

DRAGON USER

International edition

The independent Dragon magazine

75p US\$3.25 February 1995

FLEX — THE OS9
ALTERNATIVE

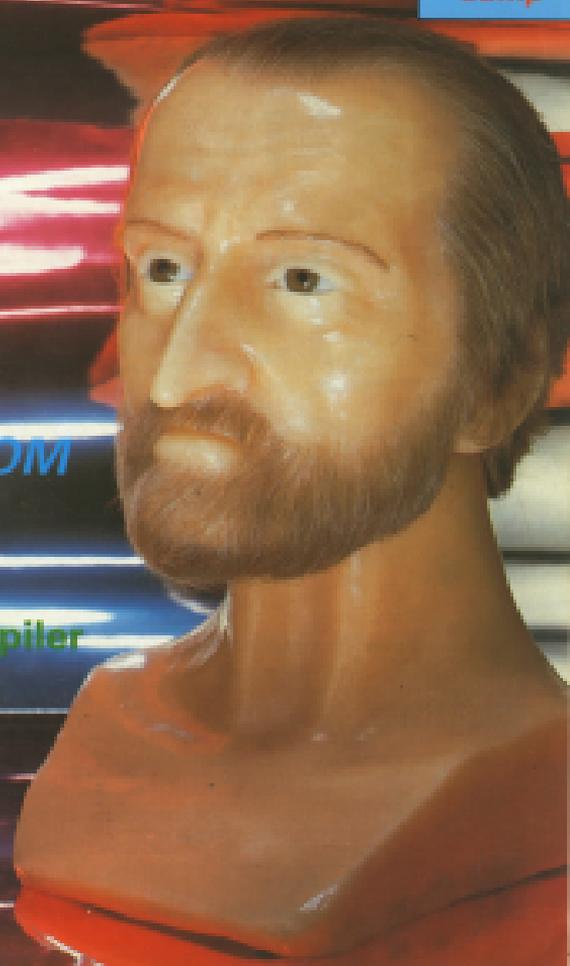
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Epson
dump

Sideways ROM

Dynafast compiler

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How to submit articles

The quality of the material we can publish in
Dragon User each month will, to a very great
extent depend on the quality of the
discoveries that you can make with your
Dragon. The Dragon computer was launched
on to the market with a powerful version of
Basic, but with very poor documentation.

Articles which are submitted to Dragon
User for publication should not be more than
2000 words long. All submissions should be
typed. Please leave wide margins and a
margin of one inch between each line. Programs
should, wherever possible, be computer
printed on plain white paper and be accom-
panied by a tape of the program.

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

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Win 20 copies of Masterworks from Channel
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Lee (Front cover by Mike I Benson)

Editorial

UNLIKELY THOUGH IT sounds, the future of the Dragon computer now depends, in no small part, on a Spanish TV company.

Eurohard, the Spanish company which took over manufacture of the Dragon from the now defunct Dragon Data, hopes to emulate Acorn by having the Dragon adopted by Spanish TV as their equivalent of the BBC micro.

Eurohard has not been slow to recognize the benefits which have accrued to Acorn from its lucrative association with the BBC. Quite apart from the publicity value, there are considerable advantages in having 'official' backing. In addition, a TV tie-in could help set up the educational market — one regional education authority in Spain has already plumped for the Dragon.

This is not to say that Eurohard's success in Spain is solely dependent on a TV contract. But, with companies such as Sinclair and Commodore making deter-
mined efforts to increase their penetration in European markets, a TV link-up would certainly help.

As far as the UK is concerned, it is obviously important that Eurohard secures its home market, since this will allow the company to devote more of its attention to the existing Dragon User base in this country. A flow of new software and machines will, in turn, help persuade UK retailers that the Dragon is not 'dead' just sleeping.

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BACKGAMMON

Backgammon is a powerful, easy-to-use program that allows you to create your own backgammon programs. It includes a comprehensive manual and a series of lessons that guide you through the basics of programming. Once you've mastered the basics, you can use Backgammon to create your own backgammon programs for the DRAGON 32.

REVERSI

Reversi is a powerful, easy-to-use program that allows you to create your own reversi programs. It includes a comprehensive manual and a series of lessons that guide you through the basics of programming. Once you've mastered the basics, you can use Reversi to create your own reversi programs for the DRAGON 32.

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Invader Game is a powerful, easy-to-use program that allows you to create your own invader game programs. It includes a comprehensive manual and a series of lessons that guide you through the basics of programming. Once you've mastered the basics, you can use Invader Game to create your own invader game programs for the DRAGON 32.

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Letters

This is the chance to air your views — send your tips, compliments and complaints to Letters
Page, Dragon User, 1213 Little Newport Street, London WC2H 7PP.

Carbon microphone

In REPLY to Darren Cocking's enquiry about attaching microphones to the joystick socket (Dragon User November) — I managed this by using a carbon microphone (from a telephone mouthpiece) and so constructed a very simple oscilloscope (non real-time). The circuit is identical to that found in the 'building a lightpen' article in April's issue, with the coil replaced by the carbon microphone.

To improve my oscilloscope, I found it necessary to deassemble and rewire the machine code joystick routine (locations \$8041 to \$8068) in Ram, with some alterations (only reading one of the four potentiometers for instance) that made it much faster. This enabled my program to read a value from 0-43 over 3,500 times a second.

Stephen Jackson
20 Farmers Mead
Hemel Hempstead
Herts

Moans and groans

THANK YOU for a useful magazine with lots of tips and handy programs. I am not a games fanatic — I'm a bit too old and I really use my Dragon for more useful purposes, such as helping me check the eight Times Portfolio cards I've now acquired from various friends. I think the program is rather too restricted to offer to your readers.

I also prefer to write my own programs rather than buy commercial software. But, I was somewhat disappointed when I tried to purchase some games from my local multi-outlet national retailer for the family's amusement at Christmas. Having perused the columns of your magazine for a couple of months, I found several programs that took my fancy. The advertisements led me to believe they would be available from Boots, John Menzies, etc. As I live near Bath and Bristol, I have the choice of several large stores. Par for the course of Boots was about eight different pro-

grams, with Menzies fairly similar.

Now I know Dragon Data was bought by Buehner, but at least 35,378 people read your magazine and sales of Dragons must have well exceeded that. So, where can I see what I want to buy? I suppose I must order direct and risk the quality. I think the multiple retailers have let us down badly, or are sales of software really so bad?

This brings me on to my next mean. Someone, some years back tried to market his software program and the market was set up for the £5.95 to £7.95 average price of programs. Various efforts have been made over the years to reduce this price, but I suspect they have been largely frustrated by the retailers who insist on their £2-£3 profit. If the average price of software was £3-£5, I feel sure sales would boom.

Finding the programs for your computer on the shop shelf is another problem. Little attention seems to have been given to making particular machine programs readily identifiable (if a standard colour code top or bottom band were used for each system, then listing what you are looking for would be much simpler).

Finally, in the moans and groans section, I would like for the industry (particularly to come clear and indicate more clearly what you can expect to get from the tape under the wrapper.

J. Crooke
Honeybank
Brixton Hill
Poulton
Bristol

Retailers certainly seem to be extremely reluctant to stock any new Dragon soft-

A question of intelligence

YOU MAY be interested to know that we recently received the following complaint and have advised the complainant that we will not be pursuing the matter as it was not, in the facts available to us and in the particular circumstances pertaining to the complaint, there appears not to be a prima facie case for investigation under the terms of the British Code of Advertising Practice.

Subject of complaint: Your mail order advertisement claim for "Artificial Intelligence on the Dragon computer" book (Dragon User).

Reason of complaint: Complainant doubts that artificial intelligence has been invented.

The Advertising Standards Authority
Brook House
2-18 Torrington Place
London WC1E 7HN

ware, hence the return to profitability of the mail order business.

What's my line?

I HAVE recently upgraded from a 387 to a 64 and have two questions which I wonder if anybody can answer. (1) Can the serial port on the 64 handle the 1200 receive 75 transmit baud rate necessary for Prostat? (2) As I seem to have one of the low 64s with the old 32 keyboard, is it possible to buy the significantly improved keyboard on the 64 anywhere?

Couples Carpenter
74 Wysey Gardens
Blastford

Dear Sir
PS Keep up the good work.

Value for money

FIRST, THANKS for a great magazine. Secondly, just had to write and say that our family of Dragon users have found the new Pocket Mini software series, being marketed by Microdeal to be fantastic.

Great value for £1.99, with special sound effects and superb graphics. I have paid for more for software which hasn't been anywhere near as good. Great stuff, especially The Time.

Joan MacTavish
48 Florence Street
Lisieux
Dorset

Madness and the Minotaur

I NOTICED in the November issue of Dragon User that you ask if anyone has completed Madness and the Minotaur. I have never actually completed it, but have scored 200 points which is close to finishing it. I had two treasures still to collect and I knew where one of them was located. I had one more monster to kill, but not the other.

This is my favourite game and I spend hours engrossed in it (much to the annoyance of my husband). Twice I wrote to Dragon Data when I was stuck over something and got some useful hints from them.

However, one thing has me baffled — I have yet to find any use for the jewels. It is not a treasure. I have a feeling it can be opened, but it has never opened for me. Also, I still haven't worked out what makes the pack not give up its treasure — sometimes it has done so, but I haven't seen any particular reason for it doing so at that particular time. If you can help with these queries, I would be very grateful.

Rue Langmead
297 Camrose Lane
Walsford
North

Software Top 10

1 (1)	Munchback	Ocean
2 (5)	Chuckie Egg	A&F
3 (3)	Dragon Chess	Oasis
4 (7)	Cuthbert in Space	Microdeal
5 (1-1)	Martin Miner	Software Projects
6 (6)	Mr Dig	Microdeal
7 (10)	Serifs Magic	Knight Software
8 (3)	Hungry Horace	Melbourne House
9 (8)	Knightspal	Beyond
10 (9)	Reg Driver	Masartonic

Chart compiled by Websters Software.

Ket rises to new summit

INCENTIVE SOFTWARE is converting its highly-acclaimed adventure series, the Ket Trilogy, to the Dragon.

OS9 accounts package

COMPLETIONSE PLANS to release an integrated OS9 accounts package in the next two to three weeks. It will cost approximately £200 and will be available for the Dragon and other OS9 machines such as the Tandy colour computer.

A Flex version of the accounts package is also planned, but it will not be ready for another two months, according to Managing Director Ted Coyne.

More information from Completionse at 2990 Green Lane, Palmers Green, London N13 5SA.

Go North young man

NORTHERN DRAGON users will have the opportunity to see some of the latest software and peripherals at the Pudsey microcomputer show on Saturday, March 18. The show, organised by Northern Premier Exhibitions, will cater for a range of machines including Dragon, Amstrad, Commodore and Sinclair.

Admission costs £1 for adults and 50p for children. The show will be held at the Civic Hall, Dawson's Corner, Pudsey, West Yorkshire, from 10 am to 5 pm.

The series is being translated from the Spectrum by John Martin and should be available in March.

Mountains of Ket, Temple of Wax and The Final Mission — the three games which make up the Ket Trilogy — were launched in 1984 with a £400 video recorder reading the first person to completely solve each adventure. Sadly, for Dragon owners, Incentive believe that a winner will probably be announced before Dragon versions of the game are released.

The impetus behind Incentive's decision to convert the Ket Trilogy to the Dragon com-



es from the company's recent success with Buck Track. This program, which was launched in September, has already sold several thousand copies.

The Ket Trilogy is likely to cost about £10 and will only be available as a three-pack — the adventures will not be available separately. For a full review of the Ket Trilogy see our sister publication Micro Adventure, September 1984.

Spiderman follows Hulk

SPIDERMAN IS here. Marvel Comic's famed super hero has been brought to the Dragon, courtesy of Scott Adams' Adventure International.

The game, which costs



£7.95, is a text only adventure and features some of Spiderman's old foes such as Hydro-Man and Lizardman. The aim of the game is to collect a

number of gems and thus satisfy the chief examiner that you are worthy to do battle with an interstellar enemy, who will appear in a later adventure.

Adventure International has also announced that all its earlier adventures will also appear on the Dragon during January. This covers Scott Adams' adventures 1-12 and the previous Questprobe adventure — The Hulk.

Those people who find adventures difficult to solve



will be glad to know they can buy a text book with clues to all the Scott Adams' adventures and the Questprobe adventures for £2.99. Details from Adventure International, 85 New Summer Street, Birmingham B19 3TE.

Exit Edna

CABLE SOFTWARE has withdrawn one of its latest games, *Exit Edna*, due to technical problems. However, the company's two other recent additions to its Dragon range, *Fastest Fight* and *Home Base* are still available at £5.99 each.

Repeat performance

THE SECOND 6666 Colour Show for Dragon and Tandy users will take place on March 30 and 31. The show will be held at London's Royal Horticultural Halls and admission will cost £2 for adults, £1 for children.

For further details contact the show organisers, Computer Marketplace (Exhibitors) Ltd, 20 Orange Street, London (Tel: 01-600 1812).

Fruit machine

FRUITY IS a high-resolution fruit machine simulation recently released by London-based Impact.

The game, which was originally sold by Dragon Data under a licensing agreement, costs £4.95 and features holds, nudges and gamble wins.

Copies of the game are available mail order from Impact, 148 Balham Hill, London SW12 9DU.

Channel 8 in new ice age



CHANNEL 8 Software is releasing three new adventures for the Dragon — *Midwinter*, *After the Fire* and *Beyond the Iceberg* — in its Mysterious Adventure series. Each game costs £5.95 and should be launched in February.

Norman Penrice of Channel 8 explained that *Midwinter* is set in a modern ice age. The main protagonist has just 12 days in which to find a device to melt the ice, otherwise the world will be locked in ice forever.

After the Fire is set in the

aftermath of a nuclear holocaust, while *Beyond the Iceberg* takes place in a universe so far distant that the normal laws of time and physics are suspended.

All three games have been duplicated on what Norman Penrice calls "smart tapes". These tapes will work on both the 32 and 64, but the graphics data will only be loaded on a 64. Thus, if you have a 32, the adventures will be text-only, but if you upgrade to a 64 you will have the benefits of graphics as well.

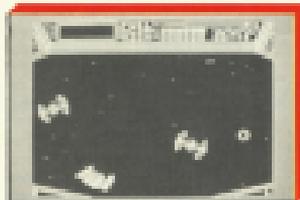




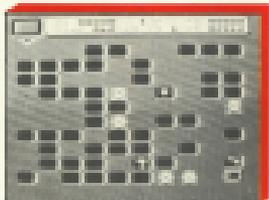
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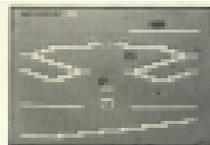
MORRIS SIMPSON — Ten screens in the old mansion must be negotiated before you come face to face with the dreaded Mafud. You are alone but nobody's the boss. Get to 1, 2, 3, 4 screens. Amiable adventures. **12.00**



THE BELLS — You have probably read the novel to open the film — now you can play the game. Resound fearfully from the 104 tower. 14 screens of danger for you to challenge. **25.00**



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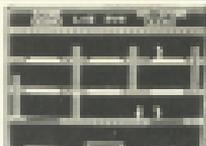
PINKOES PIT — Deep underground in the crystal mines reside the dreaded Oloes and his cronies, who are hell bent on robbing the almighty of Bords the miner. To fit the track full of crates — four screens. **25.00**



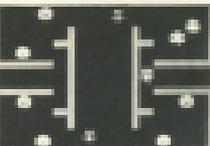
DARTS — Open a couple of cans of beer, sit back, and get at the excitement of throwing darts. **12.00**



BORN TO BOLD — Urged into glory by Bords, Stop. Please open home. Stop. Beware of the controllers, traps and bombs. Stop. Please grab a few diamonds on your way. **12.00**



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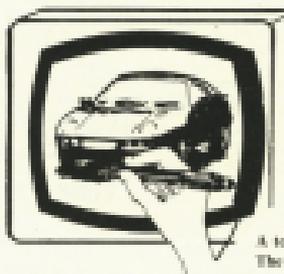
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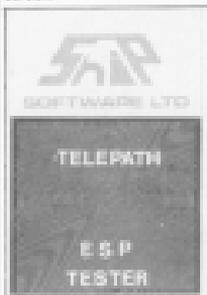
Dragonsoft

New software for users should be sent to: Dragon User, 12-13 Little Newport Street, London WC2H 7PP.

Telepath

Program: Telepath, Sirp Software, 171 Malton Road, Colchester, Essex. Price: £7.00.

WHAT, you may ask, have computers got to do with telepathy? The answer comes in the form of a do-it-yourself ESP tester called Telepath. The program starts by asking for your name, and then goes through a rather long (the sequence, all printed in lower and upper case on the hi-res screen).



You are next asked if you would like "a short audio history [of telepathy] with

graphics demonstration". Pressing "Y" returns a prompt to turn over the tape, which you play while the computer goes through a very nice graphics routine. The "audio history" consists of a man speaking against a background of swirly synthesizer music, and isn't quite comprehensive, but is quite interesting all the same.

Finally the program comes to the ESP test itself. This proved to be rather disappointingly dull, involving seemingly endless repetitions "which cut me off thinking of" questions, to which the user presses one of the keys 1-5. The tests consist of groups of 25 "guesses", and at the end of each group the program prints the number of correct guesses in that group, as well as its running total. The user may then continue with the test, start again, lengthen or shorten the test duration, and do a variety of other things including quit.

As there are five cards to choose from, and 25 guesses per group, the program points out that if guessed at random, a non-telepath could expect to score five per group. I scored four.

David Rowledge



Katerpillar

Program: Katerpillar 2, Microdeal, 41 Turo Road, St Auston, Cornwall. Price: £9.00.

KATERPILLAR is an arcade-type game for which you will need joystick to play. It is written in machine code and operates on the high resolution colour mode of FMOD63. This gives a range of colours which it uses to give some variety to the display. The program is obviously well designed, as the game runs at an entertaining speed and the button responses as well as joystick responses are good.

The basic idea is that the player controls the direction in which the "laser" gun points with the joystick, and fires the gun with the button. Suitable space-invader-type noises are emitted when the gun is fired

at a variety of noises which try to obliterate the player(s). Suitable sound effects are included.

This game can also be played by two players if a pair of joysticks are plugged into the computer. Among the attacking insects are Termites, Scorpions and Bees, not to



mention the "Katerpillar" itself, of course.

To complicate matters the screen is also covered with mushrooms which influence the behaviour of the Katerpillar. Some of the mushrooms are "magic" ones and others may be "killer" types. These have drastic effects upon the Katerpillar, which makes the game a lot more interesting.

As you get more expert at

this game and progress to the next level, things get steadily more difficult and faster, eventually becoming impossible. This title has been voted a great hit in my house by all ages and definitely gives good value for a high-speed arcade-type game.

John Jaynes



Time Police

Program: Time Attack, Tutor Williams, 15 Sumnerwick Road, Brixton, West Midlands WV14 9PD. Price: £7.95.

THIS IS one of those programs that is hard to categorise. It tries to be a game and an educational program, but fails on both counts.

The object of the game part is to destroy the evil Time Police and their computer. The player is first presented with a timeship control panel. A little experimentation reveals that the "up arrow" and "down arrow" keys move the ship forward and backwards through time, and "E" places the player outside the ship. If the latter is selected the computer draws a line(s) picture of the timeship's surroundings at the particular year you have arrived at. This usually consists of a group of buildings which, although colourful,

doesn't differ much from year to year.

Once outside, providing the player isn't arrested or shot at, there are three courses of action he or she can take. If there is an old timeship lying around, any remaining fuel can be transferred to the player's ship. If the Time Police Computer happens to be outside, the lucky player can shoot it up. If all else fails, pressing "E" takes you back into the timeship to try another year.

The educational part of the program comes in the form of the "Mind Probe" - this devious Time Police weapon asks you history questions, and then shoots you if you get them wrong. A lot of effort has obviously gone into this program, the aim of which seems to be to "bring history to life", but it doesn't really succeed, and the overall effect is not up to scratch.

David Rowledge



Snow Queen

Program: Snow Queen, Cambridge Computersolve, 15 Derwent Close, Preston, Clwyd LL18 7TT. Price: £5.95.

HERE IS yet another supposedly educational type of game, in which the player has to find the letters of a word presented in a confusing mess of black and white squares. The letters to be found are formed using the coarse squares of the low resolution format of Dragon Basic.

A blue coloured rectangle must be placed over the required letter using either a combination of numbers and cursor arrow keys to direct the rectangle to its next position or

a joystick to serve the same purpose. This has to be done against the clock and a score is accumulated as the player proceeds through the different words set. The length of words



set can be varied according to the level of difficulty required.

The problems are "set" by the "snow queen" whom the player passes by obtaining the correct answer. The successful player is rewarded by marks and a rather tedious display attempting to imitate a snow crystal.

It appears to me that this program was written for a lesser machine than the Dragon as it does not make use of its graphics capabilities in any way. Although the program has been written in Basic it repeats the tedious drawing of the "snow crystals" each time, using the LINE command.

Much better crystals could

have been formed using the DRAW command and then storing them with GET and recalling them with PUT. This would have been much better, but would not have overcome the fundamental problem of this program in that the letters to be identified are very difficult to recognise because some of them, especially the "W", "M" and "M" are very odd. My children (ages six, nine and 11) soon gave up on this game.

To summarise therefore, not a bad idea but poorly written and of little appeal to children (mine anyway).

Bob de Grey



Pogo Stick

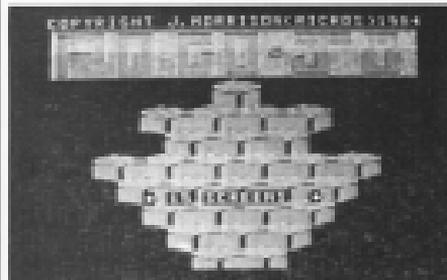
Program: PO-GO-JO, J Morrison Moore, 4 Hain Gardens, Timpany, W Yorks WF3 1JH. Price: £3.95.

MORE AND more Caberl MORE are appearing for the Dragon these days — "Blackhead" from Touchmaster, and "Cuber" from Tom Mix to name but two. The latest is from J Morrison Moore.

In case anyone hasn't seen a version of this game, the

colourful, but the graphics are limited to cubes and springs. At least there is a black background which makes a nice change to the usual green that 99 per cent of software seems to use.

Having eaten, the game goes into its demo mode, which shows all 15 different screens (different arrangements of cubes) whilst playing a catchy tune. It's also allowed to start at any of the 15 screens on any level (1-6). The level simply determines how many enemy screens will roam over the screen — as



object is to guide an object, in this case a shiny spring, over a 3D display of joined cubes. Landing on one changes its colour, and changing the colour of all the cubes takes you on to the next level. Falling off the edge or being landed on by one of the nasties loses a life.

PO-GO-JO is a particularly nice version as it makes excellent use of semi-graphics 3d mode. This allows text and 64 x 192 graphics in all eight colours to be used at once. The display is therefore very

these are not intelligent it is not difficult to avoid them using a little care.

As usual with Morrison Moore games now, there is a full of fun, and an opportunity to enter your name at the start of the game. There is little to choose between various versions of the Caberl game, but as PO-GO-JO is only £3.95, it would seem the best value for money.

Brian Cudge



Dungeon

Program: Dungeon Raid, Microdeal, 41 Turo Road, St Asaph, Cornwall. Price: £5.00.

DUNGEON RAID is an example of an arcade adventure game—a type that has grown to be more popular recently. As such it combines the exploration aspects of an adventure game with the quick fingers usually necessary to avoid enemies.

This game starts off by allowing you to choose the background colour and the difficulty level from 1 to 3. You control a small figure who appears to run down a long corridor containing different rooms. The illusion is achieved by keeping the figure still and scrolling the walls up the screen past him.

There is only a limited amount of time to pass through each room, and you must not touch any of the walls. In each room are snakes, rats, and snappers that you must avoid by use of the joystick. These can be shot by pressing the fire button which releases a blast

downwards. This is also the way in which you can open the doors between each room.

To provide some extra interest, inhabiting the labyrinth are "stones" which look just like your own figure. If you shoot these by mistake, you lose a reserve man (if there are any left). Each time you destroy one of the creatures, a type of shock wave bounces



out to both side walls and back, which is probably more of a problem to avoid than the creatures themselves.

John Screen



Yumping Yack Flash

Program: Yumping Yasser, Knight Software, 30a High Street, Exon, Clevedon T56 5AD. Price: £3.95.

YET ANOTHER "Donkey King" arcade game derivative, but with a difference. It is written in machine code and the quality of the graphics and sound are good. All the instructions you need to play the game are included in the program and you can choose to have them shown or not.

The basic idea is that "Yasser" has to jump from one platform to another in a series of "rooms" to get a key which is needed to open a door on the other side of the room, and a number of jumps away. Just to make things interesting, a variety of monsters wander about and unless you are careful, Yasser will be either munched by a monster, break his head on the roof, or shatter his ankles by falling too far.

The movements can be controlled either by joystick or from the keyboard. All movements are accompanied by

good sound effects giving quite an enjoyable game. With experience one can learn to anticipate the movement of the monsters and after several games you proceed to new rooms with different patterns to tackle and fresh monsters to avoid. All this is set against the clock. The less time you take, the higher your score. A very enjoyable game which appeared to all ages in our house.

The only drawback to this program is that exactly the same pattern of obstacles occur each time the program is run and the monsters seem to move in a preset pattern. With some experience therefore, you do learn how to get the better of each part of the game. Even so it will take a long time to run out of all the rooms and monsters available, as each pattern is significantly different from the others. Consider therefore this to a good game.

John de Grey



Start to

After purchasing our games cassette for the Dragon 12 I felt I had to try out all the new titles. I have purchased and have been pleased with them. The only game I do not absolutely recommend is 'The Incredible Machine' I would not have bought it if I had any one of these games, especially 'Interplanetary Trade' 'Dragon and the Wizard' 'The new computer activities'. It seems to me that you are, like many other software houses, a victim of the 'new' factor.

Your sincerely
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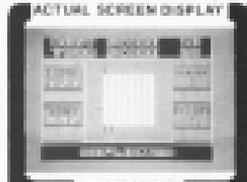
INTERPLANETARY TRADE

Play the role of a trader in space. You must be cunning to get the best prices. You must be able to take orders, demands, demands, demands. You must be able to take orders, demands, demands, demands. You must be able to take orders, demands, demands, demands. You must be able to take orders, demands, demands, demands.



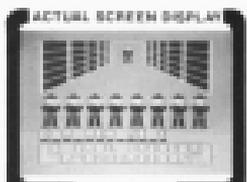
WIZARD

BE WARNED - This is not just any game. A challenging, multi-level graphic game demanding fast, accurate reaction. It begins slowly enough, but gets progressively more difficult. Features a colour high resolution graphics, sound, bonus points and high score.



STONE HUNT

A superb test of programming to make your brain ache and challenge your Dragon's memory to the absolute limit! The game is a progressive strategy in the colour graphics mode and features a unique rapid game facility, individual settings, and 1-4 players. Use over 2000!



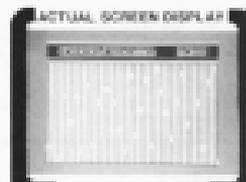
EXECUTION

Are you a real 'word master'? Do you want to test your ability to recall words? 'Execution' is the game for you. It's a simple yet highly compelling game (supporting excellent colour graphics and brilliant sound effects). Over 200 of clever programming.



WILD

Is it tall or is it tall? Can you turn your humble £50 stake into £1,000,000? This is a simple yet highly compelling game (supporting excellent colour graphics and brilliant sound effects). Over 200 of clever programming.



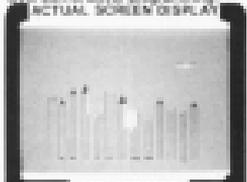
WUMPUS MANSION

Only a young person can solve the mystery of 'Wumpus Mansion'. You'll have to use your wits to solve the mystery and solve the mystery of 'Wumpus Mansion'. You'll have to use your wits to solve the mystery and solve the mystery of 'Wumpus Mansion'. You'll have to use your wits to solve the mystery and solve the mystery of 'Wumpus Mansion'.



SMALL FACE

The smallest of small faces is the one you'll see. The smallest of small faces is the one you'll see. The smallest of small faces is the one you'll see. The smallest of small faces is the one you'll see. The smallest of small faces is the one you'll see. The smallest of small faces is the one you'll see.



486 ASSAULT

MASSIVE BATTLE! Your rapid response is the key to success. Your rapid response is the key to success. Your rapid response is the key to success. Your rapid response is the key to success. Your rapid response is the key to success. Your rapid response is the key to success.



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Sideways ROM board

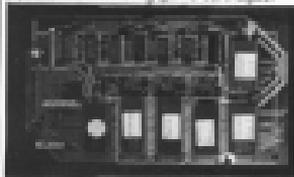
Hywel Francis examines some extra BASIC commands

AFTER KEITH AND Steve Board's review of a Dragon Epoch programmer many of you must be wondering what to do with your newly 'daisy' Eproms. I hope to give you some ideas by examining an intelligent sideways Rom board.

Produced by Race Electronics the unit is housed in a well designed hard plastic case, which is supplied with support legs to prevent any strain on the Dragon's edge connector. As with all Dragon cartridges, it should never be inserted or removed while the Dragon is powered up. All the most popular Eprom devices may be used with this product, with sizes ranging from 2K up to 16K (Fig 1). However, this unit does not support the new obsolete 16-supply types of Eproms.

To facilitate the use of the Rom board, five additional commands have been added to the Dragon's BASIC (Fig 2). These extra commands are themselves held in Rom on the cartridge.

There are four banks of Eproms available for use at any one time by typing in Rom 1-4. The first three banks may be set up to take 2K-pin devices while the fourth up to take 28-pin devices while the fourth bank is set for two 2532 Eproms. This allows you to use any existing Dragon Data cartridge software. Bank four may be used for any 2532 software, not just Eproms from existing game cartridges.



Changing the first three banks to accept any of these devices (Fig 1) is relatively easy — each bank supports a 3 × 3 matrix of selection pins, which have been num-

Fig 1

Devices supported by the ROM board	Eprom	Size	Package description
1	2716	2K x 8	SOIC
2	2716	2K x 8	SOIC
3	2716	2K x 8	SOIC
4	2716	2K x 8	SOIC
5	2716	2K x 8	SOIC
6	2716	2K x 8	SOIC
7	2716	2K x 8	SOIC
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100	2716	2K x 8	SOIC

bered vertically 1 to 3 and horizontally 'A' to 'D'. You would be advised to use a very small pair of tweezers to facilitate the removal and replacement of these selection links without damaging the unit. Only 14K of contiguous memory is permitted for each bank, so the top 2K of a 27128 device cannot be used.

The manual supplied with the unit gives all the technical information required to make the most of the sideways Rom board. It is written in very readable English and is only 10 pages long.

One very useful feature of this unit is its ability to recognise BASIC programs in Rom and load them into memory ready to Run. A special storage format has been used so that several BASIC programs may be held in a single Eprom.

When a BASIC program is loaded from Eprom the system is set to a merge mode. This allows the user to store a library of commonly used subroutines such as screen dumps or hi-res character set.

One minor restriction is that the user

(07), (08) and (09) are no longer available for use. However, the first six calls are still free.

The extended BASIC command Prepare takes the current BASIC program in memory and prepares it for tape storage. Once prepared, the program may then be committed to EPROM.

Few machine code programs on the market have been written in position independent code (relocatable at different memory addresses). So, in order that we can use software that does not reside in the cartridge memory (M1C000 to M1EFFF), a 24 byte hard copy of a machine code program that should be appended to such non-relocatable programs is included. This is the method that may be used to Rom such programs as Microsoft's Teletester. The replacement program must have the new and old start address, old end address and the new BASIC address.

Reusing Dragon cartridges

Many people have been re-using Dragon Data's cartridges for their own firmware. However, the sideways Rom board, which costs £25, offers the first occasion to use such devices as 2754s and the 27128A.

The only criticism I have of the unit is that I would have liked the relocatable program included in the extended BASIC set of commands. However, there is a trade off between increasing the size of the operating software (2K at present) and the amount of cartridge memory available to the user.

If at present you do not have the facility to load your own Eproms then both the Eprom programmer and the Rom board must be considered together. Perhaps the companies involved might do a combined offer on the units.

In further tests, the two units both worked well with the Dragon 32 and 64. There was a customary note offered by the manufacturers that the Dragon 64's power supply might not handle these units, but in my tests they have worked very well indeed.

With the availability of various Eprom programmers for the Dragon (the intelligent sideways Rom board is a very welcome addition to the arsenal of user kits for the Dragon 32 and 64 owner. ■

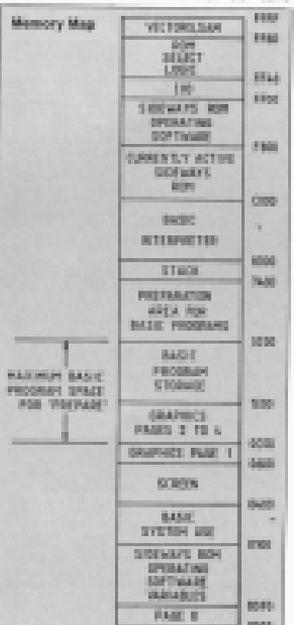


Fig 2

EXTENDED BASIC COMMANDS	ROM
ROM	The command loads the requested ROM bank, where n = 1 to 4.
WASH	By entering the command the selected ROM bank is displayed.
START	Starts the BASIC command in BASIC. It allows the operator to start at any address in the selected PROGRAM.
WLOAD	This allows the operator to merge a BASIC program from the sideways cartridge. 5000 BASIC programs may be held in one page and accessed individually at any time.
PREPARE	This command takes the BASIC program in memory and prepares it for loading to tape in readable format ready to be stored to EPROM with a programmer.


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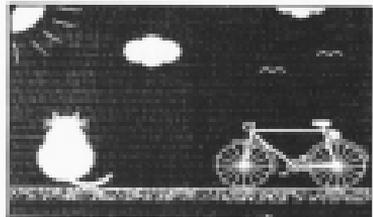
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Discontinued listings

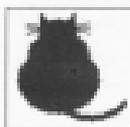
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7484	32609	880	A		40			7534	32687	130	# 250	1687
7488	32610	8800	32364		147000			7538	32689	578	7	1360
7492	32613	880	-	1	1680	4	32666	7542	32691	CMY	# 240	1080000
7496	32615	130	A		87			7546	32695	880	-	0
7500	32616	1300	30	7	11800			7550	32697	130	#	40
7504	32619	880	30700		147000			7554	32698	880	-	30
7508	32622	880	-	17	1687	†	32687	7558	32700	CMY	3	1304
7512	32628	130	32700		147000			7562	32702	CMY	# 91	8700
7516	32637	130	32700		880000			7566	32704	880	-	10
7520	32639	880	0		50			7570	32706	CMY	# 1687	87000
7524	32641	880	-	4	3470	†	32627	7574	32709	880	-	1
7528	32643	130	32364		148400			7578	32711	1300	33	2
7532	32644	880	32366		148400			7582	32714	880	-	30
7536	32647	880	-	40	3600	†	32590	7586	32716	CMY	# 91	8700
7540	32641	1300	1	1	3001			7590	32718	880	-	1
7544	32643	CMY	32364		87390			7594	32720	CMY	# 1360	88000
7548	32646	880	-	20	2623	†	32680	7598	32722	880	-	1
7552	32648	130	# 12		8800			7602	32724	880	-	30
7556	32650	300	32700		88000			7606	32726	1300	30	1
7560	32653	1300	326	1	1080000			7610	32728	880	-	30



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Go Flex

Brian Cudge looks at an alternative to OS/2

IF YOU ARE thinking of moving up to a professional operating system for your Dragon, then an alternative to OS/2 is Flex from Comshare. The minimum system required is a 64K Dragon and a disk drive, though two disk drives are preferable.

The Flex disk is supplied with a hefty 200 page manual which describes all the commands and the editor/ assembler which is included on the system disk. Also included is a booklet describing a few extra features added to the standard Flex set up for the Dragon implementation. Unfortunately, I have not seen a copy of the latter.

It is advisable not to use your original disk, but to immediately make a backup copy and use this to boot Flex (one crash could wipe out the disk). Once installed into the disk drive, Flex is started using the `BOOT` command. After a few seconds the screen goes into 51 column mode, (using Mode 4 graphics) and asks for the current date to be typed in.

The disk supplied has a demo program installed as the startup procedure which 'welcomes' you to Flex (this can be deleted from the disk once you're familiar with the package). There is a Flex prompt to signal that it is waiting for a command. The first one to try is `CAT` which shows a directory of the disk — various parameters can be added to the command so that only certain types of file are listed etc. The size of the file is also shown.

As with OS/2, the `BUILD` command allows you to enter a file from the keyboard. The `EXEC` command can be used to execute the file as a set of instructions. You might, for example, build a file with the necessary commands to copy the disk on a fresh disk in drive 2.

A powerful `TTYSET` command allows you to alter just about every attribute associated with your terminal, as this is never anything but a Dragon running Comshare's standard 512 column display, this will seldom be used.

A certain degree of IO redirection is possible. Sending output to a file or printer, rather than the screen, and taking input from a file, rather than the keyboard, are all supported.

The Flex Operating System is comprised of three parts, the File Management System, which allocates disk space, the Disk Operating System, which interfaces the programs and the RMS to the Dragon disk drives, and the utility command set, which are the commands such as `CAT`, `DELFILE`, `BUILD`, etc. All of these are stored on the disk and are only loaded when called by the user. Flex itself is stored in Ram starting at `8C000`, which just happens to be where the Dragonos is stored on Rom.

Also included on the Flex disk, as mentioned earlier, is an Assembler/Editor; the editor is used to prepare text files for the assembler. It is a fair text editor, but is in no way a word processor. The assembler is the program worth looking at.

A file is assembled by coding the assembler, called `ASSEMB` and following this by the filename of the source code. A number of options can be added to do things like: generate no object code, suppress the assembled listing, suppress the printed table output and suppress warning messages.

The assembler uses the standard Motorola mnemonics, so most assembly language programs for the Dragon can be entered with the minimum of changes. However, there are some very powerful features that most Dragon assemblers do not offer. Disk files can be assembled into part of the program, using the `LIB` directive, several conditional assembly constructions using `IF` are supported, such as:

```
if <expression>
```

conditional code goes here

```
endif
```

Finally, perhaps the most powerful option is to include macros into your program. Macros are similar to subroutines, except that when called the code is inserted at the current location. Therefore, three calls to a macro results in three copies of the same code in your program — not very efficient. Macros really become useful when you start using them with parameters — the basic construction of the code is the same each time, but the memory addresses used are different and are supplied as parameters in the macro call. Using conditional assembly statements in the macro itself allows very powerful programming techniques to be used.

If you want to know more about the Flex operating system then there is an advanced programmers guide available. This is certainly not written for the beginner and none of the information included in it is needed to use Flex efficiently. (But if you fancy writing your own Flex commands, or customising your system, then you will find all the information here.)

A memory map of all the user callable routines is included, as well as a list of the useful locations used by Flex. There are sections on the DOS, the file management system, the disk drivers, printer driver and writing your own utility programs. Assembly language examples are liberally scattered throughout the text. Again the manual refers only to Flex, and doesn't mention the Dragon or any particular implementation.

Just released is `DBASIC`, which allows you to use the standard Microsoft Basic in Rom with Flex. When loaded, `DBASIC` copies the Rom into Ram and cold starts the Basic. There are additions such as `GSAYIF` to save a file on to a Flex disk, and `CLDADF` to load it back. Using the `EXEC` command with a string, instead of an address, allows you to Pass a command directly to Flex, such as `EXEC "CAT"` which will directory the disk.

The cassette I/O commands, `OPEN`, `CLOSE`, `INPUT`, `PRINTF` etc have been extended to handle up to eight files at once — either serial data, random access or text files can be specified. Channel numbers 1-8 are used.

There are also extensions to the `CLS` command to use the frame 51 column test screen, so you effectively get Comshare's Hi-Flex cartridge built in. Existing programs can be loaded and will run, with the exception of those that use Dragonos commands. This package is only really intended as a cheap alternative to a completed Basic running under Flex, and to maintain compatibility with present Dragon programs.

Finally, also available for Dragon Flex is the `RMS` database, which is also available for the `OS/2` operating system. The record management system allows you to store just about any type of record you want, such as personnel, customer, accounting, or club files.

`RMS` will create the file to store the details for you, and then request the information in form-fit style — that is, you fill in a form on the screen for each record. Once this is done, you can search for and update records from the keyboard. `RMS` will also produce printed reports to the specification given in a file.

`RMS` consists of several modules, to create a new database, to input and edit the file, and to print the reports. All data is saved in the standard `ASCII` format, so `RMS` files can be read by other Flex programs and languages such as `Basic`. `RMS` takes some getting used to, but once mastered it is a powerful record management system, if not quite a database.

Inevitably, Flex is going to be compared to `OS/2`, and to be honest it comes off worst. Although it has more prewritten software than `OS/2`, as an operating system it is much less powerful. There is no multitasking available, no piping of data to concurrent programs, and it certainly isn't as easy during to use. Having said that, the Flex system disk is probably worth buying, just for the Assembler included on it, as this is certainly the most powerful I have seen running on the Dragon.

For the assembler/editor, Flex gets 10 out of 10, but for an operating system I would plump for `OS/2`.

Flex disk & manual	OS/2
Advanced Programmers guide	£11.90
RMS database	£70.00
Basic	£30.00

High-speed Compiler

Brian Gudge looks at the Dynafast compiler from CompuSense

IF THERE is one disadvantage of Basic, it's that it is slow compared to machine code. Of course, this is more than made up for by the fact that it is easier to learn and much easier to use and debug.

The reason Basic is slow is that each command is taken one at a time and "interpreted". This interpretation takes account of whether the command is in a loop or whether a branch has been previously executed. For example, every time a branch is made to a line, that line is searched for starting at the first line of the program. Even if the program has jumped there previously, no note of its position is made. An interpreter is therefore in many ways inefficient.

Intermediate code

Alternatively, a language can be compiled into "intermediate" code before running, using a Compiler. This "intermediate" code is really a cross between Basic and machine code. All jumps are replaced by actual machine addresses and space for variables is reserved during compilation. Of course, a compiler cannot produce code that is as efficient as a true machine code program, however, compiled programs can run many times faster than interpreted ones.

The latest Basic compiler to appear for the Dragon is "Dynafast" from CompuSense — available either on disk or on cartridge. The version reviewed here is on disk.

Dynafast is capable of compiling any working Basic program even including the DragonDOS extensions, but to make best use of the advantages of a compiler some changes are necessary. The compiler offers both floating point numbers (as used by normal Basic) and integer numbers in the range -32768 to +32767. The advantages of using integers is that they only occupy two bytes per variable, whereas floating point numbers use 7 bytes. Integer variables are also accessed much faster than floating point ones as the 16 bit capabilities of the 68000 central processing unit are used directly.

So, to get the best speeds out of your compiled programs, integer variables should be used wherever possible (for

example in for-next loops, counters and integer arrays). Dynafast requires that all integer variables are declared at the start of the program in comment lines, together with their storage address. For example, the line:

```
20 I33000 I J
```

tells Dynafast that the variables I and J are integers and are to be stored at addresses 33000 I and 33000 J. Floating point numbers are only really necessary for large numbers and scientific applications, using SM, LCK and so on and although these are supported by Dynafast, you will not gain any increase in speed by using them.

Once you have a working Basic program that you wish to compile, all that is needed is to load Dynafast and tell it the name of the program on disk (or tape) and the name of the output file (if you want to save the compiled program), also the mode of compilation. The options available are FAST (the program is compiled at full speed), NORMAL (the program is compiled with each line displayed with a short pause), STEP (the enter key is pressed after each line has been compiled) and PRINT (the output goes to the printer). Error messages and warning messages are clearly displayed during compilation and most programs compile in a matter of seconds.



The compiled program is run using BASIC and the break key is disabled (there is an option to have the break key checked if required). All integer arithmetic is fully compiled and floating point and other special commands (for example graphics) are semi-compiled — at runtime the ROM is called directly. The compiled program is put into memory where the original Basic one was, so this can no longer be used. Subsequent use of RUN will run the compiled program.

I tried six tests for speed using Dynafast, some were the example bench marks supplied on the disk, some were my own. The results are shown in figure 1.

Clearly, the compiled programs run much faster when using integers. Using floating point operations as in BASIC offers very little time saving.

In addition to the compiler, two other programs are included on disk — Dynasizer and Dynasort. Dynasizer analyses a Basic program producing a cross reference table showing variables and constants. Once loaded you simply load your Basic program to be analysed and type EXEC. There are several options available by adding a colon and characters after the exec, for example EXEC A2 will only list variables (variables whose first character is between A and Z), and EXEC "" will only list string variables.

Dynasort display

The display constantly shows what Dynasizer is doing and once completed the program can be listed with the variable table to either the screen or the printer. Clearly, this program is of little use to the Basic programmer, but used in conjunction with the compiler it can help you to decide what variables can be changed to integer ones in existing programs.

Dynasizer intelligently compresses Basic programs by the following methods:

- 1) Removing all spaces.
- 2) Deleting unnecessary ROMs.
- 3) Combining several lines into one. This process will nearly always save you a lot of memory and will often speed up programs (although not very significantly).

When used on a program before compilation, the resulting compiled program also takes less memory. It is wise to keep a copy of the original program as compressed versions are very difficult to read however!

To summarise, Dynafast from CompuSense is a very professional package, all programs are easy to use (Dynafast even has "help" pages for each step) and the manual supplied is excellent. The disk (or tape with cartridge) also contains some test and demo programs to get you started.

The major advantage of Dynafast over its rivals is its ability to handle ALL Basic commands, even if some are only directed to the ROM. This does mean that any working program can be compiled with very little alteration. The price is not cheap, £29.95 per Cartridge or Disk, which is twice the price of the Cassi compiler, but Dynafast offers more features, if you want faster programs and can't use machine code, then Dynafast should be your first choice. ■

	Interpreter	Compiler
BH1	1.46 secs	0.48 secs
BH2	18.34	7.48
BH3	19.82	8.74
BH4	17.12	5.28
BH5	65.18	64.18
BH6	16.58	18.64

Test	Figure 1: the results of a speed test using Dynafast
FOR-NEXT	
Counter loop	
Integer calculation	
5000 GOSUB's	
Floating Point calcs	
Print a number (1000x)	

DRAGON OPEN FILE

Send us your Dragon programs, beginning with a general description and then explaining how the program is constructed. Take care that the listings are all bug free, enclosing a cassette and, if possible, a printout. We pay \$8 for each original bug-free program published, double for the program of the month. If you have any problems with the listings, please send your queries to the appropriate author, Dragon User, 12-13 Little Newport Street, London WC2H 7PP.

Meander

From Keith David in Sussex

MEANDER is a strategy board game for two players. The object of the game is to form a continuous line from the top left corner of the board to the bottom right

corner, or to force your opponent off the edge of the board.

To form the line, one of three possible pieces are placed at the end of the existing line. These pieces will cause the line to change direction, and sometimes to loop over itself. The program will automatically search for the end of the line, so in order to place a piece, it is only necessary to type in its identity letter. The three pieces are permanently displayed on the side of the board, for reference.

Program Notes

Lines

- 150-450 Draw the board
- 450-770 Search for the end of the line. Line 770 checks whether the next space is usable, and if it is not, causes a repeat search.
- 480 and 760 Check for the two different ways of ending the game.

When typing the program, all spaces may be omitted.

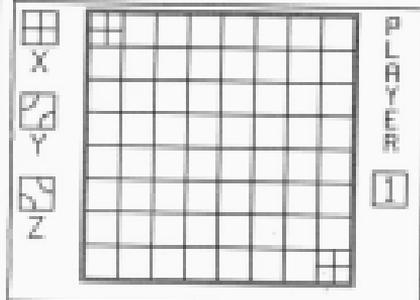


Fig. 1. The board at the start of a game.

```

10 REM MEANDER
20 REM INITIALISATION AND TITLES
30 DIM X(0,11),Y(0,11),Z(0,11),A(9,9)
40 P1$="BQZ",122;R0N4ZU1402"
50 P2$="BQZ",122;NR8US2R463U5H2L
402"
60 CLS
70 PRINT#73,STRING$(11,"*")
80 PRINT#105,"* MEANDER *"
90 PRINT#137,STRING$(11,"*")
100 FOR I=1 TO 1000:NEXT I
110 PRINT#224,"DO YOU WANT INSTRUCT
IONS? (Y/N)"
120 I$=INKEY$:IF I$="" THEN 120
130 IF I$="Y" THEN 890
140 REM DRAW BOARD

```

```

150 P#D#E4,1:PCL8:SCREEN1,1
160 FOR Y=12 TO 112 STEP 50
170 LINE(0,Y)-(120,Y+20),PSET,B
180 NEXT Y
190 DRAW"BM18,12;B10M,10M;10M;10"
200 CIRCLE(8,82),10,S,1,0,,35
210 CIRCLE(28,82),10,S,1,,3,,75
220 CIRCLE(28,112),10,S,1,,25,,5
230 CIRCLE(8,132),10,S,1,,75,1
240 DRAW"ML4,36;M22,40;ML14,40;M2
2,36"
250 DRAW"ML4,86;M18,92;M6;M22,86"
260 DRAW"ML4,136;R8;M14,140;R8"
270 GET(8,12)-(120,32),X,B
280 GET(8,82)-(20,82),Y,B
290 GET(8,112)-(18,132),Z,B
300 FOR X=40 TO 200 STEP 30
310 LINE(X,52)-(X,172),PSET
320 NEXT X
330 LINE(46,101)-(1210,174),PSET,B
340 FOR Y=12 TO 172 STEP 20
350 LINE(40,Y)-(120,Y),PSET
360 NEXT Y
370 PUT(40,52)-(60,32),X,PSET
380 PUT(180,152)-(1200,172),X,PSET
390 DRAW"BM28,22;U10R6DSL6"
400 DRAW"BM28,36;R110R6"
410 DRAW"BM28,50;U8NR6L1R4F15R"
420 DRAW"BM231,64;U8NR238,54;M234,
54"
430 DRAW"BM28,78;NR6UCNR4UR6"
440 DRAW"BM28,92;U10R6F1038;NL5M2
34,92"
450 LINE(221,105)-(1241,125),PSET,B

```

```

460 REM PLAY
470 FOR X=0 TO 9:FOR Y=0 TO 9:AX(X,
Y)=0:NEXT Y,X
480 A(1,1)=1:A(8,8)=1:A=50:Y=23:X=
78:Y1=23:P=2
490 IF X1>208 OR X1<48 OR Y1>172 O
R Y1<12 THEN G20
500 DN P GOTO 510,520
510 DRAW"CO"+P18+"CS"+P28:P=2:GOTO
530
520 DRAW"CO"+P28+"CS"+P18:P=1
530 I8=INKEY$:IF I8="" THEN 530
540 IF I8<"8" OR I8>"2" THEN 530
550 ON ASC(I8)-87 GOTO 560,580,400
560 PUT(X1-10,Y1-10)-(X1+10,Y1+10)
,X,PSET:A(1)(Y1-2)/20,(X1-38)/200=1
570 GOTO 630
580 PUT(X1-10,Y1-10)-(X1+10,Y1+10)
,Y,PSET:A(1)(Y1-2)/20,(X1-38)/200=2
590 GOTO 630
600 PUT(X1-10,Y1-10)-(X1+10,Y1+10)
,Z,PSET:A(1)(Y1-2)/20,(X1-38)/200=3
610 GOTO 630
620 REM SEARCH FOR END OF LINE
630 ON A(1)(Y1-2)/20,(X1-38)/200 GO
TO 640,660,720
640 IF X1=X+20 THEN X=X1:Y=Y1:X1=X
+20:Y1=Y+20:GOTO 760
650 IF X1=X-20 THEN X=X1:Y=Y1:X1=X
-20:Y1=Y:GOTO 760
660 IF Y1=Y-20 THEN X=X1:Y=Y1:X1=X
+Y1+Y-20:GOTO 760
670 IF Y1=Y+20 THEN X=X1:Y=Y1:X1=X
+Y1+Y+20:GOTO 760
680 IF X1=X+20 THEN X=X1:Y=Y1:X1=X
+Y1+Y-20:GOTO 760
690 IF X1=X-20 THEN X=X1:Y=Y1:X1=X
+Y1+Y+20:GOTO 760
700 IF Y1=Y-20 THEN X=X1:Y=Y1:X1=X
+20:Y1=Y:GOTO 760
710 IF Y1=Y+20 THEN X=X1:Y=Y1:X1=X
-20:Y1=Y:GOTO 760
720 IF X1=X+20 THEN X=X1:Y=Y1:X1=X
+Y1+Y+20:GOTO 760
730 IF X1=X-20 THEN X=X1:Y=Y1:X1=X
+Y1+Y-20:GOTO 760
740 IF Y1=Y-20 THEN X=X1:Y=Y1:X1=X
-20:Y1=Y:GOTO 760
750 IF Y1=Y+20 THEN X=X1:Y=Y1:X1=X
+20:Y1=Y:GOTO 760
760 IF X1=178 AND Y1=162 THEN 790
770 IF A(1)(Y1-2)/20,(X1-38)/200=0 T
HEN 490 ELSE 630
780 REM END TITLES
790 FOR I=1 TO 20:SCREEN 1,0:SOUND
100,1:SCREEN 1,1:SOUND 150,1:NEXT
I
900 CLS:IF P=1 THEN PRINT#71,"PLAY
ER 1 WINS." ELSE PRINT#71,"PLAYER
2 WINS."
810 GOTO840

```

```

820 FOR I=1 TO 20:SCREEN 1,0:SOUND
100,1:SCREEN 1,1:SOUND 150,1:NEXT
I
830 CLS: IF P=1 THEN PRINT#64,"PLA
YER 1 LOSES BY GOING OFF EDGE" EL
S E PRINT#64,"PLAYER 2 LOSES BY GOIN
G OFF EDGE"
840 FOR I=1 TO 1000:NEXT I
850 PRINT#48,"PRESS SPACEBAR FOR
ANOTHER GAME."
860 I8=INKEY$: IF I8="" THEN 840
870 IF I8="" THEN 150 ELSE STOP
880 REM INSTRUCTIONS
890 CLS
900 PRINT#32," THE OBJECT OF 'MEAN
DER' IS TO COMPLETE A CONTINUOUS
LINE FROM THE TOP LEFT CORNER OF T
HE BOARD TO THE BOTTOM RIGHT CORNER
, OR TO FORCE YOUR OPPONENT TO CAR
RY THE LINE OFF THE EDGE OF THE
BOARD."
910 PRINT#PRINT" SIMPLY TYPE IN TH
E LETTER OF THE PIECE YOU WISH T
O PLAY TO CONTINUE THE LINE."
920 PRINT#451,"PRESS ANY KEY TO CO
NTINUE."
930 I8=INKEY$:IF I8="" THEN 930
940 CLS
950 PRINT#PRINT" THE FIRST PIECE W
ILL BE PLACED ON THE SECOND SQUARE
OF THE TOP LINE, SO PLACING PIECE
'Y' AS THE FIRST MOVE OF A GAME
WILL AUTOMATICALLY LOSE THE GAM
E."
960 PRINT#356," PRESS ANY KEY TO P
LAY."
970 I8=INKEY$: IF I8="" THEN 970
980 GOTO 150

```

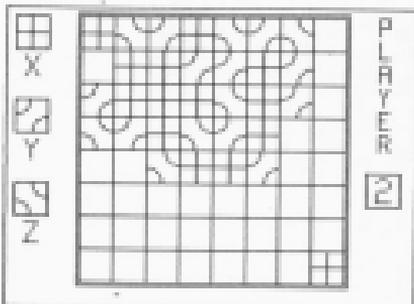


Fig. 2. A possible position after 29 moves. If Player 2 now plays piece 'X' he will lose. If he plays piece 'Y' he is bound to win.

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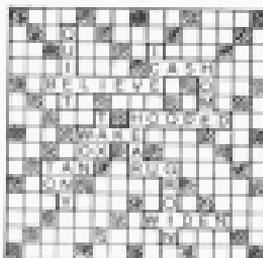
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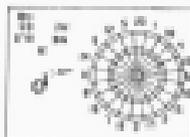


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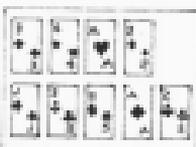
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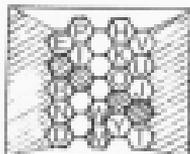
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Directory

From R. Paterson in Leicester

THIS IS A fast-loading program (program modelled on M McPartin's program published in the July 1984 edition of Dragon User).

The program utilizes arrays and data statements and in the listed format represents a blank master which can be loaded, then listed and the data statements amended to the required contents of a particular tape. The amended program is then saved at the start of the tape, and the first program on the menu is also saved. The tape is then reloaded, and the

directory used to locate the second program by fast forward wind, and after this is saved the tape is again reloaded and the directory used to locate for program 3.

The program is easily adapted to suit any size of tape, the numbers given being those found from experiment to suit a C-90 cassette divided into 18 segments to allow storage of most programs.

If a different sized tape is used the user can adapt the array size to suit the contents and amend the data lines to suit his programs.

A dummy save run using a stop watch can help determine what value to use for the locating value for fast forward.

Program notes

50-170 Sets up variables and fills arrays.

170-220 Displays first list of menu and allows selection.

300-360 Repeats process for page 2 of the menu.

410 Caters for selection of non-existent program by error or to locate tape for saving.

430-490 Supplies prompt messages and motor switching for fast winding.

510 Advances ready for saving.

520-550 Supplies prompts for loading program and erasing.

570-590 Data lines. The numbers are gained by experiment, providing six to eight seconds of tape winding per program at fast speed. The lines should be amended as shown and their details of times and properties added when used.

```
5 REM *****
10 REM *** DIRECTORY ***
20 REM * WITH FAST FORWARD *
30 REM * R. PATERSON 7/84 *
40 REM *****
50 CLEAR 1000: DIM X(18), N%(18)
60 FOR N=0 TO 18: READ X(N), N%(N)
NEXT
70 CLS: PRINT@224, STRING$(32, CHR$(172)): STRING$(12, "+") ; "DIRECTORY"; S
TRING$(11, "+"); STRING$(32, CHR$(163))
75 FOR D=1 TO 1000: NEXT: CLS
80 C$="PLEASE PRESS FAST FORWARD KEY"
90 D$="ON THE TAPE RECORDER"
100 E$="THEN PRESS THE SPACEBAR"
110 F$="PLEASE PRESS THE PLAY BUTT
ON"
120 G$="PLEASE WAIT"
130 H$="SEARCHING FOR"
140 J$="LOADING"
150 P$="SORRY NOTHING LISTED YET"
160 C=195: B=178: E=232
170 CLS
180 PRINTSTRING$(14, "+"); "MENU"; S
TRING$(14, "+"); STRING$(32, CHR$(163))
190 PRINT@75, "PAGE 1 OF 2"
200 FOR N=1 TO 9: PRINT "  ", N, "
", N%(N): NEXT N
210 PRINT "PLEASE SELECT ONE OF THE
ABOVE"
220 PRINT "OR PRESS enter FOR NEXT
PAGE"
230 INPUT N$: N=VAL(N%)
250 IF N=0 THEN 300
260 IF N<1 OR N>9 THEN 270 ELSE 400
270 SOUND200,4:GOTO 190
300 FOR D=1000 TO 1479: POKEX,143: N
EXT
310 PRINT@75, "PAGE 2 OF 2"
320 FOR N=10 TO 18: PRINT "  ", N, "
", N%(N): NEXT N
330 PRINT "PLEASE SELECT ONE OF THE
ABOVE"
```

```
340 PRINT "OR PRESS enter FOR PAGE
ONE"
350 INPUT N$: N=VAL(N%)
360 IF N=0 THEN 160 ELSE 370
370 IF N<10 OR N>18 THEN 380 ELSE
400
390 SOUND200,4:GOTO 310
400 REM * FAST LOCATION *
410 CLS: IF N%(N)="" THEN
PRINT@D,F$:PRINT "PRESS 'C' TO CONT
INUE":PRINT "OR PRESS 'R' TO RETURN
TO MENU" ELSE GOTO 450
420 A$=INKEY$: IF A$="" THEN 420
430 IF A$="R" THEN 170
440 IF A$="C" THEN 420
450 CLS: IF N=1 THEN 500
455 PRINT@C,C$: "  ", "  "
460 A$=INKEY$: IF A$="" THEN 465 E
LSE 460
465 TIMER=0: MOTOR ON
470 CLS: PRINT@C,G$
475 PRINT@G,G$: "  ", N%(N)
480 IF TIMER/50>=X(N) THEN 490 ELS
E 480
490 MOTOR OFF
500 REM * LOADING *
510 CLS: IF N%(N)="" THEN
PRINT@D,F$:FOR N=1 TO 1000: NEXT: PR
INT "TAPE POSITIONED FOR SAVING"
PROGRAM "": N: STOP
520 PRINT@C,F$, "  ", "  "
530 A$=INKEY$: IF A$="" THEN 540 E
LSE 530
540 CLS: PRINT@D,J$: "  ", N%(N)
550 PRINT@C,H$
560 SCREEN 0,1:LOAD
570 DATA 0, 0, _____, 8, _____
, 10, _____, 16, _____, 24, _____
, 32, _____, 40, _____, 48, _____
, 57, _____
580 DATA 65, _____, 72, _____, 8
0, _____, 87, _____, 94, _____
, 101, _____, 107, _____, 114, _____
, 121, _____, 130, _____
```


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3000 RUN EDIT A RECORD
3010 PRINT
3020 PR(=)EDITOR STOCK NUMBER)
3030 INPUT ST
3040 GOSUB 3000(LINE# FIND RECORD
3050 IF ST="1" THEN 3000(PUR CHECK R
ECORD EXISTS
3060 PRINT
3070 GOSUB 1000
3080 GOSUB 3000(RUN DISPLAY RECORD
3090 PRINT
3100 PRINT"DEBIT OF AMT " ;
3110 INPUT VDR
3120 IF LEFT(VDR,1)="#" THEN RETU
RN
3130 GOSUB 3100(RUN ENTER DETAILS
3140 GOTO 3070
3200 RUN FIND RECORD ST
3210 IF=""
3220 FOR I=1 TO NR
3230 B=(IN(I))
3240 IF B#0=ST THEN RETURN
3250 NEXT I
3260 IF I=1 THEN NOT FOUND
3270 RETURN
3300 RUN ENTER DETAILS
3305 PRINT
3310 PRINT
3320 PRINT"DESCRIPTION" ;
3330 INPUT DESCRIP)
3340 PRINT"EDIT PRICE" ;
3350 INPUT DP(=)
3360 PRINT"SELL PRICE" ;
3370 INPUT SP(=)
3380 PRINT"IN STOCK" ;
3390 INPUT QU(=)
3400 RUN SUBROUTINE TO SORT THE ST
OCK FILE BY STOCK NUMBER
4010 FOR S=0 TO NR-1
4020 P=S
4030 FOR I=1 TO NR-S
4040 IF SP(I+1) < SP(I+1+1) THEN
4100
4050 SWAP
4060 P=I+1
4070 SW(I)=SW(I+1)
4080 SW(I+1)=P
4090 P=(FROM SWAP HAS OCCURED
4100 NEXT I
4120 IF P=0 THEN RETURN(RUN SEE AN
HER SWAPS HAVE OCCURED
4130 NEXT S
4140 RUN ARRAY IS NOW SORTED ANYWA
Y
4150 RETURN
5000 RUN 0000
5100 DATA 10
5110 DATA100,200,250,275,0
5120 DATA5000,100,00,00,20,11
5130 DATA120,10000,200,200,0
5140 DATA7000,00000,10,00,17,25,
24
5150 DATA5000,60,0,210,200,12
5160 DATA10000,000000,100,100,0
5170 DATA10010,10000,10,00,10,99,1
4
5180 DATA111,00000,7,00,0,00,2000
5190 DATA00000,10000,-40,-20,10000
5200 DATA1200,01000,4,99,0,50,100

```

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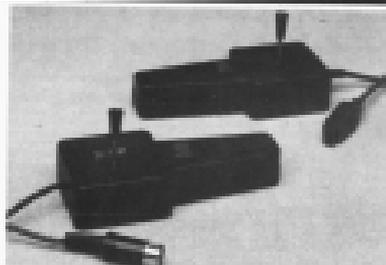
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MIKE GERRARDS' ADVENTURE TRAIL

"I WOULD like to say how much I like the edition of the adventure column," says reader David Cochrane of North Shields. Thank you, David, you can write again. "But," he goes on, "... what's this? BUT?" "But I would like to see a permanent Help feature."

Well, a Help feature rather depends on readers writing in to ask, for help, and in the first month or two we didn't receive too many letters. But, now they're starting to come in quite regularly and we'll be happy to try and deal with both hints and helps. So, this month's column will be devoted mainly to the readers, including one who's bravely submitted his own adventure and asked for "constructive criticism." Would I give any other hint?

Having requested the Help column, David Cochrane offers to set the ball rolling by helping any readers who are stuck in Wintersoff's *Return of the Ring*, which he recently completed and which he also highly recommends. If you need help, send a stamped addressed envelope to David at 115 Grey Street, North Shields, Tyne and Wear NE20 2BQ. In fact, if writing to anyone send an SAE — and that includes me! Going to my local Post Office to buy vast amounts of stamps is an adventure in itself, but one I prefer to avoid. It leads to things like STAMP FOOT, EXAMINE WATCH and KILL IDIOTS.

Back to thoughts of co-operation, though, and a heart-felt plea from S Harrison, also of Tyne and Wear: "I am currently trying to complete *Dragon Darts* by El Diablero and it's driving me up the wall. I have painted the magic book, taken the eagle's feather, have done what the talking threads told me but I cannot find any viable blossom to dip my magic bag in!"

Up the wall

If anyone has successfully completed El Diablero then they can win themselves several Needs for life as this seems to be one of the most puzzling adventures. Don't turn to me for help because I only got a copy of it this week ... that's my excuse, anyway. If you wish to help S Harrison, then the wall he or she is being driven up is at 15 Pembroke, Goswick, Washington, Tyne and Wear NE20 3LQ.

I'd like to thank Adams Atkinson for my copy of El Diablero; at least I think I'd like to thank him as all I've done so far is

wander aimlessly round a desert in the one session I had with the adventure. Adam is obviously a seasoned adventurer, having completed *Madness* and the *Miscotaur*, *Ring of Darkness* and *Return of the Ring*, but he too is stumped by El Diablero, where he can't stop the mother eagle killing him, and doesn't know what the snake, lizard and crow are for. He also can't get the boards off the door in *Black Sandpiper*, so D-I-F hints to Adam at P20 *Saltopop's Hostel*, Tenby College, Cambridge CB2 1TQ. I completed *Black Sand-*



pen myself in one long sitting, but don't keep any notes and now can't remember how I did get the boards off the door. Memo to myself: always keep notes and maps!

El Buck of 31 Westfield Road, Swindon, Wiltshire would like to know how to cross the water and mountains in *Ring of Darkness*, while Steve Barrett of 126 The Mackay, Daventry, Northants NN11 6XZ offers help to anyone stuck in *Madness* and the *Miscotaur*.

There are a couple of readers looking for help, but I can't try and fix them up without their full addresses. Kenan Cleary wrote from County Tipperary, looking for help on *Dragon Darts*'s *Crescent Moon*, but I can't read Kenan's address clearly ... write again, Kenan. And write again Lionel Depeux of Assieres/Gene in France. I

replied to Lionel's long letter, but it was returned to me as his address was incomplete. Lionel's amusing letter complained that his mind was taking to pieces thanks to ... what else, El Diablero! His main problem is that he can't leave the desert. How dipped his bag in "a certain place". If anyone can help Lionel, or if I just interjected in getting in touch with a French adventurer, write to me and I'll forward the letter or what I hear from Lionel.

I Smith of 26, Atterley Road, Maidenhead, Berks SL6 1RH was stuck in several places in *Salamander's* *Franklin's Tomb*. H Smith's hints were the Aquarium and the PS, and he or she was also unable to open the safe. I've passed some help on to the reader, courtesy of Lucy Parker of Salamander, who said she was looking forward to seeing her name in print.

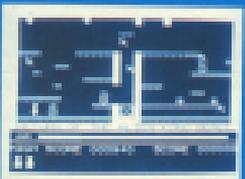
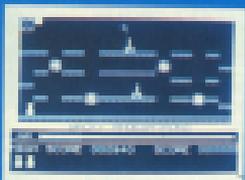
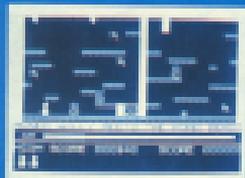
No hints

Salamander do offer help sheets for all their adventures, and if you're being starved of new games then they have produced 10 hints versions of two adventures. For *52* which you can have versions of *Franklin in Wonderland* and *White City of Dover*, though they came without covers or instructions, I don't think that matters too much, and I'll be having a longer look at one of these next time, when there's a little more space.

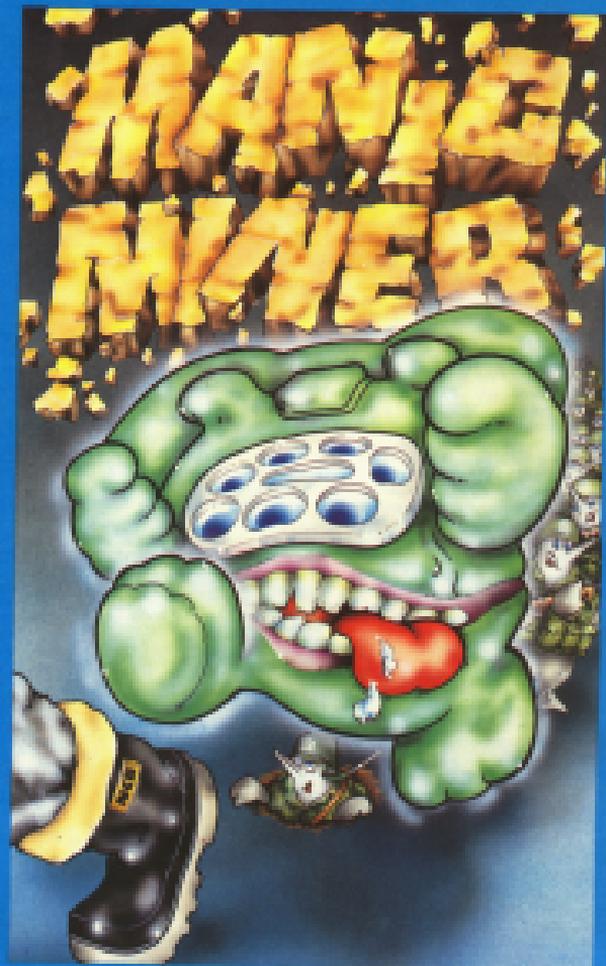
On another topic, what chance has a reader got of marking a *Dragon* adventure? Tony McGhee has written *The Story Celeste*. There's a very nice loading screen, with a quick burst of organ-like music, and you begin on the bridge of a deserted ship.

There are some good routines included, such as the pirate ship which attacks at one point, giving you just 12 moves to defend yourself — this has you running around looking for gunpowder, cannons, pistols ... anything! You should eliminate some of those sudden death routines, though, Tony. If you're interested, contact Tony at 24 Arundell Drive, Barnsley, S. Yorks S71 3LJ.

And if you're interested in asking for or offering help then contact me at *Dragon* Editor, and we'll deal with as many of the letters as space permits. Next month a look at those *Salamander* titles, and the problems of Wigan's *Starline*. ■



There's Billy, while prospecting these
 hidden way to hidden spots in ancient,
 long forgotten mountains. On the far
 expeditions, he finds evidence of a lost
 civilization that requires his own team. It's
 your personal quest to dig deep into the
 Earth's core to supply the essential raw
 materials for their advanced industry. After
 centuries of peace and prosperity, the
 world has now been split by war, and
 exposed into a long dark, very disturbing
 Earth history and mysteries. Nobody,
 however, thought to call the same subjects to
 stop working, and through countless years
 they had actually accumulated a huge
 stockpile of valuable metals and minerals,
 and they're with conditions that he never knew the
 opportunity to make a big fortune by sharing
 the underground stores. In order to move to
 the next chapter, you must collect all the
 missing keys to the maze while avoiding
 monsters that Professor Paradise and Spinks
 and Miss and several other, hidden, missing
 partners. When you have all the keys, you can
 enter the portal which will now
 be heading. The game ends
 where you have been 'out' or
 before having three times.



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Book: *Dragon Programs*
Author: Nick Harpin
Publisher: Duckworth
Price: £8.95

"SOMETHING OLD, something new... runs the old adage, which might also be said in some respects to reflect this collection of 26 routines for the Dragon 32. Certainly, there is variety here. Whatever your taste, programmer John Alshaw provides a wide assortment of material, with old favourites such as Hangman lying cheek by jowl with the newer style space invaders.

In some respects the book is a little too general, and in trying to cover such a wide range of material some of the individual programs tend to be a little on the sparse side, an impression which is not helped by the unusual 'side-way' format in which the entire book is printed. This is done, presumably, to allow the full 80-character wide printout of the listings to run along the

length of the page, but with the majority of the program lines less than half this length, there tends to be a predominance of white paper.

Overall, if there is something that appeals to you — from a personal point of view, I always feel that, for example, text adventures in BASIC entered in from the keyboard are never really satisfactory, probably because in typing them in you get a fair idea of the alternatives, and any sense of 'surprise' is consequently missing. I would also have liked to have seen programs using the RANDOM function using an INKEY\$/TIMER routine to achieve these random 'randomness', and so avoid the same sequence being

selected when starting from 'cold'.

Minor points, maybe, but it is these which tend to let the book down. There are many others full of listings, and a book, therefore, should just have that little extra attention to detail.

Gordon Lee

Book: *A Pocket Handbook for the Dragon*

Authors: Peter Gerard and Danny Doyle

Publisher: Duckworth

Price: £2.95

WHENEVER I am programming I find nothing more irritating than forgetting a memory location, character code, or special POKE. I have often contemplated the idea of gathering all the useful bits from various magazines together to form a sort of 'handbook'.

The job has been done for me by Messrs Gerard and Doyle who have produced possibly the most useful book the Dragon programmer will ever buy. At £7 it would represent good value, at £2.95 it's a gem.

Within the covers is 90 pages of very useful information for programmers including ASCII tables, character codes (for M/C users), formulas for logarithmic functions, details of the connectors to the cyntronic, cassette and joystick ports, the complete 9500 instruction set, a comprehensive memory map, and more of the same. The information is arranged in alphabetical order, is spaced out and presented clearly and attractively.

But, the book does have its flaws. For every useful thing in the book, another equally useful thing has been left out. For example, where are the memory addresses on the 'Print & Get', or the pokes enabling one to get into the 14 graphics modes so tantalisingly described? Where are details of vectors for the random number ROM routine, or the routine to print the NUMBER in the Dragon? Where is any reference made to paging, or how to PCLEAR 1 after having used PMODE 4?

The book is also printed in a very strange way — it is almost like a series of equally sized photocopied sheets bound together. Some of the

pages are professionally printed, some of them are dumped from a Dot-Matrix Printer, some are even laser-written for reasons known only to the authors.

But, despite these faults, the book is still a must for any Dragon owner who wishes to progress further than writing "Guess the Number" and "Mafia Quiz" programs and will always have a place beside my Dragon. Buy it.

Jason Orban

Book: *Introducing Pascal*

Author: Alan Allen

Publisher: Clarendon

Price: £2.95

SCOTT ALLAN is a well known author in microcomputing circles, and his latest book, *Introducing Pascal* is a very well presented Pascal text. As Pascal is a 'structured' language, Alan has tried to teach it in a 'structured' fashion and I think the approach works well.

The book starts by giving the 'feel' of Pascal, the reasons behind its development, and the basic concepts involved in the language. Later chapters go into more detail about the language, ending up with a look at Pascal's future prospects. There are several useful appendices including one about Modula-2, the language derived from Pascal, and one describing P-Calc, which is used to implement more popular Pascal compilers.

Pascal is not a language which can be learned without trying practical examples on a computer. Dragon owners are particularly badly served in this respect, because unless you have Pile or C98, there isn't a single proper Pascal compiler on the market. However, if you have access

to an implementation somewhere, and you want to learn Pascal, this is a very good book to learn from. It is written in readable style, and there are lots of examples. At just under £7 it must represent excellent value for money — what more can I say?

David Rowntree

Book: *The Beginner's Guide to Forth*

Author: David Johns

Publisher: Interleaf

Price: £2.95

IF YOU ask the ubiquitous 'What is the best' to name three computer languages they will give the standard reply BASIC, PASCAL and FORTH. FORTH is rather different from the other languages as it has no line-by-line program structure, concentrating instead on the build-up of a vocabulary from basic (no pun intended) beginnings.

A FORTH program looks daunting to the average BASIC programmer, partly because of its structure and partly because of the fact that it uses Reverse-Polish notation.

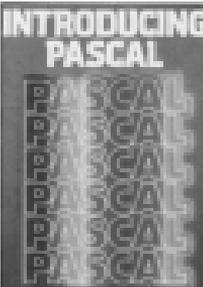
Several FORTH compilers are now on the market for the Dragon (with such imaginative names as 'Dragon-Forth') and the book, by David Johns, although not Dragon specific provides a very good introduction to the language. But sadly, not a perfect introduction. Although most people will find it very easy and quite relaxing to read, others will be driven to distraction by this 'Blue Peter' approach to programming.

The text is very large (and yet the book only covers 66 pages, lines...) and the listings are of slight printer dumps and therefore theoretically perfect.

The appendices are the most useful part of the book, containing as they do, a complete FORTH dictionary, a list of the standard FIG-FORTH error messages, and the obligatory ASCII character set!

Yes, I'm sorry to say, is one of the books that the FORTH beginner will have to see before buying. I would advise any interested parties to read the first two chapters in the shop and then make their choice.

Jason Orban



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

Dragon Answers

DRAGON USER CLUB
MEMBERSHIP LIST
1985
MEMBERSHIP LIST
1986
MEMBERSHIP LIST
1987

Program entry points

THANK YOU for the advice and helpful pointers you have provided in Dragon User. I see your column more frequently.

Your answer in the October issue, dealing with the loading of Hi-res pictures, prompted me to ask how you decide on the "program entry points" for a CGA/EM program? Published programs vary in their approach a great deal — entry points can be found inside programs, at their start, or outside programs altogether. Is it a case of "think of a number" or are there clear rules to be followed?

Dr. Giuseppe
Lombardi
Lombardi

THE ENTRY address of a machine code program is like the line number in a RUN command — usually this is left out, meaning run the program from the start, but occasionally RUN 100 might be used to make run the program from line 100. The entry address of a machine code program is often the start of the program itself, but it may not be an address within the program. Inside the RUN command, this address must be specified in the CGA/EM command, as this address becomes the default EXEC value when the program is relocated.

You may often use the entry address given as 32847 when the data loaded is not real machine code, for example it might be a graphics screen. 32847 is a Mem routine which simply returns the OK prompt and is included for safety reasons.

The idea that the entry address is the number of bytes to be saved is wrong. The confusion is caused by the original Dragon manuals, which stated this.

OS9 printer escape codes

I AM hoping you will be able to help me with a couple of queries that I have on using OS9 on my Dragon 64. My problems are: a) How do I enter Printer Escape Codes through (OS9)? How do I configure ROM-STUDIOSMART to run on my printer which is an IBM 80320-57? c) When using



MAILBOX to print multiple copies, how do I stop the printer from feeding a complete blank page in between each page of print?

J.R. Gagnon
Clifton
Park

YOU CAN send printer escape codes by using the DISPLAY command and redirecting the output to the printer. For example, to send the sequence, FF, 18, 7, 9 you would use:
DISPLAY FF,18,7,9 >P

You can configure Stylograph to any printer by preparing a table called STYPS in the STY directory. This should contain the ASCII code, followed by the number of movements required for the width of the character, followed by the sequence of characters required to print the next character. There should be one set of entries per line. Type LIST OSSTYSTYPS to get the idea.

As far as I know you cannot easily stop maintenance from leaving a blank page between copies.

Pclear — not so clear

I HAVE been having a lot of difficulty with the use of PCLEAR. If the computer has been left on for any length of time, the use of PCLEAR 1, PCLEAR 2 and PCLEAR 3 is always followed by an Error message PCLEAR 4-6 is accepted normally. This also applies if I have used the words PCLEAR 1 etc.

However, if I switch the machine off to cool down before loading a program, there is no problem. I normally keep the computer on all the time and find

this particular bug a big nuisance. Dr. Jarkko Joutsen
Apostrophe
Orwell

I DON'T think there's anything wrong with your Dragon. The trouble with the PCLEAR command is that it will not let you release graphic pages that are in use in the current Pmode.

At power up the default Pmode setting is 0, which uses one page, so PCLEAR 1 is accepted, but after having used PMODE 2 or 4, all four pages are in use, and you cannot PCLEAR a value less than four. The solution is to use a PMODE 6-1 command before the PCLEAR statement, which should solve any problems.

Robots on the march

I AM making an interface for a robot. I have the electronics section, but have no idea how to connect it to my Dragon. Could you please tell me which individual pins in the cartridge port are used for what and how to access them. Given this information, I should be able to write the software.

Any enlightenment would be of great help.

R. Andrew
Blythford

PS: The robot is a Proton Micro-robot Controller if that is of any use.

I THINK you would find it easier to control the robot from the printer port, the pin connections for this are given at the back of the Dragon manual.

However, these are the pin connections for the cartridge port in order from 1 to 40:

— 1b, — 12b, — 12a, 10b, 9b, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1

Fulfilling your potential

I USE a Sokosoft GP-100A Mark II with my Dragon and find it serves my needs well. I am, however, anxious that I am using it to its full potential. I have the Demos Manual but can't claim to understand much of it!

Do you know of any other manuals or articles that might explain in detail that even I could understand how control codes work, how to set the printer to its full width software etc?

G. Moore
Torbairhill
Lincoln

I SUGGEST you take a look at the December 1985 issue of Dragon User (available as a back issue). This included an article on the GP-100A for screen dumps from the Dragon.

Power pack burn out

MY SON is the owner of a Dragon 3C. Unfortunately, he is unable to use it at the moment because the power pack is, we believe, burnt out.

Could you please tell me if it is possible to purchase a new power pack. We have been told the cost of repairs to ours would be £35 plus.

A. Booth
Dunston-on-Sea
Blackburn

YOU CAN purchase a new power pack for your Dragon from Trenchester for £1.99 including p.p.s. The address is Trenchester Ltd, Keating Industrial Estate, Margate, Post Tidal, W. Glam, SA12 7PS.

Before you part with your money, it is worth checking your Dragon with a friend's power pack to make sure it is not the computer itself which is faulty.

Post Script

Finally, a tip — you can have a machine code program run on loading using the RUN command, eg RUN "PROGRAM". It is not made clear in the manual that RUN will operate with both Basic and machine code files.

Solid state for waxworks

Gordon Lee presents another mind-boggling problem for puzzle solvers

ONE OF THE more frequently encountered terms in the field of recreational mathematics is that of "triangular" numbers. These, together with their more familiar neighbours, the "square" numbers form the basis for a number of interesting problems.

If we take a single coin (or counter) and place it on the table we have the first "triangular" number. Now if we place two more beneath it to form an equilateral triangular pattern, the three coins produce the second "triangular" number, 3. By adding extra rows of coins in the same

general pattern we can extend the pattern ad infinitum. Clearly, the series of numbers is generated by the formula $1 + 2 + 3 + 4 + 5 + 6 + \dots$ the first six terms being: 1, 3, 6, 10, 15 and 21. Ten-pin bowlers will recognise the "10" pattern as the layout of pins on the bowling alley, and snooker players the "10" as the arrangement of the red balls at the commencement of the game.

There are a number of properties of triangular numbers that can prove helpful when it comes to solving puzzles involving these numbers. For example, a triangular number can only have a digital root of 1, 5, 6 or 9. Also, the sum of any two consecutive triangular numbers is equal to a perfect square.

A perfect square can also be obtained from the expression $2T + 1$ where T is any triangular number. This forms the basis of a useful test to determine if a given number is triangular or not. If eight times the number plus one is a perfect square, then the number is triangular.

Finally on the subject of triangular numbers, the n th number of the series can be found from the equation $N = n(n+1)/2$.

Infinite number

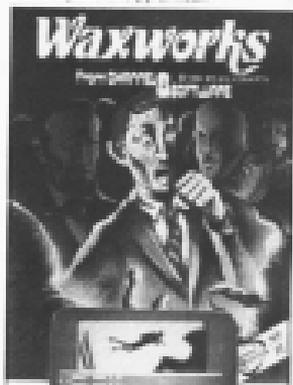
The "square" numbers are too well known to need further explanation except to consider them in relation to the triangular numbers. For example, are there any numbers that are both triangular and square? In fact, there are an infinite number of them, the first seven being: 1, 36, 1225, 41616, 1413721, 48024800 and 1601432801. After this the number becomes very large indeed!

We ought now to look at the three-dimensional counterparts of triangular and square numbers — the tetrahedral and pyramidal numbers respectively. Both of these numbers might be best visualised in the form of, for example, a stack of tin in a supermarket display. So, if they were arranged on a "triangular" base they would be "tetrahedral" in form. Each layer counting down from the apex would consist of a successive triangular number (1, 3, 6, 10, 15, 21) and by taking the cumulative total of each layer — again from the top we would arrive at the tetrahedral series of numbers 1, 4, 10, 20, 35, 50 etc. Similarly, if the structure were built on a square base, each

layer being successive square numbers, we do have the pyramidal series: 1, 5, 14, 30, 50, 81 etc.

Having considered earlier numbers that are both triangular and square, we can see from the few numbers already listed other inter-relationships between some of these series. For instance, 10 is both triangular and tetrahedral, while 35 is both triangular and pyramidal.

Unfortunately, not all of the inter-relationships are as easy to find. For example, it is unlikely that there is a number, apart from the trivial case of unity, that is both tetrahedral and pyramidal. If one exists, it will be incredibly large. Similarly, it has been proved that apart from 1 there are only two numbers that are both square and tetrahedral, and only one that is square and pyramidal.



This month's competition involves some coloured wooden blocks. I have a large collection of painted cubes of wood, coloured red, blue and green. The red blocks alone can be arranged into a square formation or a tetrahedron. If I add the blue blocks, the red and blue together can also be arranged into a larger square or into a pyramid. Finally, by adding the green blocks, the entire set can form a third square, and again can be built into another tetrahedron.

How many of each colour have I?

Prize

CHANCE! If you're in contact 20 weeks in the office to win Waxworks, its latest adventure for the Dragon.

November winner

THE SOLUTION to the November quiz is that there are 17 winners out of 25 that a white counter will be picked. Only 17 people sent in the correct solution, but each winner receives a copy of *Ball-Scooter Heaver's* *How-to-go Skiing*. The winners are: Brian Hughes of Rowland, J Peter of East, D Faulkner of Poppit, Pauline Gagnard of France, Jan Cheshire of Donsham, R Dalton of Southminster, Colin Silvester of Rochester, Paul Pinfield of Louthale, A Douglas of Salford, N Jagoe of Coventry, M Armstrong of Basingstoke, S Baker of Iceland, Paul Bennett at Moxey, P Sapiro of Liverpool, S Hutchinson of Cheshire, M Sandford of Devon and P De Gushy of Jersey.

Rules

TO WIN a copy of the game you must show both the answer to the competition and how to solve it with the use of a Basic program developed on your Dragon. Prizes do not send in a cassette containing the answer. As a 16-bit-er complete the following sentence in 15 words or less: "I would like a wizard Dragon because..."

Your entry must arrive at Dragon Year by the last working day of February. The winners and the solution of the quiz will be published in our May issue. Entries will not be acknowledged and we cannot enter into correspondence on the result.

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Worlds Of Flight



Not a Game, ... A very realistic Flight Simulation!!!

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"View" orientated means that the pilot may determine his or her position by actually viewing the surrounding landmarks and features as opposed to flying on instruments only.

The craft is a light weight, low winged, single engined aeroplanes, with a nose wheel which is both steerable and retractable.

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