"**I** don't think you should go inside," Floyd says. "We'll need card there to fix computer. Hmmm . . . I know! Floyd will get card. Robots are tough. Nothing can hurt robots. You open the door, then Floyd will rush in. Then you close door. When Floyd knocks, open door again. Okay? Go!"

> Open the door.

Floyd plunges into the bio lab. Immediately, he is set upon by hideous, mutated monsters! More are heading straight toward the open door! Floyd shrieks and yells to you to close the door.

> Close the door.

From within the lab you hear ferocious growlings, the sounds of a skirmish, and then

ALL NEW GAMES FROM PENGUIN!

Minit Man™ by Greg Malone

When the first wave of robots hit the bridge you were having lunch. By the time you climbed into your chopper and reached the gorge, the damage was done! The bridge was shattered. That was about the time the radio started squawking about incoming missiles.

Your silos are empty, awaiting three interceptor missiles that had just been prepared for launching. Unfortunately, they are loaded on trains on the other side of the gorge, unable to get across the damaged bridge. Your job is to repair the damage and set the launch computer.

Simultaneously, the enemy's robots have penetrated the building complex in an attempt to sabotage the computer. If you don't stop them, saving the bridge would be pointless.

Available on Apple disk. **Only $19.95**
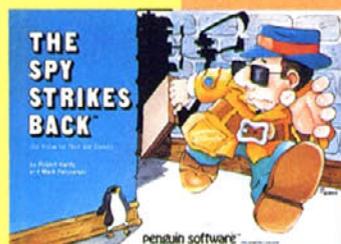
The Spy Strikes Back™

(or How to Not Be Seen) by Robert Hardy and Mark Pelczarski

The spy is back! Once again wit and stealth are the tools of his trade as he attempts to thwart an international terrorist's threat to blackmail the world community. Can you aid him in his efforts to evade the patrolling electronic guards, while searching the myriad rooms of a five-story castle, rounding up the clues needed to locate Dr. X's nuclear laboratory?

Colorful graphics, great sound, and real-time action make this new game maddeningly addictive!

Available on Apple disk, Atari 32K disk and 24K cassette. **Only $19.95**

PENSATE™ The Thinking Game by John Besnard

A thinking game of evasion, Pensate is an original in the board game genre. The object is to get to the top of an 8x8 grid while avoiding all other playing pieces. The computer has 10 types of pieces each of which moves in a pattern relative to the player's move. The higher the round, the more pieces on the board. Pensate features both one- and two-player modes and players can plot one to four moves ahead. There is a practice option in addition to tournament play. If you lose, you can watch an instant replay or even play the same game over.

Available on Apple disk. **Only $19.95**
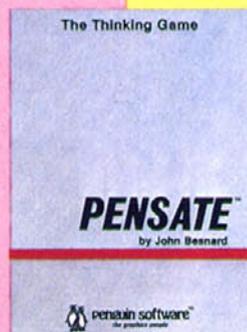
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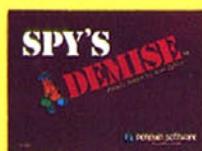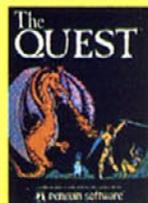
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S I L E N C E

The Game Library

Notice to Patrons: This is your library; please acquaint yourself with its facilities so that it may best serve your needs. To make the library a pleasant place for everyone, your cooperation is appreciated in observing the following regulations: There is no running in the stacks. Shouting and falling out of your chair should be done only in the designated cubicles. Please observe and abide by copy protection, where present. Do not deface the games or alter your high scores. Demo any games before checking out. Check out any games before demoing. Do not replace games in the stacks after playing, as we are going to be constantly moving them around anyway. We will acknowledge donations and bequests with a donor card, if requested.

Thank you.

Recommended

Archon. Arcade games too fast? Strategy games too slow? This Atari masterpiece combines the best of both worlds. As someone who found chess to be boring beyond belief, author Paul Reiche did something about it, along with fantasy game pros Jon Freeman and Anne Westfall. If you want to take an opponent's square, you fight for it—in hi-res. Skilled spell-casters will have the upper hand in this thoroughly enjoyable battle between light and dark forces. Have a good supply of adrenaline ready.
Electronic Arts, 2755 Campus Drive, San Mateo, CA 94403. $40.

Astro Chase. Fernando Herrera shoots to Atari programming stardom with a flashy style and attention to detail in this new variation on an old theme. The game is standard operating procedure (save Earth, or else), but alien variety, really tremendous graphics, and rich sound push this one past the point of being "just another computer game."
Parker Brothers, 50 Dunham Road, Beverly, MA 01915. $36.

Choplifter. The most awarded computer game in history has virtually no variety in repeat play, but it's a grabber nonetheless.
Broderbund, 1938 Fourth Street, San Rafael, CA 94901. $34.95.

Crossfire. Appleites have enjoyed this one for almost two years, and now it's available for the Commodore 64 and somewhat for the VIC-20. There's just one level, but only a masochist would want more; no game is the same. Jay Sullivan's smoothly programmed classic challenges some of today's bests.
Sierra On-Line, Sierra On-Line Building, Coarsegold, CA 93614. $29.95.

Enchanter I. The first of a planned trilogy that will succeed the *Zorks*. Above-ground exploration of castle and its environs in search of lords of darkness. Enchanters use magic logically to solve puzzles, which are great. Marc Blank and Dave Lebling have again come up with a game that's a delight to play and read.
Infocom, 55 Wheeler Street, Cambridge, MA 02138. $49.95.

Frogger. What would any Atari or Commodore 64 be without this classic computer conversion—by John Harris and Chuck Benton respectively—of the arcade hit? Disk or cartridge, it doesn't matter; both versions do full justice to the original.
Sierra On-Line, Sierra On-Line Building, Coarsegold, CA 93614. $34.95. Parker Brothers, 50 Dunham Road, Beverly, MA 01915. $36.

Geopolitique 1990. As the chief executive, you call the shots. In the diplomatic first part of Bill Ketchledge's two-phase game, the United States and Soviet Union struggle for economic and political world dominance. In phase two, you play "what if" in a conventional war situation. Seven scenarios ranging from today's global situation to the

hypothetical 1990s are yours for the choosing.
Strategic Simulations, 883 Stierlin Road, A-200, Mountain View, CA 94043. $39.95.

Hard Hat Mack. Mike Abbot and Matthew Alexander didn't know the competition they'd be facing when they released this. Nonetheless, *Mack* holds its own. Fast and smooth animation coupled with a stiff challenge make up for its three-screen limit. One original concept in the area of nonviolence: You can't kill those who hound you; you can only try to avoid them.
Electronic Arts, 2755 Campus Drive, San Mateo, CA 94403. $35.

Legacy of Llylgamyn. Andrew Greenberg's and Robert Woodhead's top-notch episode of a top-notch game features super atmosphere, neat puzzles, and an eerie transformation of *Wizardry* characters to their own progeny.
Sir-tech, 6 Main Street, Ogdensburg, NY 13669. $39.95.

Lode Runner. Here's a game that brings a new meaning to the word *variety*. One hundred fifty levels. If there are any reasons to be addicted to a game, Doug Smith has found them all and included them in this baby. Play the game; cheat if you want; construct your own levels. The Apple never looked so good.
Broderbund, 1938 Fourth Street, San Rafael, CA 94901. $34.95.

Miner 2049er. The game that even software pirates decided to buy. Ignore the plot; it doesn't make too much sense anyway. Boot it up (or plug it in) and have a ball. Three levels even on the lowest-end machines, ten on the high ones. Bill Hogue broke new ground when this one debuted; it's subsequently become the most translated game in microdom.
Big Five, Box 9078-185, Van Nuys, CA 91409. $49.95. Micro Fun, 2310 Skokie Valley Road, Highland Park, IL 60035. $39.95.

North Atlantic '86. Gary Grigsby lets you be either the Soviet aggressor or the commander of NATO forces in this hypothetical battle. The Soviets have taken control of Germany and Norway and now plan to swallow Great Britain and the North Atlantic. *Possible, realistic,* and *scary* are the words to describe the scenario. The Soviets' attempt to take Iceland and NATO's efforts to keep England supplied make for some interesting parallels between this confrontation and World War II.
Strategic Simulations, 883 Stierlin Road, A-200, Mountain View, CA 94043. $59.95.

Planetfall. A lighthearted and strongly involving sci-fi text adventure with characters who care. Was Steve Meretzky an adventurer or a writer first? It's hard to tell—that's how rich the text is. Fascinating exploring, good puzzles, well-written text.
Infocom, 55 Wheeler Street, Cambridge, MA 02138. $49.95.

Shamus: Case 2. The movie industry could learn something from this game—a sequel that surpasses the extremely popular original. Shamus is back in the same survival game, facing the Shadow and aquatic mutants. Several dozen screens means you'll have something to do on rainy days. Having crammed the whole program into 24K, William Mataga makes Atari gamers wonder what he could do with a full 48K.
Synapse, 5221 Central Avenue, Richmond, CA 94804. $34.95.

Suspended. Chalk up another win for Michael Berlyn. A superb multitime replayable text adventure in which the player controls six independent robots to locate and repair a malfunction to the planetary control system. Terrific logic puzzles, logistics, and timing challenges. Each robot has a unique personality and capabilities. The text is excellently written fiction.
Infocom, 55 Wheeler Street, Cambridge, MA 02138. $49.95.

TAC. It stands for Tactical Armor Command. Detail is what sets this strategy game apart from the rest. This is no board game on screen; tanks and turrets actually move and turn! Ralph Bosson's creation is distinguished by its quick execution of commands (no more fixing sandwiches while the computer deploys forces) and variables so numerous that the game could be played only on a computer. First-rate graphics and sound effects add to its playability and addictiveness.
Avalon Hill Microcomputer Games, 4517 Harford Road, Baltimore, MD 21214. $40.

Zaxxon. Here's one of the best computer adaptations of a coin-op game ever. No favoritism; Atari and Apple versions are both excellent, and the TRS-80 version is easily the best game currently available for that machine. It could be that Ron Fortier and John Garcia are the first persons to create extraordinary special effects for a computer game; never has such an impossible effect been simulated so well. Watch for this one at Oscar time.
Datasoft, 9421 Winnetka Avenue. Chatsworth. CA 91311. $39.95.

New Arrivals

Adventure

Infidel. *Most computers.* Infocom's Egyptological adventure: Find pyramid, uncover pyramid, find entrance to pyramid . . . then it gets tough. A November release, by Michael Berlyn. kicking off the company's Tales of Adventure series. Infocom, 55 Wheeler Street, Cambridge. MA 02138. $49.95.

The Philistine Ploy. *Apple.* As a wandering Israelite in Judea, fourteenth century B.C., you race against a Philistine for the Treasure of the Seven Nations. A graphic adventure, ripped from the pages of the biggest bestseller of all time. Davka, 845 North Michigan Avenue. Suite 843, Chicago, IL 60611. $34.95.

Arcade

Big Top. *IBM.* Wendell the acrobat climbs ladders, jumps over beach balls, ducks cannonballs and knives while trying to collect the ringmaster's hats. Several levels; saves high scores. Funtastic, 5-12 Wilde Avenue, Drexel Hill, PA 19026. $39.95.

David's Midnight Magic. *Commodore 64.* David Snider's original Apple pinball masterpiece, heroically converted by Martin Kahn. Even lets you put English on the ball, but don't overdo it, natch. Broderbund. 1938 Fourth Street, San Rafael. CA 94901. Disk, $34.95.

Galactic Gliders and **Spartan.** *Apple.* A touch of *Sneakers*, a bit of *Breakout*, and even a little *Joust*. . . . Nice little effort from a new company; pricey, but really not bad for a two-game disk. Micro Arcade Software, 5809 Scenic Drive, Minnetonka, MN 55343. $34.95.

Master Miner. *IBM.* A two-player asteroid-belt blast-'em-up from Dan Illowsky. Funtastic, 5-12 Wilde Avenue, Drexel Hill, PA 19026. $39.95.

Night Mission Pinball. *Commodore 64.* Bruce Artwick's user-adjustable classic; ten play modes and forty parameters, for your customizing pleasure. Twenty-page manual! SubLogic, 713 Edgebrook Drive, Champaign, IL 61820. Disk or cassette, $29.95.

Threshold. *VIC-20.* Cartridge conversion of one of the original *Space Invaders* riffs, with large variety of foes and overheating laser to encourage accuracy. Sierra On-Line, Sierra On-Line Building, Coarsegold, CA 93614. $29.95.

Vindicator. *Apple.* A joystick-buster from Jimmy Huey. Robotize me. H.A.L. Labs, 4074 Midland Road, Suite 23, Riverside, CA 92505. $24.

Strategy

Combat Leader. *Atari, Commodore 64.* Scrolling tank battle with ability to choose level of command and choice of over seventy historically accurate tanks, plus an arcade game. Strategic Simulations, 883 Stierlin Road, A-200, Mountain View, CA 94043. Disk or cassette, $34.95.

Devil's Dare. *Atari.* Get five checkerboard tokens in a row before the computer does. Twelve boards; three levels; one to four players. Play each other or gang up on the computer. If you beat this game within ten days of purchase, the company will refund your money. Jay Gee, 7185 Blue Hill Drive, San Jose, CA 95129. Disk or cassette, $19.95.

Price break: The suggested retail price of *Zargs*, *Spider Raid*, and *Grapple* from Insoft (10175 S.W. Barbur Boulevard, Suite 202B, Portland, OR 97219) is now $19.95.

General

The bitCard. *Most computers.* Ever see those personalized children's books that let you insert your kid's name into the story when you order? Here's the computer version, *A Christmas Adventure*, with the recipient's name appearing on scribbled notes inside locked drawers and in other places during the course of the game. Your holiday greeting appears as part of a climactic graphics display when the adventure is successfully completed—before Christmas, one hopes. bitCards, 120 South University Drive, Suite F, Plantation, FL 33317. $16.95. Specify computer.

Coco 2. *VIC-20, Commodore 64, Atari.* The fundamentals of computer game design for the beginner. Follows a sample game, then picks from a variety of objects, colors, sounds, and weapons for writing a new game. Human Engineered Software, 71 Park Lane, Brisbane, CA 94005. Atari, 32K, $44.95; VIC, 16K, $39.95.

I.Q. Baseball. *Apple.* Your answers to baseball trivia questions move your players around the diamond—singles, doubles, and triples, depending on difficulty of questions. Rain delays and a relief pitcher, too. Davka, 845 North Michigan Avenue, Chicago, IL 60611. $24.95. Supplementary disks by team (American and National leagues and World Series), $14.95.

Macrofire. *Commodore 64.* This editor/assembler translates 10K of source code in five seconds; allows assembly of files greater than the amount of memory. Elcomp, 53 Redrock Lane, Pomona, CA 91766. Disk or cassette, $89.

Moviemaker. *Atari, Apple.* Minimovie system for making animated computer cartoons without programming. Reston Publishing, 11480 Sunset Hills Road, Reston, VA 22090. Disk. $60.

Hardware

ComMander. Two new joysticks—the CR-301 and CR-401—for Atari and Commodore computers, four-switch and potentiometer respectively. The really intriguing one looks to be the 401, alleged to be somehow also compatible with the Apple, the IBM pc, the TRS-80, and the Epson! Comrex, 3701 Skypark Drive, Torrance, CA 90505. 301 standard, $19.95; 401 deluxe, $44.95.

Data-Dubler. The secret revealed: how you, too, can use both sides of a floppy disk. Comp-Fidence, Box 14, Moraga, CA 94556. Complete "kit," $19.95; documentation only, $9.95.

Joy.Sensor. Touch-sensitive joystick simulator for Ataris and Commodores. Four- or eight-direction movement optional. May feel a bit like playing an elevator at first, but mastery of this little honey opens up new horizons in game control. Suncom, 650-E Anthony Trail, Northbrook, IL 60062. $34.95.

Supermother. Wonderfully named VIC-20 expansion board. Eight switch-selectable cartridge slots for up to 35K add-on memory, system reset, and pause button. The company promises "future product introductions geared for the VIC-64." Do watch for them. Compuscope, 6400 Signal Street, Tillamook, OR 97141. $129.95. **SL**

DIRECTLINE

It's Messy—Someone's Got To Do It

I read your wondrous periodical frequently. One of its more endearing qualities is the way you rake people through the dirt. However, concerning Matt Lentz of Blue Earth, Minnesota, you have raked incorrectly.

In *Wizardry* and *Knight of Diamonds*, if a good party attacks a group that doesn't wish to fight, there is a very small chance that one good character will become evil. The class of that unfortunate character will not change; hence an evil lord is possible.

In *Knight of Diamonds* there is a slight chance, if an evil party doesn't attack a peaceful group, that a character could become good. (Martha, hide the Ninjas.) Also, in *Knight of Diamonds* there are two devices I know of (coin of power and metamorph ring) that will change class randomly. So you can see that Mr. Lentz may not be guilty of foul play.

By the way, Mr. Lentz, to give you a hint: Ignore the three riddles and remember who you are and what you are looking to become. (The answer is four words!)

I was going to write more but you folks at *Softline* are too dangerous.

Richard Lipman, Rochester, NY

Getting Nowhere Fast

I am an avid reader and enjoy your magazine a lot—particularly the games review section where I feel *Softline* honestly evaluates the myriad of new games. I appreciate the fact that if it isn't a good game, you will say so.

Although I am really good at most arcade games, I decided to expand my game awareness by trying one of the popular fantasy role-playing games, *Ultima II*, for my Atari 800. I have spent quite a bit of time on this game and have gotten virtually nowhere with it. Perhaps someone could enlighten other players and me on the basics of playing this game. I get killed very quickly when traversing the terrain.

One question I would like answered in particular: Can the game be won by any character that I create, or is winning based on the chance that I create a particular character with particular attributes? Any general information on playing this type of game would be greatly appreciated. I'm sure I'm not alone! Thanks!

Bob Albright, York, PA

And Now . . . Computer Love?

To Ken Rose: In May-June's Adventures in Adventuring, how do you catch the train *with your cattle*? Either I go or the cattle go, but not both.

To Len Marinaccio: Your contest-winning maze game sounds great! What are your plans to market it, if any?

To Jock Root: Thank heaven you came along! I've always wanted a *Dungeons and Dragons*-type program, but I've been too unconcerned (lazy?) to write one myself. I hope it's as good as I think it will be.

To everyone: In *Aztec*, did you know that if you climb an open chest on the top floor of the screen at either end, you end up upstairs?

And last, but far from least, does Christine Drda need a boyfriend?

Keith Ammann, Evanston, IL

You have to ask yourself, what self-respecting adventurer would drive his cattle through a train station? And what self-respecting young lady would have anything to do with him?

HP Sympathy

Gee, I hope Ken Rose isn't dropped from the Adventure Writers Guild. I'm sure he didn't mean to drop the third level from his program. Besides, look at the fun we had adding that last line of code with its pit traps and blind alleys. I enjoyed the exercise so much that I then loaded the game into the Hewlett-Packard HP 85. The string-handling capabilities of the 85 are closer to the Atari, so I started with its parser.

How about a few less jokes and more programs for the Commodore line? With the VIC-20 under $100, and the Commodore 64 under $200, there is a large group of people looking for the kind of help *Softline* gives.

Mike Horgan, San Diego, CA

Okay, an Atari, a Commodore 64, and an HP 85 walk into a bar. . . .

Egalitarianism Shall Reign

As a recent subscriber, I have some things to comment on and some requests. First, let's get the first name correctly. My name is David, not Dick, as was written on my mailing label.

I have some questions about the Wico adapters for the Apple II. Will they work in a IIe? I have one of the adapters but it doesn't function properly when I use an Atari joystick. Do I need to buy their $30 Command Control, or should the Atari joystick work? I have found that the Joyport did not work on my IIe. Any suggestions?

One final comment. I notice that you are starting to include reviews on the Commodore 64 and other computers. I thought *Softline* was for Apples. There are already too many other magazines that try to cover every computer system. Let's keep *Softline* for Apples.

David Berkham, Portland, OR

Games, David. It's about games. And we haven't tried a Joyport with a IIe, but our Wico works wonderfully.

Music from Inside

I sent my finest tune to the *Softline* song contest, but unfortunately it didn't win. The music for my original song was meant to be accompanied by the Love Disk Band, which I, Clarence B. Lovejoy, have organized in my spare time. We have not done any songs that have been performed by anyone else; all our original material is performed by myself and the Love Disk Band. We have been trying to get our current album of hit songs produced into a commercial album for sale to the public. I had hoped that if the song, *The Arts of Computer Love in a Science Fiction White Man's World*, had won the song contest, the notoriety would help me achieve my dream and goal: to become a very well-known performing musician upon release from my prison-home. Since *Softline* is located in Hollywood, maybe you would know some record producers or famous musicians who could help me.

I, Clarence B. Lovejoy, Jr., am learning to program and operate computers in my prison-home. I hope to use these skills and knowledge to rise out of the white man's ghetto prison upon my release, but my truest dreams and goals are to spread the word of how the future can be changed through working with computers, learning the knowledge of The Man, and working with brothers in all prison-ghettos throughout the world. I believe that *Softline* may share some of these same goals.

Clarence B. Lovejoy, Jr., and the Love Disk Band,
State Penitentiary, Joliet, IL

Saved!

I was reading Directline in the July-August issue when I ran across the letter from Vernon Anderson asking for help in saving his screen data for his electric-easel program. I can see that Vernon is a Basic jock, like most microcomputer people are. When you come across these problems you should find an internals person (a person who knows the Atari's guts or, for that matter, the Apple's or the IBM's). These people are usually found in local user groups. Now on to the problem at hand.

You could use a nested for-next loop with the locate instruction to pull each pixel and store it. The only problem is that it would take more than 490 sectors on the disk to store the screen. So this solution is a poor one.

The next solution to this problem has two advantages over the last. One, it uses only about sixty sectors for the save, and second, it saves

eight times faster. And now the solution: Save the screen memory. In mode eight there are eight pixels per byte of screen, so saving screen memory uses one-eighth the disk space and loads/saves eight times faster. In order to find the location of the screen data you must first find the location of the display list. This is done by the equation:

$$DLIST = PEEK(560) + 256*PEEK(561)$$

Now the vector pointing to the first byte of screen data is the fourth and fifth bytes of the DLIST (display list). To find the data use the following equation:

$$DATSTART = PEEK(DLIST + 4) + 256*PEEK(DLIST + 5)$$

Now turn to the first page of Chapter 9 of your Atari Basic manual. On this page you will find a table listing all of the graphics modes. In the rightmost column you will find the amount of RAM used for each graphics mode. This is important because we want to know how much memory to store when we save our screen data. And now the sample program:

```
10    GRAPHICS 8:SETCOLOR 2,0,0:COLOR 1:REM set up
      screen
20    FOR A = 0 TO 31:PLOT A*10,0:DRAWTO
      A*10,150:NEXT A:REM draw test pattern
25    FOR A = 0 TO 10:PLOT 0,A*10:DRAWTO
      310,A*10:NEXT A
30    GOSUB 1000:REM execute save routine
40    END
1000  DLIST = PEEK(560) + 256*PEEK(561):REM find display
      list; start of save subroutine
1010  DATSTART = PEEK(DLIST + 4) + 256*PEEK
      (DLIST + 5):REM find start of screen data
1020  OPEN #1,8,0,"D:TESTFILE.B01":REM open file for save
1030  FOR BYTE = DATSTART TO DATSTART + 7900:REM
      7900 was in table Chapter 9, page 1
1040  DAT = PEEK(BTYE):PUT #1,DAT:REM get data and
      store on disk
1050  NEXT BYTE:REM END LOOP
1060  CLOSE #1:REM close file
1070  RETURN:REM end of save routine
1100                    use line 1000 here: REM start of load
                        routine
1110                    use line 1010 here
1120  OPEN#1,4,0,"D:TESTFILE.B01":REM open data file
1130  FOR BYTE = DATSTART TO DATSTART + 7900
1140  GET #1,DAT:POKE BYTE,DAT:REM put data onto
      screen from disk
1150  NEXT BYTE
1160  CLOSE #1
1170  RETURN
```

The load and save routines can be put on any line numbers. Enter and run this program; then delete lines 20 and 25, change line 30 to GOSUB 1100, and run the program again.

It has come to my attention that there are a lot of IBMers out there who would also like to be Apple people. (See David Bean's letter in the January '83 Directline.) A company called Quadram, which makes expansion boards for the IBM pc, is making a board called Quadlink.

Quadlink seems to be an Apple II on a board. It supports Apple graphics and, according to the ad, will run most programs written for the Apple II, II Plus, and IIe, including games. It has a built-in game port and can use IBM I/O devices designed for the pc. It may be worth looking into. Quadram's address is 4357 Park Drive, Norcross, GA 30093.

Jon Mellott, Orlando, FL

Panhandled

I would like to claim a high score on the bootup game of *Arcade Machine* by Broderbund. My score was 123,456,789 points. This may have been influenced by the fact that the aliens do not shoot back and

that you can never lose a tank. The score is not verified due to the fact that I quit playing only when the electricity was turned off. I had been playing for thirty days straight and had not paid the bill.

If you accept this score I have some semi-arid land (read desert) in Texas you might be interested in buying.

James Hogue, Levelland, TX

Hogue's score is being withheld from the lists until such time as he informs us where he gets his darling little dinosaur stamps.

K-k-k-kudos

I'm writing in response to a number of letters in the July-August Directline. First, to Steven J. Kirchhof, who complained about certain aspects of *Ultima II*: If the sound bothers you, take the top off of your Apple and find the speaker. (It's the little round black thing to the lower left.) Follow the cord to the right and pull its plug. Be sure to remember which way it was put on; it's a two-pronged plug and the effects of reversing the plugs are unknown to me at this time. As to the problem of eye fatigue, simply dimming your monitor should do the trick.

Softline should extend its highest-level kudos (What *does* that mean? It sounds like a Mediterranean disease!) to Don Howe for single-handedly improving the High Scores section by suggesting the placement of high scores in the Hall of Fame.

Before I go, I think more (groan) kudos are in order. Sierra On-Line has been fantastic in helping me overcome horrendous problems in *Time Zone* and *Wizard and the Princess*. They even replaced the main *Time Zone* disk when it busted, without even asking when or where I bought it. (I was one of the first.) Likewise, Penguin Software replaced my *Graphics Magician*, when I accidentally bought the nontablet version, for the difference in price of the disks. It was my mistake and they had no obligation whatsoever, yet the lady on the phone didn't even bat an eyelash when I explained the problem.

Bear Braumoeller, Orinda, CA

Oh My Grid!

I would like to thank *Softline* for the fifty dollars awarded to me for the tip I gave in the May-June 1983 issue, which is not to be confused with the May-June 1982 issue, nor is it to be confused with Confucius, who was not alive in 1983 (or in 1982, for that matter). Anyway, besides writing to tell you what insanity lurks in the minds of mice and men, I would like to tell all the befuddled readers (or weaders, if they are Elmer B. Fuddled) that a great new spreadsheet program is now available! I was able to break into it and list it, so, through my great generosity, here it is: The Superduper Spreadsheet from Zombo Prod. (The Inverse Realities People).

```
10    HGR2 : HCOLOR = 7
20    FOR A = 0 TO 279 STEP 10
30    HPLOT A, 0 TO A, 191
40    NEXT A
50    FOR A = 0 TO 191 STEP 6
60    HPLOT 0, A TO 279, A
70    NEXT A
80    GET A$ : PRINT CHR$( 7)
90    GOTO 80
```

Unfortunately, the instructions are much too long to put in a letter (a full 200 pages long).

Gary Geniesse, president, Zombo Prod., Osprey, FL

To Market, to Market

I am an avid computer programmer and *Softline* fan who needs some information. I am a fairly good programmer and I have a couple of games that might be worth marketing. If I am to market them, where should I start? Also, how should I go about it?

I, too, salute Penguin Software for publishing software that isn't copy-protected. If I ever get around to marketing my programs, I will leave them unprotected.

Steve Lutz, Redlands, CA

Send a sample of your work to virtually any of the game software houses; most of them actively solicit this very thing. **SL**

WE UNLEASH TH
POWERFUL GRAP

BOONE CORPORATION

If you want to start your own software company and you have little or no business experience, you start small, right?

Wrong.

At least according to Michael Boone. The company that bears his name is a living example that the start-small-and-grow-bigger approach isn't the only way to go. Boone's method was to find a bunch of people who shared the same interest, map out where the company should be in the future, and only *then* get started.

Boone had always been somewhat interested in computers. He bought his first one five years ago when computers weren't something you had in your house; they were something that other people had in their houses.

Around the end of his junior year at Stanford University, Boone, like countless other college students, was trying to figure out what all his time spent in school had amounted to. His major, petroleum engineering, wasn't exactly what he wanted to devote his life to. "My whole family is in the business, so I just sort of followed the pattern," he explains. Boone is the kind of person who does things because they're fun, and a career in petroleum engineering just didn't seem to present the fun image.

Computer games are fun.

Around the spring of 1982. Boone began thinking about getting into the business of computer games. But the first game that entered his mind wasn't aliens, mazes, adventures, or fantasy. It was a golf game. "The local computer store told me that a good golf game would sell a lot of copies," Boone explains. "I already had an IBM pc: golf seemed like a

game for the affluent; IBM seemed like the computer that business people and the affluent were buying. So, I should write a golf game for the IBM computer."

Hey, Gang, Let's Start a Business! The first thing Boone did was go out and find an artist for his future company. His friends directed him to Brad Davis, now vice president in charge of design. To do the programming, Boone rounded up a friend, Oliver Oaks, who was a Ph.D. candidate in computer science at Stanford. "Things were really hectic then," Boone recalls. "I remember the night I wrote out the contracts on my word processor. I was supposed to have been studying for the next day's physics final."

If anything can be said about starting a new business, it's that there's always the doubt about whether or not it will succeed. Boone experienced that doubt. And if it weren't for some coaxing by a few people, Boone Corporation might be offering titles like Rum Raisin and Fudge Ripple instead of its currently available *Cyclon* and *Crater Raider*. During the summer, Boone became bored and disenchanted with the whole idea of software and began toying with the idea of starting an ice cream chain. But then things started coming together for the company. Boone found three things he needed to help the company grow: Larry Burke, a Hewlett-Packard employee; David Stone, a fellow petroleum engineer; and some private sources for venture capital. Money helps.

Adventure fans will readily recognize one of Boone's first products, *Demon's Forge*. Its author, Brian Fargo, was a neighbor of Boone's. "I was always jealous of Brian because he had already published his own computer game, and here I was still tinkering around with this golf

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You can take the kids out of the dorm rooms, but you can't take the dorm rooms out of the kids. Shown here, ready to chug, are (left to right) Michael Boone. Bill Heineman, Brad Davis, Troy Worrell, Captain F. Brian Fargo, and David K. Stone. Ain't no such thing as lo-res root beer. These party animals go for the real stuff.

game," Boone remembers. "I used to drive by his house and sneer at him."

Not too long afterward, Fargo and Boone met each other at the computer store one day and began discussing ideas. Fargo joined the team as the person in charge of research and development.

Though the company incorporated in October 1982, its employees were still having problems coordinating each other's efforts; most of them were still operating out of their dormitory rooms at Stanford, while Fargo was rounding up programmers from southern California, where he was attending the University of California, Irvine. Dorm rooms are made for studying, sleeping, throwing small parties, and watching *Dynasty*; they're not made for housing software companies. "It was a real hassle coordinating everything between us in Palo Alto and Brian in Irvine," Boone recalls.

That's no longer a problem. Now that everyone is finished with school, Boone has made its official home in Newport Beach, California—not exactly the software capital of the world, but the convenient home town of its employees.

Only the Inexperienced Need Apply. Not everything has been smooth sailing for Boone. More than a year after the idea for the company was born, the golf game that started it all is still in limbo. This is partly because the people at Boone are learning the ropes as they go along. "I don't have any real experience in marketing," says Boone. "And Brian's never had any training in research and development. I figure that for every dollar invested in our company, about thirty-five cents went toward giving us a real-life MBA degree. You know how the CBS News motto is 'Uniquely qualified to bring you the world'? Ours is 'Remotely qualified to bring you the world.'"

So far, all of Boone's products have little to do with this world at all. *Crater Raider* and *Cyclon* are two outer-space games for the VIC-20. The new version of *Demon's Forge* is being released for the IBM pc. (Lawyers, consumer advocates, and people dedicated to the war on misrepresentation and deceptive advertising can rest assured that *all* pictures of scantily clad women that appeared in the ads and packaging of *Demon's Forge* have been eliminated. Fargo confirms that the artwork they'll be using this time around really does reflect what appears in the game.)

The as-yet-unnamed golf game, also for the IBM computer, is going to be a tree-for-tree, inch-for-inch re-creation of the course at Pebble Beach. Due later in the fall is *Moodies in Iceland*, a game that promises to be unlike any other on the market. The game features "cute little Smurf-like characters" that hop around on ice blocks, trying ultimately to kiss Miss Moodie.

"The way we got started on *Moodies* is really coincidental," says Boone. "Sisson and Associates, the creators of the Moodies creatures, contacted us to do the game. They called one day because they had a question about how to get out of a certain room in *Demon's Forge*. Brian got on the phone and started telling them the kinds of things we're doing, and then they came out to sign the Moodies contract with us."

By Golly, That's a Good Game. Being a new company, Boone bases many of its decisions on what has succeeded in the industry before. Its game creators look at what's currently successful and try to determine what elements of each game make them popular. Copy other games? Not exactly. If they see that a game is popular because of screen variety, they'll aim to include the same kind of variety. If a game appears to do well because of its animation, they'll try to come up with equally smooth animation.

Boone has numerous projects waiting in the wings, the biggest of which is the production of software for the Toshiba T-300 computer. When Boone heard that Toshiba wanted to market a game that would take advantage of the T-300's graphics, Boone gave them a call. With the popularity of golf in Japan, convincing Toshiba to buy the golf game required no heavy sales pitch. "It was really weird. They just gave us a T-300 and said, 'Let's see what you can do,'" says Boone.

Another project involves the use of artificial intelligence (AI) in games, though artificial intelligence is a term nobody at Boone is really

too comfortable with in describing the project. Even on the largest mainframe computers, AI is still theoretical; what Boone's programmers are doing is taking one of those theories and implementing it on a computer.

According to Fargo, the game will be somewhat similar to Infocom's *Deadline* and *Suspended* in the way that different characters react differently to each situation. According to Boone, however, the game should surpass Infocom's adventures in terms of parser sophistication and game intelligence.

The main feature of the AI game will be that the program will react to the player's actions, but its reactions won't be preprogrammed; they'll be more or less spontaneous. A typical conversation between a player and the game might go something like this:

Player: Did you see a tall blond man here?
Game: Yes, he left here about twenty minutes ago.
Player: What was he wearing?
Game: He was dressed in a black suit.
Player: Are you sure it was black?
Game: Well, come to think of it, I believe it was more of a dark blue than black.

When the game comes out, it will be available first for a 128K IBM pc. "Getting it out is our primary goal; we'll worry about translations to different computers later," says Fargo.

High Hopes. Boone Corporation is supported mostly by confidence and positive thinking—not to mention dedication to the principle of having fun. If it weren't fun, none of them would be in the business.

Even if only a fraction of the goals Boone has set for itself come to fruition, computer gamers should be in for a lot of pleasant surprises in the months to come. Commodore, IBM, Apple, Atari, DEC, Mattel, or Texas Instruments; adventurer, arcader, fantasy role-player, or simulation player—Boone plans on offering something for everybody. **SL**

NO CONTEST

Fictitious Interaction. As you gaze upon the panel of distinguished programmers, novelists, and novel programmer/novelists arrayed within these pages, no doubt you feel a great sense of historical moment welling up within you.

"Interactive fiction," you murmur to yourself. "Participatory novels. Of course. Why didn't I think of that? Truly, this is the wave of the future. Dashed if I don't feel I should be getting in on this and doing my bit for the future of compu-lit."

You sink further into the rich leather upholstery of your nineteenth-century Barcalounger, meditatively tamping your meerschaum, turning up the collar of your turtleneck sweater, and gazing moodily out the leaded glass of the bay window at the storm-tossed, windswept coast of the New Hebrides.

"Well, heck," you think, "that could take months!" And you fall into a fitful doze.

Not so! No point in letting those more intelligent, ambitious, and talented than you have all the fun. Let's get a little participatory lit going here.

How many words can you form out of the words *interactive fiction*? Use each letter no more than once per word. (Of course, letters such as *i*, which appears four times, may be used as many times as they appear.) Now see what kind of story you can write that uses all those words (among others). A simple scene will suffice; two pages max. Each word may be used only once.

Those creating the most words will go into the final round of judging; the accompanying story will be the tie-breaker. It must use all the words in your list. The winning author receives $200, or any equivalent combination of cash and software she chooses.

Incredible Talent Bonus: The judges reserve the right to award an additional $100 prize to an entry deemed superb, astoundingly witty, or otherwise magnificent, regardless of length or number of words found. This special judges' prize will be awarded only should an entry be so judged.

Write to Softline Write-up, Box 60, North Hollywood, CA 91603. Postmark deadline: October 10, 1983.

How Can You Lose? Do you have what it takes to be a financial adviser in the big leagues? Let's find out. Try taking a look into your cash-flow crystal ball and forecasting the fiscal future of some corporate giants. Now write:

> For the entire fiscal year of 1983, I predict that Mattel Electronics will lose_____million dollars, Warner Communications (Atari) will lose_____million dollars, and Texas Instruments will lose_____million dollars.

The amateur analyst who comes within five million dollars of all three actual amounts as reported in each company's annual report will receive one millionth of the amount of the highest figure, or the equivalent value in computer games. You stand to make quite a killing here. Let's see some real cutthroat competition. Find E.F. Hutton and make him talk.

Postmark deadline: December 1, 1983. Winner to be announced in the May-June 1984 issue.

Send entries to Softline Bust, Box 60, North Hollywood, CA 91603.

How High the Moon? No good at precognition? Well, you don't have to enter that contest; you can enter this one. Take all the same companies' 1983 second-quarter losses (Atari: $283 million; TI: $119 million; Mattel: $20 million) and think what you could have done with the total amount of all that money. To wit: how many arcade games ($29.95), adventure/fantasy games ($39.95), and strategy games ($59.95) you could have bought (never mind sales tax), keeping in mind that you want to end up with as near to an equivalent number of each type of game as possible, with the least amount of money left over. Got them all counted? All stacked up in their three piles?

Now take those three stacks of floppy disks, turn each disk on edge, and (very carefully) restack them, edge on edge, into one stack. Never mind leaving them in the outer sleeves. How high is the stack (in miles, feet, and inches; to the first decimal point only, please)? Now get realistic and select $100 worth of software that you need to have. If your entry is the correct one drawn, that is exactly what you shall receive.

Turn in your papers to Softline Markup, Box 60, North Hollywood, CA 91603.

You must include your worksheets with your answers. Incomplete answers do not count. Postmark deadline: October 8, 1983.

And now, the news:

Someday, You, Too. . . . Every spring, the Rocky Mountain chapter of the Society for Technical Communications holds its annual publications and communications competition. Divisions are in various writing and graphic categories, and competition is open to STC members and nonmembers throughout the region. This year the Distinguished Communications Award went to Ernest E. Mau's book, *Create Word Puzzles with Your Microcomputer*, which went on to cop a certificate of achievement in the annual international Technical Communications Conference. In other words, it's now very famous and well known, so if you were thinking of lifting from it for our continuing word games contest, forget it.

The Official Computer of the 1983 Olympics. Three hundred teams representing schools from across the U.S. competed in the 1983 Olympics of the Mind World Competition, held June 2 at Central Michigan University in Mount Pleasant, Michigan. Commodore, as exclusive computer sponsor, provided twenty VIC-20s and a computer problem for competing teams to solve.

The Olympics of the Mind program was organized in 1978 to encourage young people to develop techniques in creative problem solving.

To participate in the world competition, a team must first win local contests. First-place winners for the '83 Olympics were Harry Spence School, Wisconsin, in Division I (elementary); Alice Burney School, South Carolina, in Division II (middle school); and Revere High School, Ohio, in Division III (high school). Team coaches received a plaque, and each placing team member received an Olympics of the Mind medal. Computer competition awards were presented by Commodore reps Dan Kunz and Mark Odgers.

Celluloid Heroes. Everybody's a dreamer, and everybody's a star. And if you want to make it in the computer film biz, you gotta know who to step on. For Alecia Thomas (San Jose, CA), the "who" was her friends, David Forster and Jeff Johnson. Thomas is one of the winners of the Filmdom Adventure contest, and she burned two cohorts along the way to becoming a Hollywood computer-movie mogul.

Allan Brockenbrough (Pittsburgh, PA) is the other winner; his route took him to the destination of Hollywood computer-movie superstardom.

Thomas's story illustrates perfectly the game of making it in

Hollywood. In the beginning, when they were young and naive, Thomas, Forster, and Johnson made it a team effort to figure out the correct path and answer the questions presented along the way. In fact, Forster was the one who read *Softline* and brought the contest to the attention of the others. But just like most Hollywood success stories, things got nasty along the way.

It's like this: The three San Joseans were tied as winners. The answer to question forty was "Philip Marlowe in *The Lady in the Lake*." Johnson spelled "Philip" with two Ls. Good-bye, Johnson. Forster referred to the movie as *Lady in the Lake*, omitting the definite article, while Thomas referred to it more correctly as *The Lady in the Lake*. Good-bye, Forster; congratulations, Thomas.

As for prizes, Thomas, who owns a TI 99/4A, isn't sure whether she'll take the whole $100 in software herself or if she'll share it with her former friends. As for the videocassettes, she gets *What's Up, Tiger Lily?* and two others of her choice, since she already has *Star Wars* and *Citizen Kane*.

The story of Allan Brockenbrough is a lot less complicated. He simply followed the correct path to computer-movie superstardom, answered the questions correctly, and won. Brockenbrough is the only one who made it to stardom; all others either took a wrong turn somewhere or missed one of the questions.

For the benefit of the curious, the answers to the pertinent questions
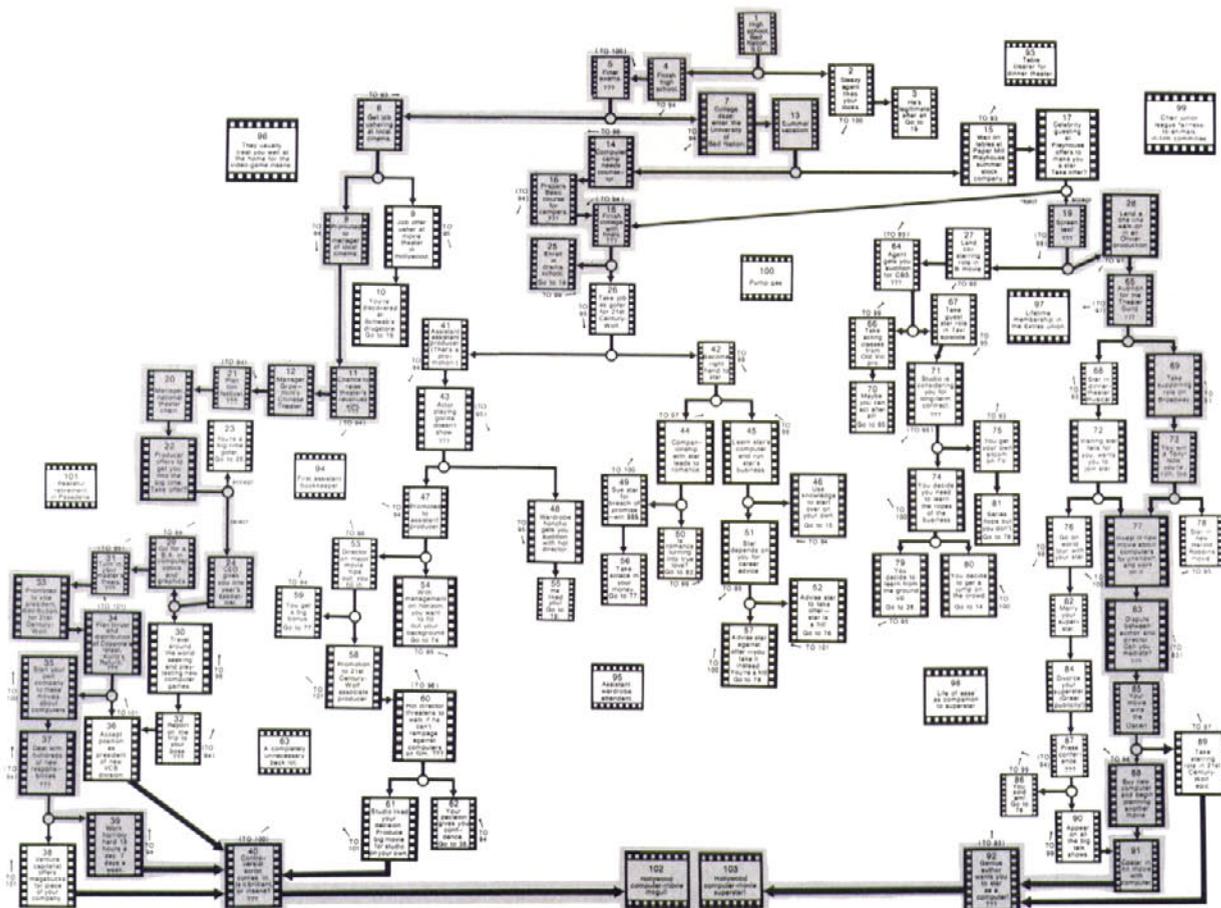
are given at the end of this section.

Ego Contest. Maybe we should have named this contest the See How Unoriginal I Can Be Contest, since that's how so many people decided to play.

"I'm a Gamer Supreme because I'm the best at *Bolo* . . . I control my joystick with my toes/feet/mind/whatever . . . I play *Shamus* blindfolded . . . I don't read game instructions. . . ." These are just a few of the yawners that stuffed the contest office mailbox. Not to mention all the ones that referred to playing *Frogger* on a full stomach and avoiding cerebral damage. It was all these entries that had the contest judges living on No-Doz for a week.

No, entries weren't judged on how much you could make yours sound like someone else's entry, but on how original you could be. The winners, in order of legible handwriting, are Clay Anderson (Isla Vista, CA), E. Macsinka (Oakland, NJ), and Ira Wexler (Randallstown, MD).

Wexler's entry: "I'm a Gamer Supreme because I can play *Crossfire* looking at an upside-down monitor in a mirror, wearing mittens, while solving partial differential equations in my head and whistling *Flight of the Bumble Bee* during an earthquake."

Coincidentally, Anderson's entry also refers to the popular Sierra On-Line game: "I'm a Gamer Supreme because I play *Crossfire* on a one-inch monitor with my right hand shackled to an injured desert iguana while submerged in eight and a half feet of DOS disassembly listings."

Commenting on the economy in this great nation of ours, Macsinka summed up how a lot of people feel (even nongamers) about the state of things: "I'm a Gamer Supreme because I'm unemployed." But we suppose Macsinka can't complain if he/she stays inside playing games all day instead of going out to look for a job.

The three winners will each receive a check for $29.95, two arcade games of their choice, and a *Softline* "Infomaniac" button.

So there we have it. A contest that had almost no winners. Oh, these weren't the only three entries that shined, but they were the ones that shined brightest. Here are a few that made it to the finals:

I'm a Gamer Supreme because . . .

"I play *Castle Wolfenstein* with a real gun, and *Choplifter* with a real helicopter." Ron Prodoehl (Greenfield, WI). How about real hostages?

"I'm a bigger cheater than Norman Fong, only I didn't get caught! (Please note: The above statement is all in fun. In fact, all my past *Softline* high scores were legitimate.)" Dean Zevchek (Parma, OH). Sure.

"I read a Supreme magazine called *Softline.*" Nancy Fong (San Francisco, CA). Good try, Norm. But you'll have to do a lot more than just change your first name to fool us.

"I challenged Brent Shaw to a shoot-out and Shaw was a no-shaw . . . show . . . Shaw show." Mike McCann (Dobson, NC).

"I can go to the bathroom and make it back to the game during the cartoons in *Taxman.*" Steve March (Lansdowne, PA). Gee, Steve, those aren't gaming skills, they're scatological.

"I can score 1,200,000 on *Raster Blaster.* Though this may not make me a Gamer Supreme, doing it with a life-size poster of Christie Brinkley hanging over me will surely get me a nomination at least." John Woo (Bronx, NY).

"I can't get a durn thing done with that life-size poster of John Woo [Bronx, NY] hanging over me. Whatta hunk." Christie Brinkley (*Vacation*, a theater near you).

Wrapping up all this gamer supremacy is a philosophical entry from John Redfield (Fort Smith, AR), who told us that he's a Gamer Supreme because "I have come to realize that the games are never really over, and that all games are within bigger games." Deep, John. Real deep. Look for Redfield on NBC this fall in the new adventure-drama-sitcom, *Heidegger, Sartre, and Me*, in which the three philosophers search for the true meaning of existentialism in gaming. The real fun begins when Redfield explains to Jean-Paul "Skip" Sartre that games are essential to existence, because Man is allowed to act freely within them, but then contradicts himself when he accuses Martin "Martian Man" Heidegger of having no free will, thus disclaiming his existence.

Until next time, fellow gamers.

Here are the answers to the Filmdom Adventure questions:

First, the answers for the road to computer-movie moguldom:

5. False. Humphrey Bogart did not say "Play it again, Sam" in *Casablanca.* He does, however, wish that he had.

11. Oswald the Lucky Rabbit was the pilfered ancestor of Mickey Mouse. That's okay. It's hard to imagine Annette Funicello as a "Rabbiteer."

21. *Heaven's Gate* was the movie that died before it lived.

31. Gabriel Pascal; one of our favorite filmic interpreters and high-level languages, and hopefully one of yours, too.

34. *One from the Heart* was called "one from the lab" by critical intelligentsia. Other, cruder moviegoers called it a lot of other things.

37. *Bwana Devil*, an early 3-D great, and even better than *Spacehunter, Jaws 3-D*, and *Dr. Tongue's 3-D House of Stewardesses* combined.

40. Philip Marlowe was the detective in Raymond Chandler's *The Lady in the Lake.*

And now, for computer-movie superstars:

5. False. Humphrey Bogart did not say "Play it again, Sam" in *Casablanca*, and he's glad he didn't.

16. *Space Paranoids* was the game Flynn designed in *Tron.* Jeff Bridges confirms that it wasn't *Miner 2049er.*

18. "America's Sweetheart," Mary Pickford, comes from Canada.

19. Fred Astaire can sing and dance a little. John Travolta and Jennifer Beals were unacceptable answers, as they cannot.

65. *Forbidden Planet* is the movie in which Walter Pidgeon sparred with a nasty mind-monster. No, it wasn't *Private School*, in which it is heavily rumored that Pidgeon fought Phoebe Cates.

83. *Plan Nine from Outer Space* was Bela Lugosi's absolute last film and one he'd much like to forget, as would most of us.

92. A trick question, testing the prevalence of movie mythology in today's society! (Also, a free square.) The Gerber baby was Ann Turner Cook. The rumor that it was Humphrey Bogart (about thirty years old at the time) is one that the Gerber Company is trying to lay to rest as just that—a rumor. **SL**

LAT 140 , LON 025
.25. . . . . 26. . . . . .
FUEL

You're in your sixth-grade civics class. The light monitor hits the lights, and the projector monitor switches on the projector.

Voice-over; a shot of the Parthenon.

"It is 123 B.C., and Socrates has been accused of sedition and treachery by the State. He has agreed to take hemlock; his followers are trying to persuade him of the folly of his course, and. . .You Are There!"

And there was Napoleon, and the death of Lincoln, and a host of others. It was one of the best, most painless ways to try to teach history to crazed, unruly kids, and those films were good as well. Ah, but we can't bring back the past.

Can we?

Electronic-sounding synthesized voice dubbed over a room with computers, paper listings, books, and empty Coke cans everywhere.

"It is 1983 A.D., and programming genius [your name here] is feverishly at work on a new graphic extravaganza, a monumental effort of animation, a scintillatingly smooth simulation. The bits are byting, the pixels are perking, the RAM is rumbling, and . . . You Are There!"

Now tell the truth: Haven't you ever, just once, wished you could write one of those fantastic games that you gaze at longingly in your friendly neighborhood computer store? Who said no? There's always a heckler. Now look: What is a home computer good for? Okay, *VisiCalc* is neat. Inventory control? Well, yeah. Okay, a computerized library is nice. All right, yes, you could use it as a dedicated coffee-pot controller if you really, really wanted to. But, aside from all that, what good is a home computer? Did someone say games?

Correct. Games are fun. And, besides, a game is a good test of a programmer's skill, if some of you really need a justification for writing some silly piece of foolishness. A fast, smooth, playable game demands a lot from a programmer; but, on the other hand, it gives a lot back. When you're finished, you can look back and say to yourself, "Wow! Whoever

wrote that is a genius!" (Who else is more qualified to say so?)

Let the Game Begin! If you haven't guessed yet, we're going to write a game together. It'll be fantastic, great, state of the art, and by the end of the series you'll know how to write a game of your very own. The screen pictures you see here are samples from one part of the game that we'll be working on over the next few months (years?).

But first, this short interjection. While it is true that we'll be writing an arcade game, not an adventure (a topic that Ken Rose has been covering here for some time anyway), or a simulation/war game, or a strategy game, the techniques and modi operandi that will be pounded into your skull will be invaluable in those fields as well. And, not to put you off, but all programming will be in machine language, because (let's say this right off) anything that you can do in Basic can be done ten times better and a thousand times faster in machine language. Don't worry—machine language is easy!

Now, about the game. Look at the photo above. What do you see? You should get the impression that you are looking through the windshield of an F-16 banking slightly to the left, at an altitude of seven hundred meters, at an air speed of 1,210 km/hr. Okay, you're in an airplane tipping over.

So what? So it's going to move, and smoothly. You'll bank left and right, dive down or pull up, even fly in a loop. The ground lines will get farther apart as you get closer to the ground, or scrunch together as you climb. The sky will darken as you gain altitude or as night falls. And all this while fighting the enemy (say, four thousand Red Barons in MIG-31s). Now what do you think?

That's not all. On the ground (eventually), you'll have your planetary base, which the enemy (four thousand Rommels in King Tiger tanks) must not be allowed to find, and you'll have your tank (which, naturally, is much better than their tanks) to cruise around in. Said movement, of course, will be 3-D as well, a la *Battlezone*, but in amongst

ANATOMY OF A Game
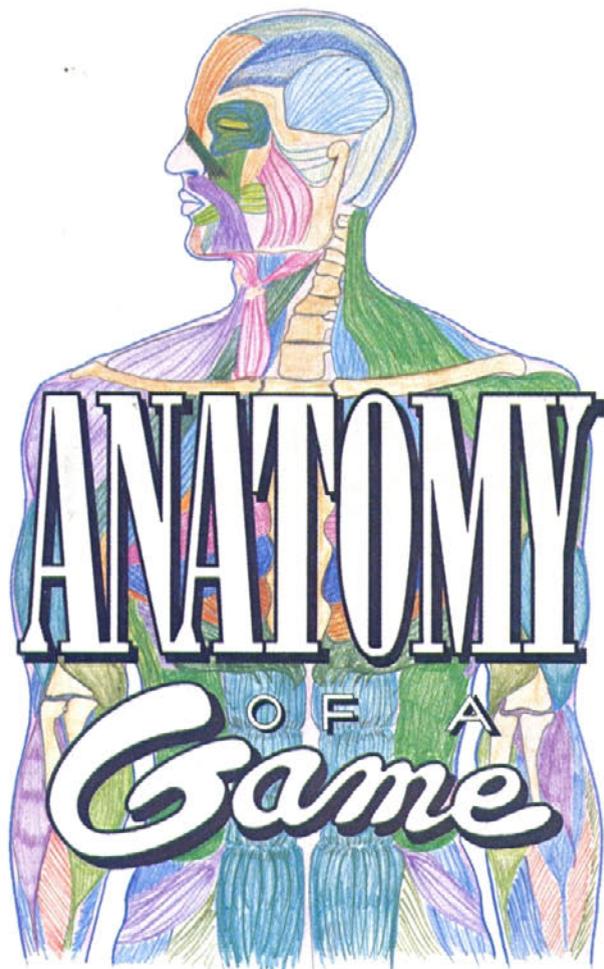
PART 1 By Brian Fitzgerald

buildings and the like (anyone remember the . . . gasp . . . *Amazing Maze*?). Quick, get that tank! Now, turn back and around that building. Oh, no, they outnumber you! Run!

And then, maybe . . . space: the fine ol' frontier. As your airplane goes up, up, and away, the sky turns black and your trusty craft metamorphoses into a mighty dreadnought of the ether. (Look, robot, the stars are out. Well, quick then, relight them.)

First, you dock with your orbiting base station to take on water and macadamia nuts for the warped drive; then you're off, first clearing the skies (spaces?) of the enemy (four thousand Captain Futures in gleaming black deathships). Then it's off to the other planets of your domain, sweeping the scoundrels before you on a churning tide of victory. Ah, grand metaphor. Are accolades sung by the millions you've rescued? Forget it; you have this quadrant to yourself (and the enemy).

By the by, the photo at right is, of course, the intrepid pilot flying upside down and toward the ground.

Now we're going to write a game. What do we need?

1. A computer (if you don't have one, run out and buy an Apple II, II Plus, IIe, or Commodore 64).

2. An assembler. This is very important, even if you don't know it yet. And don't worry if you don't know machine language now; you'll learn fast. We'll be using *Lisa 2.6* on the Apple and will announce next issue the assembler for the Commodore. (Don't worry if you have or are getting another assembler; conversions are easy. But *Lisa* is neat, and. . . .

3. Lots of paper (lined or not, as you prefer), pens and/or pencils, graph paper, liquid refreshments, and someplace to work (and protect your work).

That's not so bad, is it? Oh, and don't miss any issues of *Softline*. You'd best subscribe now if you haven't already done so.

Now for the interview portion of the show.

Q: How much of the game are we going to cover?

A: All of it, if possible. The problem is, there's going to be *a lot* of code. Hundreds of pages of code. That's a lot of articles. So, first comes the airplane game. Here's a chance to do it right. *Horizon V* was a nice beginning. The various flight simulators are good at being flight simulators. But we're going to do a classic. Or maybe something merely outstanding (but it'll be great).

Q: What if I don't know assembly language?

A: It's nothing to be ashamed of, though you should take steps to correct that. You will learn by (a) following the articles very closely, paying attention to the explanations of what each piece of code does, and (b) trying other sources—books, such as Roger Wagner's *Assembly Lines*, other programs, and *Apple Orchard, Nibble, Softalk*, and other such magazines that commonly list assembly language programs.

Also, if you're really motivated, you can get a disassembler (like *DISASM/65*, which is *Lisa*-compatible) and attack any graphics programs you can find. But be warned; disassembling and understanding someone else's program is usually harder than writing it in the first place. That's because the object code (the hex numbers the computer understands) has no neat labels or comments in it and no running commentary to accompany it. And explaining and understanding is the whole purpose of this project. Isn't it? You bet.

Q: I'm lost. What's going on?

A: Too late; no time to explain. Just follow along and catch up.

Q: Will it start out easy?

A: Yes. In fact, it'll start out now, with a short example. Remember the two screen pictures? Let's draw another one.

First we have to set a program origin, so the assembler knows where to start assembling code, and define some zero-page locations and Applesoft graphics routines.

```
            ORG     $800
COUNTER     EPZ     $0000
Y           EPZ     $0001
HGR         EQU     $F3E2
SETHCOL     EQU     $F6EC
HPLOT       EQU     $F457
HLIN        EQU     $F53A
```

Now, the first code. HGR clears the hi-res screen and sets the display mode to hi-res. SETHCOL is like the Applesoft hcolor = , and the color is passed to the subroutine via the X register.

```
START       JSR     HGR
            LDX     #$06
            JSR     SETHCOL
```
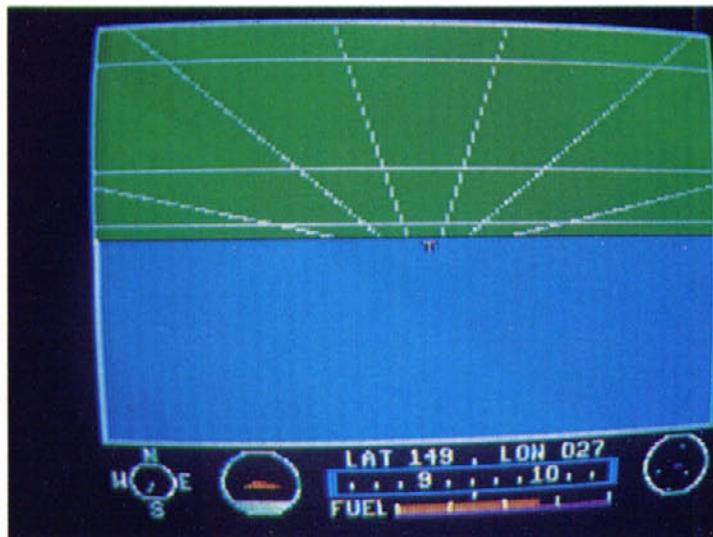
Next, we want to fill the screen from Y = 0 to Y = 129 with blue. So, we use Y as a loop variable that counts from #$00 to #$81 (0 to 129) while we draw horizontal lines:

```
        LDA     #$00
        STA     Y
^1      LDA     Y
        LDY     #$00
        LDX     #$00
        JSR     HPLOT
        LDY     Y
        LDX     #$01
        LDA     #$16
        JSR     HLIN
        INC     Y
        LDA     Y
        CMP     #$82
        BCC     < 1
```

The HPLOT routine plots a dot of the current color at Y = (accumulator) and X = (Y register is high byte, X register is low byte). The HLIN routine draws a line of the current color from the last plotted dot to Y = (Y register) and X = (X register high byte, accumulator high byte). The inconsistency is due to the workings of the Applesoft parser.

So we draw lines from 0,Y to 279,Y, for Y ranging from 0 to 129.

Now we want to draw green from 130 to 159, leaving a black border between sky and ground. The code looks similar:

```
        LDX     #$01
        JSR     SETHCOL
```

```
        LDA     #$83
        STA     Y
^2      LDA     Y
        LDY     #$00
        LDX     #$01
        JSR     HPLOT
        LDY     Y
        LDX     #$01
        LDA     #$17
        JSR     HLIN
        INC     Y
        LDA     Y
        CMP     #$A0
        BCC     < 2
```

A note on local labels. ∧ 1 and ∧ 2 are local labels. They don't have to be unique; and, in a large program, this saves you the effort of having to invent millions of labels like BRANCH23, JP10, and UP2 each time you branch. This speeds up programming and makes your programs more readable, since most of the labels are just two characters long.

On branching to a local label in *Lisa*, you precede the label number with < or >, depending on the direction your branch should take. Thus, the local labels also aid you as you are skimming through listings looking for errors.

Anyway, now we need to draw the horizon lines. This is just a bunch of HPLOTs followed by HLINs. Simple stuff, right?

First, the horizontal horizon lines:

```
        LDX     #$03
        JSR     SETHCOL
        LDA     #$84
```

```
        LDY     #$00
        LDX     #$00
        JSR     HPLOT
        LDX     #$01
        LDA     #$17
        LDY     #$84
        JSR     HLIN
        LDA     #$8A
        LDY     #$00
        LDX     #$00
        JSR     HPLOT
        LDX     #$01
        LDA     #$17
        LDY     #$8A
        JSR     HLIN
        LDA     #$97
        LDY     #$00
        LDX     #$00
        JSR     HPLOT
        LDX     #$01
        LDA     #$17
        LDY     #$97
        JSR     HLIN
```

Now we draw the vertical horizon lines, which aren't exactly vertical on the screen but are supposed to be so in reality. (Perspective, you know.)

```
        LDA     #$83
        LDY     #$00
        LDX     #$87
        JSR     HPLOT
        LDX     #$00
        LDA     #$6E
        LDY     #$9F
        JSR     HLIN
        LDA     #$83
        LDY     #$00
        LDX     #$91
        JSR     HPLOT
        LDX     #$00
        LDA     #$AA
        LDY     #$9F
        JSR     HLIN
```

Next, the second set of vertical horizon lines.

```
        LDA     #$83
        LDY     #$00
        LDX     #$7C
        JSR     HPLOT
        LDX     #$00
        LDA     #$30
        LDY     #$9F
        JSR     HLIN
        LDA     #$83
        LDY     #$00
        LDX     #$9C
        JSR     HPLOT
        LDX     #$00
        LDA     #$E8
        LDY     #$9F
        JSR     HLIN
```

And, finally, the last set of vertical horizon lines.

```
        LDA     #$83
        LDY     #$00
```

```
        LDX     #$64
        JSR     HPLOT
        LDX     #$00
        LDA     #$00
        LDY     #$90
        JSR     HLIN
        LDA     #$83
        LDY     #$00
        LDX     #$B4
        JSR     HPLOT
        LDX     #$01
        LDA     #$17
        LDY     #$90
        JSR     HLIN
        RTS
```

And that is that. Type it into your assembler, save it (if you don't save it, how can you change it and reassemble it tomorow?), assemble it, save the generated code to the disk, and then run it. As an example, here's how you would do it with *Lisa*.

First, run the assembler. Then, type "I" for insert and type in all of the preceding code. For lines without labels (almost all of them), you must precede the LDA, JSR, LDY, and other three-letter words with a space, to let the assembler know that there is no label for this line.

Once all that is typed in, type a space and END to put the pseudo-op END at the end of the program, so *Lisa* has an end-of-program marker when it's assembling. If you forget the END, *Lisa* will tell you that when you try to assemble it.

Now save it to the disk. Pick a name, say, Picture, and type

SAVE PICTURE

and it will save it for you. Then type

ASM

and the program will assemble. Note the address in front of the END statement. It should be $8F1. That's the end of your program. The beginning is at $800 (remember, you told it so in the beginning). So save the code by typing

control-D BSAVE BINPIC,A$800,L$F2

Then, reboot the computer into Applesoft (because the assembler sits in the upper 16K in place of Applesoft) and type

BRUN BINPIC

(Note: Control-D means hold down the control key and type a D, not the characters "control-D." But you know that.)

Looks Like We Made It. Wow, that was a lot of work, but we did it. And the reason that it wasn't a thousand times faster than Applesoft is because an Applesoft program would use the same machine language routines that we called, and they take a lot of time. But, if you rewrite the Applesoft program so that it does all its graphics by Basic peeks and pokes (no small task!), this will literally run thousands of times faster.

So, you all mumble to yourselves, why not write the crucial parts in machine language and the rest in Basic, because Basic is easy and machine language is not?

Because, for one, Basic is a waste, and because passing things from Basic to machine language is slow, and it makes debugging complicated, and things still go forty to one hundred times slower than in a pure machine language program. It's not worth the speed decrease to write games in Basic. And with a good set of utilities (*Speed-ASM*), you can whip out a machine language program almost as fast as the corresponding Basic program. And it's more bombproof.

Convinced all of you yet? Good. See you next issue, when we'll get into the real stuff. **SL**

NO TIPPING

Adventurers are invited to respond to the pleas of the stumped listed herein and solicit aid in turn. Fifty-dollar rewards are given to those submitting tips that the editors judge to be extraordinarily clever, cute, concise, and correct. You would be wise to include your idea of the straightforward solution along with each masterpiece of literary or cryptographic subtlety.

Try to limit yourself to three responses from the Typifieds. Address your entries to Softline Tip, Box 60, North Hollywood, CA 91603. There is no particular time limit on these—a good tip is a pearl beyond price and lives forever in an adventurer's heart.

(Tip to tipsters: Include the name of the game to which you are furnishing the tip!)

Bounties

That's right, pilgrim: From now on the cash rewards go to specified selections from the Typifieds, usually on the basis of most frequently asked questions. All other tips will be printed under the appropriate Typified game headings to facilitate their location by the seeker who originally asked for the help. The tipper's reward will be the knowledge of the undying gratitude of the tipped.

However, we'll be choosing any one of those noncompetition tips and rewarding it with a special $100 double prize, should it appear to us to be especially meritorious and in view of the fact that it was submitted completely without expectation of financial gain.

November Bounties:
Mask of the Sun: How do you get past the room with the gas?
Deadline: How do you find the new will and safe?
Kabul Spy: How do you get through the bars?

Postmark deadline: October 9, 1983

Castles of Darkness—How do you get past the boulder? What do you do with the gloves or pill?
And the winner is:

If I feel something in my glove
How do I remove it?
Right away when this is done
There will be nothing to it.
—Craig Sorensen, Denver, CO

Adventure—Can I cross the bridge without giving the troll a treasure? And the (dubious) winner is:

Bereftly share your valuables, for the darkness bears good eating!
—Con Suelo Underwood, Escondido, CA

SAGA #8: Pyramid of Doom—How do I get past the giant oyster and the iron statue?
And the winner is:

Something that you might not find yummy
The oyster might like having in his tummy.
To move the evil statue placid,
Throw something red into the acid.
—Andrew Sabol, Waterville, NY

Transylvania—How do you open the door in the cave, and what is the ring for?
And the winner ("So ya don't want poems, huh?") is:
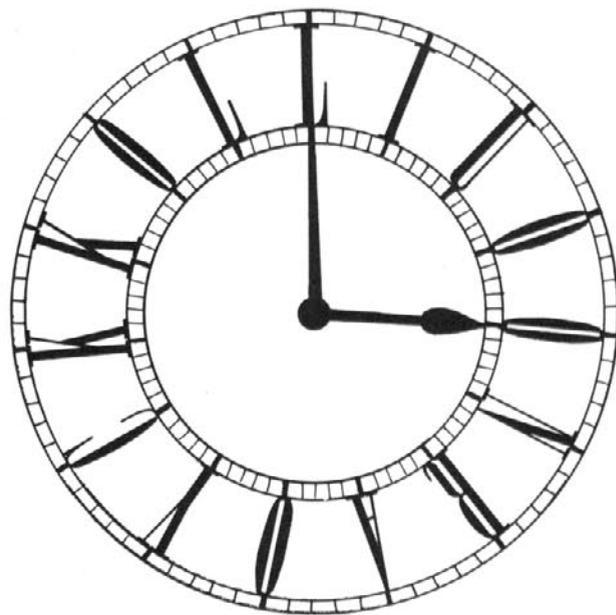
—Albert L.M. Ting, Wilmette, IL

A little extra tip: No, it doesn't have anything to do with recording the passage of time.

Typifieds

Adventure
I, too, am trapped in the repository, but at least I picked up the oyster. Now what is the word to get into the office, please?!—Anthony White, Hillsborough, CA

Apventure to Atlantis

How can you board a ship that delivers the monster without getting killed?—John and Jeff Baker, Alexandria, VA

Castles of Darkness

What do you do to the old troll (and how)?—Mel Liu, Pasadena, CA

What do you do at the grate? I know what the charm means but where do you say it?—David Nichols, Vista, CA

Cranston Manor

What do you do with the knife, the mushrooms, and the well outside?—James Fristrom, Orinda, CA

Critical Mass

How do I trip the voice-activated alarm in the green room on Martinique? Is there a map? Can I get in the villa?—T.K. Almroth III, Huntington Beach, CA

Cyborg

Just about anything anyone would care to impart.—Paul Gordon, Long Beach, CA

What is the vending machine for and where is the permanent power pack?—Patty Harding, Waterville, NY

Deadline

Where is the hidden closet?—Jonathan Gottfried, Ventura, CA

Empire of the Overmind

Have been trying to kill the overmind for over a year. Am desperate.—Paul Terjenian, Arcadia, CA

Ghost Town

How do you get to the village?—Barry Garner, Boise, ID

What are the treasures?—Allen Holland, Downey, CA

How is the safe opened?—John and Jeff Baker, Alexandria, VA

Knight of Diamonds

I have earned the staff with a guess but would like to see the rooms on the sixth level blocked by the riddle.—T.K. Almroth III, Huntington Beach, CA

Please help me! How do I get to the second level?—Richard Bird, Cottage Grove, OR

Mask of the Sun

How do you cross the hellish place without being killed every time you press a key? What do you do with the stone slab at the top of the pyramid?—Mel Liu, Pasadena, CA

How do I get by the snake and the gas?—T.K. Almroth III, Huntington Beach, CA

Mystery House

Have killed the murderer but can't find the treasure.—John and Jeff Baker, Alexandria, VA

The Quest

How do I get past the sharks? What is the answer to the riddle of the sphinx?—Allen Holland, Downey, CA

Saga #1: Adventureland

How do you get past the lava? How do you get the mirror without giving the bear honey?—Laurel Goulding, Grosse Ile, MI

Saga #3: Mission Impossible

What do you do after you have found the bomb?—Pat Nash, Enid, OK

Saga #4: Voodoo Castle

I've gotten the incantations to peak. Now what? I'm baffled.—E. Macsinka, Oakland, NJ

Saga #7: Mystery Fun House

How do I get past the calliope?—David Scheftel, Bedford, TX

Saga #8: Pyramid of Doom

Is there a way to get past the brick wall?—John and Jeff Baker, Alexandria, VA

Saga #10: Savage Island I

I can't get the objects from the lake or get past the bear. He wants salt, but how?—Ron Stanley, San Leandro, CA

Sands of Egypt

I've crawled to the pool but can't drink from the filled canteen.—Ron Stanley, San Leandro, CA

Serpent's Star

I'm totally lost. Is there a way to enter the ice cave? Where can I get a lantern? Can the inn be searched? What about the monastery?—Craig Sanders, Los Angeles, CA

Suspended

How do you get the robots to go up steps?—Barry Garner, Boise, ID

How do I get the cutting tool off the shelf in the small supply room? How do I balance the weather? I can balance it for a while but it always unbalances.—T.K. Almroth III, Huntington Beach, CA.

How do you open the tool bag?—Nancy E. Fong, San Francisco, CA

Ultima II

How about a hint on the location of the quicksword and how to find it?—Gerald and Stuart Goldman, Rockville, MD

I would like to know what to do after I get the ring.—Eric L. Rihanek, Omaha, NE

What are the chairs in the evil queen's castle for?—Anderson Dang, Houston, TX

Wizard and the Princess

Stuck in the desert. Killed snake, have match, cracker, two notes, and locket. I can't go farther.—Nancy E. Fong, San Francisco, CA

How do I get past the chasm?—Brian Campbell, Wheeling, WV

Wizardry

Can someone explain the meaning of Contra-Dextra Avenue and location of "Trebor Sux" banner?—James "Giant Armadillo" Hogue, Levelland, TX/Bret Smith, Banks, OR

I need hints on how to raise character levels without cheating. I took some high-level characters down to level 10 and almost wiped out the party!—Laurel Goulding, Grosse Ile, MI

ZORK TALK

Before we get to it, let's take a moment to pay our respects to America's first woman in space. Brave, resourceful, and determined, Sally Ride had a job to do on space shuttle *Challenger*, and she did it well ... but "*Zork* is going to drive me to my knees," said Sally in a recent interview. This column's for you, Ms. Ride. People, let's all do our bit to keep the U.S. space program ahead in gaming.

Prize-wise, there were no particularly hot tips this time around, but based on demand we're offering a $100 bounty for the best advice on how to get past the Menhir in *Zork II*, or how to manage the maze of oddly angled rooms. Ditto, how to get past the guardians of Zork in *Zork III*.

General Pleas and Assistance

I

Help granted. On the matter of getting the egg open, Jack Hamilton (McKinleyville, CA) recommends: "Give it to who is quick and nimble and tells lies. When you are experienced, you will be able to cut through the lies to claim your prize." A different approach, with different results, from Jason Slater (Rancho Palos Verdes, CA): "To open the egg is a dextrous feat, but with this clue you can beat. Take a tool from the handyman's shop, use it on the egg and open it will pop."

Help wanted. "Does anyone know if it's possible to cross the chasms? Can anything be done with the granite walls?" wonders George Eliades (Nashua, NH).

Laurel Goulding (Grosse Ile, MI) just started and she's already stuck. Her needs are simple: "How do you open the wooden door in the living room; how do you inflate the boat; what items are in the maze, and how do you find them (I'm a lousy mapper)?"

Aaron Forland (San Antonio, TX) wants to know where and what is the Scenic Vista room; also if anything is in the maze besides the skeleton and gold, lantern, knife, and key; and also (and a bit much)

where the crack near the bottom of the ladder in the coal mine leads. John Woo (Bronx, NY) would just like to know what to do in general in that mine and, specifically, how to use the machine, how to get the torch past the gas room without being blown up, how to get past the bat, and how to get from the timber room to the drafty room ("I could never fit").

"How do I get below the mirror room?" queries T.K. Almroth III (Huntington Beach, CA). "I touched the mirror and the ground moved."

"How do I empty the *'$#% reservoir?" growls Bear Braumoeller (Orinda, CA).

"How does one find the brass bauble?" muses Barry Garner (Boise, ID).

And Royce Kam (Honolulu, HI) wants to know if anyone's found the land of the living dead, or wherever it is all your stuff goes when you disturb the skeleton.

II

Help granted. Jason Slater (Rancho Palos Verdes, CA) lets us know how to get through that lizard-headed door: "The lizard on the door will not let you pass, unless you give him something to make his sweet tooth las'." We had to abridge that, because he made it too obvious.

Help wanted. Mel Liu (Pasadena, CA) wants to know: "What is the use of the basket? Where do you stuff the clay brick? What do you do with the baby serpent? (I know you can get it by typing 'eat serpent.') What is the pentagram?"

Mr. or Mrs. William Rendahl (Torrance, CA) would like to know how to get into the demon's doorless bank vault.

III

Help granted. Scant, indeed. Rorke Haining (Seattle, WA) has a brother who is dungeon master for *Dungeon*, a three-in-one version of *Zork*, but can't get him to give any answers. Aww....

Help wanted. Doug Zavodny (Bloomingdale, IL) wants to do something to the sailor on the Viking ship and is open to suggestions—also in the matter of the room with the table by the western shore.

Mel Liu (Pasadena, CA) can't get the bronze door open. And the dungeon master is following him. **SL**

Dungeon Fun

Level Two

All Dressed Up and Someplace To Go

BY JOCK ROOT

When we left Joe last issue, he was doing pretty well. He could defeat any fighter he was likely to meet, and his pockets were overflowing with loot. Joe had only one problem: He couldn't move! He was stuck in an endless hallway, and no matter how far he walked, he never got anywhere.

We are now going to rescue him. We are going to redesign the universe and put Joe on the map.

In other words, the program we're constructing this time will let you guide a character through a maze, telling you what he sees at each step. We are using a simple map for this example (only four rooms), but you don't have to stop there. Instructions for entering (pun intended) a map of your own are included.

Our program is complete in itself, but it is designed to fit together with the Combat program of last issue so that your character will be capable of both exploring and fighting. Future articles in this series will cover traps and treasures, the design of specific characters (Joe is an average and undistinguished sort of guy), magic spells and equipment, and stuff like that. Eventually, the computer will be able to run the whole dungeon for you, and you'll be able to lead expeditions into it.

Where Am I? A simulation program allows you to simulate movement through an environment by having the computer move a point (which represents your character's viewpoint) through a map in the computer's memory (which represents the environment). When you tell the character to move or turn, the program changes the numbers that represent his location on the map; then it looks up what the character could see from that point and tells you about it.

Actually, what the computer is doing is even simpler than that. As you know, these machines have no imagination. The map is in our imagination, not the computer's. What the computer has, as usual, is a bunch of lists.

Our map is divided into squares, with each square representing one viewpoint/position—one place where Joe can stand. The scale of the map is (approximately) one square equals ten feet. The map is described to the computer in the form of a series of lists: a list of what you would see looking north from each square, ditto for looking east, and so on. Thus, when Joe steps onto a particular square, the program adjusts the numbers that represent his position and then uses those numbers to index (or point into) the various lists, displaying the results to tell you what Joe "sees."

Other lists can provide for "special events" on each square, descriptions of the various rooms, or similar trimmings. We have done some of that in this version and will do more later; if you like to experiment, you can do some yourself.

An Array of Squares. We are going to combine all the lists into an "array variable," so we'd better have a brief review of what that means (for a fuller explanation, see last issue). An array variable is actually a whole set of variables. All variables in the set have the same name, but each has a different number. Square(1), square(2), and square(3) could be an array variable. The number in parentheses is called the *index* of the variable.

What we didn't cover last time is that an array variable can have more than one index. One index gives you a one-dimensional array, a simple linear sequence: item(1), item(2), and so on. With two indexes, you get a two-dimensional array. Think of a checkerboard as a two-dimensional array. Each square on the board represents a separate variable with the same *name* as all the other squares but also a unique *index* that corresponds to the coordinates of the square. Since a checkerboard is 8 by 8, the variable would range from checkerboard(1,1) to checkerboard(8,8).

A two-dimensional array is very useful for describing a map. You

can use north-south displacement for one of the dimensions (or indexes) and east-west displacement for the other. Thus square(2,1) would be two squares north of square(0,0) and one square east.

A three-dimensional array would allow for several levels. Your dimensions would be N-S, E-W, and up-down. Or you could use that third dimension to separate several different lists so the dimensions would be N-S, E-W, and list number. That would let you keep track of several different facts about each square, which is exactly what we need.

We will use the array SQ%(V,H,L), in which the indexes are vertical displacement, horizontal displacement, and list number (the percent sign makes it an array of integer variables—we'll explain that later). There will be four lists: the number of the square Joe is on, the number of the room it's in, what's on the south side of the square, and what's on the west side of it (the north and east sides are taken care of by having the program move one square beyond and then look back; after all, an open door is open on both sides).

The Map Is the Territory. Our map must be drawn on a squared grid—quarter-inch graph paper is ideal. It's important to specify what is on each side of each square: a door, a wall, or open space (this is the information that will go into the lists). The program can list any door as either closed or open, but since the program section about opening doors is not listed here, all the doors in our example are permanently open.

Speaking of unwritten sections, this mapping system will also support secret doors, walls with hidden compartments, trap doors in the floor, and other goodies—but not today.

```
              .        .    (North)    .        .

          .   .   .    .    .     .    .    .   .   .
          +------------+------------------------------+
          |  6    3    |  7    4  . 8         4       |
          |            |          .                   |
          |     20     |    21    .     22            |
          |            |          .                   |
     .  . |  .     .   |  .    .  .  .   .     .    .  | .  .
          |  3    3    |  4    4  . 5         4       |
  (West)  |            |          .                   | (East)
          |     10     |    11    .     12            |
          |            |          .                   |
     .  . |  .    [==] .  [====]  .  .   .     .    .  | .  .
          |  0    1  . 1    1    1 | 2         2      |
          |            |         [|]                  |
          |     00     |    01   [|]     02           |
          +------------+------------------------------+
          .        .    .    (South)    .        .
```
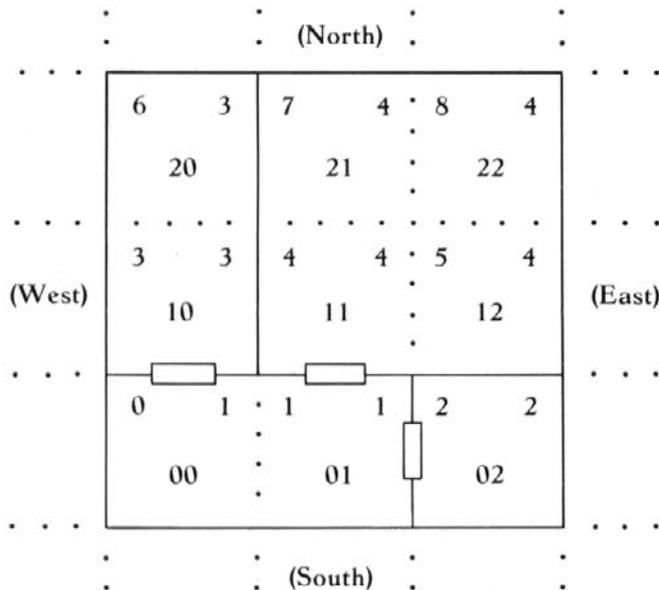
Now take a look at the map. The straight lines are walls, and the lines with boxes in them are doorways; for now, those are the only possibilities. We will list them as 0 for open space, 1 for a wall, and 2 for an open door (3 will be a closed door, when we start using them). Note that (so far, anyway) even numbers permit free passage, while odd numbers are blocked. We may take advantage of that someday.

The numbers in the squares will go into the array, too. The numbers in the middle of each square are the array indexes for that square—first the vertical position, then the horizontal. Note that the *origin*, or zero-zero square, is at the lower left (or southwest) corner.

The number in the upper left corner of each square is the number of that square. That number can be used to key a special event, such as a trap door, or it can be combined with the direction Joe is facing to refer to the wall (or whatever) in front of him. The number in the upper right corner is the room number. We use that number to key a description of the room, which Joe will see when he crosses the threshold. A similar process could be used to awaken a monster who lives in that room....

To use a map of your own dungeon, first lay out the map as before. Your map must fill a rectangle that is V squares south to north and H squares west to east. You must include all the walls and doors and the various numbers for each square: H and V (the list indexes), the number

of the square itself, and the number of the room it's in.

Then change the dimension statements in the program. Line 6110 should have the dimensions of your map (use H-1 and V-1, since each list begins with zero); and line 6120 should reflect the number of rooms.

Finally, change the values and strings loaded into the various lists (lines 6200 to 6600 or so) to describe your map. You will have to put in a whole new set of data statements; and don't forget to change the indexes of the for-next loops that load the arrays.

Proceed to Program. The program structure is the same as last time. The *main loop* begins at line 100, and the *initialize* section begins at 5000. However, everything between lines 500 and 5000 is different. We have omitted the *combat* section from this listing (you're supposed to have that already), and the entire *movement* section is new.

There is, of course, new initialize material. It begins where we left off last time, at line 5800, and uses the same techniques as before. Line 5870 is two lists, alternating—see line 5850.

Line 5890 sets up one of our array variables, WT%(3). This variable will be used to remember what is on each side of Joe's square, from north (0) to west (3).

Line 6110 establishes another array, and this is the biggie: three dimensions! This is the array of squares described a minute ago, measuring three units south to north and three units east to west and listing four values for each square.

Now is a good time to explain the "%" sign. It makes our array an *integer variable array*—an array that will only accept values in the integer format of Basic (see the *Applesoft Tutorial* or an equivalent book on Basic for the difference between "integer" and "floating point"). Using this technique saves space in memory.

In line 6120 we dimension a string array for room descriptions. This array will hold four descriptions of four lines each.

Finally we load the arrays. First comes the square array, one list at a time. Note that list SQ%(X,Y,1), loaded starting at line 6310, represents the south side of square X,Y, and list SQ%(X,Y,2), at line 6350, specifies the west side. Then we load the room description array, starting at line 6500, preset a couple of variables (lines 6970 and 6980), and jump into the program.

The movement section begins at line 4000. It's not exactly self-explanatory, but with what you know already, you should be able to figure it out. The section from line 4000 to line 4080 decodes the input and branches accordingly, and the other sections between 4000 and 5000 take care of the various inputs.

You don't need to understand how the program works in order to run it—just type it in. Feel free to experiment if you like, but you had better save a copy of the original version first.

The Old and the New. If you plan to combine this program with the Combat program from last issue, a few simple changes must be made. In general, you can just add the new material—lines 1400–1470, 4000–4900, and 5800–6990—into the old program; if any lines within those ranges are duplicated, use the newer version. Specifically, lines 140, 320, 330, 370, 5020–5050, 5360–5380, 5510–5575, and 5660 have been changed; lines 460 and 5670 have been added; and the section of the Combat program from line 500 to line 730 has been deleted (but keep lines 800¢990). A correction: Line 2220 should read IF HE(1)< 1 THEN PRINT "OOPS! TOO BAD. . . .": HTAB 20: END.

Next, you will have to add two lines, as follows:

```
935   HS = INT (3 * RND (7)):
      VS = INT (3 * RND (7))
940   DOING = 0: GOTO 4500
```

After all that has been done, renumber line 444 to 460; change "goto 100" in lines 4690 and 4870 to "goto 800," and save the new version. Joe should now be able to explore or fight, as appropriate.

```
3   REM
4   REM THE DUNGEON MACHINE
5   REM PART 2: MOVEMENT
6   REM
7   REM V: 108
```

```
8    REM
50   "GOTO 5000: REM INITIALIZE
100   REM + + + EACH ROUND + + +
110   REM ** EACH PAGE **
115   REM ENTER W/CUR JUST BELOW LAST LINE TO BE
      RETAINED
120   CV = PEEK (37)
130   CALL - 958: GOSUB 1240
140   FOR X = 1 TO CV - 18
150   CALL - 912: NEXT X
160   FOR X = 0 TO 1:ENERGY(X) = ENERGY(X) + 15
170   IF ENERGY(X) > 100 THEN ENERGY(X) = 100
180   NEXT X
200   REM ** PRINT STATUS **
210   HTAB 1: VTAB 1: PRINT ST$
220   CALL - 868: PRINT NAME$;
230   HTAB 8: PRINT PROF$;
240   HTAB 11: PRINT HEALTH(1);
250   HTAB 18: PRINT ENERGY(1);
260   HTAB 31: PRINT HP;
270   HTAB 36: PRINT EP
280   CALL - 868
300   REM ** PROMPT & INPUT **
310   GOSUB 1240: REM PAUSE
320   VTAB 21: CALL - 958
330   PRINT P$::CH = PEEK (36)
340   PRINT : PRINT : GOSUB 1240
350   PRINT O$(DOING);
360   GOSUB 1240
370   VTAB 21: POKE 36,CH + 2
380   GET Q$
400   REM ** DECODE & BRANCH **
410   Q = ASC (Q$)
420   IF Q = 27 THEN END
430   HTAB 1: CALL - 958
444   GOTO 4000
450   ON DOING GOTO 900,2000
1000   REM + + + UTILITIES + + +
1010   REM ** RANDOM MOD **
1015   REM ENTER WITH RIN PRESET
1020   SIGN = 1 - 2 * ( RND (7) < 0.5)
1030   RO = INT (RIN * RND (6) ^ 2) + 1
1040   RO = SIGN * RO / 2
1050   RETURN
1200   REM ** DELAY TIMER **
1210   GOSUB 1220: REM 16 CYCLES
1220   GOSUB 1230: REM 8 CYCLES
1230   GOSUB 1240: REM 4 CYCLES
1240   GOSUB 1250: REM 2 CYCLES
1250   FOR T = 1 TO TIME
1260   NEXT T: RETURN
1270   PRINT DAM$(HIT( NOT W))
1300   REM ** BAD INPUT **
1310   POKE 36,CH + 2: PRINT Q$
1320   GOSUB 1340: VTAB 20
1330   CALL - 958: GOTO 200
1340   GOSUB 1240: GOSUB 1350
1350   GOSUB 1240: VTAB 24
1360   PRINT Z$O$(DOING);: HTAB 1
1370   GOSUB 1230: CALL - 868
1380   RETURN
1400   REM ** ADVANCE VWPT **
1410   HL = HS:VL = VS
1420   IF D = 0 THEN VL = VL + 1
1430   IF D = 1 THEN HL = HL + 1
1440   IF D = 2 THEN VL = VL - 1
1450   IF D = 3 THEN HL = HL - 1
1470   RETURN

1900   REM ** NEW OPPONENT **
1910   HEALTH(0) = 100
1920   ENERGY(0) = 100
1930   AC(0) = 100
1940   DC(0) = 100
1950   DEAD = 0
1960   GOTO 100
1990   REM
4000   REM + + + MOVEMENT + + +
4010   REM ** DISTRIBUTE **
4020   SP = 0
4030   IF Q = 76 THEN 4300: REM LOOK
4040   IF Q = 8 OR Q = 21 THEN 4400: REM TURN
4050   IF Q = 68 THEN 4200: REM ROOM DESCRIPTION
4060   IF Q = 67 THEN 4800: REM COMPASS
4070   REM R)OOM DESCR, Z)OTHER, O)PEN DOOR
4080   IF Q < > 32 THEN 1300
4100   REM ** FORWARD **
4110   IF FO% = 1 OR FO% = 3 THEN 1300: REM CAN'T
      DO THAT
4120   IF FO% = 2 THEN RD = 0: REM NEW ROOM,
      DESCRIBE IT
4130   GOSUB 1400
4140   HS = HL:VS = VL
4150   A = 1
4160   IF RD THEN 4500
4200   REM ** ROOM DESCRIPTION **
4220   FOR X = 1 TO 4
4230   PRINT I$RM$(SQ%(VS,HS,0),X)
4240   NEXT X
4250   PRINT :RD = 1
4260   GOTO 4500
4300   REM ** LOOK AHEAD **
4310   IF FO% = 1 THEN 1300
4320   IF FO% = 3 THEN 1300
4330   GOSUB 1400
4340   A = 0: GOTO 4520
4350   GOTO 4520
4400   REM ** TURN **
4405   A = 1
4410   IF Q = 8 THEN 4450: REM (LEFT TURN)
4420   D = D + 1: IF D > 3 THEN D = D - 4
4430   GOTO 4500
4450   D = D - 1: IF D < 0 THEN D = D + 4
4500   REM ** WHERE YOU ARE **
4510   HL = HS:VL = VS
4520   VX = VL + 1: IF VX = 3 THEN VX = 0
4530   HX = HL + 1: IF HX = 3 THEN HX = 0
4540   WT%(0) = SQ%(VX,HL,1)
4545   WT%(1) = SQ%(VL,HX,2)
4550   WT%(2) = SQ%(VL,HL,1)
4555   WT%(3) = SQ%(VL,HL,2)
4560   HX = D - 1: IF HX = - 1 THEN HX = 3
4565   LT% = WT%(HX)
4570   HX = D + 1: IF HX = 4 THEN HX = 0
4575   RT% = WT%(HX)
4580   FT% = WT%(D)
4585   IF A = 1 THEN FO% = FT%
4600   REM ** WHAT YOU SEE **
4610   PRINT I$VT$(A)VW$(FT%);
4620   PRINT VZ$(FT% < 2)
4630   IF LT% < > FT% THEN 4670
4640   IF RT% < > LT% THEN 4660
4650   PRINT I$" AND ON EITHER SIDE.": GOTO 100
4660   IF LT% = 0 THEN PRINT I$" THE SAME ON YOUR
      LEFT, AND": GOTO 4680
4665   PRINT I$" ANOTHER ON YOUR LEFT, AND": GOTO
      4680
```

```
4670    PRINT I$" "VW$(LT%)" ON YOUR LEFT, AND"
4680    PRINT I$" "VW$(RT%)" TO THE RIGHT."
4690    GOTO 100
4800    REM ** COMPASS **
4830    PRINT I$"FACING   ";
4840    GOSUB 1230: PRINT DIR$(D);
4850    PRINT "  V:"VS" H:"HS;
4860    PRINT "  SQ:"SQ%(VS,HS,3)
4870    GOSUB 1220: GOTO 100
4890    REM
4900    REM
5000    REM + + + INITIALIZE + + +
5010    REM ** START PROLOG **
5020    I$ = "     ": REM 5 SPACES
5030    HOME
5060    PRINT I$"YOUR FIGHTER, ON THIS TRIP, IS": PRINT
5070    PRINT I$"JOE, A MALE HUMAN OF AVERAGE": PRINT
5080    PRINT I$"SIZE AND CAPABILITIES.": PRINT : PRINT : PRINT
5090    REM CONTINUED AT 5500
5100    REM ** VARIABLES **
5110    DOING = 0
5130    EP = INT (6 * RND (5)) + 2
5140    HP = INT (4 * RND (5)) + 1
5150    EQ = EP:HQ = HP
5160    SAFE = 3
5170    TIME = 60
5180    WALL = 0
5200    REM ** STRINGS **
5210    NAME$ = "JOE":PROF$ = "F"
5230    Z$ = CHR$ (7)
5250    E$ = "SOMEONE IS COMING!"
5260    P$ = "WHAT WILL YOU DO NOW?"
5270    ST$ = "NAME    PR HEALTH ENERGY     HEAL   ENERGZ"
5300    REM ** STRING ARRAYS **
5350    DIM O$(2)
5360    O$(0) = "SP:FORWD  < -:LT   - >:RT    L:LOOK
        AHEAD    D:ROOM DESCR   C:COMPASS"
5370    O$(1) = "F:FIGHT  R:RUN"
5380    O$(2) = "1-9:FIGHT   H:HEAL  E:ENERGIZE"
5400    REM ** COMBAT SPECS **
5410    DIM HEALTH(1): DIM ENERGY(1): DIM VIT(1): DIM
        IN(1)
5420    DIM AC(1): DIM AI(1): DIM DC(1): DIM DI(1)
5450    HEALTH(1) = 100:AC(1) = 100
5460    ENERGY(1) = 100:DC(1) = 100
5500    REM ** MORE PROLOG **
5510    GOSUB 1220: PRINT I$I$;
5520    PRINT " - - COMBAT CHART - -": PRINT : PRINT
5530    PRINT I$" DEFENSE: SLIGHT MEDIUM STRONG"
5540    PRINT "A": PRINT "T NONE "I$;
5545    PRINT I$" 1 "I$" 2 "I$" 3 "
5550    PRINT "T": PRINT "A MODERATE ";
5555    PRINT I$" 4 "I$" 5 "I$" 6 "
5560    PRINT "C": PRINT "K ALL-OUT ";
5565    PRINT I$" 7 "I$" 8 "I$" 9 "
5570    PRINT ":": PRINT : PRINT
5575    DATA "E MEDIUM    4   5    6","N","S
        STRONG    7   8    9","E"
5580    PRINT I$"   (ANY KEY TO CONTINUE)": PRINT
5590    HTAB 20: GET Q$: PRINT : REM
5600    REM ** INTRODUCTION **
5610    PRINT
5620    FOR X = 1 TO 6
5630    READ Q$: PRINT I$Q$
5640    GOSUB 1220: PRINT : NEXT X
```

```
5660    DATA "JOE, YOU ARE IN AN ISOLATED","GROUP
        OF ROOMS, SOMEWHERE","UNDERGROUND. THE
        WALLS ARE","OF NATIVE STONE,
        REINFORCED","WITH AGE-BLACKENED
        TIMBERS.","IT'S CHILLY DOWN HERE!"
5670    GOSUB 1210
5700    REM ** COMBAT STRINGS **
5710    DIM HIT$(1): DIM DAM$(4)
5720    HIT$(0) = "YOU HIT HIM! "
5730    HIT$(1) = " HE HIT YOU! "
5740    FOR X = 0 TO 4
5750    READ DAM$(X): NEXT X
5760    DATA "MISSED.","ONLY A
        SCRATCH.","MODERATE DAMAGE.","","SERIOUS
        DAMAGE!"
5770    DIM LT$(1)
5780    LT$(0) = "ENERGY PILLS!"
5790    LT$(1) = "HEALING POTIONS!"
5800    REM ** MOVEMENT STRINGS **
5810    DIM DIR$(3): DIM VT$(1)
5820    DIM VW$(4): DIM VZ$(1)
5830    VT$(0) = "YOU SEE ":VT$(1) = "THERE IS "
5840    FOR X = 0 TO 3
5850    READ DIR$(X): READ VW$(X)
5860    NEXT X
5870    DATA NORTH,NOTHING,EAST,A WALL,SOUTH,AN
        OPEN DOOR,WEST,A CLOSED DOOR
5880    VZ$(0) = " AHEAD, ":VZ$(1) = " IN FRONT OF
        YOU, "
5890    DIM WT%(3)
5990    REM
6000    REM + + + THE ROOMS + + +
6100    REM ** PARAMETERS **
6110    DIM SQ%(2,2,3): REM 3 × 3, WITH 4 FILES
6120    DIM RM$(4,4): REM 4 ROOMS
6200    REM ** ROOM NUMBERS **
6210    FOR V = 0 TO 2: FOR H = 0 TO 2
6220    READ SQ%(V,H,0): NEXT H,V
6240    DATA 1,1,2,3,4,4,3,4,4
6300    REM ** WALLS **
6310    FOR V = 0 TO 2: FOR H = 0 TO 2
6320    READ SQ%(V,H,1): NEXT H,V
6330    DATA 1,1,1,2,2,1,0,0,0
6350    FOR V = 0 TO 2: FOR H = 0 TO 2
6360    READ SQ%(V,H,2): NEXT H,V
6370    DATA 1,0,2,1,1,0,1,1,0
6400    REM ** SPECIAL SQUARES **
6410    FOR V = 0 TO 2: FOR H = 0 TO 2
6420    READ SQ%(V,H,3): NEXT H,V
6430    DATA 0,1,2,3,4,5,6,7,8
6500    REM ** ROOM DESCRIPTIONS **
6510    FOR ROOM = 1 TO 4: FOR LINE = 1 TO 4
6520    READ RM$(ROOM,LINE): NEXT LINE,ROOM
6530    DATA "YOU ARE IN A SHORT
        HALLWAY,","TWENTY FEET LONG BY TEN
        WIDE.","THERE IS A DOOR AT THE END AND",
        "TWO DOORS ON ONE SIDE."
6540    DATA "A BOX OF A ROOM, TEN","FEET SQUARE.
        THERE IS","ONLY ONE DOOR AND
        NO","FURNITURE."
6550    DATA "ANOTHER SHORT HALL, SHAPED
        LIKE","THE LAST ONE, BUT AT A RIGHT","ANGLE
        TO IT. THERE IS A DOOR","AT ONE END."
6560    DATA "A LARGE ROOM,","TWENTY FEET
        SQUARE.","THERE IS ONLY ONE","DOOR."
6970    D = 1: REM FACING EAST
6980    A = 1: REM 'THERE IS'
6990    GOTO 4200                              SL
```

Atari Sound
by Bill Williams

Part 8: Pulse Width Modulation

As we continue to search for greater variety in the Atari's sonic repertoire, we will find ourselves dealing with more and more complex waveforms. The Atari's normal mode of operation provides us with probably the simplest waveform, a square wave. In the last few columns we have played with designing custom waveforms such as sine and ramp waves. Now we're going to push one step farther into the jungles of wacka-wacka: dynamic modulation of waveshapes.

The most easily modified waveform characteristic is probably the *pulse width*. Take, for example, a simple pulse waveform. The pattern might look like this:

10000000

where a 1 means that the speaker is pushed out at some distance and a 0 means that the speaker is at rest. This kind of shape produces a very thin, nasal-like tone, because the speaker is mostly at rest and is only occasionally being popped out. To stretch out the pulse width, we would just lengthen the time the speaker was pushed out:

11110000

This shape sounds fuller, because the speaker is spending equal amounts of time in each position. When talking about the pulse width, we commonly refer to the percentage of the relationship between in and out. Hence, the waveform pattern just described is called a 50 percent *duty-cycle* pulse. Fifty percent is the widest pulse we can obtain, because a 75 percent duty cycle (11111100) sounds just the same as a 25 percent duty cycle (11000000).

If this doesn't make any sense, bear in mind that the important factor in sound is not the amplitude itself but the *change* in amplitude. A speaker held out at the maximum position makes no more noise than a speaker held at rest—it's the movement of the speaker that creates noise, not its position. Now go back and look at the 75 percent and 25 percent waves and notice that if you invert each of the positions (turn 1s into 0s and vice versa) you get the same pattern. Our ears will not be able to detect any difference.

"Ah," you say, "but doesn't widening the pulse change the pitch?" Not so! In every case shown so far, the pattern takes eight steps to repeat: The frequency will thus stay the same.

Since changing the pulse width affects the subjective quality of the tone, we can now predict what would happen if, while playing the waveform, we simultaneously stretched its shape. If the waveform started out as a narrow pulse (like the first example) and ended up as a square wave (the second), we would hear the tone swing from a thin, reedy sound to a full-bodied tone. This is an interesting and useful effect vaguely reminiscent of the Tesla coil sound from the early *Frankenstein* movies. (Remember the funny little device that made a high-voltage electric arc move up and down?) What's more, because we're not doing anything funky with the pitch, pulse width modulation is musically useful, too.

And, in case you haven't guessed, that's what we're going to do.

The Assembler Listing. The machine code in listing 1 sets up the same frequency-controllable interrupt we discussed last time. The only thing different is some additional initialization and, of course, what happens inside the interrupt routine. The safest thing to do here was to have the setup procedure poke 255 into the audio frequency register so that

when the interrupt was enabled the machine wouldn't lock up due to too high a frequency.

This is safe, but it means that you have no choice over the pitch that comes on when the set routine is first called. To correct this, a crude volume control at location 203 (decimal) was added, and this location is initialized to 0 by the setup procedure. Poking a 15 into this register will cause the waveform to be played at its loudest volume. Note that poking a 0 into this register stops the tone but does *not* stop the interrupt, and is not a replacement for the clear interrupt procedure!

The sound routine uses bit manipulation to obtain the pulse width modulation effect. An explanation of the assembler code follows, but the listing should also be studied. If you are a beginning assembler programmer, pay close attention to the way the carry register is used.

STEP keeps track of what portion of the waveform the routine is currently playing and contains just a single bit perpetually moving to the right. This pointer is ANDed with the waveshape variable WIDTH to derive the value to be sent to the speaker. To get the ramp wave, we just replace the arbitrary "on" amplitude discussed earlier with one derived from the routine's wavestep position (STEP again). This means that the first time through the routine the on amplitude will be 8, then 4, and so on. This is all we need to play the waveform; the rest takes care of the modulation.

Next we update a counter to control the rate of modulation. When the counter goes to 0, the first thing we do is check to see if the modulation rate has reached its maximum value, $80; if it hasn't, the rate is slowed down. This portion was added to make the modulation more interesting than a steady sweep speed. When a 1 is poked into MRATE, the pulse width changes at a furious rate, eventually slowing down to a slow, steady sweep. The Basic demo uses this to provide a certain amount of expression. Note, too, that if you poke MRATE with a number greater than $80, the sweep speed is simply set to that rate. The Basic demo uses this in line 55 to start the music off with a very slow shift.

The only thing remaining to do is to change the pulse width. This is done by examining the third bit from the left of the byte WIDTH and inverting its state, then rotating all the bits to the left so that the new bit comes in from the side. This gives us a marching parade of bits: First three 1s go by, then three 0s, then three 1s again. The maximum width of three bits was chosen to ensure that there would always be a change of state somewhere in the waveform, thus preventing gaps of silence in the tone.

Finally, if you're going to play music with pulse width modulation, you need to know which values produce an equally tempered scale. Listing 2 will allow you to print out a chart of these values. The formula for determining the frequency of the interrupt is the same as that discussed previously, but note that the calling rate of the sound routine and the pitch produced by that routine are two different things. In this case, the routine has to be called six times before the waveform is complete (three 0s and then three 1s), and so the output frequency is accordingly divided by six.

Listing 3 gives a fairly obvious use of the routines. The only unusual feature in it is the use of negative pitch specifications: Whenever a negative pitch is read from the table, this is interpreted as a signal to tweak the modulation rate, which in turn causes a burst of tonal activity. The frequency values are also used to determine the color and position of the

lines drawn on-screen. Once again, the Basic demo is intended as a springboard only, to encourage you to use the real meat in the assembler listing and to experiment with it.

Next time around, we're going to change the pace a bit with a look at a very nice alternative to coding in Basic or assembler: the language C.

```
          TITLE 'PWM 1.0'
;
;Pulse Width Modulation Demo
;*Assembler Listing*
;
;OS equates
IRQEN    =    $D20E        ;IRQ enable
POKMSK   =    $10          ;shadow for IRQEN
AUDF     =    $D200        ;frequency register
AUDC     =    $D201        ;volume register
VTIMR1   =    $210         ;timer vector
RANDOM   =    $D20A        ;random # register
;
;Zero page variables
VOLUME   =    $CB          ;master volume
MRATE    =    VOLUME + 1   ;modulation rate
MODC     =    MRATE + 1    ;modulation count
WIDTH    =    MODC + 1     ;pulse width
STEP     =    WIDTH + 1    ;wave step count

         ORG $600
;
;Refer to the July '83 Atari Sound
;column for a description of the method
;used to obtain an interrupt-driven
;sound routine.
;
;Enter here to start sound
SET      SEI
         LDX  #$FF
         STX  AUDF          ;ensure no lockup
         INX                ;upon start
         STX  VOLUME        ;zero volume
         INX
         STX  STEP          ;initialize step
         STX  WIDTH         ;and pulse width
         LDA  #LOW PWM
         STA  VTIMR1
         LDA  #HIGH PWM
         STA  VTIMR1 + 1
         LDA  POKMSK
         ORA  #1
         STA  POKMSK
         STA  IRQEN
         BNE  SET2
;Enter here to kill sound
CLEAR    SEI
         LDA  POKMSK
         AND  #$FE
         STA  POKMSK
         STA  IRQEN
SET2     CLI
         PLA
         RTS
;
;Here's the new pulse width modulation
;sound routine:
;
PWM      LDA  STEP          ;get position count
         LSR  A             ;update it
         BCC  NWRAP         ;if bit falls off,
         LDA  #8            ;replenish it
NWRAP    STA  STEP          ;save updated pos
         AND  WIDTH         ;examine waveform
         AND  VOLUME        ;clip bits for vol
         ORA  #$10          ;set forced output
         STA  AUDC          ;poke speaker
         DEC  MODC          ;check if time
         BNE  NOMOD         ;to modulate
         LDA  MRATE         ;recharge count
         STA  MODC          ;with mod rate
         BMI  NACCL         ;if > $7F, skip
         INC  MRATE         ;slow down mod rate
NACCL    CLC                ;change pulse width
         LDA  WIDTH         ;examine d2
         AND  #4            ;...if set.
         BNE  CCLR          ;then carry clear
         SEC                ;else set carry
CCLR     ROL  WIDTH         ;rotate carry in
NOMOD    PLA                ;ta-da
         RTI
;

         END
```
Listing 1.

```
0005    REM  This program will print
0010    REM  all the equally tempered
0015    REM  notes available from the
0020    REM  PWM assembler demo
0025    DIM N$(25)
0030    ? "Turn on printer, press RETURN"
0035    INPUT N$
0040    LPRINT "Note","Value","Frequency"
0045    LPRINT
0050    REM  Note placement of spaces
0055    N$ = "C C#D D#E F F#G G#A A#B "
0060    FOUT = 8.1759375:SKEY = 1
0065    CLOCK = 63921
0070    AUDF = INT((CLOCK/(FOUT*12)) - 0.5)
0075    IF AUDF > 255 THEN 0090
0080    IF AUDF < 23 THEN 0110
0085    LPRINT N$(SKEY,SKEY + 1),AUDF,INT(FOUT*
        100)/100
0090    SKEY = SKEY + 2
0095    IF SKEY = 25 THEN SKEY = 1
0100    FOUT = FOUT*1.059463094
0105    GOTO 0070
0110    END
```
Listing 2.

```
0005    REM  ********************
0010    REM  *      PWM Demo     *
0015    REM  *                   *
0020    REM  ********************
0025    REM
0030    GOSUB 0235
0035    REM  Start up interrupt
0040    Q = USR(ION)
0045    RESTORE
0050    A = 243:COL = 15
0055    POKE PWM,255
0060    POKE AUDF,ABS(A):POKE VOL,15
0065    IF A< 0 THEN POKE PWM,20:COL = 15
0070    SETCOLOR 2,COL,0:IF COL>0 THEN COL = COL - 3
0075    X = ABS(A)/1.5:Y = Y + 8 - COL/2
0080    IF Y > 191 THEN Y = 0
0085    PLOT 0,0:DRAWTO X,Y:DRAWTO 160,96:DRAWTO
        319 - X,Y:DRAWTO 319,0
0090    PLOT 0,191:DRAWTO X,191 - Y:DRAWTO
        160,96:DRAWTO 319 - X,191 - Y:DRAWTO 319,191
0095    READ A
0100    IF A <> 0 THEN 0060
0105    REM  Note table
0110    DATA 204,172, - 144,102,85,72
0115    DATA 60, - 45,42, - 35,37,45,47
0120    DATA  - 33,35,42,45,26,31, - 37,45
0125    DATA  - 53,31,37,45,57,57, - 42,67
0130    DATA 57,67, - 85,136, - 114,136
0135    DATA 172,172,172,172,172,172
0140    DATA 172,172,0
0145    REM  Turn off interrupt
0150    Q = USR(IOFF)
0155    GOTO 0155
0160    REM  Machine code follows
0165    DATA 120,162,255,142,0,210,232
0170    DATA 134,203,232,134,207,134
0175    DATA 206,169,48,141,16,2,169,6
0180    DATA 141,17,2,165,16,9,1,133
0185    DATA 16,141,14,210,208,10,120
0190    DATA 165,16,41,254,133,16,141
0195    DATA 14,210,88,104,96,165,207
0200    DATA 74,144,2,169,8,133,207,37
0205    DATA 206,37,203,9,16,141,1,210
0210    DATA 198,205,208,18,165,204,133
0215    DATA 205,48,2,230,204,24,165
0220    DATA 206,41,4,208,1,56,38,206
0225    DATA 104,64
0230    DATA  - 1
0235    REM  Poke in machine code
0240    GRAPHICS 24:COLOR 1
0245    SETCOLOR 1,0,12
0250    RESTORE 0160
0255    FOR L = 1536 TO 1625
0260    READ A
0265    POKE L,A
0270    S = S + A
0275    SETCOLOR 2,0,14 - INT(S/736)
0280    NEXT L
0285    READ A
0290    IF A <> - 1 OR S <>10309 THEN ? "Error in machine
        code": STOP
0295    REM  Machine code entry points
0300    ION = 1536:IOFF = 1571
0305    REM  Special register equates
0310    VOL = 203:PWM = 204:AUDF = 53760
0315    RETURN
```
Listing 3.

SL

Call Yourself Ishmael Micros Get The Literary Itch

(continued from the cover)

a high-pitched metallic scream.

>Wait.

Time passes. . . . You hear three fast knocks, followed by the distinctive sound of tearing metal.

>Open the door.

Floyd stumbles out of the bio lab, clutching the mini-booth card. The mutations rush toward the open doorway!

>Close the door.

Not a moment too soon! You hear a pounding from the door as the monsters within vent their frustration at losing their prey.

Floyd is badly torn apart, with loose wires and broken circuits everywhere. Oil flows from his lubrication system.

You drop to your knees and cradle Floyd's head in your lap. Floyd looks up at you with half-open eyes.

"Floyd did it . . . got card. Floyd a good friend, huh?"

Floyd smiles with contentment, and then his eyes close. You sit in silence for a moment over the brave friend who gave his life that you might live.

Floyd was a good robot. He was helpful. He was courageous. He was fun-loving. Your friend is gone and you're alone. How do you feel?

You don't feel like that very often. Maybe after you read *Charlotte's Web*. Maybe when they shot Bambi's mother. Maybe when Raskolnikov got religion in the Siberian slave labor camp. But this scene is from a computer game. A game!

The rising level of sophistication in the adventure game—that most sophisticated of entertainments ever to pass through a central processing unit—has fain threatened to take it out of the computer junkies' realm of private delight and toss it into the center ring of popular culture, along with books, plays, and movies. Can it absorb the culture shock and continue to develop and transcend standards that are already high, or will it be homogenized, simplified, and forced to satisfy the lowest common social denominator? What's on teevee tonight?

The following is a discourse on the true meaning of interactive fiction . . . participatory computer prose . . . ultra adventure . . . whatever . . . by people who ought to know. They discuss what has been, what may be, and what am. On some points, there is no argument. On others, they all agree to disagree. We've invited them all to a party at midnight next Friday, to be held in an old mansion on a remote island in the Pacific. A sheer cliff surrounds it on three sides. The southern half is a wild game preserve. . . .

The condensed excerpt is from *Planetfall*, by Steve Meretzky, copyright 1983 by Infocom.

Okay, Cue the Genius
By Fred Saberhagen

Fred Saberhagen is the author of more than twenty science-fiction novels. With his wife, Joan, he has cofounded Berserker Works Limited, a company engaged in converting the works of science-fiction and fantasy authors into computer games. Here, he helps give us a little . . . perspective.

Suppose that in some alternate universe you are William Shakespeare. Strolling about London one day in the late sixteenth century, mulling over plans for your next novel, you come upon some workmen erecting a large wooden structure of peculiar shape. The design of the building strikes you as inappropriate for either a dwelling or a place of business.

A few questions gain you some information about a recent invention (this is an alternate universe, remember) called the "play." Live people, sometimes costumed and in makeup, are getting up on a flat surface called a "stage" and *acting out stories*!

The clever people who have designed and built the first stages, as well as the inventors of acting, are right in there writing and directing the best plays they can come up with. (At least the best they can come up with in their spare time—each of these people necessarily has one or two active careers already going.)

In one of the earliest successful plays, dummies representing invading aliens (Frenchmen, perhaps, or Spaniards, from across the channel) were lowered on ropes from concealed positions above the stage, while the actor (this play needed only one) ran back and forth, following shouted directions from the audience, trying to shoot all the dummies before they touched the floor. The audience liked this play a lot and cheered it enthusiastically.

In a somewhat more recent show, also very popular, the lead actor climbs about on a crazy scaffolding of planks and ladders, trying to accomplish some rather simple-minded tasks, while others costumed as fantastic creatures try to knock him off by throwing barrels. It's good slapstick fun, and the audiences love it.

"Wait a minute," you say to these eager people who have been proudly explaining how plays work. "Wait a minute. That all sounds amusing, yes. But I really think you're on to something bigger. Let me go home and think about this for a while. . . . How many people can you get onstage at once? How many lines can an actor memorize? Can you have it dark on one half of the stage and light on the other half?"

fiction." Credit for the inspiration as to how it could be done should go to Joseph Weizenbaum's *Eliza* program, which created the impression of talking with a psychologist.

That was the clue that you could use keywords to figure out what someone was saying; you didn't have to do a complicated syntactical analysis. That made it possible to write an interactive story that would fit on a disk—otherwise, the routine to analyze the input would have taken too much memory. It might have been a smarter program, but it would have been too big.

Interactive fiction has been based on "genre literature"; that is, readily identifiable styles, like detective stories, spy novels, sea stories, and so forth. Because the form itself is so new—most people who first sat down at the keyboard to write the stuff hadn't even the remotest idea what to expect—we're all stuck with themes that are readily recognizable (including science fiction—although it would seem that talking to other characters in a story that's in your computer already *is* science fiction).

In one of Interactive Fiction's first programs, *Six Micro-Stories*, a lady slips and falls and drops her books while she's roller-skating in the park. She's an absolutely gorgeous woman, your ideal. You help her pick up her books, she says, "Thanks," and then it's up to you to think of the right opening line. What happens depends on what you say to her.

The best outcome, the payoff, is that she finds you absolutely fascinating and you go off with her to Bali, where you enjoy a life of ecstasy. But it's hard to have it turn out that way. She's a very fussy lady; usually she makes some snide comment and skates away. It pays to be interested in the books she's reading. But, also, you have to be honest; she hates pretension.

A lot of people think of the programs by Interactive Fiction as being a different genre of the adventure game, partly because they're published by Adventure International, Scott Adams's company. But to I.F. the approach is completely different. We started off with the idea that first it should be well written; fun to read—something you wouldn't be embarrassed to pick up in a bookstore—and second, it should make use of the technology of the microcomputer: You talk to the characters and they talk back to you, and you can say—type—anything you want. In adventure games (at least the traditional ones) you're restricted to two-word sentences: "Go north," and so on. In interactive fiction you can say whatever you like.

The I.F. programs use keyword searching to figure out what the reader is talking about. Often just one keyword is enough for the program to understand (or think it understands) what the reader is saying. Sometimes it has to check two or three words. It depends on the structure of a particular story. Of course, the story can take different turns, depending on what you say—or, sometimes, what you do. It's a tree structure. (The further along in the story you go, the further out on some limb of the tree you find yourself.) In *Six Micro-Stories* there aren't that many branches—three or four, maybe. But those are just the major branches. When you're talking to other characters, there are often dozens of responses they can make to what you say.

Most of the programs are "full-length" stories. They originally took up an entire TRS-80 disk; the equivalent of a fairly long short story. Now, with double-density and so forth, you can squeeze a couple of these onto a disk. These longer stories are far more complex, of course, with many more branches to the tree. In fact, the structure is really more complicated than a tree, since something you do or say at the beginning of the story can come back to haunt you toward the end, without seeming to have any effect in the middle—bad karma.

In *His Majesty's Ship Impetuous*, which is a Hornblower-like sea story, you're the captain of a British man-of-war. One of your seamen makes a disparaging comment about the king, which of course was a hanging offense in those times. You have to decide whether to hang him or not. If you do, the crew thinks you're being too harsh. If you don't, they think you're soft. Either way, in the big sea battle at the end of the story, they abandon their posts. It requires a little imagination to figure out the right thing to do. It's a third choice in a situation that seems to have only two choices. Most people figure it out eventually. That's one of the tricky parts of writing interactive fiction: The decisions the reader—the

They look at each other. "We're not really sure," one replies at last. "Our stages are still pretty primitive. Our actors are all new at the job. Everybody is. Next year we'll be able to do more. But what should we try to do?"

You don't have any instant answers for them. A lot of vague ideas suddenly churning. Possibilities. . . .

"I hope you will go home and think about it, Will," says one of the stage managers. "You're good with words. Maybe we could have the man on the ladder say something more than 'Ouch!' and 'Wow!' "

"Yes, something more," you agree thoughtfully, turning away. The other stage people call good wishes after you. But you scarcely hear them. Your mind is involved with new ideas.

To work with—depend on—carpenters, actors, experts in stage machinery and lighting? Whatever story emerged would no longer be purely your own. But already you can see that the stage those others have created can capture the imagination and enthrall an audience, even with no more than a few clowns and ladders.

You head for home, for a place where you can sit down and think, and write. Your thoughts are on a story that you had planned to make into a book. The one to be called *Hamlet*. . . .

Roots

By Robert Lafore

Robert Lafore is the founder of the company that bears the name Interactive Fiction and one of the early explorers of the murky lands between micro technology and the literary muse. His pioneering forays into interactive computer prose have been on the market since 1980—almost forever, in the microcomputer biz.

What is interactive fiction? When capitalized, it's a microcomputer software development firm in Inverness, California. More to the point, interactive fiction is fiction that's interactive. Roughly, a story unfolds on a computer screen, the scene is set, and you suddenly realize that you're one of the characters in the story. You have to answer when the other characters talk to you, and what you say determines the outcome of the story.

As an idea of something to do with a computer, it just seemed pretty obvious at the time. "The time" was the time the first microcomputers arrived on the scene—the TRS-80 Model I and the Apple II. If you'd been writing novels for years, it was natural to look at the micros and say, "There must be some way to put these things together with writing

hero—is called upon to make have to be hard enough to be challenging but not so hard that the story becomes frustrating. The idea is that the third or fourth time the reader faces the situation he suddenly sees the solution, smites himself on the forehead, and cries, "Why didn't I think of that before!"

What sort of people like interactive fiction? Hard to say. Perhaps people who are technofreaks but who are also interested in traditional literary forms. Some people think it's sacrilege, using computers for literature. Of course, they're the same people who think it's sacrilege to use computers for anything.

Strangely enough, schools seem to be the most interested in our interactive fiction games. Both universities and high schools are using interactive fiction in creative writing courses—they find it can help a beginning writer start putting lines on paper—or on the computer. Once the student has talked back to a bunch of fictional computer characters for a while, he's ready to start writing his own stories.

As to the future, it'll be nice when voice recognition and speech synthesis become common enough to be applied to interactive fiction. And now that the interactive laser disk is with us, I don't think it'll be too long before we have interactive movies. Imagine: Pretty soon you'll be able to play Bogart's role in *Casablanca*—or just inject yourself into the story and slip off with Ingrid Bergman . . . make Shane come back . . . convince Dorothy to stay in Oz. I don't think anyone can imagine where it will all lead.

Manuscript and Machine

By Scott Prussing

Scott Prussing's computer adaptation of his novel, The Devouring Darkness, *will debut later this fall as a "participant novel" for the IBM pc. Before embarking on the project, he decided to lay out for himself a manifesto for adapting a novel to a computer.*

Transforming a novel into a work of interactive fiction is not easy, for the writer relinquishes much of his control over the linchpin of his story, the main character. No longer can he make the character do exactly as he wishes (although, come to that, it's not unusual for a character in a book to go in directions other than those the writer

originally intended). The author must now view his situations from a dozen viewpoints, trying to anticipate how readers (players) he has never met will react to given events. No longer can the road not taken be conveniently ignored, for some player is certain to travel it. Each possibility must be accounted for in some manner. The better this is done, the more successful will be the final product.

One of the main differences between an adventure game and a "participant novel" lies in the complexity of the plot. Adventure games have only the barest of plots, if any. They are built around a series of situations, loosely linked together, that confront the player. Interactive fiction should have a complex plot, complete with a definite objective, subobjectives, and some sense of urgency regarding the success or failure to achieve the final goal.

The logical place to start, then, is with the plot. If you're transforming a novel, the plot should be clearly outlined. If you're beginning from scratch, a story line similar to that of a novel should be developed. Once the basic story is complete, decision points must be identified—places in the story where the player's decision determines in which direction the story will proceed. In a novel, only the decisions made by the author need be accounted for; in a work of interactive fiction the writer must allow for myriad responses.

The challenge to the programmer/author is to enhance the player's visceral involvement—to get his pulse racing the way a good novel can. If this is done well enough, perhaps fatigue will be something the player actually feels, something that slows his reactions, rather than a number on a corner of the screen that can be replenished by taking smaller steps or dropping some weight.

In what areas of the adventure game can the novelist best bring his expertise to bear?

First, improve the quality of the text. Most programmers write like, well, programmers. The text is very clear, but very bland. Let's leave the writing to the writers, who know the value of varying sentence length and structure and what a well-placed adverb or adjective can do. Player involvement can be enhanced by immersing the player in the atmosphere of the setting. Enlisting writers will not be difficult. There are countless authors (and hopeful authors) out there who are looking for new, interesting places to ply their craft.

Second, adventure games must make more and better use of plot, one of the most basic aspects of writing. The writer must develop a story line that will grab the player and give him a feeling of urgency regarding his success or failure. All good adventure stories have this sense of time; the pace builds as the climax nears.

The manipulation of time is perhaps the most important element in the suspension of disbelief, always the most potent ingredient in novels and films, and never attempted to any great degree with a computer. Program routines can make the player's response critical through the use of time limits. A signal would inform the player that he has entered such a sequence; if he waits too long to go through a door, a cave-in may block one of the exits or even bury him under several tons of rock. Moving swiftly through a chamber may awaken a slumbering monster or it may gain the player an advantage, perhaps allowing him entrance to a passage that is closed to a player who moves cautiously. But moving cautiously may allow him to avoid a hidden trap that would be triggered by moving swiftly. It's up to the player to use the clues in the descriptions (plus his adventurer's intuition) to decide the speed of his movements.

Battle experience would improve the player's skills by improving his reactions, rather than by simply adding to some artificial experience score.

The creation of story branches from decision points in the plot can be as simple or complex as the writer wishes. (This is one of the parts that are the most fun about this type of writing.) Keeping in mind how quickly the number of branches can grow, the writer should funnel some of them together and eventually bring them back to some point on the main story line. The route chosen by the player may bring him to later points in the game without certain equipment or knowledge he might have gained had he traveled a different path. This is an excellent technique for adding variety to a game so that it can be replayed many times without monotony.

Another major difference to remember when writing a game rather than a novel is that a character in a book cannot go backward—correcting mistakes and doing things previously undone. Unlike in life and literature, this is a distinct possibility in a game. A clever program will allow for it but should also include now-or-never opportunities that are only available the first time a player reaches a certain point.

Making a novel into a game involves a great deal of work, but the rewards are worth it. The writer can let his creativity roam unfettered in any direction he wishes instead of having to follow one story line. The what-if game can be played out as fully as the writer wishes (what if Lincoln had not gone to Ford's Theater?). How many authors have written more than one ending to a story, then agonized over which to use? In this setting, all can be included. The finished product is fluid rather than static. For the player, the game is different each time it's played.

And for the author, there is the excitement of being in the forefront of a new genre, in which reader and writer work together to achieve a final product with variations as limitless as their combined imaginations.

The New Storytelling
By Redmond Simonsen

Thirteen years of designing and authoring simulation games and editing Strategy and Tactics, Ares, *and* Moves *magazines has given Redmond Simonsen a particularly critical eye when it comes to the simulation of the real world in a game. He has lately shifted his gaze to the microcomputer, and he sees some room for improvement.*

The hit of the Czech Pavilion at the 1967 World's Fair was an interactive movie. At some crucial point in the course of the story, a romantic comedy, the action froze and the audience was asked to vote upon which of two courses of action the main character should take. The participatory nature of the experimental film enthralled and delighted the fairgoers. Most people were completely taken in by the illusion of interaction.

And illusion it was. The film was rigged to return to the main story line regardless of what choices the audience made. There were two different endings, but the sentimentality of the watchers almost always delivered the happier denouement. Of course, the physical and informa-

tional limitations of film being what they were (and are), it was inevitable that the decision tree be small and guided back to the canned main line of the narrative. Today, if we were to implement the same story as a microcomputer story/adventure, the choices would be much wider, the variability of the narrative much richer, and the actual creative input of the participants much, much greater.

Well . . . maybe not.

Consider: Good, involving, entertaining writing is a difficult and time-consuming task. The development of interesting characters, situations, and conflicts is not a trivial task. Unless we assume that programs can be developed that will produce intelligent, engaging prose, automatically written in response to easy-to-make user input, the putative authors of such software are limited to the Czech-film syndrome: essentially displaying canned paragraphs in answer to a rather limited set of choices. Admittedly, the computer will allow more variability but not as much more as you might suppose in your first gush of enthusiasm for the idea of interactive fiction.

If, however, we can let go of the idea of literally displaying written narrative (or worse, the less-than-wonderful pictures microscreens can deliver), then there is some hope. The interactive author cannot be bound by the old forms of communication and storytelling. These forms are chained to their static media and directive creative approach (the author is in charge and you keep your mouth shut). The challenge of interactivity is such that a new narrative language must be synthesized. For this language, let's put forth the working title of "Interlogue."

Interlogue will use only traditional text or pictures to present broad, scene-setting Contexts. For the sake of directness and speed, no Context is permitted to be longer than one screen of thirty-two characters by sixteen lines. By imposing such a Spartan limit on "old-style" text, the crutch of the previous form is removed.

Interlogue and the user weave the web of the story by displaying and manipulating Actors and Icons. As these names suggest, the principal characters are Actors and the nonvolitional elements (tangible and intangible) are Icons. The Actor and Icon symbology (all done as character graphics) are displayed on an Event Grid. The Event Grid is a modifiable diagram that expresses changing relationships between and among Actors and Icons. The basic unit of time in Interlogue is an Event. Events can be thought of as brief moments or millenia—the only requirement being their scale-appropriateness to the specific link in the story being told.

The story expresses itself graphically and positionally. In a literal way, the Actor can be placed closer to a Romance Icon (should one happen to exist in the Event Grid) and have his options and possibilities influenced in myriad ways. If you contemplate the display of several Actors along with dozens of different Icons, all in the same Event Grid, you can imagine how a very complex character/situation relationship can be expressed and manipulated very economically. Think of it as a combination of chess, Tarot, and the I Ching dedicated to storytelling rather than game-playing and fortunetelling.

A form such as Interlogue makes much better use of the strengths of the microcomputer than does the manipulation and crude parsing of traditional text that we now see presented as interactive fiction. Of course, the user must pay an intellectual entry fee to interact successfully in what amounts to a new language. Such a consideration has not deterred computerists in the past. Given a high degree of transparency vis-a-vis structure and symbology, the front-loading on the Interlogue environment should not be an obstacle to enjoying truly interactive fiction.

Whether or not you agree with the specifics of the Interlogue approach, you should discard any preconceptions that may bind you to unrealistic expectations for true interactive fiction so long as it is dependent upon traditional text and/or picture presentation. Print has its own strengths, as does film. These forms should not be arbitrarily imposed upon software. The computer as storyteller is more closely related to the oral tradition wherein the speaker is prompted and cajoled by his audience; where gesture and eye contact are all-important; and, in fact, where the very language and syntax are bent to accommodate the form. We now have, as never before, an opportunity to directly engage the mind of the audience. We should not squander that opportunity on imitations of other media.

The Interactive Experience

By Marc Blank and Mike Berlyn

Marc Blank (Zork, Deadline, Enchanter) and Mike Berlyn (Cyborg, Suspended) are among the leading practitioners of the computer adventure in the world today. Their company, Infocom, developed a machine-independent programming language and full-sentence parser, allowing the player to use a six-hundred-word vocabulary. Time magazine lately commented that one of their programs was "more like a genre of fiction than a game." Blank and Berlyn are of the opinion that true interactive fiction is already here.

The experience of interactive fiction is similar to reading a novel in only two ways: They both communicate through prose, and they're both fiction. That's where the similarity ends. The experiences of reading a book or of watching a movie, a television program, or a play are passive. Interactive fiction is never passive.

The concept of *story* or *plot* means something different than it does in novels or screenplays. In interactive fiction, you don't watch or read about someone doing something; you do it yourself. You tell the computer what you want to do by typing in an English language sentence. The computer then tells you what happens as a result and waits for you to decide what you would like to do next. The *story* in interactive fiction grows out of what you do as the character. The story is not waiting for you to walk through it—it grows dynamically with each decision you make.

Interactive fiction could only be written on and experienced through a computer. Extremely primitive distant relations exist in book form—decision novels—but their relationship to true interactive fiction is that of a pocket calculator to a computer.

Reading a decision novel is much like walking along a path: When you come to a fork in the path, you must decide on the left or the right path. You cannot leave the path. Decision books actually look a lot more like fiction than interactive fiction. They are cleverly woven stories that overlap at certain points; and they're a far cry from being interactive. They do allow you choices, each in the form of a "decision," but what happens if you want to do something that isn't one of the choices?

Should you pick the left fork or the right fork? Or maybe you should go back the way you came? Maybe it would be better if you left the path entirely and wandered through woods off to your left, or followed the meandering stream paralleling the path to your right? Perhaps you should wait here for someone to pass by. And if someone does pass by, maybe you should ask which path is the safer of the two. Is it time to eat? Is your stomach growling? Is it growing dark? Only a computer can create a world where, at each turn, you can make hundreds or thousands of decisions. Decision books pale in comparison.

The computer makes interactions between yourself (as the main character in the story), other characters, objects, and changing situations. Your current location—whether it's a small shack, a tent in the desert, or a magical castle—is a small part of your environment. You can move around this world, go from location to location, and explore. Each new place offers new things to be done.

Characters other than yourself can also walk around through this environment. They may have their own goals and can follow their own machinations. They can walk around independently—if you are not in a location when a character walks through it, you might not even know of his existence. If a character is walking through a room in which you are standing, you can choose to ignore him or interact with him.

Objects sitting on tables—even the very tables themselves—can be manipulated by your character if you so direct. Want your character to look under the table, or take something off the table, or put something he is carrying on the table? Simple. Just type, "Look under the table," or, "Take the red book off the table," or, "Put the red book on the table."

Writers of interactive fiction create a small universe in which there is a consistency, even to the smallest details. A simple example would be a container. Let's say you're in the wilderness and you're thirsty. There's a stream nearby, so you go over to the stream and take a drink. Your thirst is quenched—for now. But what happens in a few hours, when you've wandered away from the stream and get thirsty again? You can't carry water around in your hands. If you try to pick up some water, the computer might tell you, "You try to pick up the water, but it leaks through your fingers." So you need something in which to keep the water. That way you can tell the computer to fill up whatever container you find.

You might run across an old tin can sitting by the side of the road. You might also find a canteen. Which one should you use? Does it really make a difference? Well, the canteen seems like the most likely choice, so you might fill it. But should you be prevented from filling the tin can? No. If the can can hold water, then you should be able to fill it. For that matter, you should be able to fill both of them.

Some early interactive fiction, written without thought toward internal consistency, fails here. In the more primitive games, when you direct the computer to fill the tin can with water, the computer might say anything from "I can't do that," to "That makes no sense to me." In a way, these examples of interactive fiction are more frustrating and limiting than the decision novels.

All interactive fiction can trace its roots to a game called *Adventure*. It was written as an experiment and later became a popular game. *Adventure* allowed players to type in two words at a time. The words almost always had to be a verb and a noun. This sentence structure severely limited interaction. The part of the computer program that was trying to understand what was being typed in, the parser, was a very primitive beast; it was looking for a verb-noun pair—"Fill canteen"—and that was the only thing it accepted. The limit of talking to a complex world with simple commands became a problem.

For that matter, how could you tell the computer you wanted to "put the manx cat in the top hat" with two words? How could you tell the computer to "press the red button on the panel" as opposed to "press the blue button on the panel"? With programs unable to understand full sentences, the interaction was crippled.

Many people attempted to imitate the original *Adventure*. In fact, so many programmers were fascinated by this type of interaction that the type of game became known as an adventure game. An adventure game is one in which the player communicates with the computer by typing in commands. The computer then responds with whatever results seem appropriate. This covers a lot of territory—interactive fiction can be considered a kind of adventure game, but it doesn't act like the original *Adventure* did.

Writing sophisticated interactive fiction is an act of creation. To be successful, the author must not only create things but must also create the rules that act upon them—the laws of nature for the world he has created. These laws need not be the laws of our world—the story may take place in another galaxy or alternate reality. What is important is the sense of completeness and consistency found in this world. Without this, the story is hollow and unconvincing.

Writers of interactive fiction tend to talk a lot about their parsers. Many writers claim that their parsers understand full sentences, but most parsers understand little more than verb-noun pairing. They look for a few keywords and ignore everything else in the sentence. But talking about one's parser is actually beside the point. Real intelligence on the computer's part—understanding what you *mean*—requires knowledge of how the created world works. This can be more easily accomplished with an intelligent parser, but the parser is not the be all and end all of interactive fiction.

Understanding—the computer being able to "get what you mean"—is the quality, the only real quality, that distinguishes a work of interactive fiction from an adventure game.

In text length a piece of interactive fiction is about the size of a short novel. But the amount of time you spend with the piece of fiction cannot be compared to anything else. Some people are satisfied to wander about the world that is depicted in each piece of work, while others want to explore every opportunity in depth as they come upon it.

Whichever way you approach it, some things are certain: It is fiction, it interacts with you, and it can be experienced only on a computer. Television didn't replace radio; nor will interactive fiction replace books. The creators of this kind of fiction don't expect it to replace novels, plays, movies, or television. What they expect to see in the future is another form of entertainment, another way to read, another way to experience art. And the future is now. ∎

ADVENTURES IN ADVENTURING

September 1, 1983

Editors
Softline Magazine
11160 McCormick Street
North Hollywood, CA 91601

Dear Sirs:

As you know, Kenneth Rose is extremely conscientious in meeting deadlines for your publication. Since we have not heard from him in the last three weeks, it appears he will not be able to meet his commitment this month.

However, I am enclosing some extracts of correspondence and information that may have a bearing on his strange and unusual silence.

Yours very truly,

Michael Rose
650 Pompano Lane
Palatine, IL 60607

July 15, 1983

Dear Mike,

Am finally in London and will conclude business in 5 days.

Was at zoo today. Pandas are fine.

Am visiting British Museum Tomorrow. Ken

TEXT ADVENTURE WRITERS GUILD
1 LAKE SHORE DRIVE
CHICAGO, IL 60090

July 10, 1983

Mr. Kenneth Rose
650 Pompano Lane
Palatine, IL 60067

Dear Mr. Rose:

We have received many inquiries regarding your lecture, "How Not To Write an Adventure Game," which you have been delivering around the country. In particular, we take issue with your statement that real life adventures don't and can't exist (The Adventure of the Prosaic Office, indeed!).

Since you have informed us that you are planning a trip to London in the near future, we have authorized funds for car fare to the British Museum (not to exceed two pounds, please), so you may examine Exhibit #1384 in the Hall of Greek Antiquities.

This, sir, is a challenge,

Yours in adventuring,

Colonel Nigel Bledgelog (Ret.)
Presiding Officer

ANOTHER THEFT AT MUSEUM

LONDON—Last evening, the British Museum was robbed once again. Strangely, only one item was stolen: a relatively insignificant item known as "Zeus Thunderbolt" exhibited in the Hall of Greek Antiquities. Museum officials would not speculate as to why such an item would be taken in lieu of more valuable articles. This was the third such minor theft in as many months.

Post Card

Mike Rose
650 Pompano
Palatine, Il.
60067

U.S.A.

PHOTO BY © STORER 82

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TX124324    TAWG    AUG   5,   1983   TEXT
ADVENTURES  WRITERS  GUILD,  1 LAKE SHORE
DRIVE,   CHICAGO,   IL......COLONEL   AM
HESITATINGLY   IN   AGREEMENT   SOMETHING
STRANGE   HAPPENING  BETWEEN  LONDON  AND
ATHENS.  WILL  CONTINUE  AT  OWN  EXPENSE
THIS  2500  YEAR  OLD  PROBLEM....MORE TO
FOLLOW  NEXT  WEEK....KEN ROSE....EN ROUTE
BRINDISI TO PATRAS.
```

(The items below and at right were found in room 624 of the Athens Gate Hotel on August 13, 1983. The Athens Gate Hotel is located directly across from Hadrian's Gate and the ruins of the Temple of Zeus. Room 624 was registered to one Kenneth Rose from the USA.)

ITEM ONE   A NOTE (translated from the Greek)

DEAR MR. ROSE. THE SUM YOU MENTIONED IS SUFFICIENT FOR THE RISK AND I WILL MEET YOU AT THE FALLEN COLUMN OF THE TEMPLE OF ZEUS (AS YOU CALL IT) TONIGHT AT 11:30. BE VERY SURE TO BRING THE OTHER ITEMS DISCUSSED. BE SURE!

SOCRATES A.

". . . so the vampire legends of Eastern Europe definitely have their roots in the early Greek myths of the undead. Euripides makes reference to them in 'Orestes':

Men. What phantom forms afflict thee thus?

Or. Three maidens black as night I seem to see.

Men. I know of whom thou speakest, but I will not name them.

Or. Do not; they are too dread; thou wert wise to 'void naming them....

It is believed that the swan, the cloven hoof, and the thunderbolt have some part in the containing of the creatures. See the following additional....

(Extract from "Greek Folklore and Myth" by Socrates Aristophanes, pp 1422-1423, Boston, Erudite Press, 1958)

ITEM TWO   AN UNFINISHED LETTER

August 12, 1983

Dear Mike,

Tell the Colonel, grudgingly, that he was right. It looks as if real life hides some very strange things...things we never dreamed of. In a few minutes I'll have the opportunity to see one of the strangest.

Since I have to rush off, I'll give you full details when I get back in a few hours (boy, are swans smelly and do they make a lot of noise).

(EDITOR'S NOTE: The letter ends there. Mike Rose has informed us that he is investigating further developments, but details weren't available at press time.) SL

PROFILES IN PROGRAMMING

Olaf Lubeck

by Andrew Christie

Shanghai, autumn 1949. Chiang Kai-shek's Nationalist forces had fallen apart like cheap rice paper. Mao's lean and hungry Communist rebels had swept into Nanking, not 150 miles to the east, effectively ending the Chinese civil war.

Olaf Lubeck's father had been born here, raised by his own father, who had for so long successfully plied the trade winds of the China Sea.

His heart was heavy. He had lived here all his life. It was his wife's homeland as well, and these were her people. They had an infant son. But like his father before him, he could feel which way the wind blew. Gathering their nine-month-old child in his blanket, the Lubecks disappeared from Shanghai like a wisp of smoke on a night breeze, as the old China disappeared under the ideological tides of the twentieth century.

And that's why we can play *Frogger* on an Apple today.

Space Castles in the Air. Fast-forward through a naval career, training in geophysics and meteorology, to San Diego, 1980. Olaf Lubeck was still in the Navy when he got his first Apple. The first game he bought for it was one of Creative Computing's many early variations on a theme of space-invading. As he played it, he thought, "Gosh, this is really neat." And then he thought, "Hey, I can do that!"

After fooling around with his Apple, making figures go across the screen, Lubeck wrote his first complete program, a home version of *Space Castle* (three rotating rings with a spaceship on the outside trying to get in), in the spring of 1981. "It was really terrible. Stick figures, vectors, black and white. . . . Heck, I thought it was good."

Was he naive? "At that time, I thought the name of the game was to go down to the arcade and try to duplicate what you saw as best as possible. Everyone was doing it. Copyright infringement, to me, was Xeroxing a book. If you take the code in the actual machine and you copy it, sure; but to just look at the thing and by the sweat of your brow develop code that does the same thing. . . . It never occurred to me that that would have any legal ramifications."

Thus were the facts behind the birth of the infamous *Gobbler*.

While Lubeck toiled, fellow San Diegan John Harris occasionally dropped by the house. Harris liked the idea of *Pac-Man* on a home computer and decided to do one for the Atari, deducing that it could look even more like *Pac-Man*. Meanwhile, Olaf's wife Pam spotted one of On-Line's ads for game programmers. Olaf sent them *Space Castle* and *Gobbler*. Ken Williams passed on the first but called the next day to clinch the deal for *Gobbler*.

Uh-oh. Five months later, when *Gobbler* was eating up the marketplace, Williams called again to say, "We've got problems. Atari is claiming copyright infringement." The superiority of Lubeck's *Pac-Man* over everyone else's had drawn the attention of mighty Atari and precipitated the now legendary On-Line–Atari legal battle.

At Atari's request, *Gobbler* was pulled off the market. John Harris had answered the same ad and sent On-Line his Atari version, an exact *Pac-Man* clone. It was now obvious that it could never be released. Harris made some alterations in an attempt to avoid more legal controversy; Lubeck converted it for the Apple, and thus *Gobbler* was replaced by *Jawbreaker*.
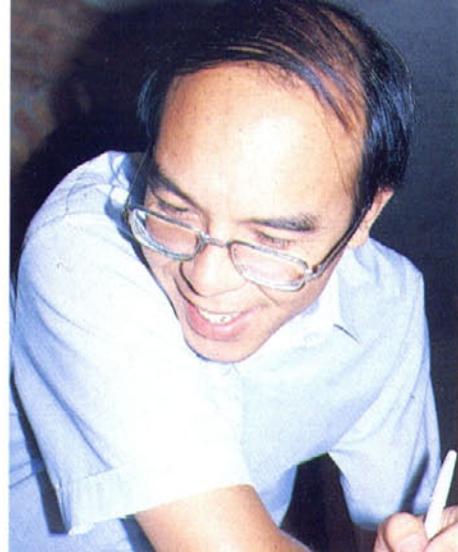
Meetings of the Lubeck board of directors are an informal affair, with all of the company's principals encouraged to contribute according to their areas of special expertise. In June, a group of Milwaukee phone phreak hackers broke into one of Lubeck's favorite VAX 11782s at the Los Alamos nuclear weapons lab. Were they just looking for his latest game? No dice, guys: This programmer keeps the good stuff at home.
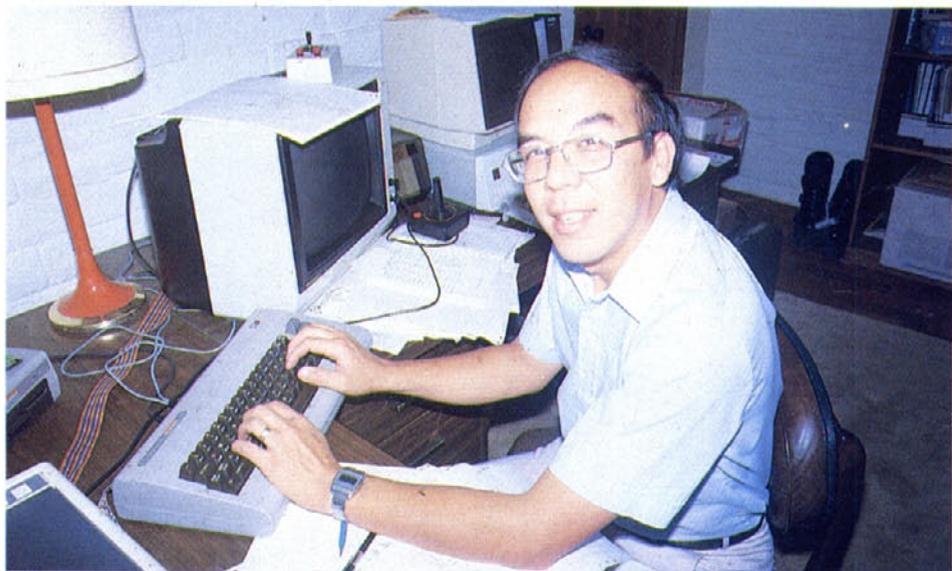
The people at Atari were not satisfied. They approached Williams with the choice of getting sued for every penny he had or letting Atari take *Jawbreaker* away from On-Line and market it for themselves. On-Line filed an antitrust suit. Atari countersued. Midway leapt into the fray. Eventually, both the Atari and Midway infringement claims were thrown out of court, appealed, and dismissed again. Everyone settled out of court, and copyright law as it pertained to computer games was firmly established as protecting not the mere idea of creatures chasing each other through a maze but the specific execution of the idea. ("Although," muses Ken Williams today, "we were really walking the line. If it was to be done all over again now, I'd probably be on their side. If they'd worked harder or had smarter lawyers, I think they could have beat me.")

"*Jawbreaker* did better than I ever expected," Lubeck says. "I started getting royalty checks and I got all fired up and started work on *Red Alert* and *Pegasus II.*" *Pegasus II* featured one of the earliest appearances of the Gebellians, playing the evil aliens, a tribute arising from Lubeck's admiration for the pioneering work of Nasir Gebelli.

"It all just snowballed, and it's really been a lot of fun."

An appropriate metaphor. The best ski area in New Mexico is part of the view from his house. The Lubecks are perched in the hills of northern New Mexico, on the outskirts of Los Alamos, computer mecca of the West. Between game programming on his six home computers and his work with supercomputers at Los Alamos National Labs, Mr. L. puts in an eighty-hour week. If the Lubecks want to go out on the town or to get some culture, they drive to Santa Fe, thirty-five miles away. Los Alamos is a company town and pretty much shuts down at eight o'clock.

Home Cooking. The making of games is a family affair. Pam Lubeck keeps the corporation running and makes the business contacts. The two of them think up new ideas for games, though they have no official brainstorming sessions. "Just in the car, or in the middle of the night, whenever," Olaf Lubeck explains. "My eight-year-old, Chris, is a great source of ideas and the best play-tester you could ever find. My teenage neighbor helps out there, too; I pay him fifty cents a bug. The two of them are invaluable for making programs fail."

Ultimately, not many of Olaf Lubeck's programs fail. One amphibious contribution he made to Apple gaming was recently heavily castigated by readers of this magazine for not reflecting its arcade origins to a greater degree. It is, however, one of the hottest-selling and most enduring games the Apple has ever seen.

This is not a man who holds a grudge. Or needs to. *Softline* salutes Mr. Autumn, the arcades' gift to micros, Olaf Lubeck. **SL**

The Lubeck Index	Atari:
	Apple Panic
	Cannonball Blitz
Apple:	IBM:
Gobbler/Jawbreaker I	*Apple Panic*
Red Alert	*Frogger*
Pegasus II	Commodore 64 (under construction):
Cannonball Blitz	*Cannonball Blitz*
Frogger	*Pinball Construction Set*

M.U.L.E.

By Dan Bunten, Bill Bunten, Jim Rushing, and Alan Watson.

Atari.

M.U.L.E. is what computer games should be like. It's a game, and it's a learning experience. It's also stimulating, fun, frustrating, thought provoking, fun, addictive, and fun.

A M.U.L.E. (multiple-use labor element) is a robot designed for exploring alien worlds. In this game, players outfit their M.U.L.E.s for specific tasks that range from mining to food production to energy production.

The game always requires four pioneers; if there's only one human player, then the computer controls the other three. The pioneers are left on a planet with the task of colonizing the place. Each turn, players select plots of land and decide what they each want to produce. Purchasing, outfitting, and installing M.U.L.E.s takes almost no time at all, and then the real action starts.

Production is taken care of by the computer; based on how much food and energy you have, where your plot of land is located, and random events, M.U.L.E.s produce various amounts of goods. At the end of the production cycle, auctions are held that allow players to buy or sell goods, based on their shortages and surpluses. Bidding is no problem; like everything else in the game, it's joystick-controlled.

At the end of the trading rounds, a status summary is given for each player, showing the amount of money, land, and goods each one has. Also shown is the total amount for the entire colony (everyone).

M.U.L.E. is basically a strategy game (as one would expect from Dan Bunten, veteran Strategic Simulations Apple master), but it goes a lot farther than that. It's a course in economics. While playing the game, you learn valuable lessons in pricing, economies of scale, the learning curve theory of production, the law of diminishing returns, and the Prisoner's Dilemma. Most of them are learned the hard way.

Three modes of play present different challenges. The beginner's game is only half the length of normal games. This is the one you play when you're just getting started. The standard game introduces land auctions, minimum production requirements, and land developments. The tournament game is the same as the standard game, but it adds Crystite, another commodity that isn't as easy to find and produce as the other goods. Also in tournament play, players are allowed to create cartels to combine their resources and gang up on other players.

Though it's possible to play against three computer opponents, most of the fun takes place with more human players. Psyching and faking each other out, tricking and lying, and general sneakiness are all part of the game. Any dirty tricks learned in *Monopoly* will come in very handy during this game.

A word of caution, though: Hoarding the necessary resources and causing the downfall and destruction of other players won't get you anywhere. The ultimate goal is to have the most money, goods, and land; but if the whole colony doesn't survive, everyone loses. Greed is necessary, but *total* greed isn't.

The list of all options in *M.U.L.E.* won't fit in this space. It's sufficient to say that Ozark Softscape (Bunten and friends) has presented publisher Electronic Arts with a virtually flawless winner. The game *feels* good because it involves not only interaction with the computer, but (sometimes physical, sometimes violent, mostly fun) interaction with other players. And that's a feature that's been long missing in computer games.

Recommendation? Buy it. In the likely case that your store is out of stock, find someone who has it, and become close friends. But not too close. MTY

Atari 400, 800, or 1200; 48K, disk; joystick required, paddles optional. $40 from Electronic Arts, 2755 Campus Drive, San Mateo, CA 94403; (415) 571-7171.

Maze Craze Construction Set

By Eric Hammond.

Apple, IBM.

Maze Craze begins where *The Arcade Machine* left off and explores its chosen realm of gaming with thoroughness approaching that of *The Pinball Construction Set*.

As the first step in the creation of your own maze game, you must make the acquaintance of the maze editor. (Make sure you have availed yourself of a joystick first.) As the first step in the maze editor, you place lines anywhere in the playing field to construct your maze. Making a workable maze takes some time and practice.

Once you've built a maze, go on to the second part of the editor where you fill your maze with fun stuff like dots, energizers, tunnels, and other important things. The tunnels work in an interesting fashion: When you enter one, you exit from another one. Not so odd in itself, but when you've placed eight tunnels in your maze, any of which you can come out of by going in any other one, you'll be hard-put to know if you're coming or going.

On to the character editor. Here you design the monsters of your choice, as well as your own little munching person. The colors are limited, but other variations in your characters aren't.

It's time to swing into the game editor. The game editor puts mazes and shapes together to form a playable game. You can put up to five mazes in one game, with some interesting results.

In the game intelligence section, you program the smarts of your monsters. The monsters' intelligence options range from genius—relentless pursuit—to bitbrain—random wandering—with nine degrees in between. The game bonus symbol can be either moving or stationary; if moving, it, too, must be assigned an IQ. You also get to assign a skill level to your game, so if you're great at maze design but a lousy player, you're still okay.

Maze Craze allows you to save your mazes to disk, but the disk can't be booted without the *Maze Craze* master disk—no fools, DTI. The master disk comes with ten premade games that you can play or alter at your whim. These let you know what a completed product can look like.

In the final analysis, a maze is a maze is a maze. But within the confines of the form, *Maze Craze* permits infinite possibilities. It requires no programming knowledge and its parts are therefore necessarily prefab.

Maze Craze Construction Set isn't going to make you a computer game-making tycoon. It's for personal entertainment, something this game will likely give you a lot of. AM

Apple II, II Plus, or IIe. IBM pc. $39.95 from Data Trek, 121 West E Street, Encinitas, CA 92024; (213) 436-5055.

Mr. Cool

By Peter Oliphant.

Apple, Atari, Commodore.

Fresh from his creative triumph with *Wall War*, designer Peter Oliphant returns with *Mr. Cool*, the first *Q*Bert* clone.

Although *Mr. Cool* lacks *Q*Bert's* Escheresque assault on the eyes, it's a no less addicting game. Its gentle premise is silly in much the way *Pac-Man* is silly, which proves imagination can do better than zap-zap shoot-'em-ups.

The playing field is a seven-tiered pyramid of hot plates. Uh huh, hot plates. Beneath the bottom tier is a fiery cauldron—a visual effect suspiciously similar to the plasma field in *Wall War*.

Mr. Cool, a cute little (you got it) ice cube with feet and eyes, drops onto the top plate from a freezer presumably hidden inside the top of your monitor. A single joystick makes Mr. Cool jump diagonally right or left, up or down. As he lands on a plate, it changes color; the object is to transform all the plates into the same color. At first, one landing per plate does the job; later rounds require several landings per plate to change the color.

Naturally, an ice cube's life is not that simple, not even when that ice cube is the laid-back Mr. Cool.

All but the top row of the pyramid are patrolled by fireballs that zip randomly back and forth. After the first level, groups of up to four hot springs drop from on high (there must be a furnace right next to that freezer) and bounce to the bottom. The slightest contact with fireball or spring melts one of the incarnations with which Mr. Cool starts the game.

Besides nimble diagonal movement, Mr. Cool has another method for dealing with these summery inconveniences. Once each round, a push of the joystick trigger sends Mr. Cool into "Supercool Time," during which he can put the deep freeze on the hot stuff. Fireballs become snowballs and the hot springs lose their tails. They're vulnerable for twelve to fifteen seconds, after which Mr. Cool loses his super and the baddies get all het up again.

Each round affords a bonus score based on time remaining on a count-down clock. But if time runs out, Mr. Cool sweats himself out of existence. He forms an extra ice cube every twenty thousand points and may have nine at a time in his heavenly tray (which proves Mr. Cool is a cool cat . . .).

Each level has fifteen rounds, each subtly unique. The levels are an endless loop of speed increases up to unplayable infinity. By the end of the sixth round of level 1, the plates are invisible until they're hit. Invisible plates won't support springs or Mr. Cool in Supercool mode.

The best new-on-any-machine arcader in a while from this top game publisher, *Mr. Cool* deserves to be a sizzling hit for Sierra On-Line.

Hot dog!   DB

Apple II, II Plus, or IIe; 48K. Atari 400, 800, or 1200; 8K, cartridge. $33.33.

Commodore 64, cartridge; $37.78. From Sierra On-Line, Sierra On-Line Building. Coarsegold, CA 93614; (209) 683-6858.

Dino Eggs
By David H. Schroeder.

Apple, IBM.

There are, as yet, not many auteurs in computer games. One scene of Disney animation is enough to tell you it's Disney; Alfred Hitchcock's personal imprint is on every frame of every film he made; and the work of any great author is unquestionably the work of that author and no other; but if you took a disk out of a plain brown wrapper, booted up, and went right into the game, what chance do you think you'd have of identifying the author, even if you were familiar with his previous creations? It's not likely. There just aren't that many game programmers with a strong, unmistakable style. David Schroeder is one.

Yes, if you liked *Crisis Mountain.* . . . And if you never saw *Crisis Mountain*, *Dino Eggs* will do fine as an introduction to Schroeder's ongoing subterranean mediations on a theme of survival.

Back again is that inexhaustibly energetic little figure; this time warping back in time on a one-person Save the Dinosaurs campaign. He leaps about prehistoric cliffs, searching for saurians in prenatal or infant form (they're of a better disposition and a lot easier to carry) to import into the future, thus saving the race from extinction. Their mothers, of course, don't understand this and endeavor to thwart his efforts with an occasional large foot placed upside his head. (Visually, this is a moving tribute to the cinema classic, *Bambi Meets Godzilla*.) Before searching the tiers of cliffs, therefore, he would be wise to pick up some sticks and start a fire, effectively warding off such maternal attentions.

This is a rich game. Seldom has a two-button joystick been given so

Activision Jumps In

The game makers are wising up. Yes, video computer system sales are going down; and yes, home computer sales are going up; yes, there's money to be made in a situation like this.

Activision has discarded the blinders and recognized the home computer market. No longer a VCS-only company, Activision has put its foot into the home computer arena by releasing two cartridges for the Atari.

River Raid and *Kaboom!* are computer versions of games Activision already has out for the Atari VCS. As for converting its games to run on Apple, Commodore, and other computers, Activision isn't saying much. Time will tell, we suppose. Stay tuned.

River Raid is the classic game of shooting things that get in your way. From your plane, you have a bird's-eye view of the terrain. Below is a river upon which float boats, fuel tanks, and helicopters (aquacopters?). As you fly down the river, you score by destroying each of the obstacles. Blowing up fuel tanks racks up big points; flying through them refuels your plane. Every once in a while, a bridge appears that's guarded somewhat by a patrol tank. You must blow up the bridge to proceed past that point.

If it sounds as though nothing in this game makes sense, that's because nothing does. Why aren't we allowed to fly over land? How is it we can collide with ships? Why can't we just fly over the bridge instead of having to blow it up? Why indeed. Asking these kinds of questions will just ruin the fun. Shoot, shoot, shoot, and blow up, blow up, blow up. That's what this game's all about.

The game becomes more difficult the farther you progress (measured in bridges crossed). The river becomes narrower, more ships and copters block your path, and tanks start using your plane for target practice. A selection feature lets you choose to start at bridge one, five, twenty, or fifty—a nice touch for those who want to get straight to the heavy-duty action.

One or two players can play *River Raid*, alternating at each plane's demise. Unfortunately, a novice can't compete with an expert. You can still choose which bridge to start the game with, but, whichever bridge you choose, both players must start at the same bridge.

Sound effects are nicely done: not too much, not too little, and not too cute.

Overall, *River Raid* is one of those addictive little numbers that have you pressing the start button for "just one more game before dinner." Unfortunately for dinner, the game is playable enough so that "just one more game" lasts quite a while.

Where *River Raid* finds a way to add variety to an otherwise simple game, *Kaboom!* looked but couldn't find. Luckily, it did find another route to making the game somewhat enjoyable.

Kaboom! pits the good guy against a character who looks like he just escaped from Leavenworth Federal Prison (the bad guy). He's standing up on top of a building dropping bombs from an unlimited supply. The good guy has to catch them before they hit the ground and explode. It's not hard to see that this escaped convict played a lot of *Pong* when he wasn't pounding out license plates. Get the idea?

Each successive set of bombs falls a little faster than the last, until they're falling at a speed faster than the laws of physics would normally allow. No real game here, just a test of paddle control.

The involvement comes in two-player games. One player controls the convict while the other tries to catch the bombs. Once the catcher misses, players switch places. Yes, sports fans, it really is just like *Pong*, except the bombs don't bounce back; you just dance until you die.

Activision has the right idea in addressing the home computer market, but its goals in doing so are a little unclear. Atari gamers have long passed the stage of evolution that *Kaboom!* is in—they want more sophistication. *River Raid* comes closer and is a good first step.

If Activision is serious about grabbing hold of the home computer market, it might consider doing more than simply converting VCS games to run on computers. Why not augment them to take advantage of the superior machines' capabilities? The Atari computers are obviously more sophisticated than the VCS toy; it's not fair to feed computers the same things the lower species eat.   MTY

Atari 400, 800, or 1200; cartridge. $34.95 each from Activision. Drawer 7286, Mountain View, CA 94042; (415) 960-0410. **SL**

much to do. Snakes, spiders, and other cliff-dwelling unlovelies offer a unique kind of threat (there are fates worse than death . . .), and the available technology (big rocks) offer you a believable, realistic form of defense. Though *Crisis Mountain* is perhaps a more constantly threatening game and has a more obvious element of nail-biting suspense, *Dino Eggs* offers its excruciating pleasures in greater variety and is, if anything, even more difficult. The subtle increases in difficulty through the nine levels and the stern scoring—which penalizes you for every egg destroyed or left behind, leaving you glad to end up with at least a low negative score—are all designed to keep you coming back and trying again for a long time. The need to do several things at once and Schroeder's trademark of a high-tension countdown are much in evidence and leave you limp and exhausted after even a brief bout.

This is just a thumpingly good game and deserves to be a big hit. But, on the chance that it proves to be too rarefied and high-flown to attract the masses en masse, it will certainly become a cult classic.   AC

Apple II, II Plus, or IIe; 48K. IBM pc. $40 from Micro Fun, 2310 Skokie Valley Road, Highland Park, IL 60035; (312) 433-7550.

Motor Mania
By John A. Fitzpatrick.

Commodore.

Ever since Commodore 64s first started trickling out of Conshohocken, Pennsylvania, the world has been waiting with bated bytes for someone to concoct a home-arcade game for this VIC look-alike. The potential was there but for many months the programs weren't. Mass hysteria has been averted, however. UMI has released *Motor Mania*.

At first sight, *Motor Mania* appears to be a basic motorway race game in the grand tradition of *Turbo*. The road scrolls beneath as you steer your car around such hazards as rolling boulders, potholes, logs, and mysterious road patches. Speed, naturally, is controllable, and it's tempting to crank it up to full steam and see what happens. Gradually, Jackie Stewart tendencies give way to the fine points of the game; only enough speed is required to keep the car's battery charged. *Motor Mania* is not a race at all, but an endurance contest; the score is the number on the odometer.

The game starts out with the car parked in a gas station, fully fueled and idling contentedly. Pulling out of the station, you first encounter a three-lane highway of inconsistent quality littered with obstacles. Highway hazards come in four varieties: logs, glass, road patches, and other cars. Hitting any of these results in some form of difficulty, ranging from merely needing to slow down for road patches to being totaled in a collision with another car. The easiest way to avoid these hazards is simply to drive slowly, staying behind the other traffic. But the slow pace won't keep the battery juiced and will eventually destroy the car. The alternative, passing, is also risky, particularly on the twisty sections; the slightest brush with the side of the road or another car will cause a crash.

This motley highway features stretches of one-lane road and dirt road. Points of interest on the one-lane road are rolling boulders and busy intersections; the dirt road offers unreliable steering, many turns, and a profound lack of width. The obvious answer to these problems is, again, low speed, but there's still the battery to be reckoned with.

The end result is a game that requires you to focus your attention on several things at once. There are the road and its assorted hazards to deal with; at the same time, the fuel and electricity levels demand attention. It isn't unusual to find yourself driving down the road, with the fuel gauge needle nearing E, praying for a gas station.

Motor Mania is challenging and semirealistic. Its only flaw is in the joystick steering, which requires a light touch to avoid the car becoming one with the wall. The situation improves if you substitute a better joystick for the rather dead-feeling Commodore unit.

Motor Mania is an enjoyable game and a good start to a 64 game collection.   PD

Commodore 64. $29.95 from United Microware Industries, 3503-C Temple Avenue, Pomona, CA 91768; (714) 594-1351.

Cyclon
By Alan Pavlish.

VIC.

Kablowee! This is a fast game. This is a game to be played and played. Great party stuff; people yelling and screaming and trying like hell to top the high score. It's adrenalin-rush time with everything coming at you faster and faster. We're not talking *Repton* here, just a simple, fast-paced gung-ho arcade-type game.

Okay, you plug in the beautifully styled cartridge: small, black plastic with a great color picture depicting a space vessel shooting through space, shooting like crazy; stars all around, with some distant planet looming in the background. Nothing like the graphics you will see on the screen, but is it ever? So you plug it in, grab your favorite joystick, and stare at the screen. Level 1. You start out with four "ships"—octagons, center-screen, with shields on all sides. Little harmless-looking bubbles (deadly satellites) appear on one of the four walls surrounding you. Lean your joystick in their direction and a red-hot laser blasts out—your first kill. As the speed increases, chances are that one of their light missiles will pop off one of your shields and another will manage to hit your reactor, thereby blowing you all over the screen. Such is the delicate balance of life.

Round about level 5 a new enemy makes an appearance. This little bugger appears on the screen significantly closer in range and begins to circle counterclockwise, hurling light missiles at your back.

Every time you survive a level you get another ship and rack up a bunch of points based on how many shots you have wasted and/or how often you used the shields. You are also awarded another Big Bomb—devices that will eliminate the enemy in one swell foop, for use when things get really sticky.

And it gets faster and faster until it seems that you can't shoot enough times; like the electrical impulses don't fly through the cable fast enough; like you have to enter a new time dimension to realize all fifteen levels. This is the time to start using the Big Bombs. Hit the space bar and every enemy on the screen is blown to smithereens. You might expect to catch your breath, but the play resumes immediately and you've got to fight to the death.   PM

VIC-20. $35 from Boone Coporation, 2900-A Bristol Street, Suite 102, Costa Mesa, CA 92626; (714) 751-2911.

O'Riley's Mine
By Mark Riley.

Atari.

Hold your hats, it's another treasure hunt. But, hold your horses, it's got another twist. Resembling the arcader *Dig Dug* on the surface—that is, on the screen—it ain't really like it at all, except for all that digging. Instead of killing monsters you have to avoid them, and instead of digging in good high ground you must be near sea level because your tunnels keep filling up with water (remember the seashore?). The earth, you see, is filled with treasure just waiting to be disinterred.

O'Riley's Mine makes it for youngsters. It's simple, slow-paced, and cute. The difficulty (perhaps too strong a word) increases when the monsters speed up, a specific event. As treasure seeker extraordinaire Timothy O'Riley, your defenses against the threatening monsters are speed, digging weirdly patterned tunnels, and dynamite. You can blow up monsters with dynamite or merely block their paths. The only defense against the encroaching water is staying away from it.

The graphics display is full of color, the mountains and multicolored mine shaft are particularly well done, and the play of the game, within its scope, is excellent.   MK

Atari 400, 800, or 1200; 16K, cassette or disk. $29.95 from Datasoft, 9421 Winnetka Avenue, Chatsworth, CA 91311; (213) 701-5161.

Minit Man
By Greg Malone.

Apple, Commodore.

To keep in mind: *Minit Man* comes from these ungreedy graphic magicians who wear tuxedo T-shirts, waddle, and go "frnk frnk" a lot.

The objective of *Minit Man* is twofold. Complete the construction of a half-built railroad bridge spanning a mountain gorge, thus allowing a train—carrying a deadly nuclear missile—to cross the gorge. Once the missile has been delivered to its silo, you must enter the command base, make your way to the launch computer, and fire the missile.

To accomplish the mission, you pilot a helicopter from the site of the bridge across the command base to the supply station. Once there, your

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HP Muscles In

The Roundhouse, historic supplier and general meeting place of all San Fernando Valley train fanciers and model railroaders, has fallen prey to the West Coast computer sales force expansionist policies of Hewlett-Packard. The plucky little hobby shop, located in the heart of scenic North Hollywood, one of the most beloved of southern California's demi-slums, held out the longest of all the commercial establishments on the block when ordered by a Los Angeles redevelopment agency to vacate the premises to make way for Hewlett-Packard's Neely Sales Division regional headquarters.

From its position of relative safety up the block, *Softline* extends its highest and widest kudos to these gritty small businesspersons for taking a stand, however brief and futile, in the name of H.O. scale fun, big packages under the Christmas tree, 1/100 scale club cars, tiny plastic trees and shrubs, and the ghosts of the Colorado Zephyr, the Old 97, the Little Engine That Could, and Casey Jones. Someone has to stand up to the grim, corporate advance of the modern age.

The excessive cost of which, by the way, in Hewlett-Packard's case, has caused HP's third-quarter profits to be lower than expected, causing the company's stock prices to plunge. Let's hope the end result of all this is not a big, empty block-long steel-and-glass building in the middle of NoHo, standing like a tombstone over the grave of a gentler and more graceful era. Toot.

EduFun Auction

It began as a lark with a Saint Louis public television station. Now it's gone national. Yes, the next time they cut away from *Masterpiece Theater* or the *MacNeil-Lehrer Report* to the shot of the guy with the microphone in front of the operators standing by to take your calls pledging your support for public television, they're going to be offering educational game software in return. EduFun initially donated forty games to the annual fund-raising auction of PBS station KETC in Saint Louis. The games were auctioned off over a ten-day period to "overwhelming" response. Consequently, EduFun is donating some 250 packages to PBS stations across the country, up for grabs in eighteen auctions.

Hut-One, Boot-Two

The Esoteric Database Contests continue. Let's take a look at Eastern Computer Consulting Associates's *Pro Sports Stats*, containing the complete history of every professional football game played in America since 1970. Programmed by a group of enslaved MIT mathematicians to run on all microcomputers in captivity, this baby can give you every team's win/loss record, tell you who the coach was for each game, home or visitor, describe the playing surface, and check every team's record, selecting any criteria against what Nathan Detroit might have called "the spread." (What

is the Bears' record against the spread since 1970 whenever they played on natural turf? Now all six of you Bears fans can find out.)

"Already the program has found certain situations that suggest an 80 to 90 percent chance of a particular team beating the spread in certain situations," marvels Eastern president Steve Silverman. "I can hardly wait until the new season begins."

The Worcester, Massachusetts, firm expects to sell about ten thousand copies of its educational program this year, at $495 a pop, to fellow aficionados of statistical information.

Wait, There's More! At last! From International Software Sales, in the good part of Newtonville, New York, comes a complete computer accounting system for your country club. Name, address, state, zip, phone, category of membership, credit limit, aging status of account, and service charges . . . yes, they're all here, except for race, gender, and religious affiliation—hardly necessary, eh? A steal at $1,995, though if you have to ask, you can't afford it. But it was really just damn fine seeing you again; everyone asks after you at the firm. . . . Oh, Dynby, refresh my drink, will you?

Book Knook

Let's get culture. Tear yourself away from the keyboard just long enough to acquaint yourself with some of the potential "Great Books" of the future.

From Hayden Book Company comes *Microcomputers Can Be Kidstuff* ($8.95), in which Anna Mae Walsh Burke prepares tots to begin speaking Basic and Pilot, with info on writing and saving programs on disk and cassette. *Stimulating Simulations for the VIC* ($6.50) is a handbook of twelve modifiable simulation game programs in VIC Basic by C.W. Engel, including flow charts and ideas for variations.
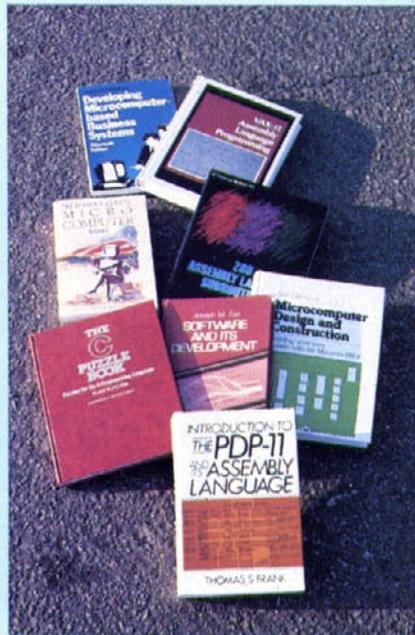
Softsync, the Timex/Sinclair game software powerhouse, has just published *Brain Games* ($9.95), containing twenty-six Timex 1000, 1500, and 2000 program listings teaching math and logic through games. Future editions will also be available for the VIC and Commodore 64.

Moving up to the high end of things, we find Wadsworth Electronic Publishing's *Survival Kit for Apple Computer Games* ($9.95)—Ray Spangenburg's and Diane Moser's overview of twenty-four game programs, with advice on selection and purchase, ratings, and playing tips from players and programmers.

From Elcomp, we have *The Great Book of Games, Volume I* ($9.95)—dealing with the programming of sound, graphics, and animation for the Commodore 64, and H.C. Wagner's *Hackerbook I for Your Atari Computer* ($9.95), subtitled *Very Important Subroutines in Machine Language*—allegedly the first book to publish just those very things for the Atari computer family (how to build your own EPROM burner and such). Good reading to you.

CompuKitsch

It had to happen sometime. When *Time* declared it man of the year, we should have been warned; when Hollywood decided that it had star quality, we should have been prepared; yet nobody thought the computer would become the next victim of the E.T. syndrome. This dreaded disease is curable, but the symptoms must be recognized. In the first stage, the merchandiser looks dazed; his eyes begin to dilate and possibly bear the message "In Greed I Trust." In the second stage, a knowing smile creeps upon the face and stays for several days. Finally, in the most dangerous phase, the merchandiser's defenses break down and he produces *Star Wars* cookies, E.T. shoelaces, and *Flashdance* tank tops. Although the syndrome hasn't become an epidemic in the computer world yet, two new sufferers are vying for what amounts to control of the 64K Hula-Hoop niche of the microchip market.

Patient number one displays symptoms of computer greeting cards that offer high-tech humor for "that special occasion." Designed to establish a user-friendly tone in any store, the cards are shaped like a floppy disk and come with an assortment of sentiments. The line of cards from Computer Greetings (San Leandro, CA) includes invitations ("You are invited for a byte at my place"), get well cards ("Got a bug in your system?"), friendship greetings ("I like your baud" and "Let's connect"), belated birthday ("Your birthday slipped my memory"), and expressions of love ("Technically speaking, I love you"). There are also congratulations for weddings and anniversaries ("May you interface with happiness" and "I never get board with you"), not to mention note and general friendship cards ("Dear friend, I like your operating system").

All cards are red, black, and white and come with matching white envelopes.

Patient number two tends to break out in attractive T-shirts for the Silicon Valley Guy. Sporting such slogans as "I speak Basic," "Programmer power," "Hardware," "Software," and the indecent proposition "Let's Cobol," these offerings—from Dimensions 4 Design Group (Worthington, OH)—come in four fashion colors (green, light blue, red, and yellow) and in the typical adult sizes of small, medium, large, and extra fat. They are machine-washable, American-made, and are guaranteed.

There is as yet no card or T-shirt that bears the legend, "P.C. phone home." If you see one that does, report it to this magazine at once. They just stole it from us.

Who Can You Trust?

In the interests of the full disclosure of vital information and safeguarding the public's right to know, further testing the limits of our own credibility, we are duty-bound to report the current availability of the following, uh, products.

MicroTie Systems (Walnut Creek, CA) has developed the Byte Bat—a seventeen-inch-long foam rubber baseball bat designed to serve as a frustration shunt. It is compatible with all operating systems and comes with a user manual, user button, and a multicolor poster showing the device in use. Says creator Jae Evans, "All too often computers aren't up when you need them, or some sort of system error costs you a lot of time and effort. Hitting a computer or terminal with anything substantial can be a satisfying but expensive act, so I came up with the Byte Bat." It's just $9.95, at, uh, better computer dealers near you.

Wallace Micro-Mart (Peoria, IL) has introduced Flooby Dust, a product that, when applied in measured amounts to hardware, software, programs, or operators, will debug any computer-connected operation, according to company president Ron Wallace. It will also repair broken hearts, mend tots' tricycles, and solve the balance-of-payments problems in Latin American countries. Wallace reports that he developed the product after discovering miniature pods growing in Chicago's Grant Park, from which he raised sixty-four producing pods in his home and crossbred them with other existing herbs until he came up with the final product. Anyone, anyone at all, interested is sincerely urged to contact Mr. Wallace in care of Wallace Micro-Mart, 2619 North University, Peoria, IL 61604; (309) 685-7876.

Handwritten calendar — October, with notes including "S.F. - 3rd Annual Computer Showcase Expo", "PC '83 - Boston", "PC '83 Changed!", "Applefest S.F.", etc.

Handwritten calendar — November, with notes including "Feb: Softcon New Orleans", "L.A. Computer Showcase Expo", "changed!! Fifth Ann. N.E. Computer Show & Software Expo - Boston", "Dinner at the club w/ Liz", "D.C. Computer Showcase Expo", etc.
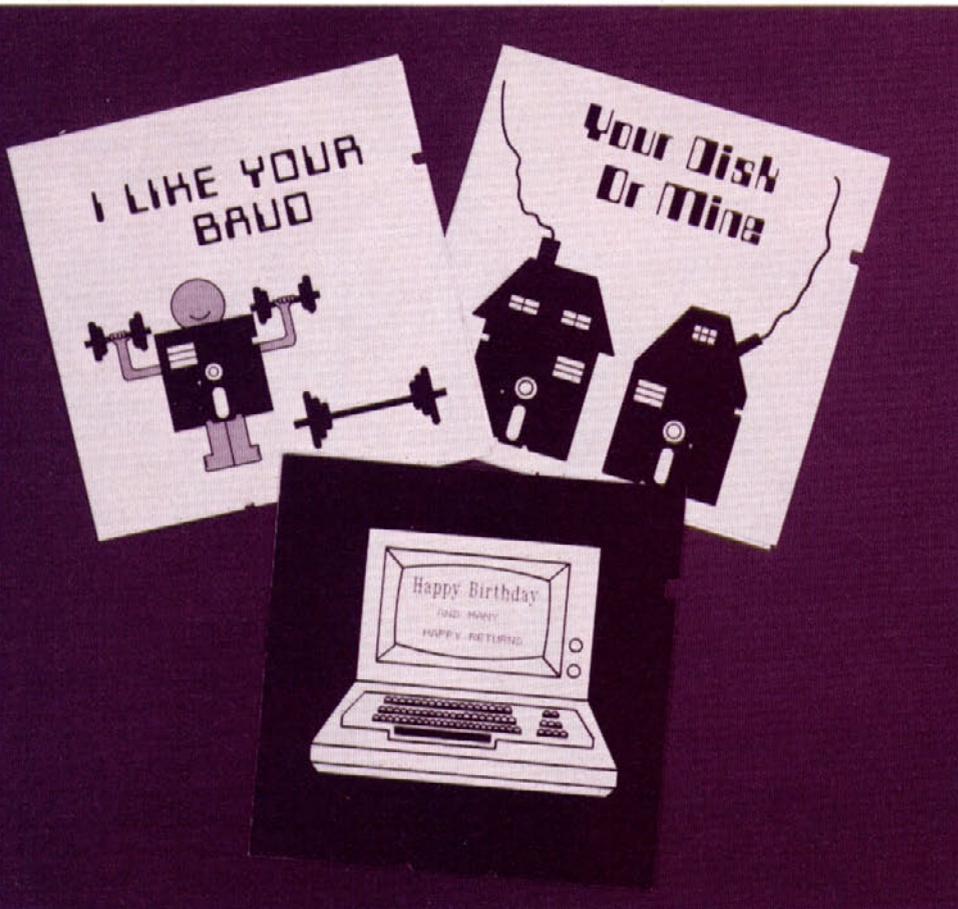
MY BUSY SCHEDULE

So Long at the Show

Dear Giles,

I know you like interesting cases, so thought I'd share one of my latest, an amnesiac. John Doe was found in New Orleans with no ID and dressed in a tattered chicken costume. He has no idea of his name, home, occupation, or how he got here. However, a journal found in his possession may help. Tell me what you make of it.

Extract from an entry dated September 15, 1983:

Ever since I found my niche in the world as a young programmer about town, I just haven't had any time to myself. None. Nada. So many computer shows, so little time. I gotta get organized.

Recently jetted back from the August Electronic Games & Toys show in Sydney, Australia, and now I'm off to the Third Annual San Francisco Computer Showcase Expo. Think I'll grace Brooks Hall with my presence all four days, September 29–October 2.

Next, I'll mosey off to PC '83 Boston October 4–6, rescheduled from October 8–10. Did they think they could confuse me? Ha. They could never cross my circuits!

Can't lollygag in Beantown too long because I'm needed at the Philadelphia Computer Showcase Expo, October 6–9 at the Civic Center. More than seventy-five national and local vendors will exhibit small systems, peripherals, software, services, and supplies. They don't advertise the partying, but hey, it's Philly. Note: Bring a case of the ten-year-old stuff.

On October 20–23 I'll zip over to Pittsburgh for the Pittsburgh Computer Showcase Expo at the Lawrence Convention Center. Seventy-five vendors will be present. I wonder if they're the same ones?

Life picks up when I hit the Miami Expo Center for the South Florida Computer Showcase Expo October 27–30. If I don't get suddenly rerouted to the south or eaten by an alligator, I'm bound to have a good time. More than one hundred vendors will be there! Note: Pack my suntan oil, Bermuda shorts, binoculars, flip-flops, Jimmy Buffett tapes, and that quart of Cuervo Gold.

Applefest/San Francisco is October 28–30. Think I'll leave Miami early and catch the last day of this bash at the Moscone Center. There'll be more than four hundred displays and booths. A one-day ticket is $10. Ouch. This being popular can get expensive.

Four days after that, I'll get Rocky Mountain low at the Denver Computer Showcase Expo at Currigan Hall. Held November 3–6; more than seventy-five vendors. (Still those same guys?)

Enough fresh air. Must hit the third annual Los Angeles Computer Showcase Expo, November 10–13. More than one hundred vendors will share the experience. Must pack: gravity boots.

November 17–19, I'll have to check out the Fifth Annual Northeast Computer Show and Software Exposition at Boston's Hynes Auditorium. There'll be five hundred displays and the cost is the usual boring price. Really, guys, you ought to try some variety.

Then it's on to D.C. and the Washington, D.C., Computer Showcase Expo and Small Computer College November 17–20.

Spend time touring the rotunda and trysting at trendy little restaurants in Georgetown. It breaks my heart, but I'll have to miss the semiannual Chicago Computer Showcase Expo at McCormick Place, with over a hundred local and national biggies. That event runs the same days as the D.C. deal, and one must have priorities.

To round out my year, I'll attend Softcon February 21–23, 1984, at the Louisiana Superdome in New Orleans—a trade-only event for retailers, independent sales organizations, consultants, Fortune 1,000 guys, government agencies, panel discussions, conferences, and workshops to choose from. Unmentioned in the event brochure are Cajun girls and Mardi Gras, but I'm prepared. I'll bring my chicken suit and wear it to Bourbon Street. I'll even catch some parades. Hey, throw me something, mister!

The entries end here; all remaining pages had been torn from the journal. We found the subject wandering the French Quarter, looking dazed.

Frankly, I am baffled. Now John Doe keeps muttering that he needs down time, whatever that is. I welcome your opinion, as ever.
Sincerely,
Herbert

Magazine Watch

COMPUTER GAMES GUIDE

Gridiron Game A First Draft Choice

First: *The Computer Games Guide* (Chicago, IL) is proud to announce itself as a purveyor of intelligent, critical reviews of the latest games. Featuring reviews of such hot new releases as *Worm War I, Bulldog Pinball,* and *Thunderbombs,* the monthly newsletter is for the Apple, VIC-20, Commodore 64, IBM pc, TRS-80, the Aquarius computer, and the Atari. It consists of six informally written pages and costs $14.95 for a twelve-issue fix. Subscribers who order by September 30 will receive a thirteenth issue free.

And Last: Warner Publishing tries the waters of compumag land in October with *Microkids,* a bimonthly for ten- to sixteen-year-olds. According to Albert B. Litewka, president of Warner Software, *Microkids* will fill a need

unfilled by other computer publications—the need to combine fun with information. No Infomaniac he, Litewka additionally said: "Some of these new publications are scholarly, technical, or pedagogic. Others are trivial and casual, catering primarily to the video-game player. *Microkids* will be editorially positioned between these extremes." Chimed in editorial director Jeffrey Weiss, "We intend to link that element of entertainment with good, solid computer education. We'll be the spoonful of sugar that helps the medicine go down!"

Rest assured, despite the wholesome onslaught of Micro Poppins, we will continue our policy gearing *Softline* toward tough, hard-bitten computer users. And we won't rot your teeth.

Programs for the Proletariat

The personal computer, as you know, is decentralizing the workplace, creating a multiplicity of revolutions in the habits of people's lives, and reweaving the warp and woof of the socioeconomic system we call home. Pretty soon, the traditional exchange of printed money for goods and services will disappear and we'll all get back to the barter system. People needing people. You read it here first.

Yes, the indicators of sweeping social change are everywhere, and here's one now: The National Software Exchange will let you swap software as often as you wish, charging only for handling. Says founder Sam Bleecker, "An entire aspect of the software market has been ignored up to now. People are filling their software shelves with games and educational programs that have lost either their interest or

their utility. This software should be recycled into the hands of individuals who can make use of those programs without having to pay the very high prices associated with buying new software. The National Software Exchange can serve as a national resource."

Annual membership fee is $75. A member may submit for trade any game or educational program for any of the popular computers. The program submitted must be a bona fide original, accompanied by documentation. A member may request any entertainment or educational program in exchange. The requested program will be sent for a fee of $5 to cover handling. There is no limit to the number of programs that can be submitted for exchange at any one time or during your subscription period. Pretty hot, huh? Details are available at (201) 783-6000.

Get a Cray One for Only 80,000,000 Boxtops

In response to President Reagan's call for more involvement from the private sector in public education, General Foods and Atari have joined forces to offer Atari hardware and software in exchange for proof-of-purchase seals from Post cereal boxes.

"We understand the difficulty public schools are having in coming up with the funds for computer equipment," quips Tom Herskovits, general manager of General Foods's breakfast division. "This offer will enable thousands of schools from every corner of the country to obtain badly needed computers, software, and peripherals."

Additionally, the two companies are funding "Catch On to Computers," a multimillion-dollar computer literacy program that will hit ten cities nationally in October, November, and December. The structured tutorials will run for ten days per city, starting October 5 in New York and San Francisco. Organizers are requesting that schools, groups, and individuals preregister.

Next Meeting Irv Brings the Brownies

Irv Brechner Targeted Marketing has something for your user group. Tell ya what they're gonna do: You sign up with them—no charge—and they'll include your newsletter as part of a listed group of publications that national advertisers can purchase space in. When Brechner signs up an advertiser, he sends you camera-ready artwork—full-page black-and-white only—accompanied by a check, to run in your next available issue. Doesn't cost you a cent. He forwards payment for your standard full-page B&W rate, after collecting his 15 percent ad agency commission. You can get in touch with him at Box 453, Livingston, NJ 07039.

Sell Your Software

ATC Software (Estill Springs, TN) has announced a new report for ambitious programmers looking for markets for their ambitious programs. *Sell Your Software* tells all about obtaining free directory listings, how to gain inclusion in national databases, how to receive media coverage, how to write a user manual, and how to operate a successful "mail order fulfillment service," presumably offering fulfillment by mail. The price is $20. **SL**

magnetic grapple will automatically descend to pick up the girders for you to carry back to the bridge to be gently lowered into place.

Mutating monsters are out to stop you. They appear over the command base, blasters blazing. Some enter the base itself (in handy cutaway view) and creep steadily toward the launch computer, sabotage in their cold hearts. Others head directly toward the bridge in kamikaze attempts to destroy it.

Speed is essential. Even as you place one segment of the bridge, you can hear more of the devilish creatures approaching. To make matters worse, your own automatic defenses are worse than useless. The aliens have far less trouble crossing the paths of the microwave towers than you.

The clock is running. With only five minutes to complete your mission, you still must enter the base and fire the missile. The aliens will try to stop you any way they can. Even those you've destroyed leave behind a lethal mine that you must jump over. Peril lurks every step of the way.

The detailed artwork in *Minit Man* is, not surprisingly, superior, and the shapes—while small—are quite detailed. Even the tiny hero, scaled to fit inside a tiny helicopter, recognizably runs, jumps, shoots a gun, and even takes a bow at the end of play.

Minit Man is difficult to play. Picking up the girders and placing them down on the bridge successfully requires precise speed and accuracy. If a player is too slow, the aliens destroy the bridge faster than it can be repaired. Going too fast makes it easy to blow it. An error of one pixel is enough; the piece of bridge is lost.

Challenge is good for the soul; with practice, these seemingly impossible obstacles can be overcome.

Minit Man suffers from some flaws. The missile launch sequence is somewhat anticlimactic. All that work just so some little train can chug along and load a missile. Then the missile launch itself is no big deal—you get fifty points and the chance to do the whole thing all over again, in less time, and through harder-to-penetrate defense screens.

Speaking of which, the logic of having your own defense screens work against you seems a bit convoluted.

Despite its flaws, the graphics, action, plot, and multiple play modes of *Minit Man* make it an enjoyable, stimulating, somewhat addicting game.   HAS

Apple II, II Plus, or IIe; 48K. Commodore 64; disk. $19.95 from Penguin Software, 830 Fourth Avenue, Geneva, IL 60134; (312) 232-1984.

Operation Whirlwind
By Roger Damon.
Atari.

The thing about strategy games is that, no matter how close they come in terms of numbers and statistics to simulating battle, the *feeling* of battle is still missing. Avalon Hill's *TAC* took care of that problem by eliminating the board game look and replacing it with pieces that move. Broderbund's *Operation Whirlwind* does that and a little bit more.

You have tanks. You have infantry companies. You also have a battalion headquarters, reconnaisssance units, an engineering company, and an artillery battery. This is no simple tank match; this is combat. Guns, bullets, shells, mine fields, river crossings—the works.

The object of the game is to move your battalion fifteen kilometers to take and hold a nearby town. Do this and the game is won.

What you see on the screen is a portion of the terrain. The scene scrolls when necessary, and a full-color poster-sized map helps to keep an overview. Clearings, roads, woods, buildings, and the town are all clearly marked. Each turn consists of five phases: command, movement, combat, orders for assault, and assault.

Everything in the game, except for advancing phases, is joystick-controlled. It's not hard to become fully involved in the game as if it were real life; mine fields, bridges that need to be repaired before crossing, attacks and counterattacks, hand-to-hand assaults, and overrunning the enemy in their own foxholes are all part of it.

As an opponent, the computer's not dumb. It knows that you want to take the town, even if you send some men in another direction as a diversion. All it takes is one man in the vicinity of the town to bring the enemy scurrying in.

Operation Whirlwind offers four levels of play, from introductory to advanced. Start at the introductory level unless you want to lose your officer's commission.

For convenience, Damon has included a save game feature. At the end of every turn, there's an option to save the game in progress. Whether you're about to try something suicidal or you'd just rather continue the game at another time, you can save the game's current state to either the game disk or a blank disk.

The manual is very well written; even novice strategy gamers should be able to read through it easily without getting caught up trying to store in their heads the abbreviations and symbols that are usually associated with these kinds of simulation games. All the game's "pieces" and phases are clearly explained.

For people who have avoided the mammoth games by Strategic Simulations and Avalon Hill simply because each game swallows several hours of one's life and there's so much information to keep track of, *Operation Whirlwind* is a godsend. No sitting in front of the computer with the manual in hand, no fixing burgers while waiting for the computer to make its move, and no complicated rules and calculations to keep track of. Just boot it up and go.

It seems like people are always saying great things about Broderbund's products. With games like *Operation Whirlwind* storming the marketplace, it's no wonder.   MTY

Atari 400, 800, or 1200; 48K, disk; joystick required. $39.95 from Broderbund Software, 1938 Fourth Avenue, San Rafael, CA 94901; (415) 456-6424.

Buzzard Bait
By Mike Ryeburn.
Apple, IBM.

It's a bird! It's a plane! It's—nope. It is a bird—a big old buzzard heading straight for humanity with an evil look in its eye.

As commander of a Hovercraft, your mission is to get those buzzards! The buzzard bait is you—or any other human the birds can grasp in their claws and take home to nourish their offspring.

The playing screen sports three aeries, each with three eggs that hatch into baby buzzards, and the babies must be fed. But the fledglings can't get food for themselves, so they depend on their big nasty parents.

The Hovercraft's job is to destroy the big buzzards before they capture the innocent people milling about below. When a bird succeeds in capturing one of the humans, shooting the bird makes it drop its victim. Then you must catch the poor soul or he'll fall to his demise (hey, better than being devoured by a buzzard). If the buzzard reaches its nest with a human and feeds a hungry baby, the baby joins its parent in attack. The babies are the smartest and quickest of the birds; they are also smaller and harder to hit.

Contact with any of the birds causes your atoms to disperse. Fatal also are rotten eggs dropped by the buzzards and contact with penguins.

Penguins?

Unlike the average penguin, these penguins aren't nice and don't eat M&Ms. They do, however, fly. Then, good grief, why are they called penguins? If the reference is the obvious intra-industry one, its implication is too obscure for us common folks.

Anyway, a penguin spotted flying over the nests is about to blunder into you at the bottom of the screen. You must jump over it or be destroyed. Jumping over it is a better idea.

Each surviving human at the completion of a level counts for bonus points. Bonus ships must be assembled from parts floating among a full screen of menacing but nonlethal penguins. (Okay, okay, so what if they look like robins?) Those mines floating among the ex-tuxedo-wearers are lethal, however.

Brightly colored, smartly animated graphics almost make up for flying penguins. The game plays most effectively with a joystick, but it works with a keyboard too.

This is old wine in a new bottle, but it's a mellow vintage and it goes down smoothly enough.   AM

Apple II, II Plus, or IIe; 48K. IBM pc. $39.95 from Sirius, 10364 Rockingham Drive, Sacramento, CA 95827; (916) 366-1195.

Guest reviewers this issue are Derrick Bang, Peter Durkee, Michael Klem, Alan Mankovitz, Paul Mithra, and Howard A. Shore.   **SL**

Kids and Computers
Part 1: Choosing the Right Software at the Right Time

by Sherwin Steffin

We've all heard about the revolutionary effects that computers can have on the learning experiences of young children. Yet, when it comes to choosing software, it's not always easy to know whether a particular program is appropriate and useful. How should we go about evaluating programs for the very young? What guidelines should we apply to assure ourselves that the software we select will teach children useful skills and will provide challenging and meaningful experiences for them?

In this article, we'll explore one perspective on the types of learning experiences that benefit young children most. Having this perspective should help us make more informed decisions about software for children.

Piaget's View of Development. Jean Piaget, the controversial Swiss psychologist, studied the developmental progress of many children, including his own, over many years. His observations led him to conclude that young children pass through four distinguishable stages of ability to understand and interact with the concepts and ideas of the world. As children mature, not only do they learn more about the world, they also perceive the world in more complex ways. The ways young children understand the events around them are fundamentally different from the ways their older siblings or their parents think and understand.

Piaget's theory holds that all children move in order through these four stages of development, which he called the sensorimotor stage, the preoperational stage, the concrete operations stage, and the formal operations stage. The typical age range corresponding to each stage differs somewhat from culture to culture; the ranges shown here are considered typical in developed Western countries.

Sensorimotor stage (newborn to age two). This is when children learn to differentiate between themselves and the world around them. They learn to control their bodies and eventually begin to try out new behaviors. Toward the end of this stage, children begin to apply strategies in solving problems and to transfer learning from one specific situation to another.

Preoperational stage (ages two to seven). Prior to this stage, children do not remember an event or object after finishing with it. "Out of sight, out of mind" is almost always true. As children enter the preoperational stage, they retain a symbolic, but static and simplistic, recollection of their experiences.

Concrete operations stage (ages seven to eleven). Now children are capable of paying attention to more than one aspect of an object at a time. A preoperational child can recognize a red ball or a yellow flower but cannot separate the concepts of color and shape. If asked to sort things into groups, he will concentrate on a single functional characteristic that makes the objects different from each other. Children in the concrete operations stage can not only sort and manipulate things according to more than one characteristic but can also understand that changing one feature of an object (such as the shape of a lump of modeling clay) need not affect its other characteristics (such as its weight or volume).

Formal operations stage (ages eleven to fifteen). As children move to this level, they acquire the ability to deal with abstract concepts. Symbols become much more powerful tools, and children are no longer tied to images of concrete objects or events.

Matching Software to Developmental Stages. Children may be ready to benefit from the use of the computer by the time they reach the preoperational stage. Children at this level enjoy creating graphic shapes and meaningful pictures. Yesterday's coloring books and chalk tablets have a powerful new incarnation in the computer. Joysticks, game paddles, and graphics tablets used with a computer capable of generating graphics offer children a new medium for experimentation and manipulation of symbols. Yet software to be used with children at this stage must not be cumbersome. Traditional art tools like crayons and fingerpaints are suited to children because these tools are easily grasped extensions of their recently developed motor skills. Software that requires children to become computer experts may simply be beyond their ability.

Another change occurs as children enter the preoperational stage: They become social beings. This is the time when children learn about friends and develop the ability to use speech effectively. Children typically invent imaginary companions during this period in their lives, using them to test and exercise their developing social skills. The computer can be another excellent friend for a child, especially when it's equipped with natural language speech synthesis.

The hardware and software you purchase for children in this age group must not require complex, abstract thinking skills. Attention should be given to simplicity of operation (few commands, simple effects, and clear sound and graphics). Your child will provide his own elaboration on this simplicity and will gain skills in creating meaningful complexity from basic tools.

Children who are introduced to computers at the preoperational stage usually accept them as just one more new part of a world about which they are learning. As these children mature, they explore the computer and they treat it as a powerful tool, just as they do pencils and paints.

By the time children enter the concrete operations stage they can engage in some classification, differentiation, and quantitative tasks. Concepts of number (how many), spatial relationships (nearer or farther), and comparison (bigger or smaller) can also be introduced.

Children at this level are also ready to begin reading and can understand the correspondence between a written symbol and the class of events or objects to which it refers. Software for children who are capable of concrete operations can incorporate written instructions and supplementary documentation. However, abstract concepts are still beyond their grasp, and, to be effective, materials must teach or entertain using concrete examples.

Along with the ability to read comes the ability to write—that is, to formalize meaningful ideas in symbolic form. Therefore, children at this level can learn the beginning skills required for programming, provided that the material to be incorporated in the programs is based on concrete, observable events. For this reason, high-level programming languages such as Logo, which allow children to define their own procedures to achieve clearly observable effects, are potent tools for children. Because they can base their use of the language on their own experiences (inventing as they go along) the computer is expanded as a personal tool, and the children achieve success by setting their own goals.

As children pass into the formal operations stage, they become capable of exploiting even more of the computer's power. They can learn to use both applications packages that require abstract reasoning and highly symbolic programming languages that employ formal conventions and styles. The simple concepts and limitations of software suitable for a younger child will bore older children—the challenge of abstractions and open-ended software tutorials and tools will provide a means of exercising their sophisticated modes of thought.

Next issue: Purchasing software for children. **SL**

IMPROVING THE CLASSICS

Can you identify all the literary lights in this shimmering cascade? If they were alive today and writing interactive fiction, you probably could. Unfortunately, they're mostly all dead, and what they wrote were things called books, a generally nonvisual medium with very low gaming value, which explains their relative anonymity today.

But you'll have to identify them all, anyway. Number a sheet of paper corresponding to the number of authors pictured here, putting what you believe to be the correct name next to the corresponding number. The first entry drawn that correctly identifies all present will win its author a $50 advance on his or her next computer novel.

Send to Softline I.D., Box 60, North Hollywood, CA 91603.

Postmark deadline: October 7, 1983.

Heck, That's Just the Entry Requirement. You can go considerably further than that, if you dare. What if . . . they *were* alive today? What if they were paving the way for the future of interactive fiction? What would they write? You tell us.

Pick one novel by one of these authors. Choose a chapter or scene from the book and write about two screens' worth of text based on your idea of a computer adaptation of that work. (Those without printers may employ a stylus/foolscap interface in printout simulation mode.) Can't afford a book? Never read one? You may fake it and create a scene that the author might have created—much tougher. You should strive to preserve the author's style within the computer game format. A definite tie-breaking feature would be any kind of logic puzzle that you may be able to toss in within the context of the story. Be sure to identify the author and work you are adapting.

The adaptation of highest computer literary merit will receive, shall we say, $300 worth of the author's chosen software. Send to Softline CompLit, Box 60, North Hollywood, CA 91603.

Postmark deadline: November 10, 1983. ⬛

Softline Classics Contests, Box 60, North Hollywood, CA 91603
☐ Yes! I know who all these bozos are, but that's as far as I'll go!
☐ No! Never saw 'em before, but boy can I write!
☐ Yes, yes! I know them all and I can write, too!
I am: _____
I'm at:_____
Answering machine: _____
☐ I can write just like: _____
☐ Mine is a completely original work.
Stuff you can give me: _____
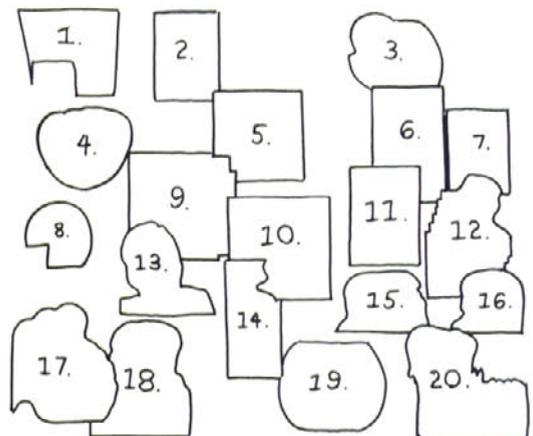
CAN A COMPUTER GAME MAGAZINE MAKE YOU CRY?

Game/Publisher   Score   Player

Game/Publisher	Score	Player
A.E. (Apple), Broderbund	241,900	Matt Schwartz, Andover, NJ
A.E. (Atari), Broderbund	*77,700	Bob Albright, York, PA
Action Quest, JV Software	*20/95	Michael Lurie, Lincolnshire, IL
Airstrike, English	*23,730	Dean Rekich, Prospect, PA
Alien Defense, Soft Sector Marketing	*185,750	Doug Azzarito, Gainesville, FL
Alien Swarm, InHome	*1,055,000	Stephen Pitt, Sunnymead, CA
Anteater, Romox	*66,652	Steve Neufeld, Norwalk, CA
Apple Cider Spider, Sierra On-Line	*1,110,000	Chris MacChesney, Fresno, CA
Apventure to Atlantis, Synergistic	*2,225	Steven Schwartz, Pittsburgh, PA
Arena 3000, Med Systems	*134,650	Warren Benson, San Jose, CA
Artesians, Rena-Soft	*13,178	Thomas Kirk, Huntington Beach, CA
Asteroids, Atari	*5,293,750	John Mellott, Orlando, FL
Astro Chase, Parker Bros.	*448,947	Bob Albright, York, PA
Attack Force, Big Five	*996,560	Kevin Bolduan, Lake Oswego, OR
Axis Assassin, Electronic Arts	*568,350	Kenneth Lui, San Francisco, CA
Aztec, Datamost	*Level 8/1,096,486	Peter Meyer, Carmel Valley, CA
Baja Buggies, Gamestar	*67.40 M.P.H.	Jim Burkhard, Boonton, NJ
Bandits (Apple), Sirius	*889,855	Terry Donahue, Oakland, NJ
Bandits (Atari), Sirius	*188,390	Barry Landgarten, Douglaston, NY
Battlesight, Versa	*Level 5/373,500	Mark Wedel, Saratoga, CA
Bell Hop, Hayden	*56.31	Curtis Weber, Diamond Bar, CA
Bezare, Southwestern Data	*164,602	Carl Webb, Vista, CA
Bez Off, Bez	*430,000	Hymie Shellfrine, Westminster, CA
Blister Ball, Creative Computing	(1 player) Level 11/1,271	Bruce Mah, Fresno, CA
Blue Max, Synapse	*4,700	David Zeve, Dallas, TX
Boa, Micro Magic	*Level 9/43,830	Steven Schwartz, Pittsburgh, PA
Bolo, Synergistic	*Level 9/10,017	Thomas Kirk Almroth III, Huntington Beach, CA
Bug Attack (Apple), Cavalier	*587,303	David Rahmel, Encinitas, CA
Bug Attack (Atari), Cavalier	*54,385	John Thorning, Bayonne, NJ
Buried Bucks, Analog	Level 27/274,231	Mike Kerekes, Colorado Springs, CO
Buzzard Bait, Sirius	*9,110	Buell Hollister III, Shelburne, VT
Canyon Climber (Apple), Datasoft	*393,800	Kahil Doty, Gainesville, FL
Caverns of Freitag, Muse	*Level 9/19,823	Steven Schwartz, Pittsburgh, PA
Centipede, Atari	*5,056,802	John Mellott, Orlando, FL
Chicken (Atari), Synapse	*173,640	Pamela Duke, Lompoc, CA
Chomper, MMG	*29,100	Ed Mixon, Ypsilanti, MI
Cosmic Fighter, Big Five	276,560	Mike Bolduan, Lake Oswego, OR
Cosmo Mission, Astar Int'l	*8,540	Kaveh Ghazi, Teaneck, NJ
Cricketeer, Software Farm	55,360	Brian Gieler, Skokie, IL
Crime Wave, Penguin	10,600	Buell Hollister III, Shelburne, VT
Crisis Mountain (Apple), Synergistic	*367,596	Wei-How Chung, Seal Beach, CA
Crisis Mountain (Atari), Synergistic	*186,403	Frank Pennisi, Jr., Walnut Creek, CT
Crolon Diversion, Cload	*7,300	Chris Athanas, Topsham, ME
Crush, Crumble, and Chomp, Epyx	*1,283,900	Lee Stafford, Phoenix, AZ
Cyclod (Apple), Sirius	966,518	Rich Dellinger, Stillwater, OK
Cytron Masters (Apple), Strategic Simulations	*Level 3/26,150	Mike Cline, Cupertino, CA
David's Midnight Magic (Atari), Broderbund	808,000	Mike Kerekes, Colorado Springs, CO
Dawn Patrol, TSR Hobbies	*18,207	Murry Burns, Tuscumbia, AL
Defender, Atari	*19,005,775	Jeff Griffen, Bellevue, WA
Defense Command, Big Five	120,380	Mike Bolduan, Lake Oswego, OR
Deluxe Invaders, Roklan	*26,850	Bobby Moy, New York, NY
Demon Seed, Trend	*28,330	Neil Kincaid, Topsham, ME
Dig Dug, Atari	*797,110	Paul Cunningham, Oklahoma City, OK
Donkey Kong, Atari	*85,600	Reginald Greene, Carson, CA
Double Trouble, Bez	*41,546	David Levine, Potomac, MD
Dragon Fire, Dakin 5/Level 10	*Level 5/409,000	Brian Service, Exton, PA
Epidemic, Strategic	*765	Jay Edwards, Phoenix, AZ
Escape from Vulcan's Isle, Epyx	13,580	Roe R. Adams III, Hyde Park, MA
Evolution, Sydney	*Expert/14,606	David DuPlantis, Bloomington, IN
Exterminator, Winner's Circle	22,469	Theodore Chen, Potomac, MD
Falcons, Piccadilly	*806,800	Hymie Shellfrine, Westminster, CA
Firebug, Muse	10,060	Steven Kahn, Jamaica, NY
Fly Wars, Sirius	98,190	Russell Willis, Glasford, IL
Flying Saucers, Radio Shack	*1,013	Chris Athanas, Topsham, ME
Fort Apocalypse, Synapse	190,809	Darryl May, Piedmont, CA
Frazzle, Muse	*56,850	Gary Penacho, Tallmadge, OH
Free Fall, Sirius	*28,432	Alan Chang, Honolulu, HI
Frenzy, Softape	*26,500	David Levine, Potomac, MD
Frogger (Apple), Sierra On-Line	*53,690	Lance LaRue, Burton, OH
Frogger (Atari), Sierra On-Line	*271,655	Tad Hamilton, New York, NY
Galactic Attack, Sir-tech	*6,320	Joseph Rossi, Pacific Palisades, CA
Galaxy Gates, Magnasoft	*60,300	Steve Cloutier, East Greenwich, RI
Ghost Encounter, JV Software	20/92	Ron Stanley, San Leandro, CA
Gorf, Roklan	59,460	Pat Todd, Palo Alto, CA
Gorgon, Sirius	*200,640	Hymie Shellfrine, Westminster, CA
Grapple, Insoft	*215,500	Mort Goodman, Orange, CA
Guadalcanal Campaign, Strategic Simulations	*2,655	Greg Munsell, Las Vegas, NV
Guardian, Continental	*128,180	Tom McDonald, Huntsville, AL

HIGH SCORES

Highlines

Scores can be accepted only when accompanied by the following: Your name and full address, the name of the company that manufactures the game, your make of computer, and the level of difficulty on which the score was achieved, where applicable.

An asterisk indicates a verified high score and is bestowed only when said score is accompanied by the legal signature of a witness.

Send your high scores to High Scores, Softline, Box 60, North Hollywood, CA 91603. It would be appreciated if you could jot down the game name(s) and scores in a corner of the envelope.

Next High Scores deadline: 7:00 p.m. EST, October 9.

How high is high? **Curtis Weber** notes that he matched the first *Zaxxon* high score to appear here after playing for five minutes. "I have since tripled the score and sent it in, and there will be others that will beat my high, but at least I can be proud of the score I received. In the future I hope to see real high scores and not a five-to-ten-minute high." Well, here's the rub. When a game has just hit the market and everybody's just started playing it, we'll receive scores that, in all probability, are not representative of what a seasoned gamer with a ready store of techniques for that game could actually achieve. Those scores will come later, when the techniques are better known. In the meantime, the average gamer gets a little time in the spotlight here, having been in the right place at the right time. They get one season of glory; the pros go to the Hall of Fame. That's the way it works.

David Kaplow, an instant Hall of Famer, having broken the *Gamma Goblins* all-time high, suggests that he and any other such record-beating hotshots deserve a little extra something, a "special prize" in recognition of such a feat, other than "the dubious distinction of having his or her name printed in your magazine and a chance at beating the random number generator." Indeed they do, David, and we want that something special to be something special. We're making a list and checking it twice, and when we're ready to spring it on you, you'll be among the first to know.

By the way, some people are pretty eager for the dubious distinction of having their names printed here. Even **Mike Crossmire**, who couldn't get a letter printed in *Time*, has been unable to get a high score on *Bandits* for the fifth straight month of trying and "can't take any more rejection. I've got to appear in *some* magazine!"

Theodore Chen would like to know, among other things, if **Hymie Shellfrine** played *Repton* for over thirty hours; what **Dennis Heaton** found

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Game/Publisher Score Player

Game/Publisher	Score	Player
Hard Hat Mack, Electronic Arts	*960,421	Hymie Shellfrine, Westminster, CA
Hazard Run, Artworx	*135,880	Dick Warmack, Jackson, MS
Heli-Lifter, Cload	*31,895	Chris Athanas, Topsham, ME
High Orbit, Gebelli	*28,860	Gilbert Huang, Stony Brook, NY
Human Fly, CPU	184	David Schulman, South Orange, NJ
Hungry Boy, California Pacific	*59,140	C.J. Keudell, Brush Prairie, WA
Hyper Head On, Star Craft	*185,440	Dean Sussman, Studio City, CA
Ice Cave, Winner's Circle	Level 5/25,950	Theodore Chen, Potomac, MD
Ice Demons, Morningstar	*(1 player) 48,990	Steve Williams, Seattle, WA
Ice Demons, Morningstar	*(2 player) 612,290	Dan Knight and Steve Williams, Seattle, WA
Intruder Alert, Dynacomp	*Level 4/4,584	Dan Perrigan, Norwalk, CA
Invasion Force, Computhings	*91,270	Joe Reitz, Barton, NJ
It's the Pits, Sage Brush Software	*47,150	Buell Hollister IV, Shelburne, VT
Jawbreaker II (Apple), Sierra On-Line	*536,790	Amy Hollister, Shelburne, VT
Jellyfish, Sirius	*Level 8/405,600	Dennis Heaton, Hampton, GA
Journey to the Planets, JV Software	4,205	Ron Stanley, San Leandro, CA
Jovian, Computer Shack	*28,650	Neil Kincaid, Topsham, ME
Juggler, IDSI	*961,460	John Osborne, Menlo Park, CA
Juice, Tronix	*24,210	David Zeve, Dallas, TX
Jump Jet, Avant-Garde	*38,160	Aron Danburg, Houston, TX
Jumpman, Epyx	*Loop/Level 25/67,900	J. Ralph Sowell, Jr., Jackson, MS
Jumpman Jr., Epyx	*10,075	David Zeve, Dallas, TX
Jupiter Lander, Commodore	47,300	Chris Chekel, Granada Hills, CA
Kid Grid, Tronix	*33,860	Bobby Moy, New York, NY
K-Razy Kritters, CBS	*291,100	Thomas Buchmann, North Hollywood, CA
K-Star Patrol, CBS	*35,640	William Chiang, New York, NY
Labyrinth, Broderbund	*210,500	Darcy Higden, Livonia, MI
Laf Pak: Apple Zap, Sierra On-Line	*56,225	Peter Meyer, Carmel Valley, CA
Laf Pak: Creepy Corridors, Sierra On-Line	*9,740	Wilbur Luo, Walnut Creek, CA
Laf Pak: Mine Sweep, Sierra On-Line	*9,533	Chris MacChesney, Fresno, CA
Laf Pak: Space Race, Sierra On-Line	*14,500	Steve Rothenberg, Mayfield Heights, OH
Laser Defense, Med Systems	*44,960	Chris Athanas, Topsham, ME
Laser Maze, Avant-Garde	*87,083	Mike Elliott, Muncie, IN
Lazer Silk, Gebelli	*896,550	Gilbert Huang, Stony Brook, NY
Leaper, Cedar Software	*12,400	Travis Beauboin, Topsham, ME
Lemmings, Sirius	*449,604	Hymie Shellfrine, Westminster, CA
Lode Runner, Broderbund	*Level 201/2,164,000	Ron Bunch, Collegedale, TN
Lunar Leeper, Sierra On-Line	*174,560	Richard Bird, Cottage Grove, OR
Mad Netter, Computer Magic	*61,746	William Chiang, New York, NY
Marauder, Sierra On-Line	Level 2/463,800	Jay Trotta, Baltimore, MD
Mars Cars, Datamost	*Level 30/64,670	Brian Ballard, Bow, NH
Megalegs, Megasoft	*19,009	Barry Landgarten, Douglaston, NY
Meteor Mission Two, Big Five	*100,780	Mike Bolduan, Lake Skyland, OR
Microbe, Synergistic	13,716	Buell Hollister IV, Shelburne, VT
Microwave, Cavalier	53,499	Richard Olsen, Deerfield, WI
Miner 2049er (Apple), Micro Fun	*2,600,040	Hymie Shellfrine, Westminster, CA
Miner 2049er (Atari), Big Five	*Zone 8, Station 10/582,205	Robert Rendahl, Torrance, CA
Ming's Challenge, Micro Fun	*36,470	Buell Hollister III, Shelburne, VT
Missile Command, Atari	*10,985,275	John Mellott, Orlando, FL
Money Muncher, Datamost	705	Tom Luhrs, Floral Park, NY
Moon Landing, Herb Sandy	*1,017	Kaveh Ghazi, Teaneck, NJ
Mountain King, CBS	*50,130	David Zeve, Dallas, TX
Ms. Pac-Man, Atari	37,520	John Allen, Mountain Lakes, NJ
Mutant, Great Lakes	*2,500,266	John Osborne, Menlo Park, CA
Nautilus, Synapse	*(1 player) 154,400	John Mellott, Orlando, FL
Necromancer, Synapse	*204,651	Ron White, Great Barrington, MA
Night Crawler, Softape	289,407	Michael Tsao, Watsonville, CA
Nightmare Gallery, Synergistic	*299,500	Howard Breinan, Glastonbury, CT
Night Mission Pinball, SubLogic	*749,653,240	Eric Gustafson, Eugene, OR
Norad, Southwestern Data	*8,540	Buell Hollister IV, Shelburne, VT
Odyssey, Synergistic	*1,173,400	Casey Lamson, Tucson, AZ
Outpost, Sirius	*31,267	Charles Destrempes, Whitinsville, MA
Paddle Pinball, Radio Shack	*215,010	Chris Athanas, Topsham, ME
Pandora's Box, Datamost	*33,750	Colin DuPlantis, Bloomington, IN
Penetrator, Melbourne House	*15,810	Chris Athanas, Topsham, ME
People Pong, Unique Software	*18,925	Klaus Liebold, Poway, CA
Pest Patrol, Sierra On-Line	*Level 29/10,336	Chris Stajdel, Trenton, NJ
Phaser Fire, Datamost	*7,045	Christopher Chan, Trenton, NJ
Phobos, APX	*172,200	Bobby Moy, New York, NY
Picnic Paranoia, Synapse	*144,360	Jonathan Hopwood, Glastonbury, CT
Pie Man, Penguin	*425	Kevin Rehak, Woodland Hills, CA
Pillbox, Lord of the Games	17,100	Theodore Chen, Potomac, MD
Pogoman, Computer Magic	673,430	Jim Mahoney, Plainview, NY
Pole Position, Atari	77,950	John Allen, Mountain Lakes, NJ
Pollywog, Top Notch	*294,765	Matt Yuen, Van Nuys, CA
Preppie, Adventure Int'l	*140,120	Kermit Carter, Boise, ID
Preppie II, Adventure Int'l	*Level 5/40,150	Mike Kerekes, Colorado Springs, CO
Protector II, Synapse	*25,750	Bobby Moy, New York, NY
Qix, Atari	*727,794	Paul Cunningham, Oklahoma City, OK

at the end of the maze in *Thief*; what board **John Osborne** got to in *Mutant*; and if **Eric Gustaffson** "fixed his *Night Mission Pinball* score." Actually, several people would like to know that. Eric?

Okay, now let's yank out the random number generator and draw up three lucky people to receive a random honorarium—$34.95, this time out—for having graced these pages in our previous issue. And the winners are:

Apple: Rich Dellinger, *Cyclod*
Atari: Rob Hammond, *Protector*
Overall: Richard Caldwell, *Bandits*

If you send us your addresses, we'll send you your money. If you don't, we won't.

Next ish: "Hymie Shellfrine: Man or Myth?"

Hall of Fame
The mightiest of the mighty. Any scores submitted in contest to any of the below must be verified.

They must be accompanied by a complete address and phone number.

They must be accompanied by a detailed description of the progress of play of the winning game.

All verifications are subject to check.

Andromeda, Joey Grisaffi, 118,000
**Autobahn**, Patrick Moran, 2,183
Avalanche (Atari), Brian Hall, 1,812
Beer Run, Robert Skell, 12,152
Bezman, Harry Ilg, 227,873
Blister Ball (2 Player), Neil Radick and Kerry Shetline, 7,164
Borg, Jeff Rosenberg, 26,030
Candy Factory, Kevin Moore, 1,198,900
Cannonball Blitz, Bill Shean, 1,390,120
Canyon Climber (Atari), Terry Rora, 92,800
Caverns of Mars, Tak Szeto, 796,900
Ceiling Zero, Denise Achram, 71,490
Chipout, Jason Meggs, 21,630
Chomper, Ed Mixon, 29,100
Clowns and Balloons, Dave Albert, 281,820
Congo, D.K. Ullman, 31,362
County Fair, James Baker, 4,205
Crazy Mazey, Greg Burnberger, 105,600
Crossfire (Apple), Brian Condon, 1,120,310
Crossfire (Atari), John Shaw, 2,000,770
Crossfire (IBM), Craig Stinson, 143,320
Cyclod (Atari), Chris Conway, 275,715
Cytron Masters (Atari), David Schlatter, 21,290
Dark Forest, Allen Holland, 16,364
Datestones of Ryn, Eric Vesper, 5,530
David's Midnight Magic (Apple), Brian Whitworth, 2,803,110
Dodge Racer, Ed Mixon, 5,350
Dragon's Eye, Bruce Schlickbernd, 4,723
Eliminator, Mark Klemczak, 478,900
Escape, Dan Steele, 245,400
Escape from Arcturus, Gary Penacho, 6,660
Galactic Chase, King Mon Yee, 40,000
Galactic Empire, Jeff Parrish, 3,217
Galaxian, Jomo Starke, 40,500
Galaxy Invasion, Leonard Marinaccio, 2,612,000
Galaxy Travel, James Marcolesco, 69,350
Galaxy Wars, Brian Donnelly, 53,700
Gamma Goblins, David Kaplow, 18,360
Genetic Drift, Tom Bredehoft, 1,020,000
Ghost Hunter, D.B. Wormington, 119,210
Golden Mountain, Scott Sanchez, 2,202,400
Gold Rush, Lee Stafford, 2,136,000
Hadron, Greg Bartlett, 604,765
Head-On, Steve Cloutier, 234,580
Horizon V, George De La Mater, 100,005
Hungry Boy, Mike Williams, 43,770
Hyper Head-On, Bob Elvey, 85,890
Intruder Alert, Dan Perrigan, 4,584
Jawbreaker I (Apple), Horace Gower, 280,615
Kamikaze, Jason Meggs, 207,125

Kayos, Randy Feldman, 51,460
K-Razy Antics, Kevin Moore, 246,000
K-Razy Shoot-out, Daniel Rosman, 35,270
Laf Pak: Apple Zap, David Duplantis, 44,025
Mar Tesoro, Michael Prater, 149,561,409
Meteoroids in Space, Robert Pettit, 555,335
Missile Attack, Chris Athanas, 32,580
Missile Defense, Bruce Schlickbernd, 429,000
Mission Escape, Steve Allen, 3,161
Monster Mash, Jim Stockla, 207,530
Morloc's Tower, John Coffee, 29,253
Mouskattack (Apple), Mark Zeitler, 89,100
Mouskattack (Atari), Jeff Connor, 240,100
Nautilus, Rob Hammond, (2 Player) 321,000
Neptune, Mike Mariant, 31,820
Night Falls, Steven Schwartz, Level 1/36
Outpost, Charles Destrempes, 31,267
Pacific Coast Highway (Atari), Keith Babcock, 146,940
Pac-Man, King Mon Yee, 422,860
Pathfinder, Brian Hall, 25,254,326
Peeping Tom, Curtis Rae, 17,900
Pegasus II, Joel Frickhoeffer, 295,840
Phantoms Five, Steve Rothenberg, 42,670
Photar, Mike Novak, Jr., 108,236
Pig Pen, Buell Hollister IV, 344,640
Planetoids, Jason Meggs, 584,160
Plattermania, Bobby Moy, 241,022
Protector, Rob Hammond, 63,000
Pulsar II, Eric Vesper, 61,968
Raster Blaster (Atari), John Mellott, 1,837,500
Rear Guard (Atari), Joey Grisaffi, 77,530
Red Alert, Michael Yang, 82,800
Roach Hotel, Mike Post, 12,350
Sabotage, Steve Cloutier, 86,431
Shamus, Jonathan Hopwood, 223,080
Shooting Arcade, Robert Gobelbecker, 94,740
Shooting Gallery (Apple), Steve Rothenberg, 3,495
Slime, Terry Rora, Storm 34/227,730
Snack Attack (Apple), Chris Wysocki, 22,984
Snake Byte (Apple), Lisa Kislan, 2,698,800
Snake Byte (Atari), George Becker, 25,590
Sneakers (Apple), Marc Brodsky, 1,035,982
Space Ace, Bobby Moy, 21,510
Space Adventure, Chris MacDonald, 1,000
Space Album: Death Star, Dave Ness, 1,391
Space Album: Tail Gunner, Charles Destrempes, 53,010
Space Eggs, Joel Frickhoeffer, 75,115
Space Quarks, Clark Alyea, 31,870
Space Raiders, John Yee, Galaxy Commander: 296
Space Warrior, William Tung, 44,441
Speedway Blast, Tommy Yang, 6,342,146
Spy's Demise, Curtis Rae, 63,968
Star Blaster, Chris MacChesney, 416,000
Star Dance, Michael Steiner, 3,605
Star Raiders, John Broas, 6,342,146
Star Thief (1 Player), Clark Alyea, 30,110
Star Thief (2 Player), Craig Wilson, 48,280
Star Warrior, Ron Felder, 1,872
Stellar Invaders, Wayland Lim, 208,330
Stellar Shuttle, Lou Arevalo, 12,460
Suicide, Joey Grisaffi, 97,030
Super Breakout, Fred Di Cesare, Progressive/4,580
Super Breakout, Fred Di Cesare, Double/2,656
Super Invader, Chris Wysocki, 99,840
Super Nova, Leonard Marinaccio, 222,310
Super Taxman II, Scott Brown, 225,490
Taipan, Dave Butler, $12.9 trillion
Tanktics, Jeff Zeissner, 606
Taxman, Eggy Paul, 999,980
Threshold (Apple), James Baker, 751,000
Threshold (Atari), Ron Felder, 309,500
Torax, Dale Archibald, 34,780
Track Attack (Apple), Brian Donnelly, 53,341
Track Attack (Atari), Chris Conway, 40,497
Tranquility Base, Brian Donnelly, 1,800
Tsunami, Kerry Shetline, 12,336
Tumblebugs (Apple), Kent Hathaway, 15,130
Twerps, Dick Nitto, 6,250
Wormwall, Tom McDonald, 178,768

Game/Publisher   Score   Player

Game/Publisher	Score	Player
Quadrant 6112, Sensible	*210,100	Hymie Shellfrine, Westminster, CA
Raiders of the Lost Ring, Cavalier	*191,210	Jeff James, Narragansett, RI
Rear Guard (Apple), Adventure Int'l	*600,423	Hymie Shellfrine, Westminster, CA
Repton, Sirius	*9,874,650	Keith Armonaitis, Rochelle Park, NJ
Rescue at Rigel (Apple), Epyx	1,557	Bruce Schlickbernd, Westminster, CA
Roach Hotel, Micro Lab	*13,510	Frank McCoy, Poway, CA
Roadblock, SubLogic	374	Theodore Chen, Potomac, MD
Robot Attack, Big Five	19,210	Mike Bolduan, Lake Oswego, OR
Robot Battle, Universal	*6,376,400	Billy Comess, Virginia Beach, VA
Rocket Command, Norell	*1,028,385	Pepe Caridad, Stamford, CT
Russki Duck, Gebelli	*375,000	Brian Schneider, Des Moines, IA
Sabotage, Sierra On-Line	99,893	Steve Cloutier, East Greenwich, RI
Sammy Lightfoot, Sierra On-Line	*69,120	Chris MacChesney, Fresno, CA
Sanitron, Winner's Circle	13,390	Theodore Chen, Potomac, MD
Scarfman, Cornsoft	*303,780	Roger Palmer, North Hollywood, CA
Sea Dragon, Adventure Int'l	*463,200	Doug Zavodny, North Hollywood, CA
Seafox, Broderbund	*1,940,050	Hymie Shellfrine, Westminster, CA
Sentinel I, InHome	*64,450	Tom Meyers, Chapel Hill, NC
Serpentine, Broderbund	*Level 275/75,433,900	H.A. Dickson, Dallas, TX
Shadow World, Synapse	*111,200	Robert Proudfoot, Long Beach, CA
Shamus, Synapse	*300,605	Jonathan Hopwood, Glastonbury, CT
Shamus: Case 2, Synapse	83,250	Mike Kerekes, Colorado Springs, CO
Shark Trap, Broderbund	*10,705	Matt Yuen, North Hollywood, CA
Sheila, H.A.L. Labs	*464,900	Hymie Shellfrine, Westminster, CA
Shooting Gallery (Atari), Analog	*28,620	Pamela Duke, Lompoc, CA
Shuttle Intercept, Hayden	*13,500	Clark Alyea, Bloomington, IN
Sigma 7, Bandinelli	*1,800	Blane Sibille, Jr., Opelousas, LA
Snake, Heath	*Progressive/282,550	John Picken, Garden Grove, CA
Snake (IBM), PDQ Software	*468	Peter Quinn, Pinole, CA
Snapper, Silicon Valley	144,759	Jean-Michael Decombe, Vaucresson, France
Sneakers (Atari), Sirius	*Level 5/76,402	Frank Pennisi, Jr., Walnut Creek, CT
Space Album: Asteroids, California Pacific	*2,592	Alan Chang, Honolulu, HI
Space Avenger, Cload	*10,350	Chris Athanas, Topsham, ME
Space Eggs (Atari), Sirius	*4,045	Lee Warren, Kelseyville, CA
Space Invasion, SSM	*6 Racks/74	Chris Athanas, Topsham, ME
Space Kadette, Funtastic	*325	Steven Chang, Honolulu, HI
Space Warp, Radio Shack	*Level 8/255	Chris Athanas, Topsham, ME
Spectre, Datamost	22,600	Martin Hrovat, Slidell, LA
Spider Raid, Insoft	*6,225	Rick Lilly, San Diego, CA
Starbowl Football, Gamestar	*College Level/28	Tommy Bennett, Jonesboro, LA
Star Cruiser, Nasir	*11,640	Alan Chang, Honolulu, HI
Star Island, Binary Software	*87,370	Tim Caldwell, Baltimore, MD
Star Maze, Sir-tech	Level 16/172,925	David Sneid, Shawnee Mission, KS
Star Warrior, Epyx	3,731	Ron Stanley, San Leandro, CA
Stellar Escort, Big Five	*19,300	Chris Athanas, Topsham, ME
Stellar Shuttle, Broderbund	*17,200	Bobby Moy, New York, NY
Stickybear Bop, Xerox Educational	*Level 4/225,040	Chandin Wilson, Kremlin, MT
Stratos, Adventure Int'l	*Expert/82,100	R.J. Forbes, Oak Park, IL
Strike Force, Melbourne House	*433,900	Chris Athanas and Neil Kincaid, Topsham, ME
Succession, Piccadilly	10,300	Bill Elvey, Grand Rapids, MI
Super Puckman, ADO Software	*80,010	Stanley Chen, Potomac, MD
Super Taxman II, H.A.L. Labs	*647,580	Wei-How Chung, Seal Beach, CA
Survivor, Synapse	*(1 player) 311,920	David Schlater, Metairie, LA
Survivor, Synapse	*(2 player) 332,760	Alro Anderson and Dave Hilderbrand, San Jose, CA
Swashbuckler, Datamost	*6,702	Frank Pennisi, Jr., Walnut Creek, CT
Taipan, Avalanche	*$23.5 Trillion	Mike Belsley, Oakbrook, IL
Tanktics, Avalon Hill	*854	John Virostek, Chicago, IL
Teleport, Cavalier	*Level 12/13,150	Devon Tuck, Danville, CA
Tharolian Tunnels, Datamost	*134,607	Steven Gazis, Queens, NY
Thief, Datamost	303,600	Dennis Heaton, Adak Island, AK
Thunderbird, Urban Software	*1,000,000	Peter Meyer, Carmel Valley, CA
Thunder Bombs, Penguin	*20,360	Buell Hollister IV, Shelburne, VT
Track Attack (Apple), Broderbund	56,417	Eugene Witzmer, Whitewater, WI
Tubeway, Datamost	*90,801	Jim Stockla, Shelton, CT
Tumblebugs (Atari), Datasoft	*38,785	Tad Hamilton, New York, NY
Tunnel Terror, Adventure Int'l	*324,387	Brian Service, Exton, PA
Turmoil, Sirius	*83,540	Bobby Moy, New York, NY
U-Boat Command, Synergistic	*2,189	Peter T. Clark, Sacramento, CA
Viper, RDA Systems	*7,917	Doug Zavodny, North Hollywood, CA
Vortex, Datamost	*48,230	Lee Stafford, Phoenix, AZ
Wall War, Sierra On-Line	*68,940	William Chiang, New York, NY
Warp Destroyer, Piccadilly	*89,950	John Osborne, Menlo Park, CA
Wavy Navy, Sirius	*88,780	John Osborne, Menlo Park, CA
Wizard of Wor, Roklan	*498,300	Bernard Gagne, Newmarket, NH
Zargs, Insoft	*3,715	Chris Chan, Trenton, NJ
Zaxxon, Datasoft	*1,400,600	Hymie Shellfrine, Westminster, CA
Zenith, Gebelli	*900,450	Hymie Shellfrine, Westminster, CA
Zero Gravity Pinball, Avant-Garde	*60,430	Hymie Shellfrine, Westminster, CA