SoftSide™

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Your Basic Software Magazine • VOLUME III • NUMBER SIX • MARCH 1981

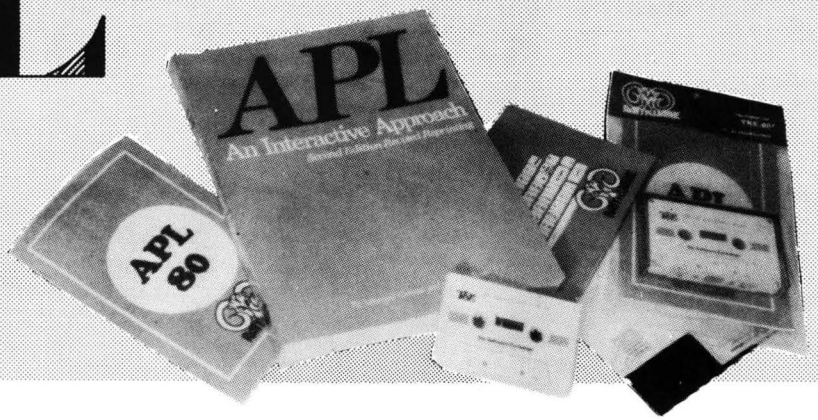
Volcano!

Can you escape the mountain of doom?

FLAGS
SCORE4
NUMBER BATTLE
STRATEGY STRIKE
MATH DECATHLON
DATA BASE... The Final Chapter

PLUS!
Hiding Your Code Pt. 2, Big Apple Adventure, A Mnemonic Exercise for Your Atari, and much, much more.

APL



by Phelps Gates

Now a high-level, scientific programming language for the home computer that doesn't cost $200 or $300. The power of this language is in its strong mathematical operations, especially with regard to matrices and vectors. Programs requiring matrix multiplication or other matrix problem solving that would require hours of programming time in BASIC are solved quickly and with minimal effort in APL.

To aid in learning APL, lessons are included on the disk. Starting from the basics, you are brought step by step through the various programming techniques involved with APL. These lessons act as a tutor which will have you "talking APL" in no time. Also available is the book, "APL: An Interactive Approach," which reinforces many of the examples given in the lessons and provides additional insight into APL programming.

FEATURES

APL-80 on disk contains the following features:)SAVE and)LOAD workspace on disk;)COPY other workspaces into current ones; Return to DOS for directory or commands without losing your workspace; Send output to lineprinter; Five workspaces of lessons included; Sequential and random files; 15 digit precision; Monadic and dyadic transposition; Easy editing within FUNCTION lines; Latent expression (FUNCTION can "come up running" when loaded); Tracing of function execution; Real-time clock; User-control of random link; Workspace is 25587 bytes (in 48K machine); Arrays may have up to 63 dimensions.

COMMANDS APL-80

APL-80 supports the following commands; Absolute value, add, and, assign, branch, catenate, ceiling, chr$/asc, circular, combinatorial, comment, compress, deal, decode, divide, drop, encode, equal, expand, exponential, factorial, floor, format, grade down, grade up, greater, greater/equal, index generator, indexing, index of, inner product, label, less, less/equal, logarithm, maximum, member, minimum, multiply, nand, negate, nor, not, not equal, or, outer product, peek, poke, quad, quote quad, random, ravel, reciprocal, reduction, reshape, residue, reverse, rotate, scan, shape, sign, system, subtract, take, transposition.

SPECIFICATIONS

Minimum system requirements: 32K disk system (48K recommended) includes APL-80, Five workshapes of lessons, instruction manual.

Price ..... $39.95 on disk

Reduced feature: 16K Level II tape version, no lessons.
Transpositions, format, and inner product not implemented. Reduced domain for some functions, 6 digit accuracy.

Price ..... $14.95 on cassette

APL: An Interactive Approach

Price $16.95

LIMITATIONS

Due to the absence of the special APL character set on the TRS-80™, APL-80 uses shifted letters to represent the various APL characters.
In addition to the keyboard limitations, lamination, domino, and matrix inverse are not implemented but can be derived with user-defined functions.
Multiple specifications must be split into two statements unless the left-hand assignment is to a quad. This also applies to implied multiple specifications.
Reduction and reshape (p) are not permitted for empty arguments; the argument of add/drop may not be scalar; empty indices are not permitted.
A quad (q) can't be typed in response to a quad (nor can the name of a function which itself gets input from a quad). Quote-quad (m) is permitted.
No more than 32 user functions can be defined in a single workspace and a function may not contain more than 255 lines.
A comment (c) must occupy a separate line: a comment can't follow a function statement on the same line.
In the tape version, arrays are limited to five (5) dimensions.

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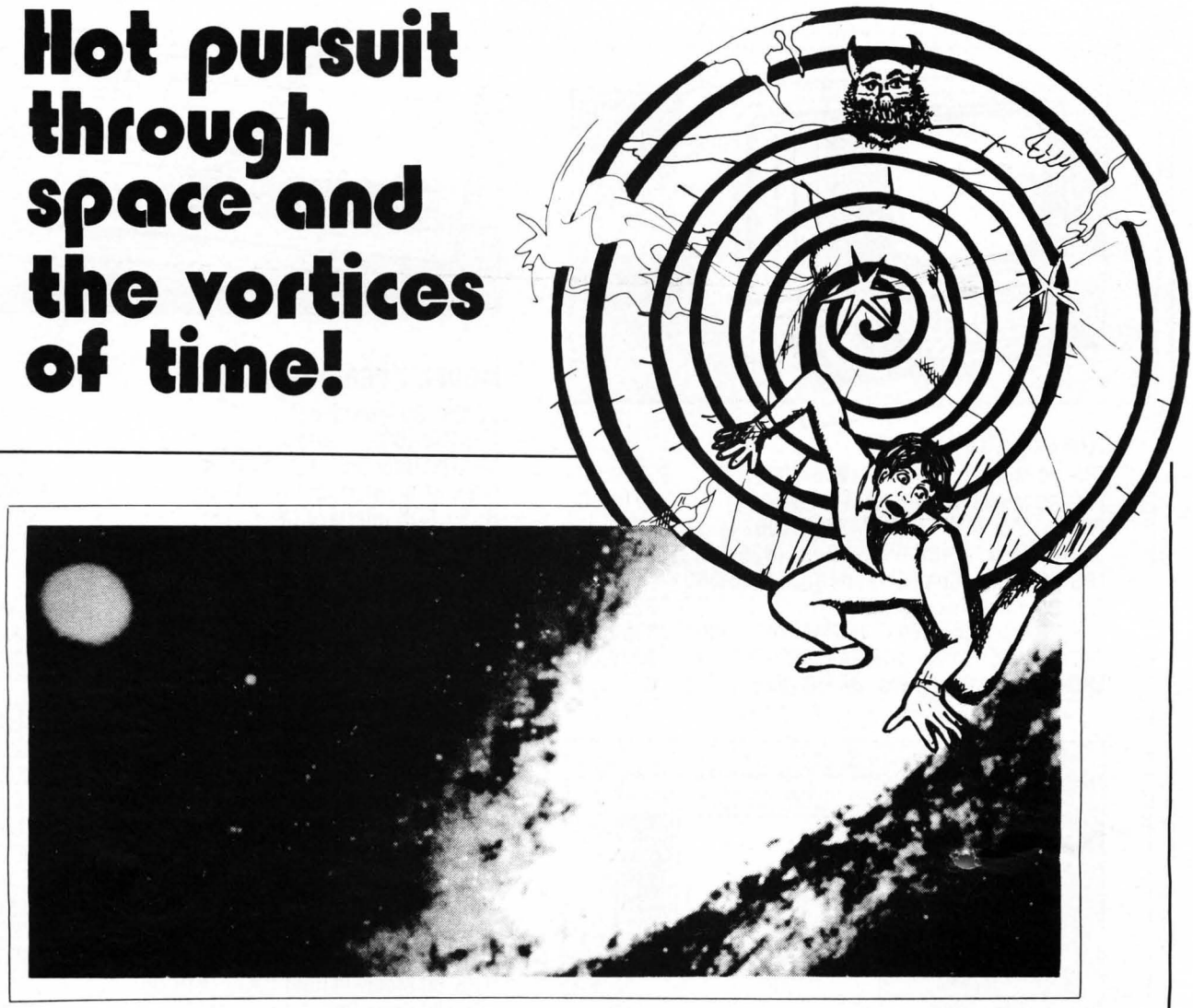

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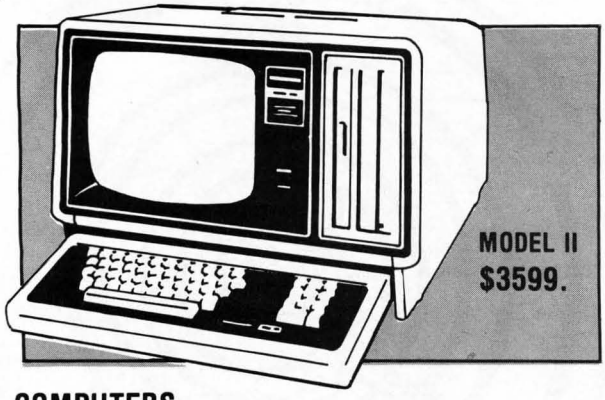

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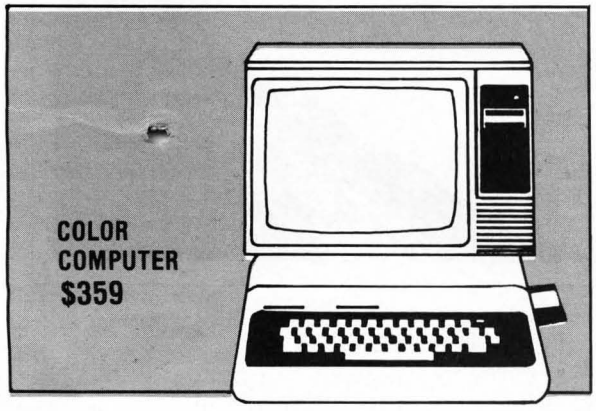

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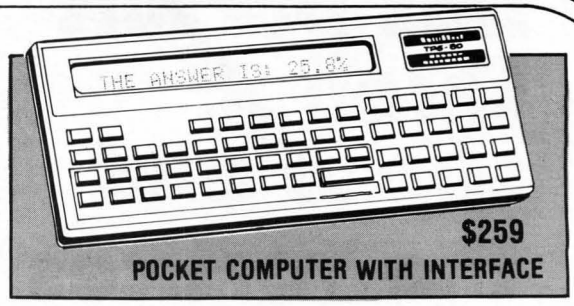

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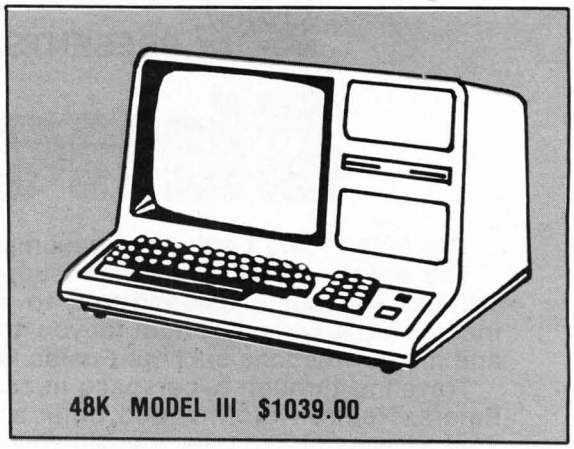

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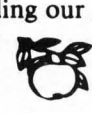
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EDITORIAL

by Dave Albert

GO DESK.

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WRITE EDITORIAL.

After a while even the best adventure gets monotonous. Adventure is a nice metaphor, but there is definitely an "if you've seen one, you've seen them all" flavor to it. There are just so many jewel-encrusted eggs or anti-gravity belts one can find before one ceases to be excited by the discovery. While the adventurer will always be thrilled by the puzzle solving aspect of the game, there isn't any real value to the experience other than fleeting satisfaction of an exceptionally transitory nature. So what's left for the hardy adventurer? Arcade games are cute, but they have no substance. Simulations are fun, but they don't really have too much to do with simulating the real world, only with simulating a gross simplification of it. If only there was something in the middle...

There is, of course. I don't really know what you would call it, but there's one in this issue about volcanos. It contains elements of both the Adventure genre and of simulations, and it's quite educational into the bargain. What it does is place the player into a precarious situation based on a real event, and then challenge the player to get out alive. In the case of the example published in this issue, the situation is that of being camped out on Mt. St. Helen's at the very moment that the top of said mountain parted company with the bottom. Once you figure out how to escape the mountain of doom, you have solved the puzzle and it's time to look for another one. But you have also learned a fair amount about volcanos, and some practical knowledge of what to do when trapped in the middle of an eruption.

If one takes a look at this program, one quickly comes to realize its vast potential as an educational tool. It has elements of the educator's dream: learning as fun. Each program can be tailored to meet the needs of a specific learning level; i.e., young children can learn safety guidelines (such as how to deal with fire, or water safety) and some general science, while adolescents and adults can receive more detailed and comprehensive information about topics of interest. Once the material is assimilated by the user, this knowledge must be used to survive in the game part of the program, thus reinforcing absorption of the information. All in all, a neat package. So where are more of them?

REWARD! $ REWARD! $ REWARD!

We will give away a $100 software certificate each month for the best translation of a feature program in **SoftSide** magazine. Furthermore, we will publish the translation in the magazine. Your portfolio will be enhanced and you will garner fame and fortune for your efforts!

We will allow three months after initial publication of a program for the translation to be sent. After that time we will not accept entries. The quality of the translation will be judged by the SoftSide editorial staff and the winning entry will be published the following month, i.e., four months after publication of the original program.

Entries must be submitted on cassette or disk, accompanied by documentation and a line listing of the program. Please enclose a self-addressed stamped envelope if you would like your entry returned to you.

Settle for More from Your TRS-80

BASIC Compiler. With TRS-80 BASIC Compiler, your Level II BASIC programs will run at record speeds! Compiled programs execute an average of 3-10 times faster than programs run under Level II. Make extensive use of integer operations, and get speeds 20-30 times faster than the interpreter.

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Simply type in and debug your program as usual, using the BASIC interpreter. Then enter a command line telling the computer what to compile and what options to use.

Voila! Highly optimized, Z-80 machine code that your computer executes in a flash! Run it now or save it for later. Your compiled program can be saved on disk for direct execution every time.

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BASIC Compiler runs on your TRS-80 Model I with 48K and disk drive. The package includes BASIC Compiler, linking loader and BASIC library with complete documentation. $195.00.

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Or to add fractions: ?1/3 + 5/6 + 2/5 + 3/7;

The instantaneous answer: 419/210.

Or to perform a more difficult trigonometric expansion you enter: SIN(2*Y)*(4*COS(X)↑3—COS(3*X) + SIN (Y)*(COS(X+Y+#PI) — COS(X—Y));

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muMATH has virtually infinite precision with full accuracy up to 611 digits.

If you use math, you'll find countless ways to save time and effort with muMATH. It's a professional tool for engineers and scientists. A learning tool for students at any level from algebra to calculus.

And if you want to expand your capabilities even beyond the standard muMATH, the option is open. muSIMP, the programming language in which muMATH is written, is included in the muMATH package. A superset of the language LISP, muSIMP is designed especially for interactive symbolic mathematics and other artificial intelligence applications.

muMATH and muSIMP were written by The Soft Warehouse, Honolulu, Hawaii. Priced at $74.95, the package includes muMATH, muSIMP and a complete manual. It requires a Model I TRS-80 with 32K and single disk. muMATH for the Apple II Computer will be available later this year.

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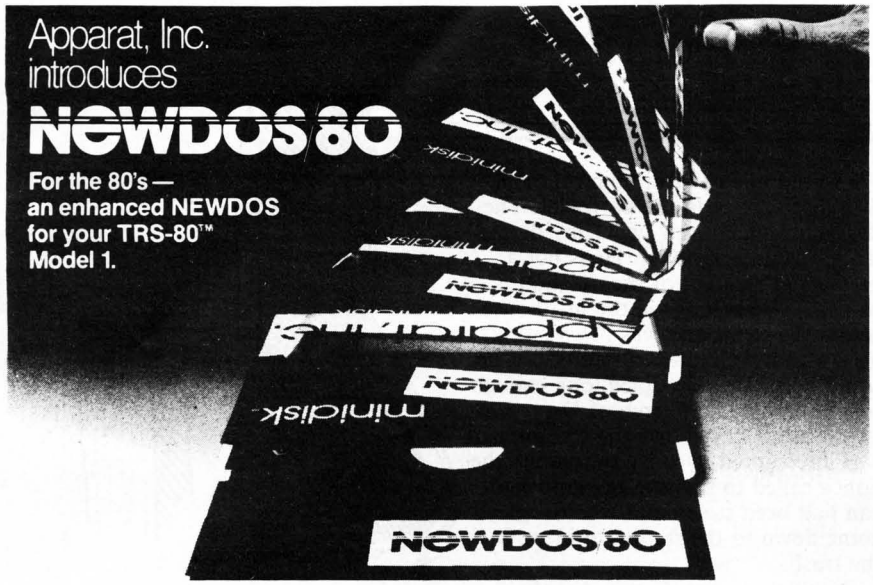

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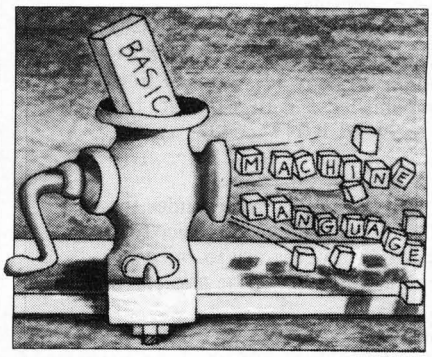

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Manual includes several sample programs as well as thorough documentation of the Compiler for those who like to know "how things work" and for those who might even wish to EXPAND on TINY COMP's capabilities.

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INPUT

Dear **SoftSide:**

Just received the August 1980 issue and tried out the "Protour 80" golf game, on page 34. Worked fine and embellished it with a tid-bit. Inserted line 9417 PRINT@640,
".....!.....!.....!.....!...
.....!.....!...."

This prints a ' scale under the 'Green' and makes it easier to gauge the 'units' necessary to putt, by judging each '.' to be two feet.

ALSO....

Added:

8148 PRINT @ 586,
"WOODS(1-4) = 260-200 YARDS"
8149 PRINT @ 650,
"IRONS(1-9) = 200-90 YARDS"
8150 PRINT @ 714,
"WEDGE..... = 70-30 YARDS"

These lines fill in the blank space under the SCOREBOARD after each hole to remind players of the ranges.
9734 Change PRINT @128 to 127
(This presents a better symmetry to the direction logo.

Jos. F. Dineen
Pocasset, MA

Dear **SoftSide:**

I was pleased to see my article published in the December 1980 issue. However, regarding the illustration, I would like you to know that there will be an investigation to see how you gained your information to base it on. I believe that the use of wire taps and hidden cameras is an invasion of privacy, and there is no other way you could have so accurately portrayed my home.

I would like to inform you though, of a discrepancy in the portrayal. The dog your camera saw under my dining table was only a visitor. He is not a permanent resident of the madhouse you saw. He belongs in the madhouse across the street and was just visiting here with my children. I had hoped he could keep them occupied long enough for me to get "In Search of Dr. Livingston" keyed into the computer. I was interrupted by the phone when the police called to say that my garbage can had been stolen and would I please come down to the station to identify the trash.

Needless to say, I never got the program typed in, nor did I get the chicken in the crock pot, and the kids had to do without their sandwiches.

Seriously, I love the illustration. Please give my regards and a hearty 'thanx a lot' to your artist, Annie.

Sincerely,
Sherry M. Taylor
Author of "What to do While the Program Loads"
Haines City, FL

Dear **SoftSide,**

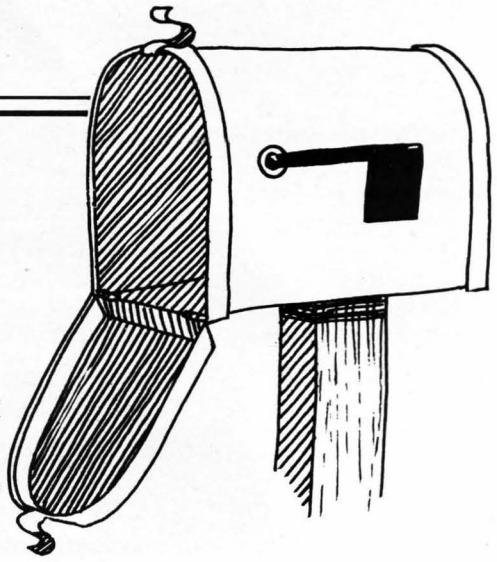
I will make only a short mention of the fact that I had originally sent in my subscription with the idea in mind that I would be getting a publication solely devoted Atari programs. I can live with what I got, however. One thing I would like to complain about, though, is the program listings (for Atari at least). I find that the dot matrix printer that you people use for program listings is difficult to read. Especially so when these listings are reduced in size, when I find that some punctuation marks practically dissappear. I can appreciate the need to cram a lot of information in a small space and hence the reduced size printing of the program. However, I noticed that Hardside sells the NEC Spinwriter and other letter-quality printers. I would like to suggest that you people use such a printer for the listings that are reproduced in your magazine. I will state again that the dot matrix print DOES NOT reproduce well.

Yours truly,
Michael A. Ivins
Las Vegas, NV

Dear **SoftSide,**

Here is an open letter to computer software authors, publishers and users:

Negative editorializing and software locks have not eliminated pirating, only made it more challenging, driven it underground, and given some people added thrills. Let's try a positive suggestion.



The vast majority of software pirating is apparently of arcade-style games and "adventures". I suggest that these very popular types of programs not be copy protected, but that they include user instructions on the original distribution media and that instructions for copying to disk and tape be included. These special PIRATABLE programs should also be sold at the lowest possible cost (certainly no more than $10 + cost of the medium). You'll entice and hold more computer users that way, anyway.

But wait! who pays the piper — i.e. authors? The ADVERTISING sponsors, that's who! Work with, not against the free enterprise system. Incorporate commercial messages within the program so that each time it is run, you are exposed to the sponsors' words. The brief ads could range from gaudy Hi-Res, full color billboards to low key use of his product for variable and location names.

Bury the advertising in data statements and machine code, if you wish. That would make it difficult enough to remove that most users wouldn't bother. The dedicated cryptographer could still have his fun, but it might be more profitable to exercise these skills in writing more of the sponsored programs.

Don't limit the sponsors to computer or electronics hobbyist businesses. Computer users tend to be better educated, to have a higher income level and to be more progressive than the population as a whole. That's exactly the market advertisers are looking for. Sell microwave ovens, VCRs, and new cars. Even soap and paper diapers!

Imagine a simulation road race with bonuses for contributions to the national economy and penalties for exhaust emissions, sponsored by the National Commission to Reduce Oil Imports, of course! Or how about a

SoftSide™

INPUT POLICY

SoftSide Magazine welcomes your comments and thoughts on both the magazine and the field of microcomputing. We try to publish as many of our readers' letters each issue as we can.

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Input
6 South St.,
Milford, N.H. 03055

We reserve the right to edit any letters prior to publication.

war game in which the successful production of a nutritious food supply must accompany the weapons supply? Let the National Farmers Alliance sponsor that one. A snowmobile race over an obstacle course? Sponsored by Ski-Doo!

Another idea. Push the games on the back of breakfast cereal boxes. For $3 + three boxtops you could order a game tape for your home computer permitting you to play the role of the Ceres Kid in his struggle against the forces of evil! Younger sib could guide his cockatoo through a maze in a search for the froot droops. Change to a rabbit looking for chocolate mothballs.

Now you have the idea. Let's use the system, not fight it!

Very truly yours,
C.E. Walker
Lincoln, NE

Dear **SoftSide**,

I am delighted about Scott Adams' new column in **SoftSide**. The debounce patch will be much appreciated.

My main frustration with the adventures is saving and loading games to and from cassette. I don't mind hanging from flag poles or jumping out of space ships, but wrestling with a cassette player at 2:00 a.m. is too much to ask of even the most ardent adventurer. I have transferred my adventure programs to disk, so loading the programs is a breeze. Is it possible to patch them so that games in progress could be saved to disk instead of cassette?

I realize that these are large programs and there may not be enough room in 16K to implement such a change, but there are plenty of disk users with 48K. besides, we've been trained to expect miracles by our adventures. Maybe, if I say YOHO...

David A. Kater
La Mesa, CA

Dear **SoftSide:**

Just a brief note to wish you and all of **SoftSide**'s softhearted women a very merry Christmas and a most happy and prosperous New Year!! And to let you know that the first copy of the **SoftSide** subscription that you entered for me had arrived (the November issue). Today the tape arrived and I've just finished "splattering" Bouncing Barney for the umpteenth time. The magazine is great and the tape is great! We'll be putting all of them to good use during the coming year.

The new format for **SoftSide** is super and I'm sure all of your readers will appreciate the new clarity it presents.

Thanks again and have a bright and happy holiday season.

Gottfreid R. Von Kronenberger
Represa, CA

Dear **SoftSide**,

The "TEXT COMMAND GRAPHICS" in the "Meteor Storm" program (November issue), is an interesting feature. Your readers might be interested in adding sound effects, if they have not already done so, by adding the code listed below.

Sincerely,
Don Kahler
Washington, D.C.

```
]
94 REM
**** LINES 95 & 96 ARE ****
**** SOUND SUBROUTINE. ****

95 FOR I = 272 TO 293: READ N:
POKE I,N: NEXT I
96 DATA 160,1,162,0,138,24,233,
1,208,252,141,48,192,
232,224,150,208,242,
136,208,237,96

150 IF SCRN (S - 1,2)<>2 OR SCRN
( S,2)<>2 OR SCRN (S + 1,2)<>2
THEN VTAB 24: PRINT: GOSUB
510: VTAB 20: PRINT L$;: GOTO
200

170 IF G = 1 AND PEEK ( - 16287)
>127 THEN G = 2:S1 = S + 1:
GOSUB 500: GOTO 180

232 GOSUB 520

500 POKE 273,2: POKE 287,100:
CALL 272: RETURN
510 POKE 273,1: POKE 287,100:
CALL 272: POKE 287,150: CALL
272: POKE 287,250: CALL 272:
RETURN
520 POKE 273,2: POKE 287,250:
CALL 272: RETURN
530 REM

SOUND EFFECTS CAN BE
CHANGED BY
CHANGING "NUMBER OF
SHOTS" IN
POKE 273, AND "LENGTH" IN
POKE 287.
```

Dear **SoftSide**,

The author of "Mad Scientist" (November 1980 **SoftSide**) is not Thomas Hamlin III, but Thomas Hanlin III.

I was somewhat amused to find the credit for my programming efforts given to a fictitious individual. I didn't find it quite as funny when the mistake appeared a second time, written on my cheque!

Please straighten out your records. I would appreciate correction of the error under "Bugs, Worms, and Other Undesirables", or wherever you deem appropriate.

Sincerely,
Thomas Hanlin III
Springfield, VA

Editor's Reply: Oops!

INPUT continued on page 19

OUTGOING MAIL

It took only took 10 years from the time President Kennedy launched the space program until men were walking on the surface of the moon. With the launch of the space shuttle scheduled for April we find ourselves on the edge of a new era. And this promises to be an even more amazing era than the last.

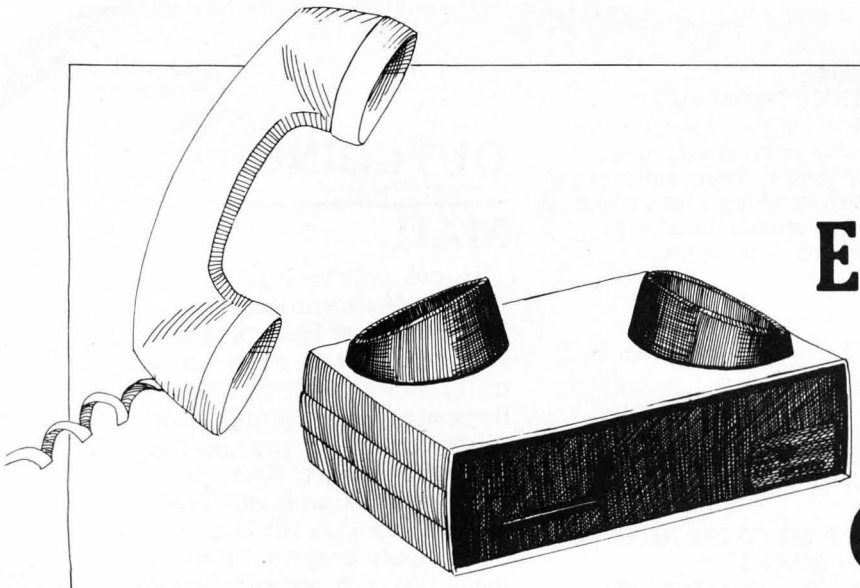
The space program offered us many things. From microwave ovens to microcomputers. This magazine itself, is an indirect by-product of the space program. More than the advancement in technology, the space program offered us a final frontier. When the Apollo program finished, we lost that horizon. With the development of the shuttle, we now have a new horizon, a new place to examine, a new place to learn from.

While discussing new horizons, I guess it's appropriate to tell you about my departure from **SoftSide**. This will be my last Outgoing Mail. I am relocating to Florida to

finish school and continuing my efforts in writing software. I plan to remain active in the software industry and continue to attend the national computer shows, so maybe someday we will cross paths again.

Besides, who could give up an opportunity to be there when the launch of the space shuttle signals the start of the second space age.

Phillip



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ABOUT THIS ISSUE

Look! Up in the sky, it's a bird . . . it's a plane, no it's (cough, cough) an ash cloud. And it's headed your way! Just turn to page 36 and you'll discover a volcano, the canonized one from the Pacific Northwest, to be precise. Everything you ever wanted to know about pyroclastic flows in one simple program. How can you resist? How can you survive? Only one way to answer both questions . . .

If finding your way off the mountain of doom is not your cup o' tea, howzabout a little strategy thinking to take your mind off of mundane woes? For S-80 and Apple users we present " Strategy Strike", courtesy of David Steenson, Rich Bouchard, and the newest of our editorial wizards, Jon Voskuil. " Strategy Strike" is based on a board game of skill and military perspicacity. Not unlike chess, " Strategy Strike" should test your abilities as a tactician to their utmost.

And speaking of that Voskuil fellow, he has graced our pages with a sporting event of digital significance, a true trial for all of you mathletes out there: "Math Decathlon". We understand that not only will this thrilling software package help you to learn your ciphers, but it may enhance your approach to programming as well. Of course we munchkins have our ciphers down pat . . . we learned to cipher gasoline out of automobiles by means of a rubber hose back when we were in high school.

For your Atari buffs we have a special treat this month: How to make your Atari smarter without paying full price. Send it to night school. If that doesn't work, try reading Paul Johnson's article in this issue. Your Atari won't grow a trunk and tusks, but it'll remember more than it used to.

That penguin fellow from out Illinois way tackles making the incomprehensible at least palatable; if you've ever contemplated taking a claw hammer to your computer, don't bother . . . Mark already has. See "Kansas" for details, and we do mean DETAILS.

For all you flag-wavers, the inimitable Morris & Cope team from the frozen tundra of Canada has graced us with an educational game of flag identification. It only works on the Atari this month, but hang in there you Appleheads. We'll have a version for you fellows next month.

Plus we have reviews, some of that YOHO stuff, hardware and software tips courtesy of ol' Granite Knoggin hisself. And the **SoftSide** Continuing Data Base does that for the last time . . . it continues. So do we . . . next month. 'Til then, a merry munchkin farewell. Yoho, and we gone!

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I DON'T THINK WE'RE IN KANSAS ANYMORE . . .

by Mark Pelczarski

Since this really isn't an editorial anymore, I'm struck with the freedom or not having to try to editorialize each month. I imagine I'll still ramble on about one thing or another occasionally, but I plan to divert most of my attention here to investigating what's really in this box on which I'm typing (and other boxes much like it). I remember a lot of the curiosities and confusion I had when I was first learning to program and I looked inside the big cabinet-sized IBM and DEC computers, and when little tiny microcomputers appeared, smaller than the video terminals to the large computers. I'd be lying if I said that much of my curiosity and confusion doesn't remain. Hopefully, I'll strike some balance between simple and complicated. It's very easy to get the feeling that you're over the heads of half your readers and insulting the intelligence of the rest. Maybe someday I'll even write a column that will be of interest to those who consider Operating System listings light reading.

Now let's see, what's in here? I'll pull the top of this Apple and look. (Careful. Sometimes if I jostle it too much the memory glitches and I lose all the text stored inside.) Well, as most of you have seen before, there's mostly a big green board with dozens of sockets filled with Integrated Circuit chips (ICs)

There's also a big power supply in here that takes the AC current (is 'Alternating Current current' considered redundant?) and changes it to DC at a lower voltage. Everything's got power supplies though (even food processors); the interesting parts are all these chips. They come in various sizes. There's a relative giant in the back (at about 2'' in length). That's the 6502 microprocessor (not much different from a Z-80 microprocessor on the outside). That one is basically the computer, where all the action happens, believe it or not. It used to take an entire cabinet itself.

There are also six larger chips near the microprocessor (about 1¼'' long) marked 'ROM'. Those are Read Only Memory chips, meaning you can't erase the programs stored on them by writing over them; you can only read and run those programs. Yes, those are only programs in there.

Someone wrote them, figured that they were worth saving, and instead of storing them in conventional memory, stored them in this indestructible memory for our permanent enjoyment. Good thing too, since BASIC itself is one of the programs stored on these chips. So is the monitor — the program that figures out what to do when the power is turned on and remembers where the screen, keyboard, and other useful devices are and what to do with them.

Early computers and microcomputers didn't have these programs built in, so you had to deal directly with the CPU (Central Processing Unit — which is what the microprocessor chip now is). That gets tedious. But the thing to remember is that BASIC and the monitor are just programs, much like the ones you can write. That's why on the Atari computers you can plug in and unplug languages the same way you can with the "Star Raiders" and "Basketball" programs. The languages are programs.

There's another larger IC hiding under the keyboard here. It's a ROM that contains all the information needed to display characters on the screen. For each character code it tells which dots should be turned on and off to make it look like something, hence it's called a character generator.

Most of the other chips in here look the same. They're only about ¾'' long and less than ¼'' wide. The microprocessor has 40 pins that plug into its socket, the ROMs have 24 each, but these little ones only have 16. Although the small ones aren't all the same, about a half of them are the memory chips — RAM. RAM stands for Random Access Memory, meaning that these are the ones on which you can read AND write. There are 24 in here, and since they together give 48K of memory, each must hold 2K, or 2048 bytes (1K = 1024 bytes which is 2 to the 10th power). You find lots of powers of 2 in computers, which ultimately boils down to the fact that electronically everything is stored in one of two states: on or off — actually high or low. Each thing that can store one of these highs or lows is called a bit, short for Binary digIT, binary being the base 2 counting system. Anyway, since a byte is 8 bits (2 to the 3rd), each of these memory chips holds 16384 bits. There are a lot of these RAM chips in the computer, so let's take one out and see exactly what one of these bits look like.

Instead of pulling one out of the Apple, I'll get one out of the Atari so I don't destroy what I'm writing. Although Atari likes to seal up everything, I fortunately have a memory expansion board for it made by another company that has all the ICs exposed. I'll pull one out and draw a little picture of it down in Figure 1 so you can see what I'm talking about. It's got 16 pins, as I mentioned earlier, but the rest of it seems rather well encased in this

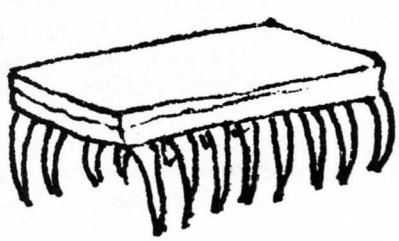


FIGURE 1

BEFORE

black plastic. It's not going to be very easy to dissect. There's nowhere to pry it apart; I'll

probably have to use a claw hammer. Put it on this cinder block here and give it a whap.

Okay, we've got it cracked open. Lost a few pins in the process, but I can now see the inside. I'll sketch it out in Figure 2. There's not much inside. From each of the pins (and ex-pins) there's a little hairline wire leading toward the center of the chip, and in the center there's a tiny little silver square. As I measure it, it's less

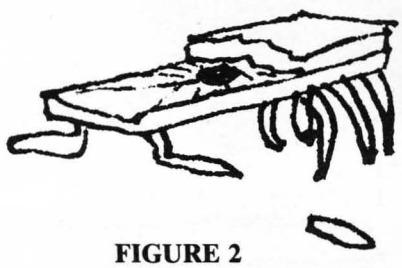


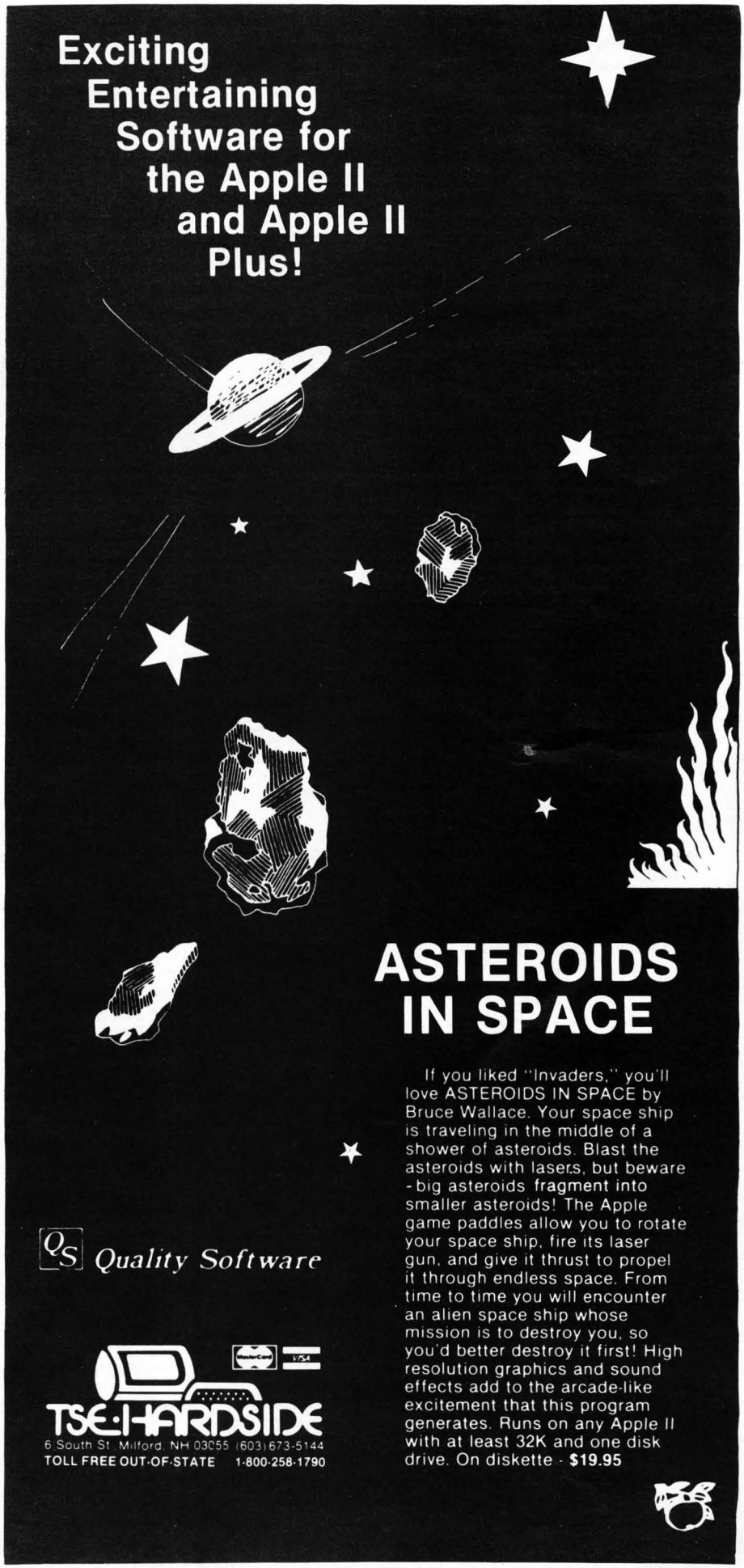
FIGURE 2

AFTER

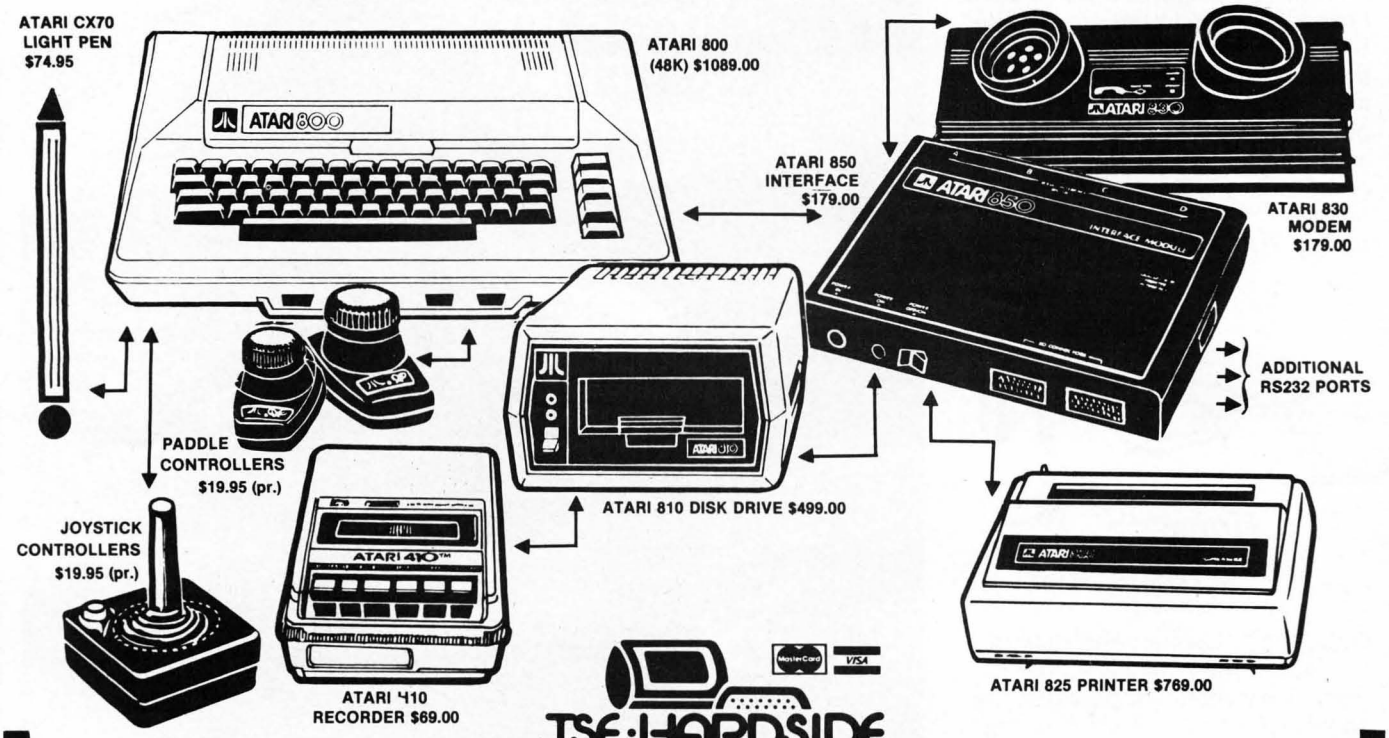
than 1/16". On the other side of the ruler it looks like it's close to 1mm. Very small. Apparently, the only reason the IC itself is so big is to accommodate the pins. Maybe that's the reason the microprocessor is so large, comparatively. More pins. The surface of the silver dot is not smooth; there are little patterns on it, but they're not readily discernible. Can't really see much more.

After a few investigative phone calls it's apparent that the dot is the actual circuit, made through a type of photographic process on a silicon-coated surface. It is made so that light will eat away portions of the surface, thus imprinting the desired circuit on the chip. The desired pattern is sketched out, then reduced photographically and transferred to the chip in a way similar to how photographic paper is exposed to a negative to create an image. The only size limit is the resolution that the light and silicon can attain. I still wonder how they attach those little wires to it that go to the pins, though.

It's difficult to put smashed chips back together, so I don't advise trying it. Next month we turn back the clock to the infamous FOO-9 error, and what it could possibly have to do with FOOD and BEEF, and for that matter, an interesting CODE.



The Atari* Connection



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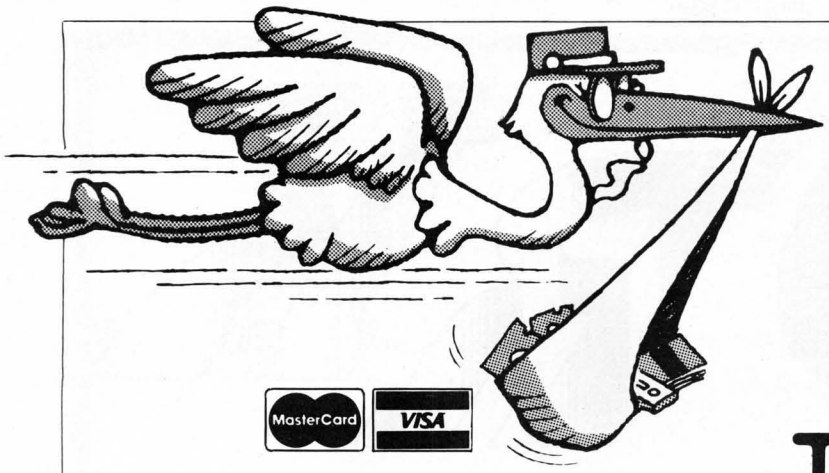

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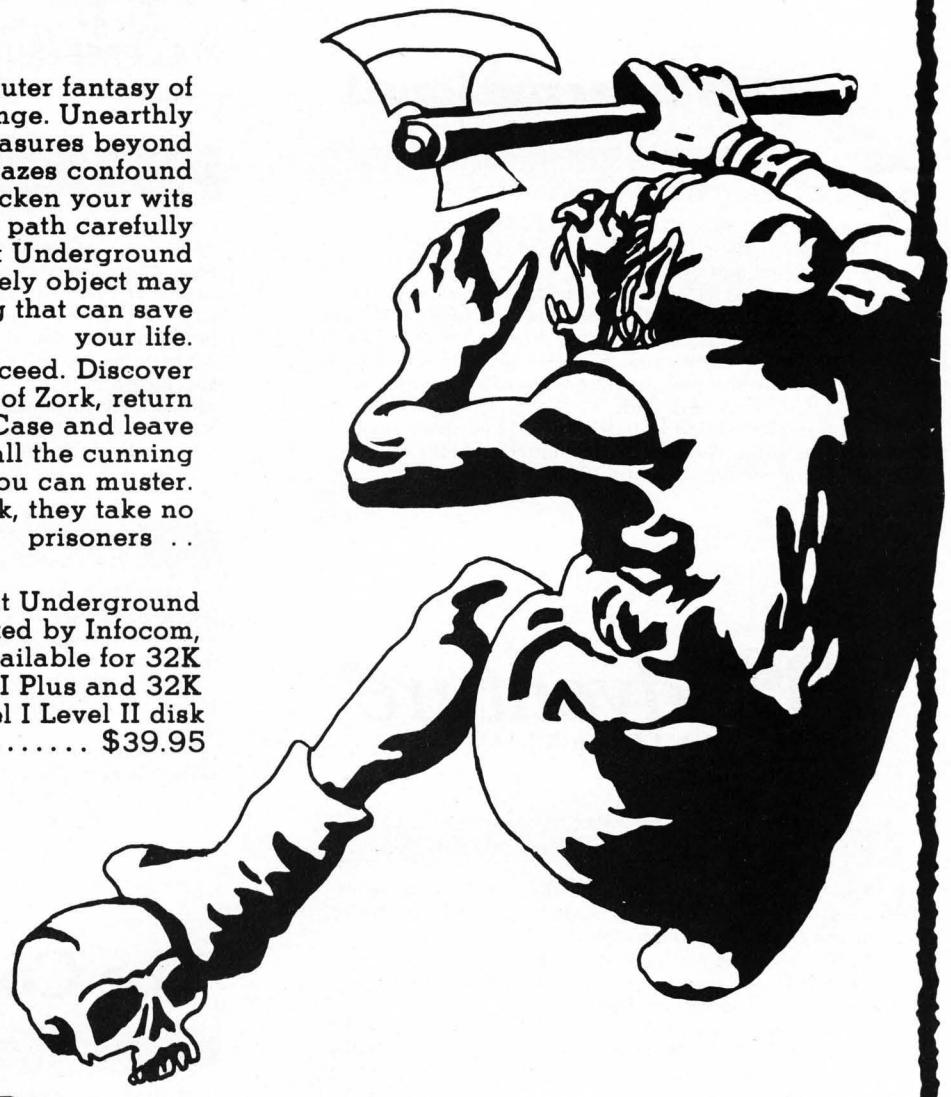

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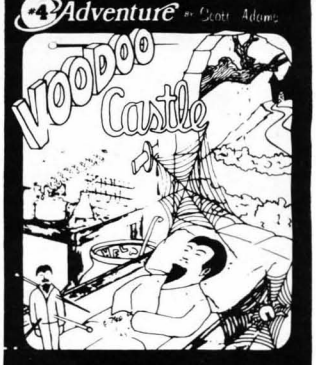
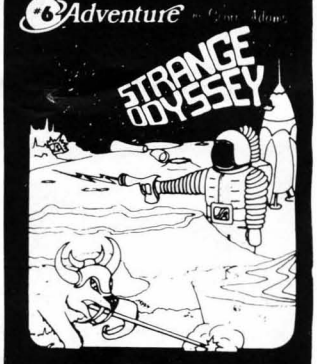
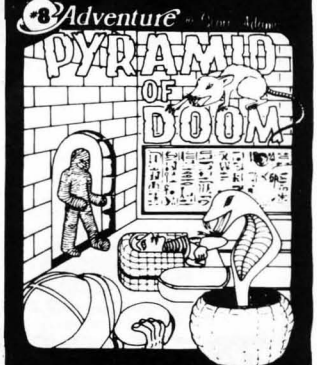
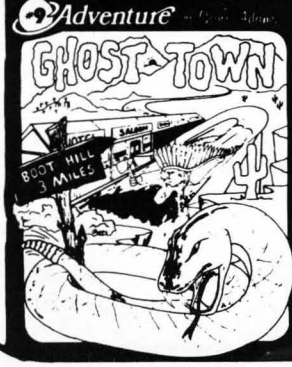
Adventure
BY Scott Adams









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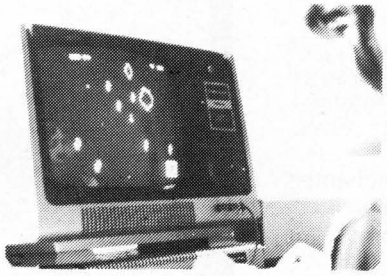

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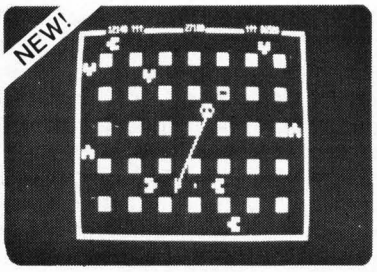

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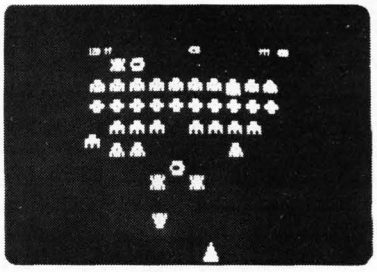

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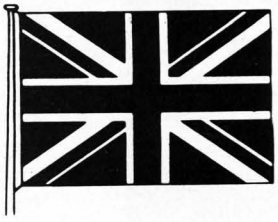

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16K S-80 Cassette Machine Language $25.00
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SAY YOHO

by Scott Adams

This month we'll cover a minor bug in the Apple cassette versions of my Adventures and briefly discuss how I write an Adventure.

For quite some time I've been getting calls from Apple owners having problems saving a game to tape and then later restoring it. I've tried the tapes myself and never seem to have a problem, so I just assumed that it was a problem in the tape players the people had been using. Well, just recently I got a phone call that shed some further light on this problem.

The caller informed us that his problem in loading a saved game on the Apple II only occurred AFTER he had turned the computer off and then restarted it at a later date. This indeed was shown to be the case. It appears that this problem is caused because the save-game routine sets up some I/O pointers which are required by the restore game subroutine.

A simple procedure to overcome this problem is:

Before restoring a save-game tape you must initialize the program by first creating a save-game. This needs to be done only one time after loading the program tape — thereafter the save-game tapes will load with no problem until the machine is shut off again. Procedure:

1) Turn on Apple.
2) Load Adventure tape.
3) Answer "NO" to restore question.
4) Type "SAVE GAME".
5) Answer "TAPE" to tape or disk question.
6) Hit RETURN without putting a tape in the tape player.
7) When program returns, type "QUIT".
8) Answer "YES" to restore question and load in your save-game tape now. Saved games will now load normally until you shut your Apple off.

I have been asked many times how I develop an Adventure. Well, my usual procedure is as follows:

1) First I pick a topic that I want to cover, such as Dracula or the Old West.
2) Then I decide whether I want to do a treasure expedition or have some specific mission to perform. (The treasure-finding type of Adventure is usually easier to write, but not by a lot.)
3) Next I lay out some terrain to cover and put in a simple skeleton of problems and obstacles to overcome. Also I dot the landscape with obvious items and objects which belong there, such as coconuts in palm trees, etc.
4) By this time, I usually have some interesting problems laid out which I then incorporate into the structure.
5) At this point I'm usually ready to enter the structure into the computer and start play-testing. The Adventure is probably about 50 percent of its final size at this time.
6) Finally, the play-testing by myself and others gives me numerous ideas of how to fill in the holes in the final structure and an Adventure is born!

How long this process takes ranges from one year, in the case of "Adventureland", to only one week for "Mystery Fun House". On the average, an Adventure will take about a month to finish, and anywhere from three hours to three months to play!

I hope this has given you some insight into Adventure creating. Until next month, may all your adventures be fun and safe.

INPUT continued from page 9

Dear **SoftSide:**

I wanted to take a moment to tell you how much I enjoy reading your magazine. I own an Atari 800 40K RAM, disk drive and 825 printer. Each month I anxiously await the arrival of this month's edition. Please keep up your fine coverage of the Atari machines and software. I'm looking forward to even better coverage in the future.

Included is a short program idea that in certain circumstances may save a great deal of typing. When I'm writing programs, on some occasions I want results printed to the screen and on the other occasions printed to the printer. I have to type everything twice just to change the command from PRINT to LPRINT. With this short program added on many occasions, I just capture the information from the screen and print it to the printer.

Garry J. Patton, M.D.
Romulus, NY

Editor's Note: Here is the program and our Apple Translation from Mark Pelczarski.

ATARI

```
10 OPEN #1,4,0, "S:":OPEN
#2,4,0,"K:"
20 DIM A$(40),B$(40)
30 ? "THE FIRST TIME THROUGH
I PRINT TO THE ";:IF P THEN
GOSUB 100

35 ? "SCREEN. THE SECOND TIME
THROUGH I CAN";:IF P THEN
GOSUB 100
40 ? "PRINT TO THE PRINTER.
SAVES TYPING!!!";:IF P THEN
GOSUB 100

45 IF P THEN GOTO 200
50 ? :? "Do you want a permanent
copy?";:GET #2,Z:IF Z=89 THEN
P=1:? "CHR$(125)":GOTO 30
60 END

100 B$="":X=PEEK(90):FOR I=2
TO 39:POSITION I,X:GET #1,V
110 B$=(LEN(B$)+1)=CHR$(V):
NEXT I
120 LPRINT B$:RETURN
200 REM THIS ALLOWS ESCAPE
TO REST OF PROGRAM
```

APPLE

```
10 PRINT "1-screen, 2-printer"
20 INPUT I: IF I = 2 THEN PR#1
30 PRINT "HELLO"
40 PR#0
```

Both of these offer the user the choice of having subsequent data go to the screen or the printer.

Dear **SoftSide:**

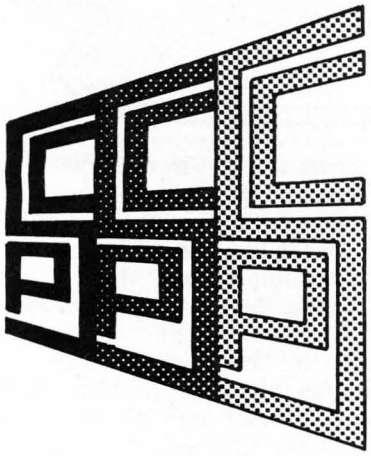
"Datapoke" — What a terrific program!! I had been looking many months for some easy way to create DATA lines for BASIC entry of machine language programs. This is perfect! A marvelous job of documentation also, from which I learned a few more techniques. Thanks!

John Schafer
Wayland, MA

Dear **SoftSide:**

I like "Collision". I made it past three racks and got 830 points. You said no one ever made it three times. I am seven years old.

Mike Winter
Camarillo, CA



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MORE CHESS AND COMPUTERS: THE MICROCOMPUTER REVOLUTION THE CHALLENGE MATCH

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MATH DECATHLON

by Jon Voskuil

Part 1

Welcome to the Olympics!

This series of four articles has two purposes. One is to develop a fun and educational math game program with some Olympic flavor to it, and the other is to learn good programming techniques along the way. Of course, if you're not really interested in the programming part, you can always (sigh) just skip the erudite exposition which follows and start entering the program itself.

The programming is in Applesoft, but is readily adaptable to other versions of BASIC; translation notes will be included along the way. The complete program will need a 24K machine, although it could be compacted into 16K by eliminating the music routines and most of the instructions.

"Math Decathlon" consists of ten math "events" which can be played on three different skill levels by as many as four contestants. Each contestant represents one of four countries in the competition, and those countries' national songs are used to honor winning players (mathletes?). Incidentally, if you should have occasion to use the program with a larger group, such as a school classroom, it works very well to have four teams competing.

This first article covers the initialization and instructions, the scoreboard and several other subroutines, and the first two events, "Find the Missing Number" and "Guess a Number."

INITIALIZATION AND INSTRUCTIONS

Line 5 sends control immediately to line 300, bypassing several small subroutines. Frequently-used routines are often placed early in the program like this because they execute faster — the computer spends less time finding their line numbers each time they are called. Speed is not at all important in this particular case, but I just *thought* I'd put them here anyway! We'll get back to these routines as they're called from the main program.

Line 300 dimensions all the variables to be used (some of which won't be showing up until later installments of the program). Note that the "%" symbol in the variable array "P%" makes it an integer array. This has two beneficial results. First, less memory is used to store the array values — two bytes per element rather than five. And second, since this is the array that contains the players' scores, an integer array assures that they will always be whole numbers and won't mess up the scoreboard with decimal points.

Lines 310-340 assign values to various strings which are used to label the events and the scoreboard. Be especially careful to type in the correct number of spaces in B$ and C$ (six between each character), or the scoreboard will be mangled.

The title page and instructions are printed beginning in line 360. [Translation note: HOME is the command that clears the screen, and VTAB moves the printing position down from the top of the screen to the specified line.] If the instructions are requested, they are printed one page at a time in digestible portions. Between each page is a call to subroutine 100, which prints a prompting message at the bottom of the screen and waits for the user to press a key before continuing. This could be accomplished with a GET command as well as with the PEEK method used, but the GET leaves a blinking cursor on the screen which I wanted to avoid. [Translation notes: POKE-16368,0 clears the keyboard strobe so that the next character can be read in. PEEK (-16384) reads the keyboard, and if the value returned is greater than 127 then a key has been pressed. INVERSE causes the text printed to be black-on-white rather than the NORMAL white-on-black]. Line 120 checks to see if the key pressed was the ESC, and if so sets NXT = 1: this will shortly be explained.

Following the instructions, in lines 480-560 the players are asked for information, each part of which is inputted as a string and checked for legitimacy before continuing. This is always good programming practice, and prevents messy "??RE-ENTER" messages and program crashes. Lines 570-630 shorten players' names to six characters if necessary and format them for the scoreboard display, following which the games are officially opened.

Each of the ten events which make up the main part of the program begins at a brand-new, fresh, multiple-of-1000 line number. And each runs through the same few steps at the beginning of the event: The variable E is set equal to the event number, the variable NXT is zeroed, and a loop is set up to repeat the event for each player. Then, for each player the event title is printed (in subroutine 10), the instructions for that event are given, and control jumps to subroutine 90 where a personal prompt is given and the computer awaits a keystroke to continue. Here's where the "ESC" key comes into play: If it is pressed at this point, then NXT is assigned a value of 1; and if NXT is non-zero when control returns to line 1040 (hmm...a dreaded number this time of year), then this event is skipped entirely and execution continues with the next event.

Event #1:
FIND THE MISSING NUMBER

Event #1, challenges you to find the pattern in series of numbers, and supply the missing value. There are three levels of difficulty (as with every event), and on each level there are three types of series from which the computer may choose. It does so at random, presenting to each player three problems which are each worth ten points. At skill level 0, the missing number of the six is always the last; at levels 1 and 2 it is randomly selected. (I assure you that the suggestive name assigned to this missing number, line 1120, was purely unintentional.) [Translation note: To Applesoft RND(1) generates a decimal number greater than or equal to zero, and less than one. Thus the expression INT (RND(1) * 3) + 1

continued on next page

continued from previous page

delivers an integer between one and three inclusive.]

When the player inputs an answer in line 1120 (again as a string, to trap bad input), the variables PX and A2 are assigned values and then subroutine 30 is called. This subroutine processes the player's input and responds with the appropriate remark. It compares A2, which now contains the correct answer, with the value of AN$, the player's input. If correct, it prints a nice message and adds PX number of points to the score; if incorrect, it expresses its sympathy and gives the right answer. By the way, I've embedded one CTRL-G (beep) in the "SORRY" message, and two of them in the "THAT'S RIGHT" message, to add a little audio reinforcement. Subroutine 30 having done its job, control returns to line 1130, where subroutine 100 is again called to print a prompt and wait for a keystroke to continue.

THE SCOREBOARD

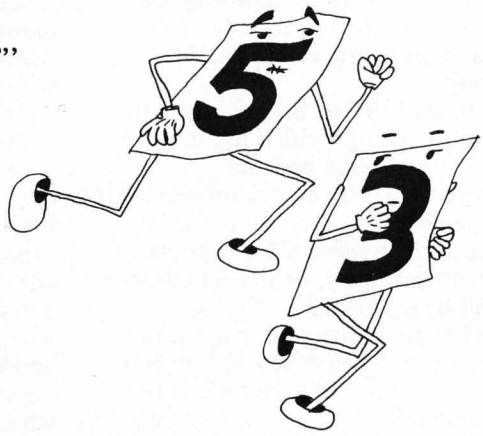
After all this has been done three times for each player, line 1140 calls the scoreboard subroutine which begins at line *11000*. This is simply a printing routine which displays each player's score in each event. [Translation notes: HTAB positions the cursor at the specified printing position along the line (1-40). SPC(n) (in a PRINT statement) prints n blank spaces.] The only tricky thing here is found in lines 11070 and 11210 where I use an expression such as HTAB 8 + P*7 + (P%(P,I)<10). The expression in parentheses evaluates as one if true, and zero if false. Thus if P% is less than ten, the value for HTAB is increased by one, and the score is printed one space further to the right so that digits will line up properly.

Event #2: GUESS A NUMBER

Following the scoreboard display, control passes on to the next event beginning in line 2000. The same preliminaries are followed as with the first event, and then the event actually begins at line 2080. The code is pretty straightforward here — picking a random integer, inputting a guess, subtracting a point for a wrong guess, giving "too high" or "too low" feedback, and returning for another guess. Since the scoring of this event works differently than in the first, the "standard" scoring subroutine at line 30 is not used. Again, there is a CTRL-G embedded in the string printed in line 2180, and two of them in line 2150, for audio reinforcement.

For now, the program ends at line 3000, following the display of the scoreboard. Contrary to the claims of the introductory instructions, there are only TWO events, and NO music yet exists to tickle the ear and stimulate patriotic fervor. But if I gave you all that this month, what would I have to give you for the next three issues?

Next month: The music routines and the next two events.



Math Decathlon Variables:
A1, AN: Value of an answer input.
AN$: Answer input string.
A2: Value of correct answer.
A$, B$, C$: Strings to construct scoreboard.
C(p): Player p's country.
E: Event number.
E$(n): Title of event n for scoreboard.
EE$(n): Full title of event n.
INCR: Increment for generating series in event #1.
LIM: Upper limit for no. guess.
NAME$(p): Player p's name for scoreboard.
NP: Number of players.
NUM: Number chosen to guess in event #2.
NUM(n): (Not yet used).
NXT: Logical variable (see text).
P: Player number.
P%(p,e): Score for player p for event e.
PL$(p): Player p's full name.
PX: Point value for scoring.
S(p): Skill level for player p.
SE(n): Series elements for event #1.
SQ(n): (Not yet used)
X: Position of unknown series element.
X$: General input variable.

```
PROGRAM LISTING: MATH DECATHLON

5 GOTO 300

Subroutine to print event titles.

10 HOME : VTAB 3: PRINT "EVENT #
    ";EE$(E): VTAB 7: RETURN

Subroutine to respond to player's
answer, and add points if correct.

30 A1 = VAL (AN$)
40 PRINT : IF A1 < > A2 THEN 60

50 PRINT "THAT'S RIGHT, ";PL$(P)
    ;"!":P%(P,E) = P%(P,E) + PX:
    RETURN
60 PRINT "SORRY, ";PL$(P);", THE
    CORRECT": PRINT "ANSWER IS
    ";A2: RETURN

Subroutine to prompt player and
wait for keystroke to continue.

90 PRINT : PRINT PL$(P);", IT'S
    YOUR TURN."
100 POKE - 16368,0: VTAB 24: INVERSE
    : PRINT ">>> PRESS THE SPACE
    BAR TO CONTINUE <<<":: NORMAL

110 IF PEEK ( - 16384) < 128 THEN
    110
120 IF PEEK ( - 16384) = 155 THEN
    NXT = 1
130 POKE - 16368,0: RETURN

Beginning of main program;
initialization.

300 DIM E$(10),SE(6),PL$(4),S(4)
    ,P%(4,10),NAME$(4),NUM(4),SQ
    (9),C(4),EE$(10)
310 E$(1) = "MISSING #":E$(2) = "
    GUESS A #"
320 EE$(1) = " 1. FIND THE MISSIN
    G NUMBER":EE$(2) = " 2. GUES
    S A NUMBER"
340 A$ = "----------+------+---
    --+------+------":B$ = "+
      +      +      +":C$ = "!
       !      !      !"

Print title page and instructions.

360 HOME : VTAB 6: PRINT TAB( 7
    )"M A T H  D E C A T H L O
    N": VTAB 10: PRINT TAB( 8)"
    WELCOME TO THE OLYMPICS!!"
370 VTAB 15: INPUT "    WOULD Y
    OU LIKE INSTRUCTIONS? ";X$: IF
    LEFT$ (X$,1) = "N" THEN 480

380 HOME : PRINT : PRINT "THIS I
    S A GAME OF MATHEMATICAL SKI
    LLS  AND REASONING FOR ONE
    TO FOUR PLAYERS.": PRINT : PRINT
    "THERE ARE TEN SEPARATE EVEN
    TS:": PRINT
```

```
390  FOR I = 1 TO 10: PRINT  TAB(
     3)EE$(I): NEXT I
400  PRINT : PRINT "IN EACH EVENT
      THERE IS A POSSIBLE SCORE O
     F THIRTY POINTS."
410  GOSUB 100
420  HOME : PRINT : PRINT "BETWEE
     N EVENTS I'LL SHOW THE SCORE
     BOARD,AND PLAY PART OF THE N
     ATIONAL SONG OF   THE PLAYER
      WHO WON THE LAST EVENT.  (N
     O SONG IS PLAYED IF THERE WA
     S A TIE.)": PRINT
430  PRINT "AT THE VERY END, I'LL
      PLAY THE COMPLETE NATIONAL
     SONG OF THE WINNING PLAYER(S
     )."
440  PRINT : PRINT "EACH PLAYER M
     AY CHOOSE ONE OF THREE     S
     KILL LEVELS:  0 (BEGINNER),
     1 (INTER-  MEDIATE), OR 2 (A
     DVANCED)."
450  PRINT : PRINT "WHEN YOU ARE
     ASKED FOR AN ANSWER, TYPE  I
     N THE NUMBER AND PRESS 'RETU
     RN'.  TO   CONTINUE WITH THE
      NEXT PROBLEM, PRESS   THE S
     PACE BAR."
460  PRINT : PRINT "IF YOU SHOULD
      WANT TO SKIP AN EVENT,    P
     RESS 'ESC' WHEN THE INSTRUCT
     IONS ARE   GIVEN."
470  GOSUB 100

 Input players' names, countries,
 and skill levels.

480  HOME : VTAB 10: PRINT "HOW M
     ANY CONTESTANTS WILL BE COMP
     ETING": INPUT "(1, 2, 3, OR
     4)? ";X$
490 NP =  VAL (X$): IF NP < 1 OR
     NP > 4 THEN 480
500  FOR I = 1 TO NP: HOME : VTAB
     3
510  PRINT : PRINT "CONTESTANT #"
     ;I;", PLEASE TYPE IN YOUR": INPUT
     "NAME, AND PRESS 'RETURN': "
     ;PL$(I)
520  PRINT : PRINT PL$(I);", WHIC
     H COUNTRY ARE YOU": PRINT "R
     EPRESENTING:": PRINT "  1. G
     REAT BRITAIN": PRINT "  2. U
     NITED STATES": PRINT "  3. F
     RANCE": PRINT "  4. SCOTLAND
     "
530  INPUT "(TYPE IN 1, 2, 3, OR
     4): ";X$:C(I) =  VAL (X$): IF
     C(I) < 1 OR C(I) > 4 THEN 53
     0
540  PRINT : PRINT PL$(I);", WHAT
      SKILL LEVEL DO YOU": INPUT
     "CHOOSE (0, 1, OR 2)? ":X$
550 S(I) =  VAL (X$): IF S(I) < 0
      OR S(I) > 2 THEN 540
560  NEXT I

 Format players' names for
 scoreboard; shorten if necessary.

570  FOR P = 1 TO NP
580 L =  LEN (PL$(P)):NAME$(P) =
     "!": IF L < 6 THEN 600
590 NAME$(P) = NAME$(P) +  LEFT$
     (PL$(P),6): GOTO 630
600 SS =  INT ((6 - L) / 2)
610  FOR J = 1 TO SS:NAME$(P) = N
     AME$(P) + " ": NEXT J
620 NAME$(P) = NAME$(P) + PL$(P)
630  NEXT P

 Announce the beginning of the
 contest.

640  HOME : VTAB 10: PRINT "L E T
        T H E   G A M E S   B E G
     I N !"
650  FOR I = 1 TO 2500: NEXT I

 Event #1:
 Find the Missing Number

 Print instructions.

1000 E = 1:NXT = 0
1010  FOR P = 1 TO NP: GOSUB 10
1020  PRINT "IN THIS EVENT, I WIL
     L LIST A SERIES OF  NUMBERS
     WHICH ARE RELATED TO ONE ANO
     THERIN SOME WAY.  ONE OF THE
      NUMBERS WILL BEMISSING, AND
      YOU MUST TRY TO DETERMINE
     WHAT THAT NUMBER IS."
1030  PRINT : PRINT "TYPE IN YOUR
      ANSWER AND THEN PRESS THE
     'RETURN' KEY.  WHEN YOU ARE
     READY FOR   THE NEXT SERIES,
      PRESS THE SPACE BAR    (THE
     RE WILL BE THREE SERIES FOR
     EACH    CONTESTANT)."
1040  GOSUB 90: IF NXT THEN 2000

 Choose one of nine series types,
 based on skill level; print with
 one number missing.

1050  FOR PROB = 1 TO 3
1060  ON ( INT ( RND (1) * 3) + 1
      + S(P) * 3) GOSUB 1160,1200
     ,1240,1280,1320,1360,1400,14
     40,1480
1070  HOME : VTAB 8: HTAB 5
1080  FOR I = 0 TO 5
```

continued on page 25

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by Mark Pelczarski

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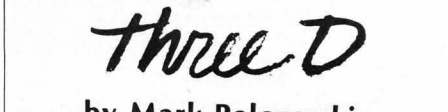

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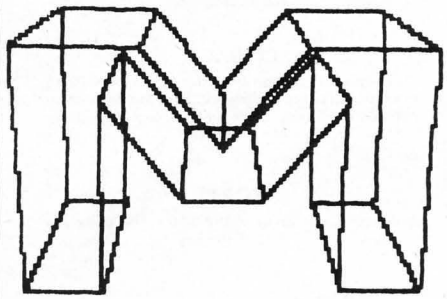

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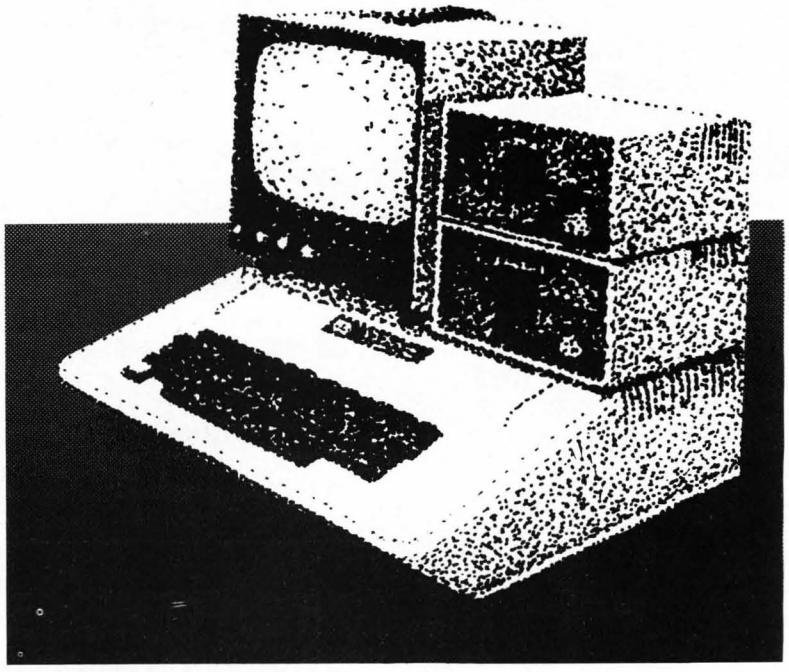

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continued from page 23

```
1090  IF I = X THEN  PRINT " ? ,
     ";: GOTO 1110
1100  PRINT SE(I);", ";
1110  NEXT I
1120  PRINT ". . .";: VTAB 12: INPUT
     "MISSING NUMBER = ? ";AN$:PX
      = 10:A2 = SE(X): GOSUB 30
1130  GOSUB 100: NEXT PROB,P
1140  GOSUB 11000: GOTO 2000


 Generate series type 1.


1160 SE(0) =  -  INT ( RND (1) *
     10):INCR =  INT ( RND (1) *
     5) + 3
1170  FOR I = 1 TO 5:SE(I) = SE(I
      - 1) - INCR: NEXT I
1180 X = 5: RETURN


 Generate series type 2.


1200 SE(0) =  -  INT ( RND (1) *
     10)
1210  FOR I = 1 TO 5:SE(I) = SE(I
      - 1) - I: NEXT I
1220 X = 5: RETURN


 Generate series type 3.


1240 SE(0) =  INT ( RND (1) * 10)
     :INCR =  INT ( RND (1) * 5) +
     3
1250  FOR I = 1 TO 5:SE(I) = SE(I
      - 1) + INCR: NEXT I
1260 X = 5: RETURN


 Generate series type 4.


1280 SE(0) =  INT ( RND (1) * 15)
      + 5:INCR =  INT ( RND (1) *
     3) + 2
1290  FOR I = 1 TO 5:SE(I) = SE(I
      - 1) + I * INCR: NEXT I
1300 X =  INT ( RND (1) * 6): RETURN
 Generate series type 5.


1320 SE(0) =  INT ( RND (1) * 9) +
     1
1330  FOR I = 1 TO 5:SE(I) = SE(I
      - 1) * 2: NEXT I
1340 X =  INT ( RND (1) * 5) + 1:
      RETURN

 Generate series type 6.


1360 SE(0) =  INT ( RND (1) * 9) +
     1
1370  FOR I = 1 TO 5:SE(I) =  - S
     E(I - 1) * 2: NEXT I
1380 X =  INT ( RND (1) * 5) + 1:
      RETURN
 Generate series type 7.


1400 SE(0) =  INT ( RND (1) * 9) +
     1:INCR =  INT ( RND (1) * 5)
      + 3
1410  FOR I = 1 TO 5:INCR =  - IN
     CR - 1:SE(I) = SE(I - 1) + I
     NCR: NEXT I
1420 X =  INT ( RND (1) * 5) + 1:
      RETURN


 Generate series type 8.


1440 SE(0) =  INT ( RND (1) * 4) +
     1
1450  FOR I = 1 TO 5:SE(I) = SE(I
      - 1) * I: NEXT I
1460 X =  INT ( RND (1) * 6): RETURN

 Generate series type 9.


1480 SE(0) =  -  INT ( RND (1) *
     30) - 9:INCR =  INT ( RND (1
     ) * 3) + 3
1490  FOR I = 1 TO 5:SE(I) = SE(I
      - 1) + I * INCR: NEXT I
1500 X =  INT ( RND (1) * 5) + 1:
      RETURN


 Event #2:
 Guess a Number

 Print instructions.


2000 E = 2:NXT = 0
2010  FOR P = 1 TO NP: GOSUB 10
2020  PRINT "IN THIS EVENT I WILL
      CHOOSE A NUMBER AT RANDOM,
     AND YOU MUST TRY TO GUESS IT
      IN AS FEW TRIES AS POSSIBLE
     ."
2030  PRINT : PRINT "TYPE IN YOUR
      GUESS AND PRESS 'RETURN',
     AND I WILL TELL YOU IF YOUR
     GUESS IS    LOW, HIGH, OR RI
     GHT ON!"
2040 LIM = 10: IF S(P) = 1 THEN L
     IM = 30
2050  IF S(P) = 2 THEN LIM = 100
2060  PRINT : PRINT PL$(P);", IT'
     S YOUR TURN.": PRINT "EACH O
     F YOUR THREE NUMBERS WILL BE
          BETWEEN 1 AND ";LIM;".
     "
2070  GOSUB 100: IF NXT THEN 3000

Choose a random number and give the
player 10 chances to guess it.

2080 P%(P,E) = 31
2090  FOR PROB = 1 TO 3: HOME : VTAB
     3: PRINT PL$(P);" -- #";PROB
     : PRINT : PRINT
2100 NUM =  INT ( RND (1) * LIM) +
     1
2110 I = 0
2120 P%(P,E) = P%(P,E) - 1
2130 I = I + 1: IF I = 11 THEN 21
     80
2140  PRINT "GUESS # ";I;: INPUT
     "; ";AN$:AN =  VAL (AN$)
2150  IF AN = NUM THEN  PRINT "YO
     U GUESSED IT, ";PL$(P)"!": GOTO
     2190
2160  IF AN < NUM THEN  PRINT "TO
     O LOW": PRINT : GOTO 2120
2170  PRINT "TOO HIGH": PRINT : GOTO
     2120
2180  PRINT "SORRY, ";PL$(P);", N
     O MORE GUESSES.": PRINT "THE
      NUMBER WAS ";NUM
2190  GOSUB 100: NEXT PROB,P: GOSUB
     11000


 Event #3 will begin at line 3000.
 For now, end here.


3000  END


 Subroutine to display scoreboard.


11000  HOME
11010  FOR P = 1 TO NP: IF P%(P,E
     ) < 0 THEN P%(P,E) = 0
11020 P%(P,0) = P%(P,0) + P%(P,E)
     : NEXT P
11030  PRINT " * EVENT * ";
11040  FOR P = 1 TO NP: PRINT  TAB(
     7 * P + 5)NAME$(P);: NEXT P
11050  PRINT : PRINT A$
11060  FOR I = 1 TO E: PRINT E$(I
     );: PRINT  TAB( 12)C$;
11070  FOR P = 1 TO NP: HTAB 8 +
     P * 7 + (P%(P,I) < 10): PRINT
     P%(P,I);: NEXT P
11080  PRINT : PRINT  TAB( 12)B$;
      NEXT I
11200  VTAB 22: PRINT A$: PRINT "
     TOTAL"; SPC( 6);C$;
11210  FOR P = 1 TO NP: HTAB 7 +
     P * 7 + (P%(P,0) < 100) + (P
     %(P,0) < 10): PRINT P%(P,0);
     : NEXT P
11220  IF E = 10 THEN  RETURN
11230  HTAB 1: GOSUB 100: RETURN
```

BASIC PERSONIFIED

by Roger W. Robitaille, Sr.

It is the goal of this article to attempt a new approach to explain how and why these wondrous things called computers function the way they do. Any of you readers who have participated in a Dungeons and Dragons (D&D) campaign will recognize and appreciate (I hope), how a fantasy culture can take on meaning and give understanding to the real world.

If you take the time to recall how often an idea can become clear once compared in some way to another already familiar idea, an appreciation of the power of analogy should come to you. If all goes well, the following pseudo world of BASE will start to take shape with problems and solutions strangely similar to the operation of a microcomputer. Wish me luck, and please be forgiving if consistency, at times, seems chimerical.

The world where BASE exists is a very busy world, and a very structured and orderly one. The Processor allows only one action to occur at a time. All is in harmony. From a human perspective, BASE is boring. It is bureaucracy that is so unyielding that any initiative on the part of an individual element other than the Processor can quickly lead to chaos. Obviously, deviant behavior is discouraged.

The world of BASE is content. Elements never willfully misinform and can be completely relied on to at least attempt to do the bidding of the Processor.

Character Clarification:

The Processor is known to humankind as CPU. Some of the more common species are the Z80s, 6502s, LSI-11s, etc.

Elements are essentially addresses. Most elements are RAM, some may be ROM. An important few are whole devices which all respond to the Processor as if they were RAM or ROM. The Processor has no favorites and responds to them all the same way. An address is an address.

With authority goes responsibility. The role of the Processor is a central one. The whole world of BASE revolves around the abilities of the Processor. However, the Processor is a driven creature. Its life is like that of a Queen Bee. Its role is special and unique, but preset from birth to respond in specific ways to certain situations — no choices, no real prerogatives. The Processor may lead the band but it doesn't select the music.

You might wonder just what a Processor does: simple things really, the building blocks of significant activity. It is as if the Processor has the only adding machine in town. As a matter of fact that's true! It adds two elements together. It will compare two elements to see if there is any difference between them. It will check a part of an element to see if it is a 1 or a 0. It can sense the value of any element and duplicate it in one of its internal adding machines. It will even read the sum of two consecutive elements and use that as the address of its next work assignment.

Perspective: Looking at the individual instructions that drive the Processor for the meaning of a program is like looking at a brick for an understanding of a building, or, more to the point, individual letters for the meaning of writing. It's the combination and sequence that separate meaning from chaos, a building from rubble, and writing from gibberish.

So what is all this about addresses? Well, most Processors in microcomputing are 8-bit types. More than that, they are provided with 16 address lines. Be that as it may, those address lines are used by the Processor to select exactly which byte it wants to read (or write). With 16 address lines, the Processor can distinguish among over 65,000 different elements (bytes, devices, etc.). For you doubters, ask your computer to PRINT 2 to the power of 16.

The awareness level of the Processor is inferior to that of a bureaucrat processing your driver's license renewal form. All it knows is how to set 16 solid state switches and read a bank of eight lights to execute the process dictated by those lights. Nothing more — nothing less.

The language, be it BASIC, FORTRAN, or whatever, is far more representative of the power of the computer. But that's another article for another day.

and other undesirables

The following lines should be added to the S-80 program "Squish 3" which was published in the December **SoftSide**.

```
335   IFA>0THENT=T+D:D=1:T1=INSTR(T,A$,","):IFT1<T+7ANDT1>0THENT
      =T1:GOTO330
450   LINEINPUT$1,A$:PP=INSTR(A$,CHR$(32)):X=PP:LN=VAL(MID$(A$,1
      ,PP)):PRINT@0,"SCANNING LINE-";LN:PRINT:PRINT:PRINT:PRINT@
      64,A$
```

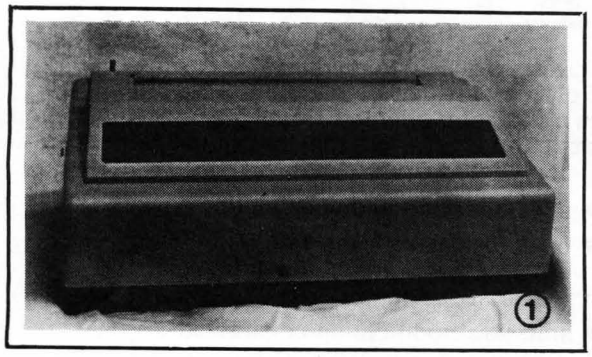
The following line should be substituted for the line 820 in "Squish 3".

```
820   J$=J$+L$:NEXT:IFPTHENJ$=J$+CHR$(34)
```

The following line should be added to the S-80 version of "Space Dodge", published in the December **SoftSide**.

```
80    ZM$=STRING$(21,32)
```

"Fugue", published in January **SoftSide** was written by William Morris AND John Cope, whose name was omitted from the author's credit. **SoftSide** regrets the omission.



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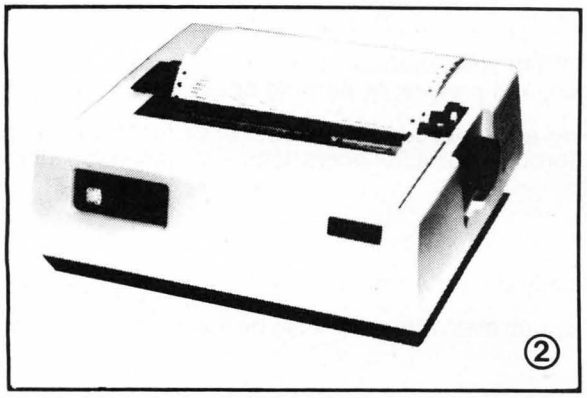

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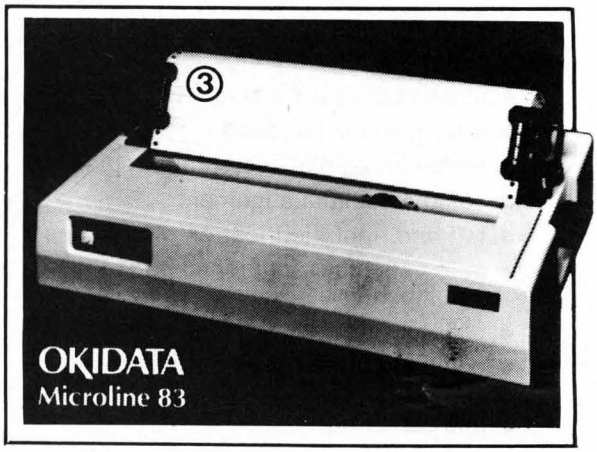

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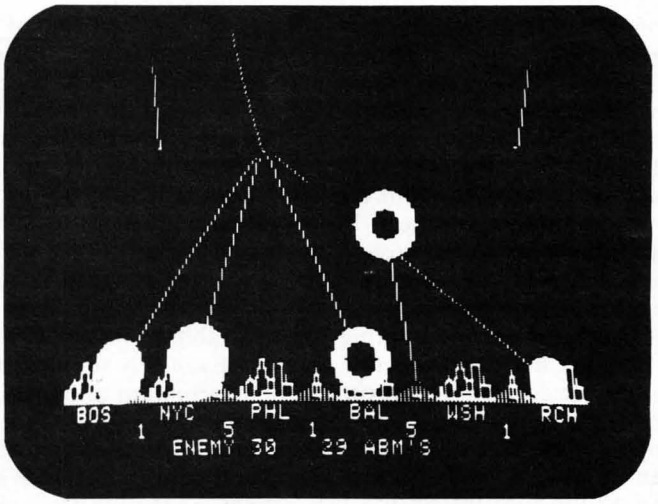

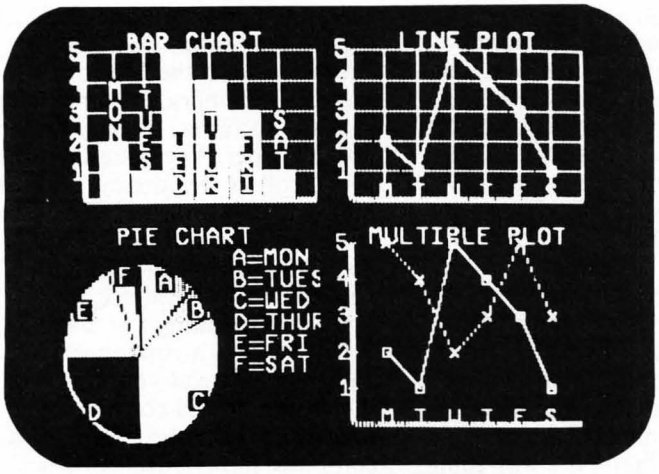

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MY SIDE OF THE PAGE

by Lance Micklus

Getting a Bit Serious-Part 2

WHERE THE NUMBERS COME FROM

In Part 1 of this series, I talked about margins and other numbers commonly used in business. There's nothing magical about these numbers. They are the results of experience. Here's where they came from.

The other day, I was visiting a man who is retired now but used to own a plumbing business. We got to talking about the cost of renting office space. He seemed to remember a book he had somewhere and started hunting for it. The book he found was not on plumbing or computers but on opening a men's clothing store in a shopping mall. Out of curiosity, I began to look through it and found all kinds of interesting information. There were tables which told you how much merchandise you had to sell based on some specific profit margin and a cost per square foot for rent. There were other places that discussed the kind of terms you could expect to get from various wholesalers, banks, landlords, etc. You know, it's really too bad I'm not planning on opening a men's store in a shopping mall.

There are numerous government and private agencies which have books like that for all kinds of businesses. All of this information comes from experience. This information is important not only to help people succeed, but also to help other people judge your success. When other people can judge your success, you stand a better chance of getting access to money.

When a new industry gets started, like the microcomputer industry, you don't have this information. So, it is more likely that these new businesses will fail. And those that do survive will have a harder time attracting capital. Given the lack of good information, the businesses in a new industry must rely on the best information available about similar industries or industries in general. One good example is the turnover rate.

The turnover rate is the number of times per year you turn over your inventory. This figure can vary greatly from one industry to another. The skiing industry turns over their inventory once a year. A&P turns over their inventory once a month.

The general rule of thumb is that you use a 100% mark up if you make one turn per year, as the skiing industry does. This works out to be a profit margin of 50%. If you make two turns per year, i.e., turn your inventory over twice a year, then your mark up is 50% or roughly a 33% margin. When you get down to 12 turns per year, your mark up is in the neighborhood of 10%.

Even this simple little piece of information about business tells us an awful lot. Look at the Mom and Pop grocery store and compare their turnover rate with any of the big food chains. All other things being equal, you can immediately see why Mom and Pop have got to charge more for their groceries.

Using this rule of thumb, we can work backwards and see that if we buy hardware on a 30% margin then we have got to turn over our inventory twice a year. With software, we have to turn over our inventory slightly less than twice a year. If your business is that of being a distributor working on a 10% margin, then you've got to turn over your inventory 12 times a year. But then, a distributor has got to move a lot of merchandise quickly to make a living.

The microcomputer industry has started to settle down to these margins pretty much because it turns out that that's the way things happen. If the figures get changed, say to a 20% margin, it simply means you must turn your inventory over a lot quicker. One way to do this is to sell more products to deplete the inventory faster. Another way is to reduce the size of the inventory.

There is, however, nothing magical about these numbers. They merely dictate a level of performance. Those who make the grade stay in school; those who don't flunk out. To live on a 20% margin instead of the usual 30% margin you must choose from one of the two options above.

Maybe you're a really good salesman. Maybe nobody can walk away from you without taking home a TRS-80™ Model II. If that's a description of you, you might very well be able to live on a 20% margin and get rich.

More than likely, the average computer salesman isn't that good. Clipped down to a 20% margin, he must reduce his inventory. The result is that products are much more likely to be out of stock.

THE COST OF MAKING THE SALE

Just because you can get the right margins does not mean you're going to make any money. Other factors must also be considered. One of the biggest is the cost of making the sale.

Part of the cost of many of the things we buy is incurred in getting us to buy these products in the first place. One example of this is McDonald's. In 1980, McDonald's spent $140,000,000 on television advertising to convince each of us that we deserve a break today. That works out to 64 cents for every man, woman, and child in the United States. But there is another side to the McDonald's story. The hungry customer comes in ready to order, in fact, he can't wait to order. You take the order, fill it, collect the money, and send him off. It is a rare McDonald's customer who will insist on inspecting the meat before it's cooked, or who will ask for assistance in eating the meal.

Not so with a computer customer. Instead you must talk to the customer and convince him that he could make good use of a computer in his business which currently is doing just fine without one. Then, you must convince him to buy the kind of computer you sell. Finally, you must convince him not to buy it somewhere else. All of this takes time and money. And it is all in addition to those expenses, like advertising, that got the customer into your store in the first place.

Obviously, you can not afford to spend a lot of time trying to sell a $15.00 product. But, if the margins are right, the higher the price, the more time you can spend with the customer. Let's take an example.

Suppose you own a computer store and you sell two types of computers. One is the ABC-800 which sells for $800.00 and the other is the XYZ-1000 which sells for $1000.00. Chances are the XYZ-1000 will sell much better that the ABC-800.

In the first place, you would rather sell XYZ-1000s because you make more money on them. Second, since you do make more money with them, you will tend to spend more time demonstrating the XYZ-1000 than the ABC-800. Third, since it is priced higher, it will appear to the customer that it is a better machine until the customer has reason to believe that it isn't. Fourth, the manufacturer of the XYZ-1000 is making more money so is more likely to give your computer store better terms than the manufacturer of the ABC-800. Since the manufacturer of the XYZ-1000 is making money, chances are he's making a better product and can spend more on advertising, making his computer easier to sell.

If the manufacturer of the ABC-800 priced that computer at $800.00 to try to compete on a price basis, then he is the one who comes out on the short end of the stick. He makes less, computer stores make less effort to sell his product, and he ends up selling fewer of them than if he competed on the basis of quality rather than price.

Of course, the whole situation gets turned around if the ABC-800 is as good as the XYZ-1000 but cost less to make, thus, making it less expensive to sell. In that case, while you may not make as much money selling ABC-800 computers, their lower profit is offset by the fact that they are easier to sell simply because they cost less.

The real problem is that people learned the simple rule of supply and demand. According to the rule, the lower the price, the greater the demand. The trouble is that it is a simple rule and things just aren't that simple. While it is possible to compete on a price basis, you've got to know what you're doing.

THE MAIL ORDER BUSINESS

Another way to sell products is through the mail. Although this has many advantages compared to over-the-counter sales, it also has some drawbacks.

One of the big advantages of mail-order is the fact that if only 1% of your customer base does business with you, you're going to be swamped.

Another advantage of mail-order is the fact that it is efficient. All of the time spent by employees is devoted to money making activities — order taking, order filling, and billing. Almost no time is spent trying to generate business which may not pan out.

A good computer salesman must be fairly well paid. He has to understand the various machines sold in his store, how to operate these machines, and how various pieces of software work. Not only must this salesman be well-qualified when he come bursting through the door looking for a job, you will probably have to spend a fair amount of time training him on all of the stuff you sell.

The mail-order house doesn't have this problem. Most of their help will not require much training beyond learning how to do their job. So, your labor costs are lower. Let me give you an example of this:

My own mail-order business is primarily done by telephone. Rather than pay a bunch of people to answer the telephone 24 hours a day, I have an answering service doing this for me. Thus, I have no scheduling problems, no wages to pay, no training problems. I pay $75.00 a month and somebody else answers the phones and takes the orders.

Who are these people? They're the women at The Message Center here in Burlington, Vermont. Talk about ignorant. I probably shouldn't tell you this but they don't even know what an S-80 is! They think an Apple is something you eat and an Atari is the name of a planet in **Star Wars**. Yet, they are perfectly capable of taking your order and filling it, thanks to a very nice order form which makes them sound a little intelligent.

To further reduce costs, a mail-order operation does not need to have any expensive storefront, although many do. The storefront space upstairs from my office (I'm located in a small shopping center) runs about $12 per foot per year. I'm paying $8 per foot per year. Just for comparison, a shopping mall (50 stores under an enclosed roof) might get from $20 to $25 a square foot per year.

Another advantage to mail-order is that you don't have to be located in the big city. This further reduces your rent and may offer you the convenience of an office next to your home. In my own case, my house is two and a half blocks from my office — about a ten minute walk.

Of course, if the rent is still too high and you're just starting out, you can run a mail-order business out of your house. A spare bedroom or a cellar can do just fine. You really can't do that with the over-the-counter trade.

On the other side of the coin, while it's true you don't have to pay any high-priced salesmen, that cost is replaced by high-priced advertising. The cost of a full page ad in most of the big computer magazines usually runs around $1000. This does not include the cost of getting camera-ready copy made, which is another several hundred dollars.

The second drawback is that people would prefer to buy over-the-counter from a person they know, rather than a stranger on the telephone who might very well be an answering service operator. There are two ways to overcome this resistance.

First, you will probably have to discount your price, or at least make it look like it's discounted. You know, sometimes, after you pay postage and handling, it might turn out to be more expensive.

Second, a toll-free 800 number helps also. These numbers are not free, however. Nothing from the telephone company is. WATS telephone service is billed by the hour just like any long distance call. Generally, on a national WATS line, the cost is about $18 per hour. Some people seem to think you can buy unlimited service with WATS so you can talk all you want for just a flat monthly fee. WRONG!!! There is no such thing. The average 800 WATS line call for a mail order product is about a dollar.

Next, you have to figure that you're going to get clipped three to four percent on your money because a lot of mail-order and almost all phone-order stuff is done by credit card. While it's true that over-the-counter sales can also involve a credit card, more often than not these are cash transactions.

The final drawback to mail-order also turns out to be one of

continued on next page

continued from previous page

its advantages. A retail computer store usually does not have a lot of competition to worry about. I have yet to hear of a city that has 80 computer stores all located within a few blocks of each other. In mail-order, your advertising is your storefront and it's inches away from many other store fronts trying to sell the same products as you.

THE DEVELOPER

Taken as a group, most of the people reading this are probably never going to get into the marketing and retailing end of the computer business. Statistically, the part of the market you, the reader, are most likely to brush up against is development work.

There isn't a single thing in the room with you right at this very moment that didn't start as an idea in somebody's head. Somehow, that idea was expressed as a product which was then manufactured and retailed and finally bought by you. The business of coming up with ideas and turning them into a marketable product is called development.

Development takes on two forms in the computer business — hardware and software. For the moment, I'll discuss both at the same time since they have a lot in common.

From a business standpoint, development work is the worst area to be in. The reason is that it is extremely cash forward with a high investment risk.

To take an example, I'll use the Model II version of "Deluxe Personal Finance." The first step was to get a S-80 Model II and then decide what to do with it. After looking over the needs of the market, several programs were identified and "DPF" was one of them. So that I could devote my time to other projects, Diane Bernard, who works for me part-time, was given the task of converting the Model I version of "Deluxe Personal Finance" over to the Model II TRSDOS operating system.

Diane began her work in March of 1980. First, she had to learn the program as well as the Model II TRSDOS operating system and the use of Microsoft's "BASIC Compiler." Then she had to do all of the conversion work, which was made much more complicated by some of the poor Model II TRSDOS protocols. The final version was completed and tested around the end of June 1980. By the middle of July the master disk was sent to Small Business Systems Group for manufacture and distribution.

By the time they were able to review the program, determine what changes needed to be made to the instruction manual, and begin production, it was December 1980. Part of the delay was due to the fact that SBSG was working on the "VTOS 4.0" manual which took a longer than usual amount of time. But there were other things which delayed the "DPF" manual, one of which was the new "ST80-III" manual. No matter. It seems to take forever to get a good manual and have it printed.

Now, in January, some dealers finally begin to hear that "Deluxe Personal Finance" is available for the Model II TRSDOS. Orders are placed but on 30 day net. So money does not even start to come in until February, 1981, and I receive my royalty check in March, 1981 — one year after the project was started.

Thus, money was spent for various expenses, especially labor, that I will not get back until one year later. Worse than that, I might not get all of my money back. Maybe the program won't sell very well. But it all boils down to this — it takes a lot of money which can be invested for a long period of time to do development work.

The amount of money that needs to be invested to develop a computer program varies greatly. Programs like "Electric Pencil", "ST80-III", or "Visicalc" represent investments of from $20,000 to $40,000. How many people do you know who have that kind of money to invest for a year or two? Probably not very many. Of the few people who do have big dollars like that around, most would rather invest in established business ventures than pursue a high-risk investment in a computer program.

If the program is a totally new concept, the investment costs become even higher while, at the same time, the risk also increases. How did Personal Software know that "Visicalc" would be a useful program? They didn't. Personal Software thought that such a program could be written and that it PROBABLY would be a useful program. The only way to really know is it to invest the money to write it and then hope that it turns out as well as you expected.

The high-risk factor coupled with a large investment in comparison to the size of the marketplace, often results in poorly-developed or under-developed software which must then be put out on the marketplace before it's ready, so that cash starts coming back. This is why there is so much junk software out today. Many software developers simply don't have enough money to sit on a product until it's really ready.

There are ways to deal with this problem. One method is the approach that was used to develop "ST80" terminal programs.

The first "ST80" terminal program was only a terminal program. Being much smaller, it took less time and less money to develop. But, when it was put out on the market, it was well-developed.

Then, with the original "ST80" program out there starting to generate income, that money was used to finance "ST80-D". The beauty of this is that part of the development work for "ST80-D" was already done. So, all of the efforts were put into extending the capabilities of the program. What was not known was how flexible "ST80-D" would be. How many different time-sharing environments would it be able to handle? There was no way of knowing that without writing the program. "ST80-D" was written to cover most of the common time-sharing environments. When work was completed, "ST80-D" went on the market.

Now, I had two terminal programs out there — each generating income. This put me in an excellent position to continue my work. On the one hand, I had proven that this new market existed and that my software would work. On the other hand, I saw additional possibilities for extending the features of "ST80." Using the feedback I was getting from the field, it seemed to me that I could now make yet another "ST80" that would work with any time-sharing computer. Small Business Systems Group also believed that there was a need for a very powerful "it-always-works" terminal program and hired me to

write "ST80-III". But this time, I received an advance, thus, totally eliminating any further need to invest more of my money and eliminating the risk factor.

Using my experience with the "ST80-D" code, I avoided, for the second time, the need to reinvent the wheel. Adding those things which were shortcomings to "ST80-D" in certain situations, "ST80-III" went out to the marketplace about one year after the original "ST80" first appeared.

"ST80" is a perfect example of how you can develop a product successfully with a low initial investment. It also had several other advantages. First, it tested the market to see if it was really there and how big it was. You've got to remember that at the time the original "ST80" came out, almost nobody had ever heard of MicroNET, the SOURCE, or FORUM 80. Second, it resulted in a vertical product line starting with a low-priced small program up to a high priced deluxe package. Vertical product lines are a lot more appealing to retailers than single product lines.

Hardware manufacturers do have one advantage over software authors: People with money see the computer industry as a rapid growth market. Hardware is something people understand. So, hardware people have a much easier time attracting venture capital than software authors do. As a result, hardware products are usually better developed and a vertical product line can be created much more rapidly.

I'll tell you a true story. I went to my bank to try to get a line of credit. Naturally, the bank wanted to know what Lance Micklus, Inc. did. When I told them my company developed computer programs, they didn't know what I was talking about. They never heard of an "ST80" or "Star Trek III". If I had said that I manufactured computer EQUIPMENT, they would have lit up like a Christmas tree even if they didn't have the foggiest idea what that equipment did. The solution was for me to give them some sample products. Specifically, I gave them an "ST80-III" for the Model II, a "Star Trek III" and "Mean Checkers Machine" from Adventureland, and an SBSG version of "Deluxe Personal Finance". Now the bank had something they could hold in their hand. I had something I could point to and say that it was my company's product. As a result, the loan was approved in a few days.

The amount of good software needed to supply the needs of all of these little computers greatly exceeds the output of the professional people who are in the business. Fortunately for our industry, there is another way software products can be developed without the need for very much investment capital at all. Instead of using expensive professional help, the work is done by amateurs. Some very excellent programs have been written this way and some very famous people have launched their computer careers as a result.

Since the amateur developer usually invests his time in return for the reward of seeing his idea work, anything else beyond that is profit. In fact, the amateur developer may spend more time developing his pet project than the project is financially worth in terms of dollars per hour. But, for him, that's not an obstacle.

There is one serious drawback to this. Money controls people. When people need money, they do what other people want them to do. That's why you get up at 6:30 in the morning to go to work even though you'd rather sleep in. If you can't control somebody by using money as a carrot, what do you do?

Since the amateur developer is not in this business for money, the professional people he must do business with have no way to control him. If a fix is needed, you can only hope that the fix will come out of pride for a job well done.

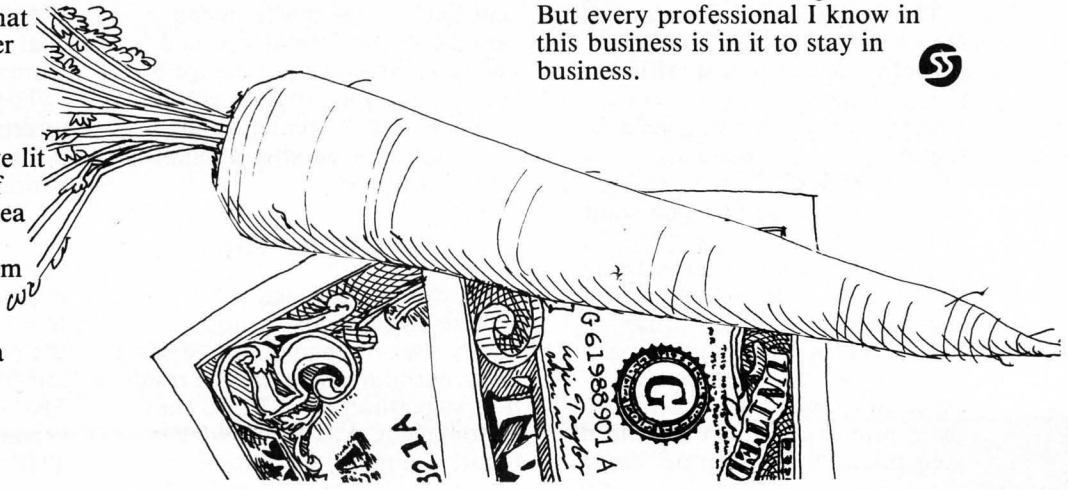
Another problem with amateur developers is their lack of resources. As I set here right now, I am within ten feet of a TRS-80™ Model II, Model III with disk drives, a Model II without disk drives, Color Computer, Pocket Computer, a TRS-80™ Model I tape system, and of course a Model I disk drive system with "Scripsit" which is being used to write this series. If someone comes to me and says that they need to fix one of my programs so it will work on a Model III as well as a Model I, I don't have a problem. The amateur program developer does because the chances are that he only has one computer.

For a computer manufacturer like Radio Shack, the difficulties in obtaining good quality vendor products, especially software, pose a major problem. To solve this problem, Radio Shack often obtains the services of outside vendors and pays for the entire development cost. The vendor is thus given the money to do the job with no risk. So long as he delivers what Radio Shack ordered, he is guaranteed payment.

On the other side of the coin, Radio Shack must carefully price these software products. If they price them too low, other outside vendors will not be able to compete and all further development work in that area will stop. Not only is this bad for the microcomputer market as a whole, it could also lead to an anti-trust suit.

THE DOLLAR CONNECTION

Not including this last section, this article has mentioned the word MONEY 28 times. That's got to tell you something. The microcomputer industry, like any other industry, is driven by money. I don't know anyone in this business who is in it to get rich. But every professional I know in this business is in it to stay in business.



DEVELOPING DATA BASE

Part 7 — The Final Chapter
by Mark Pelczarski
S-80 and Atari translations by Rich Bouchard
For Apple, S-80, or Atari

This will be the last installment of "Data Base" to be published in **SoftSide**. As such, it's about time to look at what we already have and see how it might be improved. Most of the modifications this month are rather system-specific in their solutions, so I'll start by outlining the types of changes and applying them to the Apple. Then Rich can take his turn with specific S-80 and Atari solutions. Bear in mind that while "Data Base" ends with this issue, there are many more enhancements that can be made. If you are interested in additions to the series send a postcard with your name and address to:
Mark Pelczarski
1206 Kings Circle
West Chicago, Illinois 60185

DISK ERRORS

One of the most flagrant programming violations we've made in the name of keeping the program simple was to omit any error-checking in the disk routines. This can cause some frustration; for example, when you try to save a file and get a DISK FULL message, your program bombs, and your data is left in shambles. Each system has slightly different error-trapping techniques, but it is possible to modify each version so that errors are caught and you are allowed second chances.

The Apple has a statement called ONERR-GOTO that sends program control to a specific line if any subsequent error occurs. One product of this statement is that normal error handling routines in BASIC are bypassed, however, so sometimes you want to use it, and sometimes you don't. An example of an existing error routine that ONERR will override is the one that prints "?REENTER" when you type a character where a number was expected. That's a nice routine for the computer to handle instead of your program. To turn off the ONERR condition, you must use the statement POKE 216,0. One other result of the ONERR statement is that if an error occurs, any FOR-NEXT or GOSUB-RETURN situations in progress are messed up. The stack that contains the necessary addresses for the NEXT and RETURN is modified, so you can't jump back into the program normally. This will be reflected in our changes.

If you look through the Apple modifications, you'll find four places in the program where disk access was made: reading and writing the data file, and reading and writing format files. In the load subroutine at 1000, an ONERR statement is placed at 1010, just before the disk file is opened. If the filename specified is not on the disk, the ONERR condition will send the program to line 1310, which prints the "FILE NOT FOUND" message, waits for a keypress, undoes to ONERR setting, and goes back to the original question at line 110. The write subroutine similarly has an ONERR statement before the file is opened that sends program control to line 2290 if there is a problem. That line prints the "DISK ERROR" message, waits for a keypress, then goes back to the master menu at line 200. Line 200 contains the necessary POKE that disables ONERR. Then down to the format subroutine at line 10000, a similar pair of statements occurs at lines 10090 and 10170 if a format was not found on disk while attempting a READ. The last pair, when writing a format file, is slightly different, since if you were sent back to the master menu you'd lose the format you had just entered. Instead, the message is printed and the program is told to GOSUB 10400, reentering the subroutine for another attempt at writing the file.

DISK DIRECTORY

In scanning through those changes, you probably noticed another set of changes in the same disk routines. These are the result of a suggestion from M.R. Dunn, editor of the **A.C.E. Newsletter** (Atari Computer Enthusiasts), in Eugene, Oregon. The suggestion was to allow the user to get a disk directory of data files from the program. On the Atari version we can ask for a directory of filenames that have certain characteristics. On the Apple, we just do an entire CATALOG, but to give more information we've added extensions to our filenames to identify what they are. Data files will appear in the catalog as NAME, DAT, the ".DAT" being added by the program in the 1000 and 2000 subroutines. Format files will appear as NAME, FMT, with the ".FMT" being added in the 10000 subroutine. The user still uses 'NAME', but now the catalog will identify what's what. Lines 270, 380, and 600 add the catalog option. One note here: When you make these changes, you'll also have to rename your existing disk data and format files before you can use them. On the Apple, use the command:
RENAME name, name. DAT
or
RENAME name, name. FMT

FREE SPACE

Starting to get a little concerned over RAM space and how many items you can actually fit in your data base, we put in line 295, which prints the number of bytes of free memory each time the master menu is listed. This number should be taken loosely, because the values of other miscellaneous strings we use will affect the amount of free space. That's why I subtracted 50 as a rough margin of error. Loading a long format file will wipe out as many characters as the length of the format, so be careful of that, too.

The FRE(0) function not only returns the amount of free space, it also does whatever housecleaning is necessary to compute that value. As a result, the more data that is stored, the longer it takes to compute this number. Some of you might want to move line 295 down to a subroutine around line 700 if the pause gets too long. Change line 295 so it prints the choice "(F) FREE SPACE", and add a line around 390 that says IF A$="F" THEN GOSUB 700. I personally

like to see that number automatically, keeping a constant reminder on the screen if I'm running short of room.

Another line added for the sake of this function is 6135, which blanks out the last item if one has been deleted. If this isn't done, the deletion won't be reflected in the free space, since the last item will still be pointing at some data, even though it's ignored.

The variable MX is also tied to the amount of space available, and while Rich had the foresight in the Atari version to tie the length of the monster data string to memory space, for simplicity's sake I arbitrarily set MX, the maximum number of items, to 100. With a 48K Apple there are about 27,000 bytes (characters) available, which roughly leaves 270 characters per record. Increasing MX to 200 takes more room for pointers and leaves about 26,000 bytes, or 130 characters per record. You can, and should, set MX to a value consistent with what you think your AVERAGE record length will be. The 130 cited above is an average, since a record may be longer than 130 as long as there are others shorter than 130 to balance it. You may also change MX at anytime, as long as you don't set it smaller than the number of records in the file you're using. To make this easier, lines 1110 and 1550, which were duplicate definitions of MX, have been deleted and MX = 200 has been moved to line 101.

LOADING ANOTHER FILE

The last change is from a suggestion from Jim Winkler in Alameda, CA. Among other things, he suggested the capability of loading a new file without having to rerun the program. This also adds a quick and easy way to expand your data file beyond RAM by keeping portions on disk. If your file's getting too large, delete the last half, store the first half under a new name, reload the original file, delete the first half, and store the remainder. Now you have two files, and although it's not terribly convenient switching back and forth, you do have a brute force method of enlarging your file capabilities.

There is a new command at 280, and 400 is changed so that both 'Q' and 'N' are included. In either case, the save switch is checked to prevent accidentally leaving an unsaved file. If 'new file' was chosen (line 540) the CLEAR statement resets all variables, and the program restarts at line 100.

APPLE CHANGES

```
]LIST
101 MX = 200
200  POKE 216,0: HOME : PRINT "(S
     ) SAVE CURRENT DATA"
270  PRINT "(F) FILE NAMES"
280  PRINT "(N) NEW DATA FILE"
290  PRINT "(Q) QUIT"
295  PRINT : PRINT "YOU HAVE ROOM
      FOR "; FRE (0) - 50;" MORE
     CHARACTERS"
380  IF A$ = "F" THEN  GOSUB 600:
      GOTO 200
400  IF A$ = "Q" OR A$ = "N" THEN
     500
510  PRINT "CURRENT FILE IS NOT S
     AVED.": PRINT "CANCEL COMMAN
     D? (Y/N)";: GET T$
520  IF T$ = "Y" THEN 200
530  IF T$ < > "N" THEN 510
540  IF A$ = "N" THEN  CLEAR : GOTO
     100
550  END
600  PRINT D$;"CATALOG": GET A$: RETURN
1010  ONERR  GOTO 1310
1020  PRINT D$;"OPEN";F$ + ",DAT"
1030  PRINT D$;"READ";F$ + ",DAT"
1280  PRINT D$;"CLOSE";F$ + ",DAT
     "
1310  PRINT "FILE NOT FOUND": GET
     A$: POKE 216,0: GOTO 110
2050  IF A$ = "Y" THEN 2090
2090  ONERR  GOTO 2290
2100  PRINT D$;"OPEN";F$ + ",DAT"
2110  PRINT D$;"WRITE";F$ + ",DAT
     "
2270  PRINT D$;"CLOSE";F$ + ",DAT
     "
2290  PRINT "DISK ERROR": GET A$:
      GOTO 200
6135  FOR J = 0 TO NH:I$(NI,J) =
     "": NEXT
10090  ONERR  GOTO 10170
10110  PRINT D$;"OPEN";A$ + ",FMT
     "
10120  PRINT D$;"READ";A$ + ",FMT
     "
10150  PRINT D$;"CLOSE";A$ + ",FM
     T"
10170  PRINT "FORMAT NOT FOUND": GET
     A$: GOTO 200
10405  ONERR  GOTO 10460
10410  PRINT D$;"OPEN";A$ + ",FMT
     "
10420  PRINT D$;"WRITE";A$ + ",FM
     T"
10440  PRINT D$;"CLOSE";A$ + ",FM
     T"
10460  PRINT "DISK ERROR": GET A$
     : GOSUB 10400
```

ATARI CHANGES

```
270 PRINT "(F) FILE NAMES"
280 PRINT "(N) NEW FILES"
290 PRINT "(Q) QUIT   ?"
295 PRINT "CHARACTERS FREE:";INT(X*0.9
)-NI*RL
380 IF CHR$(A)="F" THEN GOSUB 600:GOTO
 200
400 IF CHR$(A)="Q" OR CHR$(A)="N" THEN
 500
505 AA=A
510 PRINT "CURRENT FILE IS NOT SAVED."
:PRINT "CANCEL COMMAND? (Y/N) ";:GET #
2,A:PRINT CHR$(A)
520 IF CHR$(A)="Y" THEN 200
530 IF CHR$(A)<>"N" THEN 510
540 IF CHR$(AA)="N" THEN CLR :RUN
550 END
600 GRAPHICS 0
610 OPEN #1,6,0,"D:*.*"
615 TRAP 650
620 INPUT #1,A$
630 PRINT A$
640 GOTO 620
650 CLOSE #1:GET #2,A:GOTO 200
1010 TRAP 1310
1310 PRINT "FILE NOT FOUND":GET #2,A:C
LOSE #1:GOTO 110
2090 TRAP 2290
2290 PRINT "DISK ERROR":GET #2,A:CLOSE
 #1:GOTO 200
10090 TRAP 10170
10170 PRINT "FORMAT NOT FOUND":GET #2,
A:CLOSE #1:GOTO 200
10405 TRAP 10460
10460 PRINT "DISK ERROR":GET #2,A:CLOS
E #1:GOTO 10400
```

S-80 CHANGES

A note for the S-80 version of "Data Base" for this month: The "FILE NAMES" feature will only function under certain types of DOS, due to the use of the CMD "DIR" function to get a disk directory. The technique works on NEWDOS and VTOS, but does not work with TRSDOS. If you do not have a DOS with this capability, delete the function by erasing lines 270, 380 and 600.

continued on page 57

VOLCANO

by Victor T. Albino

"Volcano" is an S-80 educational adventure game requiring at least 16K memory.

As one of the snow-capped jewels of Washington's Cascade Range, Mount St. Helens ruled with majestic silence for 123 years. Then on Sunday, May 18, 1980 at 8:32 a.m., it erupted in a mammoth fury which paralyzed much of the Pacific Northwest.

Seventy people died as a result of the volcano. Hundreds of square miles of virgin timberland were blasted into a lifeless, gray moonscape. Massive mudflows caused widespread destruction many miles from the volcanic site.

Despite these elements and the odds, almost 200 people were saved from the mountain by brave crews in rescue helicopters. This program, based on actual eyewitness accounts, recreates the experiences related by these survivors.

If you had been one of those present near the mountain that Sunday morning, would you have managed to survive?

Load this program and find out!

Volcano Variables:

D: Contains the number representing your decision of "what to do next".
D$: Contains yes or no reply to "try again?" routine.
M, X, Y: Miscellaneous. Used for display positioning.
P: Contains the string: "HIT '/' KEY".
T: Used in time delay loops.

```
0 CLS
10 REM xx VOLCANO xx
     BY VICTOR T. ALBINO
        OCT. 1980
90 PRINT@464,CHR$(23)"V O L C A N O !";
95 FORT=0TO1200:NEXT:CLS
         Lines 100-175: Introduction and historical back-
              ground.
100 PRINT@320,"ON MAY 18, 1980 AT 8:32 AM, MOUNT ST. HELENS ERUP
TED WITH A
FORCE 500 TIMES GREATER THAN THAT OF THE ATOMIC BOMB THAT FELL
ON HIROSHIMA.";
105 PRINT"  THE TOP 1300 FEET OF THE MOUNTAIN WAS IMMEDIATELYPUL
VERIZED AND THROWN 12 MILES INTO THE SKY.  WITHIN MOMENTS
EVERYTHING WITHIN 150 SQUARE MILES WAS ENGULFED IN THE FURY OF
THE VOLCANO.":PRINT@982,"PRESS '/ ' KEY";
106 IFINKEY$<>"/"THEN106ELSECLS
110 PRINT@192,"THICK, BLACK SMOKE ACCENTED WITH PINK AND PURPLE
LIGHTNING,
FLYING BOULDERS AND CHUNKS OF ICE BLASTED A SWATH OF
DESTRUCTION 20 MILES TO THE NORTH."
115 PRINT"HOT ASH, ROCKS, AND GAS ROARED DOWN THE MOUNTAIN IN
PYROCLASTIC FLOWS AT OVER 100 MPH.  THE 800 DEGREE FLOWS
COLLIDED INTO SPIRIT LAKE AND BECAME A TORRENT OF SUPERHEATED
MUD
CARRYING OFF 100 TON LOGGING TRUCKS, BUILDINGS, BRIDGES AND"
120 PRINT"ANYTHING ELSE IN ITS PATH.  THE MUD FLOWED ON INTO THE
TOUTLE, COWLITZ AND COLUMBIA RIVERS CAUSING SEVERE FLOODING."
125 PRINT@982,"PRESS '/ ' KEY";
130 IFINKEY$<>"/"THEN130ELSECLS
135 PRINT@192,"DRAWN BY THE HOPE OF SEEING SOME VOLCANIC ACTIVIT
Y, MANY
PEOPLE HAD COME TO THE MOUNTAIN THAT WEEKEND AS MANY HAD EVERY
WEEKEND SINCE ST. HELENS BEGAN EMITTING PUFFS OF STEAM BACK IN
MARCH.";
140 PRINT"  ALTHOUGH THERE WERE SIGNS AND ROADBLOCKS WARNING
EVERYONE TO STAY AWAY, THEY STILL CAME.  TOURISTS, CAMPERS,
SCIENTISTS, PHOTOGRAPHERS, ADVENTURERS AND THE JUST PLAIN
CURIOUS."
144 DEFSTRP:P="PRESS / KEY"
145 PRINT:PRINT"BUT THEN NO ONE EXPECTED THAT THE MOUNTAIN WAS W
AITING TO
EXPLODE LIKE SOME KIND OF GIGANTIC NUCLEAR TIME BOMB.":PRINT@982
,P;
150 IFINKEY$<>"/"THEN150ELSECLS
155 PRINT@320,"ABOUT SEVENTY OF THE VISITORS TO THE MOUNTAIN THA
T WEEKEND
DID NOT LEAVE ALIVE.  EXACTLY HOW MANY PEOPLE PERISHED WILL
LIKELY NEVER BE KNOWN."
160 PRINT:PRINT"WHAT IS KNOWN IS THAT AIR FORCE AND ARMY NATIONA
L GUARD
HELICOPTERS RESCUED 197 PEOPLE, SNATCHING THEM FROM AROUND THE
BOILING MOUNTAIN.":PRINT@982,P;
165 IFINKEY$<>"/"THEN165ELSECLS
170 PRINT@384,"SCIENTISTS ARE NOT EXACTLY SURE WHAT CAUSES A VOL
CANO, BUT IT
IS THOUGHT THAT THEY RESULT FROM THE MOVEMENT OF THE EARTH'S
CRUST.":PRINT@982,P;
175 IFINKEY$<>"/"THEN175ELSECLS
         Lines 180-230: Graphics display explaining
               volcanic eruption.
180 PRINT@448,STRING$(30,","):FORX=27TO31:SET(X,27):NEXT:FORX=32
TO41:SET(X,26):NEXT:FORX=42TO49:SET(X,25):NEXT:FORX=50TO59:SET(X
,24):NEXT:FORX=60TO65:SET(X,22):NEXT:FORX=66TO69:SET(X,21):NEXT:
FORX=70TO75:SET(X,20):NEXT:FORX=76TO77:SET(X,19):NEXT
181 SET(60,23):SET(61,23)
185 FORX=78TO83:SET(X,18):NEXT:FORX=84TO87:SET(X,17):NEXT:FORX=8
8TO89:SET(X,16):NEXT:FORX=90TO93:SET(X,15):NEXT:FORX=94TO99:SET(
X,14):NEXT:SET(100,13):SET(101,13):SET(102,12):SET(103,12):SET(1
04,11):SET(105,11):SET(108,11):SET(109,11):SET(110,12):SET(111,
12)
190 SET(112,13):SET(113,13):FORX=114TO119:SET(X,14):NEXT:FORX=12
0TO127:SET(X,15):NEXT:FORX=1TO41STEP2:SET(X,28):NEXT:FORX=43TO49
STEP2:SET(X,29):NEXT:SET(51,30):SET(53,30):SET(55,31):SET(57,31)
:SET(59,31):SET(61,32):SET(63,32):SET(65,32)
195 FORX=67TO73STEP2:SET(X,33):NEXT:SET(75,34):SET(77,35):SET(79
,35):SET(81,36):SET(83,36):SET(85,37):SET(87,37):SET(89,38):SET(
91,38):SET(93,39):SET(95,40):SET(97,41):SET(110,47)
200 FORX=1TO39STEP2:SET(X,34):NEXT:FORX=41TO49STEP2:SET(X,35):NE
XT:FORX=51TO55STEP2:SET(X,36):NEXT:FORX=57TO61STEP2:SET(X,37):NE
XT:SET(63,38):SET(65,38):SET(67,39):SET(69,39):SET(71,40):SET(73
,40):SET(75,41):SET(77,41):SET(79,42):SET(81,42)
205 SET(83,43):SET(85,44):SET(87,45):SET(89,46):SET(91,47):SET(9
9,41):SET(101,42)
210 PRINT@515,"OCEAN";:PRINT@642,"OCEANIC CRUST";:PRINT@840,"UPP
ER MANTEL";:PRINT@543,"CONTINENTAL CRUST";:PRINT@887,"<--MAGMA";
:PRINT@566,"<-VOLCANIC";:PRINT@632,"CONDUIT";
215 M=16242:POKEM,176:POKEM+1,176:FORX=M+2TOM+4:POKEX,191:NEXT:M
=16307:POKEM,139:POKEM+1,175:FORX=M+2TOM+4:POKEX,191:NEXT:POKE16
374,139:POKE16375,143
220 PRINT@0,"GREAT SLABS OF THE EARTH'S CRUST RUB AGAINST EACH O
THER
GENERATING TREMENDOUS HEAT AND PRESSURE AND FORMING MAGMA OR
MOLTEN ROCK.";
225 PRINT"  THE HOT MAGMA RISES AND EVENTUALLY WORKS IT WAY TOTH
E SURFACE.  WHEN IT ERUPTS, A VOLCANO IS BORN.";
```

```
230 FORY=38TO12STEP-1:SET(107,Y):NEXT
        Lines 235-515: Instructions.
235 PRINT@268,P;
240 IFINKEY$<>"/"THEN240ELSECLS
500 PRINT:PRINT:PRINT ' x THE SCENARIO
505 PRINT"THIS PROGRAM CREATES A SCENARIO SIMILAR TO THOSE REPOR
TED BY
SOME OF THE APPROXIMATELY 300 PEOPLE WHO WERE CAMPED AROUND
MT. ST. HELENS ON THE MORNING OF MAY 18, 1980."
510 PRINT:PRINTTAB(14)"YOUR GOAL IS SIMPLE :  SURVIVE !
515 PRINT:PRINT:PRINT"THE HAZARDS ARE MANY..."
        Lines 520-605: Facts about the consequences of an
            eruption.
520 PRINT@982,P;
525 IFINKEY$<>"/"THEN525ELSECLS
530 PRINT:PRINT"L A V A :  UNLIKE THE MORE LIQUID LAVA OF THE HA
WAIIAN VOLCANOS,THE LAVA OF ST. HELENS IS OF THE ANDESITE VARIET
Y — A STICKY,
GUMMY MATERIAL.  IT MOVES SLOWLY AND DOES NOT TRAVEL FAR."
535 PRINT:PRINT"A S H :  MOST OF THE DEATHS AT ST. HELENS WERE D
UE TO
SUFFOCATION CAUSED BY HOT ASH FORCED INTO THE LUNGS."
540 PRINT:PRINT"P Y R O C L A S T I C  F L O W S :  MASSES OF H
OT, DRY ROCK
THAT MOVE LIKE A FLUID BECAUSE THEY ARE MIXED WITH HOT AIR AND
AND OTHER GASES.  THESE FLOWS TRAVEL AT OVER 100 MPH AND AFFECT
AREAS FAR FROM THE VOLCANO."
545 PRINT@982,P;
550 IFINKEY$<>"/"THEN550ELSECLS
555 PRINT:PRINT"M U D F L O W S :  THESE LOOK LIKE A WAVE OF HOT
, FLOWING
CONCRETE AND CAN MOVE AT SPEEDS UP TO 50 MPH.  THEY CARRY ALONG
BOULDERS, TREES, AND DEBRIS IN THEIR WAKE."
560 PRINT:PRINT"G A S E S :  HOT GASES SUCH AS CARBON DIOXIDE, C
ARBON
MONOXIDE, CHLORINE, AND SULFUROUS FUMES ARE SPEWED OUT TOGETHER
WITH MOLTEN OR SOLID ROCK."
565 PRINT:PRINT"D E B R I S :  LARGE CHUNKS OF EARTH, ROCK AND I
CE CAN BE
THROWN OUT FROM ANY OF THE MOUNTAIN'S FLANKS AS WELL AS ITS
SUMMIT."
570 PRINT@982,P;
575 IFINKEY$<>"/"THEN575ELSECLS
580 PRINT"L I G H T N I N G :  FLASHES OF LIGHTNING, GENERATED B
Y
HIGHLY CHARGED DUST PARTICLES, STREAK AROUND THE MOUNTAIN."
585 PRINT:PRINT"F L O O D S :  MUDFLOWS JOIN WITH RIVERS SWELLIN
G THEM MANY
TIMES THEIR NORMAL SIZE CAUSING WIDESPREAD FLOODING AND KILLING
WILDLIFE."
590 PRINT:PRINT"E A R T H Q U A K E S :  THESE RESULT FROM THE M
OVEMENT OF
MOLTEN ROCK WITHIN THE MOUNTAIN."
595 PRINT:PRINT"F I R E S :  ABOUT A HUNDRED FIRES WERE STARTED
DURING THE
ST. HELENS ERUPTION BY HOT GASES, PYROCLASTIC FLOWS, AND
LIGHTNING."
600 PRINT@982,P;
605 IFINKEY$<>"/"THEN605ELSECLS
        Lines 609-645: Opening scene.
609 DEFSTRE,P:E="ENTER THE NUMBER OF THE ACTION YOU SELECT":P="P
RESS / KEY"
610 CLS:PRINT@214,"- THE SCENE -"
615 PRINT:PRINT"YOU ARE CAMPED ON THE WEST SIDE OF MT. ST. HELEN
S.
YOU HIKED UP FROM THE END OF A LOGGING ROAD WHERE YOU LEFT
YOUR CAR LAST NIGHT.  YOU HAVE A SMALL FIRE GOING TO MAKE
SOME COFFEE."
616 PRINT:PRINT"THERE IS AN EERIE QUIET.  THERE ARE NO BIRDS SIN
GING."
620 PRINT@982,P;
625 IFINKEY$<>"/"THEN625ELSECLS
630 PRINT:PRINT:PRINTTAB(9)"SUDDENLY YOU ARE SHAKEN BY AN EARTHQ
UAKE!
THE GROUND UNDULATES AROUND YOU.  TALL FIR TREES SWAY."
635 PRINT:PRINT"THEN.... A GIANT ROAR, AND THE TOP OF THE MOUNTA
IN
EXPLODES THOUSANDS OF FEET INTO THE AIR SUSPENDED ON A
THICK COLUMN OF BLACK SMOKE.":PRINT:PRINT"THE DENSE CLOUD EXPAND
S AND BEGINS TO MOVE IN YOUR DIRECTION."
640 PRINT@982,P;
645 IFINKEY$<>"/"THEN645ELSECLS
        Lines 650-660, 730-740, 800-810, 885-895,
            945-955, 1005-1015, 1060-1070,1110-1120:
            Player's options of "what to do next."
650 PRINT@276,"WHAT SHOULD YOU DO ?"
655 PRINT@340,STRING$(20,"-");
660 PRINT:PRINT"1.)  USE YOUR CAMPING SHOVEL AND DIG IN UNTIL IT
'S SAFE TO MOVE.2.)  TAKE PHOTOGRAPHS.  THEY SHOULD BE WORTH PLE
NTY.
3.)  START BACK DOWN THE MOUNTAIN TO YOUR CAR.
4.)  GET TO HIGH GROUND.
5.)  TRY TO FIND SOME SHELTER."
665 PRINT@905,E;:INPUTD
670 ONDGOTO675,680,685,690,695
        Lines 675-695, 755-770, 820-850, 910-930,
            970-980, 1085-1095: Perish routines.
            Program branches here when you have made
            a fatal decision.
675 CLS:PRINT@448,"YOU JUST DUG YOUR OWN GRAVE.  HOT ASH WILL BU
RY YOU.":GOTO700
680 CLS:PRINT@448,"CONGRATULATIONS.  YOU HAVE TAKEN SOME REALLY
SPECTACULAR
PICTURES THAT WILL BE DUPLICATED IN A HUNDRED NEWPAPERS.
YOU WILL RECEIVE MANY AWARDS -- ALL POSTHUMOUSLY.":GOTO700
685 CLS:PRINT:PRINT:PRINT"NOW YOU ARE USING YOUR HEAD.  GET OUT
OF THERE FAST!":GOTO710
690 CLS:PRINT@448,"FORGET IT!  HOT SULFUR DIOXIDE GAS COMING OUT
 OF THE SIDE OF
THE MOUNTAIN GETS YOU AS YOU CLIMB HIGHER.":GOTO700
695 CLS:PRINT@448,"YOU ARE TOO CLOSE TO THE HOT ASH FOR ANY SHEL
TER TO BE
EFFECTIVE.  THOSE WHO TRIED THIS WERE BURIED ALIVE.":GOTO700
700 FORT=0TO3000:NEXTT:CLS:PRINT@330,CHR$(23)"YOU  HAVE  PERISHE
D";:FORX=15616TO15679:POKEX,143:NEXT:FORX=15744TO15807:POKEX,143
:NEXT:PRINT@710,"WANT TO TRY AGAIN (Y/N)";
701 INPUTD$:IFD$="Y"THEN609
702 IFD$="N"THEN705
703 IFD$<>"Y"ORD$<>"N"THENCLS:PRINT@452,CHR$(23)"ANSWER ONLY WIT
H A Y OR N.";:GOTO701
705 CLS:PRINT@448,CHR$(23)"EITHER TAKE A SURVIVAL COURSE ORSTAY
FAR AWAY FROM SMOKING
MOUNTAINS... PREFERABLY BOTH !":PRINT:PRINT:END
        Lines 710-715, 780-785, 865-870, 985-990,
            1030-1045, 1140-1175: Player's current
            location.
710 PRINT:PRINT:PRINT"AS YOU APPROACH THE HIKING TRAIL THAT LEAD
S DOWN TO
THE LOGGING ROAD, YOU FIND THAT MANY TREES HAVE FALLEN ACROSS
THE TRAIL MAKING PASSAGE DIFFICULT."
715 PRINT:PRINT"YOU THINK YOU REMEMBER A SHORT CUT DOWN THE MOUN
TAIN THAT ALSO
LEADS TO THE END OF THE LOGGING ROAD."
720 PRINT@982,P;
725 IFINKEY$<>"/"THEN725ELSECLS
730 PRINT@276,"WHAT SHOULD YOU DO?"
735 PRINT@340,STRING$(20,"-")
740 PRINT:PRINT"1.)  ATTEMPT TO NAVIGATE THE TRAIL.
2.)  TAKE THE SHORT CUT."
745 PRINT@905,E;:INPUTD
```

continued on next page

continued from previous page

```
750 ONDGOTO765,755
755 CLS:PRINT@448,"IN AN EMERGENCY WE OFTEN FORGET EVEN THOSE TH
INGS THAT WE
KNOW WELL-- SUCH AS OUR OWN PHONE NUMBER.
IN YOUR EXCITEMENT YOU QUICKLY FIND YOURSELF LOST."
760 PRINT"YOUR TIME RUNS OUT AND YOU ARE OVERRUN BY A PYROCLASTI
C FLOW.":FORT=0TO2000:NEXTT:GOTO700
765 CLS:PRINT:PRINT:PRINT:PRINT"UNDER THE CIRCUMSTANCES THIS IS
THE BETTER CHOICE.
AT LEAST YOU KNOW THAT THE TRAIL EVENTUALLY LEADS BACK TO THE
ROAD.
YOU CLIMB OVER AND UNDER HUGE FALLEN TREES AS YOU MAKE YOUR
WAY BACK DOWN THE TRAIL."
770 PRINT@982,P;
775 IFINKEY$<>"/"THEN775ELSECLS
780 PRINT:PRINT:PRINT:PRINT:PRINT"WHEN YOU ARRIVE AT YOUR CAR, Y
OU FIND THE ROAD IS BLOCKED
BY SEVERAL LARGE ROCKS WHICH ROLLED ON TO IT DURING THE QUAKE.
YOU KNOW THAT THE END OF THESE LOGGING ROADS IS ONE OF THE
FIRST PLACES THAT RESCUERS WILL LOOK."
785 PRINT:PRINT"ON THE OTHER HAND THERE IS A CHANCE YOU COULD MO
VE THOSE ROCKS
JUST ENOUGH TO GET THROUGH."
790 PRINT@982,P;
795 IFINKEY$<>"/"THEN795ELSECLS
800 PRINT@276,"WHAT SHOULD YOU DO?"
805 PRINT@340,STRING$(20,"-")
810 PRINT:PRINT"1.)  GET IN THE CAR FOR PROTECTION AND WAIT TO B
E RESCUED.
2.)  FORGET THE CAR AND GO DOWN THE ROAD ON FOOT.
3.)  BUILD A FIRE TO ATTRACT RESCUERS.
4.)  TRY TO GET THE ROCKS OUT OF THE WAY."
815 PRINT@905,E;:INPUTD:CLS:ONDGOTO820,825,830,835
820 PRINT@448,"SOME PEOPLE DID EXACTLY THAT.  UNFORTUNATELY, THE
IR CARS
BECAME THEIR TOMBS.":GOTO700
825 PRINT@448,"IT IS HARD TO OUTRUN A VOLCANO.  YOU ARE OVERTAKE
N BY A MUDSLIDE":GOTO700
830 PRINT@448,"YOU WON'T HAVE TO BUILD A FIRE HERE.  IT WILL BE
PLENTY HOT
WITHOUT IT IN A FEW MINUTES.":GOTO700
835 PRINT"IF THERE IS A CHANCE YOU CAN USE YOUR CAR TO GET AWAY,
 TAKE IT!":PRINT:PRINT:PRINT"BY USING TREE LIMBS AS A LEVER AND
PUSHING OTHER ROCKS OUT OF
THE WAY WITH THE CAR, YOU MANAGE TO GET THROUGH."
840 PRINT"AS SOON AS YOU'RE CLEAR, YOU FLOOR THE ACCELERATOR.  Y
OU'RE
GOING 80 MPH DOWN A DIRT ROAD.  YOU ARE APPOACHING A BRIDGE THAT
CROSSES THE TOUTLE RIVER WHEN SUDDENLY A MUD FLOW HITS.  THE
BRIDGE EXPLODES BEFORE YOUR EYES."
845 PRINT"YOU SLAM ON THE BRAKES AND STOP JUST SHORT OF THE STEA
MING
CHOCOLATE OOZE.  YOUR WAY BLOCKED, YOU GET OUT OF YOUR CAR AND
BEGIN RUNNING.  AFTER A WHILE YOU TIRE AND SLOW DOWN, BUT
LOOKING UP YOU START TO RUN AGAIN.";
850 PRINT"  THE ASH CLOUD IS COMING."
855 PRINT@982,P;
860 IFINKEY$<>"/"THEN860ELSECLS
865 PRINT:PRINT:PRINT:PRINT"AS THE CLOUD DESCENDS, IT IS AS IF S
OMEONE HAS THROWN A BLACK,  VELVET CURTAIN OVER YOUR HEAD.  ALL
LIGHT VANISHES.  YOU CANNOT SEE YOU HAND IN FRONT OF YOUR FACE.
 IT IS HOT, BURNING.
870 PRINT"YOU TRY TO CATCH YOUR BREATH, BUT YOUR THROAT FEELS LI
KE IT IS
STUFFED WITH WARM COTTON FLUFF.  YOUR LUNGS BURN AND YOUR EYES
STING.  YOU STUMBLE AND FALL IN THE DARKNESS."
875 PRINT@982,P;
880 IFINKEY$<>"/"THEN880ELSECLS
885 PRINT@276,"WHAT SHOULD YOU DO?"
890 PRINT@340,STRING$(20,"-")
895 PRINT:PRINT"1.)  LIE DOWN WITH YOUR FACE ON THE GROUND.
2.)  FIND SOME SHELTER.
3.)  RUB THE ASH FROM YOUR EYES.
4.)  KEEP MOVING IN THE DARK."
900 PRINT@905,"ENTER THE NUMBER OF THE ACTION YOU SELECT.";:INPU
TD
905 CLS:ONDGOTO910,915,920,925
910 PRINT@448,"THE RIGHT DECISION, IF YOU WANT TO MAKE THIS YOUR
 ETERNAL
RESTING PLACE !":GOTO700
915 PRINT@448,"I HOPE YOU LIKE THE SPOT YOU FIND, BECAUSE YOU'RE
 GOING TO
BE THERE FOREVER.":GOTO700
920 PRINT@448,"VOLCANIC ASH IS VERY ABRASIVE.  YOUR EYES SWELL U
P.
YOU WANDER AROUND AND ARE OVERCOME.":GOTO700
925 PRINT:PRINT:PRINT"THIS IS THE ONLY REAL CHANCE YOU HAVE.  TO
 STAY WHERE YOU ARE
MEANS CERTAIN DEATH."
930 PRINT:PRINT:PRINT"YOU GET UP AND BEGIN WALKING WITH YOUR HAN
DS OUT BEFORE
YOU TO FEEL THE WAY.":PRINT"AFTER A WHILE YOU NOTICE THAT YOUR F
EET FEEL WET.
YOU THINK YOU ARE WALKING IN A CREEK."
935 PRINT@982,P;
940 IFINKEY$<>"/"THEN940ELSECLS
945 PRINT@276,"WHAT SHOULD YOU DO?"
950 PRINT@340,STRING$(20,"-")
955 PRINT:PRINT"1.)  GET OUT OF THE WATER AND KEEP MOVING.
2.)  WASH OUT YOUR EYES WITH THE WATER.
3.)  WALK IN THE CREEK.
960 PRINT@905,E;:INPUTD
965 CLS:ONDGOTO970,975,980
970 PRINT@448,"SINCE YOU HAVE NO WAY TO KNOW WHERE YOU'RE GOING,
 YOU WANDER
IN A CIRCLE UNTIL EXHAUSTION TAKES OVER.":GOTO700
975 PRINT@448,"THE ASHFALL IS TOO HEAVY.  THE WATER MIXES WITH I
T TO FORM A
GRITTY PASTE.":GOTO700
980 PRINT:PRINT"SINCE YOU HAVE NO IDEA OF WHICH DIRECTION YOU'RE
 GOING, THIS
OFFERS THE BEST ALTERNATIVE.  YOU STOOP DOWN AND FEEL THE WAY
THE WATER IS FLOWING AND FOLLOW THE CURRENT DOWNHILL.":PRINT
985 PRINT:PRINT"YOU TRAVEL DOWN THE CREEK FOR SOME TIME.  THEN,
WITHOUT WARNING
YOU PLUNGE INTO HOT WATER UP TO YOUR NECK.  INSTINCTIVELY, YOU
REACH OUT IN THE DARKNESS AND GRAB HOLD OF SOMETHING...
A FALLEN TREE."
990 PRINT"IT PULLS YOU ALONG DOWNSTREAM."
995 PRINT@982,P;
1000 IFINKEY$<>"/"THEN1000ELSECLS
1005 PRINT@276,"WHAT SHOULD YOU DO?"
1010 PRINT@340,STRING$(20,"-")
1015 PRINT:PRINT"1.)  LET GO OF THE LOG AND SWIM FOR THE BANK.
2.)  SWIM UNDERWATER.
3.)  HANG ON."
1020 PRINT@905,E;:INPUTD
1025 CLS:ONDGOTO1030,1030,1035
1030 PRINT@448,"THE RIVER IS FILLED WITH DEBRIS.  YOU ARE CRUSHE
D IN A LOG JAM.":GOTO700
1035 PRINT:PRINT"THE LOG CARRIES YOU ALONG UNTIL IT STOPS AT A L
OG JAM.
THE END YOU ARE HOLDING ON TO SWINGS AROUND AND RESTS ON A
SHALLOW AREA BESIDE THE BANK.  YOU SCRAMBLE OUT OF THE WATER."
1040 PRINT:PRINT"FINALLY, YOU CAN SEE SOMETHING... A DIM GLOW IN
 THE DISTANCE.
IT LOOKS LIKE A SEARCH LIGHT.  THEN YOU REALIZE THAT IT IS THE
SUN SHINING THROUGH THE ASH CLOUD.  AS YOU GO ON THE ASH GETS
THINNER."
```

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1045 PRINT"FINALLY, THE SUN BREAKS THROUGH AND YOU CAN SEE THE S
KY AGAIN.  UP AHEAD YOU SEE A RIDGE, BELOW YOU IS A PLATEAU OF
INDESCRIBABLE DEVASTATION... A GRAY ASH COVERED MOONSCAPE."
1050 PRINT@982,P;
1055 IFINKEY$<>"/"THEN1055ELSECLS
1060 PRINT@276,"WHAT SHOULD YOU DO?"
1065 PRINT@340,STRING$(20,"-")
1070 PRINT:PRINT"1.)  YOU ARE BLEEDING A LITTLE FROM YOUR HEAD A
ND ARMS.
     TEND TO YOUR WOUNDS.
2.)  GO UP TO THE RIDGE.
3.)  START DOWN TOWARDS THE PLATEAU.
4.)  REST YOURSELF."
1075 PRINT@905,E;:INPUTD
1080 CLS:ONDGOTO1085,1095,1090,1085

1085 PRINT@448,"YOU HAVE WASTED VALUABLE TIME.  YOU FALL ASLEEP
AND
NEVER WAKE UP.":GOTO700
1090 PRINT@448,"WHY ON EARTH WOULD YOU WANT TO GO DOWN THERE!
POISON GAS GETS YOU.":GOTO700
1095 PRINT@448,"UP ON THE RIDGE YOU CAN BE SEEN BETTER FROM THE
AIR.
ONCE ON TOP YOU GET AN EVEN BETTER APPRECIATION FOR THE AWESOME
MAGNITUDE OF THE VOLCANO.  EVERYTHING BELOW YOU IS COVERED WITH

THICK, INPENETRABLE SMOKE."
1100 PRINT@982,P;
1105 IFINKEY$<>"/"THEN1105ELSECLS
1110 PRINT@276,"WHAT SHOULD YOU DO?"
1115 PRINT@340,STRING$(20,"-")
1120 PRINT:PRINT"1.)  CONTINUE DOWN THE MOUNTAIN.
2.)  TRY TO ATTRACT RESCUERS."
1125 PRINT@905,E;:INPUTD
1130 CLS:ONDGOTO1135,1140
1135 PRINT@448,"THERE IS NO PLACE TO GO BUT BACK INTO THE DARKNE
SS.

 YOU SUCCUMB TO SMOKE INHALATION.":GOTO700

          Lines 1140-1205: Win routine.


1140 PRINT:PRINT:PRINT"SINCE YOU ARE IN AN AREA EASILY VISIBLE T
O RESCUE HELICOPTERS,
AND EVERYTHING BELOW YOU IS COVERED WITH TOXIC SMOKE, YOU WISELY
DECIDE TO BUILD A SIGNAL THAT CAN BE SEEN FROM THE AIR."
1145 PRINT"YOU ARRANGE ROCKS SO THEY SPELL OUT 'S O S ' AND POIN
T A LONG
ARROW TO A SMALL FIRE.
FINISHED YOU FALL TO THE GROUND EXHAUSTED, BUT FIGHTING THE URGE
TO SLEEP.  YOU MUST REMAIN ALERT FOR THE POSSIBILITY OF RESCUE."
1150 PRINT:PRINT"AGAINST THE RUMBLING OF THE VOLCANO, YOU HEAR A
 NEW SOUND...
ALSO LOUD, BUT CHOPPY."
1155 PRINT@982,P;
1160 IFINKEY$<>"/"THEN1160ELSECLS
1165 PRINT@335,"IT'S A HELICOPTER !"
1170 PRINT:PRINT"YOU TAKE OFF YOUR TORN SHIRT AND WAVE IT WILDLY
.
ASH FALLS OFF YOU IN A SMALL CLOUD AS YOU JUMP UP AND DOWN
YELLING AS LOUD AS YOU CAN."
1175 PRINT"THEY SEE YOU AS A PLASTER GRAY FIGURE RUNNING AROUND
IN CIRCLES.THEY LOWER A WICKER RESCUE BASKET, AND YOU JUMP IN."
1180 PRINT@982,P;
1185 IFINKEY$<>"/"THEN1185ELSECLS
1190 PRINT@271,CHR$(23)"YOU  MADE  IT ! !"
1195 PRINT@522,"YOU BEAT THE MOUNTAIN"
1200 PRINT@784,"CONGRATULATIONS";:PRINT:PRINT
1205 FORT=0TO1200:NEXTT:END
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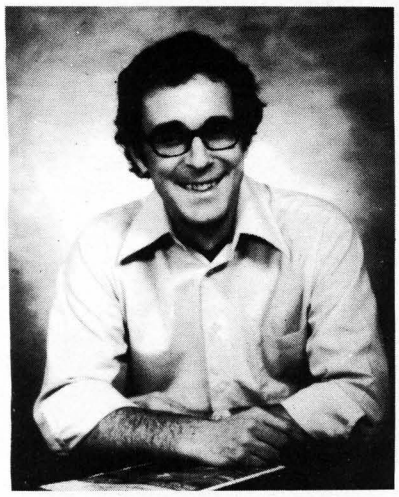
A REMARKABLE MAGAZINE



David Ahl, Founder and
Publisher of Creative Computing

creative computing

"The beat covered by Creative Computing is one of the most important, explosive and fast-changing."—Alvin Toffler

You might think the term "creative computing" is a contradiction. How can something as precise and logical as electronic computing possibly be creative? We think it can be. Consider the way computers are being used to create special effects in movies—image generation, coloring and computer-driven cameras and props. Or an electronic "sketchpad" for your home computer that adds animation, coloring and shading at your direction. How about a computer simulation of an invasion of killer bees with you trying to find a way of keeping them under control?

Beyond Our Dreams

Computers are not creative per se. But the way in which they are used can be highly creative and imaginative. Five years ago when *Creative Computing* magazine first billed itself as "The number 1 magazine of computer applications and software," we had no idea how far that idea would take us. Today, these applications are becoming so broad, so all-encompassing that the computer field will soon include virtually everything!

In light of this generality, we take "application" to mean whatever can be done with computers, *ought* to be done with computers or *might* be done with computers. That is the meat of *Creative Computing*.

Alvin Toffler, author of *Future Shock* and *The Third Wave* says, "I read *Creative Computing* not only for information about how to make the most of my own equipment but to keep an eye on how the whole field is emerging.

Creative Computing, the company as well as the magazine, is uniquely lighthearted but also seriously interested in all aspects of computing. Ours is the magazine of software, graphics, games and simulations for beginners and relaxing professionals. We try to present the new and important ideas of the field in a way that a 14-year old or a Cobol programmer can understand them. Things like text editing, social simulations, control of household devices, animation and graphics, and communications networks.

Understandable Yet Challenging

As the premier magazine for beginners, it is our solemn responsibility to make what we publish comprehensible to the newcomer. That does not mean easy; our readers like to be challenged. It means providing the reader who has no preparation with every possible means to seize the subject matter and make it his own.

However, we don't want the experts in our audience to be bored. So we try to publish articles of interest to beginners and experts at the same time. Ideally, we would like every piece to have instructional or informative content—and some depth—even when communicated humorously or playfully. Thus, our favorite kind of piece is acessible to the beginner, theoretically non-trivial, interesting on more than one level, and perhaps even humorous.

David Gerrold of *Star Trek* fame says, "*Creative Computing* with its unpretentious, down-to-earth lucidity encourages the computer user to have fun. *Creative Computing* makes it possible for me to learn basic programming skills and use the computer better than any other source.

Hard-hitting Evaluations

At *Creative Computing* we obtain new computer systems, peripherals, and software as soon as they are announced. We put them through their paces in our Software Development Center and also in the environment for which they are intended—home, business, laboratory, or school.

Our evaluations are unbiased and accurate. We compared word processing printers and found two losers among highly promoted makes. Conversely, we found one computer had far more than its advertised capability. Of 16 educational packages, only seven offered solid learning value.

When we say unbiased reviews we mean it. More than once, our honesty has cost us an advertiser—temporarily. But we feel that our first obligation is to our readers and that editorial excellence and integrity are our highest goals.

Karl Zinn at the University of Michigan feels we are meeting these goals when he writes. "*Creative Computing* consistently provides value in articles, product reviews and systems comparisons . . . in a magazine that is fun to read."

Order Today

To order your subscription to *Creative Computing*, send $20 for one year (12 issues), $37 for two years (24 issues) or $53 for three years (36 issues). If you prefer, call our toll-free number, **800-631-8112** (in NJ 201-540-0445) to put your subscription on your MasterCard, Visa or American Express card. Canadian and other foreign surface subscriptions are $29 per year, and must be prepaid. We guarantee that you will be completely satisfied or we will refund the entire amount of your subscription.

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The story behind the two best selling computer games books in the world.

Computer Games

by David H. Ahl

Everybody likes games. Children like tic tac toe. Gamblers like blackjack. Trekkies like Star Trek. Almost everyone has a favorite game or two.

It Started in 1971

Ten years ago when I was at Digital Equipment Corp. (DEC), we wanted a painless way to show reluctant educators that computers weren't scary or difficult to use. Games and simulations seemed like a good method.

So I put out a call to all our customers to send us their best computer games. The response was overwhelming. I got 21 versions of blackjack, 15 of nim and 12 of battleship.

From this enormous outpouring I selected the 90 best games and added 11 that I had written myself for a total of 101. I edited these into a book called 101 Basic Computer Games which was published by DEC. It still is.

When I left DEC in 1974 I asked for the rights to print the book independently. They agreed as long as the name was changed.

Contents of *Basic Computer Games* (right) and *More Basic Computer Games* (below).

Artillery-3
Baccarat
Bible Quiz
Big 6
Binary
Blackbox
Bobstones
Bocce
Boga II
Bumbrun
Bridge-It
Camel
Chase
Chuck-A-Luck
Close Encounters
Column
Concentration
Condot
Convoy
Corral
Countdown
Cup
Dealer's Choice
Deepspace
Defuse
Dodgem
Doors
Drag
Dr. Z
Eliza
Father
Flip
Four In A Row
owar
Grand Prix
Guess-It
ICBM
Inkblot
Joust
Jumping Balls
Keno
L Game
Life Expectancy
Lissajous
Magic Square
Man-Eating Rabbit
Maneuvers
Mastermind
Masterbagels
Matpuzzle
Maze,
Millionaire
Minotaur
Motorcycle Jump
Nomad
Not One
Obstacle
Octrix
Pasart
Pasart 2
Pinball
Rabbit Chase
Roadrace
Rotate
Safe
Scales
Schmoo
Seabattle
Seawar
Shoot
Smash
Strike 9
Tennis
Tickertape
TV Plot
Twonky
Two-to-Ten
UFO
Under & Over
Van Gam
Warfish
Word Search Puzzle
Wumpus 1
Wumpus 2

Introduction
The Basic Language
Conversion to Other Basics
Acey Ducey
Amazing
Animal
Awari
Bagels
Banner
Basketball
Batnum
Battle
Blackjack
Bombardment
Bombs Away
Bounce
Bowling
Boxing
Bug
Bullfight
Bullseye
Bunny
Buzzword
Calendar
Change
Checkers
Chemist
Chief
Chomp
Civil War
Combat
Craps
Cube
Depth Charge
Diamond
Dice
Digits
Even Wins
Flip Flop
Football
Fur Trader
Golf
Gomoko
Guess
Gunner
Hammurabi
Hangman
Hello
Hexapawn
Hi-Lo
High I-Q
Hockey
Horserace
Hurkle
Kinema
King
Letter
Life
Life For Two
Literature Quiz
Love
Lunar LEM Rocket
Master Mind
Math Dice
Mugwump
Name
Nicomachus
Nim
Number
One Check
Orbit
Pizza
Poetry
Poker
Queen
Reverse
Rock, Scissors, Paper
Roulette
Russian Roulette
Salvo
Sine Wave
Slalom
Slots
Splat
Stars
Stock Market
Super Star Trek
Synonym
Target
3-D Plot
3-D Tic-Tac-Toe
Tic Tac toe
Tower
Train
Trap
23 Matches
War
Weekday
Word

Converted to Microsoft Basic

The games in the original book were in many different dialects of Basic. So Steve North and I converted all the games to standard Microsoft Basic, expanded the descriptions and published the book under the new name Basic Computer Games.

Over the next three years, people sent in improved versions of many of the games along with scores of new ones. So in 1979, we totally revised and corrected Basic Computer Games and published a completely new companion volume of 84 additional games called More Basic Computer Games. This edition is available in both Microsoft Basic and TRS-80 Basic for owners of the TRS-80 computer.

Today Basic Computer Games is in its fifth printing and More Basic Computer Games is in its second. Combined sales are over one half million copies making them the best selling pair of books in recreational computing by a wide margin. There are many imitators, but all offer a fraction of the number of games and cost far more.

The games in these books include classic board games like checkers. They include challenging simulation games like Camel (get across the desert on your camel) and Super Star Trek. There are number games like Guess My Number, Stars and Battle of Numbers. You'll find gambling games like blackjack, keno, and poker. All told there are 185 different games in these two books.

Whether you're just getting started with computers or a proficient programmer, you'll find something of interest. You'll find 15-line games and 400-line games and everything in between.

The value offered by these books is outstanding. Every other publisher has raised the price of their books yet these sell for the same price as they did in 1974.

Moneyback Guarantee

Examine one or both of these books and key some games into your computer. If you're not completely satisfied we'll refund the full purchase price plus your return postage.

Basic Computer Games costs only $7.50 and More Basic Computer Games just $7.95 for either the Microsoft or TRS-80 edition (please specify your choice on your order). Both books together are $15. Send payment plus $2.00 shipping and handling to Creative Computing Press, Morris Plains, NJ 07950. Visa, MasterCard and American Express orders should include card number and expiration date. Charge card orders may also be called in toll-free to 800-631-8112 (in NJ 201-540-0445).

Order today to turn your computer into the best game player on the block.

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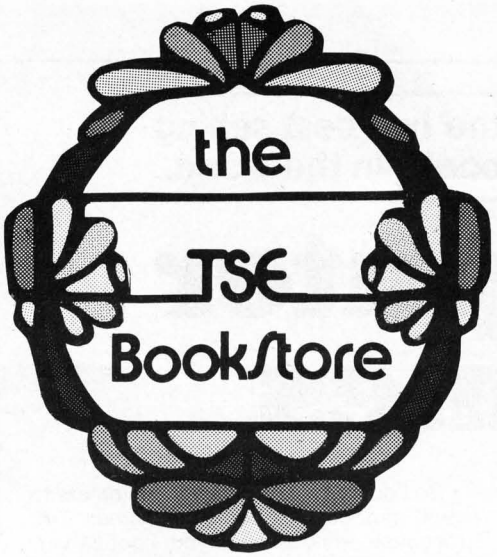

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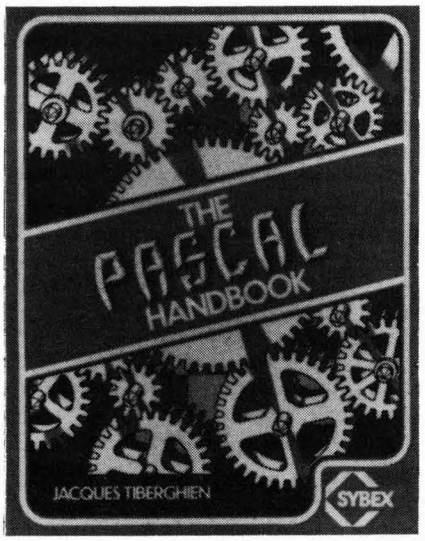

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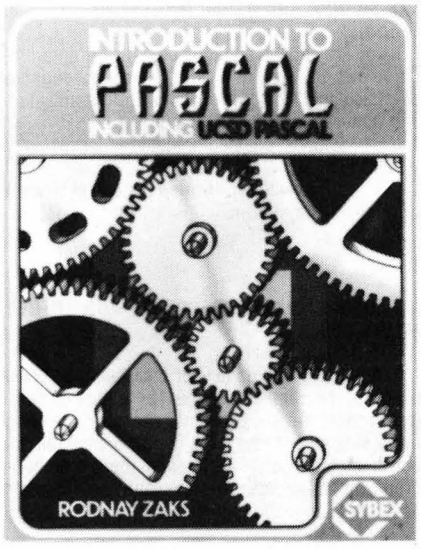

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This step-by-step guide to UCSD and STANDARD Pascals is written as a tutorial for beginners — even those with no programming experience — yet includes complex concepts for experienced programmers. Both will find the book a useful reference tool because of its logical format and extensive appendices. $12.95

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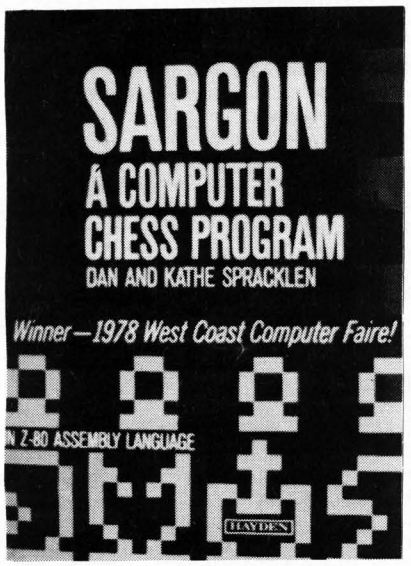

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by W. Morris and J. Cope

Flags is an Atari program requiring at least 16K memory.

This program uses Atari's colorful graphics capabilities to display national flags on the screen. The object, then, is to dig back in your mind to your 7th-grade geography class and associate the flags with the countries which they represent. It's not only fun, but painlessly educational as well! All the necessary prompts and instructions are given by the program as it runs.

Play with this for awhile, and the next time you visit the United Nations building you'll be able to impress all your friends out of their minds.

Flag Variables:
A$: Country name.
B0, B1, B2, C0, C1, C2: Color luminescences.
NU: Number of flags to identify.
PR: Current number of flags being identified.
SCORE: Current number correct.
TOTAL: Current number of entries.
STICK, STRIG: Joystick commands to control choice of input.
KEY: Keyboard input.

Documentation

Lines 20-50:

Title Page

Lines 60-90:

Game Delimiter — Player sets the limit on the length of the session. Line 90 sends the program to line 8000 after the final emblem.

Lines 100-140:

Random selection of the country and flag to be identified. If R >18 branch to line 1000, otherwise we go to 2000.

Lines 1000-1090:

Routine to draw VERTICAL bars. Line 1010 branches to 3000 if r < 8 to draw a crest.

Lines 2000-2010:

Routine to draw HORIZONTAL bars. Line 2010 is a conditional branch to 3000 if R<25 to draw a crest in the flag center.

Line 3000:

Crest Routine

Lines 8000-end:

The participant chooses whether to end the session or start again.

Lines 9000-9200

The main game loop section. Notice how the Atari 'STICK' command is used to scroll the possible choices while the STRIG statement is used to signify the player's selection.

Line 9140 controls the scolling of possible choices through recongnizing only an 'up' input. Once received, the program branches to the appropriate line.

Line 9150 is used to recognize the player's choice of the country's flag.

Line 9170 equals correct answer while 9200 registers an incorrect entry.

Lines 10000-10360:

Data lines containing country and color data.

Lines 15000-15010:

Data lines for two voice anthem.

Lines 30000-30020:

Sound routine for siren affect.

Lines 30040:

Sound routine for Anthem. A, B, C and D are dummy variables used to speed up the read process.

Lines 30100-30130:

Delay Routines.

Lines 31000-31060

Introduction

```
0 REM xxx FLAGS xxx
1 REM xxx Wm Morris & J. Cope xxx
10 DIM A$(81),B$(20)
20 GRAPHICS 18:SETCOLOR 4,4,1:COLOR 32
:PLOT 6,5:? #6;"flags":GOSUB 30040
30 ? #6:? #6:? #6;" instructions [y/n]
?"
40 OPEN #1,4,0,"K:":GET #1,KEY
50 GOSUB 30000:IF KEY=89 THEN GOSUB 31
000
60 GRAPHICS 2:SETCOLOR 1,11,0:SETCOLOR
 2,11,6:SETCOLOR 4,11,0:COLOR 32:PLOT
0,3
70 ? #6;"HOW MANY FLAGS DO":? #6;"
YOU WISH TO":? #6;"     IDENTIFY?":?
80 INPUT NU
90 PR=PR+1:IF PR=NU+1 THEN 8000
100 RESTORE :R=INT(RND(0)*37)+1
110 FOR Z=1 TO R:A$="":READ A$,C0,B0,C
1,B1,C2,B2:NEXT Z:FOR Z=LEN(A$)+1 TO 8
0:A$(Z)=" ":NEXT Z:A$(81)="*"
120 GRAPHICS 3:SETCOLOR 0,C0,B0:SETCOL
OR 1,C1,B1:SETCOLOR 2,C2,B2:SETCOLOR 4
,0,5
130 IF R>17 THEN GOTO 2000
140 GOTO 1000
1000 FOR Z=2 TO 16:COLOR 1:PLOT 6,Z:DR
AWTO 15,Z:COLOR 2:PLOT 16,Z:DRAWTO 25,
Z:COLOR 3:PLOT 26,Z:DRAWTO 35,Z:NEXT Z
1010 IF R<8 THEN GOSUB 3000
1090 GOTO 9000
2000 FOR Z=1 TO 3:COLOR Z:FOR Y=1 TO 5
:PLOT 6,(Z-1)*5+Y+1:DRAWTO 35,(Z-1)*5+
Y+1:NEXT Y:NEXT Z
2010 IF R<25 THEN GOSUB 3000
2090 GOTO 9000
3000 COLOR 4:FOR Z=19 TO 22:PLOT Z,8:P
LOT Z,10:NEXT Z:PLOT 19,9:RETURN
8000 GRAPHICS 18:SETCOLOR 2,2,0:SETCOL
OR 4,2,0:COLOR 32:PLOT 4,3:PRINT #6;SC
ORE;" OUT OF ";TOTAL
8010 PLOT 1,6:PRINT #6;"play again (y/
n)":GET #1,KEY:IF KEY=89 THEN RUN
8020 END
9000 IF R>33 THEN RESTORE
9005 READ B$:POKE 752,1:FOR Z=21 TO 61
 STEP 20
9010 FOR Y=1 TO 7:READ B$:NEXT Y
9020 A$(Z,Z+19)=B$:NEXT Z
9100 ? "   WHAT COUNTRY FLIES THIS FLA
G ?":GOSUB 30120:GOSUB 30120
9110 R=INT(RND(0)*4)*20:Z=R
9120 Z=Z+20:IF Z>61 THEN Z=1
9130 GOSUB 30020:? :? :? ,A$(Z,Z+19):?
9140 IF STICK(0)=14 THEN 9120
9150 IF STRIG(0)=1 THEN 9140
9160 PRINT :PRINT :PRINT ,A$(1,20):PRI
NT :IF Z<>1 THEN 9200
9170 SCORE=SCORE+1:TOTAL=TOTAL+1:PRINT
 "  CORRECT      SCORE: ";SCORE;" OUT
OF ";TOTAL
9180 FOR Z=1 TO 3:FOR Y=0 TO 6 STEP 2:
SETCOLOR 4,0,Y:GOSUB 30130:NEXT Y:GOSU
B 30000:NEXT Z:GOTO 90
9200 TOTAL=TOTAL+1:PRINT "  INCORRECT
    SCORE: ";SCORE;" OUT OF ";TOTAL:GO
SUB 30010:GOSUB 30110:GOTO 90
10000 DATA MEXICO,11,0,0,13,3,0
10010 DATA BARBADOS,8,0,13,12,8,0
10020 DATA GUATEMALA,8,0,0,13,8,0
10030 DATA PERU,3,0,0,13,3,0
10040 DATA CAMEROON,13,0,3,0,13,12
10050 DATA RWANDA,3,0,13,12,13,0
10060 DATA SENEGAL,11,0,13,12,3,0
10070 DATA IRELAND,13,0,0,13,2,0
10080 DATA ITALY,13,0,0,13,3,0
10090 DATA ANDORRA,8,0,13,12,3,0
10100 DATA CHAD,8,0,13,12,3,0
10110 DATA GUINEA,3,0,13,12,11,0
10120 DATA IVORY COAST,3,0,0,13,13,0
10130 DATA MALI,13,0,13,12,3,0
10140 DATA NIGERIA,13,1,0,13,13,1
10150 DATA BELGIUM,0,0,13,12,3,0
10160 DATA FRANCE,8,0,0,13,3,0
10170 DATA INDIA,3,0,0,13,13,0
10180 DATA EGYPT,3,0,0,13,0,0
```

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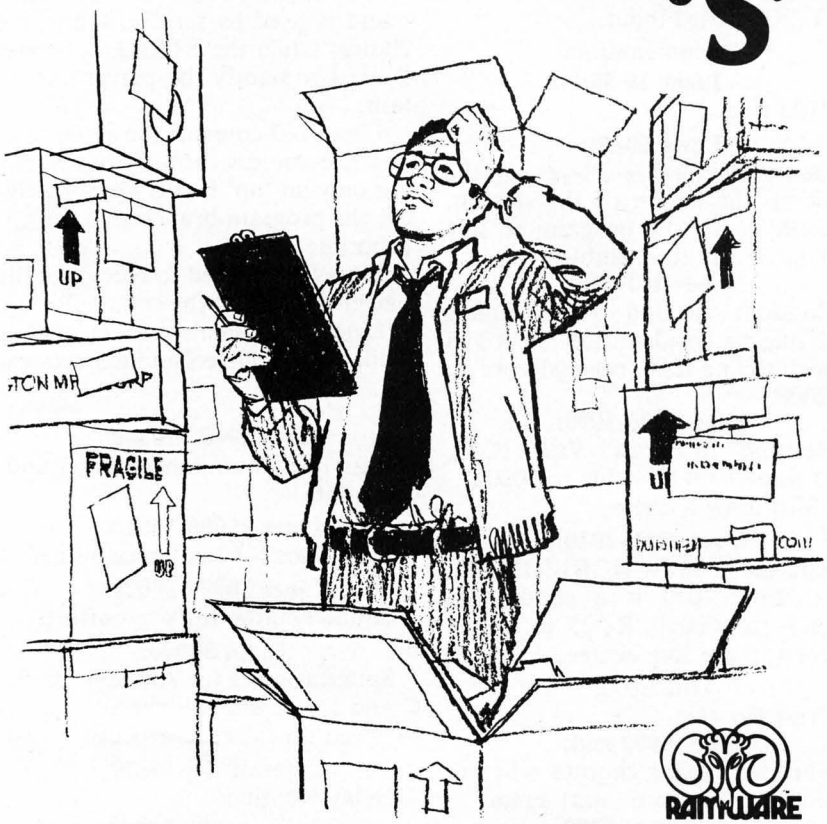
INVENTORY 'S'



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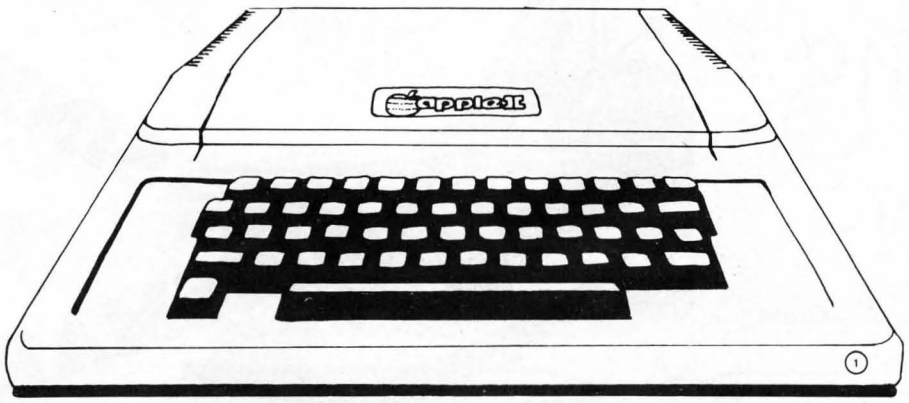
continued from previous page

```
10190 DATA BOLIVIA,3,0,13,12,13,0
10200 DATA NIGER,2,0,0,13,11,0
10210 DATA VENEZUELA,13,12,8,0,3,3
10220 DATA BULGARIA,0,13,13,5,3,0
10230 DATA EAST GERMANY,0,0,3,0,2,4
10240 DATA YUGOSLAVIA,8,0,0,13,3,0
10250 DATA PARAGUAY,3,0,0,13,8,0
10260 DATA LUXEMBURG,3,0,0,13,10,0
10270 DATA NETHERLANDS,3,0,0,13,8,0
10280 DATA WEST GERMANY,0,0,3,0,2,2
10290 DATA ETHIOPIA,11,0,13,12,3,0
10300 DATA GABON,11,0,13,12,8,0
10310 DATA HUNGARY,3,0,0,13,11,0
10320 DATA SIERRA LEONE,11,0,0,13,8,0
10330 DATA SUDAN,0,0,13,12,13,0
10340 DATA AUSTRIA,3,0,0,13,3,0
10350 DATA UPPER VOLTA,0,0,0,13,3,0
10360 DATA EL SALVADOR,8,0,0,13,8,0
15000 DATA 81,193,81,193,96,217,121,24
3,121,243,96,193,96,193,81,162,81,162,
60,243,60,243,60,243,60,243,60,243
15010 DATA 60,243,60,243
30000 FOR U=200 TO 100 STEP -1:SOUND 0
,U,10,4:NEXT U:SOUND 0,0,0,0:RETURN
30010 SOUND 0,240,12,8:FOR TT=1 TO 50:
NEXT TT:SOUND 0,0,0,0:RETURN
30020 SOUND 0,100,10,8:FOR TT=1 TO 20:
NEXT TT:SOUND 0,0,0,0:RETURN
30030 FOR U=1 TO 10:SOUND 0,INT(RND(0)
*100),10,4:NEXT U:SOUND 0,0,0,0:RETURN
30040 FOR U=1 TO 37:READ A$,A,B,C,D,E,
F:NEXT U
30050 FOR U=1 TO 16:READ US,UR:SOUND 0
,US,10,6:SOUND 1,UR,10,4:GOSUB 30130:G
OSUB 30130:NEXT U
30060 SOUND 0,0,0,0:SOUND 1,0,0,0:REST
ORE :RETURN
30100 FOR TT=1 TO 2000:NEXT TT
30110 FOR TT=1 TO 500:NEXT TT
30120 FOR TT=1 TO 100:NEXT TT
30130 FOR TT=1 TO 10:NEXT TT:RETURN
31000 GRAPHICS 0:SETCOLOR 2,8,0:SETCOL
OR 4,8,0:POKE 752,1:? :? :PRINT ,"Welc
ome to FLAGS"
31005 ? :? :? :? "Upon entering the nu
mber of national":? "emblems you wish
to identify, a flag"
31010 ? "will be displayed on the scre
en.":? "Push the joystick forward to v
iew the"
31020 ? "4 possibilities.  Pressing th
e ":? "joystick button will signify yo
ur"
31030 ? "choice. After an incorrect gu
ess":? "the emblem will be identified
for you"
31035 ? "before proceeding to the next
 flag.":? :? "A large 'C' in the emble
m's center"
31037 ? "represents a crest.":? :? :?
"      PRESS ANY KEY TO CONTINUE":POKE
 764,255
31050 IF PEEK(764)=255 THEN 31050
31060 POKE 764,255:GOSUB 30000:RETURN
```



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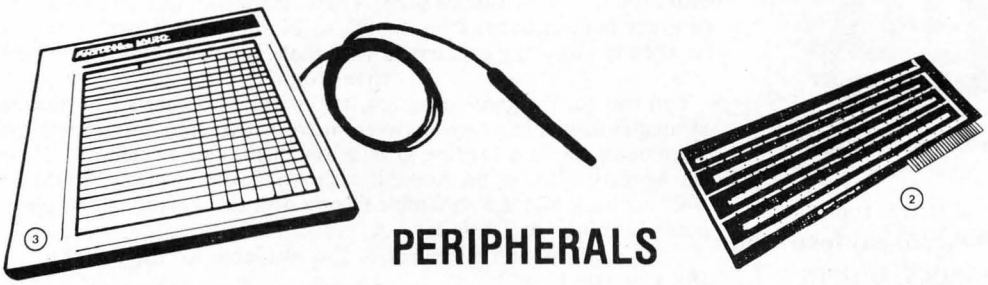

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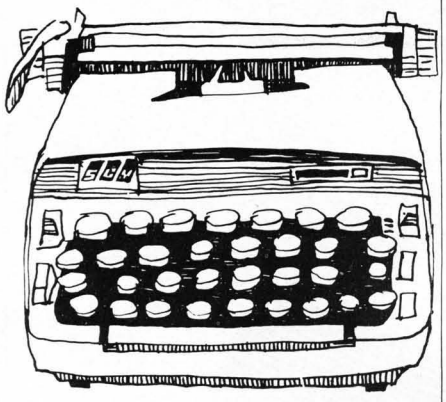

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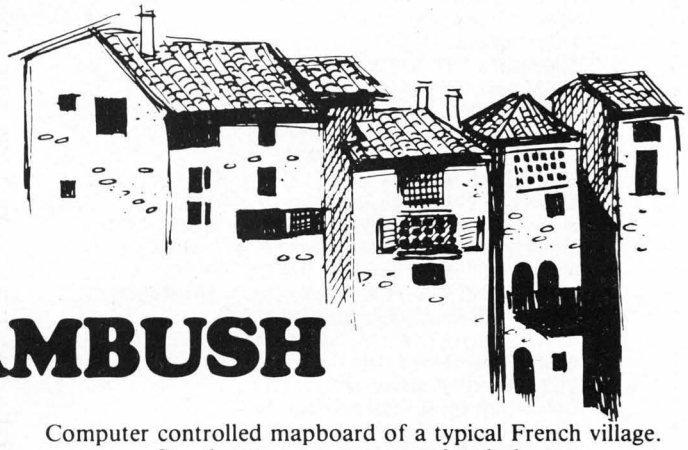

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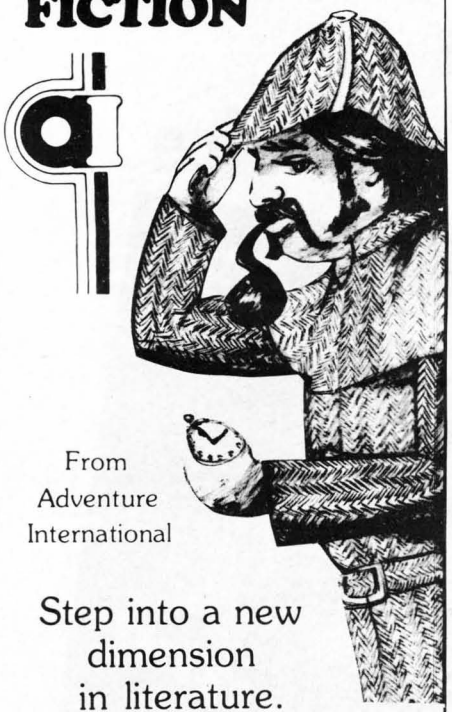

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STRATEGY STRIKE

by David Steenson
Apple translation by Jon Voskuil

"Strategy Strike" is a game that requires a 16K Level II S-80 or an Apple II or Apple II Plus. The program is equipped with sound, so an external amplifier is needed for the S-80 version.

"Strategy Strike" is a fast-moving game that combines both logic and memory. Players attempt to capture the opposing player's flag by moving an army of 40 pieces across a battle board frontwards, backwards, or sideways.

The game usually will take between 30 minutes and an hour to play. As players become more and more familiar with the process of the game, they will begin to develop their own strategies for army setups and movement.

The Atari version of "Strategy Strike" will appear in the April issue of **SoftSide.**

INSTRUCTIONS

The object of the game is to move militarily ranked pieces across a battle board in anticipation of capturing the opposing player's flag. Each player starts with an army of 40 pieces consisting of:

# OF PIECES	NAME	RANK
1	Marshal	1
1	General	2
2	Colonel	3
3	Major	4
4	Captain	5
4	Lieutenant	6
4	Sergeant	7
5	Miner	8
8	Scout	9
1	Spy	10
6	Bomb	UNMOVEABLE
1	Flag	UNMOVEABLE

The above pieces are in order of military rank, the Marshal being the highest ranked, and the Spy being the lowest. However, even though the spy is the lowest ranked piece, it is the only piece that can remove the Marshal from the board. The Bombs are unmoveable pieces that can remove any piece that tries to "strike" it, except for the Miner who can dismantle and remove the Bomb.

The game is played on a ten-by-ten board which will be fully displayed on the screen throughout the game. Player 1 sets up the pieces on the top four rows of the board, and player 2 sets up pieces on the bottom four rows. The two middle rows are left blank at the start of the game. When both players have set up their armies, they will have a chance to make any needed changes.

SETUP

Player 1 sets up pieces on rows 1-4 (row 1 is the back row and row 4 is the front row). To place any of the movable pieces (except the Spy) on the board, simply type the rank of the desired piece and the blinking square will then contain that piece. To place a Spy, a Bomb, or a Flag, type S, B, or F respectively. Player 2 sets up pieces on rows 7-10 (row 10 is the back row and row 7 is the front row.) Player 2 places pieces on the board in the same manner that player 1 does.

MOVEMENT

1). Pieces may move only one space at a time — forwards, backwards, or sideways. There are no diagonal moves. The players type in the coordinates of the piece they want to move and where they want to move it. The X and Y coordinates of a piece are measured VERTICALLY and then HORIZONTALLY (X: Vertical Y: Horizontal).

2). Pieces may not move onto the lakes in the center of the board.

3). Two pieces may not occupy the same space at one time and pieces may not be jumped.

4). The Flag and Bombs cannot be moved.

A player's pieces are revealed only when it is that player's turn. The opposing player should should not be facing the screen when an opponent is debating a move. The only time that both players can look at the screen at the same time is when one player's piece attacks another's.

STRIKE OR ATTACK RULES

1). Players' pieces must be in adjoining squares to attack. There are no diagonal attacks.

2). A player cannot strike and move in the same turn.

3). To strike, a player does the following: When the computer prints "FROM?", the player types the current position coordinates. The computer will then print "TO?". The player types the coordinates of the piece that is to be attacked (making sure it is in an adjoining square). The computer will then print "CORRECT?". A response of "YES" will check to see if the attack is correct. A response of "NO" will return execution to "FROM?" input.

4). The piece with the lower rank is erased from the board.

5). If the rank is equal, both pieces are erased from the board.

6). A Spy can remove a Marshal if the Spy attacks first, however if the Marshal attacks first, the Spy is removed. A Miner can remove a Bomb from the board.

7). Bombs cannot be moved, but rather must wait for an opposing player to strike them.

SPECIAL FEATURES

1). If for any reason the display on the screen becomes distorted (possibly due to improper input) a player can input the coordinates (0,0) in either the "FROM?" or "TO?" input and the board will be redrawn.

2). If the player cannot move in turn or wishes to give up, the coordinates (-1,-1) can be typed in the "FROM?" input.

3). If the player types the wrong coordinates in the "FROM?" input, the coordinates (-1, -1) may be typed in the "TO?" input to return to the "FROM?" input.

4). When a player has input both the initial (FROM?) and final (TO?) coordinates, the computer will print "CORRECT?". A "YES" response will move the player's piece as instructed. A "NO" response will return to the "FROM?" input. This feature serves two purposes:

1) A player may have typed in the wrong "TO?" coordinates.

2) A player may want to make a different move.

The game ends when a player strikes the opposing player's Flag or a player gives up.

Strategy Strike Variables:
S-80 Version

DD$: Graphic string used to build DE$

DE$: Graphic string used to white out part of screen during attack routine.

ED$: Null string used to erase the section of the screen whited out by DE$.

B$(1-12): Graphic strings for strike routine printout of the value of the pieces attacking.

X, Y: For/Next loop variable counters used to compute data and poke graphics characters.

E(1-10,1-10): PRINT@ positions for player's pieces on game board.

A(1-10,1-10): Space occupation variables for player 1. If A(X,Y) has a piece at coordinates (X,Y).

A(11-20,1-10): Space occupation for player 2.

I: For/Next loop variable for delay of execution and graphic display printouts.

U: User call variable.

II: For/Next loop variable for delay of execution and graphic display printouts.

T: Counting variable used to print coordinate numbers on game board.

C(1-10,1-10): Space identification variables for player 1. If the value of C(X,Y) is between 1 and 12, and A(X,Y) = 1 then C(X,Y) contains the type of piece at this location.

C(11-20,1-10): Space identification variables for player 2.

A$: INKEY$ used for players to set up their pieces.

A: Numerical value of A$ if it has one.

C1, C2: X, Y coordinates of piece player is attempting to move (in STRATEGY STRIKE, the X is the vertical coordinate and the Y is the horizontal coordinate).

C3, C4: X, Y coordinates of space to which player wants to move his piece.

X6, Y6: Set points of the PRINT@ position that the player is trying to move to (used to make sure a player is not moving onto a lake via POINT (X6,Y6)...).

U1, U2: Starting coordinate of player's piece that player wishes to change the position of.

U3, U4: Final coordinates of piece at coordinates (U1,U2).

U5: Stores the current value of C(U1,U2) so players piece at coordinates C(U1,U2) and C(U3,U4) can be interchanged.

NL$: Dummy string for sound routine.

E8: Starting address where sound routine is POKEd into memory.

E9: Variable pointer for NL$.

E7: Counting variable that POKEs sound data into memory.

E6: Sound routine variable (reads sound data).

NU(1-12): Starting number of pieces of each type that may be placed on the board by each player.

PI(1-12): Number of pieces of each type actually placed on the board by the current player.

SP(1-2): Position for the two display boxes on the screen used during attack routines.

```
5 REM STRATEGY STRIKE  BY DAVID STEENSON
      TRS-80 LEVEL II 16K OR DISK
      (C) COPYRIGHT 1981
   Line 7 defines all variables A-Z as integers and clears 250
          bytes for string space.
7 CLS:DEFINTA-Z:CLEAR250:PL=1:Z=125:DIM SP(2):SP(1)=314:SP(2)=69
8
8 DIM A(20,10),C(20,10):DIM NU(12),PI(12):FORT=1TO12:READNU(T):N
EXTT
   Line 9 contains the number of pieces of each type that each
          are used in setting up the screen.
9 DATA 1,1,2,3,4,4,4,5,8,1,1,6
   Line 10 sets up strings that white out and erase the section
          that contains the player's pieces during an attack.
10 PRINTCHR$(23);:PRINT@464,"STRATEGY STRIKE";:DD$=STRING$(7,191
)+CHR$(26)+STRING$(7,24):DE$=DD$+DD$+DD$+STRING$(7,191):ED$=STRI
NG$(7,131)+CHR$(26)+STRING$(7,24)+CHR$(199)+CHR$(26)+STRING$(7,2
4)+CHR$(199)+CHR$(26)+STRING$(7,24)+STRING$(7,176)
   Lines 20-50 set up the large graphic strings(numbers 1,9, S,
          F, and a graphic bomb).
20 DIME$(12):B$(1)=CHR$(131)+CHR$(191)+CHR$(26)+STRING$(2,24)+CH
R$(176)+CHR$(191)+CHR$(176):B$(2)=STRING$(2,131)+CHR$(191)+CHR$(
26)+STRING$(3,24)+CHR$(191)+STRING$(2,179):B$(3)=STRING$(2,131)+
CHR$(191)+CHR$(26)+STRING$(3,24)+STRING$(2,179)+CHR$(191)
30 B$(4)=CHR$(191)+" "+CHR$(191)+CHR$(26)+STRING$(3,24)+STRING$(
2,131)+CHR$(191):B$(5)=CHR$(191)+STRING$(2,131)+CHR$(26)+STRING$
(3,24)+STRING$(2,179)+CHR$(191):B$(6)=CHR$(191)+STRING$(2,131)+C
HR$(26)+STRING$(3,24)+CHR$(191)+CHR$(179)+CHR$(191)
40 B$(7)=CHR$(143)+CHR$(131)+CHR$(191)+CHR$(26)+CHR$(24)+CHR$(19
1):B$(8)=CHR$(191)+CHR$(179)+CHR$(191)+CHR$(26)+STRING$(3,24)+CH
R$(191)+CHR$(176)+CHR$(191):B$(9)=CHR$(191)+CHR$(179)+CHR$(191)+
CHR$(26)+CHR$(24)+CHR$(191)
50 B$(11)=CHR$(191)+STRING$(2,131)+CHR$(26)+STRING$(3,24)+CHR$(1
91)+CHR$(131):B$(10)=CHR$(166)+CHR$(131)+CHR$(132)+CHR$(26)+STRI
NG$(3,24)+CHR$(164)+CHR$(179)+CHR$(132):B$(12)=CHR$(136)+CHR$(14
7)+CHR$(26)+STRING$(2,24)+CHR$(190)+CHR$(191)+CHR$(189)
   Lines 60-70 set up the PRINT@ positions of the game board
          squares
60 FORX=1TO10:FORY=1TO10:E(X,Y)=125+Y*5+X*64:NEXTY:NEXTX
   Lines 80-100 is a machine language routine that provides
          Strategy Strike with sound. A test is made to see
          if DISK or LEVEL II is being used.
80 NL$="12345678901234567891234567":E9=VARPTR(NL$):E8=PEEK(E9+1
)+256*PEEK(E9+2):FORE7=E8TOE8+26:READE6:POKEE7,E6:NEXTDATA205,12
7,10,77,68,62,1,105,211,255,45,32,253,60,105,211,255,45,32,253,1.
3,16,238,175,211,255,201
90 IFPEEK(16396)=201POKE16526,PEEK(E9+1):POKE16527,PEEK(E9+2):GO
TO110
100 CMD"T":DEFUSR0=PEEK(E9+1)+256*PEEK(E9+2):POKE14308,0
   Line 110 sets all the space occupation variables A(X,Y) to
          1. These are the fourty squares occupied at the start
          of the game.
110 FORX=1TO4:FORY=1TO10:A(X,Y)=1:A(X+16,Y)=1:NEXTY:NEXTX:GOSUB1
20:GOTO320
   Lines 120-130 and line 280 print the entire board on the
          screen. Lines 120-125 print the board including
          the two lakes. Line 130 prints the board coordinates
          along the side of the board. The end of line 130 also
          does two GOSUB 210s to print the playing pieces on
          the board. These lines are executed at the start of
          the game and every time a player redraws the board.
120 CLS:FORI=15488TO15538:POKEI,176:U=USR(800):NEXT:FORI=192TO76
8STEP64:PRINT@I,"";:FORII=1TO10:PRINTCHR$(191);CHR$(196);:U=USR(
850):NEXTII:PRINTCHR$(191):NEXT:FORI=16192TO16242:POKEI,131:U=US
R(800):NEXT:FORI=15819TO15828:POKEI,191:POKEI+64,191:POKEI+20,1
91
125 POKEI+84,191:U=USR(625):NEXT:POKE15819,184:POKE15839,184:POK
E15820,190:POKE15840,190:POKE15826,188:POKE15846,188:POKE15827,1
76:POKE15847,176:POKE15883,131:POKE15884,143:POKE15903,131:POKE1
5904,143:POKE15890,143:POKE15891,131:POKE15910,143:POKE15911,13
1
130 T=1:FORI=897TO942STEP5:PRINT@I,T;:T=T+1:U=USR(1632):NEXT:T=1
:FORI=243TO819STEP64:PRINT@I,T;:T=T+1:U=USR(1632):NEXT:PP=1:GOSU
B210:PP=2:GOSUB210:GOTO280
   Lines 160-200 is a subroutine that prints player PL's pieces
          on the board.
160 FORX=1+(PL-1)*10TO10+(PL-1)*10:FORY=1TO10:IFA(X,Y)=0THEN200E
```

continued on next page

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```
LSEIFC(X,Y)=10THENPRINT@E(X-AD,Y)," S";ELSEIFC(X,Y)=11THENPRINT@
E(X-AD,Y)," F";ELSEIFC(X,Y)=12THENPRINT@E(X-AD,Y)," x";ELSEPRINT
@E(X-AD,Y),C(X,Y);
170 U=USR(1300)
200 NEXTY:NEXTX:RETURN
210 FORX=1TO10:FORY=1TO10:IFA(X+(PP-1)*10,Y)=0THEN220ELSEPRINT@E
(X,Y),STRING$(2,140);:U=USR(1320)
220 NEXTY:NEXTX:RETURN
280 FORI=15607TO15615:POKEI,131:POKEI+192,176:POKEI+384,131:POKE
I+576,176:NEXT:FORI=15607TO15799STEP64:POKEI,191:POKEI+8,191:POK
EI+384,191:POKEI+392,191:U=USR(8020):NEXT:PRINT@183,"PLAYER  1";
:PRINT@887,"PLAYER  2";:RETURN
```

Line 290 is a subroutine that delays execution of program.

```
290 FORI=1TO500:NEXTI:RETURN
```

Line 310 is a subroutine that erases the top line of the screen.

```
300 PRINT@0,CHR$(30);:RETURN
```

Line 310 is a subroutine that delays execution of the program and erases everything on the top line of the screen.

```
310 FORI=1TO1200:NEXTI:PRINT@0,CHR$(30);:RETURN
```

Lines 320-749 allow players to set up their armies on the game board. Line 350 uses INKEY$ to see what piece player PL want in the current (X,Y) position. (S:Spy F:Flag B:Bomb 1-9:Marshal to Scout). Line 360 makes sure that there are not too many of one piece placed on the board. Lines 730-732 print the piece on the screen and store it into array C(X,Y).

```
320 FORPL=1TO2:FORXX=1TO12:PI(XX)=0:NEXTXX:AD=(PL-1)*10:PRINT@0,
"PLAYER"PL"SET-UP";:GOSUB310
330 FORX=1+(PL-1)*16TO4+(PL-1)*16:FORY=1TO10
340 PRINT@0,"WHAT PIECE DO YOU WANT IN THIS POSITION";
350 A$=INKEY$:IFA$="S"THENA=10ELSEIFA$="B"THENA=12ELSEIFA$="F"TH
ENA=11ELSEA=VAL(A$):IFA=0THENPRINT@E(X-AD,Y),"  ";:PRINT@E(X-AD,
Y),STRING$(2,140);:GOTO350
360 P=PI(A):IFP=NU(A)THEN340
370 PI(A)=PI(A)+1
730 IFA$="B"THENA$="x"
732 PRINT@E(X-AD,Y)," ";A$;:C(X,Y)=A
740 U=USR(8020):FORII=1TO10:NEXTII
749 NEXTY:NEXTX:P=0:P1=0:P2=0:P3=0:P4=0:P5=0:P6=0:P7=0:P8=0:P9=0
:PS=0:PB=0:PF=0:PP=PL:GOSUB210
```

Lines 750-755 print each player's pieces on the board in turn, and allow each player to make changes. A subroutine from line 7000-7080 prints the actual change of pieces on the screen.

```
750 GOSUB300:NEXTPL:FORPL=1TO2:AD=(PL-1)*10:GOSUB300:PRINT@0,"PL
AYER";3-PL;": PLEASE TURN AROUND";:GOSUB310:GOSUB160
751 GOSUB300:PRINT@0,"ANY CHANGES";:INPUTRR$:IFLEFT$(RR$,1)="N"T
HEN756ELSEIFLEFT$(RR$,1)="Y"THEN752ELSE751
752 GOSUB300:PRINT@0,"FROM";:INPUTU1,U2:IFU1<1ORU1>10ORU1<>INT(U
1)ORU2<1ORU2>10ORU2<>INT(U2)THEN752ELSEU1=U1+(PL-1)*10:IFA(U1,U2
)=1THEN754ELSE752
754 PRINT@15,CHR$(30);:PRINT@15,"TO";:INPUTU3,U4:IFU3<1ORU3>10OR
U3<>INT(U3)ORU4<1ORU4>10ORU4<>INT(U4)THEN754ELSEU3=U3+(PL-1)*10:
IFA(U3,U4)=1THEN755ELSE754
755 U5=C(U1,U2):C(U1,U2)=C(U3,U4):C(U3,U4)=U5:GOSUB7000:GOTO751
756 PP=PL:GOSUB210:NEXTPL
```

Line 765 informs each player that it is his turn, that player 2 should turn around, and prints his pieces on the board.

```
765 FORPL=1TO2:AD=(PL-1)*10:GOSUB300:PRINT@0,"PLAYER #";PL;"'S T
URN (PLAYER";3-PL;": PLEASE TURN AROUND)";:GOSUB310:GOSUB160
```

Line 770 allows each player to input his FROM? coordinates. It checks to see if the player wants to redraw the board or give up, and if the first coordinate of the initial input is an integer between 1 and 10.

```
770 GOSUB300:PRINT@0,"FROM:";:INPUTC1,C2:IFC1=0ANDC2=0THEN775ELS
EIFC1=-1ANDC2=-1THEN1360ELSEIFC1>=1ANDC1<=10ANDC1=INT(C1)THEN780
ELSE770
```

Line 775 redraws the board.

```
775 CLS:GOSUB120:GOSUB160:GOTO770
```

Line 780 checks to see if the second coordinate of the initial input is an integer between 1 and 10.

```
780 IFC2>=1ANDC2<=10ANDC2=INT(C2)THEN790ELSE770
```

Line 790 checks to see if the player tried to move a bomb or flag, tries to move a piece that does not exist, or tries to move one of his opponent's pieces.

```
790 C1=C1+(PL-1)*10:IFC(C1,C2)=11THEN770ELSEIFC(C1,C2)=12THEN770
ELSEIFA(C1,C2)=0THEN770ELSEIFA(C1-AD*2+10,C2)=1THEN770
```

Line 800 allows player 1 to input final coordinates.

```
800 PRINT@14,CHR$(210);:PRINT@14,"TO:";:INPUTC3,C4
```

Line 801 checks to see if the player wishes to redraw the board or change initial coordinates input.

```
801 IFC3=0ANDC4=0THEN805ELSEIFC3=-1ANDC4=-1THEN770 ELSEIFC3<1ORC
3>10ORC3<>INT(C3)ORC4<1ORC4>10ORC4<>INT(C4)THEN800
```

Line 802 calculates the X,Y set point coordinate of the player's final position and checks to see if a move into a lake has been attempted. It also checks to make sure the player has not specified the same initial and final coordinates.

```
802 C3=C3+(PL-1)*10:Y6=3*INT(E(C3-AD,C4)/64):X6=2*(E(C3-AD,C4)-I
NT(Y6/3)*64):IFPOINT(X6,Y6)THEN800ELSEIFC3=C1ANDC4=C2THEN800ELSE
820
```

Line 805 redraws the board.

```
805 CLS:GOSUB120:GOSUB160:PRINT@0,"FROM:";C1;",";C2;:GOTO800
```

Line 820 checks to see if the player has moved diagonally, or into a square already occupied by one of his pieces.

```
820 IFA(C3,C4)=1THEN800ELSEIFC3<>C1ANDC4<>C2THEN800
```

Lines 830-850 check to see if the player moves more than one space at a time forwards, backwards, or sideways.

```
830 IFC3<>C1THEN850
840 IFC4=C2+1ORC4=C2-1THEN860ELSE800
850 IFC3=C1+1ORC3=C1-1THEN860ELSE800
```

Line 860 allows the player to change both the initial and final coordinates.

```
860 PRINT@35,CHR$(30);:PRINT@35,"CORRECT";:INPUTRR$:IFLEFT$(RR$,
1)="N"THEN770ELSEIFLEFT$(RR$,1)<>"Y"THEN860ELSEIFA(C3-AD*2+10,C4
)=1THEN920
```

Lines 870-890 move the desired piece to the new coordinates. The space occupation and indentification variables of the final coordinates are exchanged with the same variables of the initial coordinates.

```
870 FORI=1TO10:IFC(C1,C2)=10THENPRINT@E(C3-AD,C4)," S";ELSEPRINT
@E(C1-AD,C2),C(C1,C2);
875 GOSUB4000:PRINT@E(C1-AD,C2),"  ";:GOSUB4000:NEXTI:A(C1,C2)=0
:A(C3,C4)=1:C(C3,C4)=C(C1,C2):C(C1,C2)=0:IFC(C3,C4)=10THENPRINT@
E(C3-AD,C4)," S";ELSEPRINT@E(C3-AD,C4),C(C3,C4);
890 FORI=1TO10:U=USR(8000):U=USR(25700):NEXTI:GOSUB290:PP=PL:GOS
UB210:GOTO1040
```

Lines 920-950 ready both players for an attack.

```
920 PP=PL:GOSUB210:IFC(C1,C2)=10THENPRINT@E(C1-AD,C2)," S";ELSEP
RINT@E(C1-AD,C2),C(C1,C2);
940 GOSUB300:PRINT@0,"PLAYER #";3-PL;": PLEASE FACE SCREEN FOR E
NEMY ATTACK";:GOSUB310:PRINT@SP(PL),B$(C(C1,C2));:PRINT@SP(3-PL)
,B$(C(C3-AD*2+10,C4));:GOSUB290
```

Lines 950-964 check to see what piece is being attacked. (Special tests are made for attacks on marshals, bombs or flags).

```
950 IFC(C3-AD*2+10,C4)=11THEN1345ELSEIFC(C3-AD*2+10,C4)=12THEN10
20ELSEIFC(C3-AD*2+10,C4)=1THEN955ELSE960
955 IF C(C1,C2)=10THEN970ELSE990
960 IF C(C1,C2)=C(C3-AD*2+10,C4)THEN1000
964 IF C(C1,C2)>C(C3-AD*2+10,C4)THEN990
```

Lines 970-980 inform players that the attacking player has won the battle. The defender's piece is removed from the board and the attacker's piece moves on to the vacated spot.

```
970 FORI=1TO10:PRINT@SP(3-PL)-66,DE$;:U=USR(9000):GOSUB1340:PRIN
T@SP(3-PL)-66,ED$;:U=USR(12350):GOSUB1340:NEXTI:PRINT@0,"PLAYER
#";PL;" WINS BATTLE";:PRINT@E(C3-AD,C4)," ";:GOSUB310:PRINT@SP(
PL)-66,ED$;:A(C3-AD*2+10,C4)=0:C(C3,C4)=C(C1,C2)
980 PRINT@E(C3-AD,C4),STRING$(2,140);:PRINT@E(C1-AD,C2)," ";:A(
C1,C2)=0:A(C3,C4)=1:GOTO1040
```

Lines 990-992 inform players that the defending piece has won, as above in line 950-960

```
990 FORI=1TO10:PRINT@SP(PL)-66,DE$;:U=USR(9000):GOSUB1340:PRINT@
SP(PL)-66,ED$;:U=USR(12350):GOSUB1340:NEXTI:PRINT@0,"PLAYER #";3
-PL;"WINS BATTLE!";:PRINT@E(C1-AD,C2)," ";:GOSUB310:PRINT@SP(3-
PL)-66,ED$;:A(C1-AD*2+10,C2)=0:C(C1,C2)=C(C3,C4)
992 PRINT@E(C1-AD,C2),STRING$(2,140);:PRINT@E(C3-AD,C4)," ";:A(
C1,C2)=0:A(C3,C4)=1:GOTO1040
```

Lines 1000-1010 inform players that both pieces have been destroyed and removed from the board.

```
1000 FORI=1TO10:PRINT@248,DE$;:PRINT@632,DE$;:U=USR(9000):GOSUB1
340 :PRINT@248,ED$;:PRINT@632,ED$;:U=USR(12350):GOSUB1340:NEXTI:
PRINT@0,"PLAYERS DESTROY EACH OTHER.";:PRINT@E(C1-AD,C2)," ";:P
RINT@E(C3-AD,C4)," ";:GOSUB310
1010 A(C1,C2)=0:C(C1,C2)=0:A(C3-AD*2+10,C4)=0:C(C3-AD*2+10,C4)=0
:GOTO1040
```

Line 1020 informs the attacker that his piece has been "blown to pieces" by a bomb.

```
1020 IFC(C1,C2)=8THEN1030ELSEFORI=1TO140:PRINTCHR$(23);:U=USR(40
0):NEXTI:PRINTCHR$(28);:PRINT@0,"PLAYER #";PL;"'S PIECE HAS BEEN
 BLOWN TO PIECES.";:PRINT@E(C1-AD,C2)," ";:GOSUB310:A(C1,C2)=0:
C(C1,C2)=0:PRINT@248,ED$;:PRINT@632,ED$;:GOTO1040
```

Lines 1030-1035 informs the players the the attacker has defused and removed an enemy bomb with his miner.

```
1030 U=USR(0):PRINT@8,"PLAYER #";PL;"HAS DEFUSED BOMB.";:PRINT@E
(C3-AD,C4)," ";:GOSUB310:PRINT@E(C1-AD,C2)," ";:A(C3-AD*2+10,C
4)=0:A(C3,C4)=1:C(C3,C4)=C(C9,C2): C(C1,C2)=0: A(C1,C2)=0: PRINT
@E(C3-AD,C4),STRING$(2,140);:PRINT@248,ED$;:PRINT@632,ED$;
1035 GOTO1040
```

Line 1040 lets the next player move.

```
1040 NEXTPL:GOTO765
```

Line 1340 is a subroutine that delays execution.

```
1340 FORL=1TO20:NEXTL:RETURN
```

Line 1345 informs the present player (PL) that he has won the game.

```
1345 CLS:FORI=1TO30:PRINT@466,"P L A Y E R";PL;"W I N S";:U=USR(
24910):PRINT@466,CHR$(215);:U=USR(24900):NEXT:GOTO6000
```

Line 1360 informs players that the current player has quit, so his opponent has won.

```
1360 PL=3-PL:GOTO1345
```

Line 4000 is a subroutine that delays execution and produces sound.

```
4000 FORP1=1TO20:NEXTP1:U=USR(5470):RETURN
```

Line 6000 lets players start a new game by pressing ENTER.

```
6000 CLS:PRINTCHR$(23);:PRINT@516,"PRESS ENTER FOR ANOTHER GAME"
;:IFPEEK(14400)=1THENRUNELSEGOSUB4000:GOTO6000
```

Lines 7000-7080 is a subroutine that prints changes in army set-up for current player.

```
7000 IFC(U1,U2)=10THENPRINT@E(U1-AD,U2)," S";ELSEIFC(U1,U2)=11TH
ENPRINT@E(U1-AD,U2)," F";ELSEIFC(U1,U2)=12THENPRINT@E(U1-A
D,U2)," *";ELSEPRINT@E(U1-AD,U2),C(U1,U2);
7040 IFC(U3,U4)=10THENPRINT@E(U3-AD,U4)," S";ELSEIFC(U3,U4)=11TH
ENPRINT@E(U3-AD,U4)" F";ELSEIFC(U3,U4)=12THENPRINT@E(U3-AD,U4),"
 *";ELSEPRINT@E(U3-AD,U4),C(U3,U4);
7080 RETURN
```

Notes on the Apple Version

In the Apple version, locations on the board are specified by a letter/number combination such as B4. The RETURN key is not used in entering these coordinates; the left-arrow key may be used, however, to connect a mis-typed character. The "0,0" and "-1,-1" entries which are allowed in the S-80 version are not allowed (or needed) here. Other than these variations, the play is about the same.

The structure of the actual program is totally different from the S-80 version, and so are all the variables. The following list should prove helpful in following the logic of the coding:

Strategy Strike Variables:
Apple Version

A: Temporary variable for a piece to be printed.
A1: Piece occupying "from" square.
A2: Piece occupyng "to" square.
A(X,Y,P): Contains player p's pieces at coordinates X, Y.
BOMB: Numerical designation for bomb.
BT: Memory address for screen window.
CUR: Memory address for cursor.
FLAG: Numerical designation for flag.
I: General loop variable.
IN(I): Number of pieces of type I already entered.
J: General loop variable.
LFT: Memory address for screen window.
MUS: Memory address for music.
N$(I): String to draw large piece I.
NU(I): Quota of pieces of type I.
P: Player number (0 and 1 in code).
PASS: Logical variable; if 1 then skip turn.
PITCH: Memory address for music.
R$: General input variable.
R1, R2: Coordinates of "from" square.
R3, R4: Coordinates of "to" square.
S1$, S2$: Strings used to draw board.
SPY: Numerical value for spy.
TIME: Memory address for music.
TP: Memory address for screen window.
WID: Memory address for screen window.
X: Horizontal coordinate.
Y: Vertical coordinate.
Z: Time delay loop variable.

```
5  GOTO 100


 Subroutine to set left-hand screen
 window.
```

```
10  POKE LFT,0: POKE WID,23: POKE
    CUR,0: INVERSE : RETURN


 Subroutine to set right-hand screen
 window.


20  POKE WID,17: POKE LFT,23: POKE
    CUR,0: NORMAL : RETURN


 Subroutine to input moves.


30 PASS = 0: GOSUB 20: VTAB 13: PRINT
    "(CTRL-P TO PASS)": VTAB 11:
     HTAB 1: PRINT "FROM: ";: GET
    R$: IF  ASC (R$) = 16 THEN P
    ASS = 1: RETURN
32  PRINT R$;:R1 =  ASC (R$) - 65
    : IF R1 < 0 OR R1 > 9 THEN  PRINT
    "";: GOTO 30: REM ----------
    "" CONTAINS CTRL-G
34  VTAB 13: HTAB 1: PRINT "
                ": VTAB 11: HTAB
    9: GET R$: IF R$ =  CHR$ (8)
     THEN 30
36  PRINT R$;:R2 =  ASC (R$) - 48
    : IF R2 < 0 OR R2 > 9 THEN  PRINT
    "";: GOTO 34
38  VTAB 13: HTAB 1: PRINT "TO: "
    ;: GET R$: IF R$ =  CHR$ (8)
     THEN  VTAB 11: GOTO 34
```

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```
40  PRINT R$;:R3 =  ASC (R$) - 65
    : IF R3 < 0 OR R3 > 9 THEN  PRINT
    "";: GOTO 38
42  HTAB 7: GET R$: IF R$ =  CHR$
    (8) THEN 38
44  PRINT R$;:R4 =  ASC (R$) - 48
    : IF R4 < 0 OR R4 > 9 THEN  PRINT
    "";: GOTO 42
46  PRINT : PRINT : PRINT "CORREC
    T? (Y/N)";: GET R$: IF R$ <
     > "Y" THEN  HOME : GOTO 30
48  PRINT : RETURN


 Initialization.


100  DIM N$(12),A(9,9,1),NU(12),W
    (1),IN(12)
110 NU(1) = 1:NU(2) = 1:NU(3) = 2
    :NU(4) = 3:NU(5) = 4:NU(6) =
    4:NU(7) = 4:NU(8) = 5:NU(9) =
    8:NU(10) = 1:NU(11) = 1:NU(1
    2) = 6
120 SPY = 10:FLAG = 11:BOMB = 12
130 LFT = 32:WID = 33:TP = 34:BT =
    35:CUR = 36
140  GOSUB 7000
150 N$(1) = "  x   xx    x   x
      x    x   x   x   xxx"
160 N$(2) = " xxx x   x    x   x
       x   x   x   x    xxxxx"
170 N$(3) = "xxxxx    x   x   x
     xxx     x    xx   x xxx"
180 N$(4) = "x  x x  x x  x x  x
    x  x xxxxx   x    x    x"
190 N$(5) = "xxxxxx    x    x
    xxxx     x    xx   x xxx"
200 N$(6) = "  xxx x   x    x
    xxxx x   xx   xx   x xxx"
210 N$(7) = "xxxxx    x    x   x
      x   x    x    x    x"
220 N$(8) = " xxx x   xx   xx   x
     xxx x   xx   xx   x xxx"
230 N$(9) = " xxx x   xx   xx   x
     xxxx    x    x   x xxx"
240 N$(10) = " xxx x   xx    x
      xxx     x    xx   x xxx"
250 N$(11) = "xxxxxx ! xx-+-xx !
    xxxxxxx    x    x    x"
260 N$(12) = "   x   x    x   xxx
     xxxxxxxxxxxxxxxxxxx xxx"
270  HOME : VTAB 8: PRINT "    S
    T R A T E G Y   S T R I K E"
    : VTAB 12: PRINT  TAB( 12)"B
    Y DAVID STEENSON": VTAB 14: PRINT
     TAB( 6)"APPLE VERSION BY JO
    N VOSKUIL"
280  GOSUB 8000: FOR Z = 1 TO 200
    0: NEXT Z
290  FOR Y = 0 TO 3: FOR X = 0 TO
    9:A(X,Y,0) = 1: NEXT X,Y
300  FOR Y = 6 TO 9: FOR X = 0 TO
    9:A(X,Y,1) = 1: NEXT X,Y
310  HOME : GOSUB 1000
320  FOR P = 0 TO 1: GOSUB 3000: NEXT
    P


 Set up each player's pieces.


400  FOR P = 0 TO 1: FOR I = 1 TO
    12:IN(I) = 0: NEXT I
410  FOR Y = P * 6 TO P * 6 + 3: FOR
    X = 0 TO 9
420  GOSUB 20: HOME : VTAB 9: PRINT
    "PLAYER ";P + 1;",": PRINT "
    WHAT PIECE DO": PRINT "YOU W
    ANT IN": PRINT "THIS POSITIO
    N?": PRINT "(1-9, S, B, F)"
430  GOSUB 10: VTAB Y * 2 + 2: HTAB
    X * 2 + 3: GET R$:R =  VAL (
    R$)
440  IF R$ = "S" THEN R = SPY
450  IF R$ = "B" THEN R$ = "x":R =
    BOMB: NORMAL
460  IF R$ = "F" THEN R = FLAG: NORMAL

470  IF R < 1 THEN 430
480  IF NU(R) = IN(R) THEN 430
490 IN(R) = IN(R) + 1
500  HTAB X * 2 + 3: PRINT R$;
510  POKE TIME,15: POKE PITCH, RND
    (1) * 100 + 10: CALL MUS
520 A(X,Y,P) = R
530  NEXT X,Y
540  GOSUB 20: HOME : VTAB 11: FOR
    Z = 1 TO 500: NEXT Z: POKE  -
    16368,0: PRINT "ANY CHANGES?
    ": PRINT "(Y OR N)";: GET R$

550  IF R$ <  > "N" THEN  GOSUB 4
    000: GOTO 540
560  GOSUB 3000: NEXT P


 Main playing loop.  Begin a new
 turn.


600 P = 0
610  GOSUB 20: HOME : VTAB 9
620  PRINT "PLAYER ";2 - P;", YOU
    ": PRINT "MUST TURN AWAY."
630  PRINT : PRINT "PLAYER ";P +
    1;", PRESS": INPUT "RETURN T
    O GO.";R$
640  HOME : VTAB 5: PRINT "PLAYER
     ";P + 1;"'S MOVE": PRINT "-
    ----------"
650  GOSUB 2000
660  GOSUB 30: IF PASS THEN 820
670 A1 = A(R1,R2,P):A2 = A(R3,R4,
    P)
680  IF A1 = 0 OR A2 <  > 0 OR A1
     = BOMB OR A1 = FLAG OR  ABS
    (R1 - R3) +  ABS (R2 - R4) >
    1 THEN 660
690  IF (R3 = 2 OR R3 = 3 OR R3 =
    6 OR R3 = 7) AND (R4 = 4 OR
    R4 = 5) THEN 660
700  GOSUB 10: IF A(R3,R4,1 - P) =
    0 THEN 780


 If player P has attacked. . .


710 A2 = A(R3,R4,1 - P): GOSUB 50
    00
720  GOSUB 10
730  IF A2 = BOMB AND A1 = 5 THEN
    770
740  IF A2 = BOMB THEN 800
750  IF A1 = A2 THEN  INVERSE : HTAB
    R3 * 2 + 3: VTAB R4 * 2 + 2:
     PRINT " ";:A(R3,R4,1 - P) =
    0: GOTO 800
760  IF A2 < A1 AND  NOT (A2 = 1 AND
    A1 = SPY) THEN A(R1,R2,1 - P
    ) = A2:A(R3,R4,1 - P) = 0: HTAB
    R3 * 2 + 3: VTAB R4 * 2 + 2:
     PRINT " ";: HTAB R1 * 2 + 3
    : VTAB R2 * 2 + 2:A = A2: GOSUB
    2500:A(R1,R2,P) = 0: GOTO 82
    0
770 A(R3,R4,1 - P) = 0
780  HTAB R3 * 2 + 3: VTAB R4 * 2
     + 2:A = A(R1,R2,P): GOSUB 2
    500
790 A(R3,R4,P) = A(R1,R2,P)
800 A(R1,R2,P) = 0
810  INVERSE : HTAB R1 * 2 + 3: VTAB
    R2 * 2 + 2: PRINT " ";
820  FOR Z = 1 TO 1000: NEXT Z: GOSUB
    3000
830 P = 1 - P: GOTO 610

 Flag captured; end of game.


900  GOSUB 20: HOME : FLASH
910  VTAB 8: PRINT "            "
    : PRINT "  PLAYER ";P + 1;"
     "; PRINT "            "; PRINT
    "  HAS WON!! "; PRINT "
          "
920  GOSUB 8000: GOSUB 6000: GOSUB
    8000: GOSUB 6000
930  GOSUB 10: FOR P = 0 TO 1: GOSUB
    2000: NEXT P
940  TEXT : VTAB 23: END


 Subroutine to draw playing board.


1000  GOSUB 10: HOME
1010 S1$ = "+-+-+-+-+-+-+-+-+-+-+
    ":S2$ = "! ! ! ! ! ! ! ! ! ! !
     !"
```

```
1020  FOR I = 1 TO 10: HTAB 2: PRINT
      S1$: HTAB 2: PRINT S2$: NEXT
      I: HTAB 2: PRINT S1$
1030  NORMAL : FOR I = 0 TO 9: HTAB
      1: VTAB 2 * I + 2: PRINT I;:
      NEXT I
1040  VTAB 22: HTAB 3: PRINT "A B
      C D E F G H I J"
1050  FOR Y = 10 TO 12: VTAB Y: HTAB
      7: PRINT "(((";: HTAB 15: PRINT
      "(((";: NEXT Y
1060  RETURN
```

Subroutine to print player's pieces on board.

```
2000  GOSUB 10: FOR Y = 0 TO 9: FOR
      X = 0 TO 9
2010 A = A(X,Y,P): IF A = 0 THEN
      2040
2020  HTAB X * 2 + 3: VTAB Y * 2 +
      2
2030  GOSUB 2500
2040  NEXT X,Y: RETURN
```

Subroutine to print individual piece on board.

```
2500  INVERSE : IF A < 10 THEN  PRINT
      A;
2510  IF A = SPY THEN  PRINT "S";

2520  NORMAL : IF A = FLAG THEN  PRINT
      "F";
2530  IF A = BOMB THEN  PRINT "*"
      ;
2540  RETURN
```

Subroutine to cover pieces on board with blanks.

```
3000  GOSUB 10: NORMAL : FOR Y =
      0 TO 9: FOR X = 0 TO 9
3010  IF A(X,Y,P) = 0 THEN 3040
3020  VTAB Y * 2 + 2: HTAB X * 2 +
      3: PRINT " ";
3030  POKE TIME,6: POKE PITCH,X *
      10 + 20: CALL MUS
3040  NEXT X,Y: RETURN
```

Subroutine to switch pieces during set-up.

```
4000  HOME : GOSUB 30
4010  IF A(R1,R2,P) = 0 OR A(R3,R
      4,P) = 0 THEN  PRINT "ILLEGA
      L MOVE!!": FOR Z = 1 TO 1000
      : NEXT Z: GOTO 4000
4020 A = A(R1,R2,P):A(R1,R2,P) =
      A(R3,R4,P):A(R3,R4,P) = A
4030  GOSUB 2000: RETURN
```

Subroutine to display attack graphically.

```
5000  GOSUB 3000: GOSUB 8000:A =
      A(R1,R2,P): HTAB R1 * 2 + 3:
       VTAB R2 * 2 + 2: GOSUB 2500
      :A = A(R3,R4,1 - P): HTAB R3
       * 2 + 3: VTAB R4 * 2 + 2: GOSUB
      2500
5010  GOSUB 20: HOME : VTAB 10: FLASH
      : PRINT "   PLAYER ";2 - P;"
      :   "; PRINT "FACE SCREEN FO
      R": PRINT " ENEMY ATTACK! "
5020  FOR Z = 1 TO 2000: NEXT Z
5030  NORMAL : HOME : POKE WID,5:
      POKE LFT,30: HOME : VTAB P *
      13 + 2: PRINT N$(A1);: VTAB
      (1 - P) * 13 + 2: HTAB 1: PRINT
      N$(A2);
5040  FOR Z = 1 TO 1500: NEXT Z
5050 W(0) = 0:W(1) = 0: IF A2 = F
      LAG THEN  POP : GOTO 900
5060  IF (A1 = SPY AND A2 = 1) OR
      (A2 = BOMB AND A1 = 5) THEN
      W(P) = 1: GOTO 5110
5070  IF A2 = BOMB THEN W(1 - P) =
      1: GOSUB 6000: GOTO 5110
5080  IF A1 = A2 THEN 5110
5090  IF A2 < A1 THEN W(1 - P) =
      1
5100  IF A2 > A1 THEN W(P) = 1
5110  FOR I = 2 TO 10: FOR J = 1 TO
      5
5120  IF W(P) = 0 THEN  VTAB P *
      13 + I: HTAB J: PRINT " ";: POKE
      PITCH, RND (1) * 100 + 150: POKE
      TIME,5: CALL MUS
5130  IF W(1 - P) = 0 THEN  VTAB
      (1 - P) * 13 + I: HTAB J: PRINT
      " ";: POKE PITCH, RND (1) *
      100 + 150: POKE TIME,5: CALL
      MUS
5140  NEXT J,I: FOR Z = 1 TO 1000
      : NEXT Z
5150  POKE LFT,23: POKE WID,17: HOME

5160  RETURN
```

Subroutine to display bomb flash.

```
6000  POKE  - 16302,0
6010  FOR I = 1 TO 40: POKE  - 16
      304,0
6020  POKE PITCH,I * 6: POKE TIME
      ,8: CALL MUS

6030  POKE  - 16303,0: NEXT I
6040  RETURN
```

Subroutine to poke in machine-language tone generator.

```
7000 POK$ = "173,048,192,136,208,
      004,198,001,240,008,202,208,
      246,166,000,076,000,003,096"

7010  FOR P = 0 TO 18
7020  POKE 768 + P, VAL ( MID$ (P
      OK$,P * 4 + 1,3))
7030  NEXT P
7040 PITCH = 0:TIME = 1:MUS = 768
      : RETURN
```

Subroutine to play fanfare.

```
8000  RESTORE : FOR I = 1 TO 6: READ
      Z1,Z2: POKE PITCH,Z1: POKE T
      IME,Z2: CALL MUS: NEXT I
8010  DATA  96,50,72,50,57,50,48,
      100,57,50,48,200
8020  RETURN
```

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S-80 Data Base

```
270   PRINT"(F) FILE NAMES"
280   PRINT"(N) NEW DATA FILE"
290   PRINT"(Q) QUIT ?";
295   PRINT: PRINT "YOU HAVE ROOM FOR ";FRE(A$);" MORE CHARACTER
      S"
380   IF A$= "F" THEN GOSUB 600: GOTO 200
390   IF A$ = "Q" OR A$="N" THEN 500
505   T$=A$
510   PRINT"CURRENT FILE IS NOT SAVED.";:PRINT"CANCEL COMMAND? (Y
      /N) ";:GOSUB 60000
520   IF A$ = "Y" THEN 200
530   IF A$ <> "N" THEN 510
540   IF T$="N" THEN 100
550   END
600   CMD"DIR": GOSUB 60000: RETURN
1005  ON ERROR GOTO 1310
1300  ON ERROR GOTO 0:SS=1:RETURN
1310  PRINT "FILE NOT FOUND": GOSUB 60000: RESUME 100
2045  ON ERROR GOTO 2290
2280  ON ERROR GOTO 0:SS=1:RETURN
2290  PRINT "DISK ERROR": GOSUB 60000: RESUME 200
6135  FOR J = 0 TO NH: I$(NI,J)="": NEXT
10090 ON ERROR GOTO 10170
10160 ON ERROR GOTO 0:RETURN
10170 PRINT "FORMAT NOT FOUND": GOSUB 60000: RESUME 200
10405 ON ERROR GOTO 10460
10450 ON ERROR GOTO 0: RETURN
10460 PRINT "DISK ERROR": GOSUB 60000: RESUME 10400
```

SARGON II

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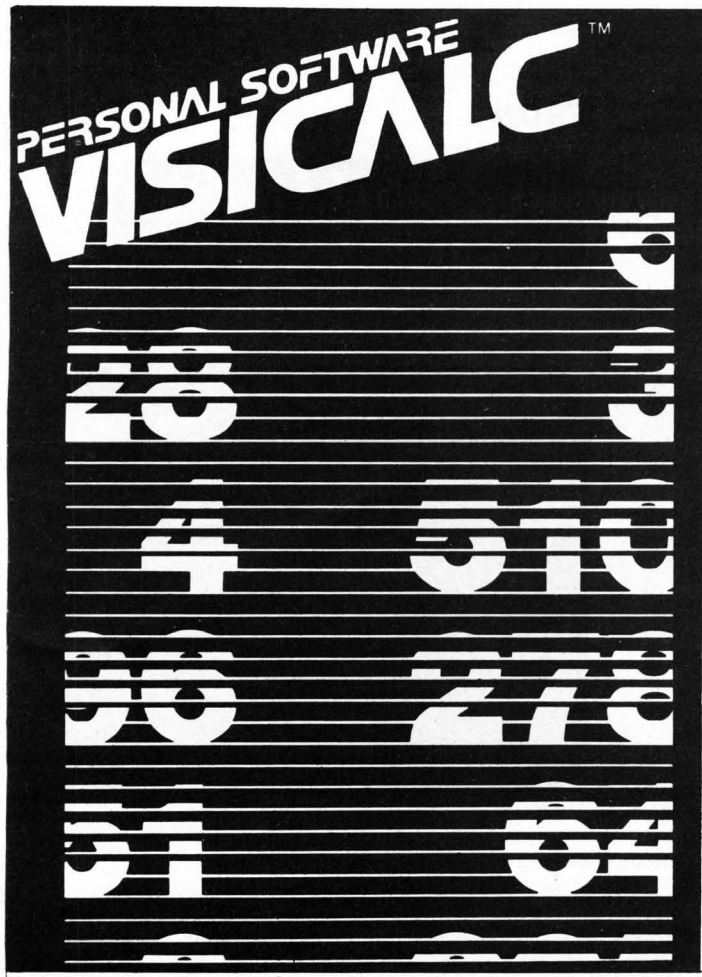

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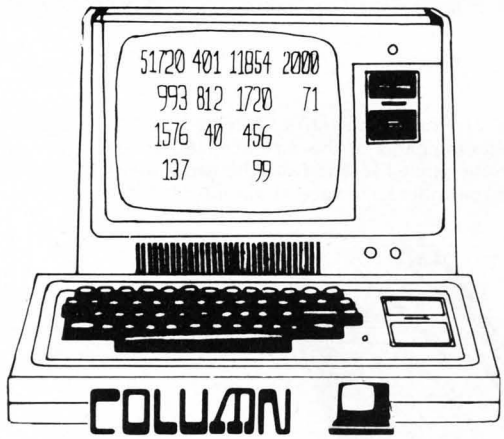

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by David T. Gray

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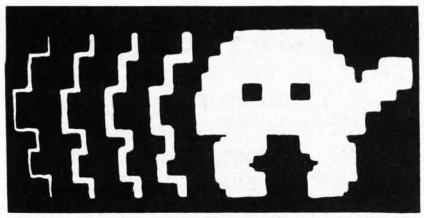

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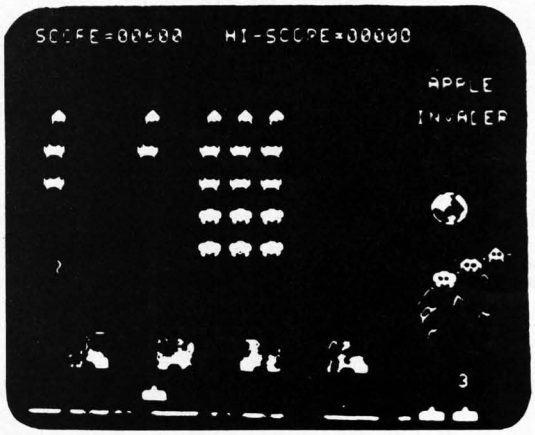

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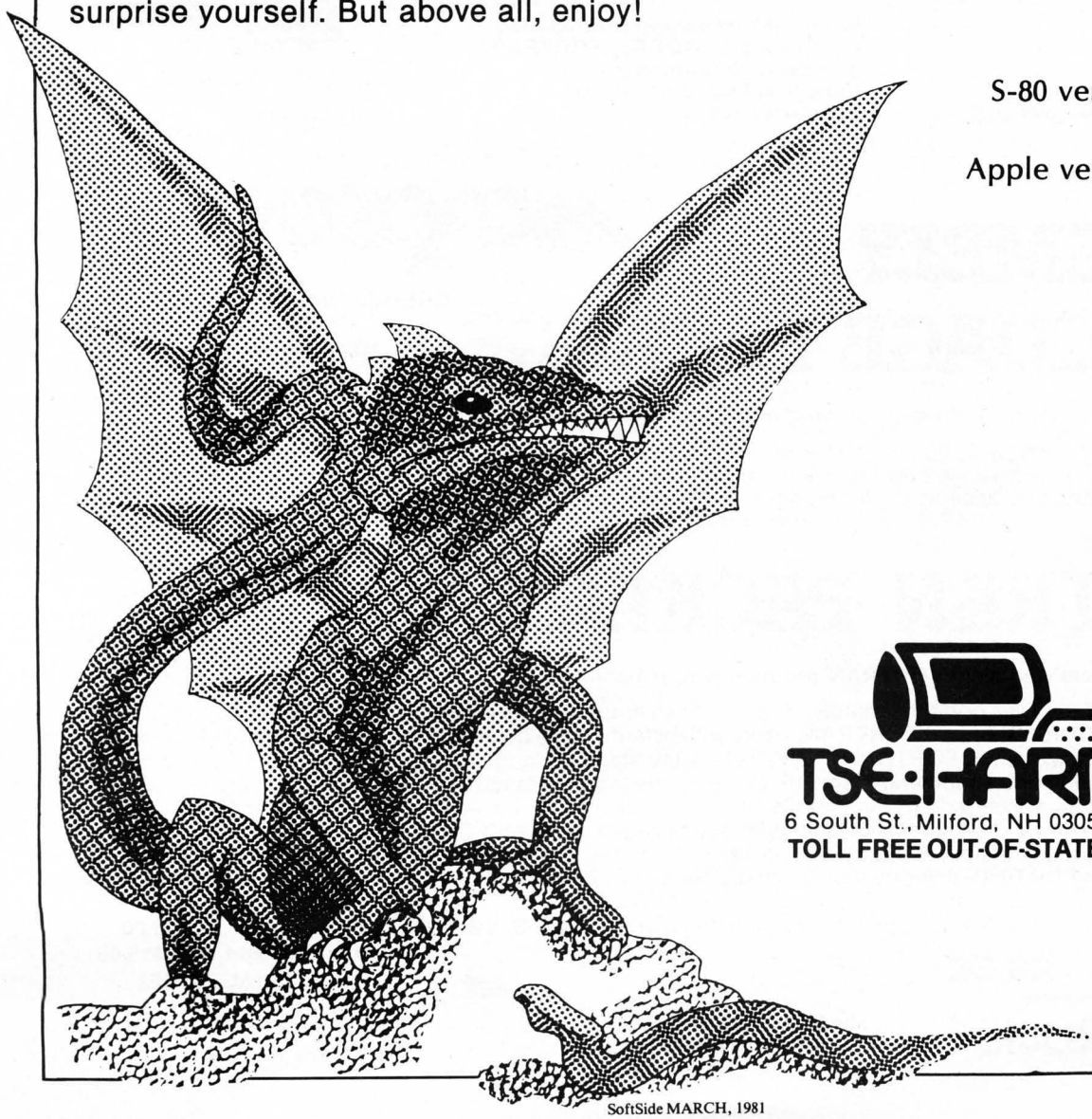

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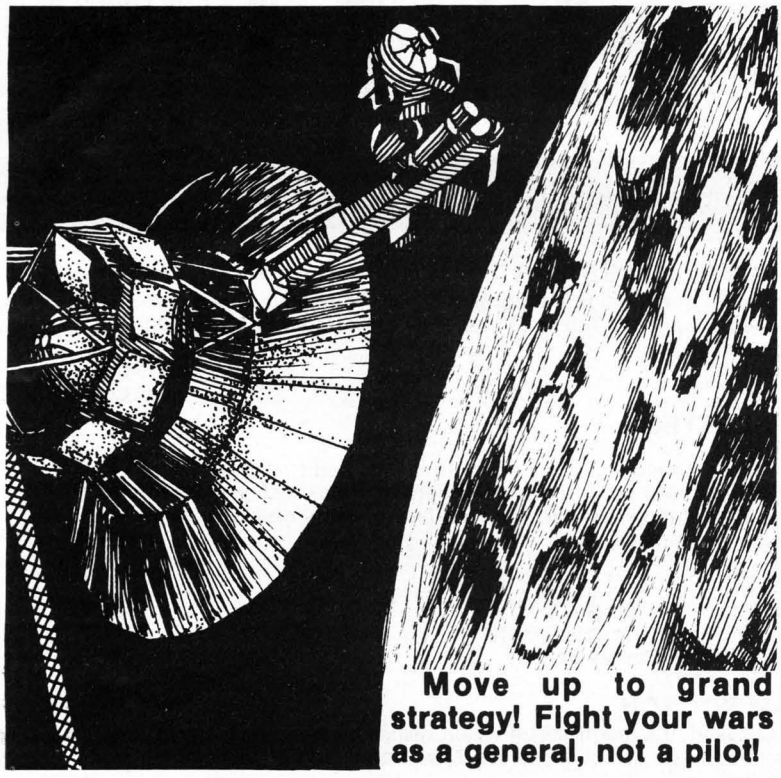

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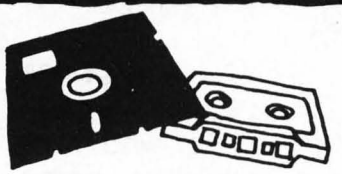

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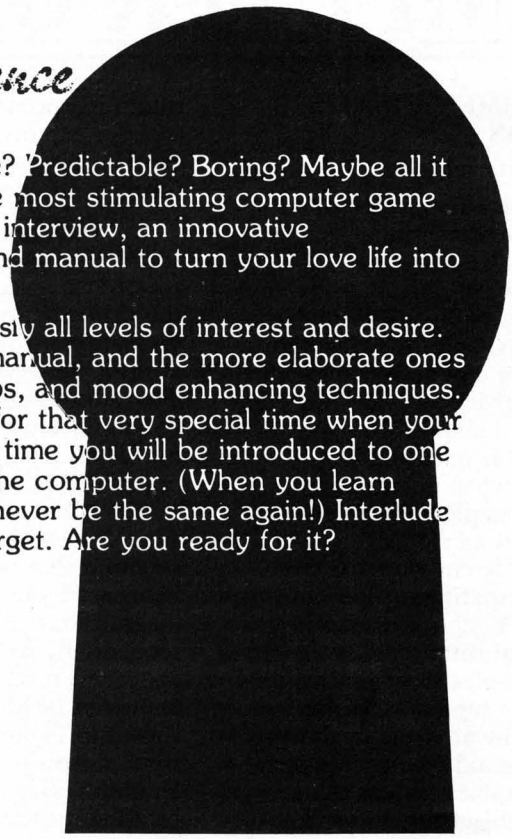

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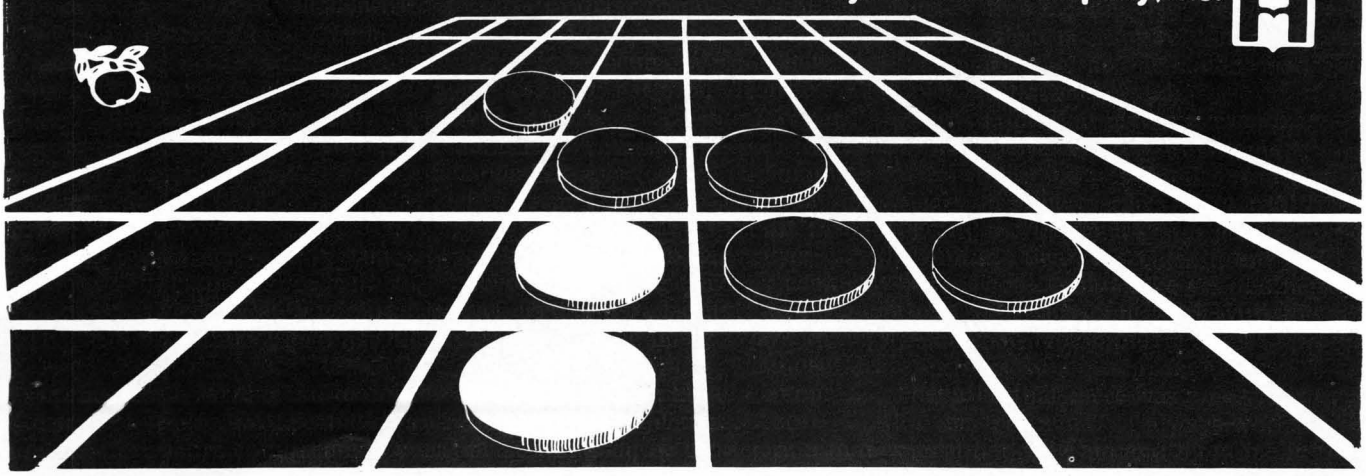


COMPUTER GRAPHICS

THREE-DIMENSIONAL ROTATION

by Joan Truckenbrod

Using the microprocessor to create three-dimensional shapes and rotate them in space allows one to draw an object at any angle of rotation, or in any combination of rotations, and thus view the object from any perspective. Each perspective view provides different information about the shape or form. This is particularly important when attempting to visualize complex objects that are different on all sides. It is useful to provide different views of the object by rotating it simultaneously on the X, Y, and Z axes. Three-dimensional rotation of a figure creates complex three-dimensional images that cannot be easily visualized by an artist or designer without the aid of a device such as a color graphics system. As a figure or object turns in space, its shape and appearance change dramatically. Due to the wire-frame character of these drawings, the figure is constructed out of a set of geometric forms. These shapes and forms appear to be stretched or compressed in various directions as the figure is rotated in space. Consequently the rotational process is a valuable tool for exploring and experimenting with new shapes and forms in the design process.

The wide range of shapes and forms that evolve as one figure is rotated in space illustrates one of the valuable aspects of the three-dimensional rotation process. This point is demonstrated in the diagram in Figure 1, which illustrates only a few of the numerous diverse forms that can be created by rotating a figure in space. All of the diagrams here were done with the rotation program that was discussed in the February issue of **SoftSide**. This diagram has 72 examples of sequentially rotated figures that appear to tumble in space in an animated fashion. A pyramid, as shown in Figure 2, has been simultaneously rotated on the X, Y, and Z axes. The pyramid is rotating in three directions at the same time. Horizontally, across the chart, the pyramid is rotated on the Y axis at 30° increments from the left to the right in the range from 30°to 360°. Vertically, beginning at the top of the chart, the figure is rotated around the X axis at 15° increments in the range from 15° to 90°. The Z rotations are made on a diagonal, from the upper left-hand corner to the lower right-hand corner, at 15° increments ranging from 15° to 255°.

The chart in Figure 3 lists the X, Y and Z rotations for each of the corresponding drawings in the diagram in Figure 1. As the figure is rotated and redrawn on the two-dimensional screen, the visual forces such as balance, rhythm, proportion and directionality of the figure change. The shapes of the object change size and position, and the object may appear larger or smaller than it really is. Depending on these shapes, the implied motion and directional flow of the figure changes. Some figures appear to be static while others appear to be moving. In viewing these wire frame drawings, there can be some ambiguity in the three-dimensional character of the object. Color or gray values can be added to these drawings to clarify the appearance of each object. This method of image clarification will be illustrated in the next issue of **SoftSide** in conjunction with a discussion of perspective drawing techniques.

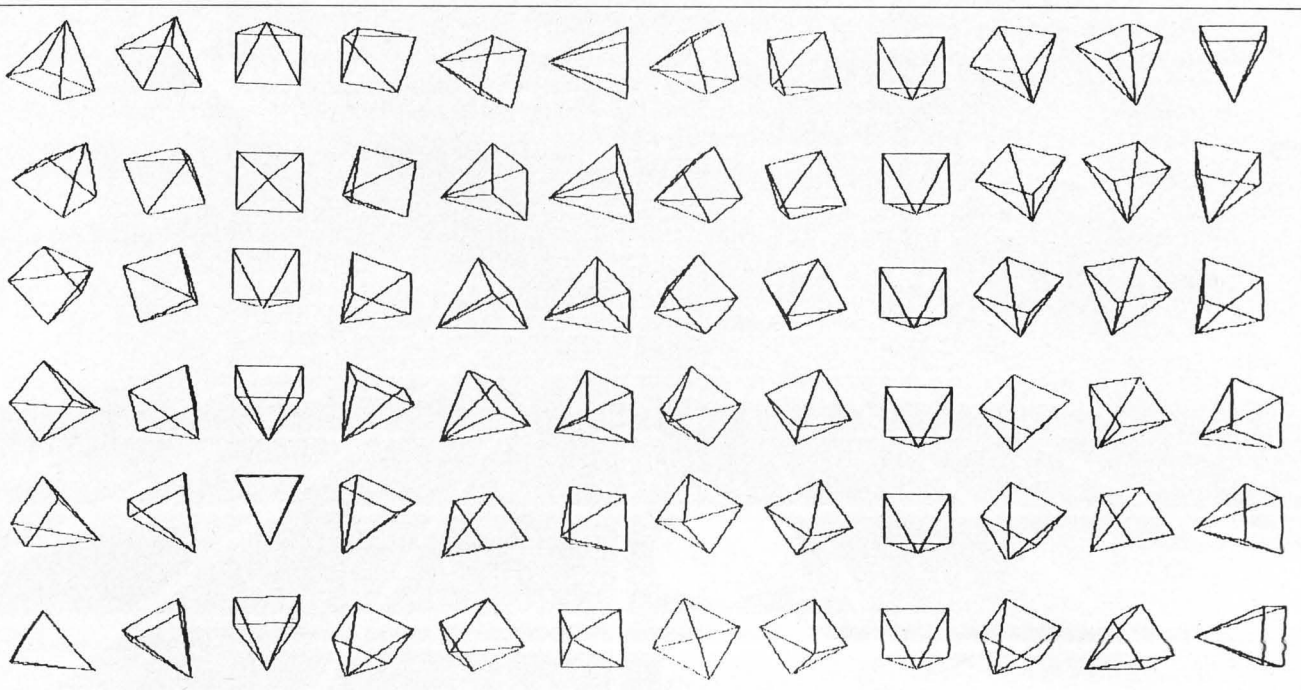
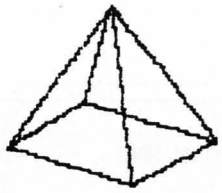
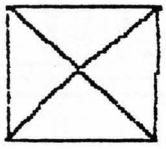


Figure 1

PYRAMID

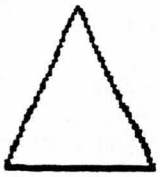
Rotation on Z Axis: 0°
Rotation on Y Axis: 30°
Rotation on X Axis: 30°



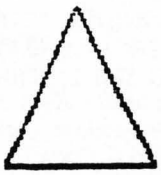


ORTHOGRAPHIC PROJECTION

Top View (90° rotation around X axis)



Front View



Side View (90° rotation around Y axis)

Figure 2

15Z	30Z	45Z	60Z	75Z	90Z	105Z	120Z	135Z	150Z	165Z	180Z
30Y	60Y	90Y	120Y	150Y	180Y	210Y	240Y	270Y	300Y	330Y	360Y
15X	15X	15X	15X	15X	15X	15X	15X	15X	15X	15X	15X
30Z	45Z	60Z	75Z	90Z	105Z	120Z	135Z	150Z	165Z	180Z	195Z
30Y	60Y	90Y	120Y	150Y	180Y	210Y	240Y	270Y	300Y	330Y	360Y
30X	30X	30X	30X	30X	30X	30X	30X	30X	30X	30X	30X
45Z	60Z	75Z	90Z	105Z	120Z	135Z	150Z	165Z	180Z	195Z	210Z
30Y	60Y	90Y	120Y	150Y	180Y	210Y	240Y	270Y	300Y	330Y	360Y
45X	45X	45X	45X	45X	45X	45X	45X	45X	45X	45X	45X
60Z	75Z	90Z	105Z	120Z	135Z	150Z	165Z	180Z	195Z	210Z	225Z
30Y	60Y	90Y	120Y	150Y	180Y	210Y	240Y	270Y	300Y	330Y	360Y
60X	60X	60X	60X	60X	60X	60X	60X	60X	60X	60X	60X
75Z	90Z	105Z	120Z	135Z	150Z	165Z	180Z	195Z	210Z	225Z	240Z
30Y	60Y	90Y	120Y	150Y	180Y	210Y	240Y	270Y	300Y	330Y	360Y
75X	75X	75X	75X	75X	75X	75X	75X	75X	75X	75X	75X
90Z	105Z	120Z	135Z	150Z	165Z	180Z	195Z	210Z	225Z	240Z	255Z
30Y	60Y	90Y	120Y	150Y	180Y	210Y	240Y	270Y	300Y	330Y	360Y
90X	90X	90X	90X	90X	90X	90X	90X	90X	90X	90X	90X

Rotations on Y Axis: 30° increments horizontally
Rotations on X Axis: 15° increments vertically
Rotations on Z Axis: 15° increments diagonally

Figure 3

MINI GOLF

by Mitch Voth

Apple translation by
Steve Justus

"Mini Golf" is an Apple program requiring at least 20K of RAM.

This month's version of "Mini Golf" will delight you Apple users. Those of you who have mastered your pool tables will be that much better than the rest of us.

"Mini Golf" is an excellent representation of the good old nine-hole amusement park golf course. About the only thing lacking is the fresh air and waiting for the next group to move on.

To play "Mini Golf" you determine the angle of your shot by moving the right and left arrow keys. When you feel the angle is just right, press a number from one to nine (one being a soft tap and nine being a hard hit) to hit the ball. The difficulty of each hole increases as you go along.

Mini Golf Variables:

A: Misc. logic.
B1, B2, C1, C2, D1, D2: Variables used for moving the ball.
HH: How hard the ball is hit.
HM: Horizontal movement.
M1, M2: Movement indicators (for calculating angles).
NP: Number of players.
P: Par for each hole.
PT: Player's turn.
S(1-10): Score for each player.
S: Number of strokes per hole.
VM: Vertical movement.
Z$(1-10): Player name$.

```
1  REM  * MINIATURE GOLF
2  REM  * ORIGINAL PROGRAM BY
3  REM  * MITCH VOTH
4  REM  * APPLE TRANSLATION BY
5  REM  * STEVE JUSTUS
 Lines 9-30: Initialize variables
 and input number of players and
 player names.
9  DIM Z$(10): DIM S(10)
10  HOME : HTAB 15: VTAB 4: PRINT
     "APPLE   9 HOLE": HTAB 15: VTAB
     6: PRINT "MINIATURE GOLF"
30  VTAB 10: HTAB 10: INPUT "NUMB
     ER OF PLAYERS? ";NP: IF NP >
     10 THEN 10
35  FOR A = 1 TO NP: VTAB 12: HTAB
     10: PRINT "PLAYER #";A;: INPUT
     Z$(A): VTAB 12: HTAB 20: PRINT
     "           ": NEXT A: HOME
     : GOTO 300
 Line 40: Score subroutine.
40  TEXT : HOME : PRINT "SCORE: "
     : FOR A = 1 TO NP: PRINT Z$(
     A),S(A): NEXT A: FOR A = 1 TO
     4500: NEXT A: GR : COLOR= 4:
      FOR I = 0 TO 39: HLIN 0,39 AT
     I: NEXT I: RETURN
 Lines 50-70: Input routine to get
 putter movement and numeric input
 for hitting ball.
50  GET Z1$: IF  VAL (Z1$) = 0 THEN
     60
52 HH =  VAL (Z1$) * 13:HM = 0:VM
     = 0: IF A = 1 THEN  COLOR=
     4: PLOT C1,C2: GOTO 200
53  COLOR= 15: PLOT C1,C2: GOTO 2
     00
60 T = 0: IF  ASC (Z1$) <  > 8 THEN
     70
62 CP = CP + 1: IF CP = 17 THEN C
     P = 1
64  IF  SCRN( C1,C2) = 15 THEN  COLOR=
     4: PLOT C1,C2: GOTO 100
66  COLOR= 15: PLOT C1,C2: GOTO 1
     00
70  IF  ASC (Z1$) <  > 21 THEN 50
72 CP = CP - 1: IF CP = 0 THEN CP
     = 16
74  IF  SCRN( C1,C2) = 15 THEN  COLOR=
     4: PLOT C1,C2: GOTO 100
76  COLOR= 15: PLOT C1,C2: GOTO 1
     00
80  GOTO 50
90  COLOR= 14: PLOT CS,AP: COLOR=
     15: PLOT B1,B2: IF  SCRN( C1
     ,C2) = 15 THEN A = 0: COLOR=
     4: PLOT C1,C2: GOTO 50
91  COLOR= 15: PLOT C1,C2:A = 1: GOTO
     50
 Lines 100-116: Routine to alter
 ball or putter position values.
100  ON CP GOTO 101,102,103,104,1
     05,106,107,108,109,110,111,1
     12,113,114,115,116
101 C1 = B1:C2 = B2 + 2:M1 = 0:M2
      =  - 1: GOTO 90
102 C1 = B1 + 1:M1 =  - .5: GOTO
     90
103 C1 = B1 + 2:C2 = B2 + 2:M1 =
      - 1:M2 =  - 1: GOTO 90
104 C2 = B2 + 1:M2 =  - .5: GOTO
     90
105 C2 = B2:M2 = 0: GOTO 90
106 C2 = B2 - 1:M2 = .5: GOTO 90
107 C1 = B1 + 2:C2 = B2 - 2:M1 =
      - 1:M2 = 1: GOTO 90
108 C1 = B1 + 1:M1 =  - .5: GOTO
     90
109 C1 = B1:M1 = 0: GOTO 90
110 C1 = B1 - 1:M1 = .5: GOTO 90
111 C1 = B1 - 2:C2 = B2 - 2:M1 =
     1:M2 = 1: GOTO 90
112 C2 = B2 - 1:M2 = .5: GOTO 90
113 C2 = B2:M2 = 0: GOTO 90
114 C2 = B2 + 1:M2 =  - .5: GOTO
     90
115 C1 = B1 - 2:C2 = B2 + 2:M1 =
     1:M2 =  - 1: GOTO 90
116 C1 = B1 - 1:M1 = .5: GOTO 90
 Line 150: Hole in one routine.
150  IF S = 1 THEN  PRINT : PRINT
      CHR$ (7); CHR$ (7); CHR$ (7
     ); CHR$ (7): PRINT "A HOLE I
     N ONE!!!": PRINT : PRINT : FOR
     A = 1 TO 2000: NEXT A: RETURN
155  PRINT "THAT TOOK YOU ";S;" S
     TROKES": PRINT : PRINT : FOR
     A = 1 TO 2000: NEXT A: RETURN
 Lines 200-205: Routine to calculate
 reflection angles.
200 D1 = B1:D2 = B2: COLOR= 4: PLOT
     B1,B2: IF ( ABS (M1) = .5 AND
     HM = 1) OR  ABS (M1) = 1 THEN
     D1 = B1 +  SGN (M1):HM = 0: GOTO
     205
202 HM = 1
205 T = T + 1: IF T > 4 THEN RC =
     2: RETURN
 Line 210: Check for hole.
210  IF  SCRN( D1,B2) = 15 THEN R
     C = 0: RETURN
212  COLOR= 15: PLOT D1,B2:B1 = D
     1: IF  SCRN( D1,B2) =  SCRN(
     CS,AP) THEN S(PT) = S(PT) +
     S - P:RC = 1: GOSUB 150: RETURN
220  COLOR= 4: PLOT B1,B2: IF ( ABS
     (M2) = .5 AND VM = 1) OR  ABS
     (M2) = 1 THEN 224
222 VM = 1: GOTO 230
224 D2 = B2 +  SGN (M2):VM = 0
230  IF  SCRN( B1,D2) = 15 THEN R
     C = 0: RETURN
232  COLOR= 15: PLOT B1,D2:B2 = D
     2: IF  SCRN( B1,B2) =  SCRN(
     CS,AP) THEN S(PT) = S(PT) +
     S - P:RC = 1: GOSUB 150: RETURN
240 T = 0:HH = HH - 1: IF HH < 0 THEN
     RC = 2: RETURN
242  GOTO 200
 Lines 300-1120: Routines for
 displaying individual holes on
 screen.
300  HOME : GR : COLOR= 4: FOR I =
     0 TO 39: HLIN 0,39 AT I: NEXT
     I
301  HOME : COLOR= 15: HLIN 20,10
      AT 5: VLIN 5,37 AT 20: HLIN
     20,10 AT 37: VLIN 37,5 AT 10
```

```
: PRINT "HOLE #1   PAR 2":P =
2:CS = 15:AP = 8: COLOR= 13:
 PLOT CS,AP
302 FOR PT = 1 TO NP:S = 1: PRINT
Z$(PT);"'S TURN":B1 =  INT (
 RND (1) * 7) + 14:B2 = 35: CO
 LOR= 15: PLOT B1,B2
305 GOSUB 100
310 IF RC = 2 THEN S = S + 1:CP =
1: GOSUB 100: GOTO 310
320 IF RC = 1 THEN  NEXT PT: GOTO
400
325 HH = HH - 10: IF HH < 2 THEN
HH = 2
330 IF D1 = 10 OR D1 = 20 THEN M
1 =  - M1: GOSUB 200: GOTO 3
10
335 M2 =  - M2: GOSUB 200: GOTO 3
10
400 HOME : GOSUB 40: COLOR= 15:Y
 = 12: VLIN 35,12 AT 4: FOR
X = 4 TO 13:Y = Y - 1: PLOT
X,Y: NEXT X: HLIN 13,25 AT 2
: VLIN 2,16 AT 25: HLIN 25,1
4 AT 16: VLIN 16,35 AT 14: HLIN
14,4 AT 35
402 PRINT "HOLE #2   PAR 2":P =
2:CS = 22:AP = 10: COLOR= 13
: PLOT CS,AP: FOR PT = 1 TO
NP:S = 1: PRINT Z$(PT);"'S T
URN":B1 =  INT ( RND (1) * 7
) + 5:B2 = 33: COLOR= 15: PLOT
B1,B2:CP = 1: GOSUB 100
420 IF RC = 2 THEN S = S + 1:CP =
1: GOSUB 100: GOTO 420
430 IF RC = 1 THEN  NEXT PT: GOTO
500
435 HH = HH - 10: IF HH < 2 AND H
H >  - 6 THEN HH = 2
440 IF D1 = 4 OR D1 = 25 OR D1 =
14 THEN M1 =  - M1: GOSUB 20
0: GOTO 420
441 IF D1 < 13 AND D2 < 13 THEN
A = M1:M1 =  - M2:M2 =  - A:
 GOSUB 200: GOTO 420
442 IF D2 = 2 OR D2 = 35 OR D2 =
16 THEN M2 =  - M2: GOSUB 20
0: GOTO 420
500 HOME : GOSUB 40: COLOR= 15:Y
 = 15: HLIN 3,30 AT 35: VLIN
35,15 AT 30: FOR X = 30 TO 2
2 STEP  - 1:Y = Y - 1: PLOT
X,Y: NEXT X: HLIN 21,12 AT 6
:Y = 5: FOR X = 12 TO 3 STEP
 - 1:Y = Y + 1: PLOT X,Y: NEXT
X

510 VLIN 35,15 AT 3: VLIN 35,15 AT
17: PRINT "HOLE #3   PAR 2":
CS = 23:AP = 30: COLOR= 13: PLOT
CS,AP:P = 2: FOR PT = 1 TO N
P:S = 1: PRINT Z$(PT);"'S TU
RN":B1 =  INT ( RND (1) * 11
) + 5:B2 = 33: COLOR= 15: PLOT
B1,B2:CP = 2: GOSUB 100
520 IF RC = 2 THEN S = S + 1:CP =
1: GOSUB 100: GOTO 520
530 IF RC = 1 THEN  NEXT PT: GOTO
600
540 HH = HH - 10: IF HH < 2 AND H
H >  - 6 THEN HH = 2
550 IF D1 = 3 OR D1 = 17 OR D1 =
30 THEN M1 =  - M1: GOSUB 20
0: GOTO 520
553 IF D2 = 6 OR D2 = 35 THEN M2
 =  - M2: GOSUB 200: GOTO 52
0
554 IF D1 < 13 AND D2 < 16 THEN
A = M1:M1 =  - M2:M2 =  - A:
 GOSUB 200: GOTO 520
555 IF D1 > 20 AND D2 < 16 THEN
A = M1:M1 = M2:M2 = A: GOSUB
200: GOTO 520
600 HOME : GOSUB 40: COLOR= 15:Y
 = 11: VLIN 35,11 AT 3: FOR
X = 3 TO 10:Y = Y - 1: PLOT
X,Y: NEXT X: HLIN 10,24 AT 3
:Y = 3: FOR X = 25 TO 32:Y =
Y + 1: PLOT X,Y: NEXT X: VLIN
12,20 AT 32
602 Y = 20: FOR X = 32 TO 25 STEP
 - 1:Y = Y + 1: PLOT X,Y: NEXT
X: HLIN 24,20 AT 28: FOR X =
19 TO 12 STEP  - 1:Y = Y - 1
: PLOT X,Y: NEXT X: HLIN 3,1
2 AT 35
605 VLIN 35,12 AT 12: HLIN 12,22
 AT 12: VLIN 12,18 AT 22
610 PRINT "HOLE #4   PAR 3":CS =
17:AP = 15: COLOR= 13: PLOT
CS,AP:P = 3: FOR PT = 1 TO N
P:S = 1: PRINT : PRINT Z$(PT
);"'S TURN":B1 =  INT ( RND
(1) * 7) + 4:B2 = 33: COLOR=
15: PLOT B1,B2:CP = 1: GOSUB
100
620 IF RC = 2 THEN S = S + 1:CP =
1: GOSUB 100: GOTO 620
630 IF RC = 1 THEN  NEXT PT: GOTO
700
640 HH = HH - 10: IF HH < 2 AND H
H >  - 6 THEN HH = 2
650 IF D1 = 3 OR D1 = 22 OR D1 =
32 OR D1 = 12 THEN M1 =  - M
1: GOSUB 200: GOTO 620
655 IF D2 = 35 OR D2 = 3 OR D2 =
28 OR D2 = 12 THEN M2 =  - M
2: GOSUB 200: GOTO 620
660 IF D1 > 24 AND D2 < 12 THEN
A = M1:M1 = M2:M2 = A: GOSUB
200: GOTO 620
665 IF D1 > 25 AND D2 > 20 THEN
A = M1:M1 =  - M2:M2 =  - A:
 GOSUB 200: GOTO 620
670 IF D1 > 12 AND D2 > 12 THEN
A = M1:M1 = M2:M2 = A: GOSUB
200: GOTO 620
675 IF D1 < 11 AND D2 < 10 THEN
A = M1:M1 =  - M2:M2 =  - A:
 GOSUB 200: GOTO 620
700 HOME : GOSUB 40: COLOR= 15: HLIN
18,28 AT 35: VLIN 35,10 AT 2
8:Y = 24: FOR X = 28 TO 18 STEP
 - 1:Y = Y - 1: PLOT X,Y: NEXT
X: VLIN 35,24 AT 18
704 Y = 10: FOR X = 28 TO 20 STEP
 - 1:Y = Y - 1: PLOT X,Y: NEXT
X: HLIN 19,11 AT 1:Y = 1: FOR
X = 10 TO 1 STEP  - 1:Y = Y +
1: PLOT X,Y: NEXT X: VLIN 11
,16 AT 1
706 Y = 15: FOR X = 1 TO 9:Y = Y +
1: PLOT X,Y: NEXT X: HLIN 10
,18 AT 24
710 PRINT : PRINT "HOLE #5  PAR
2":CS = 4:AP = 13: COLOR= 13
: PLOT CS,AP:P = 2: FOR PT =
1 TO NP:S = 1: PRINT Z$(PT);
"'S TURN":B1 =  INT ( RND (1
) * 8) + 19:B2 = 33: COLOR=
15: PLOT B1,B2:CP = 1: GOSUB
100
720 IF RC = 2 THEN S = S + 1:CP =
1: GOSUB 100: GOTO 720
730 IF RC = 1 THEN  NEXT PT: GOTO
800
740 HH = HH - 10: IF HH < 2 AND H
H >  - 6 THEN HH = 2
750 IF D1 = 1 OR D1 = 18 OR D1 =
28 THEN M1 =  - M1: GOSUB 20
0: GOTO 720
755 IF D2 = 35 OR D2 = 1 OR D2 =
24 THEN M2 =  - M2: GOSUB 20
0: GOTO 720
760 IF (D1 > 17 AND D2 > 13) THEN
A = M1:M1 = M2:M2 = A: GOSUB
200: GOTO 720
765 IF D1 > 19 AND D2 < 11 THEN
A = M1:M1 = M2:M2 = A: GOSUB
200: GOTO 720
770 IF D1 > 0 AND D2 > 14 THEN A
 = M1:M1 = M2:M2 = A: GOSUB
200: GOTO 720
775 IF D1 < 12 AND D2 < 12 THEN
A = M1:M1 =  - M2:M2 =  - A:
 GOSUB 200: GOTO 720
800 GOSUB 40: COLOR= 15: HLIN 9,
26 AT 35: VLIN 35,25 AT 26: HLIN
26,32 AT 25:Y = 25: FOR X =
32 TO 38:Y = Y - 1: PLOT X,Y
: NEXT X: VLIN 18,4 AT 38: HLIN
38,9 AT 4: VLIN 4,35 AT 9
804 Y = 32: FOR X = 9 TO 21:Y = Y
 - 1: PLOT X,Y: NEXT X: VLIN
20,10 AT 21: PRINT "HOLE #6
  PAR 4":CS = 15:AP = 20: COLOR=
13: PLOT CS,AP:P = 4: FOR PT
 = 1 TO NP:S = 1: PRINT Z$(P
T);"'S TURN"
810 B1 =  INT ( RND (1) * 15) + 1
1:B2 = 33: COLOR= 15: PLOT B
1,B2:CP = 1: GOSUB 100
820 IF RC = 2 THEN S = S + 1:CP =
1: GOSUB 100: GOTO 820
830 IF RC = 1 THEN  NEXT PT: GOTO
900
```

continued on next page

continued from previous page

```
840 HH = HH - 10: IF HH < 2 AND H
    H > - 6 THEN HH = 2
850 IF D1 = 9 OR D1 = 38 OR D1 =
    26 OR D1 = 21 THEN M1 = - M
    1: GOSUB 200: GOTO 820
855 IF D2 = 4 OR D2 = 35 OR D2 =
    25 THEN M2 = - M2: GOSUB 20
    0: GOTO 820
860 IF D1 > 31 AND D2 > 17 THEN
    A = M1:M1 = - M2:M2 = - A:
     GOSUB 200: GOTO 820
865 IF D1 > 8 AND D2 < 33 THEN A
     = M1:M1 = - M2:M2 = - A: GOSUB
    200: GOTO 820
900 GOSUB 40: COLOR= 15: HLIN 11
    ,38 AT 35: VLIN 35,20 AT 38:
    Y = 20: FOR X = 38 TO 21 STEP
     - 1:Y = Y - 1: PLOT X,Y: NEXT
    X: HLIN 20,10 AT 2:Y = 1: FOR
    X = 10 TO 2 STEP - 1:Y = Y +
    1: PLOT X,Y: NEXT X: VLIN 11
    ,25 AT 2:Y = 25: FOR X = 2 TO
    10:Y = Y + 1: PLOT X,Y: NEXT
    X
901 VLIN 35,20 AT 20: HLIN 20,30
     AT 20
902 PRINT "HOLE #7   PAR 3":P =
    3:CS = 28:AP = 28: COLOR= 13
    : PLOT CS,AP: FOR PT = 1 TO
    NP:S = 1: PRINT Z$(PT);"'S T
    URN":B1 = INT ( RND (1) * 6
    ) + 11:B2 = 33: COLOR= 15: PLOT
    B1,B2:CP = 1: GOSUB 100
920 IF RC = 2 THEN S = S + 1:CP =
    1: GOSUB 100: GOTO 920
930 IF RC = 1 THEN NEXT PT: GOTO
    1000
935 HH = HH - 10: IF HH < 2 AND H
    H > - 6 THEN HH = 2
940 IF D1 = 38 OR D1 = 2 OR D1 =
    20 THEN M1 = - M1: GOSUB 20
    0: GOTO 920
950 IF D2 = 2 OR D2 = 35 OR D2 =
    20 THEN M2 = - M2: GOSUB 20
    0: GOTO 920
957 IF D1 > 21 AND D2 < 21 THEN
    A = M1:M1 = M2:M2 = A: GOSUB
    200: GOTO 920
960 IF D1 < 11 AND D2 < 11 THEN
    A = M1:M1 = - M2:M2 = - A:
     GOSUB 200: GOTO 920
965 IF D1 > 1 AND D2 > 24 THEN A
     = M1:M1 = M2:M2 = A: GOSUB
    200: GOTO 920
1000 GOSUB 40: COLOR= 15: HLIN 1
    5,25 AT 38: VLIN 38,25 AT 25
    :Y = 25: FOR X = 25 TO 30:Y =
    Y - 1: PLOT X,Y: NEXT X: VLIN
    19,10 AT 30:Y = 10: FOR X =
    30 TO 25 STEP - 1:Y = Y - 1
    : PLOT X,Y: NEXT X: HLIN 25,
    15 AT 4
1005 Y = 4: FOR X = 14 TO 10 STEP
     - 1:Y = Y + 1: PLOT X,Y: NEXT
    X: VLIN 10,19 AT 10:Y = 18: FOR
    X = 10 TO 15:Y = Y + 1: PLOT
    X,Y: NEXT X: VLIN 24,38 AT 1
    5
1007 VLIN 11,19 AT 15:Y = 19: FOR
    X = 16 TO 20:Y = Y + 1: PLOT
    X,Y: NEXT X:Y = 24: FOR X =
    21 TO 25:Y = Y - 1: PLOT X,Y
    : NEXT X: VLIN 19,11 AT 25
1010 PRINT "HOLE #8   PAR 3":P =
    3:CS = 20:AP = 20: COLOR= 13
    : PLOT CS,AP: FOR PT = 1 TO
    NP:S = 1: PRINT Z$(PT);"'S T
    URN":B1 = INT ( RND (1) * 7
     + 16):B2 = 35: COLOR= 15: PLOT
    B1,B2:CP = 1: GOSUB 100
1020 IF RC = 2 THEN S = S + 1:CP
    = 1: GOSUB 100: GOTO 1020
1030 IF RC = 1 THEN NEXT PT: GOTO
    1100
1035 HH = HH - 10: IF HH < 2 AND
    HH > - 6 THEN HH = 2
1040 IF D1 = 25 OR D1 = 30 OR D1
    = 10 OR D1 = 15 THEN M1 = -
    M1: GOSUB 200: GOTO 1020
1050 IF D2 = 38 OR D2 = 4 THEN M
    2 = - M2: GOSUB 200: GOTO 1
    020
1060 IF (D1 > 24 AND D2 > 19) OR
    (D1 < 15 AND D2 < 9) OR (D1 >
    20 AND D2 > 19) THEN A = M1:
    M1 = - M2:M2 = - A: GOSUB
    200: GOTO 1020
1070 IF (D1 > 24 AND D2 < 14) OR
    (D1 < 17 AND D2 > 17) OR (D1
     < 21 AND D2 > 19) THEN A =
    M1:M1 = M2:M2 = A: GOSUB 200
    : GOTO 1020
1100 GOSUB 40: COLOR= 15: HLIN 1
    5,25 AT 38: VLIN 38,24 AT 25
    : HLIN 25,35 AT 24: VLIN 24,
    2 AT 35: HLIN 35,5 AT 2: VLIN
    2,24 AT 5: HLIN 5,15 AT 24: VLIN
    24,38 AT 15
1105 Y = 14: FOR X = 15 TO 20:Y =
    Y + 1: PLOT X,Y: NEXT X:Y =
    21: FOR X = 23 TO 28:Y = Y -
    1: PLOT X,Y: NEXT X:Y = 11: FOR
    X = 27 TO 22 STEP - 1:Y = Y
     - 1: PLOT X,Y: NEXT X:Y = 4
    : FOR X = 18 TO 14 STEP - 1
    :Y = Y + 1: PLOT X,Y: NEXT X
1110 PRINT "HOLE #9   PAR 4":P =
    4:CS = 21:AP = 12: COLOR= 13
    : PLOT CS,AP: FOR PT = 1 TO
    NP:S = 1: PRINT Z$(PT);"'S T
    URN":B1 = INT ( RND (1) * 7
     + 16):B2 = 36: COLOR= 15: PLOT
    B1,B2:CP = 1: GOSUB 100
1120 IF RC = 2 THEN S = S + 1:CP
    = 1: GOSUB 100: GOTO 1120
1130 IF RC = 1 THEN NEXT PT: GOTO
    2000
1140 HH = HH - 10: IF HH < 2 AND
    HH > - 6 THEN HH = 2
1150 IF D1 = 15 OR D1 = 25 OR D1
    = 35 OR D1 = 5 THEN M1 = -
    M1: GOSUB 200: GOTO 1120
1160 IF D2 = 2 OR D2 = 38 OR D2 =
    24 THEN M2 = - M2: GOSUB 20
    0: GOTO 1120
1165 IF (D1 > 21 AND D2 > 14) OR
    (D1 < 20 AND D2 < 11) THEN A
    = M1:M1 = - M2:M2 = - A: GOSUB
    200: GOTO 1120
1170 IF (D1 < 21 AND D2 > 14) OR
    (D1 > 21 AND D2 < 11) THEN A
    = M1:M1 = M2:M2 = A: GOSUB
    200: GOTO 1120
1180 GOTO 1120
Line 2000: End game routine.
2000 TEXT : HOME : PRINT "FINAL
    SCORE:": FOR A = 1 TO NP: PRINT
    Z$(A),S(A): NEXT A:
```

APPLE ONE LINERS

```
2 A = 0:B = 0:E = .05 * RND (1):
    C = .05 + E:D = .2 + E ^ 2: HGR
    : POKE 49234,0: HCOLOR= 7: FOR
    Q = 1 TO 100: HPLOT 120 + 11
    0 * SIN (A),95 + 90 * COS
    (A) TO 120 + 110 * SIN (B),
    95 + 90 * COS (B):A = A + C
    :B = B + 0: NEXT Q: GOTO 2
```

Jim Escoffier
Merritt Island, FL

```
1 HOME : HGR : POKE - 16302,0: HPLOT
    PDL (0) / 255 * 279, PDL (1
    ) / 255 * 191: FOR X = 1 TO
    3000: HPLOT TO PDL (0) / 2
    55 * 279, PDL (1) / 255 * 19
    1: NEXT : FOR X = 8192 TO 16
    383: POKE X,S:S = S + 1 - 25
    5 * (254 < S): NEXT : GOTO 1
```

Dennis Ward
Beaverton, OR

```
1 A = 278:B = 190:C = 1:D = 3:X =
    A * RND (C):Y = B * RND (C
    ): HGR2 :P = RND (C) / 2:T =
    100 * RND (C) * RND (C) *
     RND (C): FOR Z = C TO T: FOR
    Q = C TO D: HCOLOR= Q: HPLOT
    X,Y TO A * RND (C),B * RND
    (C): NEXT Q: NEXT Z: GOTO 1
```

Bruce Mount
Lincoln, MA

```
10 HOME : INPUT "MESSAGE";A$: INPUT
    "NUMBER OF REPEATS";A: HOME
    : FOR I = 1 TO A: PRINT " ";
    A$;" ";: NEXT I: PRINT : PRINT
    "AGAIN? (Y/N)";: GET T$: IF
    T$ = "Y" THEN 10
```

Peter Stone
Los Angeles, CA

REVIEWS

ABM
from Muse

"ABM" is a visually exciting game, one at which you cannot win, only stave off disaster for an indefinite period of time. Essentially, you are the Air Defense Commander in charge of five Anti-ballistic Missile (ABM) bases located on the Atlantic Coast of the U.S.A. Some nameless enemy is lobbing nuclear missiles at you from an unknown locale off the top of your video screen. Your job is to knock those incoming missiles out of commission by firing your own missiles at them. Your ABMs are either 1 Kiloton Sprint missiles or 5 Kiloton Ajax missiles.

In order to guide your ABMs, you must use either game paddles or joysticks to locate a cross hair sight in the path of an incoming missile. Once the sight is in place, you launch a missile and try to blow the incoming mail to smithereens. Sound easy? Wait.

Among the faceless enemy's bag of tricks, there is a nifty fellow called a MIRV. That's Multiple Independently targetted Reentry Vehicle, for those who left your military reference books at the office. The MIRV does a neat little number after entering the picture, it plays amoeba and divides itself into several little missiles all going towards a different target. If you don't get it before it divides, you don't last a whole lot longer.

Sooner or later, the East Coast as represented by Boston, New York, Philadelphia, Washington D.C., Baltimore, and Richmond, gets wiped out. There's no way around this, the enemy has just as many, if not more, missiles than you do. My own private theory is that the enemy is located in Redondo Beach, California, but then I have definite Yankee leanings.

Once the Atlantic Seaboard has slowly sunk into the east, the video monitor displays the number of enemy missiles that you destroyed in your futile efforts to save the seat of government, the number of missiles you used in the aforementioned fruitless task, and your score.

"ABM" is a lot of fun, even if you're not from the West Coast. The graphics are excellent, the game is fast paced and unpredictable. In fact, the only drawback to the whole package is the fact that you cannot "win", you can only survive a little bit longer than you did before...and that is only a drawback if you choose to view it as such.

Oh yes, there is one other slight problem: It's highly addictive.

Dave Albert

GALAXY WARS
from Starcraft Inc.
Distributed by Broderbund Software

This one should have been named "Fish in Space". Really, in order to win you must pilot a missile through an obstacle course of fish (!) and knock out alien saucers. "Galaxy Wars" is a Japanese import marketed by Broderbund Software, and it's quite a decent little arcade game. Only I found myself waiting for Mothra or Godzilla to rear up out of the schools of fish and take a swipe at my missile.

There are a few other disconcerting things about "Galaxy Wars", although none of them really detract from the program. For one, you have to turn your monitor on its side unless you prefer to visualize your missile as a bazooka shell. And then there are the choreographed little saucers all synchronized with the opening sound routine, calling to mind the June Taylor Dancers or a Busby Berkeley musical.

Perhaps these are not logical inconsistencies at all, but quite natural to the Oriental mind... if we Westerners buy the line about the moon being made of green cheese, why not swarms of fish roaming the astral pathways? Certainly there are no "rules" in fantasy space games, nor does there need to be a logical pattern. If the action is well-paced and the game entrancing, then who cares if there are seeming incongruities? And "Galaxy Wars" IS fun to play, as much fun as any Invaders-type game I have seen. Now if we can just get the "lethal writhing electrical worms" from Space Invasion onto hooks...

Dave Albert

MONTY PLAYS MONOPOLY
from Personal Software

If you enjoy Monopoly, I think you'll enjoy Monty. As the name says, Monty plays Monopoly. And he plays it with a flourish that normally isn't found among his more human counterparts. (I say MORE human, because Monty is really a very warm, engaging sort of opponent.)

"Monty Plays Monopoly" is available in Apple and S-80 versions; I played it on the Apple.

The playing board is represented in colorful low-resolution graphics on the monitor, although you still need a regular Monopoly board game to play. Once you load "Monty", the program runs itself, beginning with a rendition of a few of the many tunes that you'll hear during the course of the game. After entering the names of the other players, and optionally placing some cash on Free Parking, the game gets under way.

"Monty" is controlled mainly through the game paddles, with keyboard input required from time to time. The program follows all the rules, including rent payments; mortgaging; buying and selling of houses and hotels; trading; bidding; doubles — and, of course, bankruptcy. All inputs are well-prompted and error-proofed.

Much of the program's appeal lies in its use of music and graphics. A different theme is played for each square on the board, sometimes accompanied by a graphics animation. And Monty's debonair face is displayed whenever it's his turn.

Of course, if you're like me and always have trouble finding Monopoly partners in the first place, then Monty's greatest appeal may well be his availability. Monty gets my recommendation as a more entertaining Monopoly player than most, and (what's even rarer) one who doesn't cheat.

Jon Voskuil

NUMBER BATTLE

by David Bohlke

"Number Battle" is an Atari program requiring at least 8K memory.

With a blaze of psychedelic color and a cascading current of sound, the battle is underway!

The object of the game is to "capture" higher numbers on the playing field than your formidable opponent, the Atari. You are first asked to choose a level of difficulty from 1 to 5, with the higher levels giving you a tougher battle (and also taking a bit longer for each move). You then choose the number of colors you want to use, from 1 to 3. The computer will be printing a field of 79 numbers, and this input determines how many different colors it will use to print them. The significance is that the second color doubles the value of the number, and the third color triples it, adding to the challenge of the game. Finally, you are asked to choose either a random or symmetrical arrangement of numbers, and then the battle begins.

When the board is displayed, you will see an "H" and an "A" mixed in with the numbers, marking the starting locations for the Human and the Atari. You enter your move (up, down, right, or left) by moving the joystick in the appropriate direction and pressing the button. The number at that location (doubled or tripled if applicable) will be added to your score. You and the computer alternate turns until one of you tops the game score, which is determined by the chosen skill level. All this is accompanied by much flashing and bleeping, to keep your senses as well as your intellect stimulated.

Documentation

Lines 5-192:
Initialization

Line 10:
Get options

Line 16:
Print scores

Line 20:
A(121) Board values
D(4) Direction for moves
B(121) Color values for PLOT

Lines 40-48:
Put numbers into array

Lines 50-58:
Set board boundary (99), PLOT numbers on screen

Line 60:
Direction values

Lines 100-132:
PLOT players pieces

Line 192:
Human moves first on random

Lines 200-260:
Computer's move (CS is the computer location)

Line 220:
Get square to move to

Line 230:
Zero current position

Line 240:
Adjust score and array

Line 250:
PLOT move

Line 260:
Prints scores

Lines 300-399:
Human's move

Lines 304-320:
Get direction of move

Lines 350-360:
PLOT question mark in move position

Lines 365:
FIRE button not pressed

Lines 370-372:
Zero position

Line 375:
Adjust score and arrays

Lines 380-382:
PLOT piece

Line 390:
Print scores

Line 399:
Continue to computer's move

Lines 500-566:
Print scores, check for end of game

Lines 700-799:
Computer's move strategy
MS Square to move to
HS High point total

Lines 710, 720, 730, 740, 750:
Five loops to look up to five squares ahead (depending on level difficulty)

Line 710:
Loop for four directions

Line 712:
Check for off board

Line 714:
If square value is higher than current high, interchange the two.

Line 715:
Possible end of game one look-ahead

Line 718:
Check level of difficulty

Lines 800-836:
Enter options

Lines 900-904:
PLOT coordinates for a given square (S)

```
5 REM  NUMBER BATTLE  by David Bohlke
10 GOSUB 800
11 GRAPHICS 1:POKE 752,1:SETCOLOR 4,0,
8

16 GOSUB 500
20 DIM A(121),D(4),B(121)
40 FOR S=12 TO SY:A(S)=INT(RND(0)*9)+1
:B(S)=A(S)+16
41 SOUND 0,S*2,10,2:SETCOLOR 4,S,8

42 IF (NC=3 OR NC=2) AND RND(0)<0.3 TH
EN B(S)=A(S)+176:A(S)=A(S)*2:GOTO 46
44 IF NC=3 AND RND(0)<0.3 THEN B(S)=A(
S)+144:A(S)=A(S)*3
46 IF SY=60 THEN A(120-S)=A(S):B(120-S
)=B(S)
48 NEXT S:SETCOLOR 4,0,8

50 FOR I=1 TO 9:A(I)=99:A(I+110)=99:NE
XT I
52 FOR I=11 TO 99 STEP 11:A(I)=99:A(I+
10)=99:NEXT I
55 FOR S=12 TO 108:IF A(S)=99 THEN 58
56 GOSUB 900
58 NEXT S

60 D(1)=-11:D(2)=1:D(3)=11:D(4)=-1
100 CP=0:HP=0:CS=48:HQ=72
110 A(HQ)=99:A(CS)=99
120 S=CS:GOSUB 900:COLOR 65:PLOT X,Y
122 COLOR 60:PLOT X-1,Y:COLOR 62:PLOT
X+1,Y

130 S=HQ:GOSUB 900:COLOR 72:PLOT X,Y
132 COLOR 60:PLOT X-1,Y:COLOR 62:PLOT
X+1,Y
190 ? :? :? :?
192 IF RND(0)<0.5 THEN GOSUB 500:GOTO
300
200 S=CS
220 GOSUB 700

230 A(S)=0:GOSUB 900:COLOR 0:PLOT X,Y:
PLOT X-1,Y:PLOT X+1,Y
240 CP=CP+A(MS):A(MS)=99:CS=MS
250 S=MS:GOSUB 900:COLOR 65:PLOT X,Y
252 COLOR 60:PLOT X-1,Y:COLOR 62:PLOT
X+1,Y

260 GOSUB 500
300 A(HQ)=0
304 S=HQ:SOUND 0,RND(0)*255,10,2:P=STI
CK(0):GOTO P+300

305 GOTO 307
306 GOTO 314
307 MS=S+1:GOTO 320
```

```
309 GOTO 313
310 GOTO 311
311 MS=S-1:GOTO 320
313 MS=S+11:GOTO 320
314 MS=S-11:GOTO 320
315 GOTO 304
320 IF A(MS)=99 THEN 304
350 S=MS:GOSUB 900:COLOR 63
352 PLOT X,Y
355 FOR I=1 TO 100:IF STRIG(0)=0 THEN
370
356 SOUND 0,I*2,10,2
360 NEXT I
365 COLOR B(S):PLOT X,Y:GOTO 304
370 S=HQ:GOSUB 900:COLOR 0:PLOT X,Y
372 PLOT X-1,Y:PLOT X+1,Y
375 HP=HP+A(MS):A(MS)=99:HQ=MS
380 S=MS:GOSUB 900:COLOR 72:PLOT X,Y
382 COLOR 60:PLOT X-1,Y:COLOR 62:PLOT
X+1,Y
390 GOSUB 500
399 GOTO 200
500 POKE 77,0
502 PRINT :PRINT ," Number Battle "
504 PRINT ,,"          GAME ";EG+1
510 PRINT "HUMAN ";HP," ATARI ";CP
520 IF HP>EG OR CP>EG THEN 550
530 RETURN
550 PRINT :PRINT "Press  FIRE  for nex
t game ?";
560 IF STRIG(0)=0 THEN RUN
566 SOUND 0,RND(0)*250,10,2:GOTO 560
700 MS=-1:HS=-1
710 FOR M1=1 TO 4:N1=S+D(M1)
711 SOUND 0,M1*30,10,2:SETCOLOR 4,RND(
0)*15,8
712 IF A(N1)=99 THEN 780
714 IF A(N1)>HS THEN HS=A(N1):MS=N1
715 IF A(N1)+CP>EG THEN MS=N1:GOTO 799
718 IF L=1 THEN 780
720 FOR M2=1 TO 4:N2=N1+D(M2)
722 IF A(N2)=99 OR N2=S THEN 778
724 IF A(N1)+A(N2)>HS THEN HS=A(N1)+A(
N2):MS=N1
728 IF L=2 THEN 778
730 FOR M3=1 TO 4:N3=N2+D(M3)
732 IF A(N3)=99 OR N3=N1 THEN 776
733 SOUND 0,M1*30+M3*30,10,2:SETCOLOR
4,RND(0)*15,6
734 S1=A(N1)+A(N2)+A(N3):SETCOLOR 2,RN
D(0)*15,6
736 IF S1>HS THEN HS=S1:MS=N1
738 IF L=3 THEN 776
740 FOR M4=1 TO 4:N4=N3+D(M4)
742 IF A(N4)=99 OR N4=N2 OR N4=N1 THEN
 774
744 S1=A(N1)+A(N2)+A(N3)+A(N4)
746 IF S1>HS THEN HS=S1:MS=N1
748 IF L=4 THEN 774
750 FOR M5=1 TO 4:N5=N4+D(M5)
752 IF A(N5)=99 OR N5=N3 OR N5=N2 OR N
5=N1 THEN 772
754 S1=A(N1)+A(N2)+A(N3)+A(N4)+A(N5)
756 IF S1>HS THEN HS=S1:MS=N1
772 NEXT M5
774 NEXT M4
776 NEXT M3
778 NEXT M2
780 NEXT M1
799 SETCOLOR 4,0,8:SETCOLOR 2,9,4:RETU
RN
800 GRAPHICS 0:SETCOLOR 2,15,2
805 PRINT :PRINT ," NUMBER BATTLE ":PR
INT
810 PRINT " ENTER  Level of Difficulty
 (1-5) ";:INPUT L:L=INT(L):IF L<1 OR L
>5 THEN 810
820 ? :PRINT " ENTER  Number of Colors
 (1-3) ";:INPUT NC:NC=INT(NC):IF NC<1
OR NC>3 THEN 820
822 EG=99:IF NC=2 THEN EG=149
824 IF NC=3 THEN EG=199
830 ? :PRINT " ENTER  Board Status : "
832 PRINT ,"1 - Symmetric":PRINT ,"2 -
 Random  ",:INPUT SY
834 IF SY=1 THEN SY=60:RETURN
836 SY=108:RETURN
900 Y=INT(S/11):X=S-Y*11:COLOR B(S)
902 Y=(Y-1)*2:X=X*2
904 PLOT X,Y:RETURN
```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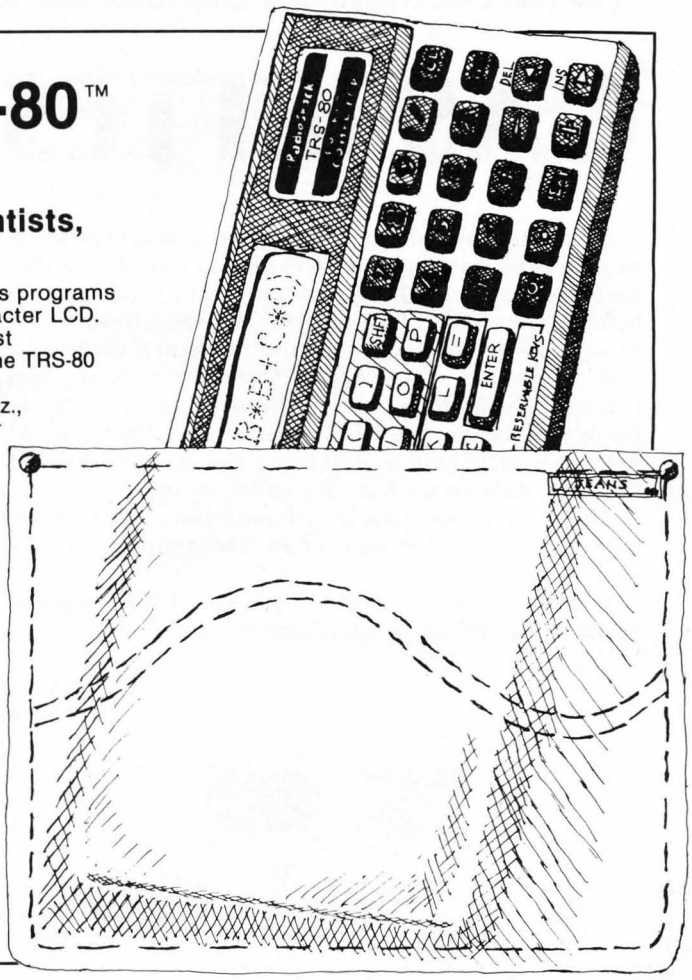

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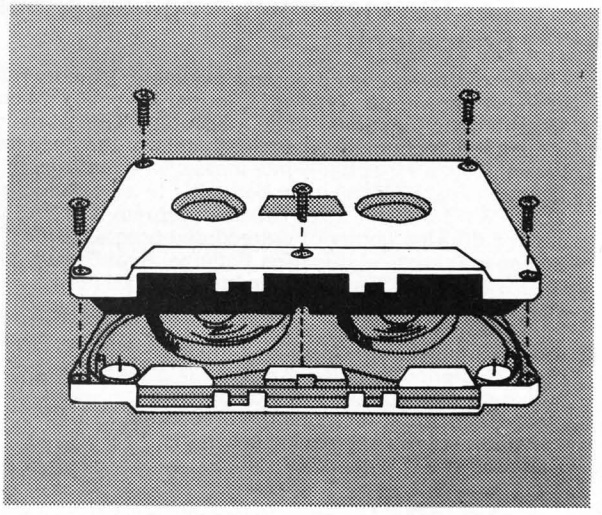

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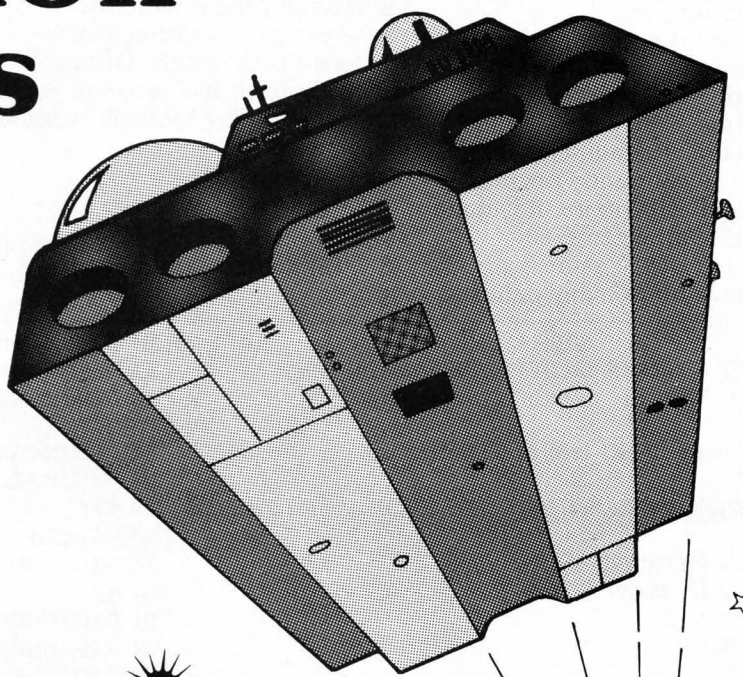

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INVASION

Now you can continue to play this popular arcade game even after you run out of quarters! Shoot down the invading aliens, but protect your guns from their bombs.

Great sound and graphics. (Sound requires external amplifier.)

16K Level II Cassette... $9.95
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Fifty-five aliens advance and shower you with lethal, writhing electric worms. As you pick off the aliens one by one, they quicken their descent. They whiz across the screen, wearing away the parapets which are your only defense, coming closer to your level. SUPER INVASION is the original invasion game with the original moon creatures.

32K Apple II Cassette..... $19.95

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Cruel and crafty invaders have been spotted in battle formation warping towards Earth at an incredible speed. Suddenly, your ship materializes just below the huge flock of invaders. But watch out! A few are breaking out of the convoy and flying straight at you!

16K S-80 Cassette..... $15.95

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SCORE 4

by Stephen Milliken

"Score 4" is an S-80 program requiring 16K of memory.

Are you the type that has trouble rubbing your stomach and patting your head simultaneously? Can you walk and chew gum at the same time? If not, have we got a program for you...

"Score 4" is a short program for improving hand-to-eye coordination and quickening reaction time. There are varying speeds in the program, enabling the player to constantly upgrade skill levels. Furthermore, it is quite an enjoyable little game.

The object of the game is simple: Rack up as many points as you can. Quite straightforward, that part. The method is slightly more esoteric. You must try to get a bouncing ball (square, really) to land on certain squares within a grid. With 19 balls to start off with, that may sound easy. But the catch is that you must land on squares in certain patterns, different patterns being worth different point totals. Once you have mastered this program you'll be ready to play football...without a helmet.

Score 4 Variables:
A-U: Integers.
V-Z: Strings.
A(1-16): Screen positions of spaces.
N: Number of bounces left.
NE: New score.
P: Current position.
R: Next direction (-1 = left, 0 = same place, 1 = right, 4 = down).
S: Number of shots left.
SC: Score.
V: String containing sound routine.
W: String containing INKEY$ and INPUT responses.
X(1-16): String containing the contents of space.
Y: String containing occupied graphics.
Z: Graphics string.
I, J, K, T: Miscellaneous. Used in loops and as temporary variables.

```
1 '                    SCORE 4
2 ' WRITTEN BY STEPHEN MILLIKEN     DECEMBER 28, 1980
3 '

        Lines 10-140: Program initialization.

10 DATA332,340,348,356,460,468,476,484,588,596,604,612,716,724,7
32,740
20 CLEAR200:RANDOM:DEFSTRV-Z:DEFINTA-U
29 ' INITIALIZE ARRAYS
30 DIMA(16),X(16)
40 FORI=1TO16
50 READA(I)
60 X(I)=STR$(I)
70 IFI<10THENX(I)=X(I)+" "ELSEX(I)=RIGHT$(X(I),2)
80 NEXT
90 GOSUB590
100 GOSUB750
110 GOSUB890
120 S=19
130 Y=CHR$(136)+CHR$(132)
140 Z=CHR$(191)+CHR$(191)

        Lines 150-300: Main routine.

150 GOSUB950
160 S=S-1
170 R=RND(4)
180 PRINT@A(P),Z;
190 R=R-2
200 IFR=2THENR=4
210 IF(P=1ORP=5ORP=9ORP=13)ANDR=-1THEN170
220 IF(P=4ORP=8ORP=12ORP=16)ANDR=1THEN170
230 IFP+R>16THEN170
240 FORI=1TOSK
250 W=INKEY$
260 IFW=""THENNEXTELSE310
270 PRINT@A(P),X(P);
280 P=P+R
290 N=N+1
300 IFN>20THEN550ELSE170

        Lines 310-580: Check for score after
            each round.

310 IFX(P)=YTHEN560
320 PRINT@A(P),Y;
330 I=USR(150):X(P)=Y
340 NE=0
350 FORI=1TO13STEP4
360 IFX(I)=YANDX(I+1)=YANDX(I+2)=YANDX(I+3)=YTHENNE=NE+1
370 NEXT
380 FORI=1TO4
390 IFX(I)=YANDX(I+4)=YANDX(I+8)=YANDX(I+12)=YTHENNE=NE+1
400 NEXT
410 IFX(1)=YANDX(6)=YANDX(11)=YANDX(16)=YTHENNE=NE+1
420 IFX(4)=YANDX(7)=YANDX(10)=YANDX(13)=YTHENNE=NE+1
430 IFX(1)=YANDX(4)=YANDX(13)=YANDX(16)=YTHENNE=NE+3
440 IFX(6)=YANDX(7)=YANDX(10)=YANDX(11)=YTHENNE=NE+3
450 IFSC=NETHEN540ELSESC=NE
460 FORK=1TO2
470 FORI=200TO100STEP-4
480 J=USR(I)
490 NEXTI
500 FORI=100TO200STEP4
510 J=USR(I)
520 NEXTI,K
530 IFSC=16THEN1090
540 IFS<1THEN1090ELSE150
550 PRINT@A(P),X(P);
560 FORI=1TO9:T=USR(255):FORJ=1TO15:NEXT:T=USR(225):FORJ=1TO15:N
EXTJ,I
570 PRINT@A(P),X(P);
580 IFS<1THEN1090ELSE150

        Lines 590-740: Instructions.

590 CLS:PRINTCHR$(23);
600 PRINT@342,"SCORE 4":PRINT
610 PRINTTAB(6)"BY STEPHEN MILLIKEN"
620 PRINT@960,;:INPUT"DO YOU NEED INSTRUCTIONS";W
630 IFLEFT$(W,1)<>"Y"THENRETURN
640 CLS:PRINTTAB(25)"SCORE 4":PRINT
650 PRINT:PRINT"THE OBJECT OF THIS GAME IS TO STOP THE FALLING B
ALL IN AN"
660 PRINT"UNOCCUPIED SPACE. THE SCORING SYSTEM IS AS FOLLOWS:
670 PRINT:PRINT"1) EACH VERTICAL, HORIZONTAL, OR DIAGONAL LINE I
S WORTH 1 POINT"
```

HIDING YOUR CODE

PART II

Last month we talked about editing your program lines to make them difficult to list. That method, however, is rather limited because it requires twice as much memory as your program would otherwise take.

This month we will talk a little about using control functions to make your programs even harder to list. You remember CHR$(23), it puts your screen into the enlarged mode. Well, anything that's on the screen in the 64 character mode will lose every other letter when you switch into the enlarged mode. You can illustrate this by typing anything on the screen, pressing SHIFT-Right Arrow, then printing CHR$(28) (home cursor). By doing this you are entering a control character in the immediate mode.

You can put these control characters into your BASIC code by adding a REMark at the end of important lines, then an asterisk (*). Here's an example:

```
10 FORA=1TO100:NEXTA'*
```

This line will still function in the regular way. After editing the line, go back and find the location in memory where the asterisk actually resides. Once found, POKE the address with a 23. Then list the line. The line automatically causes the computer to change into the enlarged format. By using different combinations of this technique, you can make it a real pain for anyone to alter or analyze your BASIC code. Below is a table of the control codes and their effects on a program during LISTing.

Phillip

ASCII VALUE	RESULTS
23	EXPANDED MODE
28	HOME CURSOR
31	CLEAR TO E.O.S.
12	FORMFEED PRINTER IS LLISTED

Score 4
continued from page 76

```
680 PRINT"2) THE FOUR OUTSIDE SPACES (1,4,13,16) ARE WORTH 3 POI
NTS."
690 PRINT"3) THE FOUR INSIDE SPACES (6,7,10,11) ARE WORTH 3 POIN
TS."
700 PRINTTAB(10)"BEST POSSIBLE SCORE: 19 (WITH BONUS POINTS)"
710 PRINT:PRINT"USE THE ENTER KEY TO START EACH ROUND AND ALSO T
O STOP THE BALL"
720 PRINT:PRINTTAB(5)"CONNECT THE AUX LEAD TO AN AMPLIFIER FOR S
OUND."
730 PRINTTAB(17)"HIT ANY KEY TO BEGIN"
740 W=INKEY$:IFW=""THEN740ELSERETURN
        Lines 750-880: Graphics display routine.
750 SC=0
760 CLS:PRINTCHR$(23);
770 PRINT@980,"SCORE 4";
780 FORI=1TO16
790 PRINT@A(I),X(I);
800 NEXT
810 FORJ=15TO37:SET(20,J):SET(84,J):NEXT
820 FORI=20TO84:SET(I,38):NEXT
830 FORJ=11TO15STEP4:FORI=84TO127:SET(I,J):NEXTI,J
840 FORI=20TO83:SET(I,11):NEXT
850 SET(20,12):SET(20,13):SET(20,14)
860 PRINT@0,;:INPUT"SKILL LEVEL (0:FAST - 9:SLOW)";SK
870 SK=INT(SK):IFSK<0ORSK>9THEN860ELSESK=SK*3
880 RETURN
        Lines 890-940: Sound routine.
890 V="SOUND ROUTINE GOES HERE"
900 I=VARPTR(V):J=PEEK(I+1)+256*PEEK(I+2)
910 FORK=JTOJ+22:READD:POKEK,D:NEXT
920 IFPEEK(16396)=201POKE16526,PEEK(I+1):POKE16527,PEEK(I+2)ELSE
CMD"T":DEFUSR0=PEEK(I+1)+256*PEEK(I+2):POKE14308,0
930 DATA205,127,10,14,9,69,62,9,211,255,16,254,69,62,10,211,255,
16,254,13,32,239,201
940 RETURN
        Lines 950-1080: Beginning of turn routine.
950 PRINT@84,"SHOTS:";S;
960 PRINT@148,"SCORE:";SC;
970 P=RND(4)
980 N=0
990 PRINT@904,"HIT #ENTER# TO START";
1000 W=INKEY$:IFW=""THEN1000
1010 IFASC(W)<>13THEN1000
1020 PRINT@904,STRING$(20," ");
1030 I=316
1040 FORJ=1TO9
1050 PRINT@I,Z;:FORT1=1TO50:NEXT:PRINT@I,"  ";
1060 K=USR(150)
1070 I=I-4:NEXT
1080 RETURN
        Lines 1090-1140: End of game routine.
1090 PRINT@84,"SHOTS:";S;
1100 PRINT@148,"SCORE:";SC;
1110 FORI=1TO15:J=USR(225):J=USR(125):NEXT
1120 IFS<1THEN1130ELSEPRINT@168,"BONUS";:S=S-1:SC=SC+1:FORT=1TO2
50:NEXT:GOTO1090
1130 PRINT@212,"PLAY AGAIN?";
1140 W=INKEY$:IFW=""THENPRINT@160,"    ";:FORT=1TO50:NEXT:PRINT@1
60,SC;:FORT=1TO50:NEXT:GOTO1140ELSEIFW="Y"THENRUNELSECLS:END
```

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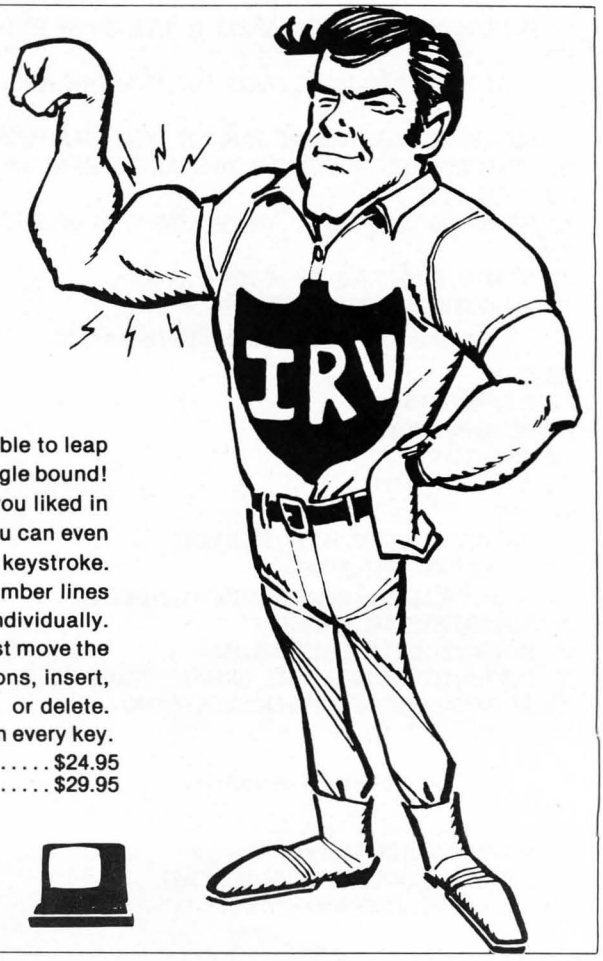

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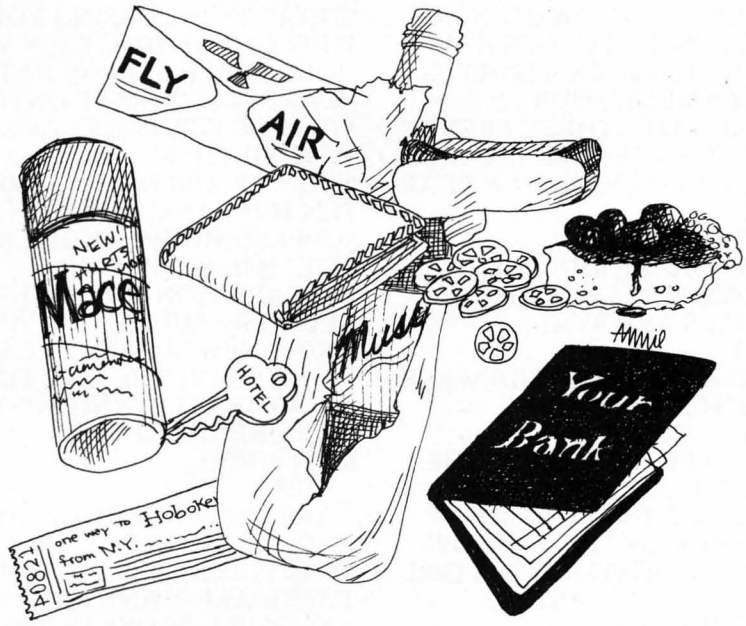
BIG APPLE ADVENTURE

by Christopher U. Light and Chris Light, Jr.

It was probably our tenth or eleventh trip into Colossal Cave, and it must have been about 2 a.m. We had come out of Bedquilt (again), tiptoed through the Soft Room and Y-2 and were hoping that this time we could get past the giant clam. Just one more try, we thought; maybe if we bring the black rod, we could pry the clam open. But it was very late, and we kept closing our eyes and suddenly jerking them open again. WEST, we ordered, holding open an eyelid with thumb and forefinger. WEST. The screen responded, YOU'RE AT COMPLEX JUNCTION. Our eyes closed, but our fingers continued typing.

SOUTH
YOU'RE IN A PARK. THERE ARE TREES AND GRASS HERE.
EAST
YOU'RE AT THE INTERSECTION OF OF A NORTH-SOUTH AVENUE AND AN EAST-WEST STREET. STEPS GO DOWN FROM HERE.
DOWN
YOU'RE ON A SUBWAY PLATFORM. THERE IS A TRAIN HERE.
BOARD TRAIN
YOU ARE ON THE TRAIN. THE TRAIN IS MOVING.
EXAMINE MAP
YOU CAN'T READ THE SUBWAY MAP. IT IS COVERED WITH GRAFFITI. YOU DON'T KNOW WHAT TRAIN YOU'RE ON. THE TRAIN IS MOVING.
SIT DOWN
ALL SEATS ARE TAKEN BY HEALTHY TEENAGERS WHO REFUSE TO MOVE FOR PREGNANT LADIES AND DISABLED WAR VETERANS. I DO NOT THINK THEY WILL MOVE FOR YOU. A CRAZY COMES INTO YOUR CAR AND THROWS A MEAT CLEAVER AT YOU. IT MISSES. THE TRAIN STOPS AT A STATION.
EXAMINE STATION
YOU CAN'T SEE OUT OF THE WINDOWS. THEY ARE COVERED WITH GRAFFITI. "ST 27" IS WRITTEN ALL OVER THEM IN STRANGE SCRIPT.
LEAVE TRAIN
YOU ARE ON A SUBWAY PLATFORM. THE SIGN ON THE WALL SAYS "14TH STREET-UNION SQUARE." A PICKPOCKET IS BEHIND YOU.
UP
THE PICKPOCKET WON'T LET YOU GO IN THAT DIRECTION. IF YOU ARE NOT CAREFUL, HE WILL STEAL YOUR WALLET AND THEN PUSH YOU IN FRONT OF THE NEXT TRAIN.
TAKE INVENTORY
YOU ARE CARRYING: AN EXPENSIVE PIGSKIN WALLET, $127.80 IN CASH, A NATHAN'S HOT DOG, 8 SUBWAY TOKENS, A CAN OF MACE, A PIECE OF LINDY'S CHEESE CAKE, A HOTEL ROOM KEY, A BOTTLE OF MUSCATEL IN A BROWN PAPER BAG, A BANK PASSBOOK SHOWING AN ACCOUNT CONTAINING $3,000, A BUS TICKET TO HOBOKEN AND AN AIRLINE TICKET BACK TO YOUR HOME TOWN.
SPRAY MACE
THE PICKPOCKET SCREAMS, COVERS HIS EYES WITH HIS HANDS AND STUMBLES AWAY.
BOARD TRAIN
YOU ARE ON A SUBWAY TRAIN. IT IS A LOCAL THAT MAKES FREQUENT STOPS.
EXAMINE TRAIN
YOU CAN'T SEE PAST THE GRAFFITI.
STOP TRAIN
THE TRAIN IS STOPPED AT A STATION.
LEAVE TRAIN
YOU ARE ON A SUBWAY PLATFORM. A SIGN ON THE WALL SAYS "GRAND CONCOURSE."
UP
YOU ARE IN THE SOUTH BRONX. THERE ARE ABANDONED BUILDINGS ALL AROUND YOU. THERE IS A CAN OF GASOLINE HERE. THERE ARE MATCHES HERE.
GET GASOLINE
OK.
GET MATCHES
OK.
POUR GASOLINE
THERE IS GASOLINE SOAKING INTO THE FLOOR OF A RED BRICK BUILDING.
LIGHT MATCH
THE BUILDING BURNS TO THE GROUND. THERE IS AN INSURANCE COMPANY CHECK FOR $200,000 HERE.
GET CHECK
OK.
NORTH
YOU ARE IN YANKEE STADIUM. A MAN STANDING ON A LOW MOUND OF DIRT

continued on next page



continued from previous page

HURLS A BASEBALL AT YOUR *HEAD AT 100* MILES AN HOUR.

DUCK HEAD

THE BASEBALL MISSES YOUR HEAD. AN UMPIRE SHOUTS "BALL ONE." THE MAN HURLS ANOTHER BASEBALL AT YOUR HEAD, THIS TIME AT 110 MILES AN HOUR.

DUCK HEAD

THE BALL MISSES YOU AGAIN. AN UMPIRE SHOUTS, "BALL TWO." THE MAN THROWS ANOTHER BASEBALL AT YOU. THIS TIME I THINK IT IS GOING TO PASS IN FRONT OF YOU.

SWING BAT

YOU HIT THE BASEBALL AND KNOCK IT INTO THE UPPER DECK. A FAT, BALD-HEADED MAN SMOKING A CIGAR COMES OUT OF THE STANDS AND OFFERS YOU A CONTRACT TO PLAY FOR HIS TEAM FOR $100,000 A YEAR.

GET CONTRACT

OK.

GO SUBWAY

YOU ARE ON A LEXINGTON AVENUE LOCAL HEADING SOUTH TO MANHATTAN.

STOP 59TH

YOUR TRAIN IS STOPPED AT THE 59TH STREET STATION. BELOW YOU ARE THE EXPRESS TRACKS. ABOVE YOU IS BLOOMINGDALES, A TRENDY DEPARTMENT STORE THAT IS OPEN LATE ON MONDAYS AND THURSDAYS.

UP

YOU ARE AT BLOOMINGDALES. IN THE STORE'S WINDOW ARE ANIMAL CAGES. IN THE CAGES ARE SEVEN LIONS, SIX GIRAFFES, FIVE CAMELS, FOUR ARMADILLOS, THREE FRENCH HENS, TWO TURTLE DOVES AND A PARTRIDGE IN A PEAR TREE.

GET CAMELS

ARE YOU KIDDING? THIS IS BLOOMINGDALES. THESE ANIMALS ARE REAL.

OUT

YOU ARE ON THE SIDEWALK AT 59TH STREET.

WEST

YOU ARE AT 5TH AVENUE.

SOUTH

YOU ARE IN FRONT OF TIFFANYS. IN THE WINDOW ARE MANY JEWELS AND A GIRL EATING BREAKFAST.

GET JEWELS

YOU CAN'T. THEY ARE IN THE DISPLAY WINDOW.

BREAK WINDOW

OK.

GET JEWELS

YOU HAVE THE JEWELS. A BURGLAR ALARM GOES OFF. A POLICEMAN COMES AROUND THE CORNER AND FIRES HIS .38 SPECIAL AT YOU. HE MISSES. THE GIRL SCREAMS AND DROPS HER BREAKFAST.

SOUTH

YOU ARE RUNNING DOWN THE MIDDLE OF 5TH AVENUE DODGING BUSES. FIVE POLICEMEN ARE CHASING YOU. THERE IS AN OPEN MANHOLE HERE.

DOWN

YOU ARE IN THE SEWER. A GIANT RAT IS THREATENING YOU. IT CARRIES BUBONIC PLAGUE.

UP

THE RAT WON'T LET YOU.

DOWN

YOU CAN'T GET PAST THE RAT.

DROP CHEESECAKE

THE RAT HAPPILY EATS YOUR PIECE OF LINDY'S CHEESE CAKE AND SCURRIES AWAY. POLICEMEN ARE SHOOTING THEIR .38 SPECIALS AT YOU THROUGH THE OPEN MANHOLE.

JUMP

YOU ARE SWIMMING OUT OF CONTROL IN A STREAM OF FILTH. AHEAD OF YOU THE SEWER DUMPS INTO THE EAST RIVER. ABOVE YOU IS AN OPEN MANHOLE.

UP

YOU ARE AT THE UNITED NATIONS. A GANG OF FOREIGN STUDENTS IS CHASING YOU. IF THEY CATCH YOU, THEY WILL HOLD YOU HOSTAGE IN THE NEAREST AUTOMAT UNTIL YOUR GOVERNMENT AGREES TO GIVE THEM THREE NUCLEAR AIRCRAFT CARRIERS, TEN H-BOMBS, 1,527 SUPERSONIC JET FIGHTERS, A LIFETIME SUPPLY OF PREPARATION-H FOR THEIR ALL-WISE, SUPREME LEADER, AND A NEW SUPREME LEADER TO REPLACE THE ONE THEY ASSASSINATED WHILE YOU WERE READING THIS SENTENCE.

WEST

YOU ARE AT 5TH AVENUE AND 42ND STREET. THE NEW YORK PUBLIC LIBRARY IS HERE. THERE ARE MANY RARE AND VALUABLE BOOKS IN THE LIBRARY.

GET BOOKS

YOU DON'T HAVE A LIBRARY CARD.

SOUTH

YOU ARE AT THE EMPIRE STATE BUILDING. AN ENORMOUS APE IS HOLDING ON TO THE TOP WITH ONE HAND AND IS REACHING DOWN TOWARD YOU WITH THE OTHER. HE IS SCREAMING AT YOU.

IN BUILDING

YOU ARE INSIDE THE EMPIRE STATE BUILDING. ELEVATORS GO UP FROM HERE.

UP

YOU ARE INSIDE AN ELEVATOR. THE ELEVATOR IS STOPPED AT THE 75TH FLOOR AND WILL NOT MOVE. THERE IS A BLACKOUT, AND THE ENTIRE CITY IS WITHOUT ELECTRICITY. YOU FEEL A HAND REACHING FOR YOUR WALLET.

UP

THE ELEVATOR WON'T MOVE. A HAND IS REACHING FOR YOUR WALLET.

OPEN DOOR

THE ELEVATOR DOOR WON'T OPEN. THERE IS A BLACKOUT THAT EXTENDS FROM YONKERS ON THE NORTH AND AMAGANSETT ON THE EAST TO ATLANTIC CITY ON THE SOUTH AND THE PINEY BARRENS ON THE WEST.

EXAMINE DOOR

ON THE OTHER SIDE OF THE DOOR ARE MEN WITH PRY BARS. MAYBE THEY ARE FIREMEN. PERHAPS THEY WILL SAVE YOU IF YOU ASK THEM POLITELY.

PLEASE HELP

THE DOORS OPEN, AND MEN CARRYING PRY BARS ENTER. THEY ARE NOT FIREMEN BUT LOOTERS WHO HAVE SPREAD OUT THROUGH THE CITY DURING THE BLACKOUT.

HIDE WALLET

YOUR WALLET IS HIDDEN. THE LOOTERS STEAL YOUR TIFFANYS' JEWELRY,YOUR NATHAN'S HOT DOG AND YOUR BASEBALL CONTRACT AND THEN DISAPPEAR. THE CURRENT COMES ON, AND THE ELEVATOR MOVES UP. YOU ARE ON THE 86TH FLOOR OBSERVATION DECK. A GIANT APE IS HANGING FROM THE TOP OF THE BUILDING WITH ONE HAND. HIS OTHER HAND IS REACHING TOWARD YOU.

KILL APE

WITH WHAT? YOUR BARE HANDS?

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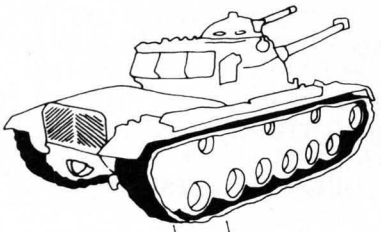
Three from Potkin

Wargamer's delight



1). Kriegspiel II

A much improved two-player version of the original. Kriegspiel II is a wargamer's delight. Choose the number of mountains (up to 200) and pick a scenario from the 9,999 possible, and then watch the computer set up the pieces, towns, mountains and a river. To win, you must enter the capital city of your opponent or reduce his fighting strength to below half of your own

S-80 Level II, 16K cassette $14.95

2). Up Periscope

The author of the popular Kriegspiel II has done it again. This time the action takes place at sea with one player controlling the submarines while the other attempts to sail around RADSHA Island, with at least three of his fleet surviving the attempt. This realistic wargame includes sonar, depth charges, and torpedos.

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3). Warpath

The Indians are on the warpath! The Chief, along with 24 braves, is out to take the garrison at the fort, or at least to stop reinforcements from entering the stockade. The General, with his 14 troopers, is trying to relieve the garrison before the flag is captured. The player determines the scenario through placement of boulders that provide both shelter and obstacles. Favorite scenarios may be replayed.

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DOWN
YOU CAN'T GO IN THAT DIRECTION. THE ELEVATOR IS ON THE FIRST FLOOR. THE APE'S HAND IS GETTING CLOSER. AN AIRPLANE LOST IN THE FOG IS FLYING TOWARD YOU. IF IT HITS THE BUILDING, THE ELEVATOR CABLES WILL BE SEVERED.
UP
YOU CAN'T GO IN THAT DIRECTION. THE APE'S HAND IS VERY CLOSE. I CAN HEAR THE AIRPLANE'S ENGINES.
WEST
NO WAY.
EAST
NO WAY.
SUMMON ELEVATOR
THERE IS AN ELEVATOR HERE.
DOWN
YOU ARE AT 5TH AVENUE AND 33RD STREET. TWO TICKETS TO THE METROPOLITAN OPERA ARE LYING ON THE SIDEWALK. THE PERFORMANCE IS SCHEDULED TO START IN 30 MINUTES. PAVAROTTI WILL BE SINGING.
GET TICKETS
OK.
GO OPERA
WHICH DIRECTION?
CONSULT MAP
I SEE NO MAP HERE. THE OPERA IS SCHEDULED TO START IN 25 MINUTES.
WEST
YOU ARE AT BROADWAY AND 34TH STREET. STEPS GO DOWN FROM HERE.
DOWN
YOU ARE IN A SUBWAY STATION. TRAINS GO OFF IN ALL DIRECTIONS: NORTHEAST TO JAMAICA, SOUTHEAST TO CONEY ISLAND, EAST TO THE ROCKAWAYS, EAST TO JFK AND NORTH TO THE BRONX. THE OPERA IS SCHEDULED TO START IN 20 MINUTES.
GO LINCOLN CENTER
YOU CAN'T GET THERE FROM HERE. YOU MUST CHANGE TRAINS.
NORTH
YOU ARE ON AN "RR" TRAIN ON THE OLD B.M.T. LINE. THE LIGHTS DO NOT WORK. THE CEILING FANS ARE BROKEN. THE CAR LOOKS 75 YEARS OLD AND MAKES A CHUFF...CHUFF...CHUFFING SOUND. IT IS MOVING AT 5 MILES AN HOUR. I THINK IT WILL DIE SOON.
OUT
YOU ARE AT THE TIMES SQUARE SUBWAY STATION. TRAINS GO OFF IN ALL DIRECTIONS: NORTHEAST TO ASTORIA, NORTHEAST TO FLUSHING, EAST TO FOREST HILLS, EAST TO GRAND CENTRAL, SOUTHEAST TO CONEY ISLAND, SOUTHEAST TO 95TH STREET (BROOKLYN), SOUTH TO SOUTH FERRY VIA CITY HALL, SOUTH TO SOUTH FERRY VIA WORLD TRADE CENTER, NORTH TO VAN CORTLAND PARK, AND NORTH TO 241ST (THE BRONX). THE OVERTURE IS SCHEDULED TO START IN 12 MINUTES.
NORTH
YOU ARE ON A NORTHBOUND I.R.T. BROADWAY AND 7TH AVENUE TRAIN. THE TRAIN PASSES BY COLUMBUS CIRCLE WITHOUT STOPPING. IT SKIPS LINCOLN CENTER AT 66TH STREET...OH, DEAR, YOU SEEM TO HAVE GOTTEN ON AN EXPRESS...THE TRAIN STOPS AT 72ND STREET, BUT THE DOORS DO NOT OPEN. THE TRAIN IS NOW STOPPED AT 96TH STREET. IF YOU DO NOT GET OFF NOW, YOU WILL END UP IN HARLEM.
OFF TRAIN
YOU ARE ON THE 96TH STREET SUBWAY PLATFORM. PAVAROTTI WILL BEGIN SINGING IN 7 MINUTES.
SOUTH
YOU ARE ON A LOCAL I.R.T. SUBWAY TRAIN.
OFF 66TH
YOU ARE AT LINCOLN CENTER. THE OPERA IS SCHEDULED TO START IN 1 MINUTE.
IN BUILDING
YOU CAN'T GO IN. THE MUSICIANS ARE ON STRIKE, AND THE OPERA HAS BEEN CANCELLED. PAVAROTTI HAS FLOWN TO CHICAGO TO SING THERE TONIGHT. YOUR TICKETS ARE WORTHLESS.
DROP TICKETS
OK.
EAST
YOU ARE IN CENTRAL PARK. A SUSPICIOUS-LOOKING CHARACTER IS FOLLOWING YOU.
EAST
THE CHARACTER THROWS A SWITCH-BLADE KNIFE AT YOU. IT MISSES.
GET KNIFE
OK.
THROW KNIFE
THE KNIFE MISSES THE SUSPICIOUS CHARACTER AND KILLS A LITTLE OLD BAG LADY SITTING ON A BENCH FEEDING THE PIGEONS. THE CHARACTER RUNS AWAY.
SOUTH
YOU ARE AT THE 6TH AVENUE AND 57TH STREET SUBWAY STATION. TRAINS GO FROM HERE TO JFK AND TO CONEY ISLAND.
GO CONEY
YOU ARE AT CONEY ISLAND. TOWERING OVERHEAD IS A GIANT FERRIS WHEEL.
WEST
YOU CAN'T GO IN THAT DIRECTION. THE FERRIS WHEEL IS IRRESISTABLE.
EAST
YOU CAN'T. THE FERRIS WHEEL IS IRRESISTABLE.
GO WHEEL
YOU ARE ON A GIANT FERRIS WHEEL. THE WHEEL HAS STOPPED WITH YOU AT THE VERY TOP.
DOWN
THE WHEEL WON'T TURN.
FLY
DON'T BE RIDICULOUS.
JUMP
DON'T BE SILLY. IF YOU WISH TO COMMIT SUICIDE, YOU MUST JUMP FROM THE BROOKLYN BRIDGE.

CLIMB DOWN
OK. YOU'RE STANDING ON THE GROUND. THERE IS A NATHAN'S HOT DOG STAND HERE.
TAKE INVENTORY
YOU ARE CARRYING: EXPENSIVE PIGSKIN WALLET, $127.80 IN CASH, 4 SUBWAY TOKENS, HOTEL ROOM KEY, BUS TICKET TO HOBOKEN, BOTTLE OF MUSCATEL IN A BROWN PAPER BAG, INSURANCE COMPANY CHECK FOR $200,000, BANK PASSBOOK WITH $3,000 IN ACCOUNT, RETURN PLANE TICKET TO HOME TOWN.
GO BUS
YOU ARE IN THE PORT AUTHORITY BUS STATION AT 8TH AVENUE AND 40TH STREET.
GO HOBOKEN
DON'T BE RIDICULOUS.
GO HOBOKEN
YOU DON'T KNOW WHAT YOU ARE SAYING. NO ONE HAS EVER RETURNED FROM HOBOKEN.
EXAMINE TICKET
YOU HAVE A ONE-WAY TICKET TO HOBOKEN. ROUND-TRIP TICKETS ARE NOT AVAILABLE.
GO HOBOKEN
YOU'LL BE SORRY. THERE IS NO RETURNING FROM HOBOKEN — EVER. ARE YOU SURE YOU WANT TO GO (YES OR NO)?
NO
CHICKEN! YOU ARE AT THE BUS STATION.
EAST
YOU ARE AT 40TH STREET AND 5TH AVENUE. A DOOR LEADS INTO THE NEW YORK PUBLIC LIBRARY. THERE ARE RARE AND VALUABLE BOOKS INSIDE.
NORTH
YOU ARE AT 47TH STREET. THERE ARE DIAMONDS ALL AROUND.
GET DIAMONDS.
HOW MUCH WILL YOU SPEND?
INSURANCE CHECK
OK. YOU NOW HAVE $200,000 WORTH OF DIAMONDS.
NORTH
YOU ARE AT THE METROPOLITAN MUSEUM OF ART. THERE ARE VALUABLE PAINTINGS HERE.
GET PAINTING
I SEE MANY THOUSANDS OF PAINTINGS HERE.
GET "GUERNICA."
DON'T BE SILLY. PICASSO'S "GUERNICA" IS IN SPAIN.
GET "ARISTOTLE"
REMBRANDT'S "ARISTOTLE CONTEMPLATING THE BUST OF HOMER" IS NOT FOR SALE. HOWEVER, FOR A SUITABLE DONATION THE MUSEUM MAY BE PERSUADED TO DEACCESSION IT.
GIVE DIAMONDS
THE MUSEUM ACKNOWLEDGES WITH DEEP APPRECIATION YOUR GENEROUS GIFT.
GET "ARISTOTLE"
THE MUSEUM WILL NOT DEACCESSION REMBRANDT'S "ARISTOTLE" FOR LESS THAN TEN MILLION DOLLARS. THE MUSEUM THANKS YOU FOR YOUR GIFT.
RETURN DIAMONDS
THE MUSEUM APPRECIATES YOUR GIFT.
GET DIAMONDS
YOUR GENEROUS GIFT IS GRATEFULLY APPRECIATED.
RETRIEVE DIAMONDS
YOUR GIFT WAS MOST GENEROUS.
STEAL "ARISTOTLE"
FIVE GUARDS ARE WATCHING YOU. IF YOU STEAL A PAINTING, YOU WILL BE TAKEN TO THE TOMBS AND WILL REMAIN THERE FOREVER BECAUSE THE CITY WILL MISLAY YOUR ARREST RECORDS.
OUT
YOU ARE AT 5TH AVENUE AND 82ND STREET.
SOUTH
YOU ARE AT WASHINGTON SQUARE IN GREENWICH VILLAGE. THERE IS A UNIVERSITY HERE. THERE IS A TRIUMPHAL ARCH HERE. THERE ARE HIPPIES HERE. THEY APPEAR HARMLESS. THE STREETS HERE ARE A MAZE OF TWISTY LITTLE PASSAGES.
SOUTH
YOU ARE AT CITY HALL.
SOUTH
YOU CAN'T GO IN THAT DIRECTION. A POLITICIAN IS BLOCKING YOUR PATH. HE HAS HIS HAND OUT.
EAST
THE POLITICIAN WON'T LET YOU. IT IS BEGINNING TO SNOW.
WEST
THE POLITICIAN IS IN THE WAY. HIS HAND IS OUT.
GIVE $50
THE POLITICIAN SMILES AND ACCEPTS YOUR "CAMPAIGN CONTRIBUTION."
SOUTH
THE POLITICIAN WON'T LET YOU. HIS HAND IS OUT. IT IS SNOWING.
GIVE $50
THE POLITICIAN IS SATISFIED AND STEPS ASIDE.
GET RECEIPT
DON'T BE SILLY.
SOUTH
YOU ARE AT THE CORNER OF WALL STREET AND NAUSSAU STREET. THERE ARE MANY BANKS HERE. IT IS SNOWING HARDER.
IN BANK
IT IS A HOLIDAY. THE BANKS ARE CLOSED. YOUR BANK PASSBOOK SHOWING $3,000 IN YOUR ACCOUNT IS WORTHLESS.
DROP PASSBOOK
OK.
TAKE INVENTORY
YOU ARE CARRYING: EXPENSIVE PIGSKIN WALLET, $27.80 IN CASH, 2 SUBWAY TOKENS, HOTEL ROOM KEY, BOTTLE OF MUSCATEL IN A BROWN PAPER BAG, PLANE TICKET TO HOME TOWN. THE SNOW IS FALLING HARDER AND IS ACCUMULATING.
HAIL TAXI
17 CABS WITH PASSENGERS GO BY. 32 CABS WITH "OFF DUTY" SIGNS IGNORE YOU. THE SNOW IS NOW THREE INCHES DEEP.
SOUTH
YOU ARE AT SOUTH FERRY. BOATS GO FROM HERE TO STATEN ISLAND. SUBWAY TRAINS GO NORTH TO THE BRONX AND EAST TO BROOKLYN. THERE IS A HELICOPTER PORT HERE. THE STREETS TWIST AND TURN IN ALL DIRECTIONS.
GO HELICOPTER
YOU CAN'T.
YOU DON'T HAVE ENOUGH MONEY, AND THE PILOT WON'T ACCEPT SUBWAY TOKENS.
HAIL TAXI
46 TAXIS WITH PASSENGERS PASS BY. 93 MORE WITH "OFF DUTY" SIGNS SPLASH SLUSH ON YOUR TROUSERS.
WAVE MONEY
NOTHING HAPPENS.
WAVE MUSCATEL
A TAXI IS STOPPED IN FRONT OF YOU.
ENTER CAB
YOU ARE SEATED IN A TAXI CAB.
GO AIRPORT
THE CAB DRIVER HEADS

continued on next page

continued from previous page

NORTH ALONG THE EAST RIVER DRIVE TOWARD THE TRIBOROUGH BRIDGE. IT WOULD BE MUCH FASTER AND CHEAPER FOR YOU IF HE WOULD TAKE THE BROOKLYN BRIDGE AND ATLANTIC AVENUE TO KENNEDY AIRPORT.

TELL DRIVER

THE DRIVER CAN'T HEAR YOU THROUGH THE BULLET-PROOF GLASS SEPARATING THE BACK AND FRONT SEATS.

HIT GLASS

THE DRIVER IGNORES YOU. YOU ARE NOW ON THE TRIBOROUGH BRIDGE. IT IS STILL SNOWING HARD.

SMASH GLASS

YOU CAN'T. YOU ARE NOW ON GRAND CENTRAL PARKWAY PASSING LA GUARDIA AIRPORT. THE SNOW IS 4 INCHES DEEP, AND THE CAB IS CREEPING ALONG AT 10 MILES AN HOUR. ALL AROUND YOU ARE WRECKED CARS THAT HAVE SKIDDED OFF THE ROAD.

STOP CAB

THE DRIVER WON'T STOP AT LA GUARDIA AIRPORT. HE IS GOING TO TAKE YOU TO KENNEDY AIRPORT.

GO LAGUARDIA

THE DRIVER WON'T.

STOP

NOTHING HAPPENS. YOU ARE IN A TAXI MOVING AT 5 MILES AN HOUR ON THE VAN WYCK PARKWAY.

END

NOTHING HAPPENS.

ESCAPE

NOTHING HAPPENS.

RESET

NOTHING HAPPENS.

CONTROL C

THE PANIC BUTTON HAS BEEN DISABLED. YOU ARE HEADING SOUTH ON VAN WYCK PARKWAY IN 5 INCHES OF SNOW AT 0 MILES AN HOUR. YOUR CAB HAS BEEN STOPPED BY SNOW TWO MILES FROM KENNEDY AIRPORT. THE METER READS $27.80

PAY DRIVER

OK.

OUT

THE DRIVER WON'T LET YOU. HE WANTS A TIP.

TIP DRIVER

WITH WHAT?

TAKE INVENTORY

YOU HAVE: EXPENSIVE PIGSKIN WALLET, HOTEL ROOM KEY, 2 SUBWAY TOKENS, PLANE TICKET BACK TO HOME TOWN,

BOTTLE OF MUSCATEL IN BROWN PAPER BAG.

GIVE WALLET

THE DRIVER TAKES YOUR EXPENSIVE WALLET.

OUT

THE DOOR WON'T OPEN.

GIVE KEY

OK.

OUT

YOU CAN'T GET OUT.

GIVE TOKENS

SCREAMING THREATS, THE DRIVER THROWS THE SUBWAY TOKENS IN YOUR FACE.

GIVE MUSCATEL

THE DRIVER UNLOCKS YOUR DOOR.

OUT

YOU ARE STANDING IN 15 INCHES OF SNOW IN THE MIDDLE OF THE VAN WYCK EXPRESSWAY. NO TRAFFIC MOVES. THERE ARE STALLED CARS IN EVERY DIRECTIONS.

SOUTH

YOU ARE SLOGGING THROUGH 2 FEET OF SNOW. THE NEWSCASTER ON A CAR RADIO NEAR YOU SAYS SOMETHING ABOUT "THE GREAT BLIZZARD OF '81."

SOUTH

YOU ARE AT JOHN F. KENNEDY INTERNATIONAL AIRPORT.

TAKE INVENTORY

YOU HAVE: AIRLINE TICKET BACK TO YOUR HOME TOWN.

GO COUNTER

YOU ARE AT THE AIRLINE'S CHECK-IN COUNTER.

PRESENT TICKET

THE AIRLINE DEMANDS AN EXTRA $120. WHILE YOU WERE IN THE CITY, ALL THE AIRLINES WERE DEREGULATED TO INCREASE COMPETITION AND TO REDUCE AIR FARES.

UNFORTUNATELY, YOUR HOME TOWN IS SERVED BY A SINGLE, MONOPOLISTIC CARRIER THAT USED THE FUEL CRISIS AS AN EXCUSE TO RAISE FARES. THE CLERK CHECKS THE COMPUTER AND FINDS THAT YOUR FARE HAS RISEN WHILE YOU HAVE BEEN TALKING TO HIM. HE NOW WANTS $150.

HELP

YOUR POCKETS ARE EMPTY. YOU HAVE NO MONEY. ALL YOU HAVE ARE A TICKET THAT WILL GET YOU HOME IF YOU SPEND ANOTHER $175 (FARES HAVE RISEN AGAIN) AND YOUR SOUL. PERHAPS THE AIRLINE WILL ACCEPT THAT.

PLEDGE SOUL

SMILING BROADLY, THE PRESIDENT OF THE AIRLINE APPEARS BEHIND THE COUNTER, SHAKES YOUR HAND AND GIVES YOU A BOARDING PASS IN EXCHANGE FOR A PROMISSORY NOTE ON YOUR SOUL.

GO GATE

YOU ARE AT THE BOARDING GATE.

BOARD PLANE

YOU CAN'T. THE RUNWAYS ARE COVERED WITH 6 FEET OF SNOW. NO PLANES CAN LAND OR TAKE OFF.

SIT DOWN

ALL SEATS ARE FILLED WITH SLEEPING PASSENGERS. YOU ARE GETTING VERY THIRSTY, VERY HUNGRY AND VERY TIRED.

GO RESTAURANT

YOU ARE AT THE AIRPORT RESTAURANT, BUT IT IS CLOSED. IT RAN OUT OF FOOD TWO HOURS AGO. THIS IS THE GREAT BLIZZARD OF '81. YOUR FEET HURT. YOU ARE HUNGRY

AND THIRSTY.

RETURN HOTEL

YOU CAN'T. THE CAB DRIVER HAS YOUR HOTEL KEY.

GO SUBWAY

YOU CAN'T. YOU HAVE NO SUBWAY TOKENS.

NORTH

YOUR FEET HURT TOO MUCH TO WALK.

SIT DOWN

ALL CHAIRS ARE ALREADY TAKEN. YOU MUST STAND.

LIE FLOOR

THE FLOOR IS COMPLETELY COVERED WITH SLEEPING PASSENGERS. YOU MUST STAND.

GO COUNTER

YOU ARE AT THE AIRLINE'S CHECK-IN COUNTER.

ENQUIRE FLIGHT

DON'T BE RIDICULOUS. AIRLINE PERSONNEL WON'T TELL YOU WHAT'S GOING ON.

FETCH PRESIDENT

THE AIRLINE PRESIDENT IS HERE.

RETURN BOARDING PASS

THE PRESIDENT IS HOLDING YOUR BOARDING PASS AND THE PROMISSORY NOTE FOR YOUR SOUL.

RETRIEVE NOTE

WHAT!...ARE YOU SERIOUS? THAT'S THE MOST OUTRAGEOUS COMMAND I'VE EVER BEEN GIVEN. ONCE YOU'VE PLEDGED YOUR SOUL...WHY...NOW YOU'VE DONE IT. YOU'VE MADE ME START LAUGHING SO HARD I CAN'T STOP.

TAKE INVENTORY

YOU HAVE NOTHING.

EXAMINE SURROUNDINGS

YOU ARE AT KENNEDY AIRPORT. THE RUNWAYS ARE COVERED WITH 12 FEET OF SNOW. THE TOPS OF A BIG APPLE AND A GIANT CLAM ARE JUST VISIBLE ABOVE THE SNOW. MUGGERS ARE THREATENING YOU WITH THEIR SWITCH-BLADE KNIVES. TERRORISTS HAVE PLACED BOMBS IN THE COIN LOCKERS. NASTY LITTLE DWARVES ARE THROWING AXES AT YOU. THERE IS A FAINT YELLOW LIGHT IN THE EAST.

GO EAST

YOU ARE IN A TUNNEL UNDER 50 FEET OF SNOW. IT IS THE BLIZZARD OF '81. ABOVE YOUR HEAD YOU CAN HEAR THE GIANT CLAM TAKE A HUGE BITE OUT OF THE BIG APPLE. WISPY MISTS FILL THE TUNNEL.

A NASTY DWARF COMES OUT OF THE GLOOM AND THROWS AN AXE AT YOU. IT MISSES. A POLICEMAN RECOGNIZES YOU AS THE TIFFANY BURGLAR AND SHOOTS HIS .38 SPECIAL AT YOU. HE MISSES. THE SUBWAY CRAZY APPEARS AND THROWS A MEAT CLEAVER AT YOU. IT MISSES. BEHIND YOU A TERRORIST'S BOMB GOES OFF. YOU ARE UNHARMED. THE YELLOW LIGHT IN THE EAST IS BRIGHTER.

EAST

A CLEAVER JUST MISSES YOUR HEAD. AN AXE JUST MISSES YOUR KNEE.

EAST

A BULLET NICKS YOUR SHOULDER. A RAT CARRYING BUBONIC PLAGE SLITHERS OVER YOUR FOOT.

EAST

YOU ARE AT A JUNCTION. A SIGN ON THE WALL READS, "TO HOBOKEN." ITS POINTER IS MISSING. BULLETS RICOCHET AROUND YOU. CLEAVERS AND AXES FLY PAST YOUR HEAD.

EAST...East...East. The yellow light grew very strong. We rubbed open our eyes and looked out the window at the dawn. Normally Adventure was just a good game with make believe snakes and birds and trolls and pirates. But last night — that was too real. It was truly frightening. We looked at each other and vowed never to boot that disk again. "Not for anything," we agreed. But we know we'll be back — at least one more time. After all, we have to retrieve that promissory note, don't we?

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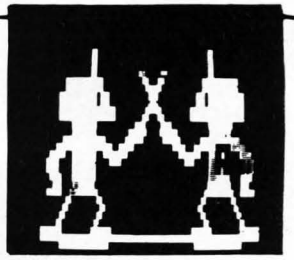
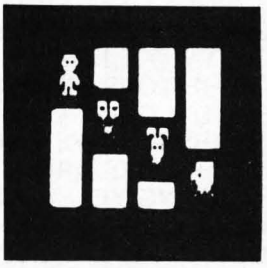
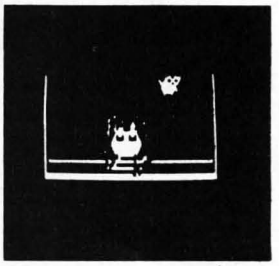

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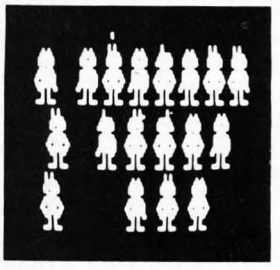

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HARDWARE CORNER

by Edward E. Umlor

As promised last month, we are going to talk about cassette recorders and the different data formats. Next month we are going to talk about disk drives and cables from different sources. Kind of a "how to" or "which end of the cable" thing.

Cassette recorder definitions:

Azimuth alignment: This sets the gap in the record/play head perpendicular to the edge of the tape. This is the way the signals are recorded on the tape itself.

Tape speed: 1 7/8 inches per second. If the speed varies too much the computer can not hear the data.

Pinch roller: The rubber wheel that presses the tape against the capstan shaft.

Capstan shaft: The metal shaft that is rotating and drives the tape through the recorder.

Erase head: The small head (usually white) that the tape passes over before reaching the record/play head.

The care and feeding of the cassette recorder is not difficult, but some preventive maintenance is necessary for long-term ease of loading tapes. Every one to two weeks (more often if heavily used) you should clean the heads and pinch roller. This is done using a cotton swab and denatured alcohol (or a cleaner designed specifically for cassette recorders). Press the play button, and lightly wipe the erase and record/play heads. Wipe the pinch roller by gently rotating the swab and using an up and down motion. This may sound like your leg is being pulled, but one particle of cigarette smoke is enough (when in just the right place) to cause a bad load. It changes the distance that the tape is from the head, which changes the output amplitude of the recorder. Cleanliness is next to accurate loads. The azimuth should be aligned at least once a year, and again, this depends upon the usage. This should be done professionally, or if you know what it's all about, any good audio shop should be able to sell you a azimuth alignment tape. This is a standard for the industry and alignment tapes will not vary enough to create a problem.

If the above is observed on a regular basis, you will encounter minimal loading problems. There are several factors that affect loading: 1) amplitude or volume setting, 2) tape speed too fast or slow, 3) dirty heads, 4) improper procedure for the type of computer, and 5) a bad tape. The Tandy computers are noted for having finicky ears. You usually have to try several times to find the correct volume (amplitude) setting for successful loading. Once found, I would recommend that the tape be marked with this setting for the next time you want to load it. However, this problem can be found to exist on any computer cassette interface. Tape speed is about the very last problem you will encounter. Most cassette recorders used with microcomputers are fixed-speed units and either run at a constant speed or don't at all. If you suspect this is a problem, any good audio shop with repair facilities can check it out for you. Dirty heads, etc. have already been covered, and there will be some tape that has bad spots and causes dropped bits. After all, it is a man-made medium, and thus it is not perfect. This leads us to loading procedures for different types of computers.

TRS-80™

Tandy computers do not have a time out associated with the cassette interface. This means that you can start a load and do a rewind, then press PLAY without a time error occurring. This procedure will apply for both Model I Level II and Model III. Set the volume control to about 5 (this is approximately the center of the advertised load range). Type CLOAD (for a BASIC program) or type SYSTEM then FILENAME (for a Machine Language program) and press ENTER. Press PLAY on the recorder and wait about 30 seconds for the asterisks to appear in the top right corner of the video. If they do not appear, remove the black plug from the earphone jack. If the sound is loud, then reduce the volumne by one number value at a time, and restart the load. If the sound is soft, then increase the volume by one number value at a time and restart the load. The indication of proper loading is the left asterisk on solid and the right asterisk blinking at a varing rate. When you get this response and the program will not run (syntax error, etc.), change the volume by ½ number value — first one way for a couple of tries, then the opposite way (from the original start value) a couple of tries until a good load is achieved. BE SURE TO MARK THIS VOLUME SETTING ON THE TAPE!! I don't know of anyone who likes to constantly fish for the right volume. Model I keyboards that have the Tandy easy-load modification usually load at a higher volume (start with a volume of 7).

APPLE

The Apple is a different ball game. This computer does have a timing circuit and will beep an error after 15 seconds without receiving any leader tone. The standard load procedure here is to leave the plug out of the earphone jack, type LOAD, and press PLAY. When you hear the leader tone, insert the plug into the earphone jack and press RETURN. The tape should load correctly at between 4 and 7 volume with the tone at 10 or highest pitch. There are two BASICs for the Apple and you have to be careful about the tape program being in the correct BASIC. Applesoft will not load an Integer BASIC program nor will Integer BASIC load an Applesoft BASIC program. If all is going well, you will hear a short beep

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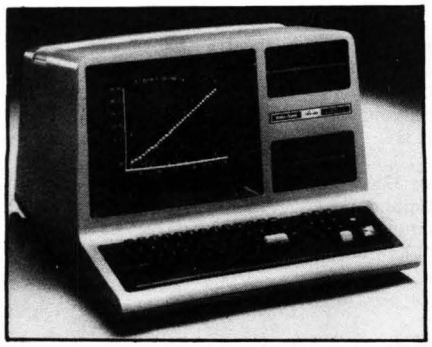
WHAT'S NEW



by Edward E. Umlor

HARDWARE

The Model III from Tandy has some good features and some bad. One of the bad things is the availability of the computer with all the options you might want. Many outlets have yet to receive a "III" with disk drives, and right now there seems to be a shortage of computers. However, this computer is a more nicely packaged unit then the "I" and has several good additions.

The cassette port is new in this machine and tends to load at a lower volume level than the "I". You have a choice of speeds (L) for 500 baud (bits per second) or (H) for 1500 baud. The 1500 baud format is totally different than the 500 baud of the "I". Being the guy responsible for tape duplication, I was interested in the data format. DO NOT SAVE DATA ON TAPE AND EXPECT IT TO BE 1500 BAUD. When using PRINT #-1, the data is dumped to the cassette at 500 BAUD ONLY. I was very surprised at this and poked the location for high speed to no avail. Tandy really missed the boat on that one. If you have "I" tapes that run on your "III", you can convert them (BASIC programs that is) to high speed in the following manner:

LOAD PROGRAM using normal low speed format.

CHANGE CASSETTE PORT SPEED by using POKE16913,1.

CSAVE program in normal fashion.

This will give you a high speed version of a "I" tape. The pokes are POKE 16913,0 for slow (500 baud) and POKE 16913,1 for high speed (1500 baud).

The hardware functions well and most "I" BASIC programs will run on the "III". I am looking forward to receiving a system with disk and other options. In the future, when I do have something more to talk about, I will be reviewing this hardware again.

SOFTWARE

The subject for this month is "Super-Utility". This software package is distributed on disk and is primarily for disk users. It is a collection of several programs for working data, files, and organization of your disk library. The package does include one tape utility called tape copy. Let's take the utilities one at a time.

Zap Utility is another program for modifying data by sector on your disk. Its features and operation are reminiscent of "Superzap". The display is nearly the same, and the different modes of operation are the same with the addition of string search and sector search. The modes are called up with single key strokes and the byte being modified is marked more plainly. A nice addition, if you don't have a zap already.

Purge Utility is a utility for cleaning up a used diskette. You can kill files, zero out unused space (killed files), clean up directory space freed (zero out), remove passwords, and several other manipulations. There are several other purge routines on the market (usually with a DOS), but again the utility has been expanded and enhanced.

Disk Format Utility allows for standard or special formatting of your disk. It is another utility present on most operating systems that has been expanded and enhanced. This will allow for a format like TRSDOS with all the questions asked. You can format a disk without erase and save the data that is still on the disk. If those are not good enough, it will let you format in any track with a special name and place any number on the sector in a NON-SEQUENTIAL numbering scheme. That's one way to keep other people from getting at your disk data. You can even read a disk for tack and sector format with this utility. The changes and enhancements in this program are not duplicated by any other FORMAT program I am aware of.

Tape Copy Utility is the one and only tape routine in this package. It is not what one would think. The data is not read into the computer and then written to the destination tape as in most copy utilities. The function of this one is to read the source tape, turn on the output at the same time, and write to the destination as data is read in. This is why they claim to copy any tape regardless of protection. You are actually doing a cassette to cassette copy using the cassette port to clean up the signal (acts like a data dubber). One of the nice things about this, is the use of only one cassette cable from the keyboard to the TWO cassette recorders. The black plug goes into the EAR in the source recorder and the large gray plug into the AUX of the destination recorder. DO NOT HIT THE 'BREAK' UNTIL THE FLASHING BLOCK STOPS FLASHING. If you do, you will stop the copying of your tape in the middle.

Disk Repair Utility is the true new utility in this package, and is a well written, very useful program to the serious disk user. We have all had the TANDY ZAP applied to our diskettes at one time or another. This program will restore GAT tables, HIT tables, killed files, and BOOT. This utility does a very good job most of the time. When working with it, there were some files restored with direct statements in file. This, as you know, will not let you load and run that program. I feel that the problem is more in how badly zapped the file is, than in the way the program does its restoring. If you can save even one fully utilized data disk, this utility is worth it.

In summary, "Super-Utility" is a potpourri of utilities that are very useful to the computer user. Being a collection of utilities, the price asked is not bad at all. I would recommend this package for Disk Repair and Format only. The documentation is sufficient and well written. Like most programs of this type, you will continue to discover new ways of using it.

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continued from page 88

(without an error message) as the program starts to load, and another when the load is finished (the cursor will also reappear). The Apple is a more tolerant, faster, and easier machine to load through the cassette port.

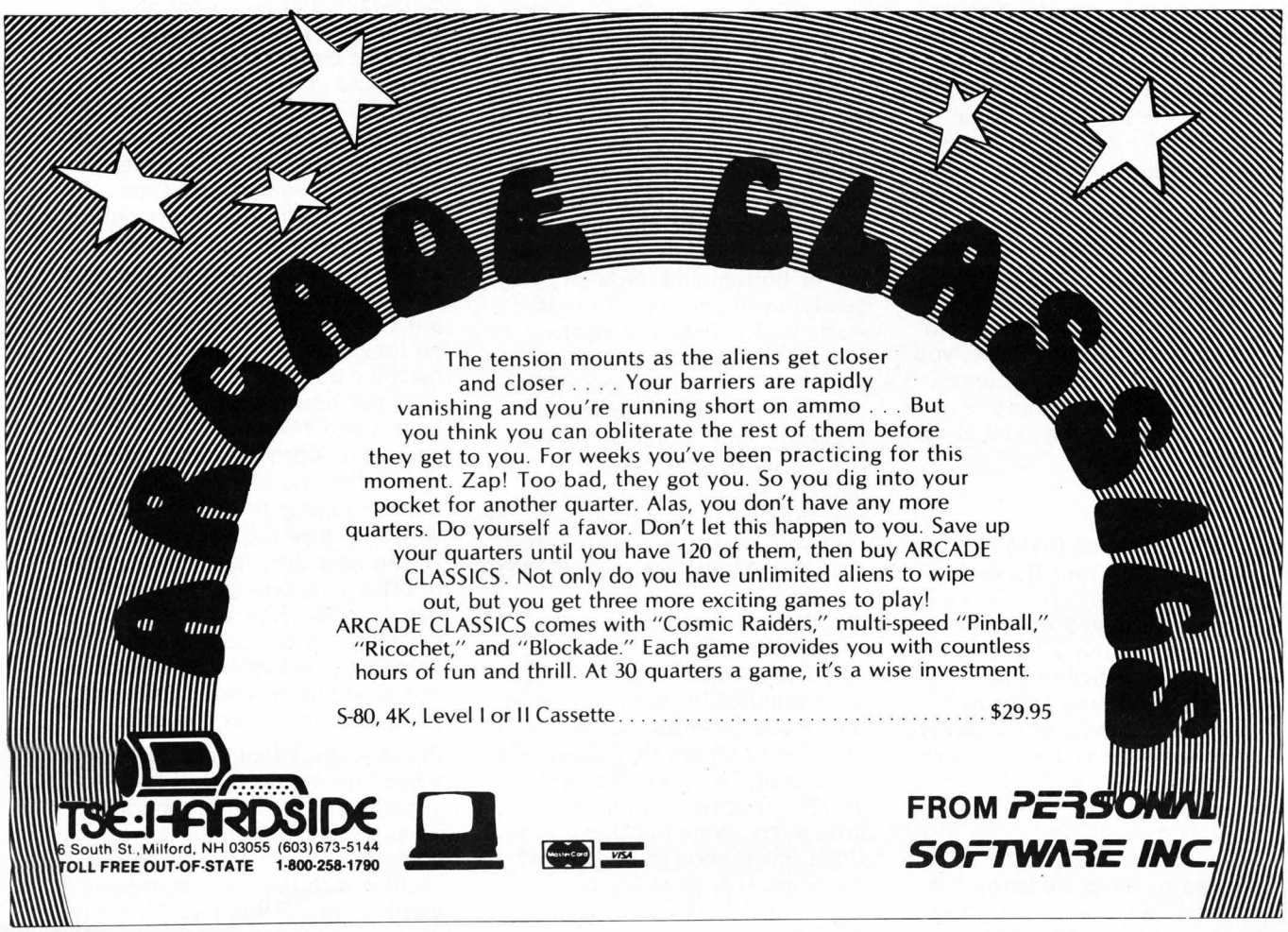
ATARI

The Atari also has a timing circuit and loves to give error 138. The Atari recorder does not allow you to play the tape to find the start of the leader tone. You will have to use the FAST FORWARD to indent to the leader tone. You can get a general idea of how far into the tape it is by using another recorder to cue the tape. With the tape cued, type CLOAD and press RETURN.There will be a single beep; press PLAY on the recorder, and RETURN. The tape will start running and loading. You might or might not hear data loading through the TV speaker. The key to loading the Atari is to be sure the cassette is cued to the right place and the recorder is kept clean. There isn't any volume adjustment that can be made. The **SoftSide** tapes are indented a count of 13 on the recorder. Put the tape into the recorder, rewind, zero the counter, and fast forward to a count of 13. This should allow the first program to load, and a space of three counts separate each of the programs.

As promised last month, here is a capsule of how we duplicate our tapes. The key to any production line is the quality of the equipment used, as well as the expertise with which it is handled. The masters are made on professional recorders with special signal processing being done between the machine and the recorder. This is done to optimize the final result. The duplicators we use run at 16 times normal speed (30 inches per second). Due to the high speed, there is a start-up and a slowdown time. The first program on each side of the tape is indented about 30 seconds (at normal speed). This is done to keep the actual data in the most linear portion of the duplicating cycle. Now you know why there is a long wait before the start of load with the **SoftSide** cassettes.

I hopt that this will answer some of your questions as to why some tapes load with difficulty. The amplitude of the signal on the tape, the way it is recorded, the playback recorder alignment and cleanliness, and many other minor factors like temperature and humidity can effect loading. There is one more item on the Tandy units: using the same recorder and cassette cable, the program tape DOES NOT LOAD AT THE SAME VOLUME RANGE from machine to machine. The primary cause of that is the tolerances of the components used. In some machines the pluses balance the minuses, in some machines they are heavy on the plus side, and in others they are heavy on the minus side. What tangled webs we weave when first we go to high technology toys.

Well, I guess old Granite Knoggin has bent your eyeballs enough for this time. Write in if you have specific questions about the hardware, and in future articles we'll answer as many as possible.



ATARI MEMORY UPGRADE

by Paul Johnson

This article explains an 8K to 16K conversion for the CX852 memory module in the Atari 800.

IMPORTANT — This modification is only known to work with a properly-functioning REV. 3 memory module (PC Board number CO12987). Perform the following steps to ascertain that your memory module is of the correct type before proceeding:

Turn off the power to your computer and any peripherals.

Open the cartridge compartment door, release the two latches, and remove the top cover by sliding it up and towards you.

Carefully slide the 8K memory module out of its slot. If you have other memory modules installed, remove them as well, for the present.

Leave the 10K ROM Operating System module in place.

Examine the 8K module that you have chosen to upgrade. You will notice two Phillips screws holding it closed. Remove them and put them aside. Pry off the metal plate to expose the PC Board inside.

Holding the module with the edge connector toward you, you should see a Rev. number and part number printed on the board. If the Rev. number is not "3" or the board number is not "C012987", do not attempt this upgrade — it may not work. If, however, your module is of the proper type, you can, following the instructions below, double the memory of your module quickly, easily, and at very low cost.

Parts required:

8 — 4116 dynamic RAM chips (Available from Hardside — Part #5-1102)
1 — piece insulated wire, approximately 2.5 inches long, 22 gauge or finer.
4 — leads from any 1/8 watt resistor, diode, or the like, to serve as uninsulated jumper wires

Tools required:

Phillips screwdriver
Wire stripper/cutters
50-watt or lower soldering iron with fine tip
Fine, ROSIN-CORE (only!!!) solder
X-acto or similar knife
Desoldering wick or vacuum bulb

Conversion instructions:

1) Set up at a clean, well-lit work surface, preferably not in a carpeted area. (You will be handling memory chips, which are VERY susceptible to damage from static electricity! For the same reason, try to wear cotton clothes for this job — synthetics and wool generate static charges easily.)

2) Assuming that you have already removed your 8K module from the computer and partially opened it as described above, finish opening it by gently prying the two halves of the case apart, starting on either side of the edge connector. The case should hinge open, allowing you to slide the actual PC Board out. Put the case aside.

3) Hold the PC Board (PCB) so that the connector is toward the bottom and the chip side is facing you. Toward the top is a row of eight ICs in sockets. These are the 8K RAM chips which you will be replacing with your 16K chips. Using a small, flat-bladed screwdriver or knife, insert the blade between the 8K chip farthest left and its socket at the top or bottom end. Now pry very gently, until one end of the IC starts to lift slightly from the socket. When this happens, place the blade at the other end of the chip and pry again. Repeat as necessary until you have rocked the IC out of its socket. This technique is tedious, but it ensures that none of the pins will bend, in case you need to reuse the chip. ONLY REMOVE ONE IC AT THIS TIME!

4) Place the IC you have just removed into the back side of the conductive foam your 16K chips were supplied in. Remove one of the 16K chips from the foam and examine it. Check that all the pins are straight — if any are bent, gently straighten with needle-nose pliers. Note that there is a slight indentation in one end of the chip: This identifies pin 1 and tells us which way to orient the IC when inserting it. Hold the chip so that it is aligned the same as the remaining 8K chips, and gently insert it into the empty socket — be VERY careful not to bend any pins. If you notice that a pin is starting to bend or is not going into its hole, remove the IC, straighten the affected pin(s) with pliers, and try again. Press the IC all the way into the socket.

5) Using the techniques in steps 4 and 5, replace each of the remaining 8K chips, one at a time, with a 16K chip. When you have finished, check each of the installed chips carefully. Look for a chip in backwards or a bent pin not entering its hole correctly.

6) Now test the new memory by inserting the PC Board back in your computer, (no case necessary for now), with the chip side facing toward the front of the computer. Make sure the connector is seated securely. The board should be in the first slot (next to the 10K ROM cartridge), and any other 8K or 16K memory boards should be removed temporarily. Close the cover and cartridge door, or the interlock switch will not allow you to power up the system. Turn on your monitor and when it warms up, turn on your Atari. Type PRINT FRE(0), then press return. The computer should respond: 5134. This is because, although we have installed 16K, we still have not told the computer that this is no longer an 8K board. If the machine does not let you type, or does not respond, you probably have a bad 16K chip. Shut off the computer, open the cover, and check that you have installed the board properly in the first slot with the chips facing toward you. If you have not, then repeat step 6, otherwise, remove the board, put your 8K chips back in, reassemble your module and computer, and have the 16K chips tested — you will not be able to complete the conversion now.

7) Assuming that your 16K chips passed the test, it is time to reprogram the memory module as a 16K module. Shut down your computer and remove the board. Hold it with the connector down and the chip facing you. Near the

center of the board are six jumper positions, labelled A, B, C, D, E, and F. There are resistors at positions "B" and "D". Using your soldering iron, and working from the back side of the board, remove the resistors at "B" and "D".

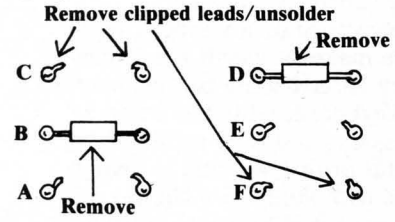
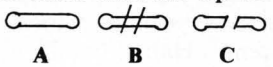


Fig. 1 - Jumper Resistors

8) Now, using your desoldering wick or bulb and your soldering iron, remove the solder and any clipped leads from jumper holes "F" and "C" — a total of four PC Board holes.

9) Insert one of the resistors removed in step 7 into jumper holes "C" and solder in place.

10) Turn the PCB component-side down, with the edge connector facing you. Refer to Figure 2 and, with a sharp knife, carefully cut the indicated jumper traces on the PCB. To cut a trace, make two parallel incisions approximately 1/32 inch apart, then remove the foil between them with the tip of the blade:



The traces you should cut are labelled in Figure 2 as A, B, C, and D.

11) Clear away any metal particles left on the board from cutting the traces and desoldering. This is VERY important to avoid a short circuit from a small metal filing which could prevent the board from working.

12) Take a piece of fine, uninsulated wire (resistor leads work well), and hold it so that it touches the two PC traces shown as "H" in Figure 3. Solder it to one of the traces using a small amount of solder, then to the other trace, to create a jumper. This, and all subsequent soldering, is done on the back (non-chip) side of the board. Snip the excess wire off on both sides of the jumper.

13) Now place jumpers at the locations marked "E","F", and "G" in Figure 3, using the technique of step 12.

14) Take a 2½ inch piece of fine, plastic-covered insulated wire, and remove about 1/10 inch of insulation from each end. Tin the ends by heating them with the soldering iron, then applying a small amount of solder. Solder one end of the wire to the trace marked "J" on Figure 3. This is the seventh edge-connector pin from the right, and is not presently connected to anything. Solder the other end of the wire to the *trace* marked "K" on Figure 3. This is the back side of jumper position "F" referred to in step 8. Of the two "F" jumper holes, you want to solder to the one closest to the letter "F" printed on the board.

15) Check over your work. Look for solder bridging the trace cuts you made, and for metal filings or pieces of wire clinging to either side of the PCB.

16) Replace the printed circuit board in its plastic case, being careful that the chips face toward the metal plate. Screw the case shut, and label the top with a marker and tape, as a 16K module — don't overlook this step!

17) Insert the module into the computer, and test as in step 6. You should get a reply of between 15000 and 16000.

18) If you have additional memory modules, insert them in the computer. 16K modules should go toward the front, and any 8K modules immediately behind them. Replace the cover on your new, smarter Atari!

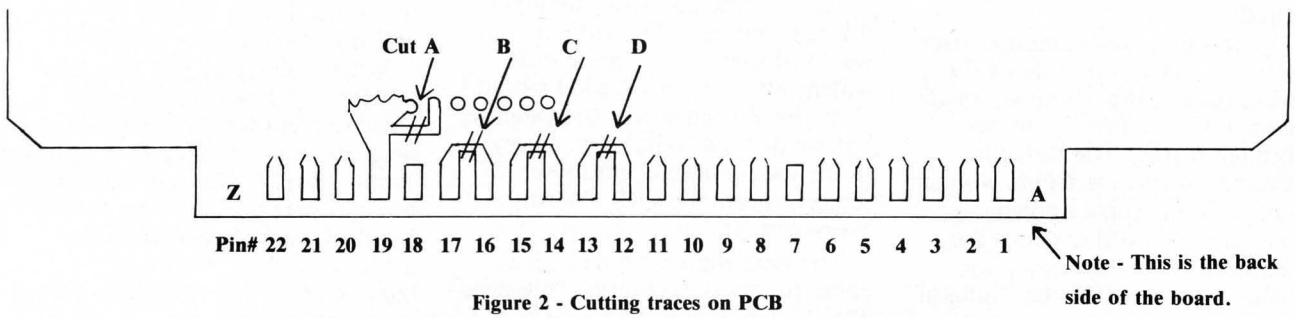


Figure 2 - Cutting traces on PCB

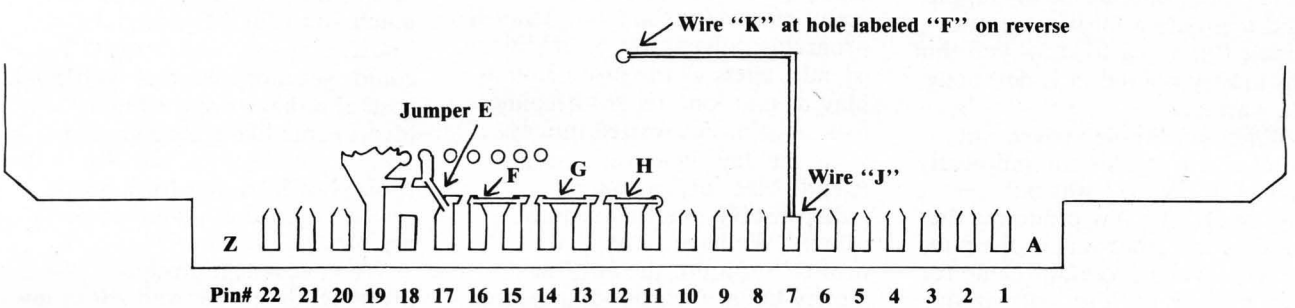
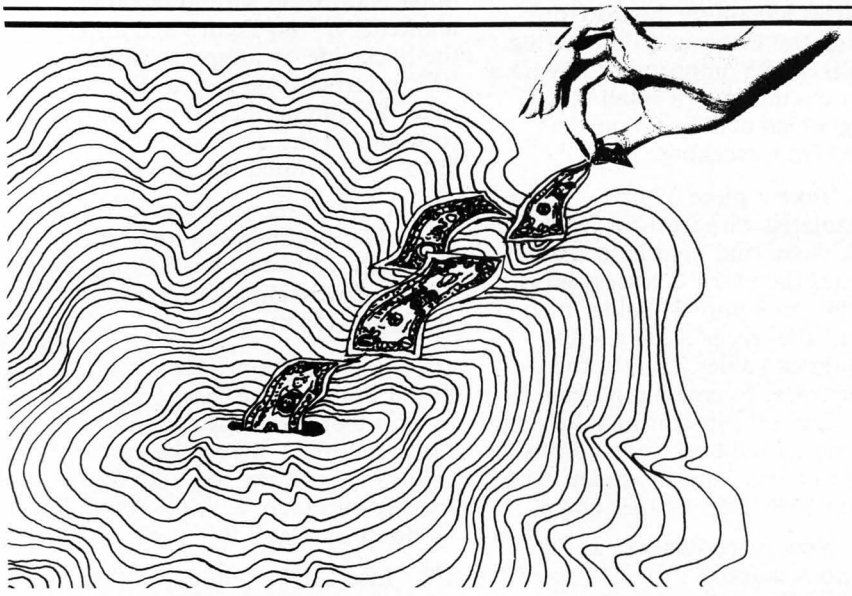


Figure 3 - Adding Jumpers to PCB

THE MONEY WHIRLPOOL



by Judy Neyhart

All hobby and sport enthusiasts have the bumpers of their cars full of cute little slogans. "A fisherman is a jerk at one end of the line waiting for a jerk at the other". "A boat is a hole in the water into which one pours money". Computers as a hobby are too new to have these witticisms in abundance, but I maintain that a lot of these can apply differently to the computer addict.

For instance, the computer user may be a jerk at one side of the keyboard, but the "brains" inside the keyboard definitely do not represent a jerk. The thought processes of this electronic wonder — mine is an Apple known affectionately as Mac (short for Macintosh) — boggle my poor "little" mind! As for the "hole in the water into which one pours money," well, this can apply to computers, too, but as a one-time female pooh-pooher of my Apple (and there are a lot like me out there), I'm going to show you that this money poured in is definitely not wasted.

When our Apple arrived, all padded with styrofoam and neatly packed in boxes, I was not impressed. The few programs that came with it (that was in the good old days when programs came for free) were so hard to load via our cassette recorder that I barely gave it a second try. The loud, high-pitched screeching that emanated from the recorder in order to test the load level was abrasive and not at all pleasant. Most of the time the word ERR appeared on the screen, meaning that the process had to be done all over again. The waiting period to find out if the load was successful was somewhat akin to the expectant father in the waiting room of the hospital — "What will it be?" When my husband said, "We have to get a disk drive," I thought of the hole in the water sucking in my money. After just one day with the disk drive, however, I knew the money was well spent. The speed with which the programs loaded would alone have been worth the expense, but we also got reliability. Every single load worked! No more screech, no more ERR! Worth every penny....

The next money-hungry plea came for more memory. "We need 48K". The only K I knew was a breakfast cereal. Those little chips mysteriously plugged away into Mac's guts allowed us to load many marvelous long and detailed programs: adventures on mythical islands, chess as the professionals play it, and long record-keeping lists. Again, not wasted money...

As the days wore on, and my friend, Mac, became more indispensable, another request came: "We have to have a printer". Oh no, the swirling money-hungry whirlpool appeared in my mind again. "What for?", I said. You see, my computer IQ was 0 and every capability had to be spoon-fed. The printer arrived, too, and once more its uses far outweighed its cost. The obsolescence of my typewriter alone makes it worth the money! Every letter I write can be entered via keyboard, edited as often as necessary, and then printed in several print types and as many times as I want. You should see how easy it is to write complaints to members of Congress — one letter, ten copies — each looking like an original. They say the printed word has punch — well, then I'm responsible for a lot of knockouts! His answer to my "What for?" question had been "I can print out program listings". Would you like to know how many times I've used it to do that? I guess you know the answer, but boy can I think up other ways to use it. Get-well cards, address lists, personal letters, business letters, club minutes, and book reports are just a few. The address label is a marvelous invention that to me is equal in value to the invention of the wheel. That little strip of gummed labels has helped us with our tennis club (I handle all mailings) and simplified my Christmas card chores. When I was little, I used to play secretary and now Mac makes it easy!

When I think of you new users out there struggling with your cassette recorders and without your printers and 48K storage, I want to shout "Buy!" You don't know it, but I'm part Scot — even to the point of washing and reusing drinking straws! That's why coming from me, this money spree is so out of character. However, your 16K Apple with cassette is like driving your car with the brakes on. You don't know how much you COULD do!

OK, you say, what's next? I could get into the other whirlpool costs that have been valuable investments like a modem and Source membership, but I'm in the process of lobbying for a music system and I don't want to press my luck.

We have a sign posted prominently on the wall above my beloved Apple, Mac. It says, "The only difference between men and boys is in the price of their toys". That goes for girls, too!

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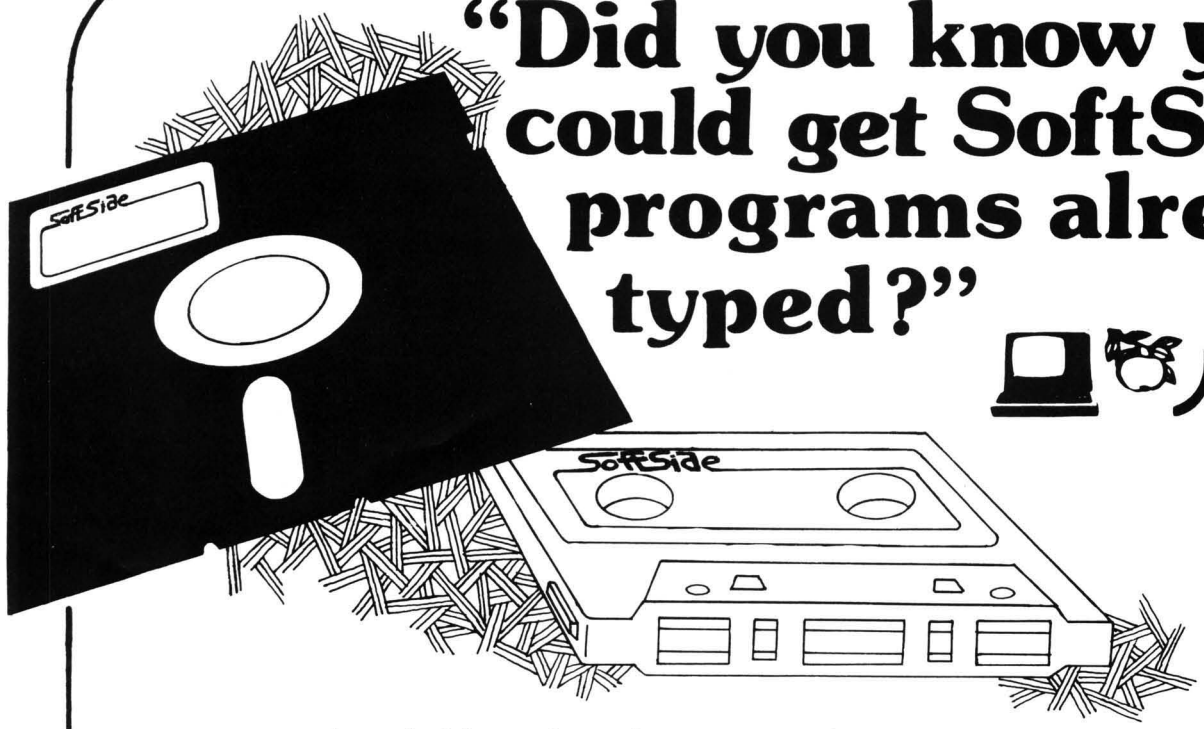

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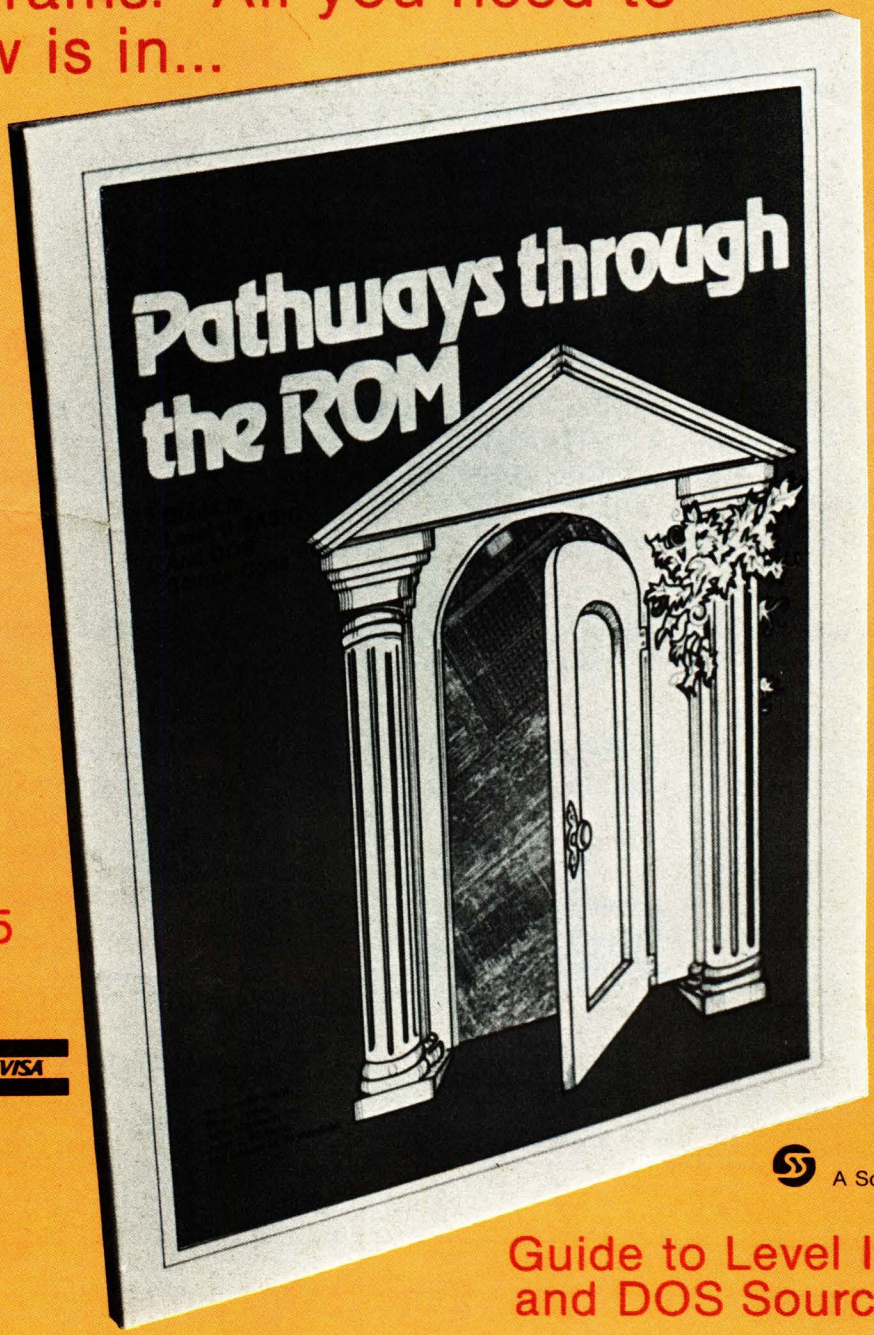

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