

DRAGON



USER

The independent Dragon magazine

August 1988

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Editorial

HERE we are, just got the new office sorted out and holiday time tearing down on me like a ten ton truck... literally, indeed, as I am moving house at the end of the week. However, thanks to Ariel and the contents it shouldn't affect this *is* August magazine, fingers crossed, toes crossed.

I need a holiday. By the way, owing to a paper avalanche at Sunshine a few weeks ago, some people who should have done, won't have had their June renewal invoices yet. We have only just found out, and we're working on it.

By coincidence, Roger Merrick's report on his experience with Gordon Tevel's hard disc system arrived in time to prove what Paul Grade is saying in his new column. The power is there for the Dragon if you look for it.

Problems with hard disc fragility are universal and not confined to the Dragon. Ask anybody with a hard disc, and watch their faces!

And new pundits predict that digital tape recording will lead data storage back to cassettes in the longer term.

Newsdesk contains an editorial rant for reviewers, in reply to those who want the secrets of time and fortune.

And the Golden Rule? Meet the deadline... bye!

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How to submit articles

The quality of the material we can publish in Dragon (see each month) will, to a very great extent, depend on the quality of the submissions that you can make with your Dragon. The Dragon computer was designed to be the partner 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 5000 words long. All submissions should be typed. Please leave wide margins and a double space between each line. Fragments should, whenever 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. It is essential to have your program on a floppy disk which includes a complete address label envelope.

Letters

This is your chance to air your views — send your tips, compliments and complaints to Letters Page, Dragon User, 49 Alexandra Road, Hove, Brighton, Middlesex TN5 4NF.

Canoe in trouble

REFERENCE: Canoe, Dragon User July 1988.

May I appeal for help through your columns with the above program, which was quite a lengthy one in machine code?

Unfortunately the listing was incomplete at address B4468A. There is a 'JMP B44724' instruction but there is no routine at B44724 in view of the fact that no corrections appeared in later issues of DU. I can only assume that was the only reader fast enough to type in such a mass of hex code, even if it did take nearly two years to get round to it.

Recent letters to Mr. Crocker requesting a listing of the missing code have failed to produce any response.

However, the article referred to supply tapes of the program. If any readers purchased such tapes and would send me a memory dump running from B44724 to B4490F I would be extremely grateful. Postage would naturally be refunded.

In closing, may I make the observation that I find it distressing that a contributor should apparently take such a cynical attitude when asked to correct an error. Dragon users would be justifiably annoyed at purchasing a faulty program from a software house.

D. Swift
41 Headington Road
Maidenhead
Berkshire SL6 5LA

YES indeed and no indeed; you were certainly not the only person to type it in, as I remember a protracted correspondence with several people concerned after Canoe appeared. I seem to recall that the correspondence had a happy ending, and that Mr. Crocker played no part in it. Apart from that, my memory is shrouded in mist and I cannot for the life of me explain why this case was either odd, or why no update appeared in DU.

There may have been something in the nature of his having not actually written machine at that location, and the program running

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 hints and your opinions, send us your hi-scores and suggestions. Send us your best Dragon stories. What do you think we are, mind readers?!



DO5 complexities raised

I would like to comment on some of the issues raised by Rex Smith in the May Dragon User.

Firstly, as SuperDO5 II appears to be DragonDO5 with about half the faults corrected, having a copy of the directory on track 18 is in no sense ' safer'. Whenever a sector on track 18 is written, it is copied to track 18 when the motor comes out. This means that directory corruption is also copied, usually before corrective action can be taken. I would contend that user-initiated (backup and recovery) would be preferable, otherwise no second copy of the directory is required.

Next, SuperDO5 II does not operate as described when using CLOSE, as the DragonDO5 fault is still present. The cure for this, and a method of

single file CLOSE operation, was given by the DragonDO5 corrections (DU May '88). Also, the idiosyncrasies mentioned at the end of the article are either introduced faults or some of the DragonDO5 faults left uncorrected (note there is no mention of data loss with FWRITE, file corruption by DIR, uncorrected errors, erroneous errors etc. etc.).

Finally, with a little effort and ingenuity, it is possible to produce a DragonDO5-compatible DO5 (I currently run such a DO5) without the errors and with the features Rex Smith would like (SCOPY equivalent, selectable (single) directory, single file close, etc.) and stay well within 8K. The remaining space can then be used for applications (user-written program compatibility, named and numbered discs, etc.)

Philip D Scott, 4 Ridgewood Drive, Windy Canebery, Surrey GU20 6QF

excellent explanation for Mr. Crocker's silence; he may be at an age to be away at college or canoeing round the world; he too may have lost and forgotten his own program; or he may be so flustered by the terrible consequences of the missing routine that he has become a hopeless recluse.

On the other hand, if he or one of his mates is reading this, could you drop me a line to let me know? We aren't going to send the Dragon boot boys round to take the cheque back — honestly.

Tandy response

ON your letters page you said you would like to know how Dragon and Tandy owners would feel about you extending your repertoire into Tandy country. I can assure you that most owners would be very pleased. I think that if Dragon and Tandy owners got together a bit more, both machines will be in use a lot longer than they would trying to clarify on individually. It would also help if software houses catered for both machines a bit more.

L. Gairbridge
51 Kynle Place
London SW11 6SS

RAM on rampage

FOR some while now my Dragon 32 has had an annoying fault. The problem was lack of usable memory. When I bought my Zenith, I could not load the Demo — there was insufficient space. I phoned Gordon Twist, who suggested that I PRINT MEM. This I did and up came 8487 bytes. A lot of ram had occurred. I carried on with the fault for a long time.

Someone at work suggested that it could be a ram chip down, so I got my mate, who is a prototype engineer, to remove the sixteen 416s (my board is an issue 3) and replace them with sockets. He took several lunch hours over the job, but in the end I had all my chips in their original positions. He then touched all the tracks and fitted leads where the tracks were dodgy.

I took the board home, plugged it in, and turned it on. Sure enough, it worked, but I still had only 8487 of memory. I now took a new 416 and fitted it in each position in turn, ignoring the first four, as the Basic goes up there, and the machine just crashes if it can't. At about the third from the end, I plugged the new one in and PRINTED MEM and lo and behold up came 24,877!

checked in my book, and that is indeed the correct figure for a 32K Dragon. (The Basic takes up the remaining 8K.)

I have enjoyed Dragon User for some years now, obtaining many useful tips from it and I am very pleased to be able to pass this one on to others who may be in the same boat as I was. I was given — in the course of my problems — an issue of Basic. It has some chip gone, but if anyone can make use of it I would be pleased to pass it on, for the cost of the postage. Finally, has any one out there in Dragon land got the book inside the Dragon, which may be lying around unused, I would like one in exchange for Best Weather.

Ian Roberts, DSH12
80 Westly Mole

Greiford
S40 3PW

Disc hangups

I have been a regular reader of Dragon User for about four years now and have seen the quality of programs and articles improve greatly. If I have a problem I need only look in past issues and usually find the answer so I would like to thank DU, and of course all the companies that have continued to support the Dragon. I have found all the articles on Dragon-DOS very helpful, particularly Pam O'Ray's "Disc Rescue" which prevented me from pulling my hair out.

After having too-long trouble with tape recorders, I decided to purchase a second hand disc drive. With the drive came a number of discs with some very good software, but one disc also contained files which I didn't want so I set about deleting them without including the file type. There result was a corrupted disc.

I am tired using some of my own programs and get nothing but CC, RFWP and fix errors. Come back ID error, I forgive you! Before I had pulled out too much hair I found the Disc Rescue program and was able to recover all but one program.

I think I have found some errors in the DOSes as well as those published in your magazine, which after Dragon DOS

users should know about. If DRAGON is used in command mode the computer sometimes hangs up. If a file is KILLED and a new file of the same name is saved, I sometimes get a RFP error. One occasion the computer hung up and corrupted the disc. On some discs the first file in the directory is corrupted when loaded.

Finally, one of my new discs developed a CG error on one file and an RFP error on another where a file which was corrupted loaded alright. All this happened in the space of five minutes when I left the room and returned.

Desmond King
68 Pembury Street
Dorset Road
Belford
DT7 3PW

RAE course

HEXON College runs a very successful course for the Radio Amateurs Examination (City and Guilds 705).

Your readers may be interested in the course, which is held on Tuesdays from 7.30 to 8.30pm at Hexon College, Corner Mead, Grimsby Park, Cumberley, Lincoln NN9 5RA. The tutor is Tony Frewin (and not Graham Peet, as I was asked to type — Ed) and the phone number for enquiries is 01 200 8300.

We also offer a range of full time and part time courses in electronics, including C&G 204 Electronic Servicing evening classes.

C. Aitford
Senior Technology Lecturer
Hexon College
London Borough of Barnet

Basic09 print alarm

THANKS for printing my article Basic09. Due to the rather faint reproduction, you probably the register of my printer, I think it would be helpful if you printed following.

Basic09 (June 1988) contained a simple program as an example of what can be done if anyone had a got at using it, they should be warned that the

underscore which connects printer_parity did not reproduce clearly. In DOS, variable names can be pretty long, but so spaces can be left in them.

Perhaps this short note will prevent a few suicides.

Also in the first column of the article, the instruction "anytime" should look like "anytime" — the space is essential.

Best wishes to you and DU under the new management.

David Hootby
1 Heath Road
Glossop
Derbyshire
S20 3BY

THANKS, David. Your listing was quite alright, apart from being abstruse, small and although we always ask the printers to make the listings as contrasted as possible in that case, still very fine details, like the tails on commas, tend to black out.

In fact, the underscores do show in 80% of the lines, but it is possible that they could be overlooked and your warning is timely.

Hope that the underscores in your letter above is reproduced correctly — but owing to the vagaries of typesetting, underscores frequently get lost, an annoyance to people who write about languages like OS-9 or QL, SuperBasic. It did get lost, we had to put it in specially.

Dragons A1 service

A few years ago when it became something of an inconvenience to share my BBC with my son, we decided to purchase a computer for him. At that point there was a particularly good sale offer at Dixons on the Dragon and, as an excellent job had been done to help the increasing future of Dragon Data, we were obviously not made aware of the problems in store, and went ahead with the purchase.

As it turned out, the problems were not so disastrous after all, but thanks almost solely to Dragon Data. We subscribed to it immediately, which was to become our blessing and, had it not been

for Dragon User, we would have changed to another computer ages ago. The main problem, of course, was the lack of suppliers for both software and hardware. It was a long time before we realised that by far the easiest way to get software and hardware was to mail order from people advertising in DU. After purchasing the initial games, etc, we decided to add a word processor and this was followed some time later (with equalised) by tape drives.

Since my son (like his elder brother — a chief programmer) was interested in computers as a career, about 18 months ago we decided to orient his facilities by having an upgrade from OS to QL. For this we contacted Compuserve. They did a first class job and, considering it was close to Christmas, a very good time.

My son will be 18 in April and we agreed to purchase a monitor for his birthday, as he had been using his television until then. I thought at first that it might be more convenient to buy one locally and avoid the necessity of delivery contact, as to be expected, when I approached the computer shops in Leicester, they did not want to know about the Dragon, but remained like "Gee! get you anything for the Dragon". There isn't one for the Dragon! and all the rest. I should have known better by now so I went back to the faithful Compuserve with dramatic results.

I phoned them on Monday March 21st to check their prices and availability and this gave me my first surprise. They said they would have to order one as they did not actually stock them and the price they quoted was exactly the same as twelve months previously.

I put a cheque in the post on Tuesday March 22nd and the monitor was delivered to my door at lunch time (Thursday March 24th). The monitor came direct from the manufacturers and the cable came from Compuserve. The status arrived on Friday March 25th. This has to be the most efficient service I have ever experienced and I felt I simply had to write to tell you, if the pathetic British postal service ever goes public I pray it is someone like Compuserve that takes over.

R. Brockhurst
7 Park Avenue
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LE8 0WA

Diamonds and ghosts

DRAGONFIRE Services have launched a bouquet of new games in the £2 to £3 price bracket.

The new titles are *Diamond Miner* (ES08), in which the challenge is to steal the Black Diamond from its owner's house, *Simon Ghost* (ES09), in which you must borrow diving equipment and a boat and set out to find gold, silver and platinum in a haunted wreck, *Must Car* (ES06), an IBM machine code version of the classic *Beetle Car*, with variable fuel and ball speeds and doors, roofs, masts and a two player option, *Dragonfire* (ES08), an educational game for over-16s learning maths, history and biology, with an optional *Encyclopaedia of Rich Pools* for the under-16s on the back if requested, and *Secret-Sleuth*

(ES06), a line-art drawing aid for users of the Tandy Electronic Book on the Dragon 32 or 64.

For details, post and packing costs and up-to-date price list, contact DRAGONFIRE Services, 13 Peary Jones Close, Bains, Great NP3 2SH.

Two pulses

PULSER Software's major releases this month, finally, an 1784-plus game on DragonDOS disc only, and Jonathan Cartwright's *Clips*, an air-attack/shooting game with detailed black and white graphics on cassette, are now both available priced at £14.95 each respectively.

Enquiries to Pulser Software, 35 Fochat, High Compton, Stone, Cheshire OL2 7WQ.

Orange appeal

ORANGE Software now have the licence to distribute DOS Plus but by Phil Scott (not to be confused with Phil Scott — Ed.) for DragonDOS, and its variant DOS Plus Delta, which allows the user to choose between DragonDOS and DeltaDOS either via a small hardware switch now available from Phil Scott himself, or by loading.

Orange are also releasing the 16th adventure from Simon Haugrave, *Smoke Island* priced at £5.00 it is likely, says Orange's Graham Smith, that they will run a special offer on the whole set of Haugrave adventures in due course.

Another new adventure from Orange is *War Hammer* of Brian, a long, alternative-choice

style adventure on two discs. A price has yet to be established. "This is very long, but fairly straightforward", says Graham, "so it may appeal to arcade buffs as well as adventure players." He draws a parallel with the popular adventure books where the outcome is decided by the player's choice of actions, rather than by the solving of riddles.

Tandy conversions of *Mean Stalker* and *Loofers' Kestrel* are also available.

Information sheets from Orange Software, The Corn, Star Road, Hatt-y-Derry, Aber-gavenny, Gwent NP23 6DP. Tel: 0509 624116.

Reviewers rule OK

"OUR editor has had one or two queries recently about reviewing for Dragon User so this is a postscript to run through the guidelines again.

Whether or not present day Dragon users remember the days (not very long ago) when 90% of Dragon games were reviewed by Jason Graham, some folk remain under the illusion that only a selected title is allowed to review for DU.

This is not true. It could be you.

All you need to do, to become a Dragon User reviewer is write a review which Dragon User decides, in its wisdom, to print with your byline at its foot.

How do you go about this?

Observe carefully the style in which Dragon User reviews its written or multi-partnered text as possible gleaned from a reasonably prolonged playing of the game. Good and bad features pointed out. An assessment of playability, value for money and appearance. Always, include details of the supplier and the price at the top. Allocate between one and five Dragons, and explain why if you wish. Handwritten copy is ac-

ceptable for reviews, but please bear in mind that somebody has to retype it.

No fixed rule

We don't set any limit on length, expect your review to be cut if necessary. Very long reviews are more likely to be trimmed than short ones, but there is no fixed rule. However, a dozen lines quoting liberally from the review itself and concluding "This game has great graphics and great sound and I think it is great" is unlikely to make an appearance — we want to know what you actually experience when you play the game.

What should you NOT do to become a Dragon User reviewer?

Well, you shouldn't write to the Editor and ask to be sent software to review. Send your own reviews. If they are consistently good, and we print them, then one day when you least expect it, a small jiffy bag will appear on your doorstep enclosing the legend "Please will you review this, and as

quickly as possible" if you don't want it, send it back, also as quickly as possible.

Surprise, surprise, we don't often get them sent back, although I do remember talking with known software author to review another specialised program, only to discover that it was a direct competitor to one of their own.

Embarrassment, embarrassment.

If you don't review something that is sent to you, and you don't send it back, you don't get asked again.

Nobody is authorised by this magazine to write as a publisher saying that they are a Dragon User reviewer and asking for complimentary software. It is, of course, a free world, but complimentary review copies are sent out by the editor in person, and only reviews commissioned by the editor have a guarantee of publication.

On the other hand, everybody knows that Dragon User often publishes more than one review of a new program, and it is up to suppliers, to decide to whom they wish to award review copies on their own account.

If it fits

Why have you published so much on Orange Software recently? People ask. Because they are a few company with a low-expanding list that Dragon User has not previously covered. All the titles that fit the print, remember. And they write and tell us what they are up to, without which, we wouldn't know, would we? It only takes ten minutes and a stamp to let the Newsletter know what your new products and special offers are, so don't delay, write today, and don't forget to let us have a copy of anything you want reviewed.

Reviewing for Dragon User is not, contrary to occasional opinion, a way to build a large free software collection. There is a limited amount to go round, it is shared out according to the magazine's requirements, and the editor's decision is final. It may come as a surprise to many readers that over half the reviews published, on average, including those from "regular" reviewers, derive from guest programs brought by title reviewers for themselves.

Indeed, it is generally true that without the enthusiasm to collect and refine one's critical judgement simply for the love of it, a person will never acquire the knowledge and conviction which leads to regular publication in a particular field.

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THE REVIEW

SOFTWARE REVIEWS

One to three and climbing

Program: *Destiny* (no disc version)

Supplier: Pulse Software, 26 Pochell, High Complex, Slane, Clonham DU17YQ
Price: £3.99 (the lot)

WELL, you adventure players, here is a three-in-one disc for you to savour. The first item is *Starting Destiny* a maze-type adventure. The location of the 'maze' is an alien spaceship which has entered the galaxy and seems to be heading to earth. The objective for the gamers is to disarm the alien machine and to get out alive. The game comes with the player being teleported into a cargo bay in the alien ship. As the adventure is played in real time, after you have disarmed the missile you must teleport home, as if you are taking a patrol off aerial you and dump you in confinement. You can of course escape if you have the keys, otherwise you are stuck. This happens and you cannot think of a solution you may as well abort the game and start again (have you tried standing on a dwarf? — Ed).

Having described the game I found it a little frustrating because, despite being told that the game is a reaction, the screen images took too long for my personal taste to disappear and re-appear, and arrows to get on or see through my anticipated solution. The wait seemed intolerable, although in actual fact it is only seconds.

The overall impression of this adventure is of a good game but lacking polish. It would be improved if it was cut-rate and quieter, as the pressing of the enter button continually increases the sense of waiting for the game. The screen display would have been enhanced if changes in colour had been introduced. The black, yellow and white areas give every appearance of being dirty, although the game is not.

The second game, *Dungeon Destiny*, devised by Tim Hilly and written by Jonathan Cartwright, is a distinct improvement on *Starting Destiny*. It is still an adventure maze, but the graphics are far superior and

the adventure itself also compares very favourably, although the instructions had to be input in the lower case, which for me detracted from the display. Any attempt to press the shift key resulted in a negative response from the computer. 'You can't ... that here' seemed a frequent response, and the continuing display of 'What now, an brilliant one?' grated after several repetitions, like most forms of 'no' which are only funny if they come as a surprise.

Notwithstanding these minor criticisms, I nevertheless thoroughly enjoyed this adventure, and if I had only £3.99 to spend I would choose this one rather than *Starting*.

The third game is *Millions of Destiny* which for me was the best. However, when I first tried the disc I thought that it had corrupted, because inside the mistake of loading without sound. The screen display told me not to remove the disc, and nothing seemed to happen. I tried again with sound, and the computer played a tone for

almost 30 seconds before it actually loaded — however, one criticism of the earlier games was overcome: it did auto run. Once commencing the game I found that I had been killed in about six moves but without warning, but at least it gave me another game immediately into the second game after trying the usual commands like enter, think, etc., for reasons showed tried Help, which told me, among other things, to be prepared for anything and use certainty must. The second game lasted longer — just if you enjoy your frustrations, this game is definitely for you.

Overall I enjoyed this disc and in terms of hours at the keyboard it is very good value. Each of the three games is better than the one before, and the development of the programs can be clearly seen. For those who specialise in adventures, this may be a bit tedious, but for all-rounders it is certainly worth a try.

Richard Howson



A word could tell a thousand pictures

Program: *Picture Maker*
Supplier: John Fern Software
Price: £5

I was asked to take another look at *Picture Maker* after Gordon Lee complained that the instructions were difficult to find and use. Well, unfortunately for David Main, the author, I must confess with Gordon Lee an uneasy opinion. The instructions, which are the only problem, are on two sheets of A4 paper in Lilliputian, so in order to make things a little easier for myself I ran the instructions from the program (where they are available) through my printer and received the same information, minus the screen dump routine.

The whole sheet of these instructions is to allow the absolute beginner to understand them, carry out the necessary commands and produce the object for the activity (Pardon,

Pardon??). The problem inherent in *Picture Maker* is that the program is extremely sophisticated, and the instructions do not give a working example with which to practice. Unless one is there to provide the ordinary computer user with a facility that he can make use of fully, visually and *Picture Maker* certainly meets this criterion. The two pages of instructions, although detailed, are not comprehensive nor easily read. There have been other ability programs in the past for creating graphic screen displays, one that springs to mind is *Graphic Writing* by R Smith, which can be run in Prose 0.2 or 4, and is less sophisticated than *Picture Maker* but comes complete with a fourteen-page instruction booklet written in simple, easy to follow outlines that are logical and sequential. Plus *Paint* which can also be used to create

and edit graphics shapes in modes 3 and 4, contains the equivalent of five pages of the *Picture Maker* instructions, complete with an example.

It would appear that David has put a very great deal into *Picture Maker* but it cannot be accessed and used to its full because of his assumption that the user will find it easy to follow, which is not the case.

However, I was impressed with the functions of the program itself. The ability to move areas about, to delete and replace, and indeed even to stretch stored areas horizontally or vertically is all there. Alterations are automatically re-numbered, and you can store up to eight different areas at a time depending on their size, which seems to be remembered when attempting to stretch an area, because obviously if the resulting area is

then too large or of a shape area have been used, there will be insufficient room and the program will ignore the function.

A most impressive command is the M for magnify, which magnifies the area under the cursor position on the normal viewing screen five magnified versions on a 640x480 screen. The size of the area magnified (not the magnification itself) can then be enlarged by a simple key depression, and colour change too set at the touch of the keyboard. The magnification screen is then updated even when not in use, which allows the speed of movement to be controlled. To couple all these functions is a true 'picture maker' which will draw lines, colour in a foreground colour from the cursor position or a border in the background

Continued on page 11

DRAGONSWORD!

Paul Grade takes a monthly stab at setting the world to rights

On the 20th of last month I received a letter from Ian in charge informing me that the next deadline was the 20th of the month, and as such I was to be in the middle of trying to answer a couple of dozen letters, repeat an overworked/photocopied and get the DRUG newsletter ready at the time, it didn't really seem like a practical proposition to me, hence the delay. I was only leaving, Paul — sorry about the delay.

Of course, it hasn't a clue what I'm supposed to be writing about. Reviewers can review, technical writers be technical, and Editors can write Editorial Comments, but what does that leave for me? Usually I only write for updates, which makes the problem easier because if I've seen publication and I can say what I like without the risk of anyone getting-out all my best bits.

It would be nice to be able to fill pages with details of all the new lines, rushing to report the Dragon, with reports on all the newest hardware and software releases, but they would have to be very small pages and I'd have to use very large type.

Yes, I know Dragon Data did a lousy job of marketing the machine, and a lot of software companies imagined that people would pay silly prices for rubbish, but that is only a contributory cause of The Decline and Fall of the Dragon. The real reason was, and still is, that its target computer users are dedicated followers of fashion. You don't believe me? How many former Dragon owners do you know who have switched to other machines? A couple of years ago they were like Kingpin Dragon in favour of the BBC, a little later it was the Master or the Amiga, and currently it's Amstrad, ST, or one of the cheaper PC clones, right? Now for the trick part of the question: how many of those who changed machines had actually taken the trouble to learn to use the one they already had? Of the ones that know, less than half had a genuine reason to change. They merely hadn't been managed to find a use for the memory available on the Dragon, but they were sure that they "needed" at least 512K of ram, and it was you who showed the old excuse about needing a "better machine for business", mainly from people whose accounting ledgers and ends with reading their Access statements.

If they needed more memory there was no reason why they couldn't use the space available on disc; after all, that's exactly what most of the "business" systems do, there's no need to have several meg of program residents in casual the time. I admit that there are exceptions, and that some people have taken the Dragon to its limits and found it still doesn't give them what they need, and in those cases a change is justified, but they are a small minority.

So what does all this have to do with you? Quite a lot, because you subscribe to Dragon User, and the reason that I have personally decided that I'd had to give was that subscriptions had dropped to a figure

that was too low for them pay their central London company expenses for the magazine. Now, Bob Harris writes and markets good Dragon software, and is taking over DRUG he is acting in self defence as much as anything else. If the Dragon market gets any smaller it will just not be practical for Bob or anyone else to produce software for it.

Before your work doesn't Dross or braves awe; with your spare money melting in your sticky little pan, try thinking. This is quite a simple process, and although it can cause some discomfort there is no actual danger, not even a Government Health Warning, so it isn't likely to do any lasting harm. By thinking about why you have a computer, what you need it for, and what advantages there are, if any, in spending a medium-sized budget on changing to a different machine. There isn't much that a Dragon can't do that other machines can, and do you really need ST graphics when you haven't even managed to draw a picture with the machine you have? Do you really need Amstrad or Lotus 1-2-3? Do you really want an expensive, vital roller lamp of plastic that's a nightmare to program, runs commercial software that needs a second mortgage to buy, and operates on MS-DOS and CP/M, both antiquated when the Dragon is first invented?

Here's the point, are you really so anxious to admit that you can't even learn to program one of the easiest machines ever made? That keeping your sweat-drip up with the Joneses' is more important than sticking with a machine that can do what you need?

OK, don't get the underwear twisted, I know I'm breaking the rules by criticizing the punters, but look at it from my point of view for a moment. Four years ago I started the DRUG, and I've currently got around a thousand members. Dragon User has been around even longer, and on a good day has about three times that number of subscribers, and the "loser" Dragon user group can just about make up another 200 between them. Some of our suppliers have mailing lists stretching back years, but how many people on those lists are actually buying software?

You don't need a computer (do you?) to work out that this doesn't really add up to more than five thousand Dragons actually up and kicking. That's 64K sales of Dragon computers were very close to six figures, and even allowing for natural wastage (Dragons which were burnt out, blown up, sat on, or whatever) that still leaves a lot of machines unaccounted for, absent or flown are probably owned by "rugged individuals", "types who don't need groups or magazines" (jokes that is generally imagined according to my knowledge of rugged individuals — that) but what happened to the rest? Are they all being used as door-mats or to prop up the bed?

My guess is that most of them were con-

signed to Africa and Capobianco because the owners either got tired of shipping goods Commodore centers for sparring them, or felt that they simply had to leave the latests over-advertised status symbols.

It still is a pity that there is a situation that you could do to give the Dragon a boost. Most of the status machines sell on one of two points, notoriously large memory and/or good (if expensive) software. Sure there's the usual "type", but that's not really very important. Now there's not a lot you can do about boosting the Dragon's RAM space. It can be fitted up to 512K without too much trouble, but that isn't going to persuade the types who relegated their Dragon to attic shelves they bought the ST to get it down again. However, if there was more software available (and advertised) which could run the Dragon ahead of the current machines I think you'd find a lot of Dragons coming back out of the woodwork. Programmers aren't some peculiar breed, some of them are! Britain's specialty food by the Star Corporation, most of them are people like you, they could be you.

You don't need to be any particular age or sex, or even some kind of genius, in fact it's probably better if you aren't a white-kid, computers are very simple minded machines, and they don't always take credit to "blow clever" programmers.

I get tired of answering the same old questions which mean about lack of software, lack of support, etc. Anyone owning a machine is capable of learning to write good software on it, and those with Dragons have a big advantage over most others in that they have an unworked "programmer" machine; ever produced, so why are you reading the rest of the writing programs? Of course, it isn't only the software side that things could be done to make the poor old beast look more attractive to the beholder owners. One of the smallest reasons is for frame grabbers/cameras. They aren't difficult to make, and even old things like the old Commodore 64 had them available, so why doesn't someone design one which is not dedicated to a particular machine, and which could be used with the Dragon and other machines (with change of software)? I know that a lot of Dragon owners are good electronics engineers, some of them even owning their own companies, so why don't they help themselves and the Dragon by giving it a try? The Dragon's strong point is, that it does not require "dedicated" peripherals, it can run any make of printer or disc drive or tape recorder, it isn't a fussy machine at all, so what's wrong with a "universal" design which only needs different driver software to adapt to several machines? That would make the Dragon a serious rival to most of the current machines, with the added advantage of being a lot cheaper OK, and a feature, but why not give it a try?

Paul

64K in two 32K pages

PD Smith consults Motorola about the real SAM

I have written this article to complete the information on the 68000, 68010 and 68020 sam chips given by Matthew Lodge in the August '87 issue of Dragon User. In his article Mr. Lodge says that he doesn't know what the sam register at \$FF04 and \$FF05 does. I have just received the ALS200 data sheet from Motorola and this clarifies the use of this register.

The register referred to as allows you to use the 64K sam in a 68000 computer (such as Dragon 86) as two separate 32K pages addressed from \$0000 to \$FFFF. In fact what happens is that, in map type 0 (PCMA at \$800-\$FFFF) the 435 bit of the sam address is replaced by the 'P' bit from the sam. This means that if 'P' is used (set) then any access to the sam will access the obvious byte. For instance if you access byte 10000, you will use byte 10000 of the sam. However if 'P' is set (equal to 1) then any access to the sam will access the byte in the second 32K page, ie accessing byte 10000 will in fact use byte 42768 (10000 + 32768). This is really quite difficult to explain and is best understood by some experimentation.

'P' is altered by accessing sam register PL, as can be seen from table one. To reset 'P' you must POKE address \$FF05 with any value. To reset 'P' you must POKE address \$FF04 with any value.

Check the mode

There are several things to note about this 1733 paged mode can only work from the map type 0, that is, the 32K mode of a Dragon 86. The paged mode will only work if you have 64K in your computer. If you only have 32K the 'P' bit will have no effect as the 435 bit of the address is not used. If you set the 'P' bit without preparation the computer will immediately crash (as some of you will have found out by now). This is because the computer will still be generating interrupts which use sam based vectors, and the Basic interpreter uses vectors in ram. Because these vectors have suddenly disappeared the computer will immediately crash.

The first program is the answer to the problem of the computer crashing. This copies the whole of ram into the second ram page, so that when the pages are swapped, Basic will continue as if nothing had happened. Note that the contents of \$FF00 to \$FFFF cannot be copied into \$FF00 to \$FFFF as those latter addresses are reassociated by the sam to 80, the sam and the interrupt vectors. However location \$FF00 to \$FFFF can be used and you are in the new page if memory.

Before you run **testing one** you must have set the top of memory to less than \$FF00, otherwise the system stack will vanish and the computer will crash. To reset the paging system you must now set the 'P' bit by **POKE \$FF05**.

```
2700 *PROGRAM 1
2700
2700 *COPY RAM ($0000-$FFFF) TO
2700 *RAM ($8000-$FFFF)
2700
2700 *NOTE - CANNOT COPY TO RAM
2700 *$FF00 TO $FFFF AS THIS IS
2700 *USED FOR I/O, SAM AND VECTORS
2700
2700 3421 GCOPYM PG=0 CC
2700 1A58 ORC #050 ;DISABLE IRQS
2700 7FFFDF CLR #FFDF ;SELECT RAM
2700 DE0000 LDX #0
2700 10000000 LDY #0000
2700
2700 E0B1 COPYLP LDD ,Y++
2700 EDA1 STD ,Y++
2700 BC7F00 ORP #B7F00
2700 26F7 BNE COPYLP
2700
2700 7FFDFC CLR #FFDE ;SELECT ROM
2700 3581 *RESTORE IRQS AND RETURN
2700 3581 PULS CC,PC
2700
```

```
10 *BASIC PROGRAM 1
20 CLEAR 200, $H7FFF
30 FOR I=3072 TO 3072+27
40 READ A$
50 A=VAL ("&H"+A$)
60 C0=C0+A
70 POKE I,A
80 NEXT
90 IF C0<3273 THEN PRINT "ERROR IN DATA"
   SOUND 10,10:END
100 PRINT "DATA OK"
110 END 3072
120 DATA 34, 81, 1A, 58, 7F, FF, 0F, 0E
130 DATA 00, 00, 10, 0E, 00, 00, EC, 01
140 DATA ED, A1, BC, 7F, 00, 26, F7, 7F
150 DATA FF, DE, 35, 81
```

```
BASIC PROGRAM 2
10 POKE $HFF03,0
20 GOTO 20
```

The computer will now appear to have crashed, but if you try a sound command such as **SOUND 17** you will hear a beep showing that the computer is still working.

The reason that nothing appears on the screen is that the sam is still displaying 1024-1030 on the screen, while Basic is writing to 32768-34307 (but still thinks that it is writing to 1024-1030). In theory this problem can be solved by telling sam to display the correct addresses, by setting

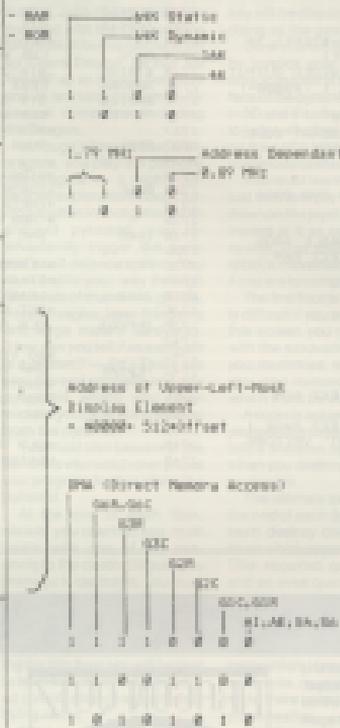
P (see table one). This will work but not for very long, as Basic will instantly reset it when the next character is to be printed.

To see that it can be done, by typing in Basic **testing two**, this will have to be done "blind", but it is short enough to be done. When you run this, you will see all the text that you have entered in your panic when you thought the computer had crashed. Now if you press **ENTER** the computer will redisplay 1024-1030. (A useful note here: Dream does not reset the text screen when it is run (at least mine doesn't) so Dream can be easily used in this mode.)

If you now reset the 'P' bit by **POKE \$HFF05** you will see that the screen is working again. Also note that program two

Table 1 - SAP REGISTERS

FF0F	B	TR	MAP
FF0E	C		TYPE
FF0B	B	PC	
FF0C	C		MEMORY
FF08	B	PC	SIZE
FF0A	C		
FF2F	C	RL	
FF2E	C		CPU
FF27	B	RD	RATE
FF26	C		
FF25	B	RL	CHNL RL
FF24	C		
FF23	B	PA	
FF22	C		
FF21	B	PS	
FF20	C		
FF1F	B	PA	
FF1E	C		DISPLAY
FF1D	B	PS	OFFSET
FF1C	C		
FF1B	B	PS	ADDRESS
FF1A	C		
FF19	B	PI	
FF18	C		
FF17	B	PS	
FF16	C		
FF15	B	PC	
FF14	C		DISPLAY
FF13	B	VI	MODE
FF12	C		CONTROL
FF11	B	VB	
FF10	C		



Even though I have found out about the paging function of the card, I cannot think of any uses for it, but maybe someone using a Dragon was thinking I wish I could use the RAM as two pages of 32K instead of having to go to map type 1 (RAM mode). Well, now you can.

The real advantage of this paging mode will be apparent if you can program systems and so have a 32K program in system and have 64K of ram as well. In this case you have 96K of memory from a computer which should only allow 64K. You could also use a static ram in place of an system (either in place of the second Basic system from a Dragon 64, or in a cartridge).

Beware speed pokes

To finish I will give a comment about the speed up' pokes for the Dragon. Matthew Lodge, in his article about the card, says that there are four speed modes given by the card. In fact there are only three. The two he refers to as 'superfast' and 'turbocharged' are identical, with a clock speed of the crystal frequency divided by 8, or 1.75 MHz. You should only use these 'speed pokes' if the 6809 microprocessor in your Dragon is capable of a clock speed of 1.75 MHz.

The actual microprocessor in the Dragon is the 6809A, which has a maximum speed of 1 MHz. There are two enhanced versions available, the 68A09E and the 68B09E which allow clock speeds of 1.5 MHz and 2.0 MHz respectively. (The 'E' after 6809 means that the 6809 uses an external rather than an internal oscillator). This means that to run at speeds of 1.75 MHz you should really use a 68B09E. The 6821 pin should also be replaced by 6822's otherwise you could damage them by using them at the higher speeds. The reason that some Dragons will work satisfactorily at the higher speeds is because all manufacturers tend to 'under-rate' their products, so that a 6809 may work at 1.5MHz, but is not under guarantee if used above its specifications.

has vanished. If you set P' again, Listing two will be back.

Now the main problem is caused by the BASIC PRINT routine resetting the text screen. Listing three solves this by intercepting the PRINT command and making out the 'RESET VIDEO' routine. The graphics screen will still be incorrectly displayed, but this can be corrected by setting TV manually as Basic does not reset this.

An important point can be seen from listing three. If you have written a program to swap between the card pages, then the program will have to exist in identical positions in both pages. This is so that the program does not vanish when the pages are changed. Alas, that since the memory is changed, you cannot pass variables on the stack (or in any other portion of memory) between the two pages. The only way to pass variables between the pages is to load the variable into a 6809 register and then swap pages.

Listing 3a

```

10 * BASIC PROGRAM 3
20 CLEAR 200,MYTOP
30 FOR I=0:255 TO 255:PRINT I:GOTO 40
40 READ A#
50 A=VAL("B"+A#)
60 GOTO 30#
70 FOR I=0
80 NEXT
90 IF OK=0 THEN PRINT "ERROR IN DATA" GOTO 10:10:10:10
100 PRINT "DATA OK"
110 EXEC 6809000
120 DATA 2#:#1,1#:#8,7#:#F,2#:#0
130 DATA 0#:#0,1#:#0,0#:#0,0#:#0,0#:#1
140 DATA 0#:#1,0#:#7,0#:#0,2#:#F,7#:#
150 DATA 0#:#0,7#:#F,0#:#0,0#:#0,0#:#7
160 DATA 0#:#0,0#:#0,0#:#0,0#:#0,0#:#0
170 DATA 1#:#0,7#:#7,0#:#0,0#:#0,0#:#0
180 DATA 0#:#0,0#:#0,0#:#0,7#:#F,0#:#0,0#:#0
190 DATA 0#:#0,0#:#0,0#:#0,0#:#0,0#:#0,0#:#0
200 DATA 0#:#0,7#:#0,7#:#0,0#:#0
    
```

Listing 1

```

2780          * PROGRAM 3
2780          *
2780          *COPY RAM (40000-47FFF) TO
2780          *RAM (40000-47FFF)
2780          *AND SET UP NEW VIDEO OUTPUT
2780          *VECTORS IN PAGE 1 (40000-1)
2780          *
2780          *WRITTEN IN FULLY
2780          *POSITION INDEPENDENT CODE
2780
2780 8007      BEGIN SUB 111
2780 8008      VORGANT B01 400FF
2780          *ORSHLD B0 41708 FOR C000
2780
2780 3041      BVIDEO P000 C0
2780 1400      *DCC B000 1000000 1000
2780 777707    CLR WFF00 1000000 RAM
2780
2780          *COPY RAM
2780 000000    L00 00
2780 10000000  L01 00000
2780 0001      *COPYL L00 1000
2780 0001      *D 100
2780 007000    *DPS 007000
2780 2007      *DPS COPYL
2780 777700    CLR WFF00 1000000 RAM
2780
2780 777700    CLR WFF00 1000000 PAGE 1
2780 000107    *DPS CLR 'ORSHLD' VECTORS
2780 000107    L00 300
2780 A70C07    STA VECTOR,PCB
2780
2780 B00000    L00 300
2780 A70C00    STA VECTOR+1,PCB
2780
2780          *DIRECT VECTOR TO VIDEOS
2780 L00 000
2780 LEAD VIDEOS,PCB
2780 CLR 300
2780 CLR WFF00 1000000 PAGE 2
2780          *RESTORE DIPS AND RETURN
2780 P000 C0,PC
2780
2780          VIDEO ROUTINE
2780 VIDEOS TEST DEVM
2780          *CHECK FOR SCREEN 1-0, IF NOT
2780          *THEN GO TO USUAL VECTOR
2780 B00 WFF00
2780
2780          *DIPS RETURN ADDRESS FROM
2780 *STACK
2780 LEAD 000
2780 *SET RAM 'PA' BIT
2780 CLR WFF00
2780
2780          *NO VIDEO OUTPUT AND RETURN
2780 JMP WORGANT
2780          *NOTE USE OF JMP RATHER THAN
2780 *JMP AND BTO TO SAVE MEMORY
2780 *AND TIME*
2780
2780          *OLD VECTOR STORE
2780 VECTOR P00 0

```

Crossword

The ninth Dragon Crossword takes its hairy head and fangs around in bewilderment at the new landscape. "My lens must be here soon", it thinks — and here they are — oh, no, this is the fan club of the seventh Dragon Beer crossword, Tony Anwright of Chippenham, who would like ancient Microcad game (Kingdud dual son, those are, my boy) and G. Grenner of Birken ("also known as Leoda") who wants to win something, anything — quick, pass one of those spangled chests —

The phrase is THE DRAGON QUIZ. There will be a couple of free tapes from the Editor's Magic/Magicalness Box for the first five who write out of the last each month. You can try telling us which tapes you'd like — you never know, we may have them.

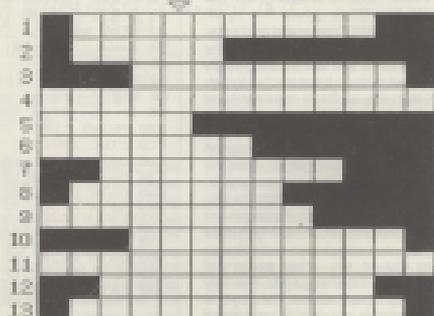
And you don't have to cut up your Dragon User — attach on a photostat of a plain piece of paper with us, as long as we can read them.

- 1 and 10. Initially the butcher goes on safari (8,3,3,6)
2. Sounds like this man avoided an excavation (3,3)
3. Can instead change into forest ruler? (9)
4. "The Eagle", firm, proceed (8,4,2)
5. Dashed to the game (3)
6. Pagan agency for these invaders (7)
7. Film about a gloomy celebrity (4,4)
8. Crazy for a 14199 (7)
9. Tops in football (6)
10. See 1.
11. Deciding decided in this large house? (7,2,4)
12. Return aside this if you're lost (9)
13. Assault by the spirit (5,6)



by Terry and Derek Prabye

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.



Dragonsoft

New software for review should be sent to Dragon User,
49 Alexandra Road, Hounslow, Middlesex TW2 9EP

Continued from page 2

colour or conversely, all of which is automatically saved to another screen and then transferred using a screen dump routine at the end, is quite an achievement.

Imagined as programming with this program, but reacting to my earlier comments I do believe that David should present his instructions in an expanded and more readable manner, perhaps in the form of a booklet using what he has already written with a couple of working examples that the user can follow and then change of experiment with. In this way I feel sure that this excellent program will be enjoyed rather than attempted and put away. One cannot tell a book by its cover and in this case the 'cover' detracts from the real story.

R. L. N. Newton



Beware of the Aardvark

Program: Mandragore
Supplier: Kings Software, 94 The Oval, Park Park, Sheffield S6 6SP
Price: £1 including p&p

KINGDA Software is a new name but the man behind the Dragon's latest entry into the

market, John Foster, has been involved with the Dragon for a long time. After high levels of success at Chere Design, he has set himself up as Kings Software and is working on games for several computers including the Dragon.

In Kings' first release, Mandragore, you play the part of a mandragora — a highly advanced experimental robot. During an routine investigation of an ancient pyramid, you inadvertently trigger the pyramid's self defence system. You must battle your way through five levels of enemies, ghosts, traps, veils, laser fringants and large mutant aardvarks. (How can you tell if an aardvark is a mutant? — Ed.) There are also several sandalls and tiny pyramids which you must avoid in your attempts to escape from the pyramid.

To do this you'll have to use the buttons which enable you as you progress further along the pyramid.

At the end of each floor, should you reach it, you must battle with one of the creatures to be dead. Should you manage to destroy it, you must fall down the hole to the next floor where your mission will continue. In all there are five floors or levels are. On completing the fifth floor, you will be sent to level six, which has the added complication of rogue bullets flying about.

After a dramatic loading screen, a short burst of music will be played, then it comes to an end, a message to press a

key will be displayed and soon doing so the game will start.

Control of the Mandragora is by joystick only, and it takes time to master it fully. The surface of the pyramid is displayed in 3D and if a softer view is not to your taste whether or not you are on the same level as one of the numerous obstacles.

You must learn how to move (not one lane) by tapping up or down on the joystick and so to means is it as easy as it may sound. This mastering of the robot's movement is essential if you are to complete level six.

The first obstacle is particularly difficult if you are careful. On the screen you must contend with the aardvarks, who fire at you, machines, who also fire at you, and numerous pyramids which must be avoided.

A score is achieved each time you manage to turn an aardvark into a skeleton by firing at it or when you destroy one of many machines.

The ultimate obstacle comes at the end of each floor. Here you must destroy one of the creatures without appearing to do so. This requires quiet thinking and an even quieter hand.

After dropping down the hole into another floor, you continue to the next floor.

Level six is a totally different kettle of fish. Here, as well as the aardvarks, machines and pyramids, there are eagles, ants and other nasties.

Mandragore is not a terribly difficult game to start with as you progress, lives start to vanish very quickly. One good point about the game, though, is that when you are killed, you continue where you left off.

In all you have five lives and while this may seem a lot, it's surprising how quickly they disappear.

The graphics are in 3D (for the most part) and are breathtaking. Never before have I seen a game achieve graphics of the standard of Mandragore (Phone the Guinness Book of Records, quiet.) They really have to be seen to be believed. As you progress further, they get better.

The screen is displayed in MODE-SCREEN 1.5 graphics. Perhaps MODE-SCREEN 1.1 graphics would have achieved a better degree of sharpness. As it stands, though, the screen contents are still a marvel.

The music is well written and the sound accompanying the game is of the highest standard. It's interesting but praise for this masterpiece. It is also a very challenging game which should challenge hardened arcade fanatics to the limit. I can say with hand on heart that rarely will you find a game as good as this one for under £10.00.

Conrad Blairlock

Imperfect world is nearly a perfect game

Program: Utopia
Supplier: Pulsar Software
Price: £1.95

UTOPIA is another game written by Gemini Software, also responsible for *Blue Sea* and *City Against Sky*. But these pale into insignificance compared with Utopia their latest game and undoubtedly their best.

A Utopia is "an imaginary state with perfect political and social conditions or constitution". Until recently (in the game scenario) the man made colony of the same name was just that. The Galactic Federation built it up into an ideal artificial planet, but now it has fallen into a state of decay and as a result is no longer the perfect place it used to be.

Unfortunately, however, the inhabitants of Utopia are unable to leave the planet because of its complex defence systems. Originally they were designed to stop intruders from entering the colony, but in the Federation's latest policy, however, that the people who lived there were as a result trapped, with no means of escape.

The task of escaping from Utopia has been given to you. As mentioned in this review, you must guide through the most advanced star fighters, stolen from the Federation, through Utopia's complex defence system to freedom.

The free star fighters in your possession are so advanced

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Hard but not too hard

Roger Merrick links OS-9 and a hard disc drive to the Dragon.

WHEN I recently wrote about my impressions of Stylgraph, I shared some of my frustration on using OS-9 on the Dragon. My criticisms/comments should not be taken too dispassionately with OS-9, or the Dragon, but with the combination of the two. Having worked with it now for some years, but not claiming by any means to be an 'expert', I think OS-9 is a wonderful operating system, but using it on the Dragon have encountered a number of problems that I find very irritating.

Floppy discs

I suppose I should be grateful that OS-9 no longer uses single density drives, and I should be 'thankful' that I do not use a CoCo with only 35 tracks per disc. I do recognise that back in the good old days of 1983, a single sided 40 track was the most cost effective solution to providing a floppy disc system for the Dragon. But I feel cheated, in a way, that nobody ever made it clear that two drives were really essential for OS-9. Of course, Dragon Data had some terminal misgivings after the release of OS-9, and it was fortunate that they got the OS-9 software released before the collapse. That was in fact the last benevolent act of a shrewd computer company who really did appear to care about their customers (and this has perhaps been repaid by the fact that we are still here five years later). I have been told that Microsoft never received the license fee from Dragon Data for the OS-9 software, so there were no legal/leak issues. So it is using Version 2 in registered users. Microsoft were also being benevolent.

However, all that being so, nevertheless find the standard double density, single sided floppy drive does not provide enough space to store a reasonable set of commands, an application and data on the same disc. Single drive operation is extremely time consuming, requiring modules to be loaded in memory, data modules to be changed, etc. Writing discs require preparation, and constructing customised BOOT discs using OS9MEM on a single drive system is difficult.

One simple solution is to add a second drive. If this drive matches the original, then online storage is doubled. The original Dragon Data release of OS-9 only supported the single sided 40 track format. VI from Eurohard includes dual device descriptors and drivers which support double sided and 80 track formats as well. A double sided 80 track disc quadruples online storage offering 768Kbytes per disc. But floppy disc operation in OS-9 is still unsatisfactory — the type-ahead buffer stops working while the disc is being accessed. At first, I took this to be poor

software writing in the device drivers, but now I come to see it as a problem with the hardware. Also, maintaining a reasonable amount of workspace means having a few modules permanently resident in memory as possible. This emphasizes an operational characteristic (for this read 'drawback') of OS-9 — the time spent accessing discs to load modules.

Having seen friends and colleagues with PCs, using hard disc systems that provided megabytes of fast online storage, and envied, I thought, well, the answer to the problems of OS-9 on the Dragon is to add a hard disc. The operating system is sophisticated enough to handle it. Then you could have all your commands and applications available at the touch of a 'Disk'.

Knowing nothing about hardware constructions, I searched for a supplier. I discovered the 'off the peg' systems available for the CoCos in America, and stumbled at the cost of bringing one over (with no guarantee that it would work on the Dragon). Competence at one time appeared to have now passed. However, their plans for 're-establishing' the OEM at 1299 were! The heading success that might have been hoped, and they abandoned the project. 'People would not be prepared to pay the cost of such a system,' said the Mr. So, at the last 1988 show at the Horticultural Hall, I asked Martin (wasn't it for some anyone who could do a hard disc interface. Gordon (wasn't his name) came up, and some time later I contacted him.

Hard disc system

The hard disc system consists of the following sub-sections: the dragon interface board, hard disc controller board, power supply, and hard disc driving software. There is a small interface board that fits inside the Dragon, mounted on the shoulder of the lower casing, above the keyboard. This board contains four components, and is wired into the Dragon's pins by several connectors. A 50-way cable leads out of the board to a hard disc controller board (from an IBM compatible) in the next section. The board mounted in the Dragon is very simple. The connections to the Dragon pins are more complicated.

But this is all the Dragon-specific hardware. Gordon will provide the hard disc and power supply, or the customer can provide their own. If you intend purchasing a hard disc, ensure that you have information concerning the number of heads, power consumption, track to track access time, and damaged sector map. If buying a second hard drive, do be careful in choosing. See a and working, or don't pay much for it. You can't do any maintenance on a hard disc the way you can with a floppy drive. In my

case, I had acquired a 16-megabyte Seagate half height drive. It is the same size as a half height floppy drive. I had expected to be able to run it from the floppy power supply, but the starting current load of 3.5 amps was too much, so I required a more powerful 'switched mode' type of power supply. Generally speaking, this type of supply is essential, and they are expensive, so budget for it. A new one might cost £30.

The Dragon interface board includes a controller chip, and data transfer takes place over two otherwise unused bytes above BHF00. It is possible, therefore, with appropriate software, for the hard disc system to be used by Plan, OS-9 and native DragonDOS. However, Gordon only supplies OS-9 drivers. He feels, and I share this to an extent, that only under a sophisticated system such as OS-9 is it worth using a device such as a hard disc.

Set up

Having had the interface installed, and purchased the controller card and power supply, I was anxious to get up and running. The first thing to do is format the hard disc. A utility disc of OS-9 modules is provided. Because of the way the BBOOT command works in DragonDOS, it is unfortunately necessary to BBOOT from floppy, so that was what I did. The message 'OS-9 version 2.4 Welcome to Gordon's OS-9 system' greeted me.

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Using MDR from my standard system disc showed the presence of the device descriptor for HD0R and HD, in addition to CD0R and DCR0R. The 'E' option showed HD0R's size as approximately equivalent to the CD0R module.

It was then necessary to format the hard disc. The PCFORMAT module on the utility disc is totally different from the standard system module. It asks for information about the hard disc — number of surfaces, heads and sectors. This information must

be known, as incorrect data could in fact damage the hard disc.

A further piece of information required is the so-called interleave factor. This refers to the fact that physically consecutive sectors may not have consecutive numbers assigned by the system. This is due to the fact that in the time taken by the system to read and read a sector, the spinning disc has moved on. If the system had to wait un-

The importance of a hard disc is proportional to its fragility... since backing-up is time consuming, I ended up not doing it, and lost a lot of work (serves me right).

til the physically consecutive sector was back in position, time would have been wasted. More efficient is read the sector that is under the head at the time. Setting the interleave factor obviously requires detailed knowledge about the speed of operation of the system. This is not available, so I took the default values, making a mental note to try different interleave factors in subsequent format operations. Then the operator must choose logical or physical format. The former is equivalent to format without verify, whereas the latter will verify and lock out any erasable tracks.

Naturally in test format, the physical option is selected. Although the formatting process works much faster than on a floppy system, with so many sectors to format a considerable period of time is taken. The operator must stay with the system during this time in case any action need be taken. After an apparently interminable period of time (15 minutes) the disc is formatted, and the command `FORMAT` came back with the satisfying answer "14,000 sectors". The next steps to transfer all OS-9 programs to the hard disc.

Hierarchy

Bearing in mind the hierarchical directory system, preliminary thought should be given to on-disk structure. Essentially one may choose to have one master CMOS directory full of subentries, probably ordered into a number of subdirectories, or set up a directory for each application (eg. one for `Stato`, one for `Pascal`, etc.) each with its own CMOS subdirectory.

This latter approach involves some duplication of files, but may be easier to use. Consider a directory called `STYLO` using

the `OSAVE` command, the contents of the floppy distribution disc of `Stato` are transferred to the hard disc directory `STYLO`. When using the `STYLO` program, a file can be contacted with the `BUILD` command, or a text editor, to `COPY` over from the master CMOS directory to the `STYLO` CMOS subdirectory any additional commands that may be required. Others prefer to have the disc structure organised around a file's purpose rather than language (eg. to work on household accounts files, `CHK` to a directory of `HOUSEHOLD`, `ACCOUNTS` rather than `DYNAMICAL`, `HOUSEHOLD`, `ACCOUNTS`).

I chose to construct a master CMOS directory from the system disc, and a number of directories representing each floppy disc that I subsequently stored on the hard disc (by `OSAVE`) — one for `Stato`, one for `STYLO` etc. My `OS-9` floppy disc files I saved hierarchically under a directory of `OS9MCDIR050K`.

Remembering that spacefill is limited to 254 characters (keyboard buffer length), and to reduce opportunity for errors, short directory names are to be preferred. Another point to bear in mind is that only one file with a given filename can exist within a directory, so if `OSAVE` encounters a module with a given name in a directory, a revised updated module being loaded in from floppy will not be stored. `OSAVE` will report an error 218 and carry on. The user must then manually remove the existing or updated module and load the module from floppy.

In use

Because of the device independent IO structure of OS-9, all commands that report the state of a device can be substituted to HD such as `DIR`, `FREE`, `DISKCHECK`. The first point that became apparent was that many applications had been hard-coded to refer to DD for various reasons. `STYLO` looks for the proportional spacing table on DD, `SPELL` looks for the dictionaries on DD, etc. There are two approaches to dealing with the either rename the HD80K driver to `DD80K`, and HD to DD. This will cause problems for floppy disc operation. Or use `DEBUG` or other utility to search for references to DD in programs, and patch to HD. Because of the size of `HD80K`, `DEBUG` should be used to create a `BOOT` file of a minimum number of modules. Once all applications are patched to replace references to DD with HD, it is not necessary to refer to the floppy disc at all. Therefore `DD80K` can be left out of the `OS9BOOT`, and loaded into memory from the startup file (being able to be removed whenever required). Having created directories for all my OS-9 applications, including separate directories for `W-COS9` and `CCO9COS9`, I have used approximately one quarter of the space in my 10-megabyte hard disc. This is with substantial duplication of files.

A major advantage is speed in use. There are two aspects to this — the data transfer rate of the hard disc, and the effec-

tive track access time are faster with a hard disc than with a floppy, as modules are loaded into memory, and files are saved from memory, and track `WASH` with a hard disc than with a floppy.

Disc snags

Recently, with all commands and applications on-line and accessible via `CHK`, there is no time spent swapping discs. For example, in `W-COS-9` I can `BOOT` up, load a previously built file to call `DEBUD` and customise `STYLO` and the floppy device descriptors, load `STYLO` and construct a C program, save and compile it, go back to `STYLO`, construct a `BASIC90` program which calls the C module.

The speed of which modules are loaded into memory means that the storage device is almost like an extension to ram. This is how the 24K limitation can be overcome. Regular use of `OS-9` gave me a different perspective on my home computer. My Dragon became a terminal to an abstract OS-9 computer, how with the hard disc, the OS-9 computer takes on a more definite form. Since the hard disc system, by adding so much on-line storage, gives me the opportunity to personalise my OS-9 system, the peripheral device takes on a crucial importance.

There are snags, of course. The importance of the hard disc to my system is also proportional to its fragility. I've been running the system for approximately one year now. But I've never written about it before because I have suffered problems with the hard disc "going down". Since backing up is a difficult and time-consuming problem, I ended up not doing it and when the system crashed, I lost all `STYLO` (serves me right).

Plugging up hard stores is even more trying than backing up floppies and the consequences potentially more disastrous owing to the large amount of work capable of being stored. However, the principle that the files which you lose are always the hardest to restore is equally true of both types, says your Editor with feeling.

I have carried out a number of tests on the performance of the HD80K-HDRING sequence combination, and they were a mix of respectable results (compared with current machines) and some poor results. Gordon has rewritten the driver so I intend to wait and report on the performance of the new version.

A number of people, users of other computers, have looked at me when I have described the system. Why they say, would you want to foot a powerful peripheral onto a rather feeble machine like a Dragon? This displays a lack of understanding of the power of OS-9, and the different approach to computing given by the combination of powerful operating systems and hard disc.

The total cost of about £150 — £200 may seem a lot of money, but if you are into OS-9, have a significant investment in software and a promising spirit, you should go for it.

Dragon Invoicer

Craig Henderson plans a prosperous future.

If you have a printer to go with your Dragon, have you ever wondered how much more you could use it and improve on the presentation of your work?

As lately I have been keeping a much closer eye on my income and outgoings (credit and debit, getting into a good habit for when I leave school), I have written this invoice compiler to compile, print-out, edit, save and load all appropriate information. You can use it to keep a careful watch on your money.

When you first measure the invoice complete, the title screen will be displayed and you will be asked if you would like to load an existing invoice off cassette. Press (Y) or (N) correspondingly. If your reply is yes (Y), the program will then go into explain what to do step-by-step and when the invoice is loaded, you will go into the main menu. If not (N), you will go straight to the main menu.

With the main menu you will have five choices; pressing (1) will send the current invoice to the printer as shown in figures see. The printer is set up for an 80 column printer but this can be changed by taking location 156 in line 6 to the greater width and location 152 to location 155 divided by 4 (type F08E 152, F08E/04) and changing the numbers 2000/0071 to contain the appropriate width minus 21. Pressing (2) will take you into the ENTER INVOICE mode. In this mode you will be asked to enter all the appropriate information to build up an invoice.

The screen will clear and the question "WEEKLY MONTHLY ENTRY?" will ap-

SCREENS - MENU.

0	-	CLEAR STRING SPACE
1	-	SET PRINT MONTH
20-40	-	DATA FOR DAYS OF THE WEEK
50-60	-	DATA FOR MONTHS OF THE YEAR
70-140	-	PRINT TITLE PAGE
150-200	-	MAIN MENU AND SELECTION ROUTINE
200-230	-	DATE ROUTINE, NEW PRGCL, BOOT MACHINE
2400-2500	-	LOAD INVOICE OFF CASSETTE
2600-2700	-	PRINT INVOICE TO PRINTER ROUTINE
2800-2900	-	ENTER INVOICE FROM KEYBOARD ROUTINE
3000-3100	-	SAVE INVOICE TO CASSETTE ROUTINE
3200-3300	-	EDIT INVOICE ROUTINE
3400-4070	-	LEFT PROMPT MOVE ROUTINE FOR EDITING DATA LINES

FORMATTED.

0	-	NUMBER OF ENTRIES
1	-	NUMBER OF DATA LINES
00	-	MONTHS OF WORK
01	-	WORK DATE
02	-	SETUP DATE
03(1)-00	-	DAY OF CURRENT ENTRY
04(1)-01	-	MONTH OF CURRENT ENTRY
05(1)-01	-	DATE OF CURRENT ENTRY
06(1)-01	-	AMOUNT ON CURRENT ENTRY
07(1)-01	-	SUBSET OF WEEKS ON CURRENT DATA LINE
08(1)-01	-	AMOUNT PER WEEK ON CURRENT DATA LINE
09(1)-01	-	TOTAL FOR WEEKS ON CURRENT DATA LINE
10(1)-01	-	ADDITION INFORMATION

< TRUCK FROM FROM 001 >

PAPER BAND INVOICE

DURING THE MONTHS OF JUNE AND JULY 1988

WEEKDAY	JUNE	478	42.00
WEEKDAY	JUNE	1178	82.20
WEEKDAY	JUNE	1878	82.20
WEEKDAY	JUNE	2578	42.20
WEEKDAY	JULY	320	42.00
WEEKDAY	JULY	978	82.00
WEEKDAY	JULY	1678	82.00
WEEKDAY	JULY	2380	42.00
WEEKDAY	JULY	3078	42.00

04 WEEKS-DAYS	#	82.00	SALES	=	6968.00
04 WEEKS-DAYS	#	82.00	SALES	=	6968.00
01 WEEKS-DAYS	#	82.00	SALES	=	6968.00
		TOTAL		=	6968.00

SCREEN

per. Day entries refer to the lines of text in the invoice which have the status:

DAY MONTH DATE AMOUNT

The prompt for a title is next and then is followed by a prompt for the month(s) of work, then the date that you began work followed by the date that you retired from work. When you have done this, the screen will clear again and the title of the invoice will be displayed at the top of the screen, followed by the entry number and the prompt ENTER DAY. This is the day of the entry number which is displayed. If you don't enter a valid day, the machine will tell you so. When you have done this, you will be asked to enter the month, and again if you enter an invalid month, you will be told. Next enter the date(s) the amount. On the amount, if you just enter the figure, a hash (H) will be displayed in front of it later on, but if you precede the figure by a hash (H) yourself, that is OK.

Once you have done this for all the entries, you will see display as in figures two.

You fill this in using keys 0-9 for the figures and the left and right arrow keys for editing. If you need to enter a 3-digit

DATA LINE EXAMPLE

```
----- WEEKS/DAYS @ C--- EACH = E---
          *-----* TOTAL
```

DATA LINE FULL EXAMPLE

```
95 WEEKS/DAYS @ #02.20 EACH
          *-----* TOTAL
```

IS THIS INFORMATION CORRECT ?

number in a 3-digit space or a 4-digit number in a 2-digit space, then start the number with a 0. If the price column is to be left blank, it is still a good idea to fill it with zeros (0).

When you have finished another prompt, IS THIS INFORMATION CORRECT? will appear. Answer (Y) or (N) correspondingly. (N) then you will go back to edit it and if (Y) you will proceed to the next prompt.

DO YOU WISH TO ENTER ANOTHER - WEEKS/DAYS @ C--- EACH = E--- TOTAL?

Again answer (Y) or (N) correspondingly. If

(Y) then you will go back with the same procedure as before and if (N) you will go on to be able to enter an extra line of notes, etc.

Press (ENTER) if no notes are required and you will return to the main menu. If you have an existing invoice in memory which you don't want and you would like to enter another invoice, go to step (2) in the main menu as this will re-boot the machine, but press (BREAK) and then (RUN) and the memory will clear.

Pressing (2) enters the save invoice mode. This saves the current invoice in memory to the cassette recorder. It saves as a file as you can see from the program. Be sure to insert the 'remote' plug to the

cassette recorder. You are able to position the cassette with the remote plug inserted, because I have made use of the MOTOR and(AUDIO) commands within the software.

Pressing (4) enters the edit invoice routine. Each piece of information will then, in turn, be displayed followed by a question mark and a flashing cursor. If this piece of information is correct then press (ENTER) to pass on to the next. If this is not correct then enter the corrected text and (ENTER).

Pressing (5) will exit the program, but when you press (2) you will be asked if you are sure. If you are, then follow by (Y) and the program will end, display the boot-up message and the Basic program will be lost along with all the data which was in memory.

If you accidentally exit the program, by pressing (BREAK) OR (RESET) you can continue without losing the current invoice in memory by typing 'LOAD 10'. NB If you own a Dragon II, check the save routine addresses BEFORE using them.

Although this is a Basic program, you may not wish the task of typing it in, and therefore it will be happy to supply copy on cassette for £2.00 including post and packing or for £1.50 if you supply a C15 or C20 cassette. Send a cheque or postal order made payable to Craig Henderson to Invoice Software, Craig Henderson, Sunny, 38 Woodbury Avenue, Wills, Somerset BA5 2DN. Anyone who sends too little money will have the cheque returned without any software. Happy Investing.

```
5 CLEAR 11000
10 POKE 155,0:POKE 153,20:POKE 325,0
11 ** INVOICE COMPILER **
20 DATA MONDAY, TUESDAY, WEDNESDAY
30 DATA THURSDAY, FRIDAY, SATURDAY
40 DATA SUNDAY
50 DATA JANUARY, FEBRUARY, MARCH
60 DATA APRIL, MAY, JUNE, JULY
70 DATA AUGUST, SEPTEMBER, OCTOBER
80 DATA NOVEMBER, DECEMBER
90 CLS
100 PRINT *****
110 PRINT "INVOICE COMPILER"
*****
110 PRINT:PRINT:READ YOU LINE TO LOAD AN INVOICE OFF CASSETTE ?
120 IF INKEY#0:IF IN="" THEN 120
130 IF IN="Y" THEN 1000
140 IF IN(">M") THEN 120
150 CLS
160 PRINT@70,"MAIN MENU"
170 PRINT@107,"-----"
190 PRINT@199,"1) PRINT INVOICE"
200 PRINT@231,"2) ENTER INVOICE"
210 PRINT@263,"3) SAVE INVOICE"
215 PRINT@295,"4) EDIT INVOICE"
220 PRINT@327,"5) QUIT PROG."
230 PRINT@448," SELECT : "
240 IF INKEY#0:IF IN="" THEN 240
250 IF IN="1" OR IN="2" THEN 240
260 IF IN="3" AND IN="4" THEN GOSUB 2020:GOTO 190
264 I=VAL(IN):PRINT I:SCROLL 30,1:CLS
266 IF IN="5" AND IN="7" THEN 160
270 ON I GOSUB 2040,2500,3000,3500,3900
271 I#INKEY#
280 GOTO 190
```

```

300 PRINT#70,"ARE YOU SURE (Y/N)?"
310 IF ANSWER IS IF IS="N" THEN 310
320 IF IS="N" THEN RETURN
331 IF IS="Y" THEN 310
340 CLS
350 EXEC 46000
1000 ' LOAD
1010 CLS
1020 PRINT"PLEASE PLACE CASSETTE INTO THE CASSETTE RECORDER,INSERT THE
'REMOTE PLUG,CHECK VOLUME SETTING AND PRESS A KEY.";SOUND#(PI*FREQ#)
EXEC 34091
1030 NOT#OFF;AUDIOOFF
1040 CLS
1050 PRINT#224,"PLEASE ENTER THE FILENAME FOR THE INVOICE WHICH IS TO BE
LOADED ";LINE INPUT FL4
1060 CLS;PRINT#224,"SEARCHING"
1070 OPEN "I",E-1,FILE#PRINT#224,"LOADING "
1080 INPUT#-1,D,H,JE,RE,RS,RS,TR,AMS
1091 DIM D#4(D),MM#4(D),DT#4(D),AR#(D),AM#(H),AW#(D),TW#(H),MM#(D),ANN#(D),TW#(D)
1090 FOR DP#0 TO D-1
1100 INPUT#-1,DP#(DP),MM#(DP),DT#(DP),AR#(DP)
1110 NEXT#FOR DP#1 TO H
1120 INPUT#-1,MM#(DP),AM#(DP),TW#(DP),MM#(DP),ANN#(DP),TW#(DP);NEXT
1130 CLOSE E-1;GOTO 150 '
2000 ' PRINT INVOICE
2010 PRINT#224,"PLEASE MAKE SURE PRINTER IS <ONLINE> AND PRESS A KEY";
EXEC 34091
2020 IF D=0 THEN CLS;PRINT#224,"NO INVOICE CURRENTLY IN MEMORY ";SOUND 100
;20;RETURN
2030 Z#RIGHT$(TR,7);IF Z#="INVOICE" THEN PRINT#-2,TR;GOTO 2050
2040 PRINT#-2,TR;" INVOICE"
2050 PRINT#-2;PRINT#-2,"DURING THE MONTH(S) OF ";
2060 IF LEN(MM)<09 THEN PRINT#-2,MM;GOTO 2080
2070 Z#RIGHT$(MM,LEN(MM)-09)
2071 MM#LEFT$(MM,09)
2072 IF RIGHT$(MM,1)<>" " AND RIGHT$(MM,1)<>"." THEN 2074
2073 PRINT#-2,MM#PRINT#-2,TR;GOTO 2080
2074 Z#RIGHT$(MM,1)+Z#MM#LEFT$(MM,LEN(MM)-1);GOTO 2072
2080 PRINT#-2;Z#;"DEBAR " ;"+04
2082 O#="RETIRED " ;"+04
2090 O#INT((PEEK(155)-LEN(O#))/2)
2100 PRINT#-2,TAB(O#);Z#
2110 PRINT#-2,TAB(O#);O#;PRINT#-2
2120 FOR DP#1 TO D-1
2130 PRINT#-2,DP#(DP);STRING$(INT(PEEK(155)/4)-LEN(DP#(DP))," ");
2131 PRINT#-2,MM#(DP);STRING$(INT(PEEK(155)/4)-LEN(MM#(DP))," ");IF LEN(
DT#(DP))<4 THEN DT#(DP)=" "+DT#(DP)
2132 PRINT#-2,DT#(DP);STRING$(INT(PEEK(155)/4)-LEN(MM#(DP))," ");
2133 PRINT#-2,AR#(DP);NEXT
2134 PRINT#-2;PRINT#-2
2140 FOR DP#1 TO H
2150 PRINT#-2,MM#(DP);" WEEKS/DAYS @ ";AM#(DP);" EACH = E";TW#(DP);NEXT
2160 LR#0;FOR DP#1 TO HL#LR#TW#(DP);NEXT
2170 PRINT#-2,STRING$(25," ");"TOTAL = E";
2171 MM#="TRAILER";MM#="RIGHT$(MM,LEN(MM)-1)
2174 IF LR IS THEM MM#="0"+MM#;PRINT#-2,MM#;GOTO 2180
2175 IF LR=100 THEN MM#="0"+MM#;PRINT#-2,MM#;GOTO 2180
2180 IF LR=INT(LR) THEN PRINT#-2,".00" ELSE IF LEN(MM)<6 THEN PRINT#-2,"0"
ELSE PRINT#-2
2190 FOR DP#1 TO 10;PRINT#-2;NEXT
2192 PRINT#-2;PRINT#-2;PRINT#-2,"SIGNED ";STRING$(PEEK(155)-7,".");
2200 RETURN
2499 END
2500 ' ENTER INVOICE
2510 INPUT"HOW MANY DAY ENTRIES ";D
2520 IF D>356 THEN PRINT"MAXIMUM IS 356 - TRY AGAIN";GOTO 2510

```

```

2530 DIM D$(DI),MM$(DI),D$(DI),A$(DI)
2540 N=D:J=1
2550 PRINT:LINE INPUT"PLEASE ENTER THE TITLE OF THIS INVOICE ";IT$
2555 PRINT:LINE INPUT"PLEASE ENTER THE MONTH(S) OF THIS WORK ";IM$
2556 PRINT:LINE INPUT"PLEASE ENTER THE DAY/MONTH/DATE WHICH YOU BEGAN WORK
";JD$
2557 PRINT:LINE INPUT"PLEASE ENTER THE DAY/MONTH/DATE WHICH YOU RETIRED FRO
M WORK: ---";J$
2560 CLR:PRINT T$
2570 PRINT:PRINT"ENTRY NUMBER ";J:D
2580 LINE INPUT"ENTER DAY ";D$(DI)
2590 H=0
2600 READ B$,IF B$=D$(DI) THEN H=1
2605 IF H=0 AND B$="SUNDAY" THEN PRINT"INVALID DAY":RESTORE:GOTO 2580
2610 IF H=0 THEN 2600
2620 RESTORE
2630 LINE INPUT"ENTER MONTH ";MM$(DI)
2640 H=0
2650 FOR D=1 TO 7:READ B$:NEXT B$=""
2660 READ C$,IF C$=MM$(DI) THEN H=1
2670 IF H=0 AND C$="DECEMBER" THEN PRINT"INVALID MONTH":RESTORE:GOTO 2630
2680 IF H=0 THEN 2660
2690 RESTORE
2700 LINE INPUT"ENTER DATE ";D$(DI)
2710 LINE INPUT"ENTER AMOUNT ";A$(DI)
2720 IF LEFT$(A$(DI),1)<>"@" THEN A$(DI)=A$(DI)+".00":GOTO 2730
2721 IF INSTR(A$(DI),"1140" THEN A$(DI)=A$(DI)+".00":GOTO 2730
2722 IF INSTR(A$(DI),"0")>LEN(A$(DI))-2 THEN A$(DI)=A$(DI)+".00":GOTO 2722
2730 D=D+1
2740 IF D>N THEN 2560
2741 H=1
2750 CLR
2760 PRINT"-- WEEKS/DAYS 8 1--- -- EACH"(PRINT:PRINT" I--- -- TOTAL"
2770 P=32:PRINT#P,---)
2780 I=INKEY$:IF I="" THEN 2780
2790 IF I="C"&&H=0 THEN 4000
2792 IF I="C"&&H=1 THEN 2800
2794 IF I="O" OR I="Y" THEN 2780
2800 PRINT#P-32,I$:PRINT#P," ";I:P=P+1
2810 IF P=4 THEN P=8
2811 IF P=8 THEN P=16
2812 IF P=16 THEN P=32
2813 IF P=32 THEN P=64
2814 IF P=64 THEN P=128
2815 IF P=128 THEN 2820
2819 PRINT#P,---)
2820 GOTO 2780
2830 PRINT#256,"IS THIS INFORMATION CORRECT?"
2840 I=INKEY$:IF I="" THEN 2840
2850 IF I="Y" THEN 2900
2860 IF I="N" THEN 2840
2870 PRINT#256,---)GOTO 2770
2890 PRINT#256,---)
2901 L=1024
2910 FOR QP=112 TO 121
2920 IF PEEK(QP)=QP THEN MM$(Q)=MM$(Q)+CHR$(QP)-64)
2930 NEXT MM$(H)=VAL(MM$(H))
2940 IF L=1024 THEN L=L+1:GOTO 2910
2950 L=1043
2960 FOR QP=112 TO 121
2970 IF PEEK(QP)=QP THEN MM$(Q)=MM$(Q)+CHR$(QP)-64)
2980 NEXT MM$(H)=VAL(MM$(H))
2990 IF L=1043 THEN L=1044:GOTO 2950
2992 IF L=1044 THEN MM$(H)=MM$(H)+".":L=1045:GOTO 2950
2996 IF L=1046 THEN L=1047:GOTO 2950
2997 L=1095

```

Adventure trail

```

2958 FOR DP=10 TO 121
2959 IF REEL(IL)OP THEN TW*(HI)+TW*(HI)+D4*(OP-44)
2961 NEXT(TW*(HI)+VAL(TW*(HI))
2961 IF L=1091 THEN L=L+1:GOTO 2958
2963 IF L=1092 THEN L=L+1:GOTO 2958
2963 IF L=1093 THEN L=L+2:TW*(HI)+TW*(HI)+".":GOTO 2958
2965 IF L=1095 THEN L=L+1:GOTO 2958
2969 IF H<1 THEN PRINT#255,"DO YOU WISH TO ENTER ANOTHER.  -- WEEKS/DAYS
  @ E---,-- EACH = E---,-- TOTAL T' ELSE GOTO 2969
2966 I$=INKEY$:IF I$=""THEN 296A
2967 IF I$="Y" THEN H=H+1:GOTO 2958
2968 IF I$="N" THEN 2966
2969 CLG:PRINT"-- WEEKS/DAYS @ E---,-- EACH = E---,-- TOTAL":PRINT#
"ENTER ANY EXTRA LINE IF NEEDED (ENTER) TO END - REMEMBER THE PRINTER HA
S 80 CHARACTERS ACROSS850 SQUARE OF LAYOUT !)"
2970 PRINT#PRINT:PRINT#LINE INPUT AM
2980 RETURN
3000 ' SAVE INVOICE
3005 IF D=0 THEN FOR DP=1 TO 100:NEXT:GOTO 2020
3010 PRINT#PLEASE PLACE THE CASSETTE INTO THE CASSETTE RECORDER,SET IT TO
<RECORD> MODE,CHECK THE VOLUME SETTING,INSERT 'REMOTE' PLUG ANDPRESS A KEY
">:AUDIODRUMOTORON:EXEC 3459:
3020 CLG:MOTOROFF:AUDIOOFF
3030 CLG:PRINT#254,"PLEASE ENTER FILENAME TO BE  SAVED ":
3040 LINE INPUT FL$
3050 OPEN "D",E-1,FL$
3060 PRINT#-1,D,H,D$,R$,R$,T$,AM$
3070 FOR DP=0 TO 9-1
3080 PRINT#-1,D$(OP),RM$(OP),ST$(OP),AR$(OP)
3090 NEXT FOR DP=0 TO H
3100 PRINT#-1,R$(OP),AR$(OP),TW$(OP),RM$(OP),AR$(OP),TW$(OP):NEXT
3110 CLOSE E-1:RETURN
3200 ' EDIT INVOICE
3210 PRINT#TITLE = "":
3220 INPUT Q$:IF Q$="" THEN 3240
3230 T$=Q$
3240 PRINT#WORKING = "":
3250 INPUT Q$:IF Q$="" THEN 3270
3260 R$=Q$
3270 PRINT#ROOM = "":
3280 INPUT Q$:IF Q$="" THEN 3300
3290 S$=Q$
3300 PRINT#RETIRED = "":
3310 INPUT Q$:IF Q$="" THEN 3330
3320 R$=Q$
3330 FOR DP=1 TO 9-1
3340 PRINT #$(OP):INPUT Q$:IF Q$="" THEN 3360
3350 G$(OP)=Q$
3360 PRINT RM$(OP):INPUT Q$:IF Q$="" THEN 3380
3370 RM$(OP)=Q$
3380 PRINT DT$(OP):INPUT Q$:IF Q$="" THEN 3700
3390 DT$(OP)=Q$
3700 PRINT A$(OP):INPUT Q$:IF Q$="" THEN 3720
3710 A$(OP)=Q$
3720 NEXT
3800 PRINT AM$:INPUT Q$:IF Q$="" THEN 3820
3810 AM$=Q$
3820 RETURN
3999 STOP
4000 PRINT#P, " ":P=P-1
4010 IF P=102 THEN P=50:
4020 IF P=90 THEN P=25
4030 IF P=53 THEN P=52
4040 IF P=50 THEN P=33:
4050 IF P=31 THEN P=32
4060 PRINT#P, " ":
4070 GOTO 2780

```

Dragonsoft

New software for review should be sent to Dragon User,
65 Alexandra Road, Harefield, Middx TW9 4EP.

Continued from page 11

that they have laser beams that cannot be seen. This prevents the enemy from dodging the lasers, and makes your ship almost totally indestructible.

However, as part of Utopia's defences, there is a fleet of kamikaze shuttle craft which, instead of firing at you, will home in on your ship and attempt to collide with it, unless you can stop them.

The planet surface is strewn with objects. Many of these are defences, some are just pain obstacles to avoid. Among the defences are the stone-encased shuttle craft, rocket launchers and force fields.

To aid your progress in the game, there are various fuel pods strewn around the planet which must be flown over in

order to raise your fuel levels.

It must be noted that the main aim of this game is not to achieve outstanding scores, although it is nice to do so, but to retain enough fuel to enable you to fly out over the planet.

As you survive each time you destroy an enemy craft, although your score can be considerably increased when your ships are flown over certain strips of land.

Should your fuel fall below zero or should you hit one of the numerous objects, you will immediately die and be sent back to the beginning of the game.

This is a short on-line primary game, like that which runs from the same program. Why programmers continue to use this irritating routine puzzles me. The real effects that the user will

become very bored with the game is, every time he or she dies, they are sent back to the beginning to repeat what has just gone before. It is particularly annoying when you are just a short distance from the end of the game — not that I have got that far with this one.

Utopia is a difficult game, perhaps too difficult. Maybe some of you will say that this provides a challenge, but the game really does suffer from only giving you three lives. Nobody can be expected to complete a massive game like this with only three lives. No doubt the hackers will come up with a miracle cheat code which will dramatically increase lives.

The graphics are really first class. I would say they're among the best I have seen,

although the screen and your ship do occasionally flicker at the screen scrolls. The sound and music are excellent, the title music in particular is pleasant and well put together.

Utopia is a bit like a former game for the BBC called *Paradox*. Utopia doesn't look anything like *Paradox*, but the aim is virtually the same and the two games have the same feel — and like *Paradox*, it is unnecessary to get killed.

For my money Utopia is one of the best Dragon games of all time despite minor faults, and Jonathan Cartwright and the rest of the crew at Dragon deserve praise for the work on it.

Donald Morrison



No red herrings

Program: The Great Fish Van Stander

Supplier: Orange Software

Price: £2.99

The Great Fish Van Stander is an observational adventure from the newly created Orange Software. Even an adventure had a ridiculous storyline behind it, this game certainly does.

One day a strange thing happens to you: as you walk to work, you are jumped by two masked men, blindfolded, tied up and gagged and thrown in the back of what smells like a fish van. Then you see fish on the road, and when you regain your wits, you swim across another small damp cell. Alternatively, remembering the London Underground during the Thursday night rush offers a brief spell of sociability, you unconsciously find yourself in Euston Station too without remembering how or even why

you got there — One Of Our Correspondents.

It sounds as though somebody has a pretty excessive imagination! The game starts off in the damp cell, with water dripping from the ceiling and rats scurrying beneath a pile of straw.

The only visible object is a blanket. EXAMINE BLANKET reveals that there is nothing special about the blanket. With no exits apparent, the only direction is west to another part of the cell, where there is a grille in the ceiling. The only way out would be to buy your way out, but as you have nothing sharp at the moment, you have to find another way.

Back to the first location, and a score realised that the only way out was under that pile of straw, though quite how I still don't know.

The game supports the usual

verbal input with NSEWUD for directions. Verbs include look, examine, help, score, bot, lit, etc. and the usual load/save commands.

However, despite the inclusion of verbs like kill, the game will not tolerate violence — on receiving a violent command, the game will stop and the cooperator will need-start. Don't panic — it's not a bug. As soon as you press a key the game will restart with a warning not to use violence.

There are a large number of locations in the game, and many of them contain elements of humour, though the game focuses precariously between humour and drollery language in parts. (Mr. Mirrator offered an example of a drollery abbreviation here, but as Jonathan wrote it out, I will leave it's greater wit to myself. — DJ)

The game operates totally in text, which hasn't been re-defined. Nevertheless, the

author has managed to keep his descriptions fairly detailed and the screen is quite well laid out.

Although the game operates in BASIC, it plays at a reasonable speed. As with most BASIC games now, it's well protected with the Break key being disabled as well as the LIST command.

There seems to be a slight bug in the game, as every time you type QAT you lose your lip and eventually die, regardless of whether or not you are eating anything at the time.

It's a good, well thought out game with a totally original idea behind it. Not one particularly for the beginner, as its fairly complex, but should appeal to the hardened adventurer.

Donald Morrison



Communications Adventure trail

Problem: Can anyone supply me with a copy of the instructions for using the Gemini Database program? Costs reimbursed.

Name: Mark Matthews
Address: 14 Graftley Close, Axtford, Kent TN23 7UE.

Problem: Help. Grosvenor Disk II/TTY cartridge will not load. SHH appears or cursor disappears and keyboard goes dead. Where has the company gone?

Name: P Richards
Address: 41 Gowerway,

Soham, Ely, Cambridgeshire
CO7 5BU 0253-722466.

Problem: Wanted any football pool programs.

Name: Peter Marsh
Address: 37 Colville Walk, Boley, Surrey GU24 9DU.

Adventure: The Grimwood incident for Little Indiana?

Problem: How do you travel by bus or train? List HELP.

Name: Neil Davies
Address: 4 Gristmill Drive, Coombe, Sharnbury, Stroud SUE.

Raise your graphs

Plots by R.L. Moss, lines by the Dragon

THE following program will create polar and parametric cartesian graphs of the kind often encountered in A-level maths syllabi. The program as it stands assumes the use of single disc drive and programs giving text on the graphics screen, such as Hints or Assistant files; but neither is essential. A screen dump of the graph can be made in conjunction with a screen dump program, of which there are seemingly thousands available, for your particular printer.

Type in the program as listed with the following changes:

For cassette users, delete LOAD and RUN commands from the first line. Screens dumped in-ss programs must be loaded in separately (if used). Change LOAD and RUN commands in line 0 to that of names of the screen dump and text-reformat program (eg. H-ss, RWK, etc). Screen dump should be in mid memory to avoid clashing with the reformatter or basic program. Delete if not used. If a text-reformat program is not used, delete line 1 and change line 2 to:

```
20CLS:FORM=OTC:READA:IN$=""  
":NEXT
```

Change line 250 to:

```
200CLS:SCREEN=1:G=FN(7):P=1  
":THEND
```

If a basic screen dump is used, type this in from line 200 onwards ending with a RETURN statement. Change line 240 to:

```
240 G:G:R:R:G:G:O:O:O:O
```

Otherwise line 240 should contain the EXEC address of the screen-dump program.

Once RUN the program displays the graph of the function contained in line 10. For a polar graph, line 10 should contain DEF F(R)= $\sin(2\pi R/10)$ or $\cos(2\pi R/10)$ or the function to be drawn, and the letter G is the variable used. This should be followed by POLAR=1, and an example is included in the listing.

Cartesian graphs are displayed using two equations, DEF F(X)= $\sin(X)$ and DEF F(Y)= $\sin(X)$. For an example see below. For non-parametric equations of the form $y=f(x)$ use

```
DEF F(X)=X:DEF F(Y)=X
```

The variable POLAR should be set to zero. Line 11 contains respectively the y and x shifts to move the axes on the screen, upper and lower limits for variables, the size of the plot and the gap between each point, all of which need experimenting with. A larger value for GAP gives a smoother trace, but seems to take for ever. All these can be changed when the program is running. After closing the graph, the computer waits a

one key command:

0 will change the size of the plot

G changes the gap between the dots

X and Y will change x- and y-shifts respectively

0 will save graph to origin memory— useful for overlaying two graphs.

1 will recall stored graph, and draw current graph over it, but make sure axes are the same.

L or K alters limits. L, give limits in pi.

D or P will print graph to printer providing screen dump loaded.

SPACE will draw a fully lined graph (optional). SPACE a second time will give a plot of all radii of curvature for polar graphs.

ENTER gives a quick summary of all keys.

Examples to try:

```
10 DEF F(X)=.5:DEF Y(F)=50*(F**5)/50*(F**5)  
DEF F(X)=COS(1)*COS(1)  
POLAR=0:11 YS=0:XS=0:UL=X:PL=2  
LL=0:LS=100:GA=.5  
10 DEF F(X)=50*(X**5)/50*(X**5)  
DEF F(Y)=  
11 YS=0:XS=0:UL=X:PL=X  
LS=100:GA=.1  
10 DEF F(X)=50*(X**5)/120+1  
11 YS=0:XS=0:UL=X:PL=X  
LS=100:GA=.25  
10 DEF F(X)=50*(X**5)/1+1:POLAR=1  
11 YS=0:XS=0:UL=X:LL=X:PL=2:LS=50  
GA=.2
```

```
0 POLAR0: CLEAR00, 20000: PFORM4: COLDR0, 1: POLCS: SCREEN1, 0: LOAD" DUMP. BIT", 20001: RUN  
"MGA. BIT"  
1 I:PBK: I=0:O=1+40:HEM:EL:SEFORM=1024:O:50:1:POREN, 120: NEXT: FORM=OTC: 2: READA: FORM  
=1:POLAR=0: P=1:O24:MM22:R+3: 2FN=0: DRN=1: 2: THENP=" "  
2 FORMP, 400: IHEEM: IAW, R, 1: 1: NEXT: R, R  
3 P=ATN(1/10)  
10 DEF F(R)=50*(R**5)/1+1:POLAR=0  
11 YS=1:P=50:XS=1:UL=X:PL=X:LL=X:LS=100:GA=.1  
12 I:POLAR: THEN DEF F(Y)=50*(Y**5)/50*(Y**5): DEF F(X)=COS(50*P/R: 10  
20 I:POLAR: P=2: ANLL=0: ANPOLAR=1: THEN LINE(0,0)=10, 2P: I: PSET: L: LINE(0,0)=250, 1P: I: PSET:  
Y:Y=1P: XX=0:EL:BE:Y=14-Y: 30=120+50: L: LINE(0, Y)=1250, Y: I: PSET: L: LINE(XX, 0)=100, 1P: I:  
PSET  
30 I:FR=1: THEN LINE(XX)=50:MM:LL:Y, Y)=50:MM:LL:Y)=100:50:MM:LL:Y, Y)=50:MM:LL:Y, Y)=50:MM:LL:Y, Y)  
BT  
40 FOR=LL: TOL: STEPP: I:GAP:1:00  
50 Y=MY(0)=X+MM:LL:Y  
60 Y=Y+Y*G: X=X+X*G  
70 I:PBK: Y:Y=1: 5000: I:K=1: 1: THEN NEXT: 50TO250  
80 I:FR=0:0: THEN PSET(XX, Y, 0)  
90 I:FR=0:1: THEN LINE(XX, Y)=10, Y, PSET  
100 I:FR=0:2: THEN LINE(XX, Y)=10, Y, PSET  
110 NEXT  
200 PRINT0, " ": 50=INKEY: I: P=1: " " THEN 000  
210 ON I: 10:TR: 1, " " BLK: 2: 50: I: 20: P: +CHR(120)+CHR(121)+CHR(122)+CHR(123)+CHR(124)+CHR(125)+CHR(126)+CHR(127)+CHR(128)+CHR(129)+CHR(130)+CHR(131)+CHR(132)+CHR(133)+CHR(134)+CHR(135)+CHR(136)+CHR(137)+CHR(138)+CHR(139)+CHR(140)+CHR(141)+CHR(142)+CHR(143)+CHR(144)+CHR(145)+CHR(146)+CHR(147)+CHR(148)+CHR(149)+CHR(150)+CHR(151)+CHR(152)+CHR(153)+CHR(154)+CHR(155)+CHR(156)+CHR(157)+CHR(158)+CHR(159)+CHR(160)+CHR(161)+CHR(162)+CHR(163)+CHR(164)+CHR(165)+CHR(166)+CHR(167)+CHR(168)+CHR(169)+CHR(170)+CHR(171)+CHR(172)+CHR(173)+CHR(174)+CHR(175)+CHR(176)+CHR(177)+CHR(178)+CHR(179)+CHR(180)+CHR(181)+CHR(182)+CHR(183)+CHR(184)+CHR(185)+CHR(186)+CHR(187)+CHR(188)+CHR(189)+CHR(190)+CHR(191)+CHR(192)+CHR(193)+CHR(194)+CHR(195)+CHR(196)+CHR(197)+CHR(198)+CHR(199)+CHR(200)+CHR(201)+CHR(202)+CHR(203)+CHR(204)+CHR(205)+CHR(206)+CHR(207)+CHR(208)+CHR(209)+CHR(210)+CHR(211)+CHR(212)+CHR(213)+CHR(214)+CHR(215)+CHR(216)+CHR(217)+CHR(218)+CHR(219)+CHR(220)+CHR(221)+CHR(222)+CHR(223)+CHR(224)+CHR(225)+CHR(226)+CHR(227)+CHR(228)+CHR(229)+CHR(230)+CHR(231)+CHR(232)+CHR(233)+CHR(234)+CHR(235)+CHR(236)+CHR(237)+CHR(238)+CHR(239)+CHR(240)+CHR(241)+CHR(242)+CHR(243)+CHR(244)+CHR(245)+CHR(246)+CHR(247)+CHR(248)+CHR(249)+CHR(250)+CHR(251)+CHR(252)+CHR(253)+CHR(254)+CHR(255)+CHR(256)+CHR(257)+CHR(258)+CHR(259)+CHR(260)+CHR(261)+CHR(262)+CHR(263)+CHR(264)+CHR(265)+CHR(266)+CHR(267)+CHR(268)+CHR(269)+CHR(270)+CHR(271)+CHR(272)+CHR(273)+CHR(274)+CHR(275)+CHR(276)+CHR(277)+CHR(278)+CHR(279)+CHR(280)+CHR(281)+CHR(282)+CHR(283)+CHR(284)+CHR(285)+CHR(286)+CHR(287)+CHR(288)+CHR(289)+CHR(290)+CHR(291)+CHR(292)+CHR(293)+CHR(294)+CHR(295)+CHR(296)+CHR(297)+CHR(298)+CHR(299)+CHR(300)+CHR(301)+CHR(302)+CHR(303)+CHR(304)+CHR(305)+CHR(306)+CHR(307)+CHR(308)+CHR(309)+CHR(310)+CHR(311)+CHR(312)+CHR(313)+CHR(314)+CHR(315)+CHR(316)+CHR(317)+CHR(318)+CHR(319)+CHR(320)+CHR(321)+CHR(322)+CHR(323)+CHR(324)+CHR(325)+CHR(326)+CHR(327)+CHR(328)+CHR(329)+CHR(330)+CHR(331)+CHR(332)+CHR(333)+CHR(334)+CHR(335)+CHR(336)+CHR(337)+CHR(338)+CHR(339)+CHR(340)+CHR(341)+CHR(342)+CHR(343)+CHR(344)+CHR(345)+CHR(346)+CHR(347)+CHR(348)+CHR(349)+CHR(350)+CHR(351)+CHR(352)+CHR(353)+CHR(354)+CHR(355)+CHR(356)+CHR(357)+CHR(358)+CHR(359)+CHR(360)+CHR(361)+CHR(362)+CHR(363)+CHR(364)+CHR(365)+CHR(366)+CHR(367)+CHR(368)+CHR(369)+CHR(370)+CHR(371)+CHR(372)+CHR(373)+CHR(374)+CHR(375)+CHR(376)+CHR(377)+CHR(378)+CHR(379)+CHR(380)+CHR(381)+CHR(382)+CHR(383)+CHR(384)+CHR(385)+CHR(386)+CHR(387)+CHR(388)+CHR(389)+CHR(390)+CHR(391)+CHR(392)+CHR(393)+CHR(394)+CHR(395)+CHR(396)+CHR(397)+CHR(398)+CHR(399)+CHR(400)+CHR(401)+CHR(402)+CHR(403)+CHR(404)+CHR(405)+CHR(406)+CHR(407)+CHR(408)+CHR(409)+CHR(410)+CHR(411)+CHR(412)+CHR(413)+CHR(414)+CHR(415)+CHR(416)+CHR(417)+CHR(418)+CHR(419)+CHR(420)+CHR(421)+CHR(422)+CHR(423)+CHR(424)+CHR(425)+CHR(426)+CHR(427)+CHR(428)+CHR(429)+CHR(430)+CHR(431)+CHR(432)+CHR(433)+CHR(434)+CHR(435)+CHR(436)+CHR(437)+CHR(438)+CHR(439)+CHR(440)+CHR(441)+CHR(442)+CHR(443)+CHR(444)+CHR(445)+CHR(446)+CHR(447)+CHR(448)+CHR(449)+CHR(450)+CHR(451)+CHR(452)+CHR(453)+CHR(454)+CHR(455)+CHR(456)+CHR(457)+CHR(458)+CHR(459)+CHR(460)+CHR(461)+CHR(462)+CHR(463)+CHR(464)+CHR(465)+CHR(466)+CHR(467)+CHR(468)+CHR(469)+CHR(470)+CHR(471)+CHR(472)+CHR(473)+CHR(474)+CHR(475)+CHR(476)+CHR(477)+CHR(478)+CHR(479)+CHR(480)+CHR(481)+CHR(482)+CHR(483)+CHR(484)+CHR(485)+CHR(486)+CHR(487)+CHR(488)+CHR(489)+CHR(490)+CHR(491)+CHR(492)+CHR(493)+CHR(494)+CHR(495)+CHR(496)+CHR(497)+CHR(498)+CHR(499)+CHR(500)+CHR(501)+CHR(502)+CHR(503)+CHR(504)+CHR(505)+CHR(506)+CHR(507)+CHR(508)+CHR(509)+CHR(510)+CHR(511)+CHR(512)+CHR(513)+CHR(514)+CHR(515)+CHR(516)+CHR(517)+CHR(518)+CHR(519)+CHR(520)+CHR(521)+CHR(522)+CHR(523)+CHR(524)+CHR(525)+CHR(526)+CHR(527)+CHR(528)+CHR(529)+CHR(530)+CHR(531)+CHR(532)+CHR(533)+CHR(534)+CHR(535)+CHR(536)+CHR(537)+CHR(538)+CHR(539)+CHR(540)+CHR(541)+CHR(542)+CHR(543)+CHR(544)+CHR(545)+CHR(546)+CHR(547)+CHR(548)+CHR(549)+CHR(550)+CHR(551)+CHR(552)+CHR(553)+CHR(554)+CHR(555)+CHR(556)+CHR(557)+CHR(558)+CHR(559)+CHR(560)+CHR(561)+CHR(562)+CHR(563)+CHR(564)+CHR(565)+CHR(566)+CHR(567)+CHR(568)+CHR(569)+CHR(570)+CHR(571)+CHR(572)+CHR(573)+CHR(574)+CHR(575)+CHR(576)+CHR(577)+CHR(578)+CHR(579)+CHR(580)+CHR(581)+CHR(582)+CHR(583)+CHR(584)+CHR(585)+CHR(586)+CHR(587)+CHR(588)+CHR(589)+CHR(590)+CHR(591)+CHR(592)+CHR(593)+CHR(594)+CHR(595)+CHR(596)+CHR(597)+CHR(598)+CHR(599)+CHR(600)+CHR(601)+CHR(602)+CHR(603)+CHR(604)+CHR(605)+CHR(606)+CHR(607)+CHR(608)+CHR(609)+CHR(610)+CHR(611)+CHR(612)+CHR(613)+CHR(614)+CHR(615)+CHR(616)+CHR(617)+CHR(618)+CHR(619)+CHR(620)+CHR(621)+CHR(622)+CHR(623)+CHR(624)+CHR(625)+CHR(626)+CHR(627)+CHR(628)+CHR(629)+CHR(630)+CHR(631)+CHR(632)+CHR(633)+CHR(634)+CHR(635)+CHR(636)+CHR(637)+CHR(638)+CHR(639)+CHR(640)+CHR(641)+CHR(642)+CHR(643)+CHR(644)+CHR(645)+CHR(646)+CHR(647)+CHR(648)+CHR(649)+CHR(650)+CHR(651)+CHR(652)+CHR(653)+CHR(654)+CHR(655)+CHR(656)+CHR(657)+CHR(658)+CHR(659)+CHR(660)+CHR(661)+CHR(662)+CHR(663)+CHR(664)+CHR(665)+CHR(666)+CHR(667)+CHR(668)+CHR(669)+CHR(670)+CHR(671)+CHR(672)+CHR(673)+CHR(674)+CHR(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 
220 R0=R0+1: I:FR=3: THEN R0=0
```

Colour connection

Ray Deaking makes a hardware mod to balance the Dragon's colour

The December issue of Dragon Answers contained a letter asking if it is possible to correct the colour balance on a CG2. The following short article might just help. I am assuming that the writer of the letter has already tried adjusting the LM1458 modulator to no effect.

The CG4 (and some of the later CG4) use a small variable capacitor instead of the fixed value 10pF capacitor (C7 on the CG2 — C22 on the 4x). The value entries should be between 2 and 22 picofarads. (Maglin part no. W470M.) The component is located on the main board (just top left hand side, immediately below the crystal B1). If you are handy with a soldering iron it should not

take very long to make this modification. With the new capacitor in place and the computer switched on adjust the small screw with a non-magnetic, insulated screwdriver until you get the best colour response.

Changing this capacitor has improved the colour display on the two Dragons that I have modified in this way (both with issue 4 power boards and the Astec UM100* modulator). The issue 3 power boards have the UM100 modulator and a slightly different circuit. Although I see no reason why this should not work, I cannot guarantee that this will cure the problem, and suggest that anybody contemplating

making this modifications should only go ahead if they are fully confident in their ability to do the job, and reverse it if necessary!

The following store program will help to set up the colours. To use the program to its full advantage, it is essential that your TV is set up correctly. In colour balance, etc. Display time can be altered by changing 1000 to any desired value.

The National Dragon Users Group, or Pooksoft, may be able to help with circuit diagrams if required.

Incidentally, 1988 is the year of the Dragon! Let's keep it that way.

```
10 CL00:PRINT"BLACK"      110 CL45:PRINT"ORANGE"
20 FOR N=0 TO 1500:NEXT N  120 FOR N=0 TO 1500:NEXT N
30 CL01:PRINT"GREEN"      130 CL06:PRINT"CYAN"
40 FOR N=0 TO 1500:NEXT N  140 FOR N=0 TO 1500:NEXT N
50 CL02:PRINT"YELLOW"     150 CL07:PRINT"MAGENTA"
60 FOR N=0 TO 1500:NEXT N  160 FOR N=0 TO 1500:NEXT N
70 CL03:PRINT"BLUE"       170 CL08:PRINT"ORANGE"
80 FOR N=0 TO 1500:NEXT N  180 FOR N=0 TO 1500:NEXT N
90 CL04:PRINT"RED"        190 GOTO 10
100 FOR N=0 TO 1500:NEXT N
```

Listing one cont'd

```
230 IF NOT (CL) THEN GOTO
240 GOTO 200
250 S=0:GOSUB450:INPUT"SIZE " :S1:GOTO400
260 GOSUB460:PRINT"NEW LINEFS * PC " :INPUTL,UL,LL,LF:UL=LL*LF:UL=LL*LF:GOTO400
265 P1=1:GOSUB460:PRINT"NEW LINEFS " :INPUTL,UL,LF:G=INT(L/3):GOTO400
270 S=Y5:GOSUB450:INPUT"X-SHIFT " :X5:GOTO400
280 S=Y6:GOSUB450:INPUT"Y-SHIFT " :Y6:GOTO400
290 S=G4:GOSUB450:INPUT"NEW G4" :G4:GOTO400
300 PRINT"CLS " :CL=NOT (CL) : IF CL THEN PRINT"OFF" ELSE PRINT"ON"
310 WAIT:GOTO:GOTO200
320 PCOPY1TO1:PCOPY1TO2:PCOPY1TO3:PCOPY1TO4:GOTO200
330 PCOPY1TO5:PCOPY1TO6:PCOPY1TO7:PCOPY1TO8:GOTO200
340 EXEC20001:GOTO2000
345 SCREEN0,0:IF INKEY="" THEN GOTO ELSE SCREEN1,0:GOTO200
400 IS=INKEY:PRINT99,STRING$(IS,32):PRINTSTRING$(IS,32):GOTO200
450 PRINT"CURRENT=" :G:RETURN
460 PRINT"LOWER" :LL:PI:"UPPER" :UL:PI:RETURN
1000 DATA SPACE- DIFFERENT PATTERN,0 - CHANGE SIZE,0 - NEW DOT GAP,L - CHANGE L J
NITS IN P,X - CHANGE LINEFS,X - X-SHIFT + GOS RIGHT,Y - Y-SHIFT + GOS UP,
C - CLR GRAPH,I - LOAD IN STORES GRAPH,C - STORE GRAPH,H - HELP SCREEN
1010 DATA 0 - DUMP TO PRINTER,ANY OTHER KEY REBRAG
```


Write: ADVENTURE

Pete Gerrard rings changes on theme

I received an interesting letter recently, from one Robert Traugott in Kenilworth (New Jersey, wrong state and Pennsylvania, but we'll let it pass), who has this to say: "I've been trying to write my own adventure recently, but haven't much idea what to do or how to go about doing it." He's developed a fairly reasonably parser (calling "Take the large sword and drop it" an example), but then ends up with a general plea for help and ideas.

Since it occurred to me that a number of people might be in a similar position to Robert, that of knowing the basics (and possibly basics) but not being quite sure how to go about putting it all together, we'll spend this month trying to help you all along a little.

Choose your system

Most people who write adventures either end up developing a system of their own and then fitting everything into that, or they use an adventure writing system developed by someone else and have to find a lot of modify their own way of thinking so that the adventure they're contemplating will be able to be written by using that particular system. It's no use coming up with an idea that allows you to swap from one character to another if the system in use has no way of coping with that.

So first of all ensure that the game you're going to be writing can actually be written! Basically if you're going to be submitting a design rather than the finished thing, study other games by that company and make sure that what you're sending them will fit in with what they have already done. Otherwise you'll get a rejection along the lines of "great idea, but our system can't be able to handle it". Translated, this means that they probably like the idea but are not willing to spend the time and energy in extending their systems to cope with whatever vagaries you've introduced. And why should they? For every adventure that won't fit into their way of programming they've probably got half a dozen ideas that will.

For example and totally unoriginal example of this, take the age-old problem of having to find a key to open a locked door. Having found the key, the player might reasonably be expected to go back to the door and type in something like OPEN DOOR. A simple line of code like:

```
IF KEY CARRIED AND CORRECT LOCATION AND DOOR LOCKED THEN UNLOCK DOOR
```

will sort everything out. Most adventure systems can be expected to cope with something like that, although I'll admit to a personal preference for not particularly boring games that have seemingly hundreds

of doors and hundreds of keys scattered about the place, forcing you to spend an eternity finding the right one for the right door. Then, when you do, and type in OPEN DOOR, the program responds with THE DOOR IS LOCKED. I know it is, stupid, that's why I've spent half an hour finding the key and am now telling you to open the wretched thing!

From little problems mighty adventures grow, and if you are going to have a locked door then for heaven's sake put something interesting behind it so that the player gets some slight feeling of reward after opening it. Perhaps make it a double, or even a triple, barretted problem. The lock might be covered with a panel that is rusty with age and cannot move, and when you do find some oil and free it you then discover that there is something stuck inside the barrel after the lock and you have to drag out. A little extension from an ancient position makes all the difference to the player.



Too many adventures, though, seem to rely on locking and unlocking things in order to succeed. Doors, chests, cabinets, safes, most of the games that I've seen need something to be unlocked at some time or another, so another of the "getting you started" ideas might well be to create oil locks altogether. It might make the game harder to write, but it will be a touch more original.

And since originality seems to be the name of the game these days, here are two mazes as well. Easy enough to program though they may be, I personally find them tedious in the extreme:

```
IF @P@R@N@:1@ THEN @P=@P@R@N@:0@ G@T@:0@
```

Or something similar (well that is, something that allows a player moving around, in or outside of a maze, if the array P[xy] contains the number of locations and the number of available exits. CP is the current location, and MD is the direction that the player

wants to go in. However, moving around within a maze could easily be achieved by simply having six or so locations that all have the same location description, such as "You are in a maze of twisting tunnels, all alike" is quite the original. Then, whenever the player moves, the location description remains the same and the player has no idea whether the move has been advantageous or not. This sort of maze is relatively easy to write by dropping objects and mapping your progress like that: if the object's still there when you move, then you're in the same location. On the other hand, the programmer can make things more difficult for the player by having something like this in the DROP routine:

```
IF @P=@@ AND @P=@@ THEN @G@B@V@:=@P@R@M@ message
```

This assumes that the maze is in locations 47 to 52, and the array GB holds the current location of all objects. Getting that location to zero would mean that the object had vanished, and the message could be something along the lines of "As you puff the object a game appears in a jiff of smoke and steam it, saying that he'll leave it outside the maze for safe keeping. He vanishes in a cloud of greasy smoke". Thus the player can now no longer map the maze by dropping objects.

A logical maze

Whether or not you have a maze in, of course, up to you. I don't like them myself, but some people do actually seem to enjoy solving them. But if you do have a maze, try and give it a purpose. Some of them just seem to be there for the sake of being there and being a nuisance, with no reason behind their curious appearance of a maze in the middle of nowhere. Make it a construction maze (a London adventure might use Hampton Court, for instance) with something at the centre of it, perhaps. Players do like to feel that they've achieved something by solving a maze.

Another old chestnut, which can be given a variation on a theme in order to get the budding adventure game writer started, is the perennial problem of light and dark. Many many games have you roaming around looking for a torch before you can go into a particular set of locations, otherwise you aren't able to see where you're going in the dark and fall into a pit to be later consumed by a malicious Gnu.

```
IF @P=@ AND @P=@ AND @P=@ THEN @P@R@M@ message
```

That sort of line could easily be added to the movement routine, with locations 30 to

38 being the dark ones, if the variable PD is set to 1 then the player has not found a light source, and the message could read something like this: "As you try to move in the dark you trip and stumble, almost knocking yourself out as you fall into a black pit. The last thing you see before you faint from sheer terror are the burning eyes and slanting jaws of some unknown beast". Peter waves lycoid.

Some adventures do allow you to roam about in the dark without falling down anywhere, but of course you cannot see objects that might be hidden on the ground. This is wrong, everyone's eyes adapt to the dark eventually, so a solution might be to make the player stay in the dark locations for a set number of moves before they can see the glittering wizard lying half-conscious behind a rock. Or, you may care to consider having a light source that goes out after a certain number of moves.

Then again, you might care to have something totally different. One adventure

of mine featured a cave area that had to be explored, and there was also a torch. Unfortunately the torch didn't work, and we would work, so some other alternative had to be found. This alternative took the form of a guide dog, who would happily guide you through the caves and prevent you from stumbling, in return for a spot of food. Added to this was the length of time taken in the caves, so that the player's eyes adjusted slightly and were able to make out level often in rackets in one corner of a particular cave. Terms rackets? It was a strange adventure!

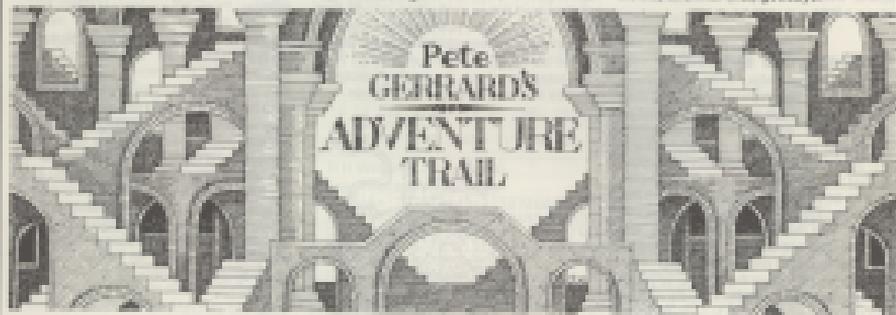
A troll's pint

One final point to consider for the beginner to the world is another favourite that could easily be changed in order to add obstacles to the game. This is where a certain being, such as a troll, blocks your path and will not let you pass until you give him something.

If GP=45 AND OB=troll=OP THEN PRINT message

If the troll is blocking your path, and it's location is, then give a message to the effect that "The troll sneers at you from the other side of the rocky old bridge, and refuses to let you pass". Fortunately, turning your bridges in front of you, only to be told "The troll doesn't like people playing with his bridges, and stamps out the fire before I can take hold".

Almost inevitably the item that you have to give the troll will be one that you want to use again later, so that the player will have to think of some way of getting it back afterwards. But you could do this same sort of problem in a totally different way. You could invite the troll for a drink or something, and when he gets to the tavern and studies the door to see if any other trolls have been in he could find that there were no runes at the inn and so go elsewhere to find a drink, leaving you plenty of time to scurry across the bridge. If it was a rope bridge you could roll it up after you and thus prevent the troll getting back across afterwards. All variations on a theme, and with that, goodbye!



Professor Deadlock time again, after last month's whinge against people who should know better, and as promised we have the old boy another unique solution to an adventure that I got a number of enquiries about, namely Pyramid of Doom. Thanks to Michael Edwards and R. Steinhilber for giving the good Professor a helping hand on two occasions when his feet stumbled slightly.

Dear Diary,

Pyramids and sarcophagi (or is that sarcophaguses? Makes them sound like some sort of aquatic material, a kind of sarcophaguses approaching the starboard bow. Cap'n! aboard on my latest travels abroad, and one cannot help but wonder what Bieder would have made of it all. Still, curs is not to reason why, and having left the admirable counter behind (deserted enough egg, but does try rather too hard to ensure that we did floges have what he refers to as a 'good time') I had the misfortune to stumble slightly and had to grab a pot to keep my balance. Heaven preserve us, the pot was in fact a shovel, and fancying that such an implement might come in useful late on I took



hold of the thing and went to a nearby pool. A curious ray and some liquid of a rather dubious nature from the catfish soon came into my possession, and after travelling first east, then north, then east again, I leant on the shovel to pause for breath and found myself digging!

I unearthed a somewhat small key, and after taking it west south, where good I was digging with gusto, so that familiar Deadlock instinct told me that something of value might well be revealed hereabouts. A large hole was revealed, to be precise, and upon going into it I found a door. Door unlocked that, I can tell you, and immediately retraced my again. There I dropped the shovel and took hold of a stone. Something about it caught my fancy, can't say what. I unlocked the main door and went in, feeling vaguely guilty as I did so, for no apparent reason. Perhaps it is that I am, inherent in most of us, of being caught where one ought not to be. What would the counter say? In a fit of excitement I dropped both keys and it my flashlight. I was in the Pyramid of Doom, and immediately took a rest before pressing on further. It would not do to be caught unawares.

I chanced upon a sarcoptegus (wrestling thing) and opened it. Proceeding by some inner instinct I headed north then east, and to and fro (before I found a flat. Strange looking animal, I can tell you. A quick plant west, south, and south once more, and I was in an unusual place. A little table of moss, I know, but in such circumstances I could not help but try and relax by playing the flute. Not that I am one of nature's musical geniuses, but there you have it.

I studied the fireplace and found some coal and ashes, although I had to look twice before the ashes revealed themselves. I made a mental note to check with my optician after the holiday was concluded. The ashes looked strangely un-natural, and upon further examination I was able to find a necklace that could come in useful at the next bridge meeting. Having got the necklace I entered a passage and immediately headed north and east. Some strange graffiti could be found here (I use the word graffiti, because glyphs become as freestyle as a white) and upon reading it I decided to dig up the stone and necklace. The stone was becoming something of an unwanted burden anyway. A little jelly attracted my attention (suitable weed, and one cannot help but fear for the future of the English language), and I took it before proceeding further.

I went west, then north, where I saw an astonishing sight. An object was looking straight at me in my alarm at this unexpected intrusion on my privacy I dropped the jelly, whereupon the object immediately ate it and presented me with a pearl. Naturally enough I took a keen hold of the pearl as it bobbed off towards an archway that sadly failed to resemble that glorious example that is the one of a life. On going east I unconsciously dropped the pearl, and in my haste to find it I hurried east and north. Somehow I also managed to lose track of the flute, but I was never much of a virtuoso and James Galway need have no fear of my musical talents displacing him.

Red as coal

I proceeded west and south and returned to the wretched sarcoptegus. Some inner instinct seems to constantly drag me back towards it, I cannot think what it all might mean. I went down, losing my step slightly as I did so, and chanced to brush my arm against the coal that I was carrying and thus I cleaned it. It was sturdy, but clearly not one of any great value and certainly not something that could be worth taking down the Portobello Road for evaluation. What had caught my eye and interested me less than my usual careful self were some burning leaves, and I immediately thought of that blessed liquid from the cabinet. I poured water all over them, extinguishing them, and was able to get what was obviously an immensely important tapestry. Peruvian, I shouldn't wonder, although I may be wrong. I am so great ex-

pert. I went to an alcove, and peered intently at a box that was lying there. I did a double take, looked again, and there was an iron glove. The sort of thing that Miss Tyson would wear, no doubt, although he would rub the day he crossed me. I can assure you. Not that that is really for happen, as I have a very long history. An old skull took my attention, and on glimpsing the medd through of examinations I was able to ascertain that it had some gold teeth that were most definitely not National Health Service issue. I added them to my growing list of goods.

I performed my usual trick of heading west and south, but in my haste I somehow managed to catch my arm on something, a protrusion from the wall I fancy, and accidentally let the skull fall from my grasp. Good heavens above, what is the world coming to? I hurried north as fast as I could possibly go, and still further I went in my efforts to escape. Feeling afraid I donned the iron glove as a suitable second weapon, but my hands had become so drenched with perspiration in my fight that I initially dropped the useless thing. With my patience rapidly approaching the end of its tether I replaced the glove and proceeded. I was going to fear that I almost collided with a door, and only a rapid motion of my hand prevented me from turning head-first against it. I dare say that to the casual observer it probably looked as if I were hitting the door, and he promptly removed the glove for fear of infection. I don't think that will have any further use for it.

Gemmed to death

I found a ripe, and my old training told me that this could be of immense use, as naturally enough I carried it with me. I headed south and south again, back to where I started my heading, tight, and went to the ladder. By the most chance I stumbled slightly, and so was forced to go to the ladder a second time. I threw myself up to the ceiling, to help me get up there, and had visions of the most awesome pharaoh striking me dead for my impudence. What could possibly bring it at this apartment that appeared before me? The ruby was worthless, and feeling somewhat akin to David against Goliath, I threw the thing. Fortunately my aim was good and my blow was true, and I lost the head. I headed sarcoptegus into my possession as a reward and offered myself a pat on the back. I did not lose the other down.

I headed south and examined the strange looking collection of suitcases in front of me. An explosion in my ear examined them also, although this latter act was performed with some little dislike as I most certainly did not like the cut of my job. For my pains I was rewarded with a pin and a canning, and after that worthless task was concluded I went west and down, dropping the canning as I did so, and replacing its presence with a saw. My mother did not raise me to be a beast of burden but that, fear, is what I am rapidly becoming as

I am forced into being a human ship of the desert.

My journeying became ever more extravagant as I turned north, then up, then west, then north again. Some inner string of my heart was quailing me, of that I am sure. Another crucially looking table seemed bent on being seen into two smaller tables, and this I did. Upon completion of this task, and at the cost of placing my elbow to remember that I am looking at the table of my youth, I dropped the saw and took hold of the necklace that had appeared. I stepped out smartly to the east and the somewhat ludicrous archway where I could carry my baggage no more and so dropped it, really, well, not really, oh, raining, and sagittae that ran very pungent, and after a slight pause to catch my breath I turned off towards the west and then turned north and west again.

Beetling home

I retrieved my saw, and after stepping out smartly to the south I retrieved both my keys, thanking the good Lord that no-one had appeared to steal them. Once more I returned to the wretched sarcoptegus and went down, then south, then to the ladder. Once more I headed south and proceeded to my ripe, following which I opened the chest and took out the most impressive looking crown that I have ever seen to my pleasure to behold. Feeling somewhat foolish, and rather as if I were in my own bathroom back home, I pulled the chain. I went to the stairs, stead my way through the bars, and was finally able to drop the saw for the last time. Wearing my iron glove for safety I unlocked a coffin before dropping both keys, again for the last time. Inside the coffin was a bracelet, which naturally I took.

I went back to the window, got a bar by that curious inner feeling known only to us Desalvians, and then performed the most extraordinary series of movements, so bizarre that later on became giddy and can only set them down as I performed them: west, down, down, west, down, north, east. Such confusion I went through the door, but unfortunately slipped and was forced to put out both hands in a clumsy way. On feeling the floor I discovered a coin, and took it with me. I headed east, lighting my flashlight in the gloom as I went. What I thought was a scrying beetle turned out to be a stationary stone, so I took it. West, then west again, re-lighting my possibly faulty flashlight as I walked, thereafter heading south, up, west, north and east before ending up once more at the ludicrous archway. East again, and added to my collection the saws, coin, bar, crown, and bracelet. "A score of treasures!" I murmured, but must have spoken louder than intended, for on saying the word "score" I was transported home and my latest holiday was complete.

What an interesting time he does have to be sure! Can you next month.

Is this a record?

Gordon Lee really is going round in circles — almost

MOST of us are probably familiar with the old catch question: How many grooves are there are a gramophone record? The answer, of course, is two — one on each side. A similar problem asks: How far does the stylus travel while playing one side of an LP record?

Both of these depend on 'catches' in the way that the questions are put. However, a person who sees through the first of them is more likely to be tripped by the second. The 'trick' to both is dependent on the person seeing that one side of a record contains, to all intents and purposes, a single spiral groove which commences at the outer edge and then spirals in towards the centre. Consequently, when asked the second question, the temptation is to try to calculate the approximate length of this spiral track and to give this as the answer. In fact, the true distance that the stylus travels is somewhere in the region of four inches! — that is, the distance that it swings from the outer edge to the inner 'music' groove on the disc. The fact that the record is rotating beneath the stylus does not affect the distance of actual travel — except to guide it slowly towards the centre.

The spiral found on a typical gramophone record is of the type known as an Archimedean spiral. This is the locus of a point which rotates around a second point, the distance between those points increasing at a constant rate. Consequently, the distance between adjacent coils of the spiral will remain constant. (Yes, I know that for certain technical reasons in the manufacture of records, this distance may vary slightly depending on the dynamic range of the music being recorded — but you get the idea.) A child on a playground roundabout who rotates at a constant speed

along one of the radial handrails would move in an Archimedean spiral as relative to the ground.

```
100 PEEK@ SCREEN1 , @PCL@
110 P=0, @R=128@ Y=@Y1@ R=@R0
120 FOR S=0 TO 1 STEP 0.02
130 @=@+@, @
140 @R@=@R1+@, @, @, @, @, @, @
150 R=R-P
160 IF R=0 THEN 160
170 NEXT S:GOTO 120
```

A reasonable representation of an Archimedean spiral can be drawn on the Dragon's 640x screen using either of the two listings given here. Listing one is a rather more straightforward method of us-

```
100 PEEK@ SCREEN1 , @PCL@
110 P=@, @R=128@ Y=@Y1@ R=@R0
    @=1, @R@
120 @=@+@*24@ I=@Y1
130 @=@+@*24@ I=@Y1
140 @=@+@
150 @R@=@R0, @R*
160 FOR S=0 TO 10
170 L=@+@+@*@ I=@R+@C-@*@
180 @R=@R*+@*@ I=@Y1+@*@ I+@R+@*
    +@, +@*@ I=@Y1 I=@Y1+@
190 @R@=@R
200 @=@, I=@R I=@R-P
210 NEXT IF R=0 THEN 160
220 GOTO 220
```

ing the computer's 'circle' command to draw small circles repeatedly, each time reducing the radius a fraction to move the

line in towards the centre. This is not a true spiral, but it instead a series of arcs of circles, but the final result is quite convincing. Interesting effects can also be obtained by using elliptical spirals. These can be achieved by altering the 'height-width' ratio of the CIRCLE command at line 140, page 100 of the Dragon manual describes how this is done.

A more finely-tuned spiral can be obtained using listing two which uses the sine and cosine functions to compute the co-ordinates of each part of the spiral. In both of these listings, variable P is used to control the 'pitch' of the spiral and can be altered to adjust the rate at which the line converges on the centre.

Another type of spiral is that obtained by constructing the 'involute' of a circle (imagine that you are confronted by a fence dog who, fortunately is trained to bite by means of long rope. By keeping just out of reach of the dog, and by moving towards the tree, it would be possible to make the dog wind the rope around the tree. The path that it would take would be the 'involute' of the circle represented by the cross-section of the tree. Now, if it is the tangent of the generating circle that is decreasing at a constant rate (as represented by the rope) rather than the radius as in the Archimedean spiral. To the naked eye, these spirals would both seem pretty similar, the difference being mainly in their methods of construction.

To complete the picture mention should be made of a third type of spiral, the logarithmic spiral. This is the most widely found spiral which occurs in nature, from the very small pine arrangement of the sections a daisy head to the very large shape of many of the spiral galaxies in

Prize

Competitors who survive the giddy spirals of Gordon Lee's imagination will be winning a treat. To assist them, we have negotiated a property deal with Dragon magazine **Preston Software**, last seen dealing in decorative strand frames: ten copies of **Hotel On Mayfair**, the classic game inspired by Monty Python's swash-buckling winners. Take up your stations...

Rules

Have you established a new record for the most effortless and most elegantly of measuring the distance from the plane to the centre on a LP record start listening to the latest chart topper by face (yephes with 'glay')? Or are you all a bunch of nearly-pampered compact disc players? Post your answer and program in a piece of paper marked AUGUST COMP, add any famous last words and post it to us. That hotel could be yours.

But the teabreaker! Let us not forget the teabreaker! Just complete the well known phrase of saying: 'I had a hotel on Mayfair, I would... — every day, impress us with your inventions. (Is another dip in the dictionary) (heck, it's not your dictionary)'

May winners

Well, we had a pretty miserable entry this month. This is what comes of letting it be known that Gordon Lee and the Editor are available for offers of marriage. We were only joking. Honestly, you can come out now. It's game time... come out from under that table at once.

I stand aside. However, I shall put it off till after the prizegiving, which goes like this: best scored answers, S A Sledge at Aston, T Pawson at Heron, D J Gray at Middleburgh, P Morgan at Bristol, P Weedon of Wotton-under-Edge, A J Westwood of Rotherhampton, E A Newman of Helen has lost the lot, but we know who

you are, E A J Smith of Teynton, Aston Henderson of Bromsgrove, and S Beach of Chichester.

We have also created a special category for Denis O'Malley called 'dis-qualified because he didn't actually enter the competition'. But the real of his letter was suggest that we had together a mention. But seriously, Denis, no teabreaker, OK, but no answer? Clearly your thoughts were on the Tournament of the Island, for which many thanks.

Best teabreaker, for sheer bad taste, was S A Sledge with 'The yellow Dragon found the Old Oak Tree.'

All these persons will be receiving a copy of **Base Stealer** from **Orange Software** in due course. Ignore the remark in last month's edition. The editor was early for once.

Solution

See opposite.

outer space).

For the competition we are returning to our hypothetical gramophone record, a twelve-inch diameter long-playing record spins at thirty-three and a third revolutions

per minute. The first "visual" groove is about a quarter inch from the outer edge and it needs just two and three quarters inches from the centre of the record, which plays for 23 minutes. Can you devise a sim-

ple program to compute the approximate length of the spiral groove on one side of the record?

The answer should be your assessment of the total length of the spiral.

The Answer

This is Gordon Lee's own solution to the May competition see page 28 for results

THE square root of 2 (to 125 decimal places) is:

```
1.41421356237309504880169872121098
81056496016967687139274017383719290
521478196612603216478286952665226917661
827
32423846730080126770486483
```

But, the final five digits are '62483' (as the next digit in the sequence is a 0—a value of '00484' would be acceptable).

This value was computed using a refined method of trials, starting with the value 1414 as the root (and 19999996 as its square). The decimal place was displaced with during the operation and replaced at the end. Each successive digit was determined by trial, starting with a 9 and decreasing by 1 each time. The required value was the first that was found which kept the square to a value with a left hand digit of 1. For example, the square of 14143 is 200024449, but the right hand digit of the root is a 3 and that 14143 when squared gives 19999964. Therefore, this will determine the correct value. This procedure is continued as often as required in

order to bring the square as close to, but not exceeding, 19999996 (19999996 -).

The actual method was performed using string variables in the past in Dragon User. To eliminate the need for the whole calculation to be performed from scratch, a method of computation was devised to allow the revised result to be appended to the previously-computed total. The method used is outlined below, although a full explanation of how it works is too lengthy to be explained here.

- 1) Take the current value of the square and multiply by 100
 - 2) Take its root approximately computed and multiply by 20. Then multiply by the digit being tested.
 - 3) Compute the square of the digit being tested.
 - 4) Add these three values together.
 - 5) This gives the revised square.
- For example, we have found the square 1999996 and its root 1414. We need to find the next digit for the root. So, starting with a 9 we repeat the procedure outlined above until the resulting square falls below

19999996 (the number of lines depending on the stage of the calculation. In this case, the digit will be 2.

So, taking each step as above, we get:
1) 1999996 x 100 = 199999600 (actually done by putting 00 at the end of the string holding this value).
2) 1414 x 20 x 2 = 56560
3) 2 squared = 4

4) Add these together = 19999964
This gives the revised square 19999964 and its root 14142. So the process is repeated until the required degree of accuracy is obtained. As the square will contain twice the number of digits as its root, the maximum length of a string (255 characters) will be adequate for the computation to be made without having to 'split' the digits into more than one string.
If the square root value given is tested using the multiplication routine given as being used on page 28 of the February 1988 Dragon User, it square can be shown to be 19999996 recurring. Adding the final digit (2) to a 4 will produce 20000000 recurring, a value which is too high.

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Write down your problem on the coupon below (make it as brief and legible as possible) together with your name and address and send to: Communication, 40 Alexandra Road, Houston, TX 77066, TWO SHIP.

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Pl., Combe Down, Bath BA2 5PA. Maybe in July or March.

DRAGON LOGS: Issue 2 of the Dragon's brightest magazine is now available, priced £1. Please send orders and payment to: Donald Morrison, 19 Christchurch Road, Ipswich IP2 3CF.

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Dragon Answers

If you've got a technical question write to Brian Cudge. Please do not send a DRAGON Disk unless guaranteed to answer individual inquiries.

Making a line tick

I would like to know if it is possible to draw a line of a certain length at an angle to another line. I would like to be able to draw the second-hand of a watch ticking round. The only way I have found of doing this is to use DATA statements to hold coordinates of the lines to be drawn — this is very time consuming as the co-ordinates have to be re-written on a graph paper for each new circle. Is there a better way?

Andrew Lamb
2 Marsham Road
Hazel Grove
Stoobport

A little elementary geometry is all that is needed here. Using the SIN and COS functions of Dragon Basic (which work in radians, not degrees), the following program

```
30 PMODE 4,1:PC/L:SCREEN 1,1
30 R=40:XC=(28:YC=40
30 CIR=CIRCUC,YC),R+9
40 FOR S=0 TO 360:INCR 6:SECONDS OF A MINUTE
50 X=XC+R*COS(S/57.3):Y=YC+R*SIN(S/57.3)
60 Y=YC+R*SIN(S/57.3):X=X,Y,PSET
80 TIMER=0
90 IF TIMER=0 THEN 90
100 LINE(XC, YC)-(X, Y),PSET
110 NEXT S
120 GOTO 40
```



will draw a second hand centred at the point XC,YC and of length R, ticking round the 60 second position.

See page 146 of the Dragon Basic manual for an explanation of these functions. I'll leave it to you to add hour and minute hands to the clock!

Sound under machine code

Is it possible to use the SOUND command in machine code? If so, where do I store the note number and duration, and what address do I call?

You use the Dragon's SOUND command from machine code programs. First store the pitch value at location 100 (this is the same as the first number in the Basic SOUND command). The duration should be stored at location 101 (as a 16-bit (short) first) number. This should be four times the duration given as the second argument in the Basic SOUND command.

Then immediately call the routine at \$7191. This will produce the required sound. The value in 101 (as documented in the manual) routine, so it is important to only set this up immediately before the \$7191.

Hi-res in two parts

I am planning to write a graphic adventure game, but I have a few problems. How can you get machine code to split the hi-res screen in two,

the upper half in semi-graphic 24 and the lower half in Priority 4. I've seen this done in The Dark Pit.

Die Dicky
Division
W-5475 Caping
Honey

It is possible to switch modes mid-screen. To do this you need to enable the horizontal sync interrupt (by using location \$4F0), so that an IRQ occurs for every screen line, rather than at the end of each whole screen. Then using a counter to count the IRQs, you can switch modes at a particular scan line.

The drawback is that all these IRQs tend to slow down your main program somewhat. The method is not simple and not for the faint hearted, but it was well explained last year in a Dragon List.

More memory

PLEASE could you answer the following questions which may be of some interest to other readers. Can the Dragon 24 have more memory attached to it than 128K. And if so how, by cartridge or internal board? Can the Dragon have a second floppy connected and can this be 5.25 or that can run Gam?

David Lindsay
12 Glen Barr
South Peter
Cheshire-in-Steve
Co. Durham
DH2 2JW

Eprom makes sense?

I bought an eprom programmer from Compuserve at the end of London. I need more information on how to use a program from memory to eprom, how do I access the program?

Some cartridge cases have two sockets with one or two eproms. If anybody has one, describe it to me a difference?

Peter Gurr
17 Manselton
Chesham
Essex SS21 9P

I assume that you have instructions on how to actually use the eprom programmer. If not then get them

from Compuserve. You may be able to get Basic programs into eprom and run them there if you carefully set up the variable table pointers and Basic program pointers correctly (see the Firmware series for details), but you are more likely to be successful with machine code programs which need to be ORed at \$712 to run in an eprom.

Most cartridges do have two sockets, these take 4K eproms (making about 10K). There are two types of one socket cartridges, the most common contains a single 8K eprom, more rare are the ones that contain a single 16K eprom (the maximum).