you should escape. (7)
8. See a look at the watering hole. (5,5)
9. Martial arts fighter. (5,7)
10. Finally, APC means NPC here (9)
11. Aahy in a vacuum? (4,2,5)
12. Jack dines this perhaps? (11)
13. Recal bar about turning on? (5,4)



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HARRIS MICRO SOFTWARE

49 Alexandra Road, Hounslow, Middlesex, TW3 4HP Tel: (01) 570 8335

Dragonsoft

Just the right game for old addicts

Title: *Supercave*
Supplier: Orange Software, The Game, Star Road, Hampt-Derry, Aberystwyth
Price: £2.99

LET me take you back in time. We look to around 3 GO-Before Dragons, for in those long gone days the (primarily British public) were addicted to a simple game called Space Invaders. However they began to get bored and craved for more, and in return new hybrids appeared, of which one had razor sharp graphics and was entitled Asteroids. Now many years later, Orange Software have taken this aged idea and transfered it into the game Super Rovers.

Yes, that's right, asteroids, but before you say "Why have they done another version of that, I got a cartridge of it free when I bought the computer and that was no good", let me reassure. Orange Software have not just taken out another stone of the old game

will explode into two, doubling your problems. This happens whenever it has counted correctly, before you finally destroy it, although the screen gets accelerated (and this) that I'm not 100% sure despite the dozens of times I've played it.

Things are never so simple though. If you collide into one of the passing stars you lose some of your vital energy. Also, the mines are limited in the number you can lay, but both mines and energy are replenished by way of a lunar landing style docking procedure when you link up to the underside of the SpaceQuads Proton Pump, which sounds easy but results in losing all your energy (and patience) until it's precisely spot to land is found.

After refuelling you have full energy and mine stocks again, but you do lose spare vitamins in case you prematurely run out of energy or blow yourself to bits, and fortunately you live in a very small, solid galaxy because if you leave the screen,

A medal is certainly what Orange Software, a name new to me, reserve for breathing new fire into such an old and dated idea. I'm not saying this is small overrated by the way, it still has health oriented in the game, for one, after initial addictiveness is relinquished into a credible level of aptitude and you can clear up a whole screen, there's no new challenges.

So apart from a slight shortage of variety and originality this is a title with which to pass a few hours without really raising your blood pressure or getting you to the edge of your seat unless you are an addict fan of the old arcade game. (Do call? — 5.5)

Philip Star



Would you trust a hero lost in the woods?

Title: *Forest of Doom*
Supplier: Orange Software
Price: £2.99

FOREST of Doom is a program that has been converted by Orange Software for the Dragon. Unfortunately this is not a conversion of a top selling game on the Amstrad or Commodore but from the Cric, a machine which disappeared long before Dragon's problems started, and what is more the Cric version was written in 1982!

An Cric top adventure from half a decade ago may not sound mindbogglingly exciting but bearing in mind that all the best window makers (with a few) took the review cover out of its orange packaging (apart from I suppose) and looked so white becoming familiar with the storyline...

A prince went out to reclaim four stolen treasures but met a sorry fate resulting in your friend Arthur going out to rescue him, only to fall at himself. Guess what you have to do? Recover the four treasures, the Prince and Arthur, if only these people were more careful in the first place.

You are also given a few clues on both the inlay and screen instructions but these tend to spoil the game rather than improve it. For instance when you entered that is the chocolate and you find a chocolate machine it's obvious to anyone with a brain who to do.

A list of appropriate verbs is displayed, this is limited to say the least. Apart from directions they are limited basically to get, drop, examine, look, inventory, rub and kill, hardly an alternative to the Oxford English Dictionary.

The game is played on the standard green text screen with a location description and scoreline exits. Starting from home you can wander off through forests, getting plants and dunes. Initially and then later into darker warlike situations and gloomy forests. Various characters are scattered around all of whom want something from you such as the innkeeper, the parrotkeeper and even Bill and Ben who seem to have turned into integrating acrobats in their old age.

As the text that Bill and Ben say in the game suggests, there is a touch of welcome humour in it, there's even a game with balloons which helps breathe new life into the adventure (if you'll forgive me), but something certainly smells fishy about this (maybe not).

The adventure is well planned and logical without being over taxing to the old grey matter. One point which irritates my mind at least though, and briefly touched on earlier, is the shortcomings of the vocabulary. Due to the lack of verbs all you really have to do is get the required object and drop it. If you want to drop something you would 'plant seed' not just drop it, if you oil a lock you fit just that, not drop oil, (Speak for yourself please). Although I realise this makes no difference to the outcome of the game it does diminish the atmosphere.

Small points like the vocabulary and the pause after each response due to the limitations of the Basic program (are Basic adventures coming back? This is the second I've reviewed in a matter of weeks) detract from the potentially good, if slightly dated storyline. I warmed more to the



but have detracted to least amount a more advanced program around it.

After an effective loading screen of several planets and stars, the joystick button is pressed to reveal your spherical space ship and a handful of stars whizzing around the screen. All you have to do is get rid of them by laying bombs (Proton Proximity Mines to be exact), being careful not to blast over the mines yourself and blowing yourself up. More of the atomizer stars move over a stationary mine then it

say at the top, you immediately reappear at the bottom.

That's the basis of the game, graphics are reasonable and have four choices of colour but music is sadly only a bit of a dripping tap concerto. Things get progressively more crowded until there's hardly room to breathe, let alone stily lay a proton proximity mine. Eventually despite gaint attempts you run out of lives, although you will no doubt be awarded posthumously with a lavatory medal of the high score.

game set west on but the above faults legitime from heating up further. Not too bad for summer nights though, as it won't keep you at the keyboard too many nights and is certainly better

than a lot of the abysmal adventures that were around in 1983.
Philip Short



New fonts for old

Program: *Computer-Tear and Script*
Supplier: Dragonfire Services, 19 Perry Jones Close, Blims, Sweet WMS 2PH
Price: £2.08 each, cassette.

ONE of the best features of MacGowanConsultants' *Printer Control* wordprocessor is the ability to load alternate character sets (fonts). *Computer-Tear* and *Script* are the first two of a set of alternatives supplied on tape from Dragonfire Services.

I reviewed *Printer Control* in the August '83 edition (and the disc version in the June '84 edition), but for those readers new to this product here is a brief overview.

Printer Control is a powerful wordprocessing package supplied on either disc or tape; the tape version will take advantage of the 64K extra memory and allow you to use the F5000 (font formatting). Using a 40-column, 24-line screen the text entered and edited using the usual sort of cursor-controlled screen editing commands, such as insert, delete, find and replace, as well as block move, copy and delete.

Printer Control is not a WYSIWYG (What You See is What You Get) wordprocessor — all formatting (eg text centering, underlining, double width etc.) is done when printing and shows up as control characters on the screen.

The major advantage of *Printer Control* over other wordprocessors is its ability to control and take advantage of the graphics capabilities of your printer. Each copy of *Printer Control* is customised for your type of printer (so state which type you have when ordering), almost every 8-bit graphics dot-matrix printer is supported (plus a few other daisy-wheel types), over 60 printers in total. Text can be printed in 4 sizes, with dots, underlining, proportional spacing, you name it.

In addition to all this, *Printer Control* is also a *Procede 4*

graphics editor. Pictures can be scrolled a single pixel at a time in all four directions, text can be added, and blocks of text pixels can be rotated through 90 degrees.

The disc version supports all the features of the original tape version (apart from the extra 30K of the Dragon 64), but also allows the keyboard repeat speed to be changed (a very useful feature), most of the useful DOS commands can also be accessed within the program/menu, kill, print etc. Cassette loading and saving is also supported.

Using the graphics mode of the printer means that just about any eight-bit character set can be loaded and used (using option 4) from the *Printer Control* main menu. Dragonfire Services have taken advantage of this to produce add-on font-on-tape. The first two are *Computer-Tear* and *Script*, an example of both is shown below.

The *Computer-Tear* font looks like the typewriter characters used on the bottom line of cheque books — it's the standard computer style font. The second font, *Script*, is some of the most impressive. It gives you a hand-written look without using base case letters (the upper case is a bit 'backy' but you can't have everything). The character matrices have been very carefully designed so that no matter which two lower case letters are next to each other they always join-up.

The output quality will depend to a large extent on your printer, but with a good 8 pin dot-matrix printer the *Script* style can be very impressive indeed. These fonts can be printed in any of the three available sizes and can be used in with the standard *Printer Control* font. However, you cannot have multiple one-add-on font loaded at a time.

At the very reasonable price of just £2 each, these fonts are a must for *Printer Control* users — just think of the invitation cards, leaflets, newsletters etc

you could use these extra fonts with.

The *Printer Control* wordprocessor program (published by MacGowanConsultants, 4 Ashford Drive, Capheaton, 4 Grantham Lane, NG22 3DQ) is available from Harris Micro Software, 48 Riverside Road, Hounslow Middlesex TW2 4HF. Prices start at £20 (for the disc version) but depend on your particular type of printer.

Brian George



Many squares make an education

Program: *Masterplan*
Supplier: Omega Software
Price: £2.00 cassette

WHEN Peter posted this piece of software for me to review he said in his accompanying letter that he thought it was basically an educational program. Some people might not agree with this view but I certainly do. As well as being a memory game it encourages the younger members of the Dragon community to get more familiar

with the keyboard.

As I was actually expecting to find on this review I have not yet had the chance to convert it to disc, and had to put up with the slowness of cassette loading, although it was most pleasing to find that there were absolutely no loading problems whatever, even though I have loaded it on many occasions. When loaded you are asked whether you would like to see the instructions or not. These are well set out and easy to understand.

You are then given the choice of 'Easy' and 'Super hard'. The former has five items which each appear six times and the latter has three items each appearing twice only.

The top of the screen is lettered A-F and the side is numbered 1-6 and there are thirty squares of varying colours. At the commencement there is a horizontal and/or vertical string of the lines of squares, alternate rows going in opposite directions, which gives a nice touch to the game but unfortunately causes problems to the game itself.

The items are obviously set out in the same squares at the beginning of each game and rely on the Dragon's randomness, which is notoriously bad, to select the number of times the squares move. This means that the same objects

are pages 10 and 11-4



Update the Dragon

Roger Merrick says, don't criticise the Dragon — boost it.

WHEN you see that for the original price of a Dragon 32 and a disc system, you could have a 528K Amstrad PC, or a 1M Atari ST with a fast, impressive multi-multi-colour graphics, you can understand why people like Ray Coates talk of hanging up their Dragon and moving on to pastures new.

However, what I want to do here is make the case for persevering with the old beast, through enhancing and upgrading the standard machine. This need not involve getting out the soldering iron — extra purchasing of peripherals can dramatically extend the utility of your system, by allowing it to meet your specific requirements. Upgrading to a completely different system has additional costs above and beyond the price of the computer — you will have to write off your present investment in software, and build up a new software resource (aimed at higher prices). The resale value of Dragon hardware and software is low, compared to the purchase price. There is no guarantee that peripherals such as disc drives, monitors, or printers, will be useful with your new system. The cost of these items can be overlooked when deciding over the latest lurches in all singing and dancing multi-megabyte resolution kit. Then you need to consider why you feel you need a new machine: is it because your present computer can't do something that you want to do? Or is it simply that the Dragon has gone out of fashion, people sniff when you speak modestly of it and what it can do? Maybe you can jazz it up.

RAM enlargement

For a Dragon 32 to be upgraded to 64K is nowadays fairly cheap. It is also relatively straightforward. Although I don't think DU has ever published details, HDUG publicist anecdotal which is very clear: if you intend to make this modification to your machine, get on with it, because 64K machines are becoming scarce as demand falls (64K is now too small). Various people will do the upgrade for you. It is worth considering, however, whether it would be more cost-effective to purchase a second-hand 64K, and get the PE332 job, the extra 64K space (a selected EPROM containing the cassette-based OS system, modelled by EGSC 8000), that can be replaced with something more useful, and keep the OS2 as a second machine, or a source of spare parts.

528K upgrades for Dragon 32 and 64 are possible, but are not as useful as one might hope (due to the unavailability of suitable memory management chips; the onboard 544K can only switch between map 0 and 1, and the 6809 can only address up to 64K continuously). Details have been pub-

lished by HDUG.

The 528K upgrade available from Computers (which includes an 80 column video display) seems to me to be rather expensive at over £100. The additional memory is configured as cache ram ('ram disc') when used with OS-9 (or Flex, I believe). Purchased second-hand, it sounds like it could be a bargain (anyone want to get rid of one, cheap?)

Dragonlets can be used with a OS2, but this machine will require an upgrade to 64K first.

For 32 to 64K upgrades, software that enables the user to switch between map types should be provided with the upgrade. Disc users who do not operate strictly under either of the two sophisticated DOSs might want to be able to switch their 64K ram machine to ram-mode, and, for example, load in from-disc patches to the OS2 (which has been copied to RAM).

It is possible, by switching out interrupts, to work from map 0, and use the upper 32K of map 1 as a data store, or a graphic display area, etc. Anyone cracked this?

Plug-in peripherals

Disc interface. If you don't have a disc interface, then getting one is the simplest way of dramatically extending the power of your system. There is still quite a wide choice — the original Dragonlet system can be obtained second-hand; two companies are still manufacturing enhanced Dragonlet-compatible systems. Then there is the Premier Delta system, available in single and double-density versions, second-hand only. The Premier system has much to commend it, not least a second Epsom socket, and although more software was made available for the Dragon/DOS system, the Delta Users group (DUDE), is now engineering software for the Premier system. Finally, the Andisk cartridge is intended for use with Flex... and is still available. Unless the other cartridges mentioned, which can be used with their own install commands, the Andisk still requires the use of Flex (and adds RAM to a 32K machine to facilitate this). It is not cheap, and probably not for a beginner at all.

Additional drives. If you already have a disc system, but only have single-drive, you ought to add a second drive. This will make a big difference to your disc operations. If you have OS9, you'll agree with Dale Pughett that two drives are essential for serious OS-9 work. But even using Dragon or Delta DOS, a second drive is a big step forward.

First advantage is in backing up — it takes only a fraction of the time of a single

drive backup.

In many DOSs, COPY will not work on a single drive system. (Indeed, in systems which produce BANS, MSs, or where COPY allows renaming of files, it produces a duplicate of the file on the same disc.)

But the real advantage comes when the user designates one drive for read and write operations, and uses another format only. A disc-full of applications and utilities can be kept write-protected in drive zero and all updates and data storage done on drive one. File handling applications can be purchased or written that access data files up to a single-disc in length, portions of the file being read into memory when required. Although this is a feature of OS-9, it is not perfectly possible with Dragon/DOS.

If you have an original Dragon Data single-sided 40 track half height unit, a second half-height drive can easily be easily installed into the drive casing if you don't. All the cables and connectors are ready for you. You will need to move a jumper on one of the drives to set it as drive 2, and you may need to remove a terminating resistor. Then the question of what kind of drive to add arises. The choice of disc size needs to be considered. Three inch drives are a relatively unpopular format, and discs are expensive. However, the single sided drive uses reversible discs, and are obtainable for under £30. They are to be particularly recommended for use with handicapped or young children. I am quite happy for my and my wife's kids to insert and eject the discs for their three inch drives.

The three and a half format is also robust, and more popular. However, their popularity means that drives are not so cheaply available; however, an High Capacity format becomes more popular, offer lower capacity drives may be available to the hobbyist market cheaply.

Still the cheapest overall format is the 5.25 disc. The drives may not be as good, but 5.25-discs are considerably cheaper. Presently, at high street prices, the cost of 20 three inch discs exceeds the price of five drives, but the same amount money could purchase 100 5.25 discs.

A matched pair of drives is the most attractive option. Single sided 40 track drives are relatively unpopular now, and should be obtained cheaply.

Bargain users be fast with double sided 80 track drives, as they have gone out of favour. However, remember that unless they are 4080 switchable, you won't be able to read most commercially supplied Dragon software, and Dragon/DOS and the Dragon Data release of OS-9 has problems with 80 track formats.

If the drives do not match, you lose much of the advantage of having two drives, so if adding a higher capacity or different size drive, buy a pair.

Cartridge port expander. If you make much use of the expansion port, you'll find the contacts become loose. The machine is not as powerful, connecting one pin, disconnecting another, as it would be if we could connect several peripherals to the expansion port together. Some units allow piggy-backing of a DOS cartridge, eg The Touchmaster Graphics Tablet, the (new) Prestel modem package. This works because the DOS cartridge uses only the lower 8K of the cartridge space, and the operating software of the application-cartridge (I believe) uses the upper part. There need be no clever electronic jiggery and out of ROMs.

The snag with these piggy-back systems is that they'll only work while the conditions they assume still obtain. Plug-in a Delta or a Gamma cartridge, let someone bring out a new extended DOS, and the space the application cartridge requires has gone. There is also the question of how often you want to use the application — suppose you have a modem and a graphics tablet — you can't double piggy back them.

A safer and more flexible solution is to attach a Cartridge Port Expander. There is followed here — Tandy's Multi-Pak interface for the Color Computer requires a slight modification before it should be used with the Dragon, but otherwise works well. It has the advantage that a number of Tandy peripherals were designed for use with it. On the other hand, not all these peripherals work well with the Dragon (see later).

Compuserge marketed a unit manufactured by Race, and the final complete is the Wyvern expansion board, originally available through the long-defunct Dragon Dungeon user group.

Each unit offers four slots, where previously there was one, and software switching between slots is possible, it is therefore possible to transfer data from a device in one slot to a device in another, controlled by software. For example, transferring files between Dragon/DOS and Delta/DOS cartridges. Making (limited use of the facilities provided by the Cartridge Port Expander may require the writing or purchase of specialised software. None of these units is available here, and second-hand units seem hard to find. The original prices were relatively high (£190-£180). There is scope for a bright spark to make one of the British designs.

RS232. You would think a plug-in would mainly be of interest to the DOS owner. However, users of serial printers may wish to communicate without disconnecting the printer.

The RS232 port could be used for printing to a serial printer, Prestel/Telex/Micro-robotics board applications, operating terminal, direct communication with a different computer.

If you find that your dissatisfaction with the Dragon centres on the display device and/or the keyboard, connecting a terminal via the RS232 interface is a satisfactory solution. An old Hurdline 2800 terminal was recently advertised in our local paper

for the very modest cost of £10.

Getting a number of Dragons (or Co-Cos), linked via the RS232, could be an inexpensive way of providing the kids with a computer each, and saving the cost of peripherals. The Tandy Deluxe RS232 pack works well with the Dragon, and is supported by OS-9 modules provided in CoCo OS-9 issue 2, to work from the Multi-Pak.

Compuserge had an RS232/IO unit which offered additional facilities and a full 25 pin D socket RS232. The original Microcomputer Resources Cartridge DOS/modem link supports Prestel-like comms, but (obviously) not telecommunications. The upgraded version by Prestel/I haven't got tried.

Sideways ROM. One of the features of the BBC that was attractive many moons ago was the ability to 'page' in one of a bank of sideways ROMs. The sideways-ROM cartridge, marketed by Compuserge, is no longer available, offered Dragon users the opportunity to select from a bank of four 16K ROMs. The unit plugs into the cartridge port, so prevents disc use unless used with a cartridge port expander. (Don't forget to note that the unit is NOT, as it stands, compatible with CoCo, but a minor patch in the operating software should correct this.

As the designer (I'm sure) said, it is a relatively simple thing, and could be resurrected by a suitably motivated entrepreneur. Think of the advantage of being able to switch to an in-line assembler/interpreter, DRP-1, a word processor, or utilities toolkit, or shunting them in an emergency DOS with no memory overhead. Advice — get one if you can.

EPRom programmer:

If you have a D04, or an RS232 cartridge with a D02, any Epron programmer that accepts data via an RS232 may be used to prepare Epron software. However, Compuserge sold a unit that plugged into the expansion (cartridge) port, with onboard software.

Update and debug your DOS chip, blow address onto ROM for use in your sideways ROM cartridge. For the terminally lazy, Compuserge's Epronner enables the user to blow Basic programs onto Epron, for use in the sideways-ROM cartridge.

Make use of the full 16,75K of the cartridge port — you would be surprised how few cartridges make use of even half of it.

The only snag is that small (128K/64K) Eprons are becoming expensive and scarce. Invest in an ultra-violet Epron eraser to wipe games cartridges and use the Eprons for utilities.

The Compuserge Programmer can read and program software for other computers.

The Epronner cartridge is not very easily used in a cartridge port expander, since these hold the cartridge vertically, with their base towards the user. An extension (see later) is required.

CoCos users should again note that the Compuserge unit is NOT compatible with

their machine without a minor patch in the operating software.

Speech sound cartridge. Visually disabled users, or people working with EBM or young children, may find that a cartridge which 'speaks' of string output, even articulating numbers correctly, is an extremely valuable aid. More trivially, the entertainment value of the 'talking computer' delights little old me, as well as the chronological children. The Tandy speech-sound cartridge is totally compatible with the Dragon, and in addition it speech can be programmed to provide sound effects and music in three voices. That said, programming it is not a trivial task, and no Dragon compatible software exists (that I am aware of) to make it easier. However, for the brave and the bold, the manual supplied is comprehensive. Simply using the programmed-in speech is easy enough, however. The unit contains 2K of on-board buffer so speech and sounds can proceed without stopping the rest of the computer's activity. The speech provides the finest quality of speech quality I'd perhaps ever heard in the digitised sounds from today's generation of machines, but perfectly understandable and usable. Fyoo, like me, bought the software. Compuserge said were disappointed, not assured, this unit is far superior. One point: this unit does not appear to work with the Dragon 32 via a Multi-pak interface. I don't know why. Incidentally, CoCo OS-9 users with a Multi-pak and speech sound cartridge, interested in computer music (there must be someone else) should get a copy of Pat — a music composer program — this is highly recommended.

JOB systems produced a speech-sound unit for the D02, but I've never seen it, so can't comment.

QeQuest80. This unit is really only of interest to CoCo owners. It is strictly speaking possible to operate it from the Dragon, but the unit needs the keyboard directly so you need to work out a key assignment chart. Also, the more sophisticated functions of disc and RS232/IO are only available to the CoCo user. For the record, the unit provides 5-voice fun channel music synthesis in high quality, and, via a multi-pak, will save/load disc files, and download from bulletin boards. Users are invited to contact me to exchange music.

Dragon's Claw. Lucidata introduced this unit which emulated the BBC user port. Relatively cheap, and piggy-backed the DOS cartridge, it appeared quite useful. However, the digitising camera that was advertised to use with this seemed expensive and of poor resolution. It is also the case that the user port is not especially well supported on the Basic.

Kit. There are three Dragon-specific kits available from Mapple, and several Dragon-related projects were published in electronics magazines.

Extendiprot. This has to be the simplest construction project. The complete review (hello!) can complete this satisfactorily.

The units simply a small pcb that takes the connector to the cartridge port a few inches away from the computer case and rotates it through 90 degrees.

Monitor interface. Perhaps the next move might be to attempt this device. It is rather more complicated. The completed kit will allow the CG2 screen connected to a monitor. At about £14, it is much cheaper than any competition, and will install itself.

I/O port. Build a device which will allow you to drive a number of relays from the computer. You could then use the relays to control a modern relay, switch house lighting and so on according to a program you write. You were away on holiday, create a timeswitch for your microwave recorder.

Building a project from plans published in a magazine is a more difficult enterprise than putting together a kit.

Hard disc.

Small (5 or 10 Mbytes) hard discs are being introduced cheaply. When used under DOS 3, a hard disc really lets loose the power of the operating system. The 64K memory expansion is easily overcome by the vast storage space offered. A hard disc can be straightforwardly connected to a Dragon, although not recommended for do-it-yourselfers unless experienced. Interfacing and connecting the hard disc controller and drive is simple enough — wiring it into the circuit board however is tricky. I hope to be able to write on that in more detail in the future.

Display device. Computers are often compared by Joe Public on the basis of the display device — the number of colours, graphic resolution and speed are subjectively compared. The new generation of

machines have 'pretty' graphic interfaces, and custom chips to enhance the speed, resolution and colours in graphic displays.

The display device in the Dragon has always been a weak point — the 32 by 16 upper case only 'window' (blank screen) around the active screen looked dated when it was introduced, never bright lines.

Compuserve still sell the Dragonpics. In addition to the cam, it provides an 80 column full screen display. However, I understand that it is monochrome only. I do not know whether high resolution graphics are supported through it.

It would be desirable, don't you agree, if a modern, multi-colour display device offering all that is expected nowadays — upper and lower case, 80 columns or more by 20 or more lines, refreshable characters, multicolours and high resolution graphics, could be developed at a realistic price.

Dragonsoft

often appear in the same places in different games, which means that after having played the game for a few weeks a person with a good memory could be able to complete it from the start without the opponent getting a try.

The game is for 1 to 4 players, although it is not very interesting for only one. For more players it is a good game. First you choose two squares to uncover the objects beneath. I liked the fact that either the number or the letter could be entered first. If a square has already been uncovered you are told that it is a void move and a selection out of range is ignored, allowing you another choice. If the objects match you are allowed two more squares until you fail to match when it is the next player's turn.

On a successful match, you are greeted with a quick burst of *Rainforest Keep Falling On My Head!*, and more at the end of the game. If two or more players tie for first place then the game is declared a draw as there is no clear winner. To sum up this is a game which is simply but attractively done and I appreciated the little touches of humour in the descriptions of some of the objects.

I would have preferred more choice in the degree of difficulty with a least one other in between these two. My eldest son who is a expert at this actually enjoys playing this game so nobody should write it off as not being their type of game. There is certainly a shortage lately of any kind of educa-

tional software and more, similar programs should be encouraged.

When my Dragon was a pup we had superior educational programs even to the *Master-App-II* BBC. The label states that this program will run on Dragon 3264 or Tandy Goco 32K but I have only run on the Dragon (3008-64 and 32).

John Scott



No herrings in this pyramid

Program: Pyradventure — Amstrad
Supplier: Dragonfire Services
Price: £300 cassette plus 50p P&P

FROM the start I had problems with this adventure but not of the usual type. I was unable to load it so I found Andrew Hill's telephone number and he apologised and sent out another copy immediately. As this one also failed to load I tried a different approach and borrowed a Dragon 32 as I own a 64. Lo and behold both copies loaded first time complete with 'real speech', which turned out to be a recorded message on the tape played back during loading, very difficult to understand and also a different level from the program so that you end up turning the volume up and then down.

When it is loaded you are

told that you have to find the Mask of Amenophis III and return it to the starting point with other treasure that you will find on your travels. Directions cannot be input as a single letter and I think that this detracts from the enjoyment of the game. However, this is more than made up for by the plot and the challenges which you encounter on your travels.

I liked especially the little touch of no deaths or serious damage caused despite your attempts at violence. I do not like adventures which are made too complex requiring completely logical actions in order to complete them. This one is certainly not like that, although you do have

to think hard about what you do in certain areas.

One of the facts that you require is in a seemingly illogical place but a clue is given to the hedges by an action you have to take in progress inside the pyramid itself. You are limited to the number of items you can carry so thought has to be given as to what item will be needed where. The cave complex is very difficult as mapping helps you to get in to find the objects, but then you seem to be in a different location when you try to retrace your steps, although it is quite possible to get out if you persist.

I nearly missed one of the items in the caves as I



Dragonsoft

Continued from previous page appeared to be wandering aimlessly but carried on and suddenly came upon a different description to my surroundings which led me to a very important item. There are no 'achievements' in this adventure and everything has its use. Take note also of the loading of the screen as there is at least one clue there.

All in all I really enjoyed it as will every adventure, although it is slightly spoiled by having to type 'GO N' at least on every location change. I have since tried this adventure on a Dragon 32 that will not accept the speed keys and the machine crashed. I have contacted Andrew Hill to inform him of these problems and he assured me that they would soon have it working for all

machines, so if you wish to buy it, please let him what your machine is so that you can be sure of a working copy.

I wish programmers would not put in the speed keys without a question about whether your machine can handle it or not at the very beginning, as I will not use it and I know of others who will not use it at all. It also restricts the number of machines that can run their software. I think that this is Tim Whead's first commercial adventure and it is not presented as well as screens as some of the others we have treated to, but rate the actual adventure as one of the best I have come across, and well worth buying when the problems are sorted out.

Mike Durr



A handy new Boot

Program: Orange Boot
Supplier: Orange Software,
The Garth, Star Road, Nant-y-Gery, Aberystwyth, NPP20P

This is a useful facility which will install a 'boot' facility on a Dragon DOS disc. It will work on Dragon DOS v1.0, Super-disk II, Superdisk V6, Douglas V4, and Cumana DOS 1.2 at least, and may be discovered to work with other versions.

Although BOOT is a standard facility the Dragon manufacturers do not give an explanation on how to achieve it. Several methods have been published in various magazines, however all contain their own peculiarities and idiosyncrasies to specific versions of Dragon DOS. Orange Boot overcomes these.

Orange Boot will check that the necessary sector on the disc to accommodate the BOOT facility is not occupied by existing data, so it is possible to install a BOOT sector on an existing disk. This will only check for data that has been stored using standard SAVE or PWRITE commands. Discs that have had data stored on them using the SHWRITE command should not be used unless that data is no longer required or the disc is reformatted. A new disc should be formatted with DDFORMAT before using Orange Boot.

If a disc with Orange Boot is reformatted, the BOOT sector will be deleted. The program will, of course, also check to see if there is an existing BOOT sector on the disc and give you the option to overwrite it with a new version if you want to. It will also protect its own memory sector on the disc to prevent it being overwritten by normal SAVE or PWRITE commands, but it can be destroyed using the SHWRITE command, so care should be taken with any program that uses this command. Orange Boot resides on track 6, sector 3 and will only reduce the total disc memory space by 288 bytes.

This may sound very complicated on paper but it is remarkably easy to use, as having done it checks the program will actually tell you that you cannot use the disc if the BOOT sector is occupied by data, whereas of course you must either move the data to another sector or reformat the disc, and then gives you the option to QUIT or restart with another.

The program also enables you to select one of up to four disc drives which again allows flexibility in use. It asks which file name you wish to BOOT and gives a history table if you try not to, together with that familiar 'Sound 160' that program authors love so much!

Overall a very neat package and well worth the price.

P. L. H. Henshaw



Done in a Klik

Program: KLIK Utility
Supplier: Harris Movers
Software
Price: £14.95

WIDE, Movers used if someone could do a review of KLIK for Basic42 by Harris Movers Software, here is my rendition:

First there was Basic42, it has a nice screen driver, giving a 42 by 24 lines text screen, plus the ability to return to the Basic 32 by 16 text screen at will. On booting the disc, the system switches the D04 into 84K mode, copies the DOS and Basic from mag to mag, loads the Basic42 into the queue 74K slot in the cartridge area (discovering info 48, the remaining 13K being reserved for Basic42 utilities), leaving the full 232 84K Basic area free for use.

The utilities available are Speed and Type, which turn your Dragon into a typewriter and give it a printer buffer of 32K, allowing you to type and print at the same time. This is followed by DOS Utility, a per-screen menu and window allowing use of DOS commands using the cursor keys to scroll up and down the menu. Then comes Icons, which is a bit complicated, so that I haven't got right into it yet, and now there is KLIK!

KLIK is a multitasking console. Briefly, KLIK contains all the above utilities, but more-ups date and enhanced, and allows full disc control via keyboard or joystick (preferred), using the keyboard only for inputs. Full use is made of just down menus (there are one of them). Each menu allows drive definition, window size and position, the type and direct commands (either Basic, DOS, or Basic42). There are three menus with at least sixteen commands in each — without counting about 60-plus are available, all at the touch of a joystick.

Menus available are main, edit, DOS, jobs, desktop, access, speed, camera and memo.

Jobs allows full editing facilities and program run. DOS is a disc management menu. A full disc requiring PROTECT ON can be done one file at a time in less than five minutes, without touching

the keyboard.

Desktop can be used to call up the next four accessories, or they can be accessed up on their own.

Memo is a set of note pads written by you and stored on disc to recall.

Speed saves a printed output to disc faster printing at a later time.

Camera saves a video screen to disc. Ie, I haven't tried this one yet.

Jobs is a one line word processor for jobbing or writing articles to Dragon User. This was written using Jobs.

One other which is on the disc is KBasic, this allows you to write your own menus and windows for inclusion in your own programs.

As an example, power up, insert KLIK disc, type BOOT, use cursor keys to select MENU, enter, enter, now you are in the joystick mode.

From now on there is a non-destructive cursor under joystick control (use fire button for enter). Now select RUN or LOAD (run or better), press fire. You will now see a new type of DIR, nice cursor over the required COMMAND (move to CURSOR at the bottom for further DIR), press fire. Your selected program/utility is loaded and run.

The above is a very brief description of KLIK, which may be used to be appreciated. My own opinion is that it was not produced early enough to keep Dragon interested going.

Full thanks to Mr. Harris for the time and effort that has gone into this. All in all it is a spreadsheet and full blown word processor on the same lines, but for all those who have not as yet purchased any of the above, do so. You need a 64 and disc drive.

One final Basic42 on disc can be used as a screen driver for your Basic program, just after your print and locations to suit the 42 column screen. It does both a lot better.

Mr. Harris can be found at Harris Movers Software, 48 Aberystwyth Road, Mollwyns TW3 4HT. Tel. 021 570 8035. He is very helpful.

F. J. Fisher



Expert's Arcade Arena

SIREWTH What? No! Surely not. I can't have missed the May deadline, not already. Hint, that's what an illness does for you! Anyway, having recovered from the code in my date (which it was more of a flu, but had to get the joke in), my absence has paved the way for an oversized bumper column.

Yes, I asked for it, I got it. Written exclusively for my readers of Dragon User, I'm proud to present to you Paul Bugh's *Chuckie Egg* screen designer. After the competitive chaos of the last high-score, it certainly proves that the old territory is very much alive. Thanks P. B. Unfortunately, though, that's just the good news. The bad news is that it's fairly lengthy, so I've split it into two parts and you'll have to wait until the next column for the instructions, user's guide and the rest of the program data. For the time being, just try to keep the coffee mugs away from parsons. This is the first time that I've featured a program like this in the arena, so don't forget to write and send me your comments.

Next, this month — Chess. No, no, please, don't start over, you see on the right page. You see, if you'll let me, I'll explain it now. Chess isn't strictly an arcade game, but, involving any insult to Hercules' brother in the office next door, it's not exactly his department either.

What I've got for you is a map showing the solution to the centuries-old challenge known as The Knight's Tour. This is a strategy puzzle whereby a chess knight starts on a 6x8 board

and starts on any square on a chessboard and is moved, sequentially, to every other square, but must not visit any square twice.

Anyway, if you cast your minds back to May 1985, you'll find that Dragon User printed a Dragon version of this puzzle, by Pat McCole and Colin Turner. It's actually my favourite game which has been printed in DU, so I was rather pleased when S. Rowland (I hope this isn't the staff of the return of the Phantom Name Shuttle!) sent me this newly presented solution. Apart from being a good friend, it's someone of those things that a lot of people have just always wanted to know, anyway.

It's a sheet (what? you mean? It says that all you do is find the corresponding square to the current position and follow the line in any direction. The line then points to all the squares you need to visit to finish the game — and it certainly works.

Now then, I'll give you the Altair help that I promised you... rain or shine, for last month. (It's lucky that I didn't mention any other types of weather.) The first letter comes from some gem who's getting his crawling head finally screwed on and begins, "Having read your column with the greatest interest ever since it began". Thanks, thanks, but take note Nicholas the gottawenther's name, fattery will get you everywhere especially where I'm concerned. Anyway, shooting past the final hours and eventually reaching the goal, he would like me to put in his address so that he can become an Altair agony aunt (I'm sure there's someone there somewhere, but

I can't quite think what it is). His humble abode can be contacted as follows: Nicholas, 38 Millbrook Road, West Wingford, Nottingham, NG2 7PS. Tel. 09020 810352. That should keep him busy. He claims to have finished the game, using various cheat POKEs — Ooo, a superhero, what can I say — and informs me that the final message is "Congratulations. The wizard is very pleased. He says 'Well done, boy, I think I'll change you back to a human now'". The wizard changes you man who blazes up and down with glee. Well, how nah?

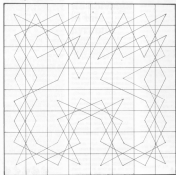
Altairhelp

To complete the screen which is SE, SE, SW, SW, SW, SW, SW jumpspace directions from the start screen, you must create a set of steps using the blocks which can be found in the screen NE, SE from there. To place the blocks in their required positions, you must use a joystick. When a block has been collected, centre the joystick, then point it slightly towards the direction in which you wish to place the block — but not far enough for the ball to move. You can then press SPACE to place the block exactly where it is needed.

Actually, the more important reason for his letter was sorted he could tell us all that if you use the lives, POKe with the game, you have to sit at the computer for hours, killing off all your lives so that a crucifix appears at the start of your next game, and it becomes possible to finish. Well, he is in fact wrong. All you need to do is find the spellbook and drop it in the starting room. You then press "M" when the wizard offers you his challenge and you die. Next, you start another game (why is it that all games programmers believe in reincarnation?) and the crucifix will appear, as it always does, at your place of death.

Right, now to the solution to the other difficult screen, brought to you courtesy of Robert Hough and yours truly. Robert wrote to me to confirm that you do in fact solve it using the boxes which can be found in a nearby screen. Since this is how the whole world suspected that it could be done, but found it impossible, I loaded up the game and stuck with it until I eventually found the answer. I discovered that the reason why only half of the Dragon community could do the screen, when everyone else had no problems at all, is that the screen is impossible using the keyboard. A satanically vicious shooting party has been despatched to find Ed Solo.

By the way, don't worry Nick Hodge, I never read the inferior adventure column! Well, since the end of the column is approaching rapidly, I'd better sign off. Don't miss next month, when it will, of course, be presenting the final part of the Chuckie Egg screen designer and I may just have space to squeeze in the special coder for Felix Salt, which has just come in.



HEXLOADER

```

10 REM
20 REM HEXLOADER WITH WEIGHTED
30 REM CHECKSUM, ENTER THE START
40 REM ADDRESS FIRSTLY, THEN EACH
50 REM LINE OF HEX DATA FOLLOWED
60 REM BY THE CHECKSUM.
70 REM
80 GOSUB POLDARI: CLEAR S0, S700
90 INPUT "ENTER START ADDRESS"; S
100 PRINTS: T=0: W=1: LINE INPUT " "; L
110 FOR S=L TO S2 STEP S
120 S=VAL("AH"+STR$(S/256, 2))
130 T=T+(L*W*W)*POKE(S*256+1, L)
140 W=W+1: NEXT
150 S=S+1: W=1: G
160 IF W=L THEN W=1: G
170 S=S+1: IF S=9999 AND S<=1599 AND S<
  32768 THEN L00

```

LISTING 1

```

7690 1841F7385862579C0070B7 = 0205
7691 14462752F10E77988F52F2 = 0265
7702 19E7F86663CA7999C7F5925 = 1622
7715 1F78E5E9E100E1E32648027 = 1970
7724 194670600F0393048434055 = 1500
7725 14348194540494747490550 = 1201
7746 1473D14445404297495941 = 1250
7757 1934C494255247474E4838 = 122F
7760 149534940454328499F494C = 1271
7779 149324953495449449F24945 = 1289
7790 149344F4945444495493E34 = 147F
7801 1477C1F73186E03999F3931 = 1242
7812 13F2494880E1F770E1F790C = 214F
7823 10187376771F79D0310789 = 0494
7834 198C9C11425032613771F74 = 190D
7845 1E79999C946999F999C9C6 = 05E2
7856 194319999F94999F999F9436 = 1044
7867 1F79D1F76103798299F76 = 1894
7878 14699C6293D1888484791E2 = 120C
7889 1988E649C946999F999F99 = 219D
7900 19424F81E122009791F7518 = 1899
7911 1279807791F794910E283D = 1544
7922 1188E4671E12200969139 = 180E
7933 1E999C646C946C946C946C13 = 1299
7944 19829428F21E12200C610 = 1900
7955 1188E31F77319999F9468947 = 1F03
7966 198C9C6F9312D3418C62646 = 192D
7977 1989F98C9C9F9318F631F74 = 1C75
7988 1583418E1F779F1F798E64 = 18E5
7999 1C84680040C4940E680C48C = 10C7
8010 1244496D04040E680C48C534 = 10C9
8021 18449E04040E680C48C3484 = 1703
8032 149E9F940C6D6730731140 = 2040
8043 148186F1F777E1D000000000 = 93D
8054 1987980C31041494E223F61 = 1114

```

LISTING 2

```

15260 1884F8C30990F25029F710 = 1495
15271 19E299F1D66640F94A93F70 = 0F17
15282 184494F40594939E7905F40 = 0240
15293 1944949C790F740594059E7 = 0F99
15404 18849804042479808979023 = 0809
15415 1849E23200F7100E21E0010 = 76F
15426 17E329100E3052F73D444 = 0813
15437 194838137948183263C7C30 = 0907
15448 1441F189329499441F6731 = 06C7
15459 138498495949394997016F = 0875
15470 18448484818327814F8F99C = 0878
15481 1843F189329C41F278C684 = 1768
15492 1888427E781832783289C6D = 194F
15503 182649840499C7D1827F8E2 = 220C
15514 19E297F344949491822794 = 1284
15525 1838326427C3D481F189329 = 18C7
15536 13484C41F700E2944394956 = 1694
15547 149584987906F8424184F84 = 1805
15558 149813088C94C49C782414 = 1784
15569 148484182348C9484818237 = 4F18
15580 1E7818327E32894818327F8 = 1702
15591 18448C25184889C7925947E = 178C
15602 1E3887999C7C188489C789 = 2188
15613 158C4F9189F18C688488E3D = 1683
15624 14948887980C6F98C8187 = 20F2
15635 13848849F63D47189E188E = 1841
15646 1829F84404F98C3C75F39 = 18F8
15657 184788781478E41888F8148 = 1682
15668 18849479F298E4D479F94D = 223F
15679 148887E4188F88888F888 = 1847

```

LISTING 3

```

30580 1884C18C7979C815318C759 = 1304
30619 1948154249F847798F45205 = 2928
30630 1F7778E8752052881704145 = 1881
30641 118C68420876180384C036 = 1877
30652 1F7234F7979F237C34986 = 298C
30663 15795184C689F848875195 = 179C
30674 1845797187F4843805CF284 = 1855
30685 1E29994FF8F288D788487C = 154E
30696 188851828E5CF24748484 = 1857
30707 1484848484848484848484F = 1385
30718 18F188F188F498C68C8879 = 168C
30729 1264889C70C4F78E184F79F = 2058
30740 138484848718F9E3C88E184 = 1F95
30751 12F482E118F7848D78D989 = 2148
30762 18F812888112888888C21E2 = 88C2
30773 1848151848C87815884159 = 14F9
30784 18888781978828819284 = 06D
30795 1418C88C8C888848278881 = 19F9
30806 12F2482541C8E78C8F9188 = 1F62
30817 12785C4884884484848484 = 1F88
30828 13404801927888F198C9F39 = 0C35
30839 1828711E1238838418E784 = 10C4
30850 1887821E12388288482788 = 778
30861 188823888C198113252DC1 = 1148
30872 18718C79F7C188C68F81827 = 330
30883 1F774888485418277F6CC1 = 1F82

```

Pamcodes

Part six of Pam D'Arcy's introduction to machine code

"LOOK out, you may have to wrap it up", says the editor, so I am writing this in a wrapped-up frame of mind. I maintained last month that there has been an increase in feedback — now, I thought, that may be able to assist across them in the column, I feel I will be swamped with them! Seriously, though, I will attempt to help anyone approaching me in writing with machine code problems if accompanied by loose postage stamps for the reply — though response time may be slow as, to be honest, I am currently getting to grips with a 90-bit machine.

My initial plan for this series was to enable absolute beginners to learn enough about the basic assembler instructions to be able to try *naïveté* — that is, put yourself in the place of the computer and work through the program, seeing the effect that instructions being executed have on registers and memory, and so being able to spot misprints, omissions and being able to put it right (a page wide is not your own needs). Having written the first drafts of the sections on indirect addressing and postfixed negative numbers, it is patently obvious that I am not going to get anywhere near my target of completing the book regarding you in two pages to permit the best course to take is to try and present these two sections as completely as I can for now.

Indirect addressing

I have covered the other modes of addressing (extended, indexed, direct) previously intending to defer indirect until a good example arose for building on. Instead, I have come up with an artificial example (indirect addressing can be spotted in source listings because the operand, in Motorola notation, is enclosed within square brackets — both rather for the user in that the symbols are marked on the keyboard and for editing in that Dream uses shift plus arrow/arrow-sticking functions. Thus this is an area to look out for when entering listings from books and magazines, I will use the Dream conventions of round brackets to denote indirect addressing.

Trying to find an analogy, I suppose indirect addressing is rather like pointing a letter. You post it in a local post box — but that is not the letter's intended final destination, which is written on the envelope. Thus the address arrived at from the operand (postbox) is not the address of the byte(s) for the load/store/compare, etc but contains a further address (on the envelope) detailing the intended destination.

So, if

memory address	contents
\$6000	0F0

\$6001	00
\$6002	23
\$6003	41 ('C')
\$6004	42 ('B')
\$6005	00
\$6006	43 ('C')

LDR \$6000 (=extended addressing) copies contents of \$6000=0F0 into register A

LDA X(=indexed addressing) copies contents of \$6000+\$41 ('A') into register A

(Obviously in this example, LDR \$7000 would arrive at the same answer, but we will assume that the contents of \$6000 contains an address that is changed during processing — such as may occur when sorting data into alphabetical sequence). Indirect addressing avoids the need to set up the intermediary register in this instance.

LDR \$6000(=Get the (=envelope) address (\$7000) from the operand (postbox) address (\$6000) and copy into register A the value at that envelope address \$41 = 'A').

The operand contained in the brackets may take any of these indexed forms covered previously. Indexed addressing may not be encountered very often but beware when it is present for mistakes can arise as easily as mistaking the hash symbol from an immediate operand. For instance,

LDR \$6000 is very different from LDR #+\$6000

LDA	(X)	LDA	(X)
-----	-----	-----	-----

as the first example treats the contents of register R (\$6000) as the postbox pointing to an (envelope) address of \$4147 — resulting in the null (\$00) from \$47 being copied into register A whereas the second example loads the actual number \$6000 into register A — the postbox containing the (envelope) address \$7000 etc as required.

Note also that any indexing applied to a register within the brackets is used to calculate the initial (postbox) address and does not enter the final (envelope) address. That is, the letter 'B' in location \$7001 cannot be pointed up by

LDR (\$6000)

.

.

.

LDR (X)

Using the values allocated to this example above, this would result in a (postbox) address of \$6001 leading to a destination (envelope) address of \$0623 — resulting in the letter 'C' (\$43) being copied into register A.

(I can have a quick, though not too prac-

cal, example of using indirect addressing (initialised by setting variable in Basic, pass its address to an assembler routine that will alter its content, return to Basic and print out the amended string. Type in and assemble listing one (but don't yet run as it requires a parameter to be set up in location \$AD3F). Type in the Basic program listing two. Running the Basic program will result in the string being changed from "HELLO" to "THERE". A few words of explanation may be helpful (particularly considering the number of times I made an error) (the way, meaningless example is worth).

a) \$AD3FH places the address of the 2-byte string descriptor in variable K. The first byte of this area contains the length of the string and the third and fourth bytes contain the actual memory address of the string data.

b) The string (=envelope) address is copied (PEEKed) into the parameter area (= postbox) of the assembler routine.

c) The assembler routine overwrites the space character at the beginning of the string with a letter 'T' using indirect addressing (ADDR(PC)=postbox/contents = (envelope)=destination address).

d) A final comment concerning the way that the variable VS has been set up: by running the program with line 30 as I initially had it

30 VS = "HELLO"

LIST V, RUN then LIST it again. Do you see the problem?

I have suggested previously that the article finding out what Dragon memory has in store by Rodney Jones, as published in the August 1983 issue, be reprinted. (Well, see what we can do — Z!) It is the only one of its nature that I have ever seen appear in Dragon (and I have never got round to expanding it. The article details the layout of a Basic program in memory — and from it I learned what I forgot when first writing these few lines of listing two — the efficient Basic interpreter will associate a string variable with the address of a present string within the program area rather than unnecessarily taking up string variables stack space — hence the amending of our program line 30 to VS="THERE". By manipulating the string content, the new string is stored on the string variables stack and hence the program content remains unchanged.

Positive and negative

To the computer a byte is just that — a byte, containing 8 signals. The Dragon (\$20 and \$40) contains 8-bit bytes (or locations or memory addresses) each containing a value at any one time of 0-255 (sum of

Figure one

Most significant bit	Least significant bit	
7	0	bit number in byte
159	64	decimal value if bit set on = 1
0	4	bit representation

decimal representations of an bit, The 256 and 848 in 256 mode have all three memory locations accessible — it is just that the location above address 32767 can only be read, not written to (Read Only Memory = ROM). Most values, often in conjunction with up to the next four adjacent memory bytes, represent a legitimate machine code instruction, so, as suggested in previous articles, if we direct the computer to any address in its memory it will attempt to obey the contents of the bytes (or contents as if they were legitimate program instructions).

However, it is not who are the wizards — the computer itself always obeys our commands — and thus, supporting the instruction set, the value in a byte can be many things depending on circumstances. Take a byte in hex 0, 1, 2, 3 and 4 set. This is the value \$0F, or, in decimal, 76. If it is part of our program, it would be the computer instruction.

CLRF

(Clear) register A — set all its bits to 0. If it was a byte within a message that we were displaying on the screen, it would be the capital letter O. We could also be using it in the fashion of the CCP with individual bits being set or otherwise representing individual conditions within our program.

Numeric values can have a further dimension. A byte can contain a decimal value of up to 255. What, however, about negative numbers? This is achieved by using the most significant bit of the byte, bit 7, as a sign bit:

0 = positive number
1 = negative number

Because of 8-bit being used to indicate the sign, only seven bits of the byte remain for representing the value approximately halving the possible maximum value (the bit representing decimal 128 is now the sign bit), which is where the range +127 to -128 comes in. The only other complication is that although 1 positive to just bit 0 of a byte set, 1 negative is NOT bit 7 and bit 0 set, as negative numbers are set in a form known as two's complement. The bit pattern for a negative value can be ascertained by subtracting the value from 256, for example, -4 = 256 - 4 = 252 or FF. The contents of registers A, and B and single memory bytes can be reversed from positive to negative and vice-versa using the NEGate instruction (note the difference from the COMplement instruction that simply reverses the state of the bit pattern, so that a value of \$FF (0) NEGated would give \$01 (1) whereas a value of \$FF COMPLEMENTed would give \$00 (after carry-inverting). The latter may be seen described as ones complement as differ-

ent from the two's complement format of positive and negative numbers.

As far as the machine code instructions are concerned, values in a byte are what they mean to us in our program at that time. For instance if a byte contains \$50, it may be regarded in context as:

- an unsigned decimal value of 80
- a signed decimal value of +80
- the ASCII character P
- bits 4 and 6 of a byte set

If the value exceeded \$FF, that is, bit 7 is set, there is no normal ASCII value that is associated with it, but again, the contents of the byte can have a number of different meanings according to the context, for instance:

- an unsigned decimal value of 149
- a signed decimal value of -87
- bits 7, 4, 5, 6 of a byte set

Double bytes are 16 bits wide and the decimal counting progression continues as though the figure one sequence, bit 0 being worth 256 etc., through to bit 15 being worth 32768, with all 16 bits being set resulting \$65536.

All unsigned values are regarded as positive values, signed values are positive if bit 7 of a single byte (bit 15 of a double byte) is 0, negative if that bit is set to 1.

The important thing to watch out for in our programming is that we do not accidentally use signed rather than unsigned instruction and vice-versa. For instance, if clearing an area of memory, an efficient way of coding it would be to put a count in register A or B and use that as a register offset, DEC A or DEC B analogously, looping back if all positive thus:

```
LEAX MEM,PC
LDA #99  ;to clear 100 bytes
        address MEM+MEM+99
```

```
LOOP:CLR A,X
      DEC A
      BPL LOOP
```

RTS MEM FWD 100

An easy slip to make is using register offsets in particular and single byte counts when there is the possibility of sign bit interference. Offsets are regarded as being signed values (so may be in the range -3 to +127) or -128 for single bytes; +3 to +32767 or -32768 for double byte values, for example, register D offsets, if the area to be cleared is, say, 200 bytes long and a single register offset/count of 199 is set up, as the value has bit 7 set (\$C7), the first address to be cleared will be seen to have a negative offset (1 + 199 = same bit pattern as bit 0) with the result that the first CLR will actually clear memory address MEM+1 rather than MEM+199 and the loop will terminate immediately as the BPL conditional branch would fail first time round, bit 7 of register A being set (=negative).

The negative inference is something to watch out for if using the LEA instruction for arithmetic. Using a constant offset (eg LEAX 200,X) will not cause problems as the assembler will generate a positive, double-byte offset value. The problem is that if one is varying the increment value using register offsets, one must be absolutely sure of the range of values one is dealing with and code appropriately (eg using double byte register D if a positive value >127 will never need to be added).

There is one method of adding a single byte positive value to a register — the ADD instruction (add the unsigned + positively treated contents of register B to the contents of register X). It is difficult without obvious examples isn't it?

I am sorry that this is a somewhat less than satisfactory article, but we contributors weren't all sure what was to become of us at the time. I think we should all give thanks to Sunshine Publications for five years of Oregon User for our magnificent machine.

5000	* LISTING 1
5001	*
5002	* INDIRECT (FILENAME)
5003	*
5004	* USING DREAM AFTER
5005	* CLEAR: 200, &+2000
5006	
5007	
5008	16000C LBRW GD
5009	0000 ADDR FCB 0
500A	
500B	0654 GD LBA # ' 1'
500C	A79CF9 STA I(ADDR,PC)
500D	39 RTS
500E	
500F	
10	REM LISTING 2
20	EA=&C000;PARAM=&+3
30	VA="HERE";VA=""+"VA
40	PRINT VA
50	V=&VPTR(V);
60	POKE PARAM,PEEK(V+2)
70	POKE PARAM+1,PEEK(V+3)
80	EXEC EA
90	PRINT VA
100	END

Slowing it down

Red Newman gets the Cumana directory under control

I HAVE a Cumana DOS. Typing DIR from the keyboard lists details of every file on a given disk. The display runs at the rate of lines — so I only see details of the last few files.

Dragon can be halted by pressing keys other than the keyboard. Pressing any key will get Dragon going again. Using this trick will stop the DIR display at the end of ten entries. But not even Hyper Exp would have been quick enough on the disk.

Here is a utility which causes all printers to run slowly. This allows the DIR display to be read as it runs. Slowing can be used in a practical way. You have to keep the keys down until the display stops since the DOS will not let the poor keys get a look in until it has dealt with a batch of file files. Push any key to continue the display on its way.

The utility is in fact general purpose. It can be far modified on and off as needed either from the keyboard, from a Basic program or from a machine code program.

The utility is written in machine code. It can be loaded onto the disc by the loader. Listing 1. The loader also loads the code into memory.

If you look at the loader you will see at the start of line 108 SAVE YOURNAME. You can of course leave it that but the idea is that you substitute YOURNAME for any name you like. I use "SF".

If you have no disc but have a cassette then change SAVE to COMSER. If you haven't either then leave the line out. You've got the code into memory anyway.

Having typed in the loader PUM4, if you have made no typing errors then after loading it will EXEC SF three times

while going, hopefully, some useful chat. Each time SF is EXECED it changes the state — from normal to slow or vice versa and indicates in which state printout has been left. Remember that each time you enter EXEC the state will change.

If you have made a mistake in typing in the loader program, DRAGON will probably tell you. If you have errors in the data lines then the screen will go out with wags! Hopefully it will also help you to catch down errors.

Once installed SF is not easily removed but there is little point in removing it, since it uses very little memory. Because it is in mic it does not interfere with Basic programs. Basic programs do interfere with each other so there is an advantage in loading SF as mic from disc or cassette. You will need to organise space for the mic. Typing in

```
CLEAR S0,SH7F00
```

and pressing ENTER will do.

No Basic program which has been previously loaded will be damaged, nor will be any mic program provided it does not use memory above SH7F00. That's why for S0800.

I have written the delay to come I think suitable but if you are any good at FORTRAN after then once SF is installed you can alter the delay by entering, from the keyboard, P0800#TEAM, N must be between 0 and 255. N has been set to 25. Delay is proportional to N. Care is needed, for if the SH7E4 is typed incorrectly all sorts of mayhem is possible! NOTE: NOTE! If you are using listings 2 or 4 the poke is

SH7FC4. The listings are for a second version of SF which leaves out the state indicator. SLOW can then be turned on and off from a program without the indicator spoiling the effect. Listing 2 shows the changes that have to be made to the loader. Line 20 has to be changed and to do the data lines. T0 and T1 are check sums. If you are lucky enough to have a Dragon 84 then after you have put it into the 84 mode you can put SF together in memory. Change line 10 in the loader to CLEAR 208,SH7F00,MS+SH7F01,CLS. For those who are familiar with mic, listings 3 and 4 are Assembler printouts from DREAM of the two versions of SF.

Some of you might like to know how SF works. In attempting to do this I'm probably on a hiding to nothing. Either you will know it all already or else it will be a waste of time. But here it goes.

The Basic character set routine (CHAROUT) is in mic. It contains a facility which enables the user to insert extra programs. SF makes use of this. It consists of three routines A, B and C.

C is an inline CHAROUT (small routine, A that takes a long time to run — it rounds down a fairly large number to zero. Every time CHAROUT tries to print out a character it has to wait for the counterdown.

Before I go any further I will explain how the insertion is arranged.

In order to understand how this is done you should first know that each operation performed by Dragon is specified by an instructional operation such as R00R DRAGON. This specifies an operation that the Dragon can suffer but not do!

Dragon programs consist of Statements which are usually arranged sequentially in memory and normally the operations follow the sequence. However Dragon provides operations that cause a jump out of sequence. Three of these — three of many — are referred to the "trick set". These are not operations and are roughly equivalent to those specified by the Basic instructions GOTO (lines), GOSUB (a line) and RETURN. GOTO causes a simple jump, GOSUB also causes a simple jump, but, as well, it causes the storage of a pointer to the next place in sequence after the jump statement. RETURN causes a jump back to the last pointer. The three statements could be given any names, say Tom, Dick and Harry if it calms AMP and DTS.

Listing one

```
10 CLEAR S0,SH7F00
20 T0=208+SH7F00
30 SH7F01=0
40 PRINT "Please enter your name (max 25 characters)"
50 READ S0:PRINT "Your name is:"
60 PRINT S0:PRINT "Enter your delay (max 255) (max 255) (max 255)"
70 T0=T0+SH7F00:PRINT "T0=":PRINT T0:PRINT "T1=":PRINT T1:PRINT "T2=":PRINT T2
80 IF T0=0 THEN PRINT "Please enter your name (max 25 characters)"
90 PRINT S0:PRINT "Your name is:"
100 GOTO SH7F00
110 EXEC SH7F00
120 PRINT "You can return to normal by typing EXEC on the key board"
130 PRINT " "
140 PRINT " "
150 PRINT " "
160 PRINT " "
170 PRINT " "
180 PRINT " "
190 PRINT " "
200 PRINT " "
210 PRINT " "
220 PRINT " "
230 PRINT " "
240 PRINT " "
250 PRINT " "
260 PRINT " "
270 PRINT " "
280 PRINT " "
290 PRINT " "
300 PRINT " "
310 PRINT " "
320 PRINT " "
330 PRINT " "
340 PRINT " "
350 PRINT " "
360 PRINT " "
370 PRINT " "
380 PRINT " "
390 PRINT " "
400 PRINT " "
410 PRINT " "
420 PRINT " "
430 PRINT " "
440 PRINT " "
450 PRINT " "
460 PRINT " "
470 PRINT " "
480 PRINT " "
490 PRINT " "
500 PRINT " "
510 PRINT " "
520 PRINT " "
530 PRINT " "
540 PRINT " "
550 PRINT " "
560 PRINT " "
570 PRINT " "
580 PRINT " "
590 PRINT " "
600 PRINT " "
610 PRINT " "
620 PRINT " "
630 PRINT " "
640 PRINT " "
650 PRINT " "
660 PRINT " "
670 PRINT " "
680 PRINT " "
690 PRINT " "
700 PRINT " "
710 PRINT " "
720 PRINT " "
730 PRINT " "
740 PRINT " "
750 PRINT " "
760 PRINT " "
770 PRINT " "
780 PRINT " "
790 PRINT " "
800 PRINT " "
810 PRINT " "
820 PRINT " "
830 PRINT " "
840 PRINT " "
850 PRINT " "
860 PRINT " "
870 PRINT " "
880 PRINT " "
890 PRINT " "
900 PRINT " "
910 PRINT " "
920 PRINT " "
930 PRINT " "
940 PRINT " "
950 PRINT " "
```

Listing two

in T08000000

```
100 PRINT " "
110 PRINT " "
120 PRINT " "
130 PRINT " "
140 PRINT " "
150 PRINT " "
160 PRINT " "
170 PRINT " "
180 PRINT " "
190 PRINT " "
200 PRINT " "
210 PRINT " "
220 PRINT " "
230 PRINT " "
240 PRINT " "
250 PRINT " "
260 PRINT " "
270 PRINT " "
280 PRINT " "
290 PRINT " "
300 PRINT " "
310 PRINT " "
320 PRINT " "
330 PRINT " "
340 PRINT " "
350 PRINT " "
360 PRINT " "
370 PRINT " "
380 PRINT " "
390 PRINT " "
400 PRINT " "
410 PRINT " "
420 PRINT " "
430 PRINT " "
440 PRINT " "
450 PRINT " "
460 PRINT " "
470 PRINT " "
480 PRINT " "
490 PRINT " "
500 PRINT " "
510 PRINT " "
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740 PRINT " "
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760 PRINT " "
770 PRINT " "
780 PRINT " "
790 PRINT " "
800 PRINT " "
810 PRINT " "
820 PRINT " "
830 PRINT " "
840 PRINT " "
850 PRINT " "
860 PRINT " "
870 PRINT " "
880 PRINT " "
890 PRINT " "
900 PRINT " "
910 PRINT " "
920 PRINT " "
930 PRINT " "
940 PRINT " "
950 PRINT " "
```

7F91	7F91	ORG	87F91	7FC7	8002		BSR	SR
7F91		PUL	88E21	7FC9	8088	8D	PULS	A, B, X, Y, PC
7F91	3435	PSH	A, B, X, Y	7FCB	108040E	SR	LDR	88040E
7F93	808877	JSR	88877	7FCF	8084	L2	LDR	.X
7F96	308040	LEAX	PROGA, PCR	7FD3	ED41		STD	.Y+
7F99	318C33	LEAY	PROGA, PCR	7FD8	EC02		LDR	2, X
7F9C	800160	CMPE	80160	7FD5	ED44		STD	.Y
7F9F	2714	MO	NP	7FD7	31481E		LEAY	30, Y
7FA1	860167	LDA	80167	7FDB	1080C5FF		CMPE	885FF
7FA4	8700	STA	.Y+	7FDE	280F		BNL	L2
7FA6	867E	LDA	867E	7FEO	39		RTS	
7FAD	870167	STA	80167	7FE1	3410	PROGA	PSHS	8
7FAD	FC0160	LDR	80160	7FE3	0E076C		LDR	81900
7FAE	ED44	STD	.Y	7FE4	801F	L3	LEAX	-1, X
7FB0	8F0160	STR	80160	7FE8	0C0000		CMPE	80
7FB2	308C3C	LEAX	NS, PCR	7FE8	26F9		BNL	L3
7FB4	8D13	BSR	SR	7FE9	3510		PULS	X
7FB6	200F	BRA	ED	7FEF	39	PROGA	RTS	
7FB8	4640	LDA	.Y+	7FF0	39		RTS	
7FBC	870167	STA	80167	7FF1	39		RTS	
7FBF	EC44	LDR	.Y	7FF2	334C4F37	NS	FCC	/SLOW/
7FC1	F00160	STD	80160	7FF4	46415354	NS	FCC	/FAST/
7FC4	308C3F	LEAX	NS, PCR	7FF6				

You should know that each Dragon memory unit can take up 256 states. This much called a byte. It can code any whole number from 0 to 255. A pair of bytes can store any number from 0 to just over 65000. If the bytes are N1, N2 then the number is: 256*N1+N2.

JMP JSR and RTS differ from their basic counterparts in that they jump to memory addresses rather than to a line. The JMP and JSR statements each use three bytes. The last two bytes specify the memory location to be jumped to. RTS only uses one byte.

Dragon not amused

Dragon puts aside three memory locations, 358, 360, 361 (sometimes called a hook) especially for the purpose of hooking code into CHAROUT. CHAROUT contains the instruction JSR 358 so it jumps to the hook. CHAROUT expects a return (RTS) and if it doesn't get it Dragon is liable to get very cross.

358, 360, 361 are RAM and so any byte value can be placed into them.

SP's C routine, to cause SLOW, POKES in JMP to SP's A1 and unPOKES it to return to normal. SP's B routine is at the

end of A. It could be just RTS and to cause a return to CHAROUT. Well it's not so easy as that. I mean it!

The question is, what was in the hook before?

It's always a good idea to have a look. By entering:

```
FOR I=358 TO 361:PEEK(I):NEXT I
```

You can do just that.

If you switch on a Dragon with no extras you will get 573757. Row 57 is RTS and it returns control straight back to CHAROUT. Obviously only the first 57 is needed, the others are ignored. If you are fitted with a Cumura DOS the numbers will be 10519480. On first switch on Dragon test put in 573757 but the DOS immediately pokes in 10519480.

105 is JMP. The 19480 specify where Dragon is to jump to. The two numbers are treated as a pair. The location is 194 times 256 plus 80. That is 49794.

So now you know that Cumura DOS has a routine starting at address 49794. If you think about it this WRTS is a sort of point-out. If you get rid of the DOSes, point at disc/WRTS become READS. This makes it hard to corrupt the disc, but it's not what you want.

If you have a Dragon DOS the numbers will be 105194790. It's best to work out where Dragon DOS starts its CHAROUT table.

Back on the hook

Before entering in the jump to SLOW, C must put what was in the hook to the end of A. To return to normal C must return to the hook's original contents.

To sum up. When C is EXECUTED, it looks to see if the JMP (to A) is in the hook. If this is not so then the contents of the hook are put on the end of A. C can now put JMP (to A) into the hook. That installs A. But if A is installed then C pokes back the original contents of the hook. This returns speed to normal. If you look look at the assembler listings you might expect to recognise some of the numbers. Well you would if you knew file. STS is 126, 339 is RT, 3C2900 is 49794. If you have a Cumura DOS why is the end of A, what is, 38, 38, 39 and not 76, 3C2, 507? Well C hasn't been EXECUTED yet. When it has 76, 3C2, 507 will be there.

I apologise for the terrible Dutch. But please read Plan D Any's articles on me. (Good hunting!)

Listing four

7F91	7F91	ORG	87F91	7FB2	4640	MP	LDA	.Y+
7F91		PUL	88E21	7FB4	870167		STR	80167
7F91	3435	PSH	A, B, X, Y	7FB7	EC44		LDR	.Y
7F93	808877	JSR	88877	7FB9	F00160		STD	80160
7F96	308040	LEAX	PROGA, PCR	7FBC	3586	ENDC	PULS	A, B, X, Y, PC
7F99	318C33	LEAY	PROGA, PCR	7FBE	8410	PROGA	PSHS	X
7F9C	800160	CMPE	80160	7FC0	8E1900		LDR	81900
7F9F	2714	MO	NP	7FC3	801F	L3	LEAX	-1, X
7FA1	860167	LDA	80167	7FC5	0C0000		CMPE	80
7FA4	8700	STA	.Y+	7FC8	26F9		BNL	L3
7FA6	867E	LDA	867E	7FCA	3510	PROGA	RTS	
7FAD	870167	STA	80167	7FCC	39		RTS	
7FAD	FC0160	LDR	80160	7FCE	39		RTS	
7FAE	ED44	STD	.Y	7FCE	39			
7FB0	8F0160	STR	80160	7FCF				
7FB2	308C3F	BRA	ENDC					

Ossett '88

Helen Armstrong shows up at the show

OSSETT Town Hall is as noble a pile as it appeared in last year's *Dragon User* photographs. This was my first visit to the popular Northern show site. Having survived kamikaze cross-country navigation to avoid the five-mile traffic jams generalised on the by the Motorways Authority for the bank holiday pleasure of M1 motorists, broken up a cat fight in Sheffield, dodged the local football gathering and arrived unscathed at Ossett, just south of Leeds, I found myself driving round and round what must be the world's shortest ring road, ever mindful of the little cupola at the apex which marked the position of the Town Hall as I tried to find the nearest car park.

Actually, the nearest car park, and the nearest nearest one, are just round the corner, the entrance wall hidden.

Ossett is not so much a town with a Hall as a Town Hall with a town attached to it. Inside the Hall, several assembly rooms for tables and chairs, there is a pleasant bar serving every variety from beer to tea and sandwiches, and plenty of chairs on which to sit and enjoy them.

As *Dragon User* had not committed itself to a stand, I was for the first time in history able to go right round the show and have a word with nearly everyone there, with the exception of Harry Whitehouse, who was whispering just as I arrived. Nothing personal, the day was wearing on and Harry wanted to get home to his tea. I do I never did find out whether he had brought and sold nine of his tatted new jysticks. This pleasure suits us all. Gossip flitted after him — is Harry in? Is he out? Will he come to the next show or won't he? 'He'll be coming to the next one after today!' squeaked one party, indicating that trading had been good.

Talking heads

First inside the door was organiser John Peters. How many people had been in? We don't really count heads any more, said John. We count the money and end of the day — then we can tell whether we'll be in a position to open another show. That's how it goes. Plans are already bubbling for a show in London in the autumn, although the organisers agree that they will have to try and cut the overheads on the 8000 Show. 'For many things like fifteen-darmed the stringers/when it eleven pounds space?' (or was it eleven damed the stringers/when it fifteen pounds space?) No matter, the point is that 'extra' has a way of popping out of the woodwork at fairs and individual fairs.

I was especially pleased to hear that Pam D'Arcy's Formula One, neatly packaged in a sealed plastic wrapper with full printed instructions, was selling very well.

Pam was sounding more optimistic about the chances of her tackling another game last time she wrote to *Dragon User*; perhaps this is the reason why.

In the meantime, I was astounded by a woeful David Meakin, protesting that Gordon Lee (who invented *Future Master* in last month's *DU*) must have deleted something by mistake, because all the instructions were within the program — pages of them — and he hadn't even mentioned the *Magical Justice*, which was one of the best bits. It's *DU*'s policy to take instructions as we find them and see how adequate they are, but it does seem as if something was missing, and I promised to moot this with Gordon. David also mentioned that he doubted that he would be doing *Music Maker 2* now — the usual reasons: economic necessity, other calls on his working time, etc. He relaxed slightly and said that he might if he had a thousand advance orders. Where have we heard that before?

Next along, Jonathan Carnright was demonstrating his recent release *Spy Against Spy*, available from Puffin Software, and a forthcoming release, *Utopia*, a tricky word-matching game, which he is still working on.

What about the rumoured *Rollback*? 'I know it, yes, said Jonathan, there is a bug, and I've got it fixed now and will have copies of the new edition ready soon. But so, I'm the only person who has come across it while playing the game is Mike Best of NDA/J? Yes, this ties up with the news coming into the *DU* office — there was a bug buried deep in the first edition of the game, but everyone who has played it and sent us a review has said what a good game it is. No worries. Bob Preston, who is selling *Rollback*, says that he can't find it either.

The NDUJ stand, manned by the aforementioned Mr. Best, was running some of the Group's homebuilt software and selling circuit diagrams and various hardware project sheets, including instructions for converting the *Dragon 3D* into a *Dragon 64*. 'Sold out' said Mike. No, said I, I don't want to buy one — I just wanted to see how much paper it covered. We had a project proposal for the conversion once, and it went on for pages.

People have sometimes asked me why *DU* has never published a conversion for the *Dragon*. This is mainly because calling up your hardware is very much an 'At Your Own Risk' affair and we can't want to encourage people who aren't experienced constructors to go ahead and try it. Have you ever seen the amount of mail a reasonably complicated hardware project generated? I used to work on a hardware magazine, and I still have the nightmares. NDUJ, however, have the plans.

Mike escorted me eagerly over to meet Graeme Smith of *Orange Software*, complete with orange shirt (just as he wrote as it sounds). This may have to do with the fact that *Orange* was showing several new games, as well as the new range of *Quixote* and other titles on disc, which have been licensed by Commodore. 'The first got Harry to sign the contract', said Graeme, mapping his brow. The discs were selling well at the show prices, a little lower than the normal retail price cost. New games on cassette from *Orange* include *Lucifer's Kingdom*, which Mike traded off with, *The Larkspur Ridge Part 2: The Journey Home* and, intriguingly, *The Great Fish War*. Scandalous! (Ironic that Mr. Van Scandal was in fact a Belgian *DU* reader who was quietly scotched).

Preston plonker

Bob Preston of R & A Preston had his tables covered with diverse goodies as usual. Some of them were quite familiar, to that black *Dragon* cover? No, alas, it's a black *Dragon* robot cover — not my size. I've been taken in the past before. Where did the dust covers and the supply of 1984 *Dragon* items come from? From Harry Whitehouse, of course. As *Dragon* dealers rationalise, speculate and streamline, similar stock lines pop up in new labels. Old *Dragon* gear never dies, it just finds a new home. As well as publishing new software, Bob specialises in sniffing out and resurrecting the old. He was looking quite pleased with himself, having come up from his home stamping ground in darkest Wales for the day. Would I like a plastic plonker? I don't care what your hands are made of, Bob — oh, I see. The Plonker is a tiny little toast rack for storing your discs in while you work. With a piece of strong sticky stuff to adhere it to the side of your monitor or printer. It's stout and scarier, holds four discs upright (no more coffee mug accidents), and though I suspect it of having been invented with 3.5in and 3.25in discs in mind, it will take six discs quite happily. It will actually take more than four 5.25in discs, because you can get five to a slot without pushing/grooving. I can't remember how much he said it cost, but it was a snip. Equipped next time you write to R&A/P.

I was also in the business of encouraging prizes for *Dragon* Club. Sadly, I was forced to turn down an offer of Mr. Preston himself and George Carnright, on the grounds that the two of them would be difficult and expensive to parcel out to ten winners, but carried away a bag full of the *Dragon Five Game Tape*, incorporating *Wolfgang* (sic), *Cliff* (sic), *21*, *Rollouts*, *Crape* and *Receptivity* for the 30/94. I hasten to say that this is available from R&A/P for those of

you who are not in the habit of competing. As yet, reviews please — I wasn't bright enough to bring an extra one for Dragonist!

Pulse Software were representing the TRS-80 Group as well as themselves, and lined my arms with bundles of the group's magazines, in the hope that we would give it a plug and perhaps find something which Dragon User would learn from. I'd love to tell you all about it, but they were bumped from my bag this morning (every day is a battle here down here) in favour of getting the review tapes in the post. Never mind, soon come.

Boxes in, boxes out

By now, I had missed the tea bar and things were going back into boxes. I went and accosted our new gaffer, Bob Harris of Harris Micro Software, who had been as usual deep in conversation all afternoon over demonstrations of his staples (Basic2 and KLR Utility) (good price for the lot). He was looking pink and puffed after unpacking some of his kit over again to show to a late user, and not looking forward to the four hour trip back to London. I told him that we had finally accepted a review of KLR. He, very definitely, seemed not to ap-

pear to be influencing editorial policy, nonetheless could not forbear to ask what the chap thought of it. His lead it, said it. Everyone I've asked who has read it has liked it. Somebody on holiday somewhere, we think. Printer wizard Bill MacGowan was also there, demonstrating the versatile Printer Control text and graphics processor, one of the versions of which was reviewed in DU last month, and some new fonts from Dragonfire Services are reviewed in this month, so Printer Control is obviously continuing to be popular.

I caught up with Harry Massey of Computap as he shelved the last of his stock into boxes. What has been going well? The Quixotic games, he indicated, have been doing well, despite those terrible warnings. What's so terrible about the warnings? Well, compared to these games from Microval which came out at the same time. *Arbit*, *Micro Quest*... well, very true. Microval printed in full colour right to the bitter end, but they have the resources of a major software house. They have a lot more than a photographer. And where are they now? As far as the Dragon is concerned, John Microval and David Quickbeam are both lining the leather pouches of the great ex-Dragon-dealers club.

But the fruits of their labours are still reaching the users. Thanks to Harry and Wiley.

Bill Cassell for another year. The show was benign on the sometimes as much of John Peen's shows, semi-co-operative, so that the profits from the show benefit all the exhibitors and not just the promoters. This method minimises the risk of making serious losses, quite an incentive to those suppliers who have to travel half way across the country to attend. Where are you going to hold a show in Leicester? enquiries are eager pumper. 'You live in Leicester?' That's just down the road, isn't it? Right, you organise it, we'll come! says John cheerfully. Don't be too hopeful. Leicester isn't the best bit in the world, organising a show takes time, willpower and experience of the pitfalls, and determination and planning on the part of all the Dragon suppliers who carry it off on a regular basis.

Hopefully, this means that we can look forward to another show in the autumn, although the when and where have not yet been decided. Thanks to everyone who attended, demonstrated or supported at the show, and to Cassell's Town Hall for being a pleasant site for one of the main Dragon social events of the year.

D'Arcy's Dragon Survey

In the March issue of Dragon User, Alan D'Arcy asked Dragon owners to write to him and tell him about their systems and what they would like to see available for the Dragon, hoping that the information would be useful to him and other Dragon suppliers working in the market. Here are the results of his survey.

Of the time of writing, 48 replies had been received, two of which were summaries for a dozen users each. One of those didn't mention printers, so I suspect that there are six to eight more printers to add to the six and twin drives alone figures.

Eight of the 48/48 owners summarised below also have 32s not mentioned as being available to other family members. Four of those 32s have printer/plotters attached in addition to a further printer on the 64/128. Details of two respondents are not included — a software company and a Tandy user.

Of 71 users, 33 (plus probably six to eight more) use printers. Of 40 disc users, 11 have single-drives and 29 have twin-drives. Disc drives are mainly 48T single-sided units. Only half supplied details of the DCGs in use (nine mention Dragon DCG, eight DSuper DCG, two Cumand DCGs and three Delta DCGs). Fifteen users mention having CG-8 four Flex and one Klix (I'll use later it's super — available from Harris Micro Software). (This was written before Alan knew that DCG was the name given to — Ed.).

Software wants

Not surprisingly, 71 users provide about 100 different software requirements (some

of which are already available). Extracts are given below for those still in the Dragon software business. Thank you to all who have taken the time and trouble to write. To those who asked questions and haven't had a reply — either I don't know (by *Dragon Answers* or *Communicator*) or I got stressed out with the idea of paying return postage!

User wants

Menu driven desktop publishing software ... that interfaces with Stylograph ... or Librarian programs for file exchange between the different operating systems; a software HLD mode utility; Fax write on black display; decent handbook on DOS, particularly saving data; Tandy/Dragon machine code program converter; word processors; spreadsheets; CAD programs; public domain software; software able to be transferred to PROfit, communi-

cations software; AI software; screen dumps; speech programs; typing tutor; converses of other micro's software, eg Laserlab (type golf course designer); series games; football game where you control the players; motorcycle racing and track designer; Plot Start type programs; the 3D adventures; easy adventures; strategy games; good quality games at no more than £25 and able to be transferred to disc; good tape to disk utility; genealogical astronomy; weather maps ... I'm keeping Alan Peen's idea for a game under my hat at present!

Many thanks to Pam for soliciting and collating that information, which should help to give Dragon users and suppliers who their fellow users are. If anyone has any further ideas about how popular 'wants' can be put into practice, send them in ... maybe the right person will see them and come up with a solution.

Analysis from 48 replies covering 71 users

	Dragon 32	64	128	Total
Basic cassette only set-up	15	3	—	18
— plus printer (no discs)	9	4	—	13
— plus single disc drive	2	1	—	3
— plus twin disc drives	2	11	—	13
— plus printer and single drive	1	7	2	14
— plus printer and twin drives	1	11	2	14
— plus modem, printer and twin drives	—	2	—	2
Totals	30	38	2	71

Basic09 in perspective

David Rothey examines the virtues of 'The Basic that thinks it's Pascal'.

THE Microsoft Basic that comes with the Dragon is undoubtedly one of the best, and combined with Dragon's 68000 processor is also one of the latest, so why change it? Some of the reasons may be:

- To get rid of the pretty text screen and use lower case
- To use the full 64K of the Dragon04 with Basic
- To use a better disc operating system
- To have better editing facilities
- To have faster processing of repeated loops etc., especially in sorts
- To have a more structured Basic

The last point will interest those who envy these extra features on the Beos (Boré — I will watch my mouth out with cost), or who take their programming seriously and wish to bring good habits which will enable them to progress to more complex languages such as Pascal with a minimum of effort. Although you think speedier problems on the Dragon, look at, say, several articles in printer dumps where one author claims that a careful structure for Basic program only takes two hours! These! Some of my own programs sort a lot of name strings and even I do bad while my machine was galloping along using the speed poke, but since all the Government Health Wings against using it, perhaps I should stop them.

Basic43 from Harris has had good reviews in DL. It has an improved text screen, and works by adding token-oriented Microsoft Basic. It enables structures like WHILE ... WEND to be used and also enables windows, pull-down menus and the like to be used. It will undoubtedly become more attractive as programs become available which make use of its features. One problem which I found was its slow response to the keyboard.

The other way to improve screen display (ie: handling etc.) is to use Flex or DB-8. Both respond well to the keyboard, make use of the full 64K and have excellent screen displays. They both have a similar range of professional grade headers, word processors and record management systems, which produce files which can be manipulated by Basic. However, the commonly available Basics in these two systems use different approaches. DB-8 in Flex is identical to the Dragon's Basic, except that it allows access to Flex's commands and disc files. Also it uses a different area for its disc commands and variable tables so that graphics saved as machine code files do not have to be loaded at a different address from their tape versions. Thus a game like The Death-Cracker can be loaded from tape into DB-8, saved to Flex disc and then run unaltered, which is not possible with DragonDOS, if

you want an improved display and file handling, but do not wish to alter existing programs too much, then DB-8 is very good. It also has windows, but no structures. One nice feature is that if you print graphics with a syntax error, DB-8 highlights the offending line with the error highlighted.

A TSC Basic also exists in Flex, which offers sophisticated file handling techniques, but lacks some of the Dragon's extended Basic commands, such as MOVE% and has no graphics commands. However, it can save variables as a 'virtual array', and access them very quickly. Also the ONERROR command allows re-summation of the program at any point, including the line where the error occurred. A 'compiled' version of the program can be generated, which stores in less space. No SORT command is available, and the error messages are simply numbers.

If you have (or are prepared to buy) the OS-9 system then you may like to consider the merits of Basic09. Since I think these are considerable I shall devote the rest of the article to it. Basic09 was developed along with OS-9 by Motorola, makers of the 68000 processor, to derive optimum benefit from its features. It is a very fast, can manipulate OS-9 files and use all its commands from within a Basic program, but above all it enables highly structured programs to be written. Whereas the beginner can use normal techniques, including line numbering, it is possible to advance to programs which bear a distinct resemblance to Pascal.

To start with, many types of variable are possible, and these should be declared at the beginning of the program.

Dim names

will define a real string variable just as in DragonBasic, although the name of the variable can contain more letters and may be in lower case. However,

Dim Real INTEGER

means that Real can only have whole number values, and its use as a loop counter will not only save memory but increase speed immediately. **INTEGER** variables are integers in the range 0-255, and take half the memory of even **INTEGER** variables, and a fifth of that of **REAL**'s. **PROGRAM** variables can have only two values, **TRUE** and **FALSE** and can be written compactly with a wide range of logical operators including the exclusive OR. This is called **XOR**, unlike the Beos's **EXOR** which always makes me think of A.A. Milne.

At the other end of the scale, arrays of several dimensions are possible and one can even define one's own complex data type. A special command enables a whole array to be copied at once into another array without the usual time-consuming

loops. All this defaults to the normal Basic text variable, if you want to ignore the rest.

The main reason why Basics are slow is because they are interpreted. Briefly, this means each command is looked up in a table and converted to machine code by the resident Basic interpreter every time, so a **FOR...NEXT** loop making a hundred loops will have to look up what to do a hundred times, and possibly evaluate the same formula than a hundred times. A compiled language will convert the whole program into object code, and save it in this form. If therefore runs very fast, but cannot be altered once it has been compiled. Thus you can try out each line of Basic almost as you enter it, and change it if it is wrong, whereas a fully program in C has to be altered at source and recompiled. Beos09 manages to get the best of both worlds. As each line is entered it is checked for **REM**'s before being accepted, and then compiles an **LCODE**. Alterations may be made while it is in this form, and it will run while Basic09 is in memory using the command **run**, you can be passed to **RUN**. In addition, by using the **PACK** command, another pass of the compiler is forced producing a code which is not only faster and more compact, but will run without Basic09 being present. A special smaller module called **RUNM** is automatically called from the system disc whenever you type in the name of a Basic program, and this allows the program. However, packed programs cannot be edited, so the original should be saved. This also means commercial programs in packed form cannot be read or interfered with by the user.

The list of Basic words provided is comprehensive, and the only omission likely to worry the programmer is the lack of **INKEY%**. However, the manual provides a machine-code source for this which, when assembled, can be called from the system disc when required. A side variety of loops is possible, since we have **WHILE** and its associated **ENDWHILE**, **LOOP** and **ENDLOOP**, **GOTO**, **IF** and **ENDIF**, as well as the usual **FOR** and **NEXT**. This means that any type of loop can be constructed, including those with conditional jumps out. Loops can be nested any depth, and the strings are 'pretty printed' to show the depth of loop as an indentation. When reading data files the **RESTORE** command can be used associated line number, **ON**, **OCUR** and **ON**, **GOVO** are both supported.

The biggest difference from Dragon Basic is in the use of procedures. The program may be (but doesn't have to be) split into self-contained procedures. Each can be called by name and can be loaded initially as part of the program or can be called from disc when required. This latter feature makes very large programs possi-

ble without regard to limitations of memory. Variables within a procedure are local, which means that the names used within the procedure can clash with those of other procedures without causing problems. Thus, stack procedures for sorts, etc. can be kept modularly enclosed when required without alteration. Variables can be passed from one procedure to another by placing them in brackets after the procedure name. Even line numbers are local to the procedure. This high degree of structuring makes it possible to virtually eliminate the need for GOTOs (which will please the purists) and makes line numbers redundant, so that you can edit optional BASIC99.

The absence of line numbers means a different form of editor is required, and here comes my only reservation. I find the editor awful to use, since you can only move from line to line by using + or -; where N is the number of lines to move up or down. Thus, search strings can be entered, but these have a habit of finding words you do not want, since searching for OR would also find NOR and FOR. If you want to change a line, the only way of doing this is to specify a search string and a replacement string. This has the same problems, and you end up with the wrong word changed. Also I find that under certain conditions the editor will fail to find the letters entered, even though they are there in the line. In fact, the only thing I do is delete the line and start again. However, because OS-9 files all have the same structure, there is nothing to stop you editing a Basic program using the Stylograph word processor and then reading it in to BASIC99. The error checking is then delayed until the program is compiled, at least.

Another quirk of BASIC99 is the way it reserves memory. When first called it only reserves about 4K or space to work in. This can be expanded at any time up to the limits of your computer by using the MEM command. In practice, if you suddenly ask for about 12K of memory, it doesn't work. Fortunately, all you have to do is keep ask-

ing for a little more memory in small steps and it works fine. Also, as I'm the only person who tests it, and wanting to be faced with WHAT? every time I make an error? Surely BASIC99 PERADDDON? — it would be just as successful and more well used!

If you try to run a program that errors in BASIC99 automatically goes into DEBUG mode. This is quite powerful, and enables you to list or change variables, introduce breakpoints, step through the program line by line, list the order in which procedures have been called, etc. Of course, this is far better than the messy version of TRAC in the original Dragon. Don't forget that all the normal OS-9 commands are accessible during DEBUG, or from the Basic program you have written. Thus a directory of files available can be read, or files can be copied, renamed, or even deleted. You could use BASIC99 to create an index of all your discs simply by getting it to redirect the DIR command to output to a file you have created. Thus, none of the versatility of OS-9 has been lost. You can also read files from Dynamic or the Resource Management System and manipulate them as you require.

The manual provided is quite good, but certainly not for beginners to Basic. The only concession to newcomers is a checklist program near the beginning which shows you how to get the computer to say "Hello". This section, entitled "What is a program?", seems hardly necessary, as the person for whom it would be intended would then have the page and immediately have a heart attack!

Graphics are not built into BASIC99, but are possible by calling a special module, called gfx. Thus, RUN GFX ("Line", n1, n2, n3, colour) will enable a colour line to be drawn between two points. Colours are supported, but the useful DRAW command of Dragon Basic is missing. If you have version 2 of OS-9 (formerly produced by Eastsoft of Spain), a module called gfx is supplied, which enables text and graphics to be freely intermixed — most useful for graphs, etc. A sample program

called Reky (Spanish for Clock) displays a clock which shows the correct time when the program is run. It will be evident that if you use these modules, which are specific to the Dragon, your BASIC99 program will not be portable to other OS-9 systems or other computers.

The very simple program I include may be useful for setting up a printer before using Stylograph or RMS. Although for most Tandy printers (and some Centronics), it can be used for any by substituting the appropriate printer codes in lines 438 onwards. The first, line 445, should correspond to the other settings. After entering and saving as normal, use the PRGR command to produce a compiled version and place it in your CMDS directory along with STYLO and RJM4. If you call "Tandy Item" from your startup file, the printer set-up program will run and then load Style automatically at the end. Of course, you can CHANGE any program you want, or simply edit the file.

In the listing the left hand numbers are the i-code references used by BASIC99. Although most will be familiar from Dragon Basic, the uses of ENDLOCAL, ENDPROC, ENDIF should be noted. Also, a printer path number should be DIMensioned but the actual number will be allocated by OS-9 and should not be specified by the programmer. Also the assignment of values to a variable can be done using x=3 to distinguish it from the statement IF x=3 THEN ... This is optional, but good practice. In OS-9, CHR(12) produces a warning beep and CHR(13) clears the screen.

The program first asks if the printer needs to be reset. If the answer is "no", it immediately loads Style. Otherwise it asks the printer what is possible. More than one of these may be selected before the choice option is to leave the program, so you can have double width and bold together if you wish. It is well to use option 1 first unless you have just switched on.

As usual, anyone having problems entering or using the program can give me a ring on Glasgow 5812.

```

PROCEDURE Tandy
0000 REM *****
0005 REM ## Tandy printer set up program ##
0010 REM *****
0015 100 PRINT CHR$(12)
0020 PRINT "DMP110 PRINTER SET UP"
0025 PRINT
0030 INPUT "Do you wish to set/reset the printer (Y/N) ",q$
0035 IF q$="y" OR q$="Y" THEN GOTO 200
0040 ENDIF
0045 IF q$="n" OR q$="N" THEN GOTO 400
0050 ENDIF
0055 IF q$("<"y" THEN GOTO 100
0060 ENDIF
0100 200 PRINT " Please check the Printer is switched on"
0105 INPUT " <ENTER to continue> ",q$
0110 DIM printer path:BYTE; name:STRING[4]
0115 name=""/p"
0120 OPEN #printer path,name:WRITE
0125 DIM opt(9,2):STRING[50]; count,num:INTEGER

```

continued

```
819F      FOR x=1 TO 2
81B1          FOR count=1 TO 9
81C1              READ opt(count,x)
81CE          NEXT count
81D9          NEXT x
81E4          DATA "Reset/Initialize","Italic Style","Condensed Mode"
8218          DATA "Elite Mode","Enlarged Mode","Bold
8248          DATA "Underline","Prop Spacing","Microfont"
8273          DATA " ", " ", "137", "96", "48", " ", " ", "96", "136"
82A2 300 PRINT TAB(18): "OPTION": TAB(38): "MAX COLUMNS"
82C5          PRINT
82C7          count=1
82CE          LOOP
82D8              PRINT count: TAB(18): opt(count,1),opt(count,2)
82E8          EXITIF count>=9 THEN PRINT "18": TAB(18): "EXIT FROM SETUP
PROGRAM"
8314          ENDEXIT
831E              count=count+1
8329          ENDOLOOP
832D          PRINT
832F          PRINT
8331          INPUT "INPUT OPTION No. THEN ENTER TO PROCEED ",num
8360          IF num>18 OR num<1 THEN PRINT CHR$(7); CHR$(12);
837C              PRINT "INVALID OPTION NUMBER"
8395          PRINT
8397          PRINT
8399          GOTO 300
839D          ENDF
839F          IF num=18 THEN GOTO 400
83AC          ENDF
83B0          ON num GOSUB 410,420,430,440,450,460,470,480,490
83D0          PRINT CHR$(12);
83E0          PRINT
83E2          PRINT
83E4          PRINT
83E6          GOTO 300
83EA 400 REM END & LOAD STYLE
8400          CLOSE #printer_path
8406 405 PRINT CHR$(12);
840F          CHAIN "/d3/cds/style"
8421          END
8423 410 PRINT #printer_path,CHR$(14)+CHR$(27)+CHR$(15)+CHR$(28)+CHR$(
(27)+CHR$(18)+CHR$(27)+CHR$(32);
RETURN
844F 420 PRINT #printer_path,CHR$(27)+CHR$(66);
RETURN
8461          PRINT #printer_path,CHR$(27)+CHR$(28);
RETURN
8475          PRINT #printer_path,CHR$(27)+CHR$(29);
RETURN
8489          PRINT #printer_path,CHR$(27)+CHR$(14);
RETURN
849D          PRINT #printer_path,CHR$(27)+CHR$(31);
RETURN
84B1          PRINT #printer_path,CHR$(15);
RETURN
84C1          PRINT #printer_path,CHR$(27)+CHR$(17);
RETURN
84D5          PRINT #printer_path,CHR$(19)+CHR$(27)+CHR$(77);
RETURN
84E0          PRINT #printer_path,CHR$(27)+CHR$(17);
RETURN
```

Write: ADVENTURE

Pete Gerrard makes another *breakaway* bid from *The Hobbit*

FROM programming last time to discussing this time! But don't worry, those of you who are seeking programming adventures and are stuck halfway through, we'll get back to the programming-related things in a long. And first, the critique.

Why is it that so many adventure writers insist on populating their games with impersonations of characters out of *The Hobbit*? I've lost count of the number of games that I've seen of that particular genre, and not one of them manages to stick in the mind as being startlingly original or distinguished with any sort of affection. Many readers will probably disagree and will write to Helen in droves, but I much prefer seeing games and characters that are ORIGINAL.

We may laugh at watching Phil Cool perform his splendid impersonation of Lord Harris or Billy Connolly, but seeing someone called Gandalf in a game is merely a poor substitute for the legendary Gandalf. Bored of the Rings after book, that is all it is, there is no reason for people to go on producing endless variations on the same theme. If you can't think of something original then you shouldn't be writing adventures.

In the book world, for instance, a spoof on *The Hitch Hiker's Guide to the Galaxy* might be well received the first time around, but if, two, three, or even more, authors all produced similar works then they would have a hard time getting their published. Even if they were, the joke will begin to pall after the first time. If someone's already done a spoof on a particular topic then leave it alone.

Having said all that, I would love to write an adventure featuring Floyd the robot, the wonderful android from *Isaac's Planetfall* and *Starfall* — oh, pity the poor soul who only has a *Dragon* and has never played these classic *Floyd* the robot is an inspired piece of character creation, and like all good characters he comes equipped with his own catchphrase: "Floyd here now!" he shouts, as he bangles into the room and nearly knocks you flying. Indeed, he seems much more realistic than the poor sap who is playing the adventure, i.e. you, because I got no real feel for my own character at all. Floyd, on the other hand, makes it all worth while.

The writers of the original adventure game tried to give some of their characters a personality by including bits of messages for each character. For instance, when trying to get past the troll bridge for the first time, many players will attempt to throw the axe at the troll. The response is something like: "The troll catches the axe and examines it carefully before throwing it back to you. 'Nice workmanship!' he says, 'but not very valuable.'" There we have not only a clue to the manner in which you must get past the troll (throwing him a treasure) but

also a slice of his character as he gives the axe a careful scrutiny before throwing it back again.

Static characters, that is ones that remain in one location and don't follow you around, are perhaps the easiest of all for the programmer. Like the aforementioned troll, they are just there in the one location and are basically a puzzle that has to be solved before the player can progress. Making these puzzles original, however, is still a problem.

Such characters can have all sorts of prompts and messages being displayed, telling the player what they're doing, what they look like, what they're thinking, and so on. You could have a happy fairy troll listening to *Steele* milligrams tapes or his fine *Walkman*, clicking his fingers and staring about him with a glazed expression. Perhaps you need to give him some fresh batteries for his *Walkman*, I don't know. The second time the player visits him he could have taken up breakdancing because he's put the wrong tape in, or he could be a dreadlocks troll with his shades on listening to *Bob Marley* tapes with his weedy hat bobbing up and down as he dances to an audible reggae beat. Simple ways of adding new life to an old situation.

Lastly, like our all-mentioned friend Denis O'Leary, can be made to stand out from the crowd by giving them an interesting thing to be in to all his adventures, though, Denis never gets drunk. That would be quite wrong, and totally out of character. He might be the staff, and in an adventure game you could have a wonderful time with him constantly implying you to take him to the pub (but not sitting down and singing about beer) and getting a full belly when you won't let him have a pint. (But hands off, he's my character, and he goes in his adventures! Myself and Sammie Sharkey, co-editor of *Adventure Probe*, are working on a series of games that will feature the majority of the characters under discussion here: Denis, and the two coming up ...)

Wizards, again like our own *Shroomburger* the Grey, can be made different by making them totally, but happily, inept. Once again though, in all the tales of *Shroomburger* and Denis the wizard rights get his spells wrong the first time, but everything sorts itself out in the end and he never causes any lasting harm to anyone other than the baddies. Well, he might damage his pride and cause grief to the leader of the wizards, *Windbreaker*, but that's about all.

A new character has been creeping into our adventures concerning the wizard and the dwarf. This is a little white rat, or rabbit, as he would pronounce it, and he is the emissary for the happy that we've just mentioned, the leader of the wizards. The rabbit is based loosely on a person I know,

and the first thing I heard him say was on a rainy day when he said "I hate this dreary old dreary class!" I am not making fun of people who have the unfortunate misfortune of being unable to pronounce the letter 'r', any more than I'm getting at anyone who is dyslexic by having a wizard called *Shroomburger*. As the adventure progresses the rabbit has a very important role to play, and is a most powerful and influential figure.

And here we have three things that give each of these characters a more realistic flavour: Denis likes his ale (or I think she's based on ...), *Shroomburger* is inept, and the rabbit cannot pronounce the letter 'r'. This is brought to the fore in the adventure with special messages for each character depending on the situation. A player might instruct the rabbit to climb a tree, in which case he'd get something like "Don't be ridiculous, I'm a rabbit, I can't climb trees." The player might ask *Shroomburger* to catch something fragile as it glides into the ground, and if he tried that then whatever it was would be more than likely to fall apart in his hands.

So, as with Floyd, we use simple, short messages to make the player really think that these characters exist, and eventually put these to make up a bit of scenery. They are real characters in real situations. We are they taken from *The Hobbit*?

We can see, then, how logical it is to give your characters that little something extra that makes them stand out from the adventure crowd. But how do you go about thinking them up in the first place?

In this instance, Denis was born in a conversation with a friend, who commented on a remark that something was 'dimly glowing'. A slight change of spelling, and the dwarf came into being. At that same moment a hundred and one imagines saw the light of day as well, such as *Peashy Goring*, *Barrel Gearing*, and so on. Denis *Ho* followed shortly after Denis, but he keeps himself in the background and we don't hear much about him. The rabbit, as I've said, was based on an acquaintance of mine, and the only decision I made was about what sort of animal he was: I wanted a talking animal who couldn't pronounce the letter 'r', so it was only natural that he should be something beginning with that very letter. As I'm getting people to like him I couldn't really make him a rat, so a rabbit he became. The inept wizard was there before I could think of a name for him, and it was only whilst writing something totally unconnected with adventure games that the name *Shroomburger* came to mind. I was talking about the weather and describing someone as one of life's storm leopards, and this inspiration! *Shoop* a few letters around, add the 'Grey' because I like Gandalf, and the character of the wizard followed on from that.

After creating the characters the adventure more or less wrote itself. Once the main storyline had been thought through, problems and puzzles were devised almost exclusively on the characteristics of our three main protagonists. This meant that, happily, we weren't having to rely on

other games for inspiration. In each of our adventures we're trying to push the art of adventuring, if you like, one step further every time. By having three such different characters we like to think that we've achieved it here. And the next game, scheduled in after this first one and before the se-

quel? Well, that will have to wait for another article, because the characters in that are so different that we want to get the game finished before writing about them. When it is I'm looking forward to the ultimate compliment: somebody doing a spin version of our game and our characters!



"Spring is sprung,
The grass is ris,
I wonder where the bodies lie:"

Probably eaten by next door's dog. I shouldn't wonder, which has spent an unpleasant morning randomly assaulting passers-by in the form of joshims, men emptying dastims, and shapes who have innocently come along to repair a washing machine. Things cannot go on the way, and one shall be forced into action before much longer. Apart from anything else, it means that escaping from the house and posting my column to my beloved editor would fly the palladium of even the most hardened Coddie escapee. The old tactics are probably the best — run!

Some evil fat has managed to slip through the net and get delivered by a postman modoud wearing a suit of armour less than a year old, so whatever we get, and who are we going to assist this month?

Well, from the look of the first two letters we're not going to assist anyone, they're both giving illuminating and copious hints on a couple of games that have troubled a lot of people.

First of all, we have Richard and Charles Brightness, who live in Haywards Heath, West Sussex. Rather like my own humble abode of Wigan there is probably precious little else to do there other than play adventures, and they have sunk in years of hints to Desnan Knight. Are you ready for all this ...

- 1) In throne room, pull lever to reveal a secret room.
- 2) In armchairs get twice then follows.
- 3) Get boxes from cupboard, and on the path sweep it to reveal a hole.
- 4) Get the iron glove.
- 5) Use lever to get key off top of sign-post.
- 6) Get flower from field.
- 7) Go to farm, get stone, dig main path to reveal hole.
- 8) Get coin from dung heap (some biting computer satirical comment there, sure-

- ly?) and use knife to kill cow (how cruel!).
- 9) Go to pond, which is full of alkali, wear rubber gloves, get nettles, suck up alkali, go to locked gate, blow nettles in open gate.
- 10) Unlock castle door with key, then go inside.
- 11) Get bucket from kitchen, then go back to heap and get dung! Ugh!
- 12) To get rid of obnoxious monster, wave flower.
- 13) To get to library, you must lay ladder across chiasm.
- 14) In library you must read book, which tells you how to kill demon.
- 15) Dig hole in garden, plant acorn, drag dung in hole.
- 16) Remember cloak of witch, suggestion is suck up water from well in bellows and kill witch, get cloak (it says here).
- 17) Use marabute mat and Mandy knife, wearing cloak of invisibility, and go and kill demon.

If you are having problems with that particular game then the above should have sorted a few things out. Since there are so many hints I couldn't print them all (Richard and Helen would never let me, I'm sorry, since they roughly follow the order of game play then I suggest that you just read up to the point at which you're stuck and then read no more. Until you get stuck again, of course, as always seems to be the way ...

Andrew McBride is a name rapidly becoming familiar to these hallowed pages, and since he ends his letter with a million and one adventures on which he can offer help, we shall start with his address. This is 100 Main Street, Little Harwood, Near Wellingborough, Northants NN16 5BA. Subcuty the ... wait a minute, we're not making that mistake again!

Astute readers may have noticed a map for Return of the Ring somewhere close to the column. This was kindly sent to me by Andrew, who says that the original map when first drawn was massive and had to be reduced to A4 size. I can well believe it,

The date on the map he explains by saying that he hasn't had time to write recently because (and I quote) "I have just had my dreaded exams. This brings me onto the next subject, I am only 14 years old and have completed more adventures than that 14 year old boy, so there!" End of quote, hope you'd enjoy your exams, and no doubt "14 year old boy will be writing in with lots and lots of adventures that help solved, some probably before they were even written.

After the map and the result — a plea. He's managed to get a copy of Return of the Ring, and as many other people have found he is usable (I say he has to be in reverse too, so if anyone (like me) wondering, Andrew) can help him out here then you've got the address to write to.

Plus number five. After his hints on The Final Mission (The Trilogy) were published the other month, he has been unable to get any further with that particular game. One knows the feeling well, dear boy, so if anyone has solved it, would you please let us know.

To wrap up Andrew's chatty little missive, he can offer help on the following adventures in return for an SAE. Deep breath, and here we go. Juxtaposition, Return of the Ring, Ring of Darkness, Massacre, Jerusalem, Williamsburg, Ultimate, Stone Forest, Aqueduct 47, Castle Island Quest, Castle Adventure 87, Castle Wagon of War, Clocktower Incident, Mountains of Mist, Temple of War. If he's just been sitting his exams, how did he find the time to solve so many games, one cannot help but wonder. Presumably his school teachers are the only ones not to be shown copies of Dragon User. Your secret is safe with me, in return for the usual bribes, tips on the page, etc.

Brief mention, talking about mags. For months and months I had a bad conscience to go back to my "in" Mission in the Grand National, then at the last moment we both changed our minds. Mission 'n' Reason holds on gamely to win, my

...and add the number you first thought of

Gordon Lee finds that hailstones tend to snowball

OVER the past few years we have, from time to time, considered a number of unsolved mathematical mysteries — many of which date from pre-computer times — but in which the computer can now prove to be a valuable tool where conventional mathematics has failed to find an answer. The fact that these mysteries still defy all attempts upon them shows that, even with the power of the computer, they are not going to yield their secrets easily, but there is no reason why the enthusiastic amateur may not succeed where the professional has failed. Take for example the case of the 'Hailstone' numbers which were discussed more fully in *GU* August and September 1984. The idea behind hailstone numbers is simplicity itself:

Take any positive whole number (the number is even, divide it by 2. If it is odd, multiply it by 3 and add 1. This will give you another number, so repeat the last sentence.

The enigma is that no matter what number you take, you will always, eventually, end up with 1. For example, starting with 3 the series would run:

3, 10, 5, 16, 8, 4, 2 and finally 1.

As yet, there is no proof as to why this should be. Why should the total for certain numbers not increase without limit? Another possibility would be a certain series of values forming an endless loop of repeating numbers. In the absence of any proof the subject is wide open to investigation, for example, by finding just one value that doesn't conform to expectations. Discovering it, however, is another matter!

A subsidiary problem with hailstone

numbers is predicting, for a given starting number, the number of steps required to reach 1, and the maximum value reached during the operation. In the case of 3 (shown above) seven steps are required and a maximum of sixteen is reached. This information can only be arrived at by actually performing the calculation. As yet, there is no formula that will produce either of these values directly. A quick test with a few low numbers will rapidly show the erratic nature of these values. Why for example, do the starting values 26 and 28 have steps of 10 and 18 respectively, and reach maxima of 53 and 52 while starting value 27 needs 111 steps and reaches a maximum of 92327?

3	1	3	9	9	1
9	8	3	9	2	9
1	6	4	3	1	2
5	1	7	4	7	1
7	1	5	9	7	1
9	3	7	3	3	9

Perhaps even more intriguing than an approved rule for which no exception can be found would be one in which only one exception could be found. At first, the discovery of this exception might give cause for celebration but, unless this provides a clue to the enigma from which a proof can be found, the exception might be even more perplexing than if one had not been found! A typical example of this sort

was considered recently (October 1987) when we looked at numbers which can be both square and pyramidal. A striking puzzle is to be found concerning 'palindromic' numbers.

A palindromic number is one which reads the same forwards as backwards (as is the case with palindromic words and sentences). Now consider the (unproved) rule that all perfect cubes which are also palindromic will have a palindromic cube root. Note that this is not the same thing as saying that the cubes of palindromes will be palindromic! A couple of simple examples would be 1531, the cube of 11, and 1600061, which has 101 as its palindromic cube root. So far so good. Further just one palindromic cube was found which does not have a palindromic cube root. The number was 10442529981 and its cube root is 2201 — a number definitely not palindromic. Computers have carried out the search for very high cubes and all which are themselves palindromic always have a cube root with this property. But why the one exception? That is still a mystery — as is the existence of a second exception to the rule. Another unsolved problem relating to palindromics is as follows:

Take any positive integer, reverse the digits, and add the two numbers together. Repeat the process until the number becomes palindromic. For example,

753
037
—
1050
0501
—
1551
—
—

Prize

SOME people, we are aware, can do an impossible thing before breakfast. We, a small organisation, can only offer few improbable things, and it's up to you when you do them. So here they are: *Midnight*, *Cast*, *Plays*, *21*, *Analysis*, *Crafts* and *Requiem* — all an £1 Game Pack for the Dragon. Available from Preston Computer Games, there are ten of these for the few people who can produce the largest hailstones.

Rules

Raise your umbrellas, pull down your hoods of silence and concentration. When the storm has subsided, your Dragon should be telling you (or you should be telling it) the smallest number which produces a hailstone of one million. Write it down. Print it out. Send us the findings, your solution, your name and address and DON'T FORGET WE HAVE A PRIZE

ADDRESS THIS MONTH! Don't panic — Carl won't burn your letters if they go to Lita Neaseport Station, but so much the better if they go to Dragon Publications, 48 Alexandra Road, Hounslow, Middx TW3 4NR. And put JUNE COMPETITION on the envelope, please.

What about a riddler? I'm letting you off lightly for the good of the continuity this month. Just suggest one way, as improbable as you like as long as it's legal and doesn't involve your editor in serious personal embarrassment, or providing the Dragon Regional and Dragon User's particular. Rhymes strictly optional.

March winners

MSL were a little thrown by two competitors in succession coming up with identical wrong answers. Just when we began to wonder if we had done something wrong, nearly everybody else came along with right ones. A mystery which may be unravelled. The ten latest solutions came

from Philip Davies of Norwich, J J Taylor of Middleburgh, Joseph James of Malin, Fred Wilkins of Dorset, Paul Presidential of Loughdale, Ted Newhouse of Ardaraire (people like the province), D J Gray of Middleburgh, Randy Longshore of Chesterfield (NO jingo says its EWing in Gwentish. Don't send the Address to AM, Randy, send it to Con-outage; see News pages), R James of Milton Keynes and Poon Refsum of Sale, who seems to have got his own back about the hobbitism.

The paradise island of Zorkie is on its way to each of you, thanks to Preston Computer Software.

Nobody had a really good excuse for going to paradise island, I've decided — I'm going myself. Before's goodbye (Lita's data are fixed if it's just a long waitmarked with a checkmark in the minute).

Solution

See opposite.

Dragon Answers

If you've got a technical question write to Brian Coyle. Please do not send a SAE as Brian cannot guarantee to answer individual inquiries.

Baud with going slow

COULD you please explain what the baud unit or 'baud rates' really is, and why faster rates than 2400 are not used on bulletin boards, as this would surely save on the cost of the phone calls?

*J. Scotland
Cockle Road
Downend
Bristol*

THE baud rate is the maximum rate at which the signal in a serial link can change each second. For example, 2400 baud means that the signal can change from 12 volts to +12 volts a maximum of 2400 times per second.

As the vast majority of serial protocols (like ASCII) use only one 'state' for each transmitted 'bit' of data (0 or 1) and 1 is a 0V, the baud rate is effectively the number of bits per second, or roughly five times the number of characters per second (allowing for start/stop bits) that can be sent or received.

The public telephone system does not cover a particularly wide frequency range (which is why a voice on the phone does not sound like a voice on the TV). The higher the baud rate used, the higher the frequency of the signal that the modem connected to the phone line will produce. Hence, very high baud rates would produce a frequency beyond the capacity of the telephone phone system.

The theoretical upper limit is actually quite a bit higher than 2400 baud, but when line 'noise' is taken into account this is the most reliable tested speed.



Turn black and white to colour

How managed to get my hands on an old Commodore 1600 colour monitor, which I want to connect to my Dragon 32. I have connected the monitor socket to the 'gun' pin on the monitor, but all I get is a black and white picture.

Can you please explain how to make the Dragon output a colour signal at the monitor socket?

*Keith Parsons
Daringstone
Herts*

THE Dragon's monitor socket outputs a colour composite video signal (a colour and brightness information is mixed together). The monitor you are using has separate inputs for brightness and colour.

All you should need to do is connect the video output from the Dragon to both the Lum and Colour

pins at once. The sound input can also be connected, as it should be compatible with the Dragon's output at the monitor socket.

Every sign of a real sine wave

I would like to know what is high speed food file, and how can I make my Dragon 32 draw one. My friend says his Atari can draw these curves but the Dragon cannot.

*Daniel Wood
Highly Road
W. Midlands
(April 7 article courtesy)*

YOUR Dragon can certainly draw sine curves as good as (probably better than) your friend's Atari. Type in and hit the following program, that should convince him!

W PAGE 41 COL 09

8:1 P02:SCREEN 1 J
20:FOR A=0 TO 1.585 STEP 0.025
30:POSTUPA026+(SIN(A)*90.8)
40:NEXT A

Stuck in the middle of an EXEC key stroke

I'm retired and have only just managed to run Basic programming. I was executing a program using the normal F002 25 and 26 with the EXEC 3273, but I think I made a mistake and typed 3273 instead. Ever since then every time I use the '3' key or the speech mark I get repeating 26 or speech marks.

*T. Connor
4 Kensington Drive
Orpington
Kent BR5 2AT*

IT IS not possible to damage your computer by typing in an incorrect BASIC address. It won't do your system the slightest to lock up, and have to turn the power off and on again.

Your problem seems to be caused by the 2 key on the keyboard (physically sticking down) because you're getting '46', this can be typing the top left key (Dragon) and clearing this key (as it's rarely removable on the edge of the keyboard). If this doesn't cure it, you'll have to seek professional advice from a computer repair centre. (Try Harry Whitehouse on 0508 782336, he may know someone reliable.)

Classified

WANTED: Dragon Personal (Control with manual etc. Tel. 0555393 330 (evenings).

DRAGON Software and Hardware. Very cheap. Send an SAE for list. Mr G M Hunt, 78 Farnside Road, Leyburn, Yorkshire, London E11 3DA.

TWO Dragon 32 computers, with compatible Cumana twin disc drive, NEC (PC-6028BE-N) dot matrix printer, tin tin television, cassette recorder, Dragon Super Printer II, MS1 items. Accounts/databases

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