JUNE 1984 PUBLISHED BY SCHOLASTIC INC. $1.95

SNEAK PREVIEW INSIDE!
APPLE'S NEW *IIc*

HACKER HEAVEN:
PROGRAMS FOR
ADAM, APPLE, ATARI,
COMMODORE 64
AND VIC-20, IBM, TI,
TIMEX, AND TRS-80

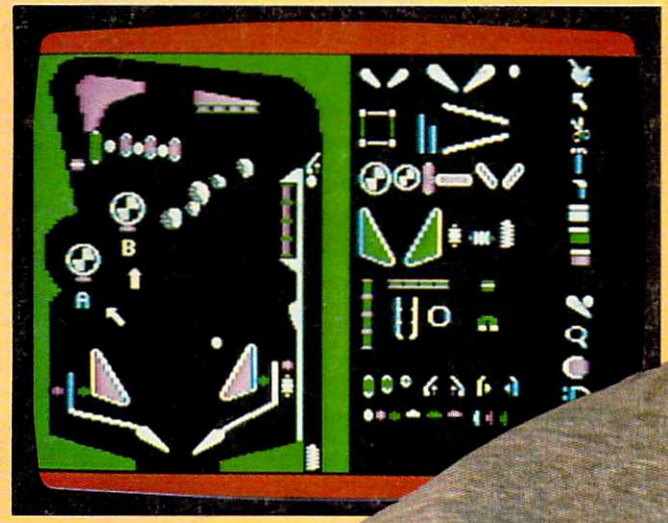
K POWER™

THE MAGAZINE FOR THE COMPUTER GENERATION

Reviews of *The Heist*, *Boulder Dash*, *James Bond: 007* & More!

Scott Adams Interview

Soar with *Flight Simulator II*!



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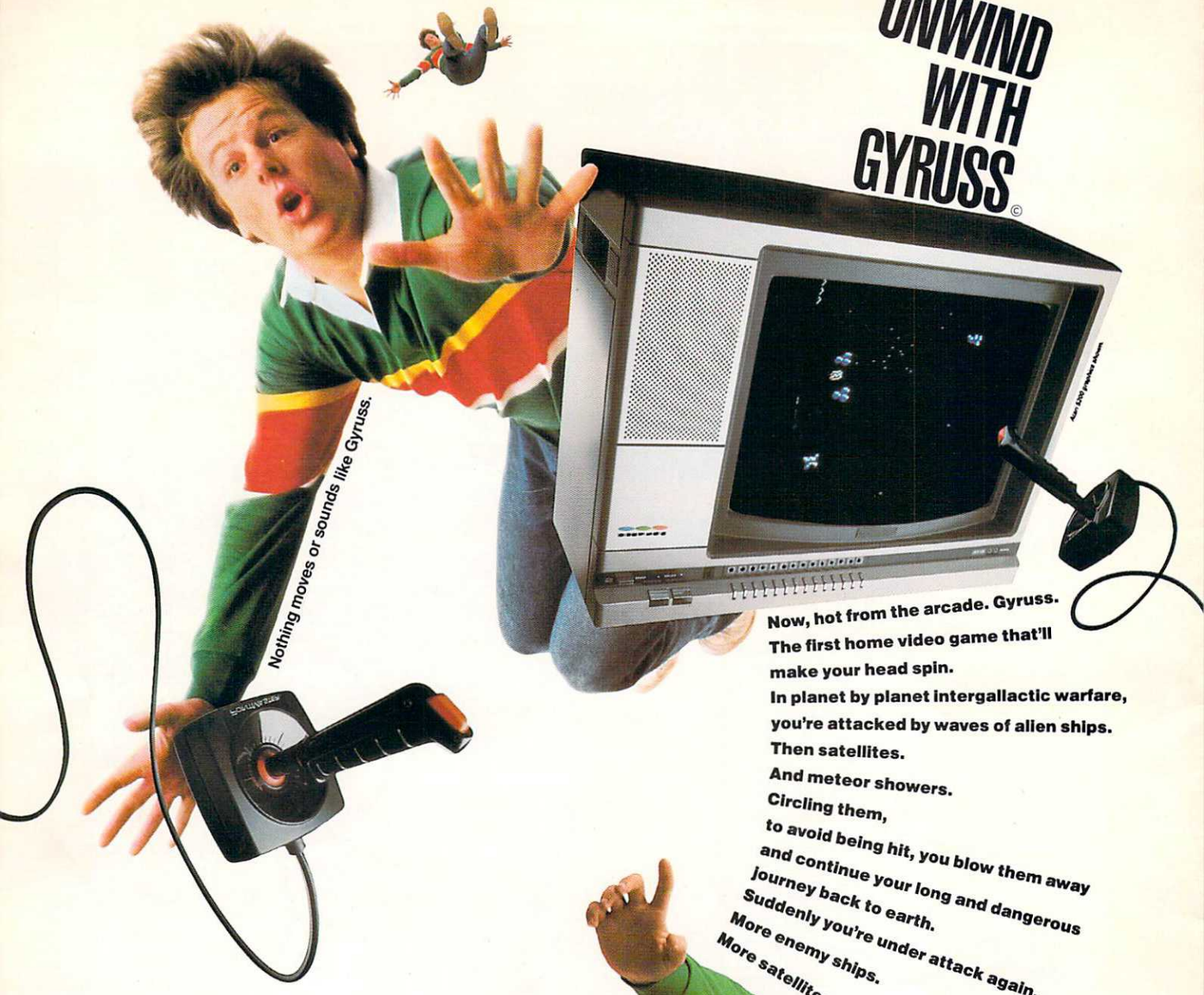
A Day in the Life of BILL BUDGE

UNWIND WITH GYRUSS©



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The first home video game that'll
make your head spin.
In planet by planet intergallactic warfare,
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And meteor showers.
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to avoid being hit, you blow them away
and continue your long and dangerous
journey back to earth.
Suddenly you're under attack again.
More enemy ships.
More satellites.

More meteors.
Faster and more
dangerous. You're
head is spinning
as you continue
on guts and reflexes.
But do you have what it takes
to make it all the way back?
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"hyper" space game.
It flies circles around
all the rest.
For the Atari 2600,
Atari 5200,
ColecoVision,
Commodore 64 and
Atari Home Computers.

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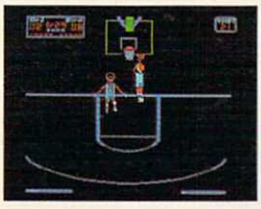
SOFTWARE ARTISTS?

How we got this year's hottest sports game out of two rather inexperienced designers.

TO MAKE THE FIRST BASKETBALL PROGRAM that feels like the real thing, it helps to start with two guys who know what the real thing feels like.

Enter Larry Bird and Julius Erving. Bird – the hustler, the strong man, deadly from outside. Erving – The Doctor, maybe the most explosive player in the history of the game.

We talked to them, photographed them in action, studied their moves and their stats and their styles. Then we set out to create on computer disc an event which may never happen in real life. We put the two of them together on a dream court of light, for an electronic afternoon of one-on-one.

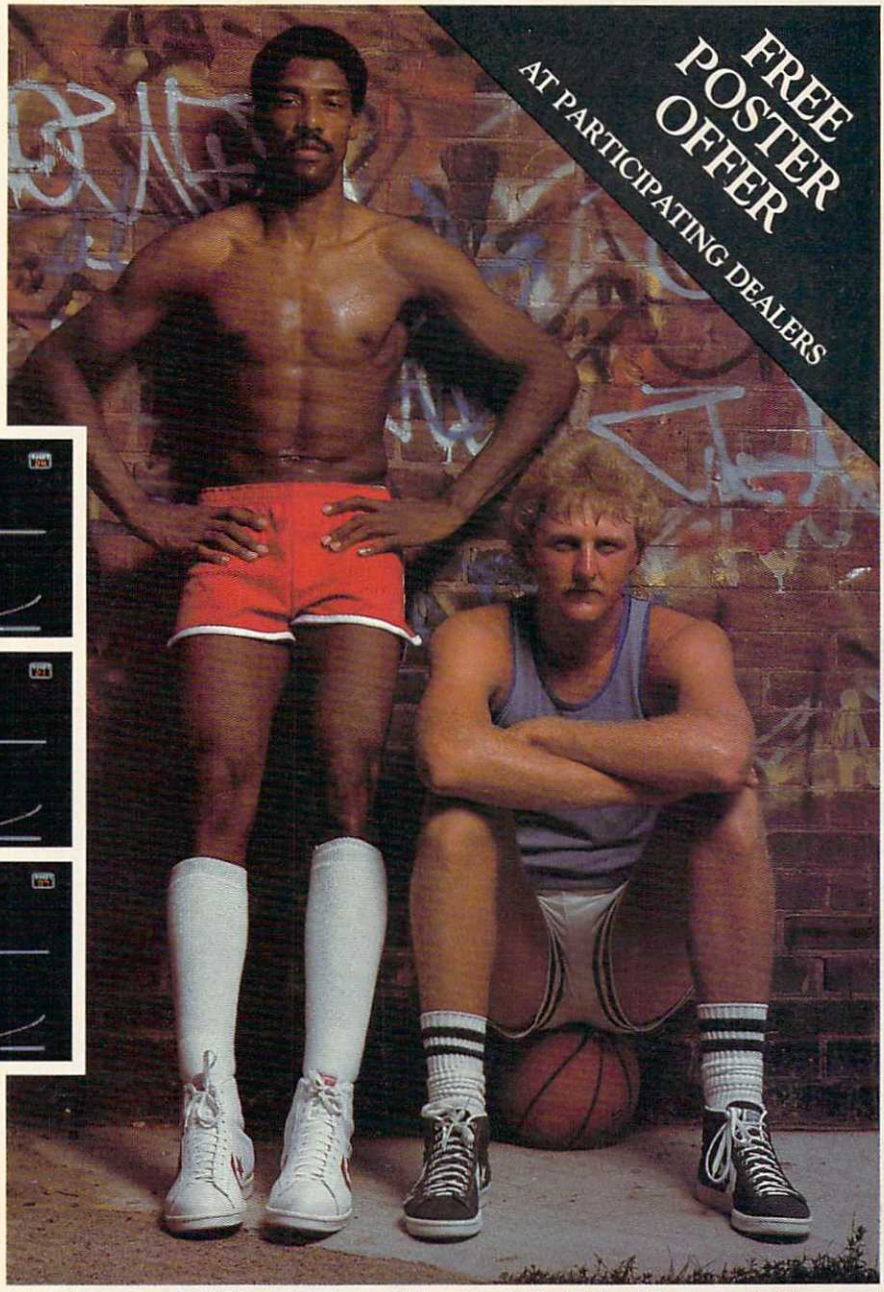


It wasn't easy. When they talked, we listened. When they criticized, we made big changes. When they gave suggestions, we took them.

And it shows. This thing is absolutely uncanny. You actually take on all the skills and characteristics of Bird or The Doctor – their own particular moves, shooting abilities, even strength and speed.

You'll meet with fatigue factors, hot and cold streaks, turnaround jump shots, and 360-degree slam dunks. But there's some whimsy in here, too – a funny referee, a shattering backboard, even instant replay.

It's called *Julius Erving and Larry Bird Go One-on-One.*™ You're Bird. Or you're The Doctor. And that's the last decision you'll have plenty of time to make.



Julius Erving and Larry Bird Go One-on-One is now available on diskette for Apple II, II+, and IIe computers. Apple is a registered trademark of Apple Computer. To find out more about Electronic Arts and its products, write us at 2755 Campus Drive, San Mateo, CA 94403 or call (415) 571-7171. For a free catalog, send a stamped, self-addressed #10 envelope. Also available for the Commodore 64. Coming soon on IBM and Atari home computers.

ELECTRONIC ARTS™

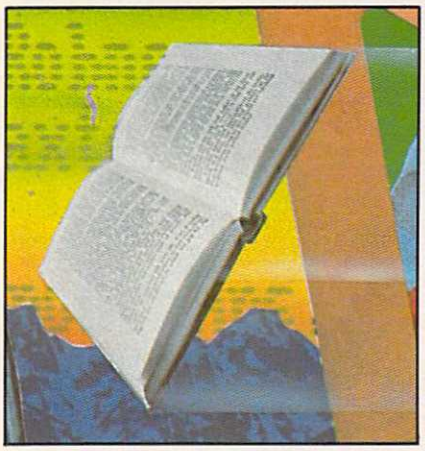
LIST

VOLUME 1 NUMBER 5 JUNE 1984

FEATURES

20 K-POWER MEETS DESIGNER BILL BUDGE
A day in the life of everybody's favorite game designer. Plus, tips on game design and Bill's favorite "hack"!

24 BOOT YOUR BOOKS
Are text adventures based on famous novels the next wave?



27 COMPUTER COMIX!
Meet "Kay Power," and get ready for a new comic each month!

28 GRAPHICS GALLERY
"Mondo Condo"—the strangest apartment complex in the galaxy—right here in our centerfold.

30 SNEAK PREVIEW: APPLE *IIc*
K-POWER gives you an advance look at Apple's new portable!

32 ADVENTURES WITH SCOTT ADAMS
A candid on-line talk with the original adventure-game programmer.

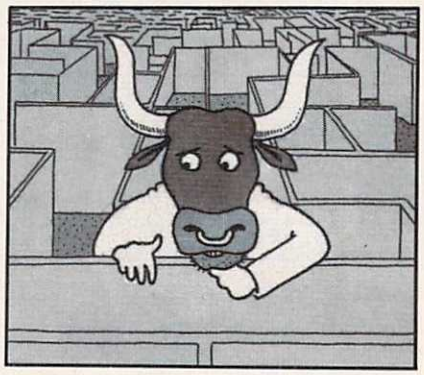
PROGRAMMING

35 HACKER HEAVEN
Find out why our programming section is causing eyes to pop!

40 PROGRAMS
Memory Melody, *Arachnid Art*, and *Energy Probe*—three AWESOME programs. Plus: Compucopia!

46 PIXEL THAT!
Chaos will cause confusion in TIs all across the country.

47 PUZZLE POWER
Get lost! Play the *Minotaur's Labyrinth*.

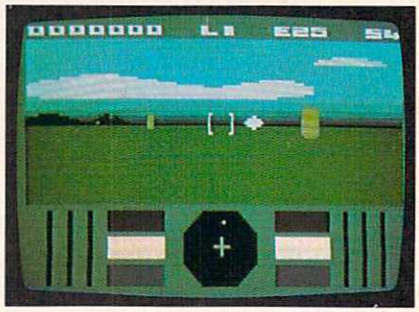


PRODUCTS

48 SCREENING ROOM
Software reviews, strategy, and the latest in new products.

48 RATING GAME
Boulder Dash takes the cake.

Also, *Encounter!*, *The Heist*, *James Bond*, and more!



52 STRATEGY
How to get off the ground with *Flight Simulator II*.

55 RISING STARS
The newest computer hardware.

DEPARTMENTS

4 EDITOR'S NOTE

6 LOGON
Reader feedback.

8 COMPUZINE
K-POWER's mini computer-news magazine. Also, hot scoops from the valley in Silicon Alley, and Scrolling in Dough.

12 DR. KURSOR'S KLINIC
Answers to your technical questions.

14 K-NET
Our national network discusses piracy—whose fault is it? Plus, find out about CompuServe's games SIG.

53 ADVERTISERS' INDEX & READER SERVICE

56 CONTEST
Here's your chance to design the most awesome computer.

Bill Budge cover photo: Rick Browne/Picture Group Apple IIc cover photo: Roger Ressmeyer

All the hits your computer is missing.

If you thought you'd never find fun games for your hardworking home computer, happy days are here. Because now ATARISOFT™ has all the great hits…Pac-Man,[1] Donkey Kong[2] by Nintendo,[2] Centipede,™ Defender,[3] Joust,[3] Jungle Hunt,[4] Moon Patrol,[3] Pole Position,[5] Galaxian,[1] Ms. Pac-Man,[1] and Battlezone.™

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EDITOR'S NOTE

Summer Sneak Preview!

Working on a magazine is like functioning in a time warp. It's weird. Snow is still falling outside my window, but it's time to write the ed's note for the June K-POWER! We think this issue is great, but I don't want to talk about it anymore! Now my head is filled with the fun computing-in-the-sun ideas planned for our July and August issues!

So, I'll let this issue speak for itself. I *can't wait* to fill you in on what's planned for your long summer hours of computing pleasure! Here's a sneak preview:

At The Movies—An interview with the special computer-effects master for the new movie *The Last Starfighter*. And a behind-the-scenes look at H.AL 9000, the computer in *2010* . . . .

Is K.I.T.T. really computerized?

Computers & Cars—K.I.T.T. may be cool, but wait till you see what real computerized cars of the future will look like and do! . . .

Computer Careers—Check out K-P's Job Circuit column (premiering this summer) for statistics on the hottest jobs in computing. Plus profiles of different computing careers—maybe one is right for you. . . .

Dr. Micro—Tom Snyder isn't just a well-known game designer (*In Search of the Most Amazing Thing, Agent U.S.A., Run for the Money*); he's also a hot singer with his own band. Find out what he's up to in the music and game-design worlds! . . .

Computerized Olympics—It looks like the summer Olympics in L.A. would be a disorganized mess without the help of computers—they do almost everything but participate in sports! Plus, meet an Olympic hopeful who has a computer coach. . . .

Microtones—This monthly column by our new programming associate, Joey Latimer, will have you tapping your toes. Look for music programs (some based on popular hits!) for your computer, plus the hottest news about computers in the music business, and great how-to's. (Like how to hook your stereo speakers to your computer!) . . .

Anne Krueger

ANNE KRUEGER Editor

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   Yes ☐ No ☐ (You can find out more at your local computer store)

2. **There are many unique features that are offered only on the Chalk Board PowerPad. We would like to know which is the most important to you. (Please rank 1-5)**
   - ☐ Multi-point contact capability
   - ☐ Large active work surface 12″ x 12″
   - ☐ Allows functions that cannot be performed with a keyboard.
   - ☐ Programmable surface
   - ☐ Graphics/Music/Game Design/Versatility

3. **Which of the following uses of the Chalk Board PowerPad that have already been discovered do you think are most important? (Please rank 1-6)**
   - ☐ Graphics
   - ☐ Music composition
   - ☐ Game design
   - ☐ Special effects
   - ☐ Programming
   - ☐ Learning through discovery

4. **Which of the following uses of the Chalk Board PowerPad currently under development do you consider the most important? (Please rank 1-5)**
   - ☐ Free-form game play
   - ☐ Test preparation (SAT, ACT, etc.)
   - ☐ Custom video design
   - ☐ Laser disk control
   - ☐ Artificial intelligence

5. **What other uses can you imagine for the Chalk Board PowerPad.**

   A. _____

   B. _____

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LOGON

LETTERS

Password Problem

About your articles on computer piracy. I believe that the criminals are also the people who don't change passwords periodically, and that they, too, should be punished. If they had bothered to change the passwords, the hacker might not have wanted to break in and do the damage.

THOM BIANUCCI
Bolingbrook, IL

Dear Thom,

That's an interesting idea. However, if you forgot to lock up your house one night, and a burglar robbed you, would that make you a criminal?

THE EDITORS

The Best

Your new magazine has helped me with computers. I was thinking about buying an ADAM computer, but I wasn't sure because I knew very little about it. But now I do know more, thanks to your magazine. I really like K-POWER. It's about the best computer magazine I've seen for young computer people like myself.

ERIC WATSON
Meridian, MS

"Hacker" Debate

I hope you find this letter propped against your computer screen in response to your request for reader response in your Editor's Note—February 1984.

In Compuzine, John Holmstrom wrote an article, "Backing Hacking," in which he states the word "hacker" has no ties with illegal computing.

Then, on page 17, in the Silicon Alley column, it states that it won't be long before most computer systems have tough security protection that the average "hacker" (same word, you notice) will not be able to break—a reference to the usual unauthorized intrusions of many (if not all, at one time or another) hackers.

Face it—most hackers hone their skills in the challenge of breaking in and raiding information. You admit yourself that the average hacker is trying to break in . . . I think John Holmstrom doth protest too much!

Later, in the article "Pirates and Raiders," I quote: "The reality is that a lot of computer users are performing some less-than-legal computing feats. And they're doing it for the fun of it." To quote Pam Horowitz, "Piracy as a pastime is big."

Fact is . . . the bad press "hackers" are getting is NOT a "bum rap," as John would lead us to believe. Even some of the "hackers" quoted on pages 32 and 33 didn't seem to think illegal access was wrong!!

I hope John rethinks his comments in a future article.

RED SQUIRREL FLYING
Blaine, WA

Dear Red Squirrel Flying,

The point of the "Backing Hacking" article was that not all *hackers break into computer systems. But, even the law-abiding ones get lumped in with raiders, pirates, and other computer criminals. Judging from the mail response to that article, and the others you mentioned, a lot of our readers (many of whom are serious hackers) agree with our point of view. We stand by that article. Just because you're a hacker, it doesn't mean that you're an unauthorized intruder.*

THE EDITORS

Wants Free Posters

Our school recently ordered computers. We were wondering if you could send us any information on where we could obtain posters to decorate our computer room.

LINDA BRZEZINSKI
Bridgeport, CT

Dear Linda,

Try writing to software or computer companies about any free posters or promotional material they can send you. Many companies are happy to send all kinds of stuff. Tell 'em K-POWER *sent you! Plus,* K-POWER*'s February, March, and April issues have free computer-generated posters inside! And our monthly Graphics Gallery centerspreads are pretty popular wallcoverings in* K-POWER*'s offices—try 'em!*

THE EDITORS

Brief Request

I bought K-POWER in February (*Premiere issue*). To make a request as brief as possible, please print me a program or two about the Intellivision, plus more information about Matt Laborteaux.

KIM DOHERTY
Malden, MA

Dear Kim,

We're sorry, but there's no such thing as a program for the Intellivision! That's a video game machine that only runs commercial software. About Matt—if CBS renews "Whiz Kids" for the 1985 season, we'll see what we can do.

THE EDITORS

Awesome!

I have a Commodore 64. I think computers are the most awesome things besides girls.

TONY DOW
Newburyport, MA

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COMPUZINE
VOLUME 1 NUMBER 5

Hacking Hits Broadway

On March 9, a play called "Hackers" opened in New York City, at the Manhattan Punch Line Theater. Playwright Mike Eisenberg, a 27-year-old graduate student at MIT, says he had the idea a long time ago. He wrote "Hackers" because it "seemed like an interesting community—a growing subculture."

To get an accurate review of the play, K-POWER *sent one of its resident hackers to the theater to check it out. Alex Shakar is 16.*

"Hackers" is a comedy about three very proficient computer-niks. They're each working on superprograms in the basement of a New England university.

K-POWER's hacker predicts "Hackers" will be a hit.

Photos: Cathryn Williams

Martin, played by Tim Choate, spends a lot of time talking into a tape recorder.

Head hacker Martin, played by Tim Choate, constructs a program to exactly copy his own personality, so even his friends won't be able to tell the difference between man and machine. To do this, he has to log his memory—½ million words—into the computer.

The words are logged into the computer by Chris (played by Michael Curran). He's a high school student who happens to be an amazingly fast typist. After getting to know the three programmers in the basement, Chris wants to learn to hack.

KJ (played by Peter Basch) is another dedicated hacker, and survives on a typical hacker diet of potato chips and water. He's creating an adventure game about his life.

The third hacker is Mary (played by Sabrina Le Beauf). She's a studious, lonely Jamaican girl who's perfected a chess program called *Checkmate VI*.

The stage is separated between the top and bottom. On the ground level is the set for the basement/computer lab. This is a dull room with three computers, desks, and chairs. Above this set is a computer-controlled LED sign and six monitors that list the scene and the date.

This timely play definitely has the makings of a hit. It's funny, touching, suspenseful, and dramatic. It builds to an eerie and shocking climax, when Martin's friends try his program.

Best of all, this play has computers! —ALEX SHAKAR

Game-Design Contest!!

Got a game program that'll fry our eyeballs? Send it in and win an Apple IIe with 64K, tilt-screen green phosphorous monitor, disk drive with controller, 80-column card, and a pair of game controllers. Or a modem . . . or $100 worth of software . . . plus $100 if we publish your program!

It's all part of K-POWER's Annual Game-Design Contest going on NOW! All entries must reach us by Aug. 31, 1984. If you want your printout or listing returned, enclose a self-addressed stamped envelope. Void where prohibited.

apple computer

If your parents complain that this is what all computer games are doing to you, they obviously don't know about Spinnaker.

With most computer games the biggest challenge isn't the game. It's keeping your parents from objecting to it.

Now, Spinnaker has the answer. It's called the Learning Adventure Series, and it's a whole bunch of great games that will challenge and inspire your imagination for hours. But won't inspire hours of complaining from your parents.

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Design a challenging adventure game that you or a friend can tackle – or let the computer design one for you. It's complex, exciting – utterly addictive! **Ages 12-Adult.**

IN SEARCH OF THE MOST AMAZING THING.™
It isn't easy to find – even in your B-liner. But you'll have help from your Uncle Smoke Bailey as you search the universe to find the Most Amazing Thing. **Ages 10-Adult.**

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SILICON ALLEY

Ready for the hottest scoops from the Valley?

ALTERED PERSPECTIVE SCROLLING That's the new fad in game design. Games like Synapse's *Dimension X* use it, and we've heard that Lucasfilm's new game *Ballblaster* will too. It utilizes a checkerboard vanishing point to produce a 3-D effect. . . .

***Dimension X*—the first game to use altered perspective scrolling.**

HACKER BACKLASH!!! According to *PLUMB*, a personal telecommunications newsletter, strong anti-hacker legislation is being drafted in Wisconsin. The law (Assembly Bill 695), would penalize bulletin-board operators who allow their callers to post "information which may enable another person to gain unauthorized access to data," whether anybody uses the information or not. As with all felony charges in Wisconsin, violators could get 10 years in prison and be fined up to $10,000. The *PLUMB* people think this could "pull the plug" on law-abiding hobbyist bulletin boards at the same time it's cracking down on computer criminals. Others see it as a threat to hackers' constitutional rights. . . .

ARCADE DEPT. *Boulder Dash*, *Flip & Flop*, *Astro Chase*, and *Bristles* are First Star games that will be hitting arcades in June . . . .

SUPEROBOT! A new animated TV series called "Voltron" is claiming to feature spectacular animation and special effects and star "TV's ultimate superobot." It'll be in syndication this September. (From what we've seen, it's Hollywood's answer to the Shogun Warriors.) . . .

America's answer, "Voltron."

SOAP STUFF! "Midas Valley" is the name of a new prime-time soap opera in the "Dallas" and "Dynasty" tradition. Produced by Edward S. Feldman Co., it'll follow the loves and lives of computer execs and programmers in Silicon Valley. Not everyone in the show is going to be human, though—there'll be a janitor robot and a guard robot. . . .

SCROLLING IN DOUGH

Teaching My Teacher

By Seth Lippman

I'll never forget my friend Edwin Gates because he's the guy who turned me on to computers. When I was 8, I'd go over to his house and watch him program on his computer. Soon I was figuring out how to program, too. I got a VIC-20 for Christmas that year and enrolled in an after-school computer program called Future School.

One day, I went to visit Miss Schreiber, my fourth-grade teacher from the year before (I was in the fifth grade then). She was busily doing an assignment for her computer class. I asked her if she needed help. The next thing I knew, I was teaching her BASIC, and making $5 an hour. Can you believe it? I was tutoring a teacher!

Miss Schreiber knows BASIC now so I don't tutor her anymore. I liked doing it, but I don't plan to become a computer teacher. I don't even think I'm headed for a career in computers. Maybe real estate. But who knows? I'm only 10 years old. I'm too young to worry about things like that.

SETH LIPPMAN *lives in Westport, Connecticut. He likes to program games on his Apple IIe.*

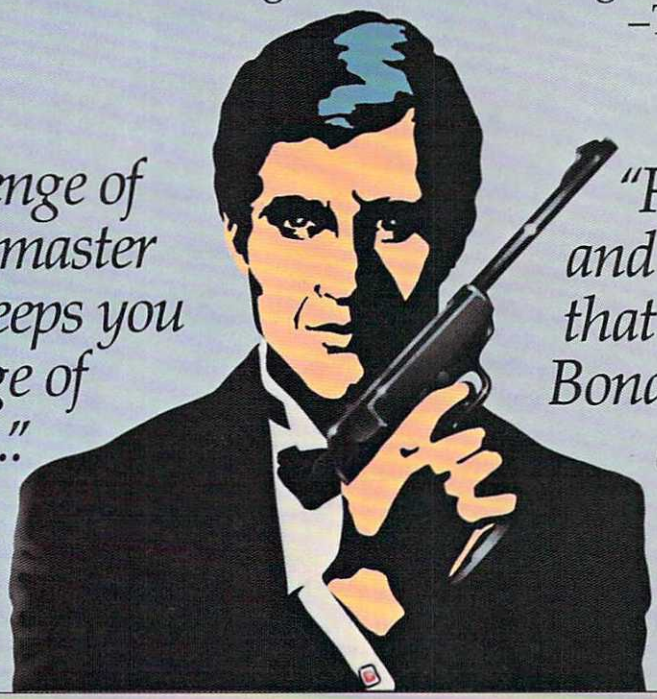
Seth, the computer tutor.

"Sensational, a real thriller... it's James Bond all the way."

"The action was so involving, it made me feel like the master spy himself."
–Rex Weed

"You'll feel like Bond as you out-shoot and outsmart the combined forces of evil..."

"The Bond 007 home video game is like reliving the Bond classics."
–The Daily Platter



"The challenge of becoming master spy 007 keeps you on the edge of your seat..."

"One second you're hovering in mid-air dodging deadly satellites in the desert... the next you're plunged into the treacherous depths of the sea."
–The Rolling Pebble

"Four land and sea escapades that rival any Bond movie adventure..."

"If you loved *Diamonds Are Forever, For Your Eyes Only*, Moonraker* and *The Spy Who Loved Me*... wait until you see the Bond 007 home video and computer game."
–Boston Fleener

Now available for Atari 2600™, 5200™, ColecoVision™, Atari® Home Computers and Commodore 64™.

PARKER BROTHERS

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DOCTOR KURSOR'S KLINIC

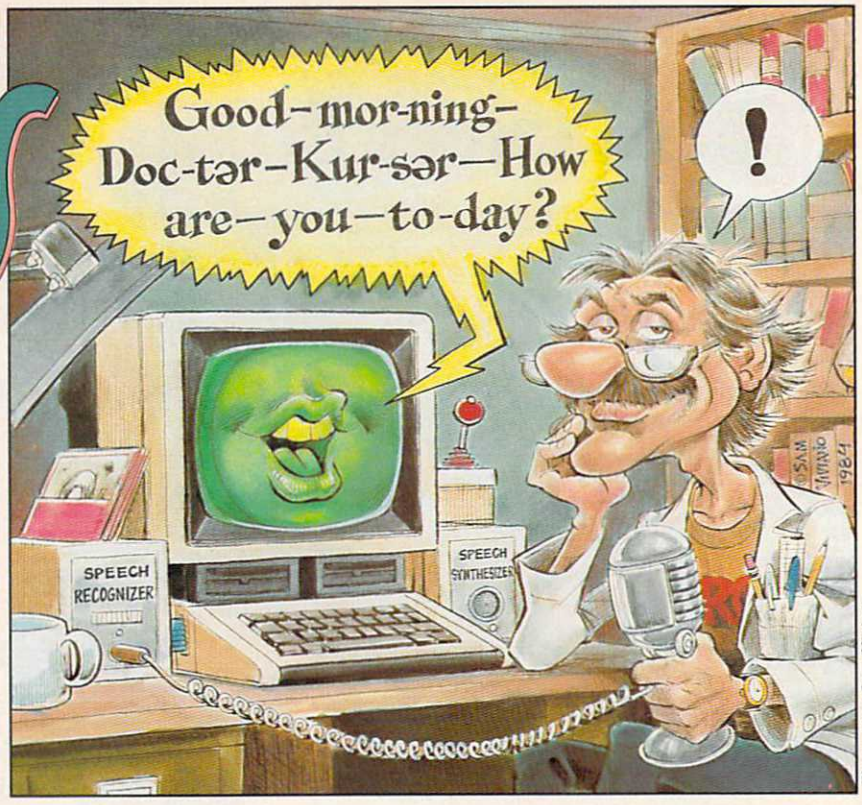

Illustration: Sam Viviano

How can a computer speak—and understand my commands?

DR. KURSOR: Words are put together from a fairly small number of vocal sounds (like the "ah" sound in "Doctor" or the "k" sound in "Kursor"), known as phonemes. "Phonemic" synthesizers can imitate each of these sounds, one by one, on command. Unfortunately, they usually produce low-quality speech that "sounds like a computer."

"Word-based" synthesizers keep a digital record of how a complete word sounds, which makes them much more natural-sounding. But all those records, especially if they're "hi-fi," take up a lot of memory, so such synthesizers have limited vocabularies.

Getting a computer to *recognize* spoken words is much more complicated. So far, systems you train to respond to your voice only, and to just a few words, work the best. But no computer can actually *understand* what the words mean—yet.

What is a mouse, and how does it work?

DR. KURSOR: A mouse is a small rolling box with one, two, or three buttons on the top. It has a long cable (that looks like a tail) connecting it to your computer.

When you move the mouse around on the tabletop next to your computer, the cursor moves around on the screen, or whatever else you've programmed your computer to do happens. The mouse, like a joystick, trak-ball, or touch tablet, translates physical motion into signals your computer can understand. The buttons on top of the mouse send an additional signal (or signals), pretty much like the buttons on a joystick.

There are two basic kinds of mice: mechanical and optical. A mechanical mouse (the less expensive kind) works pretty much like a trak-ball turned over on its stomach. When you slide the mouse over your desktop, a metal ball inside it rotates (see diagram). The ball turns two rollers, which are connected by tiny gears to the shafts of two potentiometers (variable resistors). As these shafts turn, the resistance of each potentiometer changes. One tells the computer the vertical position of the mouse, the other the horizontal.

For a higher price, you can get high precision with an optical mouse. Most optical mice have to be used on a special surface, which the mouse "reads" using a light beam.

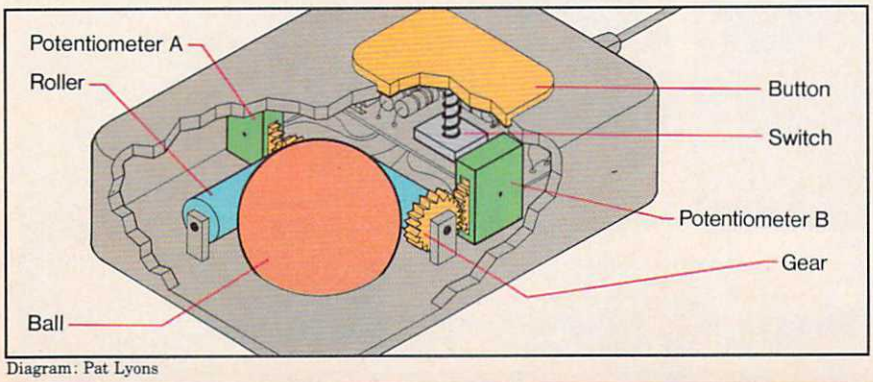

Diagram: Pat Lyons

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Stickmaster holds your joystick in perfect position for small youngsters, teens and adults so that the whole family can enjoy their games together. It's like having a video arcade right in your own home!

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$ _____ Sales Tax (Texas residents only)

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Plug into K-NET each month for what's new with K-POWER's national network.

Plus, find out what else is hot in the world of networking!

Piracy: Who should help stomp it out?

One of the hottest hacker issues these days is piracy. Are computer break-ins OK? Whose fault is it that piracy exists? This is what K-NET had to say about the subject.

(JILL) The software companies. They should lower their prices. I think the only reason people do it is because it costs so much to buy a game.

(TOM P.) I can't think of any way to stop software pirating. People are always going to be pirating software. Of course they (software companies) are going to come up with safer systems but there are some really smart people who are always going to find ways to get in.

(JODI) The government should probably make stricter laws. But some people won't stop, anyway. It's just like robberies. You're not supposed to do it but some people just always will.

(SCOTT) It's the fault of the people that are doing it. But the software companies should put in better systems, too.

(ERIC F.) I tend to think it is a little bit of everyone's responsibility. Software companies should be especially careful with their passwords and have tighter systems.

(ERIC S.) I think that it's people's jobs not to pirate. The company should make it harder, but if the person is determined to get in, he's gonna get in.

(TOM S.) It is up to the people who are doing it to stop. There is no way you can protect software enough so people can stop getting in. I think there are some good systems that I

Photo: Jonathon Utz/Picture Group

Jill Bassett, 13
Miami, FL

Photo: Randy Wood/Picture Group

Tom Peterson, 14
Vancouver, WA

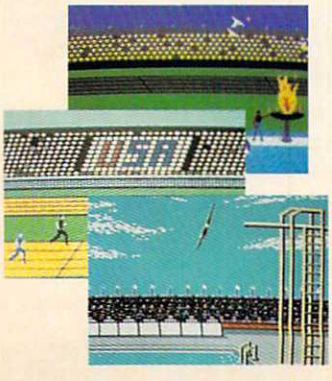
Photo: Robert Flishel/Picture Group

Jodi Moskowitz, 12
Scott Moskowitz, 9
Toledo, OH

Photo: Steve Wort/Picture Group

Eric Fisch, 14
St. Paul, MN

SUMMER GAMES.
WHY WATCH THE OLYMPICS WHEN YOU CAN BE IN THEM?



You're an Olympic athlete competing in eight key events at the Summer Games. How well can you score in track, swimming, diving, shooting, gymnastics and more? So realistic, there's even an opening ceremony and awards presentation after each event.

Unlike other "Olympics-Like" games, Summer Games has incredible realism, superb state-of-the-art graphics and sound effects (including national anthems from 18 countries), and it is a true action-strategy game. In each event you must plan and execute your game strategy in order to maximize your score. It is not just a matter of how fast you can move the joystick.

So change into your running shoes, grab your joystick and GO FOR THE GOLD!

One or more players; joystick controlled.

EPYX™ COMPUTER SOFTWARE

Strategy Games for the Action-Game Player

Photo: Tony O'Brien/Picture Group

Eric Saberhagen, 13
Tom Saberhagen, 12
Albuquerque, NM

Photo: Nik Kleinberg/Picture Group

Dara Cook, 9
Tuckahoe, NY

Photo: Joel Bronz

Steve Horowitz, 17
Dan Horowitz, 14
Westport, CT

could break into. There's always going to be people who can break in.

(DARA) I think that everyone should go against piracy. The people who do it should pay for what they did and the companies should do more to stop pirating.

(STEVE) The companies should take certain measures to prevent piracy, but I don't think anyone could stop it. Piracy could be brought down quite a bit if they would just lower their software prices.

(DAN) I don't think that software companies or the government can do a whole lot about pirating. It's up to the people who do the pirating and their values.

WILL YOU BE THE NEXT K-NET KID?

K-POWER is almost finished choosing the rest of K-NET. We received lots and lots of letters from computing kids who want to hook up with the network. And we read 'em all!! The winners will be announced in our July issue. Watch for it!!

Name of the Game

More than 6,500 CompuServe members nationwide leave messages on Scorpia's Games Special Interest Group (SIG). The popular SIG is a clan of computer games players who discuss games, give each other hints and tips, or just shoot the breeze.

The main gamer and sysop behind the scenes is Scorpia, a data-processing consultant who lives in New York City. Says the games addict, "If you need help with a game, or if you want to find people with similar interests in games, we'll provide you with the information you need."

Scorpia's Games SIG is the eighth largest of CompuServe's 100-plus Special Interest Groups. The board holds 368 messages at a time.

A large percentage of the SIG's members are teenagers. Also, men outnumber women on the board, although recently more women have been logging on.

And what kinds of games do the SIG members discuss? "Overall, the Infocom games always have generated the most messages, especially the Zork series," Scorpia says. She estimates that more than 50 percent of all the board's messages have been directed towards Infocom.

"Other games come and go," says Scorpia. "You know, there's a hot game for a while. But it always goes back to Infocom."

Members can access an expert file, hold on-line conferences, send and receive messages, and download game programs.

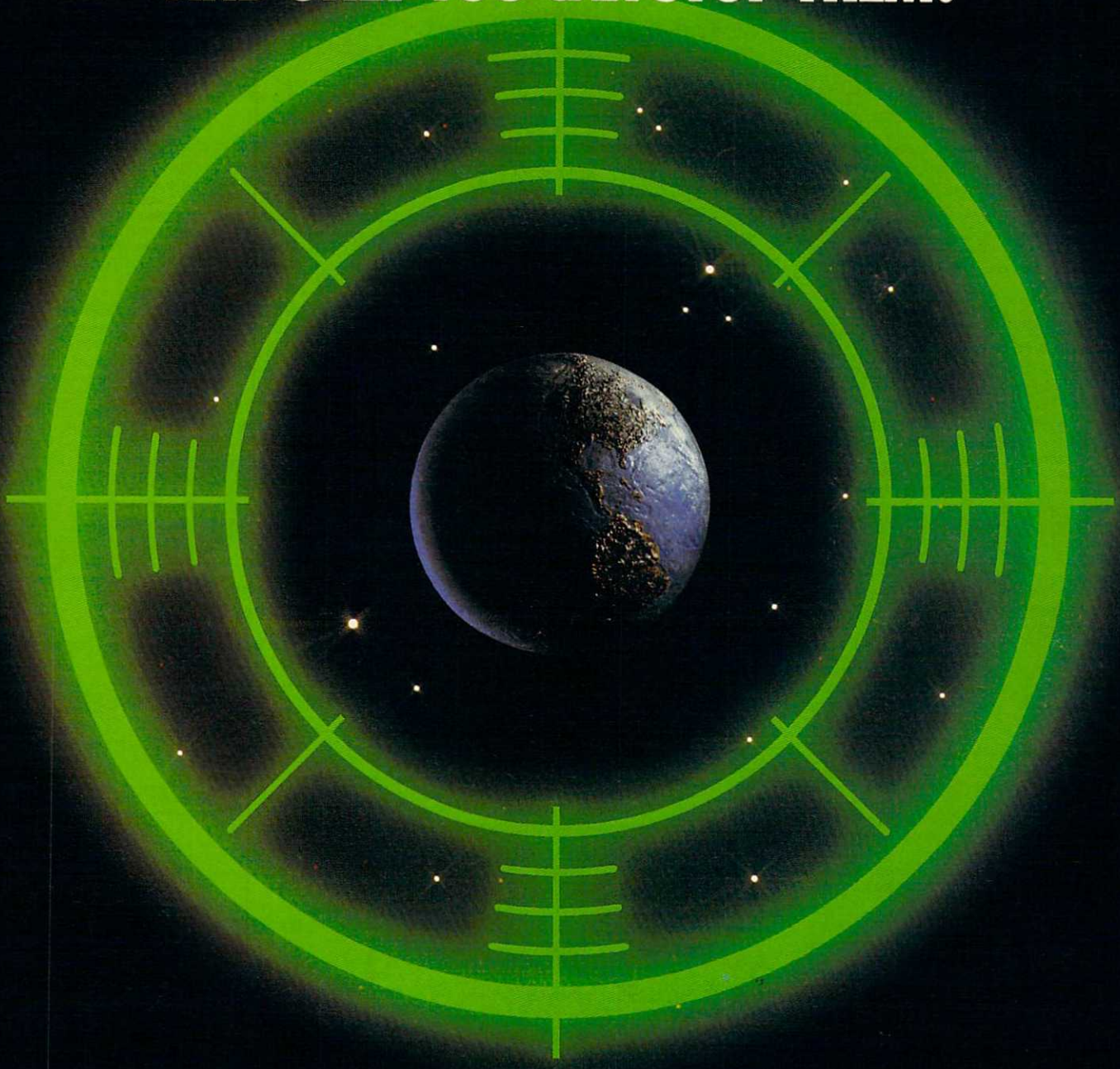
Scorpia and two other women, Patti Fitzgibbons and Maria Price, started up the SIG in November 1982, after getting the go-ahead from CompuServe. They split a small royalty and were granted free access to CompuServe. Since then, Maria has dropped out of the sysop trio, leaving Scorpia with the bulk of the work for the bulletin board.

"I go to work in the morning," says Scorpia. "Then I come home and sit down at this machine, and there I stay until I go to bed. It is a lot of work and it doesn't pay anything near what I get for my job in the real world."

So, why does she do it? "I enjoy it. I'm addicted."

—BERNADETTE GREY

LUNAR OUTPOST.™
THEIR TARGET IS EARTH AND ONLY YOU CAN STOP THEM.

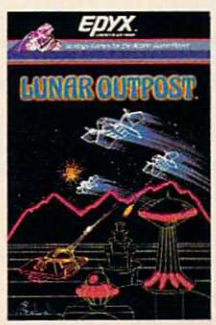


The Zytron Strike Force is attacking the Lunar Outpost, and Earth lies open to their assault. Use your Infrared Enemy Detector to pinpoint the Zytron's location. Then race across the moon searching your Lunar Map for the enemy. When you find them, it's time to switch to the battlefield screen for 3 dimensional combat!

Maneuver your Lunar Assault Vehicle under the Zytron ships, then blast them out of the sky as you dodge their nuclear barrage. If you're hit or low on fuel, do you have time to service your vehicle? Can you afford to stand and fight, or is it better to sacrifice this territory to protect another? What is the best strategy?

Plan well, but don't waste any time. Earth is depending on you!

One player; joystick controlled.



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Accounting Pack	$49.00	$39.00	$29.00
Total 5.2 Word Processor			
Tape	$69.00	$49.00	$34.00
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Total Text 2.6 Word Processor			
Tape	$44.95	$34.95	$22.00
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Tape	$24.95	$18.00	$12.00
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Serpentine — Awarding winning game. Avoid hostile red snakes and lay your young while getting food to keep you alive. Fantastic strategy game that has become a classic. List $34.95. **Sale $9.95.**

Priced Below Cost

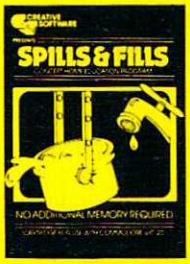
Apple Panic — The fast action computer game hit now comes to the VIC-20. You must dig traps in the brick floor and wait for the wandering apples to fall in.

Then simply beat them on the head to push it through and destroy the apple. Otherwise the apple's will roll right over you and kill you. (Fast action.) List $34.95. **Sale $7.95.**

While They Last

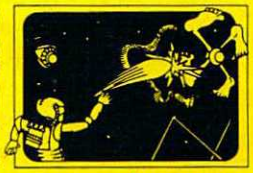
Rat Hotel — Here you get to play the rat. Running and jumping from floor to floor in Hotel Paridisimo you must eat whatever you find but Waldo the maintenance man has set many traps for you that you must avoid. Plus Waldo has an atomic elevator that let's him jump several floors at once. See if you can get to the bottom before Waldo does you in. Fantastic graphics and sound. List $34.95. **Sale $9.95.**

Terraguard — Your mission is to destroy the aliens before their ship has a chance to land. Move your base along the ground and shoot up at them. List $34.95. **Sale $9.95.**



Spills & Fills — How much is too much? How much isn't enough? With this original concept educational game designed for grade schoolers through high school students, you can develop ratio and perspective skills. With three exciting and challenging skill levels, this program presents new and ever-changing challenges for the inquisitive mind. **Sale $9.95.**

Video Mania — You're in an open field and strange alien creatures are roaming all over. If you stand still too long, they'll collide with you, causing instant annihilation. Your only defense is to destroy them by throwing your electronic, football-shaped alien zapper at them. **Sale $9.95.**



Trashman (Better than Pacman). Dash for the trash and pick up CASH!!! List $29.95. **Sale $9.95.**

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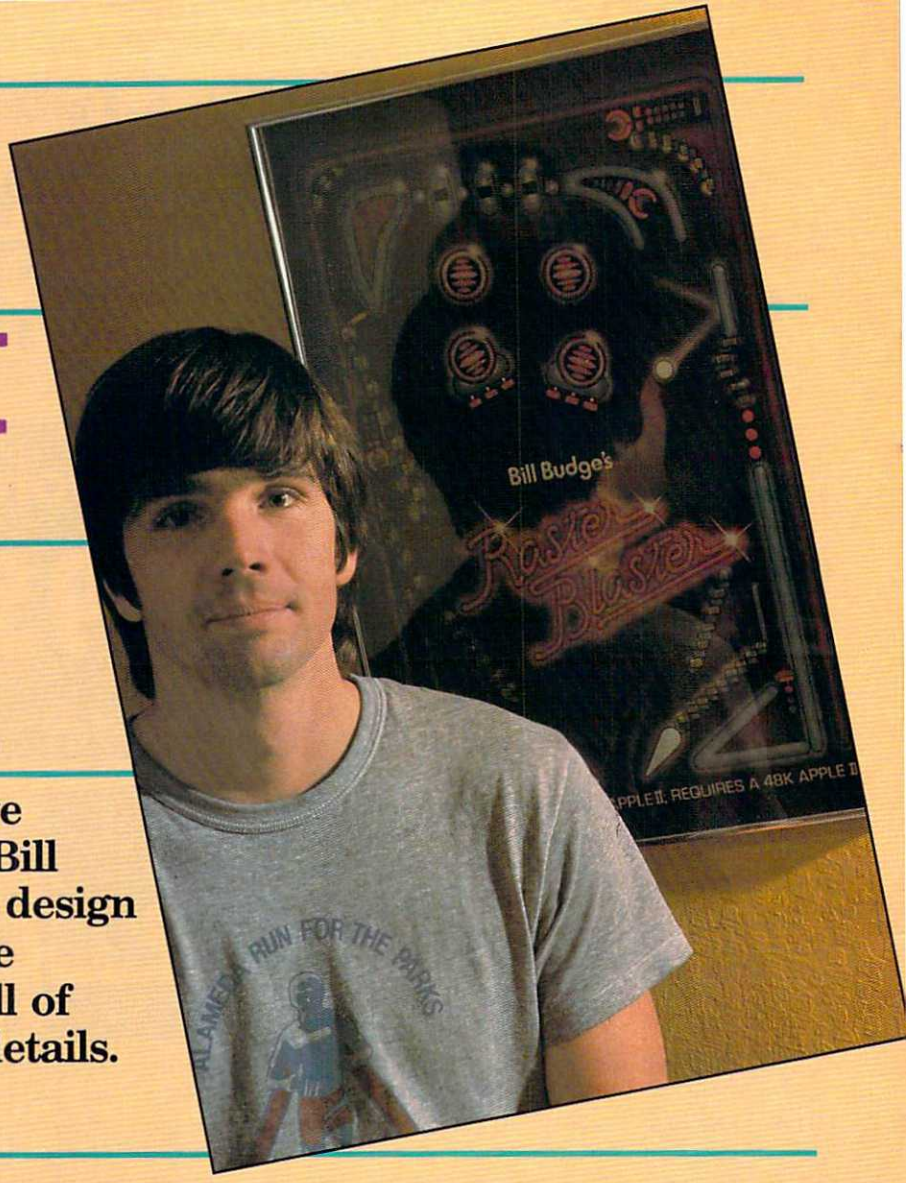
A DAY IN THE LIFE OF BILL BUDGE



Aspiring programmer Steve Horowitz has long been a Bill Budge fan. A day with the design whiz sent Steve back to the keyboard with his head full of game-design dreams and details.

By Steve Horowitz

I suppose it might be great to spend an entire day with Brooke Shields. Or Michael Jackson. Or Van Halen. But to me, the max has always been the chance to spend some time with a real programming pro. Thanks to K-POWER, I got to do just that! I was assigned to interview Bill Budge and got to sneak in all the programming questions that have plagued me late at night.

When Bill's first pinball game, *Raster Blaster*, came out, I was amazed. I've always been a pinball freak, so I'd run every pinball disk I could find for my Apple or Atari, in hopes of finding a hi-res pinball simulation. Usually I found a low-res mockery of pinball. But *Raster Blaster* was exactly what I'd imagined a computer pinball game to be. It was hi-res and performed like a real pinball machine!

Just as I was getting over the thrill of *Raster Blaster*, Electronic Arts came out with Bill's one and only *Pinball Construction Set*.

I realized what it took to create some of the effects Bill produced when I started writing my own programs. My admiration for him grew. As I got into assembly language, I ran into lots of problems I knew Bill could help me solve. Then, I was lucky enough to meet him!

I flew to Oakland on the big day, and Bill picked me up at the airport. He was taller than I expected, but his face looked exactly like all the magazine photos I'd seen.

As we walked to the parking lot, I wondered what color his Porsche would be. (You'd expect all game designers to have hot cars, right?) That was my first surprise. The Porsche turned out to be a silver VW Jetta. I was in for a lot more surprises from Bill. Although he's a programming genius, Bill turned out to be a lot like most hackers I know. He's a pizza lover and connoisseur of Wendy's fast foods. He plays lots of tennis and water polo, and is into Van Halen, the Eurythmics, Sting, and digital recordings.

Bill lives in Piedmont (a ritzy suburb of Oakland, across the bridge from San Francisco). His computer room is filled with computers, papers, books, and even a dismantled *Stargate* arcade game. Most of his days are

Photos: Rick Browne/Picture Group

spent programming, with a break for yogurt and a run in the late afternoon.

Bill has all sorts of projects up his sleeve. One he talked about was his new program, *MousePaint*, released with the mouse for the Apple II family. *MousePaint* is the best graphics drawing program for the Apple II, because the easiest way to create graphics is with a mouse.

After spending some time at Bill's house, we drove to Cupertino to visit Apple Computer headquarters. It was a long ride, so I had a chance to ask Bill all the questions I'd been saving up.

STEVE: What do you see in the future for home computer games?

BILL: Mice will be an important part of the future. The mouse will control icons (such as different buttons, a steering wheel, or a rudder) which would appear on a control panel somewhere on the screen. Players will use the mouse to choose the icon they want from this "control-panel" menu. You'd push the buttons on the mouse to manipulate the chosen icon. It's like the mouse takes on the function of a hand!

The mouse probably won't replace the joystick in current games because the challenge of most joystick games is found in strategy and in positioning the stick.

Right now, they [the industry] are working on some nice graphic stuff that will let anybody write 3-D games without having to be a wizard at graphics. Another thing developing is an expert system which can understand a little bit of English. It'll understand what you want and be able to simulate human personality. Right now, software with characters is just beginning. The personalities have goals and can accomplish them.

STEVE: What's your opinion of interactive laser video games?

BILL: I like to think that the real way to do it is to have the computer generate the graphics. The disadvantage to that is it's really hard. No computer is fast enough to do that right now. But it will happen. There won't be any reason for the videodisc. The videodisc is like a stop gap—like a disk drive. It's silly to have a disk drive. What you really want is to have eight megabytes of RAM on your computer.

A laserdisc is useful for doing graphics, but it's not interactive. Computers are interactive, but they can't do videodisc graphics. The same thing that's going to happen to disk drives on the computer will happen to the videodisc. It's going to disappear when better technology comes along.

STEVE: What was the first program that you sold?

BILL: *Penny Arcade*. I only wrote that for fun. It was my first machine language program for the Apple, and [the company] traded me a printer for it! I thought, "This is great! I can sell programs for $1,000 each. If I sell 20 programs a year, I can make money!" But I soon found out that you can only write one or two programs a year.

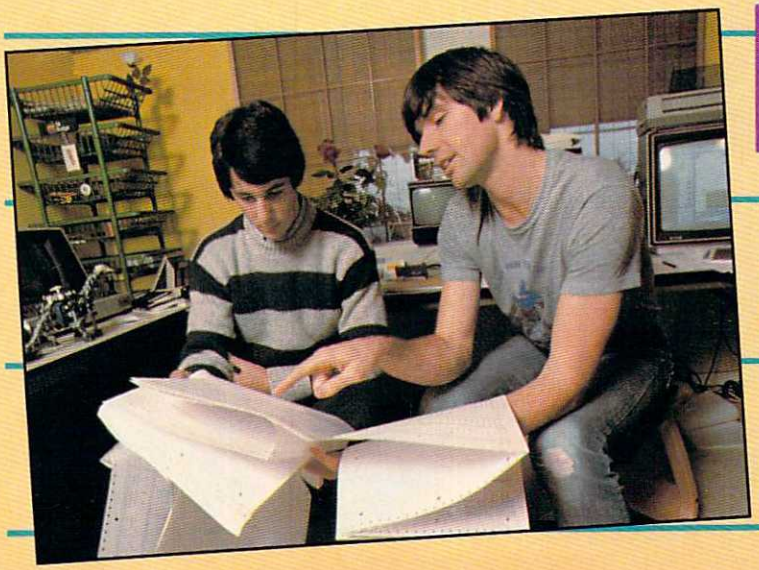
When I think about how I programmed then, I can't believe I was so awful. I had studied computer science for years; I just didn't know software engineering. I'm sympathetic when I think about how hard it was for me to write my first program. The average kid who learns to program has to be resigned to the fact that his first two programs are going to be given away until he gets good enough.

STEVE: You mean the first machine language programs?

BILL: Yes, unless you go for a radically new idea that's really great. If you're doing a video game, I just can't imagine anything that can be done in BASIC.

STEVE: How do you get ideas for programs?

BILL: I get ideas the same way everyone else does—by accident. Big ideas aren't common, so it's great when they happen. Unfortunately, they come along just



My next project may be a "Construction Set Construction Set."

once in a while. My idea of fun is writing a new routine or program that does something no one else has ever done before.

STEVE: How do you stay above the competition?

BILL: I look at what other people are doing and then I think of how their stuff could be improved. In my case, I sort of see programs that I've done, and they look really bad to me, because I'm learning better ways to do things.

Experience is the best teacher. When you're trying to solve a problem and there are 10 different ways to do it, experience tells which method is the best. When you're just learning, you have to try all 10 different ways before you find the one that works.

STEVE: What's your advice to kids who want to become professional programmers?

BILL: Well, I think you can tell at an early age if you really want to do it. You spend all your spare time programming. I wanted to be a writer in high school, but I never wrote. I should have known that I could never be a writer, because I spent all of my time programming. You couldn't keep me away from the computer, because I wanted to try out all kinds of new ideas.

I was very intense in high school and was definitely a nerd. I knew I wanted to be a programmer. There's a lot of pressure to be social, and I gave up a lot of that. Fortunately, in college I started dating and becoming more social.

The first thing is to be honest with yourself. The next thing is to try to hang around people who know more about computers than you do. The last thing is to try and take college courses. I would recommend at least getting a master's degree in college.

In today's computer games market, *design* is the most important thing. There are a lot of programmers out there—what's needed is *creativity*.

We need people who can produce something the public wants—something they don't necessarily *know* they want until they see it.

STEVE: How does Electronic Arts hire programmers?

BILL: They're always looking for programmers and hot programs, because if they don't get them, someone else will. They go to shows like the Applefest.

STEVE: What made you decide to work for Electronic Arts?

BILL: I liked Electronic Arts because I felt that the president and board members and employees had a vision of software beyond video games. That's exactly how I view software. I see programs you can use to make your own video games, or programs you can talk to.

STEVE: What are your personal goals in programming?

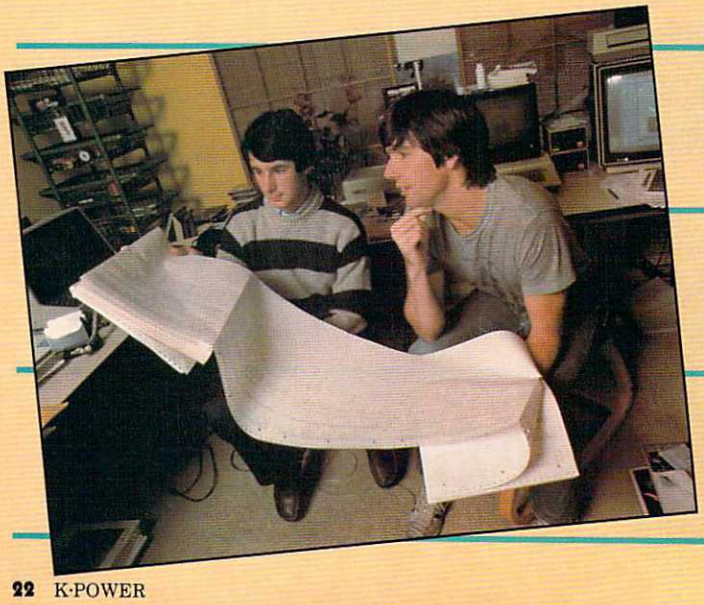
BILL: I don't consider myself a graphics expert. What I'd really like to do is write programs that are useful, instead of just entertaining. My main interest is artificial intelligence.

My next project may be a "*Construction Set Construction Set*" which would let players create all sorts of games, and then play them.

When we got to Apple headquarters, Bill discussed changes in *MousePaint* with some of the programmers, and I had a chance to meet a few of the people working on new Apple projects. Bill gave me a sneak look at the new Apple (you can see it for yourself on pages 30–31)!

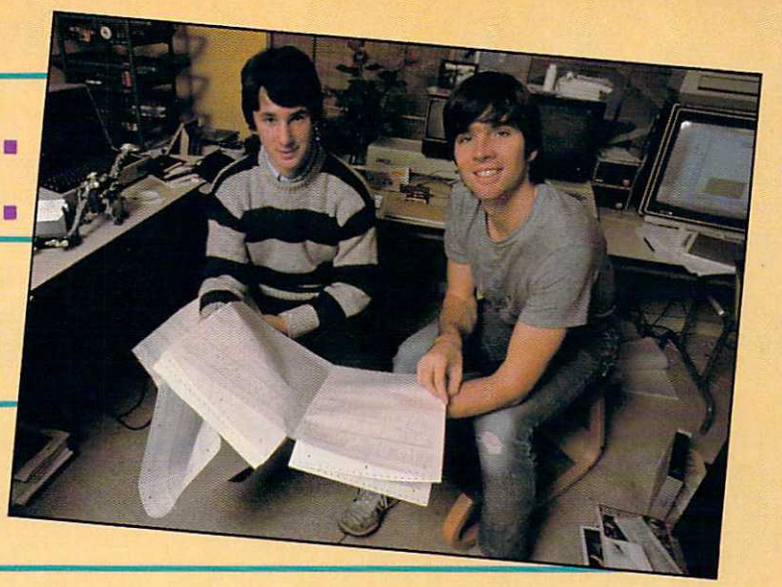
My day with Bill was over, and our eight hours together seemed more like eight minutes. After seeing Bill in action, I was more determined than ever to go home and start pounding my keyboard. k

STEVE HOROWITZ, *17, lives in Westport, Connecticut. He and his brother,* DANIEL, *wrote "It's Showtime!" in the April* K-POWER.



In today's computer games market, *design* is the most important thing.

FOR HACKERS ONLY: BILL BUDGE'S HINTS ON GRAPHICS



What are some good ways to speed up machine language for graphics applications?

HINT: Use dedicated (as opposed to general-purpose) code so you eliminate loop overhead. The more straight-line code you have, the fewer problems you'll run into with loops and counters. The only problem with dedicated code is it takes up a lot more memory.

How do you move a colored shape over a colored background?

HINT: Before you do anything to the screen, you have to save the area of the screen that will be changed in a buffer so you can restore it later. To put your bit-mapped shape on a colored background, you need two bit maps. One is called the mask, and the other is the actual colored shape you want to put on the screen. The mask is sort of a shadow of the shape. It is just the outline of the bit-mapped shape filled in by setting its bits to "1" (on most computers this will display as white or a foreground color) with the other bits set to "0" (to display as black or background color). You use the mask to punch a hole in the background for the bit map.

To put the shape on the background, you take the inverse of the mask and you AND it to the screen. This will punch a hole in the background exactly the shape of your original bit map. Then you take the original bit map and you OR it to the screen. This will put the shape over the background with no flaws.

What are some good ways to eliminate flicker?

HINT: The best way is to use page flipping to change one screen while displaying the other, and then switch them. To do nonflicker animation on one page you have to try timing to the vertical blanking signal that often can be detected through software.

How do you detect collisions in *Pinball Construction Set* when it is possible to create invisible shapes?

HINT: For *Pinball Construction Set*, I used a data-base system. As the pieces were added to the game, the data base was updated. This let me check each scan line to see what was there and to find the angles that the ball would bounce off of the polygons.

What would you suggest for someone who is trying to program a video game in assembly language?

HINT: The best way to learn to write machine-language games is to have a game that can't be done in anything but assembly language. When you first start you have to do everything from scratch, and develop a lot of little routines. But after a while you'll develop a library of routines which you can put together in a large and powerful game.

BILL'S FAVORITE 'HACK'

A "hack" is a little programming trick. Here's one of Bill's favorites for the Apple:

First, enter the monitor by typing

```
CALL -151
```

and pressing RETURN. Your Apple will answer with the * prompt. Then, very carefully type

```
C050 C052 C054 C057 2001:AA 55 2000<2001.2002M 2002<2000.3FFFM 34:0 N
```

and press RETURN. (You'll need a color TV or monitor to get the full effect.) To stop the program, press RESET (on IIe's, you'll have to hold down CONTROL at the same time).

BOOT your BOOKS

As text adventures grow more popular, fans are asking each other, "Boot up any good books lately?"

By Bruce Chadwick

Reading a book is usually kind of a one-way affair. You sit and read as the characters and plots unfold around you. But what would you think of a novel where it's you, and not Miss Marple or Tom Swift or Ellery Queen, who has to get to the bottom of things?

That's what interactive fiction is all about. Text adventures are computer books—screenloads of words linked together to form a personal fantasy—that are part book, part game. There are few visuals in this kind of fiction; it's up to your imagination to supply the pictures.

THE INTERACTION FACTOR

What distinguishes these adventures from books is the interaction factor. You're thrown into the position of a detective whose task is to get to the bottom of a rich woman's apparent suicide. Or, you're a young scientist trying to save an undersea research station from some mysterious and deadly force. The decisions are yours. It's *your* neck on the line. No more sitting back and leafing through the action.

That's what makes computer books such a hit, according to Michael Berlyn, one of the game designers at the leading text game company, Infocom. "You're thrust into the middle of an action novel unfolding all around you, and you determine what happens next. It's like jumping into the middle of a book," Berlyn says.

"Whatever you decide to do is what happens next," explains Marc Blank, a doctor-turned-designer at Infocom. "In regular books, the plot is predetermined and you just read along. Here, *you* make everything go."

There are more companies making adventures with graphics than not, but the army of book lovers at Infocom sneer at graphics in computer games. They churn out words, instead, on a huge, $750,000 mainframe computer.

Infocom's been putting out all-text adventures since 1979. With more than 11 titles in their library for all the major computer brands, they're confirmed leaders in the field. Infocom releases—like *Zork, Deadline, Infidel,* and *Suspended*—regularly top the best-seller charts.

COMPUTERIZED NOVELS

The latest twist in interactive fiction is text games based on books or book characters, and using well-known book authors as consulting designers or writers. Stratemeyer Syndicate, for instance, is exploring the possibility of turning Nancy Drew and her adventures into an interactive text game. And publisher Simon & Schuster reportedly has signed up author Douglas Adams to work on a computerized version of his popular book *Hitchhiker's Guide to the Galaxy*. This text game will be distributed via bookstores in December.

Infocom's already on this bandwagon. Slated for release this summer is *Seastalker,* interactive fiction for the tenderfoot. To help create *Seastalker,* Infocom brought in Jim Lawrence, who has a lot of experience as a storyteller. In fact, he wrote a number of the Tom Swift Jr. and Hardy Boys books back in the '50s and '60s.

Stu Galley, *Seastalker*'s game designer, says the collaboration worked well. "This is an original story Jim created for us. He gave us a sample run-through with side trips here and there. I expanded and went with it. He's very good at adventures. They're just a different way of telling stories."

SNEAK PREVIEW

Galley gave K-POWER a sneak preview of some of the action in *Seastalker*. "You play the part of a famous young inventor," Stu said. "You're in your lab, working on your latest invention, when you get an emergency call from an undersea research station, the Aquadome. You have to take your submarine and solve puzzles, traveling through the shoals, going deep into the ocean." You have to reach the Aquadome and discover and destroy what's threatening the research station.

Galley, whose credits include the mystery adventure *The Witness,* says that *Seastalker*'s puzzles are a bit easier to solve than the other Infocom games. Plus, along with all the typical Infocom trappings, there'll be an Infocard that contains hidden clues to rescuing the troubled Aquadome. Here's a glimpse of one part of the story. (K-POWER got it in preproduction, so the final version may be different.) You've been alerted that the Aquadome's in danger. You manage to power up your sub and take off into the sea. You're about midway to your destination. . . .

THE OCEAN HAS BEEN GETTING DARKER AS YOU DIVE TOWARD THE AQUADOME, TURNING FROM BLUE GREEN TO DARK GREEN TO A DULL GRAY GREEN. IT'S BECOMING DUSKIER AND MURKIER WITH EVERY MINUTE. A YELLOW CONE OF LIGHT NOW ILLUMINES THE WATER AHEAD. THE SUBMARINE'S SEARCH LIGHT WAS AUTOMATICALLY SWITCHED ON BY AN ELECTRIC EYE, NOW THAT YOU'RE TOO DEEP FOR THE SUN TO LIGHT THE WATER. COLORFUL SEA LIFE SWIMS THROUGH THE BEAM. TIM EXCLAIMS, "HEY, THERE'S A BLIP ON THE SONARSCOPE AT 3 O'CLOCK. AIM THE SEARCHLIGHT TO STARBOARD."

It doesn't take big brains to figure out what to type into the computer:

AIM LIGHT TO STARBOARD

Illustration: David Rickerd

The computer responds:

AN ENORMOUS WHALE CAN BE SEEN LOLLING COMFORTABLY IN THE DEEP. OBVIOUSLY, THIS IS WHAT'S BEEN MAKING THOSE NOISES OVER THE HYDRAPHONE. . . .

BRIDGING THE GAP

Infocom's "books," such as *Seastalker*, are so inviting because they understand your instructions. You can tell the computer to interrogate a witness, cast a spell, and so on. In response to commands such as KICK DOOR, the computer will tell you, DOOR OPENS TO REVEAL ROOM WITH TABLE AND VASE FULL OF DEAD FLOWERS, or, YOU STUB YOUR TOE.

Early text adventures had a communication gap between the computer and the user. The computer would respond only to the most basic commands, such as GO NORTH.

Thanks to a special program within a program called a "parser," you can type in complex sentences like, WAVE YOUR ARMS AT THE AIRPLANE AND TRY TO CATCH THE PACKAGE IN THE PARACHUTE. Instead of giving you an, I DON'T UNDERSTAND, the computer will be able to simplify your sentence to fit the program's vocabulary. It's sort of like a translator that bridges the communication gap between you and your machine.

So far, most computer books have been fairly tough going for newcomers. If you want to get a taste for the puzzle-solving and logic they demand, you have to start with simpler games. Those games use lots of graphics, at the expense of vivid descriptions or a more involved plot. Well, Infocom's finally realized that not everyone can dive right into a *Deadline* or an *Enchanter*. That's why they've created *Seastalker*. They also have plans for other "junior-level" games, which have an even more sophisticated parser able to understand a variety of mixed-up sentences the beginner might input, Stu Galley says.

INTERACTIVE OVERVIEW

The interactive storytellers at Infocom are not alone. Pacific Infotech, a California company, has unveiled a mostly text adventure called *Heroism In The Modern Age*.

As more authors get in on the fun, and classics like the Hardy Boys are considered for the programmer's flowchart, who knows? Maybe someday you'll be able to save yourself and your ship in *Moby Dick* by typing in a command such as, TELL CAPTAIN AHAB TO LEAVE THE WHITE WHALE ALONE. **k**

BRUCE CHADWICK *has written about computer games for New York's* Daily News *and several national magazines.*

COMPUTER *fiction* DISKOGRAPHY

Deadline (Infocom)—Solve a murder mystery involving a big industrialist, his suspect wife, the oddball son, and those mysterious ladder prints in the garden. $49.95

Enchanter (Infocom)—Use cunning, savvy, and spells to enter the Wizard's lair in this fantasy adventure. $49.95

Heroism In The Modern Age (Pacific Infotech)—Rescue Orlando, Florida, from political terrorists who threaten to blow up the city unless their demands are met. $58.95

Infidel (Infocom)—Search through the bowels of a cursed pyramid in search of a long-dead Egyptian Pharaoh's tomb. $49.95

Planetfall (Infocom)—As a stand-up comic ensign who has survived the explosion of your spaceship, you wind up traipsing around a kingdom of mutants with a difficult 'droid named Floyd. $49.95

Seastalker (Infocom)—As a young inventor you are called upon to rescue the besieged underground research station and combat its enemies. (First of Infocom's junior-level series.) $39.95

Sorcerer (Infocom)—Another thriller, the sequel to *Enchanter*, in which you search for the Wizard Belboz. $49.95

Starcross (Infocom)—Take off in search of the mysteries of space in a science-fiction adventure set centuries into the future. $39.95

Suspended (Infocom)—Wake up from a deep, scientifically induced sleep and control six independent robots who represent the various senses you need to survive. $49.95

The Witness (Infocom)—Get to the bottom of a fishy suicide in a mystery of jealousy involving a slippery manservant, a wild daughter, and a curious book of matches. $49.95

Zork I, II, III (Infocom)—Take on assorted villains, wizards, and hobgoblins inhabiting a bizarre, underground kingdom. $39.95 each

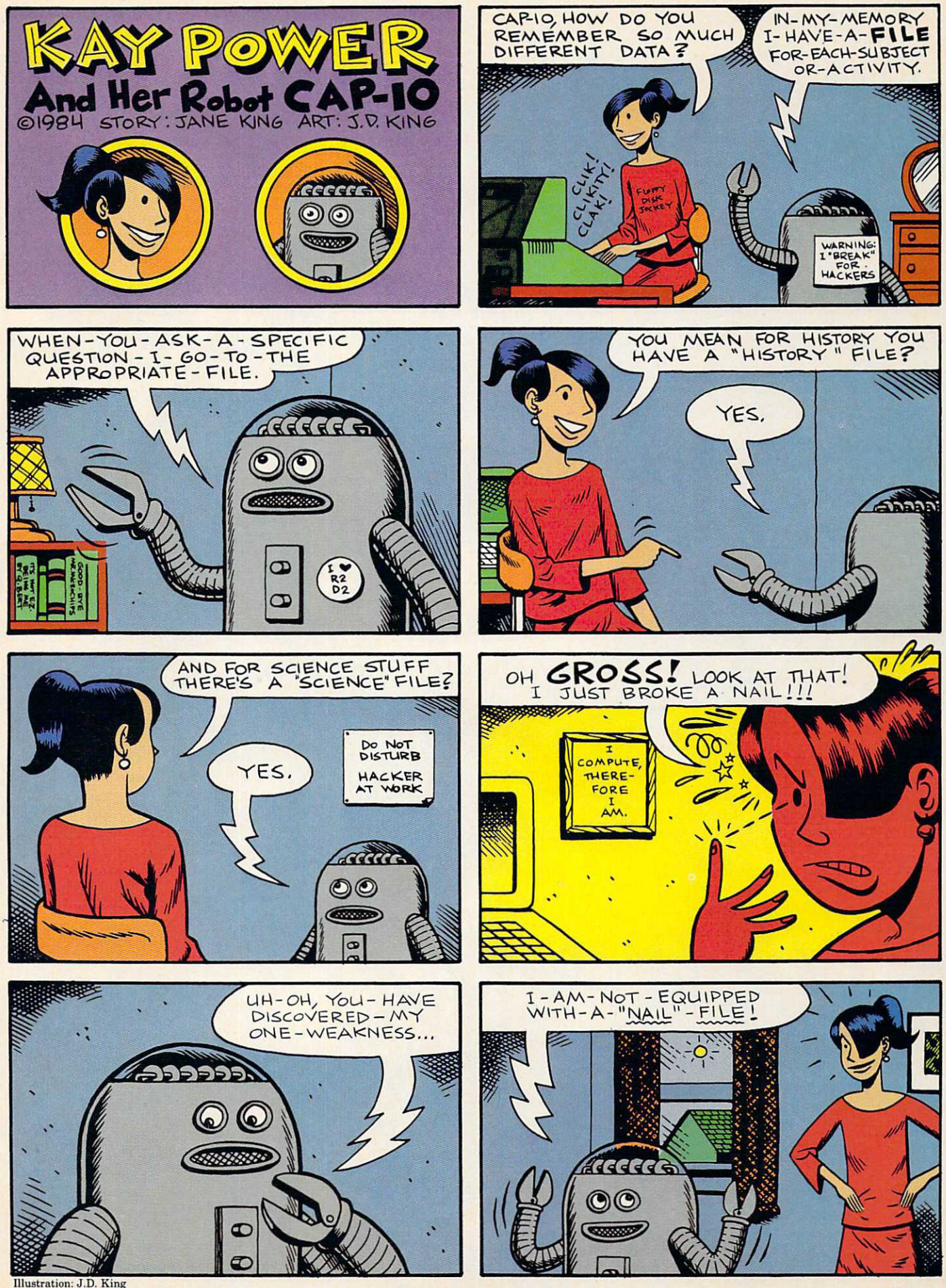
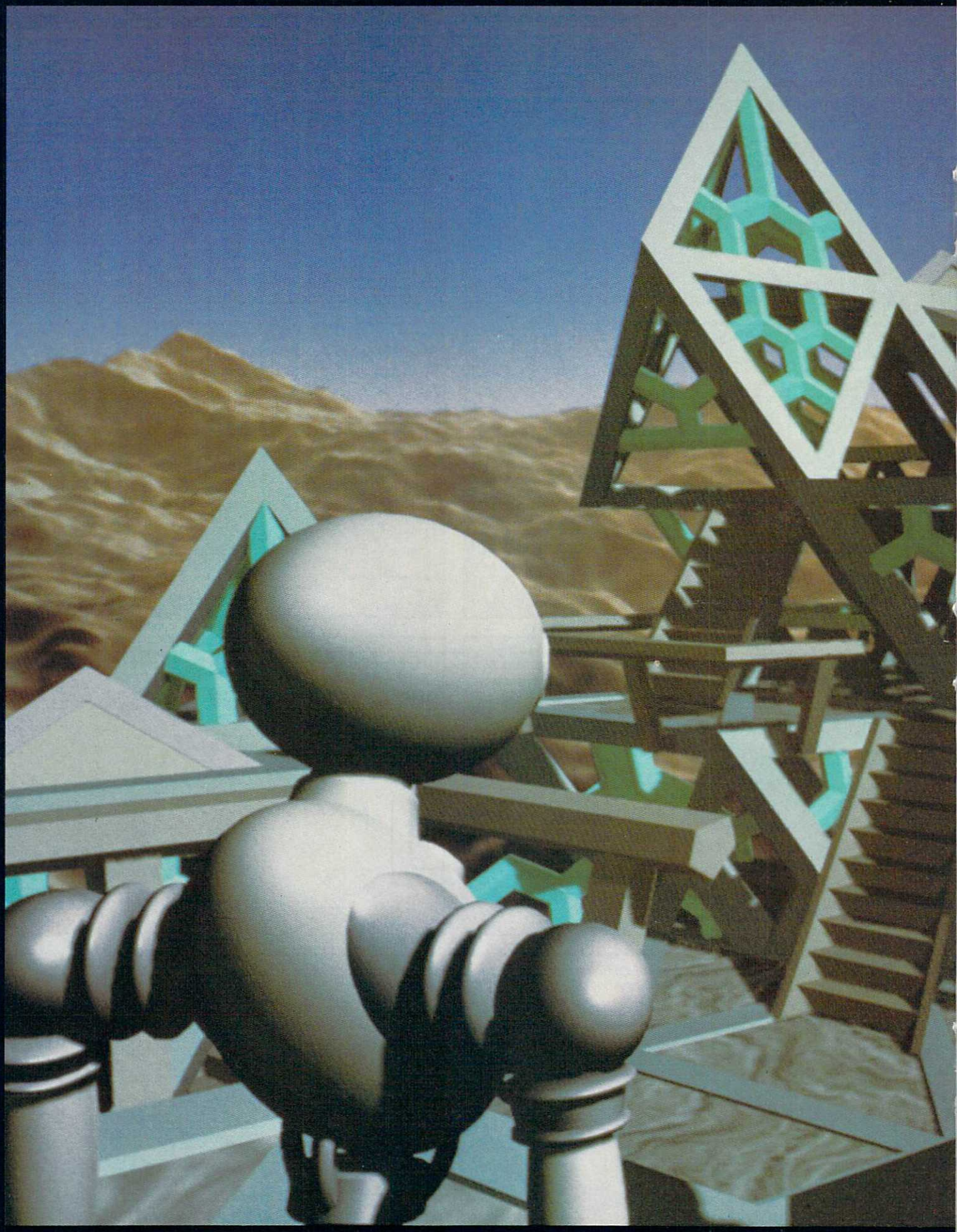
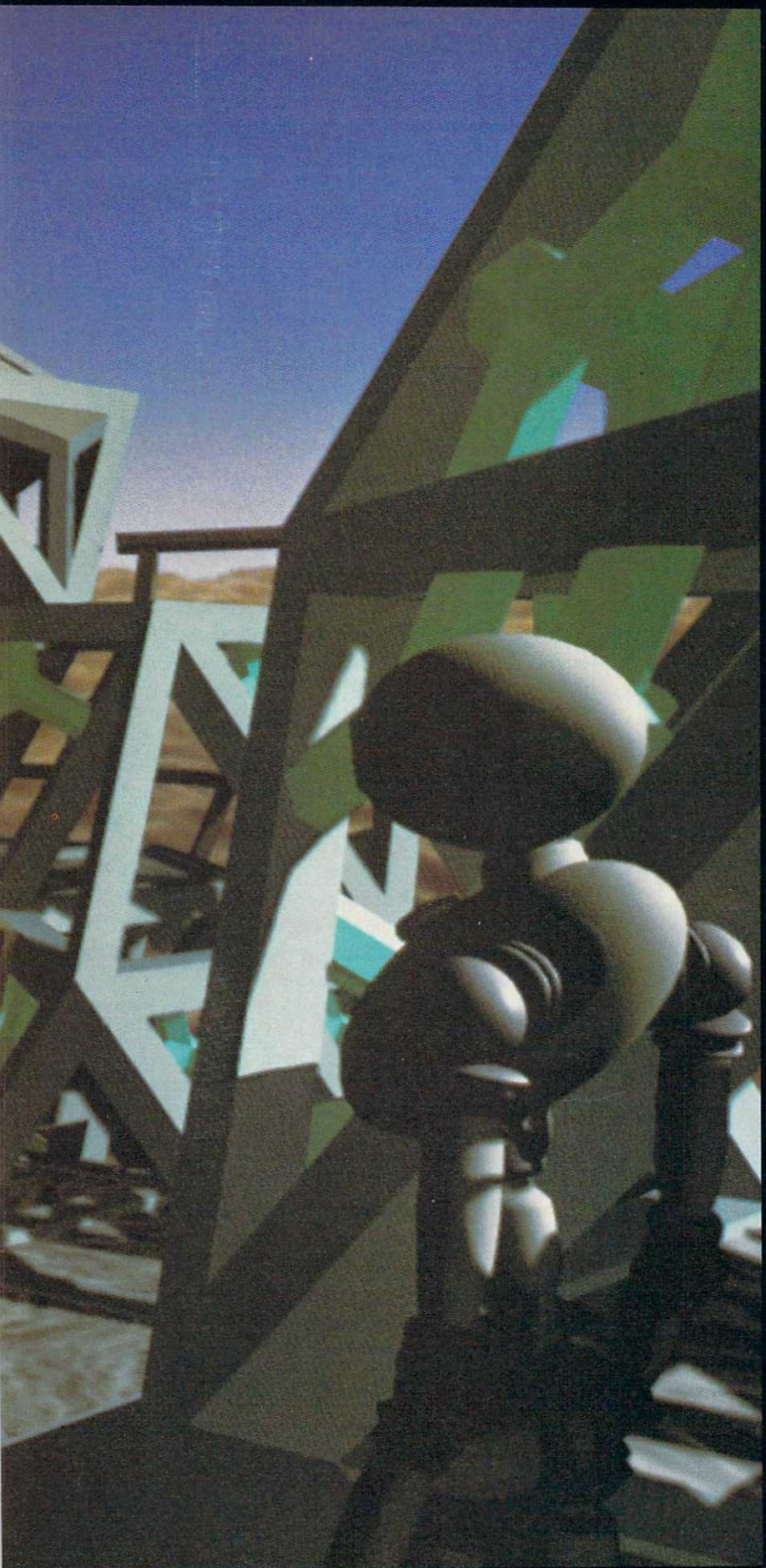


Illustration: J.D. King





POWER™

GRAPHICS GALLERY
JUNE 1984

'MONDO CONDO'

COMPUTER-GENERATED ART BY NED GREENE

This month's Graphics Gallery was made at the New York Institute of Technology (NYIT) Computer Graphics Lab. This image was made in preparation for an animation sequence that will show movement through the building from a robot's point of view.

Mondo Condo is an example of three-dimensional scene simulation. The program used to make the picture required a complete 3-D description of the objects in the scene.

Developing a geometric description of a scene is a lot of trouble, but once it's developed it can be used to draw the scene from any point of view. To show movement through the scene, the same geometric objects are drawn for each frame as the "camera" moves from place to place in the scene. This is how animation is done.

Most animation of complicated three-dimensional scenes is limited to a few seconds for television commercials, or special effects for movies. But as computer technology advances, producing computer animation will become faster and easier, and it'll be practical to make full-length movies with computer animation. k

NED GREENE *has been a research programmer at the New York Institute of Technology Computer Graphics Lab since 1980.*

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APPLE *IIc*

A SOUPED-UP PORTABLE *IIe*

BY NICK SULLIVAN AND JOHN JAINSCHIGG

The "c" in Apple's new computer stands for: compact, color, and compatible. Take your pick. The IIc is transportable (7.5 pounds), displays 16 colors in "double hi-res," and runs most software (95 percent) written for the Apple II line. It's got a few extras to boot. Here's the scoop K-POWER got during a recent visit to the Apple headquarters.

"We were talking with Steve Jobs one day," says Peter Quinn, the chief hardware designer on the IIc. (Jobs, 29, cofounded Apple.) "A couple of IIe motherboards were lying around, and Steve said, 'You know, if you did this . . .'—he picked up a keyboard and put it on the front of the motherboard—'and then you did this . . .'—he picked up a disk drive and put it on the back—'you'd have a perfect computer.' "

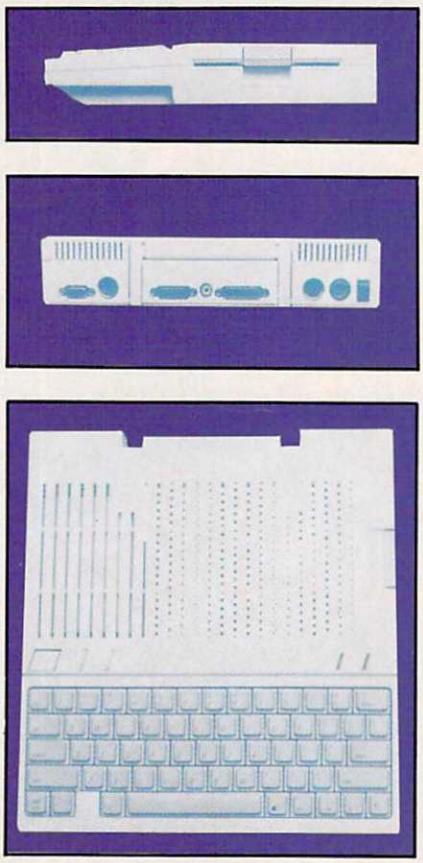
Quinn took the cue. Working with a bunch of people who'd helped build the IIe, Quinn and team took less than a year and a half to build the IIc. A German firm that had contributed to the design of the Sony Walkman was called in and helped mold the machine. The IIc went by code names during its construction—Elf, Jason, Lolly, Teddy—but Apple kept this computer and its final name very secret right to the end.

WHAT'S IT DO?

The white IIc, which probably will sell for $1,000 to $1,300, is basically a souped-up IIe that you can carry around; from the living room to the bedroom, from home to school—who knows?

The IIc's got 128K RAM (bank switched), a built-in 5¼-inch disk drive, an 80-character screen display, and what Apple calls "double hi-res" graphics. For the technically-minded, that means 560 × 192 pixels (with a monochrome display), horizontally by vertically. For the thrill-seekers, it means a really clear, vivid picture. You can display 16 colors at once at 140 × 92 resolution, which you can't do on the IIe.

To keep things in perspective, you can get the same effects from an Apple IIe—if you buy an Extended 80-Column Card (for about $275). That gives you 128K, an 80-character display, and double hi-res. But the IIc's got a few other tricks up its sleeve.



The IIc is light (7.5 pounds) and small (11⅛ × 12 × 2 inches).

THE BACK PANEL

The IIe is an open machine. You can look inside, figure out what you need, and get it. Just stick a new card in one of the eight open slots and you're off to the races. Apple and third-party manufacturers supply just about all the goods you'd ever need—from mouse cards to music synthesizers. But, as Apple discovered in its research for the IIc, a lot of people don't have the instinct, time, or money to build soap-box computers.

So, most, if not all, of the necessaries are built right into the IIc. The back panel has a port for a mouse or joystick—the computer automatically reads the voltage and figures out which device is plugged in. With its two serial ports, you can connect both a modem and a printer. There's also a port for an external disk drive (both the built-in and optional drives store 143K), and a "power-in" port, which allows the IIc to be connected to a car battery via the cigarette lighter plug.

The IIc's got a few other bells and whistles that set it apart from the IIe. If you want to switch from a 40- to an 80-character display, just click a button

Photos: Roger Ressmeyer

above the keyboard. If you want to plug in headphones—and create a kind of computerized Sony Walkman—there's a jack ready to spill out sound. (Sorry, mono only.)

SOFTWARE

When introduced, most new computers boast a few super-duper software packages. The IIc, making up for a lack of new mind-boggling technology, boasts a few thousand. Almost all the 10,000 or so programs written for the Apple II, II plus, and IIe will run on the IIc. Some of the new ones developed for the IIc (such as Apple's *MousePaint*, a classy version of Macintosh's *MacPaint*) use a mouse.

Upcoming software, like the new *Fact and Fiction Tool Kit* (Scholastic Wizware), will make full use of both a mouse and double hi-res graphics. *Fact and Fiction Tool Kit* contains two programs. One allows you to create data bases, the other lets you mix color pictures and texts, in several different typefaces, and print out a 12-page color booklet.

To make projects like this possible (and relatively inexpensive), Apple has introduced a new seven-color thermal-transfer printer. Called the Scribe, it can output text and graphics on plain paper—like the ImageWriter that is used with the fabled Macintosh—and costs only $300. Other peripherals from Apple include a modem (under $300 for 300-baud, under $500 for 1200-baud), the same mouse that comes with the Macintosh (about $100), and a 9-inch green-phosphor monitor (about $250).

Depending on how you look at it, the IIc's either humdrum and more-of-the-same—or a snazzy new computer with a lot going for it. Either way, the IIc gives you a lot more for your money than the IIe. Look for a future issue of K-POWER where we'll put the IIc through all its paces. **k**

NICK SULLIVAN *is* K-POWER*'s and* FAMILY COMPUTING*'s roving reporter. He and technical editor* JOHN JAINSCHIGG *flew to sunny California to give the IIc the hacker once-over.*

FOR HACKERS ONLY

The IIc's motherboard is a tight unit. All the circuit boards (or cards) that were needed in the IIe to create I/O ports or extra memory are contained on the IIc in small chips. VLSI's (Very Large Scale Integration chips) and PALs (Programmed Array Logic chips) do the job.

With all this circuitry jammed into such a small space, you might expect the IIc to run hot—but it doesn't. The disk drive, mounted right above the motherboard and below the top vents, does run extra hot. The extra heat it throws off creates a convection current that keeps the air flowing—right up and out through the many vents in the casing.

Other neat stuff . . . The 65C02 microprocessor is not just another 6502. It uses CMOS (Complementary Metal-Oxide Semiconductor) technology, which requires much less power. This keeps the heat down and could allow for battery operation. The 65C02 also has 27 more instructions than the 6502. So you can do some neat things—like loading the accumulator and X register from the same location at the same time.

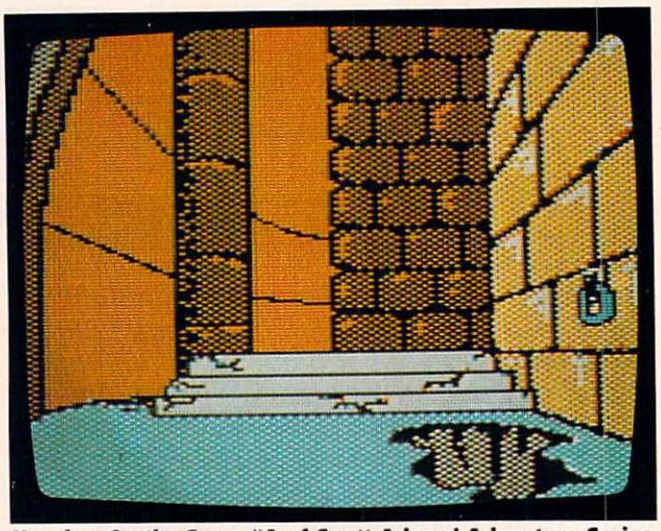
If you're into graphics, you'll love the double hi-res mode. The display is memory-mapped by "multiplexing" two 8K banks of RAM together. "Piece of cake!" says Quinn, the hardware designer, in a classic understatement. "You just grab one byte from over here, another byte from over there."

The enhanced graphics really get shown off in *MousePaint*. And besides the graphics, *MousePaint* is loaded with goodies like pull-down menus, icons, a choice of text fonts, and the ability to mix text and graphics. You can print out your art work on Apple's Scribe ($300) or ImageWriter ($595) printers—graphics dumpsville!

As for programming, the IIc version of Applesoft has an improved screen editor. Instead of using ESCAPE-I, ESCAPE-J, etc., to move the cursor around, you can use the cursor keys themselves. The way it should have been in the first place—much easier. In fact, the whole machine is much easier to use than the IIe, bringing along many of the great user interfaces—the mouse, icons, friendly disk-based tutorials, etc.—that have made the Lisa and Macintosh technology such a rage.

ADVENTURES WITH SCOTT ADAMS

Approaching the Voodoo Castle.



Voodoo Castle, Saga #4 of Scott Adams' Adventure Series.

On-line tips from an adventurous creator turn you on to the game-making biz.

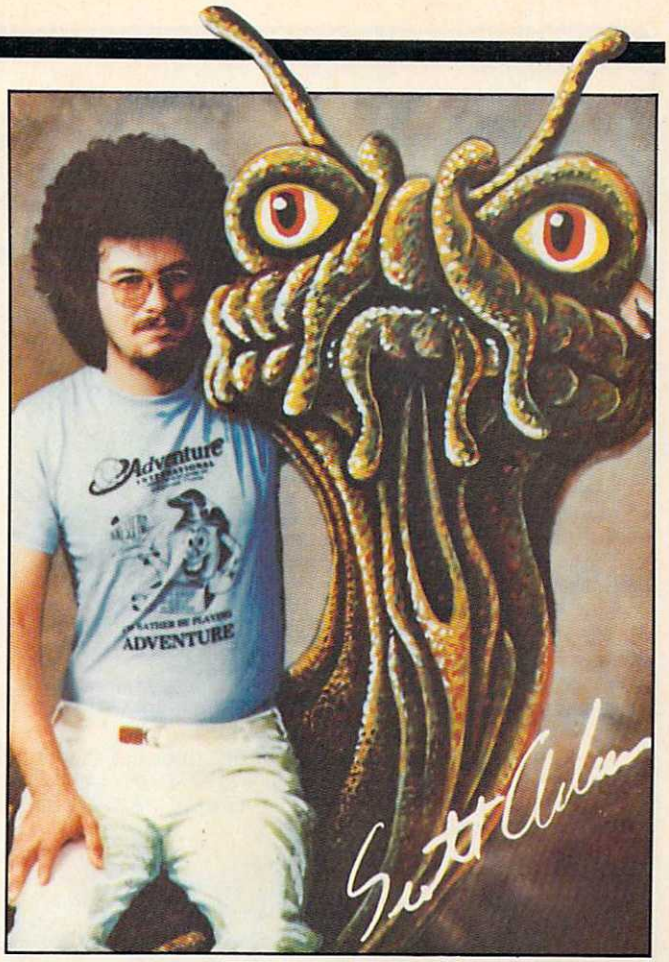
Interview by David Peyton, Jr.

Scott Adams' world is filled with skeletons that walk, swords that glow, and purple worms that kill on contact. It's a world of ancient castles, dark pyramids, enchanted islands, and twisting passages.

Scott creates his world on a computer. He's the founder of Adventure International, one of the oldest software publishing houses in the business. The 31-year-old programmer has been writing adventure games since 1978 and is well known for creating adventures in which players direct the action with typed-in commands (GO, EAST, EXAMINE, etc.). He prides himself on leaving just enough clues in his games to solve the riddles. But he doesn't promise that the solutions are going to be easy!

Twelve-year-old David Peyton conducted an online interview with Scott Adams via CompuServe Information Service. David typed the questions from his home in Huntington, West Virginia, and Scott typed the answers from his home in Longwood, Florida. Excerpts from David's interview follow.

DAVID: When did you make up your mind to go into computer programming?
SCOTT: Back in third grade, I think. We went on a field trip to the University of Miami and saw the computer lab from behind glass windows. We were told we couldn't go in there. I decided that someday I would go in!
DAVID: Did you have any courses in computers before college?
SCOTT: I took no computer courses before college, but I used computers both at my high school and at Dade Community College.
DAVID: How did you get the idea for *Adventureland*, your first adventure game?
SCOTT: Free association, mostly. The adventure tended to write itself. The original game took about one week to get up and running with about one fourth of the game there. The rest took about six months to really fine-tune.
DAVID: Tell me about the new games you're now writing.
SCOTT: I've just made a deal to get the exclusive rights on computer adventure games for all characters in the Marvel Universe of Characters. The series is tentatively entitled *Questprobe* and will have a comic book spin-off tied into each adventure. The first one will be with The Hulk and Dr. Strange, and the entire series will tie together!
DAVID: What would you say to a kid who claims he can't think up a new game because his computer is too small, or too old, or all he knows is BASIC?
SCOTT: I wrote my first game on a remote terminal using APL/360 as the language. My first microcomputer game emulated a complete tank war game on a home-brew system I built that had a whopping 4K of memory and a 512-byte operating system. The point is, a good writer need not blame his tools. He'll make do!
DAVID: How would you advise a kid who thinks he invented a good game to proceed in getting it sold or published?
SCOTT: Ideas are cheap. A dime a dozen, as they say. It's the implementation that's important! The trick isn't just to have a computer game idea, but to actually create the game!
DAVID: And when you've created it, then what?
SCOTT: Submit it to publishing houses. We're one of the oldest software publishing houses and always welcome freelance submittals!



Scott befriends the dragon in *Adventureland*, Adventure International's first adventure game.

DAVID: Does someone *really* take a look at all games submitted to your company?
SCOTT: Absolutely. And we have a software-review board meeting usually once a week to discuss the week's submittals. Usually 99 and nine-tenths are not what we're looking for, but we look at all and try to encourage promising authors.
DAVID: What does a game programmer like yourself think about piracy?
SCOTT: Needless to say, I feel it's the one absolutely worst problem facing our industry today!
DAVID: Is there any way to stop piracy?
SCOTT: The hardware manufacturers have to design their machines to prevent piracy.
DAVID: Could it destroy the industry or even prevent new games from getting on the market?
SCOTT: In many cases it has! The Apple market is a good case. Piracy is rampant there, and new programs are really not as good as they could be. Publishers are now switching to systems with less piracy! **k**

DAVID PEYTON, JR. *is an avid Adams game fan. He chases purple worms all across West Virginia hoping to find enough treasures to start his own software company.*

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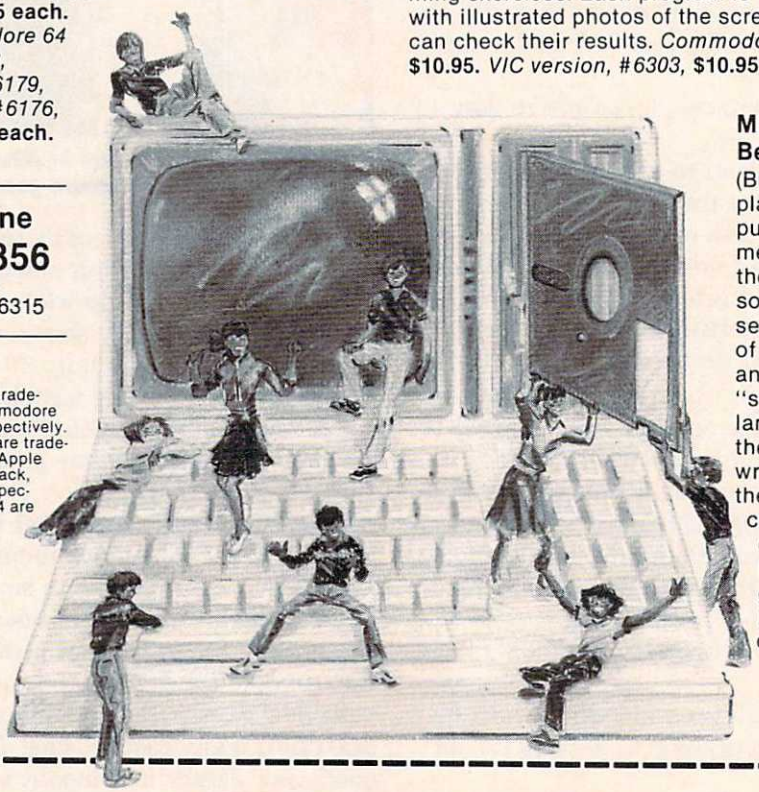

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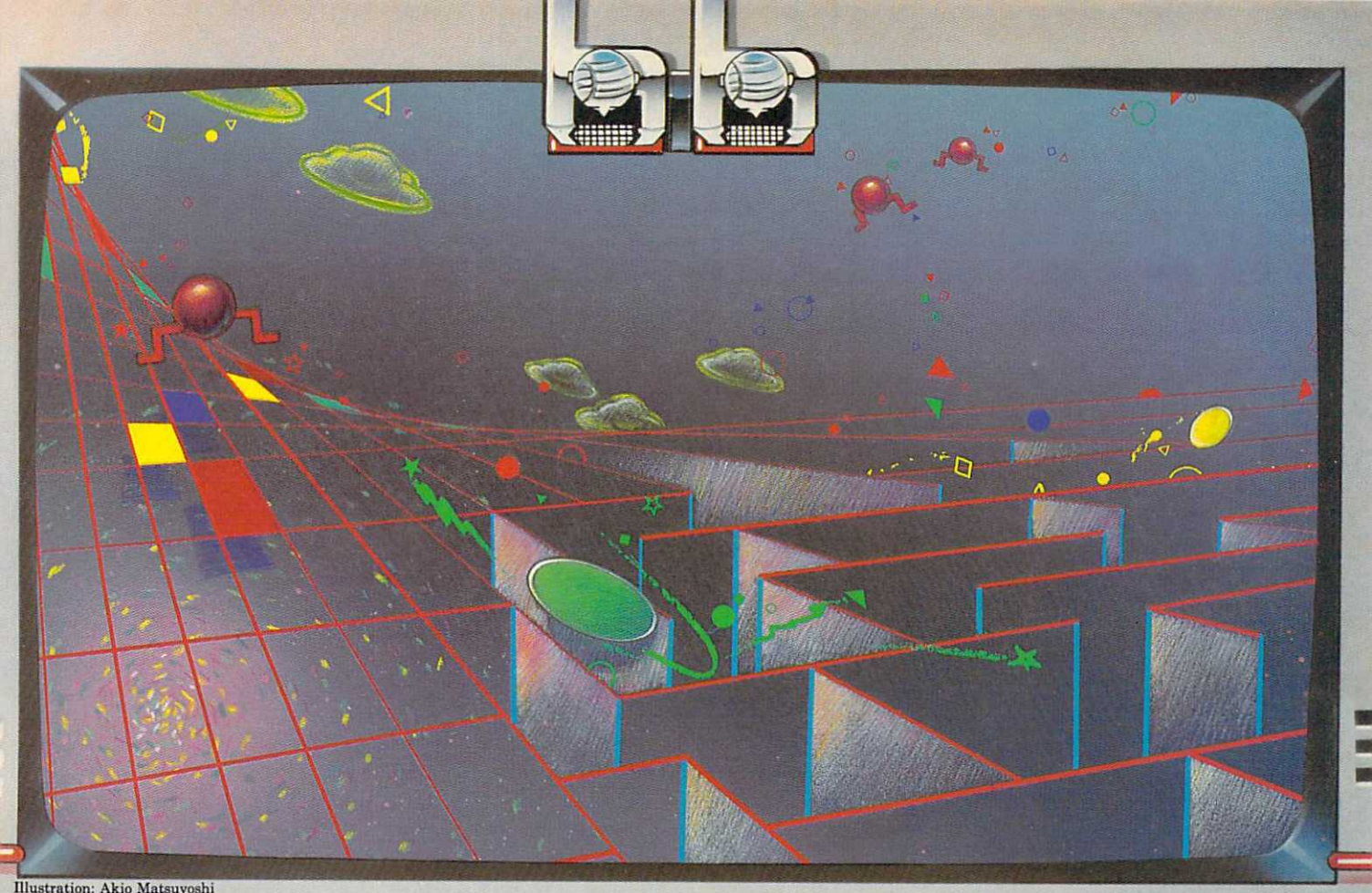


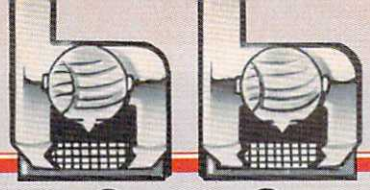
Illustration: Akio Matsuyoshi

HACKER HEAVEN

JUNE

K-BLOOPERS Page 36 So, we made a few mistakes. Here's where we tell you (and you tell us) how to fix them.	**PIXEL THAT!** Page 46 *Chaos*. The craziest program for the TI-99/4A you'll ever see.
PROGRAMS Page 40 Spiderweb designs, a robot, and loads of programs to make your brain sweat.	**PUZZLE POWER** Page 47 Can *you* get out of the *Minotaur's Labyrinth*?

Illustration: Jim Cherry III



K - B L O O P E R S

So, we made a few mistakes. We're sorry. Here's where we tell you (and you tell us) which ones and how to fix them.

LOST IN THE PRESSES

In last month's issue of K-POWER, several characters dropped right out of the programs! This happened in lines 1080 and 2010 of the Apple version of *Lunar Kangaroo* (pages 46–47), which should read:

```
1080 BY = BY - (BY / 30) ^ 2 - 2
2010 SX = SX + SS:IF SX > 278 THEN SX = 0
```

and also in line 40 of the Apple version of *Black Hole* (page 42), which originally looked like this:

```
40 FOR I=0 TO 45:HPLOT 45-I,0 TO 45-I,191:HPLOT 234+I,
0 TO 234+I,191:NEXT I:GOTO 20
```

In the Timex version of *Microworld* (pages 41–42), it happened in line 160, which should have a semicolon at the end:

```
160 PRINT CHR$ (CODE T$(N)+128);
```

TIMEX TRIP-UP

There were errors in lines 120, 1010, and 1210 of *Manimate*, a program for the Timex 2068 in the May issue (pages 51–52). Here are the corrected lines:

```
120 NEXT Y:NEXT X
1010 DATA 18,17,2,2,2,2,2,2,72,136,64,64,64,64,64,64
1210 DATA 132,64,192,128,0,0,0,0,1,2,2,1,2,6,10,0
```

HOLD THAT CRYSTAL!

Watch out for the Apple version of *Crystal Maker* (May, page 42). Line 40 should end with 70 rather than 60:

```
40 IF ((280*(Y>0))-AA)/Y>((192*(Z>0))A-BB)/Z THEN 70
```

And did anyone catch the misspelling of HPLOT (as HPLOLT) in line 70?

SOME INPUT ON *OUTPUT*

Have you tried integrating April's *Output Subroutine* (May, pages 46, 48–49) into your own programs? You'll get unusual results in the Commodore 64 and TRS-80 Model III versions if you try to print a line that's exactly the width of the screen. You can clear up this problem easily. In the Commodore 64 version, change the number 21 in line 2080 to 20:

```
2080 PRINT SPC(20-N) LEFT$(B$,N);RIGHT$(B$,N);
```

And in the Model III version, change the number 31 in line 2070 to 32:

```
2070 PRINT @ VT*64-32-N,LEFT$(B$,N);RIGHT$(B$,N)
```

The Atari version of the subroutine works OK, but line 20 of the demonstration program is too long for the Atari to accept on a single line. To make it work, break it into two lines (and redimension A$ so it's long enough to hold this super-long string):

```
10 DIM A$(132),B$(120):PRINT CHR$(125)
20 VT=1:A$="THIS IS A SHORT DEMONSTRATION OF HOW EASY
IT IS TO USE THIS"
30 A$(LEN(A$)+1)=" SIMPLE SUBROUTINE IN YOUR OWN PROGR
AMS. LIST THE PROGRAM AND LOOK AT ..."
```

Finally, the modification instructions for the TI *Extended* BASIC version tell you to "change + to & in line 2020." You're probably smart enough to know that that goes for only the first + in the line:

```
2020 IF M / 2 <> INT(M / 2) THEN B$ = B$ & "  ":M = M
+ 1
```

But we should have been clearer.

TIC-TAC-TAC-TAC-. . .

You have to remove :PCLEAR 4 from the end of line 10 of the CoCo program *Tic-Tac-Toe* (April, pages 55–56) to make it work correctly.

COCO MYSTERY

Frustrated **Wally Carr** couldn't debug the CoCo version of *Mysterious Message* (Premiere issue, pages 46, 48). He says, "The changes shown on page 46 were incomplete. . . . The change to line 440 was impossible. I made the more obvious changes, but encountered at least 10 more."

Well, Wally, you're right about the change to line 440; the correct version of that line for the CoCo is

```
440 PRINT@64+BH," ";
```

Without this change the program still works, but the screen looks a little funny.

But it sounds like you didn't notice that the CoCo modifications continued on page 48. If any other CoCo owners have had trouble with this program, they should make sure they typed in all the lines on page 48, and make the changes shown on page 46.

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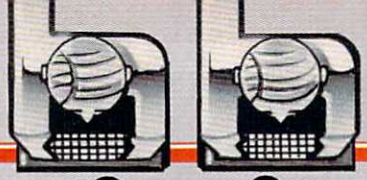

K - B L O O P E R S

ADAM SYMPHONY: ENCORE!

Hacker **A. R. Gayson** of **Downsview, Ont.,** discovered on his own how to make the Apple version of *Symphony in 3-D* (Premiere issue page 44) work on the ADAM (omit lines 30, 1000, 2000–2020, and the :GOSUB 1000 in lines 130–160). Then, he spruced up the program with added color: "It's too bad there is no sound, but the colors will make up for it if you turn on your stereo." All you need to do is change line 60 to this:

```
60 h = INT(RND(1)*15)+1:HCOLOR = h:a = INT(RND(1)*8):I
F a = ao OR h = 4 THEN 60
```

The program looks great with this change. Thanks a lot, A.R.!

ADAM'S COMEDY DEBUT

ADAM owner **Arthur E. Carman** of **Montgomeryville, PA,** writes: "I think it's just great you include programs for the Coleco ADAM in your magazine because there aren't any available anywhere else. Unfortunately, I am having a problem programming *Comedy Debut* in your March 1984 issue (pages 42–43). I can't pinpoint whether it's the program that's faulty or the ADAM itself."

Don't worry, Arthur, it's not you or your ADAM. Two lines (270 and 310) of the listing are too long for the ADAM to accept. You can solve this problem by breaking each one into two lines, like so:

```
270 n$="BEFORE YOU CAN BEGIN YOUR NEXT JOKE YOU ARE BO
MBARDED WITH    ROTTEN TOMATOES. YOU RUN FOR   YOUR LI
FE."
280 PRINT n$:GOTO 440
310 PRINT "BRILLIANT ROUTINE, OR IF":PRINT "THEY'RE JU
ST VERY GLAD YOU'VE"
315 PRINT "FINISHED.":PRINT:PRINT "THE NEXT ACT, TINY
TINA AND HER";
```

Also, line 9070 will give you problems unless you take out the extra quotation mark. Here's the correct version:

```
9070 DATA "GOOD EVENING, LADIES AND       GERMS.","AAA
HH! THE OLDEST AND THE      FINEST!"
```

Here are more ways you can improve the program: Remove :PRINT n$ from the end of line 330. Change the first DATA value in line 9000 from 92 to 95. Remove the word DATA between THOSE and DENTURES on line 9130. Correct the spelling of ARTIC to ARCTIC in line 9310. And you can play around with adding and removing spaces in the DATA statements and in line 410 to make the program look prettier on your screen. (While you're at it, why not add some of your favorite jokes?)

Arthur, we're glad you spotted the errors.

HELP FOR TI OWNERS

TI-99/4A owner **Ray Potts** of **Columbia, TN,** found a problem in the TI version of *Towers of Eternity* (March 1984, pages 50, 52). "I have checked entry of programming three times. I get the error message: BAD SUBSCRIPT IN LINE 700 when electing to WATCH instead of PLAYing."

Viola Limrie of **Summerdale, PA,** also had problems with that program. She adds, "Please remember just because TI left the personal computer business doesn't mean we no longer need good programs. It'll be a few years before that happens. All I can say is HELP!!!"

Ray and Viola, you found a big blooper this time! Somewhere on the way to the printer, an early version of *Towers of Eternity* (with the WATCH feature not yet debugged) got substituted for the corrected, final version. We're sorry about this slipup. To try to make it up to you, we're giving you the entire final version, not just the changes. And don't worry; we'll continue to provide at least one TI program in every issue (more if we've got room!).

TEXAS INSTRUMENTS/*TOWERS OF ETERNITY*

TI-99/4A • 16K RAM • TI Extended BASIC

```
10 DIM B$(10),T(3,10),N(3),ND(10),TT(3,10)
20 CALL CLEAR
30 I$="FOFOFOFOFOFOFOFO" :: CALL CHAR(34,I$)
40 J$="OFOFOFOFOFOFOFOF" :: CALL CHAR(35,J$)
50 H$="4242424242424242" :: CALL CHAR(36,H$)
60 K$="FFFFFFFFFFFFFFFF" :: CALL CHAR(96,K$)
70 TT(1,1)=1 :: TT(2,1)=3 :: TT(3,1)=2
80 FOR X=1 TO 9 :: B$(9)=B$(9)&CHR$(96):: NEXT X
90 B$(8)=CHR$(35)&SEG$(B$(9),1,7)&CHR$(34)
100 B$(7)=" "&SEG$(B$(9),1,7)
110 B$(6)=" "&CHR$(35)&SEG$(B$(9),1,5)&CHR$(34)
120 B$(5)="  "&SEG$(B$(9),1,5)
130 B$(4)="  "&CHR$(35)&SEG$(B$(9),1,3)&CHR$(34)
140 B$(3)="   "&SEG$(B$(9),1,3)
150 B$(2)="   "&CHR$(35)&SEG$(B$(9),1,1)&CHR$(34)
160 B$(1)="    "&SEG$(B$(9),1,1)
170 B$(10)="    "&CHR$(36)
180 FOR X=1 TO 3 :: N(X)=0 :: FOR Y=1 TO 10 :: T(X,Y)=
10 :: NEXT Y :: NEXT X
190 INPUT "HOW MANY DISKS? ":DK :: IF DK<2 OR DK>9 THE
N 190
200 DK=INT(DK):: N(1)=DK :: FOR X=1 TO DK :: T(1,X)=DK
+1-X :: NEXT X
210 PRINT "DO YOU WANT TO P)LAY"
220 INPUT "           OR W)ATCH? ":A$ :: SU=(A$="W")
230 CALL CLEAR
240 CALL HCHAR(20,1,96,32)
250 FOR Y=1 TO 10 :: FOR X=1 TO 3
```

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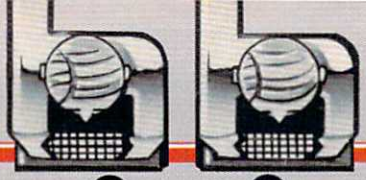


K - B L O O P E R S

```
260 DISPLAY AT(20-Y,(X-1)*10):B$(T(X,Y))
270 NEXT X :: NEXT Y
280 DISPLAY AT(21,1):"TOWER 1" :: DISPLAY AT(21,10):"T
OWER 2" :: DISPLAY AT(21,19):"TOWER 3"
290 IF SU THEN GOSUB 1000 :: GOTO 450
300 IF N(2)=DK OR N(3)=DK THEN 450
310 DISPLAY AT(23,1):"       " :: DISPLAY AT(22,1):"FR
OM: "
320 CALL KEY(0,F,Q):: IF Q=0 THEN 320
330 A=F-48 :: IF A<1 OR A>3 THEN 310
340 DISPLAY AT(22,6):A
350 IF N(A)=0 THEN 310
360 DISPLAY AT(23,1):"TO: "
370 CALL KEY(0,Z,Q):: IF Q=0 THEN 370
380 B=Z-48 :: IF B<1 OR B>3 OR B=A THEN 360
390 DISPLAY AT(23,6):B
400 IF N(B)=0 THEN 430
410 IF T(A,N(A))<T(B,N(B))THEN 430
420 DISPLAY AT(24,1)SIZE(19)BEEP:"INVALID MOVE!" :: FO
R L=1 TO 500 :: NEXT L :: DISPLAY AT(24,1)SIZE(28):" "
 :: GOTO 300
430 GOSUB 2000
440 GOTO 300
450 FOR X=1 TO 500 :: NEXT X :: CALL CLEAR :: IF SU TH
EN PRINT "ALL DONE!" :: END
460 PRINT "CONGRATULATIONS!" :: PRINT "YOU HAVE COMPLE
TED THE GAME"
470 PRINT "IN";M;"MOVES." :: END
1000 LV=0 :: ND(1)=DK
1010 LV=LV+1
1020 IF ND(LV)=1 THEN A=TT(1,LV):: B=TT(2,LV):: GOSUB
2000 :: GOTO 1060
1030 ND(LV+1)=ND(LV)-1 :: TT(1,LV+1)=TT(1,LV):: TT(2,L
V+1)=TT(3,LV):: TT(3,LV+1)=TT(2,LV):: GOSUB 1010
1040 A=TT(1,LV):: B=TT(2,LV):: GOSUB 2000
1050 ND(LV+1)=ND(LV)-1 :: TT(1,LV+1)=TT(3,LV):: TT(2,L
V+1)=TT(2,LV):: TT(3,LV+1)=TT(1,LV):: GOSUB 1010
1060 LV=LV-1
1070 RETURN
2000 X=T(A,N(A)):: N(A)=N(A)-1
2010 N(B)=N(B)+1 :: T(B,N(B))=X
2020 DISPLAY AT(19-N(A),(A-1)*10)SIZE(10):B$(10)
2030 DISPLAY AT(20-N(B),(B-1)*10)SIZE(10):B$(T(B,N(B))
)
2040 M=M+1 :: DISPLAY AT(1,1):"MOVES: ";M
2050 RETURN
```

C O M P U C O P I A

A galaxy of microprograms for your microcomputer.

APPLE/*POLYGON CONSTRUCTOR*

II plus or IIe • 32K RAM

```
10 INPUT "# OF SIDES? ";S:HGR:HCOLOR= 3:A = ATN(1) * 8
 / S:HPLOT 140,150:FOR I = A TO ATN(1) * 8 STEP A:HPLO
T TO 140 + SIN(I) * 70,80 + COS(I) * 70:NEXT I:HPLOT T
O 140,150:GOTO 10
```

COLECO/*POLYGON CONSTRUCTOR*

ADAM • 80K RAM

```
10 INPUT "# of sides? ";S:HGR:HCOLOR= 3:a = ATN(1) * 8
 / s:HPLOT 140,150:FOR i = a TO ATN(1) * 8 STEP a
20 HPLOT TO 140 + SIN(i) * 70,80 + COS(i) * 70:NEXT i:
HPLOT TO 140,150:GOTO 10
```

APPLE/*SUPER RASTER*

II plus or IIe • 32K RAM • color TV or monitor optional

```
10 TEXT:HOME:INPUT "N,S? (0-255):";N,S:HGR2:POKE 232,0
:POKE 233,N:FOR I = 0 TO 64:HCOLOR= INT(RND(1) * 6) +
1:SCALE= S:ROT= I:DRAW 0 AT 140,95:NEXT I:GET A$:RUN
```

TIMEX SINCLAIR/*(TEXT)ILES*

1000 or 1500 • 2K RAM

```
10 DIM G$(9)
20 FOR I=1 TO 9
30 LET G$(I)=CHR$ (INT(RND*11)+(RND>.5)*128)
40 NEXT I
50 PRINT AT 0,0;
60 FOR I=1 TO 78
70 PRINT G$;
80 NEXT I
90 PRINT G$( TO 2);
100 GOTO 20
```

2068 • 48K RAM

```
10 DIM G$(9)
20 FOR I=1 TO 9
30 LET G$(I)=CHR$ (INT (RND*16)+128)
40 NEXT I
50 PRINT AT 0,0;
60 FOR I=1 TO 78
70 PRINT G$;
80 NEXT I
90 PRINT G$( TO 2);
100 LET X=INT (RND*8): PAPER X
110 LET Y=INT (RND*8): IF Y=X THEN GO TO 100
120 INK Y: GO TO 20
```

Memory Melody

By Tom Peterson

You know how much memory your computer has, but what about yourself? How many "K" do you have?

Here's a program that'll test your memory and your ear for music. To start, your computer will play a random note and flash one of four squares on the screen. You then have to press the key corresponding to the square that just flashed. Each round another note is added to the sequence making it tougher and tougher to recall the exact order. You won't have too much time to think, so you've got to act fast or lose.

Give it a try. Test your power of recall. Do you have more memory than your computer?

TOM PETERSON, *14, hails from Vancouver, Washington. He's the proud owner of both a Commodore 64 and a TI-99/4A.*

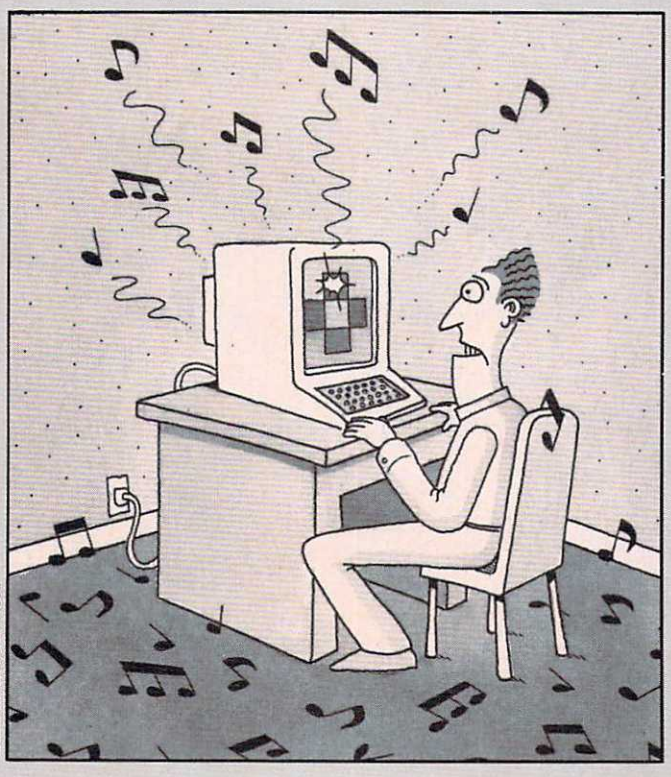


Illustration: Chris Reed

COMMODORE/*MEMORY MELODY*

Commodore 64 • color TV or monitor

```
10 DIM S(30),ARR(4,3):V=53248
20 FOR X=1 TO 4:FOR Y=1 TO 3:READ ARR(X,Y):NEXT Y:NEXT
 X
30 FOR N=0 TO 62:POKE 832+N,255:NEXT N:FOR X=2040 TO 2
043:POKE X,13:NEXT X
40 FOR N=0 TO 62:READ Q:POKE 896+N,Q:NEXT N:FOR X=2044
 TO 2047:POKE X,14:NEXT X
50 FOR X=1 TO 200:BLANK$=BLANK$+" ":NEXT X
60 POKE 54296,15:POKE 54277,9:POKE 54278,0
70 PRINT CHR$(147) TAB(240) "LEVEL OF DIFFICULTY:"
80 PRINT:PRINT "1-BEGINNER":PRINT "2-INTERMEDIATE":PRI
NT "3-ADVANCED"
90 GET K$:LOD=VAL(K$):IF LOD<1 OR LOD>3 THEN 90
100 NBR=LOD*8:A=1
110 POKE V+21,15:POKE V+29,255:POKE V+23,255:POKE 5328
0,1:POKE 53281,1
120 POKE V,76:POKE V+1,136:POKE V+2,156:POKE V+3,88
130 POKE V+4,156:POKE V+5,184:POKE V+6,236:POKE V+7,13
6
140 FOR X=V+39 TO V+42:POKE X,0:NEXT X
150 IF GHP>0 THEN 180
160 PRINT CHR$(147) TAB(4) "USE I, J, K, AND M KEYS TO
 PLAY."
170 FOR D=1 TO 1000:NEXT D
180 PRINT CHR$(147) TAB(15) "GET READY!":FOR D=1 TO 10
00:NEXT D
190 PRINT CHR$(147) TAB(16) "ROUND:" A
200 S(A)=INT(RND(1)*4)+1:GOSUB 1000:C=1:F=0
210 TM=0
220 GET M$:TM=TM+1
230 IF TM=100 THEN PRINT CHR$(19) TAB(133) "TOO MUCH T
IME!":GOTO 340
240 IF F=1 AND (TM>25 OR M$<>"") THEN GOSUB 4000:F=0
250 IF M$="" THEN 220
260 R=ASC(M$):TJ=-((R=74)+2*(R=73)+3*(R=77)+4*(R=75))
270 IF TJ<1 OR TJ>4 THEN 220
280 IF TJ<>S(C) THEN PRINT CHR$(19) TAB(137) "WRONG!":
GOTO 340
290 HI=ARR(S(C),2):LO=ARR(S(C),3):GOSUB 3000:F=1
300 IF C<>A THEN C=C+1:GOTO 210
310 FOR D=1 TO 100:GET M$:NEXT D:GOSUB 4000
320 IF A=NBR THEN 410
330 FOR D=1 TO 200:NEXT D:A=A+1:GOTO 190
340 HI=34:LO=75:GOSUB 3010:FOR D=1 TO 100:NEXT D:GOSUB
 4010
350 PRINT CHR$(19):FOR X=1 TO 7:PRINT TAB(120):NEXT X
360 PRINT TAB(11) "DO YOU WISH TO SEE"
370 PRINT TAB(6) "THE CORRECT SEQUENCE? (Y/N)"
380 GET F$:IF F$<>"Y" AND F$<>"N" THEN 380
390 IF F$="Y" THEN GOSUB 1000
400 A=A-1:GOTO 430
410 PRINT CHR$(19) TAB(240) TAB(252) "CONGRATULATIONS!"
420 POKE V+21,(PEEK(V+21) OR 240) AND 240
430 IF A>=GHP THEN GHP=A
440 PRINT CHR$(19):FOR X=1 TO 3:PRINT TAB(240):NEXT X:
PRINT BLANK$
450 PRINT CHR$(19) TAB(13) "LAST ROUND:" A
460 PRINT CHR$(19) TAB(92) "HIGHEST ROUND:" GHP
470 PRINT CHR$(19):FOR X=1 TO 7:PRINT TAB(120):NEXT X
480 PRINT:PRINT TAB(11) "PLAY AGAIN? (Y/N)"
490 POKE V+9,136:POKE V+10,156:POKE V+12,156:POKE V+15
,136
```

```
500 X=0:IDX=5
510 GOSUB 2000:X=X+IDX
520 IF X=150 OR X=0 THEN IDX=-IDX
530 GET F$:IF F$="Y" THEN POKE V+21,0:GOTO 70
540 IF F$="N" THEN PRINT CHR$(147):END
550 GOTO 510
1000 FOR C=1 TO A:HI=ARR(S(C),2):LO=ARR(S(C),3)
1010 GOSUB 3000:FOR D=1 TO 100:NEXT D:GOSUB 4000
1020 NEXT C:RETURN
2000 POKE V+8,76+X:POKE V+11,88+X
2010 POKE V+13,184-X:POKE V+14,236-X
2020 FOR Y=1 TO 4:POKE V+42+Y,2:NEXT Y
2030 FOR D=1 TO 10:NEXT D
2040 FOR Y=1 TO 4:POKE V+42+Y,0:NEXT Y
2050 RETURN
3000 POKE V+38+S(C),ARR(S(C),1)
3010 POKE 54273,HI:POKE 54272,LO:POKE 54276,33:RETURN
4000 POKE V+38+S(C-1),0
4010 POKE 54276,0:POKE V+38+S(C),0:RETURN
5000 DATA 8,8,97,14,9,104,7,10,143,13,11,48
5010 DATA 1,255,128,14,0,112,48,0,12,64,0,2,64,0,2,67
5020 DATA 129,194,131,1,129,128,0,1,128,24,1,128,24,1
5030 DATA 128,60,1,136,0,17,136,0,17,136,0,17,68,0,34
5040 DATA 68,0,34,67,0,194,49,255,140,12,0,48,3,255
5050 DATA 192,0,0,0
```

Arachnid Art

By Peter Cockcroft

Not all webs catch insects. Here's a subroutine that duplicates the web patterns of one particularly artistic and energetic spider.

The web subroutine is quick, versatile, decorative, and can be used in any number of ways to enhance your next program.

The subroutine webs in a triangle with vertices (X,Y), (X,Y2), and (X2,Y). To use it in your programs, set X, Y, X2, Y2, and S (the number of lines in the web); then GOSUB 1000. Isn't it great? Finally, a program that can reproduce the patterns of a spider's web without having to keep the disgusting things around.

PETER COCKCROFT, *16, lives in New York City. He programs constantly.*

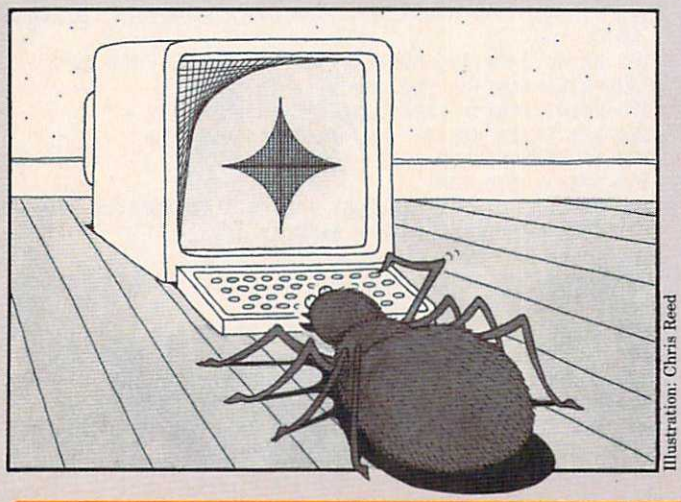


Illustration: Chris Reed

IBM/*ARACHNID ART*

PC or PCjr • 64K RAM • Color Graphics Adapter and color monitor (PC) • color TV or monitor optional (PCjr)

```
10 CLS:KEY OFF:SCREEN 1,0:COLOR 0:RANDOMIZE
20 CLS:COL=1:S=(INT(RND*4)+1)*8
30 FOR I=0 TO 3:READ X,Y,X2,Y2:GOSUB 1000:NEXT I
40 FOR I=0 TO 3:READ XD(I),YD(I):NEXT I
50 CO=0:X=160:Y=100:S=8
60 FOR I=2 TO 78 STEP 4:D=(I-2)/4:C=D-INT(D/4)*4
70 X2=I*XD(C)+X:Y2=I*YD(C)+Y:COL=2:GOSUB 1000
80 X2=(I-1)*XD(CO)+X:Y2=(I-1)*YD(CO)+Y:COL=0
90 GOSUB 1000:CO=C:NEXT I
100 RESTORE:GOTO 20
999 REM WEB-DRAWING SUBROUTINE
1000 XS=(X2-X)/S:YS=(Y2-Y)/S:YY=Y2
1010 FOR W=X TO X2 STEP XS
1020 LINE (W,Y)-(X,YY),COL:YY=YY-YS:NEXT W
1030 RETURN
2000 DATA 0,0,319,199,0,199,319,0
2010 DATA 319,199,0,0,319,0,0,199
2020 DATA 1,1,1,-1,-1,-1,-1,1
```

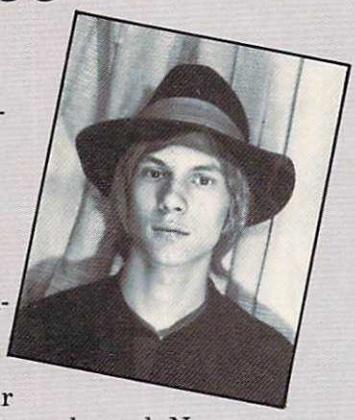
RADIO SHACK/*ARACHNID ART*

TRS-80 Color Computer • 16K RAM • color TV optional • Extended Color BASIC

```
10 PMODE 3,1:SCREEN 1,0:COLOR 4,2
20 PCLS:COLOR 0:S=RND(4)*8
30 FOR I=0 TO 3:READ X,Y,X2,Y2:GOSUB 1000:NEXT I
40 FOR I=0 TO 3:READ XD(I),YD(I):NEXT I
50 CO=0:X=128:Y=96:S=8
60 FOR I=2 TO 78 STEP 4:D=(I-2)/4:C=D-INT(D/4)*4
70 X2=I*XD(C)+X:Y2=I*YD(C)+Y:COLOR 3:GOSUB 1000
80 X2=(I-1)*XD(CO)+X:Y2=(I-1)*YD(CO)+Y:COLOR 2
90 GOSUB 1000:CO=C:NEXT I
100 RESTORE:GOTO 20
999 REM WEB-DRAWING SUBROUTINE
1000 XS=(X2-X)/S:YS=(Y2-Y)/S:YY=Y2
1010 FOR W=X TO X2 STEP XS
1020 LINE (W,Y)-(X,YY),PSET:YY=YY-YS:NEXT W
1030 RETURN
2000 DATA 0,0,255,191,0,191,255,0
2010 DATA 255,191,0,0,255,0,0,191
2020 DATA 1,1,1,-1,-1,-1,-1,1
```

Energy Probe

By Damon Osgood



On a distant planet orbiting the second star in the Big Dipper's handle lies the wreckage of a rocketship. The mission of its crew was to establish a colony on the planet's inhospitable surface. Due to a malfunction in the ship's computer, their landing wasn't as smooth as planned. No one survived. No one except a small, spherical robot called Energy Probe.

Energy Probe is a very simple machine. It knows how to do one thing and one thing only: collect energy. Set loose in the many valleys and caverns of this curious globe, Energy Probe begins its task. Scattered throughout the landscape are an infinite number of energy-filled organisms. Coexisting with these organisms, however, are lethal vacuum clouds that drain energy from whatever they touch.

As Energy Probe, you must absorb all the energy you can without getting drained by the vacuum clouds. To control your movements, use the "G" key to move left and "H" to move right.

DAMON OSGOOD, *16, lives in Brooklyn, New York. In addition to programming, Damon plays role-playing games like* Dungeons & Dragons.

COMMODORE/*ENERGY PROBE*

VIC-20 • 5K RAM • color TV or monitor optional

```
10 LV=1:SP=240:C=30720:K=36876:J=0
20 FOR X=7168 TO 7223:READ A:POKE X,A:NEXT X:FOR X=742
4 TO 7431:POKE X,0:NEXT X
30 POKE K+3,24:VTL$=CHR$(17)+CHR$(18)
40 POKE K-7,255
50 PRINT CHR$(147) CHR$(5) VTL$ "     ENERGY PROBE":PR
INT VTL$
60 PRINT VTL$ "<G> MOVES YOU LEFT":PRINT VTL$ "<H> MOV
ES YOU RIGHT"
70 PRINT VTL$ " ENERGY=>":PRINT VTL$ "DRAINER=>":PRINT
 VTL$
80 PRINT VTL$ " PRESS <RET> TO PLAY.":FOR X=7702 TO 80
10 STEP 44
90 FOR T=0 TO 21 STEP 2:Q=T+X:A1=PEEK(Q):POKE Q,2:POKE
 Q+C,0:FOR DE=1 TO 60:NEXT DE
100 POKE Q,A1:A2=PEEK(Q+1):POKE Q+1,3:POKE Q+C+1,0
110 FOR DE=1 TO 60:NEXT DE:POKE Q+1,A2
120 IF Q=7888 THEN POKE Q,1:POKE 38608,5
130 IF Q=7932 THEN POKE Q,4:POKE 38652,4
140 NEXT T:NEXT X
150 GET K$:IF K$<>CHR$(13) THEN 150
160 L=7800:M=8142:S=5:N=128:TI$="000000"
170 POKE K+3,26:PRINT CHR$(147) CHR$(31):POKE K+2,15:P
OKE K-7,255
180 FOR X=1 TO 21:PRINT TAB(5) CHR$(144) "FFEEEEEEEEFF
":NEXT X
190 A=INT(RND(1)*3)-1
200 IF A+S=-1 OR A+S=10 THEN A=0
210 IF TI$>"000060" AND S=5 THEN 490
220 S=A+S:PRINT TAB(S) CHR$(144) "FFEEEEEEEEFF"
230 D=3+(D=3)
240 L=L+Y:P=PEEK(L)
250 POKE L-22-Y,5:POKE L,D:POKE L+C,6:POKE K-1,195:POK
E K-1,0:Y=0
260 IF P=6 THEN 420
270 IF P<>4 THEN 310
280 EN=0:SC=SC-25:IF SC<0 THEN SC=0
290 FOR X=N TO 128 STEP -1:POKE K,X:FOR DE=1 TO 10
300 NEXT DE:NEXT X:POKE K,8:N=128:GOTO 340
310 IF P<>1 THEN 340
320 EN=EN+1:SC=SC+50:N=N+5:IF N>254 THEN N=254
330 FOR X=N-10 TO N:POKE K,X:FOR DE=1 TO 10:NEXT DE:NE
XT X:POKE K,0
```

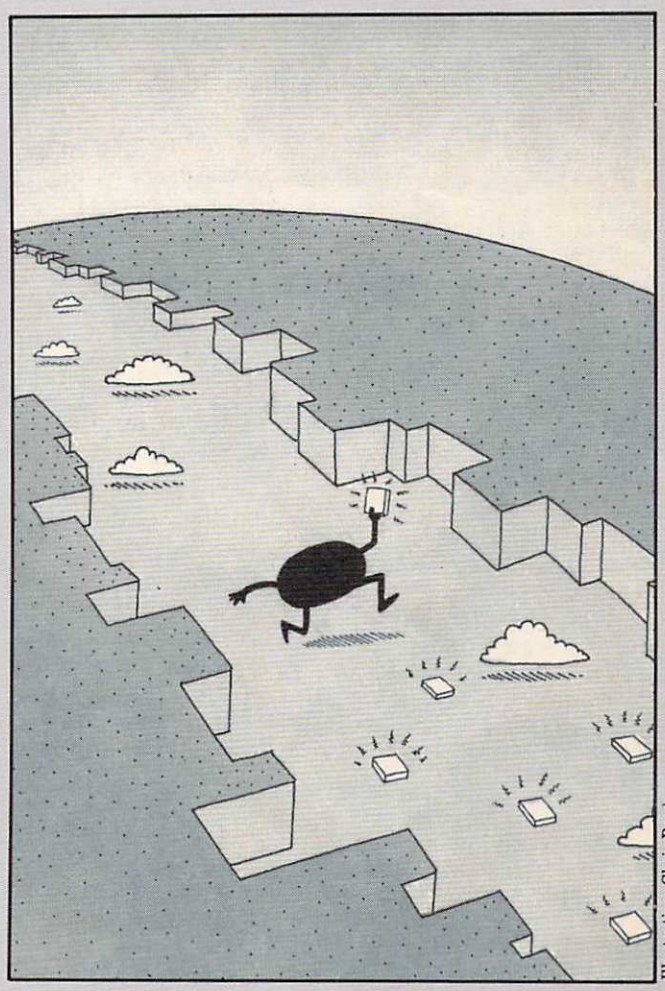
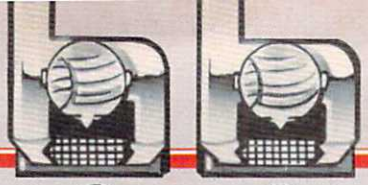


Illustration: Chris Reed




```
340 IF INT(RND(1)*6)+1>LV THEN 370
350 T=INT(RND(1)*18)+2:IF PEEK(T+M)<>5 THEN 350
360 POKE T+M,4:POKE T+M+C,4
370 IF INT(RND(1)*6)+1>LV THEN 400
380 T=INT(RND(1)*18)+2:IF PEEK(T+M)<>5 THEN 380
390 POKE T+M,1:POKE T+M+C,5
400 FOR DE=1 TO SP:NEXT DE
410 GET K$:Y=(K$="G")-(K$="H"):GOTO 190
420 POKE K-7,38:POKE K+1,230:POKE K-2,130:FOR DE=1 TO
1000:NEXT DE
430 POKE K+1,0:POKE K-2,0:J=J+1:IF J<3 THEN 160
440 POKE K-7,240:PRINT CHR$(147):PRINT "* GAME OVER *"
450 PRINT:PRINT "ANOTHER GAME?"
460 GET K$:IF K$="Y" THEN RUN
470 IF K$<>"N" THEN 460
480 POKE K-7,240:PRINT CHR$(147) CHR$(31):END
490 IF L=7800 THEN 510
500 Y=SGN(7800-L):FOR X=L TO 7800 STEP Y:POKE X-Y,5:PO
KE X,0:POKE X+C,0:NEXT X
510 L=7800:FOR X=1 TO 21:PRINT TAB(5) "FFEEEEEEEEFF"
520 POKE L-22,5:POKE L,0:POKE L+C,0:FOR DE=1 TO 10:NEX
T DE:NEXT X:POKE L,5
530 PRINT TAB(5) "FFEEEEEEEEFFFFFF":PRINT TAB(5) "FFEE
EEEEEEEEEEE"
540 PRINT TAB(5) "FFFFFFFFFFFFFFFF":FOR X=22 TO 330 ST
EP 22:POKE L+(X-22),5
550 POKE L+X,0:POKE L+X+C,0:NEXT X
560 FOR X=8130 TO 8141:D=3+(D=3):POKE X,D
570 FOR DE=1 TO 100:NEXT DE:POKE X,5:NEXT X
580 PRINT CHR$(147):POKE K-7,240:PRINT "LEVEL:" LV
590 PRINT CHR$(17) "ENERGY COLLECTED:" SPC(3-LEN(STR$(
EN))) EN
600 PRINT CHR$(17) "POINTS EACH:" SPC(8-LEN(STR$(10*LV
))) 10*LV
610 T=10*LV*EN:PRINT CHR$(17) "TOTAL BONUS:" SPC(8-LEN
(STR$(T))) T:SC=SC+T
620 PRINT CHR$(17) "TOTAL SCORE:" SPC(8-LEN(STR$(SC)))
 SC:LV=LV+1:EN=0:SP=SP-30
630 PRINT CHR$(17) "PLEASE PRESS <RETURN>."
640 GET K$:IF K$<>CHR$(13) THEN 640
650 IF LV=9 THEN 440
660 GOTO 160
2000 DATA 24,60,60,126,90,66,66,231,38,70,73,57,156
2010 DATA 146,98,12,24,60,60,126,90,226,2,7,24,60,60
2020 DATA 126,90,71,64,224,16,124,255,254,100,0,82,82
2030 DATA 0,0,0,0,0,0,0,0,255,255,255,255,255
2040 DATA 255,255,255
```

RADIO SHACK/*ENERGY PROBE*

TRS-80 Model III • 16K RAM

```
10 CLEAR 1000:CLS:LV=1:J=0
20 FOR X=1 TO 3:READ A,B,C,D:A1$=A1$+CHR$(A)
30 A2$=A2$+CHR$(B):E$=E$+CHR$(C):F$=F$+CHR$(D):NEXT X
40 W$=STRING$(3,191)+STRING$(24,128)+STRING$(3,191):BL
$=STRING$(3,128)
50 PRINT CHR$(23):SEP$=CHR$(13):IN$="        **ENERGY
PROBE**"+SEP$+"<G> MOVES YOU LEFT"+SEP$+"<H> MOVES YOU
 RIGHT"+SEP$+" ENERGY=-> "+E$+SEP$+"DRAINER=-> "+F$+SE
P$+"PRESS <ENTER> TO BEGIN."+SEP$
60 A$=A1$:C=1:FOR X=0 TO 640 STEP 128:FOR Z=0 TO 58 ST
EP 2:PL=X+Z
70 IF MID$(IN$,C,1)=CHR$(13) THEN FL=1
80 GOSUB 1000
90 PRINT@PL,A$:FOR DE=1 TO 5:NEXT DE:IF FL=0 THEN PRIN
T@PL,MID$(IN$,C,1):C=C+1 ELSE PRINT@PL," "
100 NEXT Z:PRINT@PL,"   ":C=C+1:FL=0:NEXT X
110 K$=INKEY$:IF K$<>CHR$(13) THEN 110
120 CLS:POKE 16920,0:POKE 16919,0:L=222:S=18:Y=0:N=17
130 POKE 16916,1:PRINT@5,"ENERGY  =->";
140 A$=A1$:FOR X=0 TO 13:PRINT@L,A$;
150 PRINT@81+X*64,W$:GOSUB 1000
160 NEXT X
170 A=RND(3)*3-6
180 IF A+S<0 OR A+S>32 THEN A=0
190 IF VAL(MID$(TIME$,13,2))>=1 AND S=18 THEN 420
200 S=S+A:PRINT@960+S,W$
210 GOSUB 1000
220 L=L+K:P=PEEK(L+15361):PRINT@L-K-64,BL$;@L,A$;
230 IF P=191 THEN 370
240 IF P<>143 THEN 270
250 EN=0:SC=SC-25:IF SC<0 THEN SC=0
260 FOR X=62 TO 17 STEP -1:PRINT@X,CHR$(128);:NEXT X:N
=17:GOTO 300
270 IF P<>158 THEN 300
280 EN=EN+1:SC=SC+50:N=N+1:IF N>62 THEN N=62
290 PRINT@N,CHR$(131);
300 IF RND(6)>LV THEN 330
310 T=RND(8)*3+S+3:IF PEEK(16256+T)<>128 THEN 310
320 PRINT@896+T,F$;
330 IF RND(6)>LV THEN 360
340 T=RND(8)*3+S+3:IF PEEK(16256+T)<>128 THEN 340
350 PRINT@896+T,E$;
360 K$=INKEY$:K=3*((K$="G")-(K$="H")):GOTO 170
370 FOR X=1 TO 100:PRINT CHR$(23);CHR$(28):NEXT X:POKE
 16916,0
380 J=J+1:IF J<3 THEN 120
390 CLS:PRINT CHR$(23) "* GAME OVER *"
400 PRINT@128,"ANOTHER GAME?"
410 K$=INKEY$:IF K$="Y" THEN RUN ELSE IF K$="N" THEN C
LS:END ELSE 410
420 FOR X=1 TO 3:PRINT@978,W$;@L,A$;@L-64,BL$;:NEXT X
430 IF L<>222 THEN FOR X=L TO 222 STEP SGN(222-L):PRIN
T@X-1,CHR$(128);A$;CHR$(128);:FOR DE=1 TO 30:NEXT DE:N
EXT X
440 FOR X=1 TO 13:PRINT@978,W$:PRINT@158,BL$;:PRINT@22
2,A$;:GOSUB 1000
450 NEXT X:PRINT@978,W$;STRING$(12,191)
460 PRINT@978,STRING$(3,191):PRINT@978,STRING$(42,191)
470 FOR X=222 TO 862 STEP 64:PRINT@X-64,BL$;@X,A$;:GOS
UB 1000
480 FOR DE=1 TO 10:NEXT DE:NEXT X
490 FOR X=862 TO 891 STEP 3:PRINT@X,BL$;A$;:FOR DE=1 T
O 30:NEXT DE
500 GOSUB 1000
510 NEXT X
520 POKE 16916,0:CLS
530 U$="######"
540 PRINT@192,"LEVEL:           " USING U$;LV
550 PRINT@320,"ENERGY COLLECTED:" USING U$;EN
560 PRINT@448,"POINTS EACH:     " USING U$;10*LV
570 PRINT@576,"TOTAL BONUS:     " USING U$;10*LV*EN:SC
=SC+10*LV*EN
580 PRINT@704,"TOTAL SCORE:     " USING U$;SC:LV=LV+1:
EN=0
590 PRINT@896,"PLEASE PRESS <ENTER>."
600 K$=INKEY$:IF K$<>CHR$(13) THEN 600 ELSE IF LV=7 TH
EN 390
610 GOTO 120
1000 IF A$=A1$ THEN A$=A2$ ELSE A$=A1$
1010 RETURN
2000 DATA 186,142,135,172,131,131,158,143
2010 DATA 141,181,184,156
```

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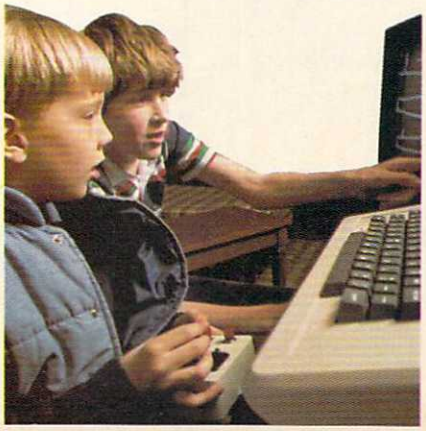

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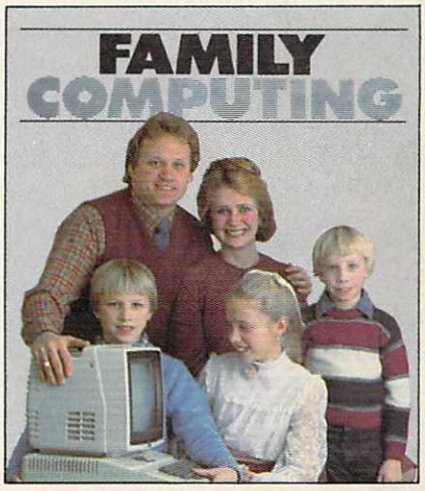

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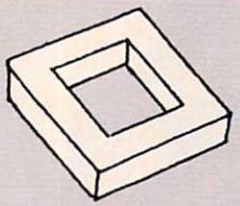
Chaos

Sprite graphics on the TI

By Mark Prenty



While the graphics commands built into most popular micros emphasize high-resolution drawing, TI instead designed the 99/4 and 4A for easy access to sprite- and character-graphics features. Other computers have these capabilities, but it's usually difficult to use them; you have to understand memory-management techniques and machine-code data-table access, and you must do numerous preparatory PEEKs and POKEs.

My program, called *Chaos*, demonstrates how easy it is to construct a complicated sprite-graphics display with TI's Extended BASIC. It uses five of the nine subprograms built into Extended BASIC for sprite creation and manipulation, plus the CHAR subprogram, which creates the sprite bit maps themselves, but also can be used for character graphics. SPRITE and MAGNIFY assist in the creation of sprites, while MOTION, PATTERN, and DELSPRITE let you manipulate existing sprites, change the way they appear on the screen, and erase them.

Lines 20–70 of *Chaos* define five bit-map images that will appear as sprites sometime during program execution. The loop in lines 90–140 creates 28 similar sprites of varying colors and positions them randomly on the screen. This loop calls the subroutine at line 1000, which plays the sound, moves the sprites in new directions, and generates the pulsating effects.

The remainder of the program maintains this theme of rapid, random variation. Screen colors and random sprite velocities and directions of movement are manipulated with increasing range, and eventually entirely new images come into play. It takes about 25 minutes until the program starts to repeat.

When entering *Chaos*, make sure the ALPHA LOCK key is down.

MARK PRENTY *is* K-POWER*'s tallest (6-foot 6-inch) technical assistant. He drew his inspiration for* Chaos *from conditions in our computer lab.*

TEXAS INSTRUMENTS/*CHAOS*

TI-99/4A • 16K RAM • TI Extended BASIC • color TV or monitor optional

```
10 CALL CLEAR
20 A$=RPT$("0",14):: B$=RPT$("0",10):: C$=RPT$("0",6)
30 CALL CHAR(96,A$&"0101"&A$&A$&"8080"&A$)
40 CALL CHAR(100,B$&"070405050407"&B$&B$&"E020A0A020E0
"&B$)
50 CALL CHAR(104,C$&"1F10171415151417101F"&C$&C$&"F808
E828A8A828E808F8"&C$)
60 CALL CHAR(108,"007F405F505754555555457505F407F0000FE
02FA0AEA2AAAAA2AEA0AFA02FE00")
70 CALL CHAR(112,RPT$("F",64))
80 RANDOMIZE :: CALL SCREEN(2)
90 LOW=110 :: FOR A=1 TO 28
100 COLOR=INT(RND*16)+1 :: ROW=INT(RND*159)+1 :: COLUM
N=INT(RND*223)+1
110 CALL SPRITE(#A,96,COLOR,ROW,COLUMN)
120 CALL MAGNIFY(4)
130 J=50 :: K=25 :: GOSUB 1000 :: LOW=LOW+10
140 NEXT A
150 FOR A=1 TO 28
160 J=255 :: K=128 :: GOSUB 1000
170 LOW=LOW+20 :: SC=INT(RND*16)+1 :: CALL SCREEN(SC)
180 NEXT A
190 CALL SCREEN(2)
200 FOR A=1 TO 28
210 CALL PATTERN(#A,112)
220 NEXT A
230 FOR A=1 TO 28
240 GOSUB 1000 :: LOW=LOW-10
250 NEXT A
260 J=0 :: K=0
270 FOR A=1 TO 28
280 CALL PATTERN(#A,96):: CALL MOTION(#A,J,K)
290 NEXT A
300 FOR A=1 TO 28
310 GOSUB 1000 :: CALL DELSPRITE(#A):: LOW=LOW-20
320 NEXT A
330 GOTO 90
1000 FOR X=1 TO A :: XVEL=INT(RND*J)-K :: YVEL=INT(RND
*J)-K
1010 CALL SOUND(1000,LOW,1,LOW+20,1,LOW+40,1):: CALL M
OTION(#X,YVEL,XVEL)
1020 FOR Z=96 TO 108 STEP 4 :: CALL PATTERN(#X,Z):: NE
XT Z
1030 FOR Z=108 TO 96 STEP -4 :: CALL PATTERN(#X,Z):: N
EXT Z :: NEXT X :: RETURN
```

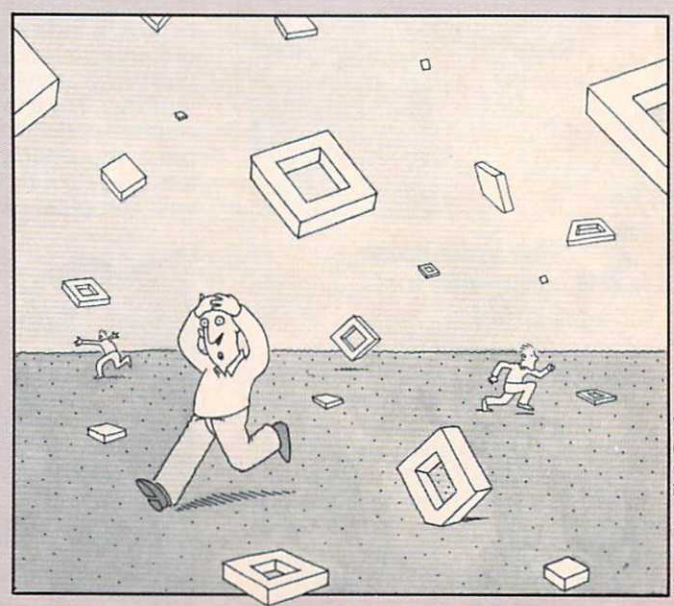


Illustration: Chris Reed

Minotaur's Labyrinth

By Tommy Rimkus

To get through the labyrinth, plug in your joystick and guide yourself through the passageways until you reach the "F," which represents the exit. You may select as many levels for your labyrinth as your computer's memory will allow. If you choose to try more than one, the exit may appear on any level. To get from one level to the next, guide your joystick until you reach a stairway (represented by a cross on the screen). When you press the joystick button you will appear on another level. Be careful, though. Stairways can only be used once. If you're very daring, you can attempt to solve the labyrinth in the dark. This way the only things visible on the screen are the stairways, the entrance, and the exit.

TOMMY RIMKUS, *14, is a tropical hacker. He lives in Niceville, Florida.*

ATARI/MINOTAUR'S LABYRINTH

400, 600XL, 800, or 800XL • 16K RAM • color TV or monitor optional • joystick (port #1)

```
10 DIM A(3),A$(37),BL$(37),CL$(1):SW=0:CL$=CHR$(125):B
L$=CHR$(160):BL$(37)=BL$:BL$(2)=BL$:OPEN #1,4,0,"K:"
20 GRAPHICS 2+16:PRINT #6;"    MINOTAUR'S":PRINT #6;""
:PRINT #6;"    LABYRINTH":FOR D=1 TO 1000:NEXT D
30 GRAPHICS 0:TOP=PEEK(560)+256*PEEK(561)+4
40 RL=PEEK(88):RH=PEEK(89):GOSUB 1000
50 TRAP 50:PRINT CL$:POSITION 2,7:PRINT "HOW MANY LEVE
LS";
60 INPUT MAXLEV:MAXLEV=MAXLEV-1:IF MAXLEV<0 THEN 50
70 BOT=INT(TOP/256)-MAXLEV*4-4:IF BOT*256>PEEK(144)+25
6*PEEK(145) THEN 100
80 PRINT CL$:POSITION 3,10:PRINT "INSUFFICIENT MEMORY
FOR ";MAXLEV+1;" MAZES.";CHR$(253)
90 FOR D=1 TO 400:NEXT D:GOTO 50
100 POSITION 2,10:PRINT "SELECT MAZE TYPE:":PRINT :PRI
NT "1-INVISIBLE":PRINT "2-VISIBLE"
110 TRAP 110:GET #1,T:INV=VAL(CHR$(T)):IF INV<1 OR INV
>2 THEN PRINT CHR$(253):GOTO 110
120 POKE 755,1:POSITION 2,17:PRINT "CONSTRUCTING MAZE"
;CHR$(27+(MAXLEV>0)*56);". WILL BE DONE IN"
130 POSITION 14,19:PRINT (MAXLEV+1)*30;" SECONDS.":FOR
 D=1 TO 1000:NEXT D:POKE 755,2:POKE 559,0:PRINT CL$
140 IF INV=1 THEN PRINT "  TO PEEK AT MAZE, PRESS ANY
KEY.":PRINT :PRINT "EACH PEEK ADDS A ONE-SECOND PENALT
Y."
150 A$="PRESS <START> TO BEGIN.":POSITION 8,8:FOR X=1
TO 23:PRINT CHR$(ASC(A$(X))+128);:NEXT X:PRINT
160 R1=BOT+MAXLEV*4:FOR X=BOT TO R1 STEP 4:POKE 77,0:P
OKE 88,0:POKE 89,X:GOSUB 1000
170 TM=PEEK(106):POKE 106,TM-4:PRINT CL$:POKE 106,TM
179 REM MAZE GENERATION
180 A(0)=2:A(1)=-80:A(2)=-2:A(3)=80
190 T=PEEK(88)+256*PEEK(89):A=T+43
200 POSITION 2,0:POKE 752,1:FOR I=1 TO 23:PRINT BL$:NE
XT I:POKE A,5
210 J=INT(RND(0)*4):X1=J
220 B=A+A(J):IF PEEK(B)=128 THEN POKE B,J+1:POKE A+A(J
)/2,0:A=B:GOTO 210
230 J=(J+1)*(J<3):IF J<>X1 THEN 220
240 J=PEEK(A):POKE A,0:IF J<5 THEN A=A-A(J-1):GOTO 210
250 NEXT X:POKE 88,RL:POKE 89,RH
260 POKE BOT*256+917,38:POKE R1*256+3,51
270 IF MAXLEV=0 THEN 340
280 FOR X=BOT TO R1-4 STEP 4:FOR Y=1 TO 5
290 J=INT(RND(0)*876)+43
300 W=J-(INT(J/40)*40):IF W<3 OR W=39 THEN 290
310 IF PEEK(X*256+J)=0 AND PEEK(X*256+1024+J)=0 THEN P
OKE X*256+J,83:POKE X*256+1024+J,83:GOTO 330
320 GOTO 290
330 NEXT Y:NEXT X
340 POKE 559,34:GOSUB 1000
350 IF PEEK(53279)<>6 THEN POKE 755,3-PEEK(755):FOR D=
1 TO 50:NEXT D:GOTO 350
360 POKE 755,INV:POKE 18,0:POKE 19,0:POKE 20,0
370 ST=R1*256+43:POKE TOP,0:POKE TOP+1,R1
380 S=PEEK(ST):T=ST:POKE ST,84
390 Q=STICK(0):R=STRIG(0):IF R=0 AND S=83 THEN 490
400 IF Q=7 THEN ST=ST+1
410 IF Q=11 THEN ST=ST-1
420 IF Q=14 THEN ST=ST-40
430 IF Q=13 THEN ST=ST+40
440 IF INV AND PEEK(764)<>255 THEN POKE 764,255:POKE 7
55,2:FOR D=1 TO 25:NEXT D:POKE 755,INV:PEN=PEN+60
450 IF PEEK(ST)=38 THEN 540
460 IF PEEK(ST)=128 OR PEEK(ST)=51 THEN ST=T:GOTO 390
470 IF ST<>T THEN SW=0:POKE T,S:POKE 77,0:GOTO 380
480 GOTO 390
490 IF SW=1 THEN 390
500 IF PEEK(ST+1024)=83 THEN R1=R1+4:ST=ST+1024:GOTO 5
20
510 IF PEEK(ST-1024)=83 THEN R1=R1-4:ST=ST-1024
520 IF R1<BOT THEN 400
530 POKE TOP+1,R1:SW=1:POKE ST,84:GOSUB 1000:GOTO 380
540 ET=PEEK(18)*65536+PEEK(19)*256+PEEK(20)+PEN:EH=INT
(ET/216000):EM=INT((ET-EH*216000)/3600)
550 ES=INT((ET-EH*216000-EM*3600)/60)
560 FOR X=1 TO 5:FOR Y=15 TO 0 STEP -0.2:SOUND 0,9,10,
Y:NEXT Y:NEXT X:POKE 755,2
570 A$="ELAPSED TIME:  0:00:00":A$(21+(ES<10))=STR$(ES
):A$(18+(EM<10))=STR$(EM):A$(16)=STR$(EH):A$(23)=" "
580 FOR Y=0 TO 1:T=BOT*256+Y*40:FOR X=T TO T+LEN(A$)-1
:POKE X+2,ASC(A$(X-T+1))-32
590 NEXT X:A$="PRESS START FOR ANOTHER MAZE":NEXT Y
600 IF PEEK(53279)<>6 THEN 600
610 PEN=0:GOTO 30
1000 T=PEEK(53770):SETCOLOR 2,T-(INT(T/16)*16),4:POKE
712,PEEK(710):RETURN
```

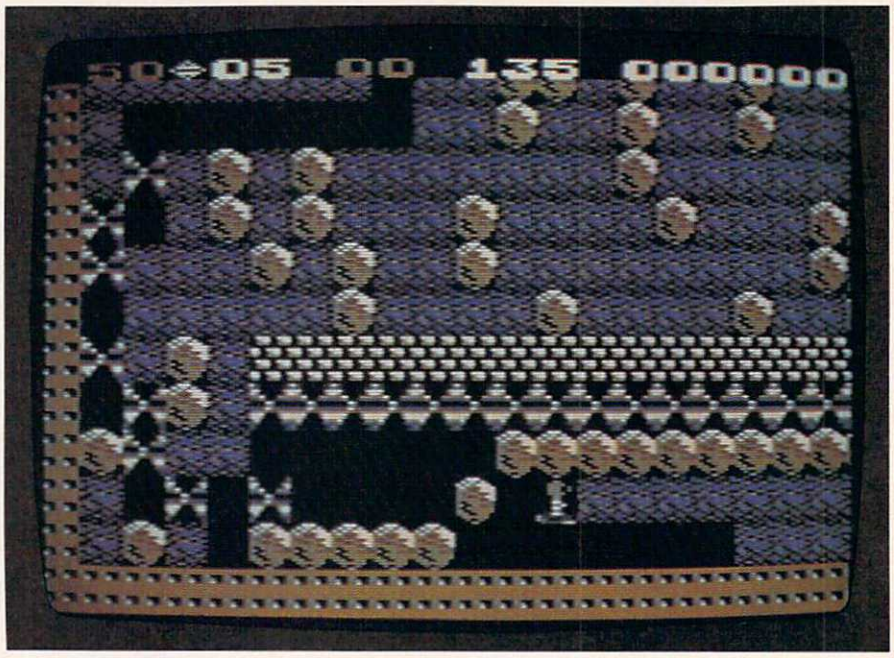
SCREENING ROOM

THE RATING GAME

BOULDER DASH

Reviewed on Atari, 32K (disk and cassette). Also available on 16K (cartridge); Commodore 64 (disk and cassette), 16K (cartridge). Soon available for IBM PCjr, 64K (disk). Joystick required. First Star Software, Inc., 22 E. 41 St., New York, NY 10017; (212) 889-1073. $29.95 (disk and cassette), $39.95 (cartridge).

GRAPHICS:
EXCITEMENT:
ORIGINALITY:
EASE OF USE:
CHALLENGE:
SHELF LIFE:



Boulder Dash is one of the most graphically impressive and addictive games I've ever played.

It features a little insect named Rockford who'll go through all sorts of trouble to satisfy his never-ending hunger for jewels. He lives underground in a kind of ant farm cluttered with boulders, weird creatures, and, of course, jewels. In order to get to the gems, he's got to dodge falling boulders and avoid deadly butterflies and fireflies.

There are 16 different screens (or caves) with five difficulty levels for each. In addition, there are a few little bonus caves. In each, Rockford has to collect (eat) a certain number of jewels within a time limit to gain access to the next cave. With your joystick, you make Rockford dig tunnels to the jewels, which he speedily devours. In some caves, he has to create his own jewels through various techniques.

In one cave, for example, he has to lead deadly butterflies through one of his tunnels till they get to an amoeba that turns them into jewels on contact. There's an incredible variety of caves. You won't get bored.

The overall quality of *Boulder Dash* is excellent, and there are many little extra touches that make it really special. Take Rockford, for instance. He actually seems to have a personality. If you wait too long to give him a command, he blinks his eyes and taps his foot impatiently.

JOHN SKOOG, *15*
Highland, IN

THE RATINGS

Software is rated on a scale of one to five in each of six categories.

POOR
FAIR
GOOD
VERY GOOD
EXCELLENT

NOT APPLICABLE = N/A

GRAPHICS: The quality and sophistication of the graphics given the computer's capabilities.

EXCITEMENT: The pace, pulse, and action of the game.

ORIGINALITY: The degree to which it's a trailblazer.

EASE OF USE: Its boot-up playability and simplicity. A low rating doesn't mean it's a poor game.

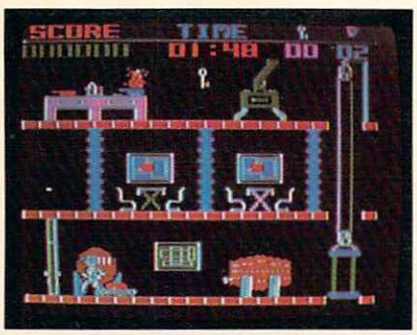
CHALLENGE: This speaks for itself.

SHELF LIFE: Its ability to maintain interest over time and not grow stale.

THE HEIST

Reviewed on Apple, 48K (disk). Also available for Atari, 48K (disk); Coleco ADAM, 24K (cartridge); Commodore 64 (disk); IBM PC, 64K (disk). Joystick required. Micro Fun, 2699 Skokie Valley Road, Highland Park, IL 60035; (312) 433-7550. $35 (Atari and Commodore 64), $40 (Apple and IBM PC), $45 (ADAM).

GRAPHICS:
EXCITEMENT:
ORIGINALITY:
EASE OF USE:
CHALLENGE:
SHELF LIFE:



Picture this: You're superspy Graham Crackers and you've got a dangerous mission before you. You must remove every piece of artwork from a museum to uncover a hidden microdot containing top secret information vital to preserving the safety of the world. The museum's security is pretty tight, though. You must dodge robot guards, keep away from the alarms (both moving and stationary), and stay alive by avoiding a whole variety of other traps that pop up.

The Heist is similar to another joystick-controlled climbing game, *Miner 2049er*, which is only natural, since they were both designed by programmer Mike Livesay. But this one is slower-moving and tougher.

Each screen has three floors with various forms of transportation between them. Some have escalators and some have elevatortype devices. Hopping around on and off the elevators is one of the more difficult maneuvers in the game.

There are three skill levels. The game's so tough I've only yet made it to the second. Both levels I've seen have the same rooms on each floor, but they're arranged differently. Scattered around these rooms are a wide assortment of objects and obstacles that add to the look and complexity of the game.

Though I enjoy the game a lot, it could be faster. But, if you're not in the market for speed, you'll be pretty satisfied with *The Heist.*

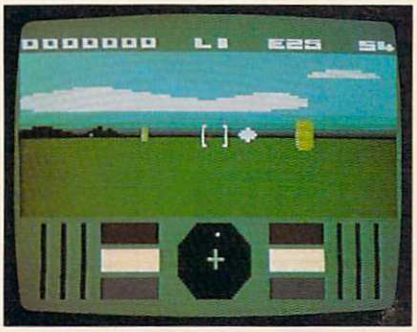
CHRIS SALLY, *13*
Nashville, TN

ENCOUNTER!

Reviewed on Atari, 32K (disk). Also available on 16K (cassette). Joystick required. Synapse Software, 5221 Central Ave., Richmond, CA 94804; (415) 527-7751. $34.95

GRAPHICS:
EXCITEMENT:
ORIGINALITY:
EASE OF USE:
CHALLENGE:
SHELF LIFE:

You're seated in front of the control panel of your tanklike Alien Seeker looking out the forward command window. Mountains loom in the distance marking the boundary of a vast battlefield. Weaving your way between the large pylons that litter the battleground, you see a small dot race across the horizon. A yellow light flashes wildly on the panel before you, and a blip creeps across the radar



screen indicating an approaching saucer attack. It's time for an encounter!

Encounter! is a lot like the arcade game *Battle Zone.* Both put you in the driver's seat of a tank that is being pursued across a treacherous battlefield by cannon-equipped vehicles. But there are differences. For one thing, *Encounter!*'s graphics are more colorful and realistic than the vector type in *Battle Zone.*

Joystick control is the key in this game. When driving the Alien Seeker, you race around obstacles to avoid shots, and when attacking, you must aim your cannon just right to make a direct hit. You're in constant danger, so you've got to keep alert. Right at the start you're attacked by flying saucers and low-flying missiles.

If you destroy all your enemies, a black doorway appears in the middle of the landscape. Racing through darkness, you dodge what look like meteors, hundreds of them. If you make it through the tunnel you'll reach the next level where your enemies' movements are trickier.

With eight levels in all and enemies that develop more complex patterns of movement as you progress, it'll take you a while to master this game. It may not be a groundbreaking idea in computer games, but *Encounter!* is very challenging and exciting.

DANIEL HOROWITZ, *14*
Westport, CT

EXODUS: ULTIMA III

Reviewed on Atari, 48K (disk). Also available for Apple, 48K (disk); Commodore 64 (disk); IBM PC, 64K (disk). Origin Systems, Inc., 1545 Osgood St., Suite #7, North Andover, MA 01845; (617) 681-0609. $59.95

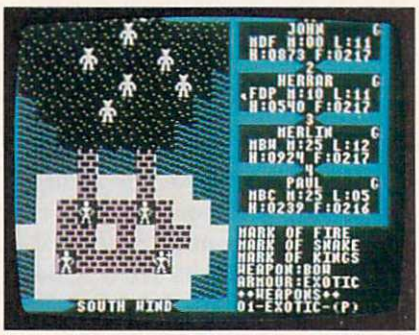
GRAPHICS:
EXCITEMENT:
ORIGINALITY:
EASE OF USE:
CHALLENGE:
SHELF LIFE:

My warriors stop in their tracks as a band of evil wizards rushes toward them. Sweat forms on my forehead as my fingers dart across the keyboard casting spells, throwing daggers, and thrusting swords. After a brutal fight, the wizards are killed, but my ranger, Erin, also has been slain. Now I must locate a temple of healing and resurrect Erin, and then my band can venture onward. . . .

Designer Lord British has put together another winner. His latest fantasy/role-playing game, *Exodus: Ultima III*, is set on a planet called Sosaria, where swords and sorcery rule.

Unlike the other *Ultima*s, in which you could only send one character out on a journey, you can control a party of up to four.

Starting out on an alien terrain with 100 gold pieces for each party member, your band must seek out and destroy the evil Exodus.



At the outset of the game, you arm your party. You move the entire group at once using four direction keys ("N, ""S," "E, " "W"). When your party meets a foe, each member is on its own. In an encounter, the computer flashes your party leader's name, and you have to give a combat command through the keyboard (32 keys are used). The computer then flashes your next player's name and so on, until each member has been accounted for. This cycle continues until one side is victorious. You can't beat a retreat in this game.

Ultima III's graphics are incredible—especially considering the amount of memory that's taken up by the sheer complexity of the game. The towns are done extremely well, though *Ultima II*'s humorous McDonald's and Hotel California were nowhere to be found.

Lord British's *Ultima* series keeps getting better and better, and the latest easily tops them all. It's smooth, interesting, challenging, and most of all, fun. Although it costs about twice as much as most software, it's well worth it.

MICHAEL RILEY, *16*
New York, NY

RAINBOW WALKER

Reviewed on Atari, 32K (disk or cassette). Also available for Commodore 64 (disk or cassette). Joystick required. Synapse Software, 5221 Central Ave., Richmond, CA 94804; (415) 527-7751. $34.95

GRAPHICS:
EXCITEMENT:
ORIGINALITY:
EASE OF USE:
CHALLENGE:
SHELF LIFE:

You're Cedrick the Rainbow Walker and you've got a job to do. One night, while you were asleep, someone stole the rainbow's colors. All was lost until the local wizard devised the spell of the magic shoes. With the magic shoes, you have the power to step on the rainbow and restore it to its original beauty, bit by bit.

Not everyone wants you to return the rainbow's colors, though. All sorts of dangers and horrible creatures await you. As you hop along the rainbow, changing each small gray square to color, you have to dodge lightning bolts and whirlwinds, a demon bird that swoops down and carries you off into the clouds, and the devil and his friends who try to catch and eat you. The rainbow is divided into eight rows of 16 squares each. (To get

to all of the squares, you'll have to scroll the rainbow back and forth.) Most of the squares are colored in shades of gray, but there are several holes throughout the rainbow that you can fall through if you're not careful. You can also fall off the side. You use your joystick to avoid plummeting to your death and to hop your way across the rainbow in eight directions. Each time you land on a grayish-colored square, it will return to its rainbow color and you'll earn points. Meanwhile, creatures appear and turn the squares back to gray unless you stop them.

When all the squares in the rainbow are colored, you proceed to the bonus round. Here, only three squares appear at a time. As you stand on each, one appears before you and one disappears behind you. The longer you avoid falling off, the more bonus points you'll get.

Though *Rainbow Walker* is similar to *Q*bert*, it's got a lot more pizazz. It also is very easy to learn and very addictive. (I sometimes had to force myself to turn off the computer!) As far as graphics go, they're superbly done. The sun even rises and sets as the game progresses. The music between rounds is relaxing, and cute sounds play throughout the game.

JILL BASSETT, *12*
Miami, FL

JAMES BOND: 007

Reviewed on Atari, 16K (cartridge). Also available for Coleco ADAM, 12K (cartridge); Commodore 64 (cartridge). Joystick required. Parker Brothers, 50 Dunham Road, Beverly, MA 01915; (617) 927-7600. Approx. $35 (Atari and Commodore 64), $30 (ADAM).

GRAPHICS:
EXCITEMENT:
ORIGINALITY:
EASE OF USE:
CHALLENGE:
SHELF LIFE:

Four of Secret Agent James Bond's most deadly foes have joined forces in an effort to bring the world to its knees. As Bond, it's up to you to stop them. At your disposal is Bond's most famous high-tech supercar. It's capable of flying, traveling underwater, dropping bombs, and shooting missiles. Perfect for snuffing out enemy agents.

At first sight, I thought this game was just another shoot-'em-up, but after a few minutes of play, I realized it involves much more than simply taking potshots at objects on the screen. It's split up into four levels, each based on a different 007 movie.

In the *"Diamonds Are Forever"* scenario, you drive and hop across rugged, crater-filled terrain and into the sea, where you search for an oil rig (which is well-guarded, I might add).

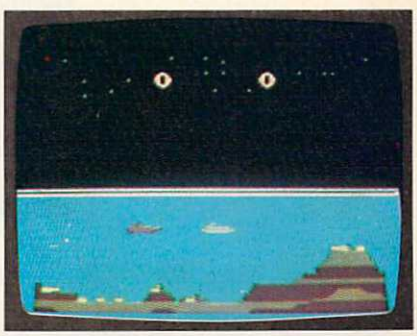
Your task in *"The Spy Who Loved Me"* is to dodge missiles, mines, and helicopter bombs on your way to a secret underwater laboratory.

If you can stay alive long enough to shoot down three orbiting poison death pods, you'll survive the *"Moonraker"* level. Staying in one piece is very difficult at this stage because you have to continually submerge in order to avoid enemy space shuttles that explode and vaporize everything above the ocean's surface.

Finally, in *"For Your Eyes Only,"* you explore the dark sea for a sunken ship.

The one thing that makes this game really interesting is the challenge of finding out how to avoid hazards. The graphics and sound are adequate, but they certainly don't push the Atari to its limits.

My biggest complaint about the game is it often puts you in a "no win" situation. The only way an arcade style game can be fun to play is if there's always a way *out* of a dangerous predicament. It can be very frustrating to lose life after life simply because the random sequence of the game isn't just right to permit you to advance. That happens a lot in this game.



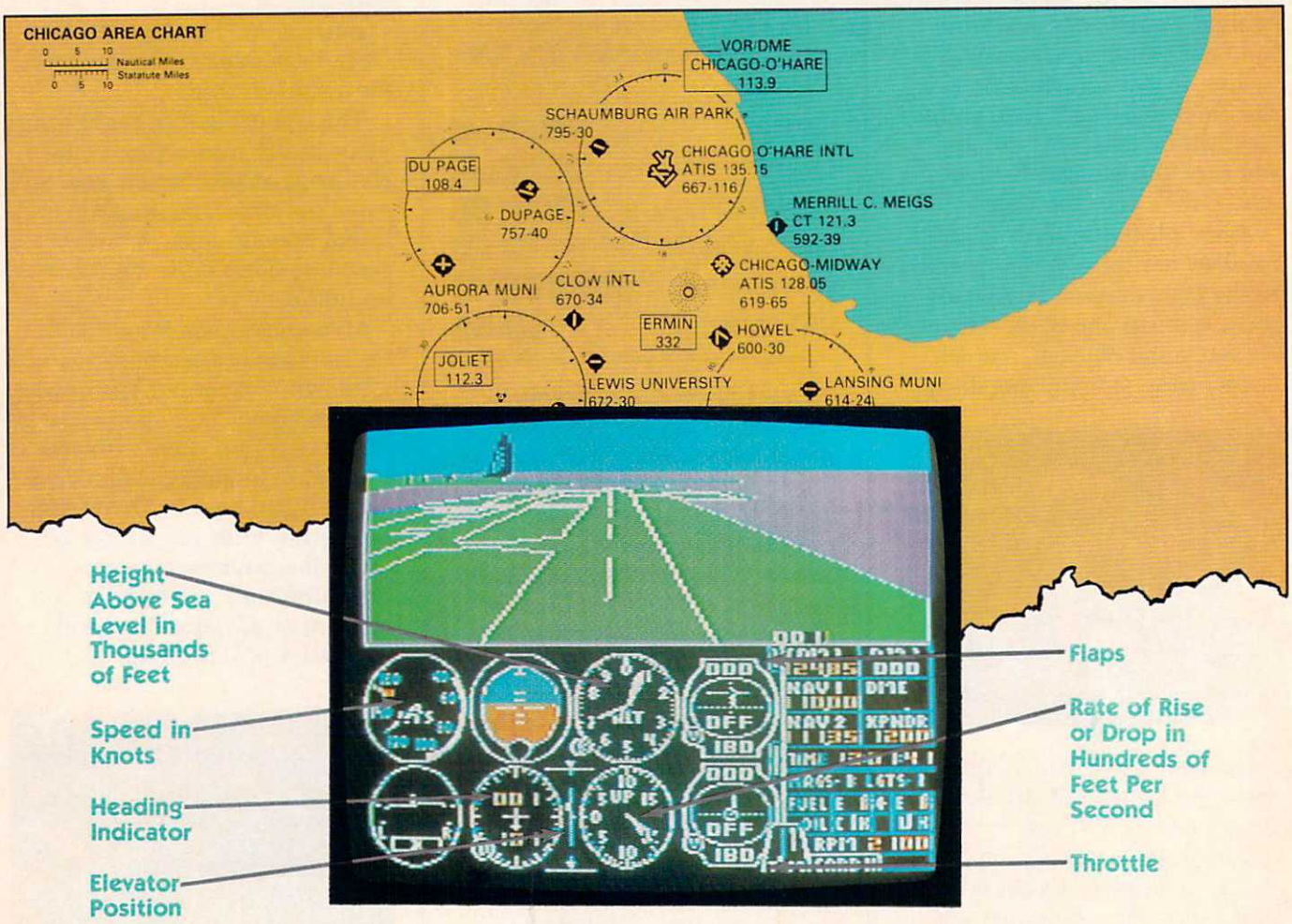
Despite these disadvantages, the game offers enough variety in the four scenarios and two difficulty levels to keep you interested for quite a while.

RICH UHLIG, *17*
Toledo, OH

TAKE OFF!

With a few quick lessons, the sky's the limit.

By Ken Coach



Just last December, *Flight Simulator II* hit the stores and it is already No. 1 on two of the industry's most closely watched best-seller lists: *Billboard*'s Entertainment Top 20 and the Softsel Hot List. Designed by game master Bruce Artwick for the Apple II/II plus/IIe, Commodore 64, and Atari computers (price: $49.95), the subLOGIC program is selling about 10,000 copies a month.

Artwick is a pilot himself. That's one reason his *Simulator* is amazingly accurate. You need a lot of skill and practice to take off, fly, and land safely.

The whopping 88-page manual may get you down, so check out these tips (based on the Apple IIe version) to get started. You'll take off from Merrill C. Meigs airfield in Chicago, buzz around the John Hancock Building, soar above Lake Michigan, turn around, and finally touch down back at Meigs Field, hopefully in one piece. So, fasten your seatbelts.

KEN COACH *is a frequent contributor to* K-POWER *and other computer magazines.*

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1	Atarisoft	3
2	Chalk Board	5
3	Commodore	C4
4	Electronic Arts	1
5	Epyx	15,17
6	Family Computing	45
7	Hayden Books	34
8	Parker Brothers	C2, 11
9	Protecto	18,19
10	Scholastic Books	37
11	Scott Adams	C3
12	Stickmaster (Gilmore)	13
	Spinnaker	9
13	Synapse	7
14	Wizware	39

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c.) ☐ Both

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g 2. ☐ educational
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37	38	39	40	41	42
43	44	45	46	47	48
49	50	51	52	53	54

TO FLY . . . .

1 Boot up the disk, tell the computer what type of display you're using, then select REGULAR FLIGHT MODE. You'll appear on the runway ready to go.

2 You need only seven keys to take off and fly. They are: the two horizontal arrow keys ("→" to raise the throttle, "←" to lower it), and a five-key cluster ("B,F,T,H,G") in the center of the keyboard. These keys let you raise the nose ("B"), lower the nose ("T"), make a bank turn to the left ("F"), or make a bank turn to the right ("H"). The "G" key causes the plane to slowly straighten out.

3 To take off, tap "B" twice to raise the nose (notice the elevator position moves up a little), then rapidly press the right arrow key 16 times to apply full throttle.

4 Press "5" then "B" to get a rear view and watch the airport fall away. To return to forward view, press "5" then "T."

5 Wait till you're at 2,500 feet, then lower the throttle a bit (by tapping "←" six times) to level out between 2,500 and 3,500 feet. The top number on the heading indicator (a compass based on a 360-degree circle with 000 as north) should read "000" and the bottom number "180." You might be a few degrees off either way, but it doesn't matter. The bottom number is the direction your tail is pointing. When you turn around, you want "180" on top.

6 Keep flying for a while so you'll have room to prepare for landing when you turn around. Fly to the second peninsula beyond Meigs Field. (To get views of what's below you, press "4" then "<" a few times. Your plane is located at the center of these views.) Return to forward view. Gently steer the plane around to the left. Tap "F," wait a moment, then "G" to bank gradually. Repeat until you're on course. (If you start tipping too much to the left, tap "H" [bank right] to compensate.) Don't forget to hit "G" to straighten out.

7 When you're on course (heading "180"), you should be above the lake's shoreline, with Meigs' runway and the John Hancock Building ahead and slightly to the right. Now, lower the throttle a little bit at a time.

8 Tap "N" once to lower your flaps a bit (which will slow the plane and aid descent). Make sure you're aligned with the runway. It'll get tougher to make course corrections from now on.

9 When you pass the John Hancock Building (on your right), you'll be nearing the runway, so you should be at about 1,000 feet. Tap "N" and adjust the "T" and "B" keys to keep the horizon between a half and one inch below the top of the screen.

10 As the plane comes down, keep the nose up a bit and lower the throttle and flaps all the way. When you touch down, the plane will give a little shake and your height above sea level will steadily read a little below 600 feet (because the runway is that high above actual sea level). As soon as you're on the ground, hit the space bar (brake) to slow down. If you make it the first time, you should consider a career as an airline pilot.

ACE ARTWICK'S TIPS

Having mastered flying, you may want to tackle the tougher World War I flying ace mode. Designer Bruce Artwick gave K-POWER the following piloting tips:

1 Enemy planes chase you only if you declare war or drop a bomb on enemy territory. Be at a high altitude when this happens. Enemy planes climb slowly, which gives you time to position yourself for their attack. A good altitude for dogfighting is about 6,000 feet.

2 Since all the enemy planes are different, get to know the characteristics of each one by flying into its area and watching how it pursues you. Each has a "launch boundary," which determines how close you can get before the plane will come after you, and a "recall boundary," which is how far the plane will chase you before heading back. Lure a plane into chasing you to its recall boundary so when it turns back, you can attack from behind.

3 In a dogfight, let the enemy plane drift into your gunsight. Don't try to be too tricky or whip the plane around quickly to attack. You'll only lose control.

4 All is not lost if you find yourself surrounded by enemy planes. The best thing to do is run. If you've maintained a good altitude, go into a shallow dive to pick up speed. If you level out doing 150 to 160 knots, you'll outrun them.

RISING STARS

HARDWARE

Atari Goes Ape

APE-FACE has arrived. Now you can hook up Atari computers to most of the popular standard printers without using a hard-to-find interface box. APE-FACE comes in two models, the 12XLP (for the Atari 1200XL) and the XLP (for all other Atari computers). The device is available for $89.95 at computer stores, or from Digital Devices Corp., 151 Sixth St., Suite 127, O'Keefe Building, Atlanta, GA 30313; (404) 872-4430.

Paws Off the PC

Your computer-curious kid brothers and sisters won't get near your precious programs with Crime Stopper. This $125 security system keeps your computer under lock and key. Find out where to buy the device by contacting Anchor Pad International, Inc., 3224 Thatcher Ave., Marina Del Rey, CA 90292; (800) 235-7972.

Spring Cleaning A Head

Avoid potential processing errors, lost data, and even damage to your disk-drive heads by cleaning regularly. The Discwasher Clean Runner program/cleaner safely cleans the heads of both single-sided and double-sided drives up to 20 times. The

nonchemical cleaning program is available for Apple, Atari, IBM, and Commodore computers. It costs $24.95 and is available through computer dealers, or from the manufacturer: Discwasher, 1407 N. Providence Road, P.O. Box 6021, Columbia, MO 65205; (314) 449-0941.

Wire Away Hides Away

Stash those unsightly, cables and wires in an out-of-the-way place. The Wire Away box lets you wind up and hide up to four computer and peripheral cords. The box costs $12.95, and is available at computer stores, or through NETWORX, 203 Harrison Place, Brooklyn, NY 11237; (212) 821-7555.

Thermal Heat

Alphacom has added heat to the thermal printer market with this 80-column printer. The Alphacom 81 operates at 100 characters a second, and includes a bit-mapped graphics feature. The Alphacom printer can be linked to most popular computers with an interface cable. Alphacom 81 costs $169.95 and the interface is priced at $44.95. Both are available at computer dealers, or from Alphacom, Inc., 2323 S. Bascom Ave., Campbell, CA 95008; (800) 538-7047.

CONTEST

THE MOST AWESOME COMPUTER

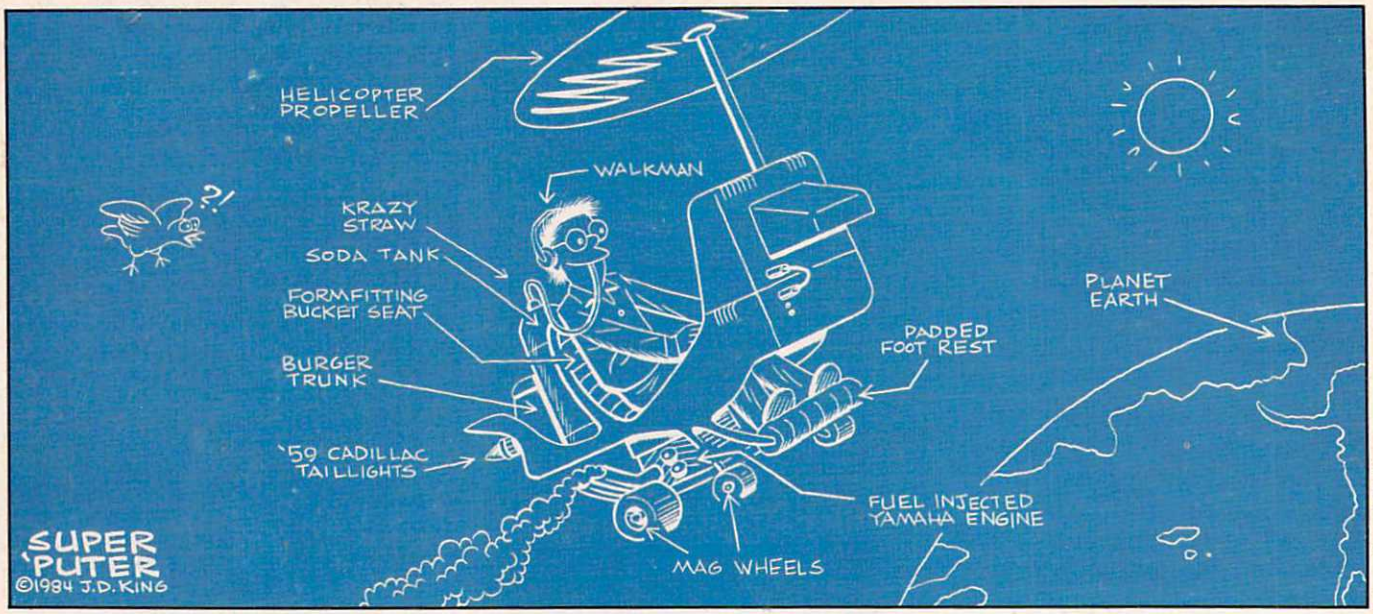

Illustration: J.D. King

Face it. Computers are ugly. In fact, most of them look like typewriters with TVs on top. And they're really bland and plain-colored. But you can bet they won't always be so homely. Take cars, for example. They were funny looking in the early years. But look at them now! What about K.I.T.T. on "Knight Rider"? Now that's an awesome car!

What would the most awesome computer imaginable look like? What could it do? Got any ideas? Draw a picture of your vision of the most awesome computer and describe what it could do, in 25 words or less. Don't hold back; the crazier the computer, the more we'll like it.

We'll print all the best state-of-the-art ideas and drawings we receive, and give K-POWER T-shirts to the five who create the most awesome computers.

Just fill out this questionnaire and mail it to:

AWESOME COMPUTER CONTEST
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Please mail all entries by July 25, 1984.

AWESOME COMPUTER CONTEST

1. Tell us about K-POWER:
   a) Favorite article: _____
   b) Favorite program: _____
   c) Favorite artwork: _____
   d) What else do you want to read about?
   _____

2. Did you get this K-POWER from:
   Book club? _____ Subscription? _____
   Store or newsstand? _____

3. Tell us about yourself:
   I am male ____ female ____ Age _____

4. Do you program? _____ How long have you been programming? _____

5. What kind of things do you like to program?
   _____

6. What is your favorite:
   a) TV show? _____
   b) Music group? _____
   c) Singer? _____
   d) Computer game? _____
   e) Magazine (besides K-POWER, of course)? _____
   _____

7. Other comments about K-POWER: _____
   _____

8. What computer(s) do you own? _____
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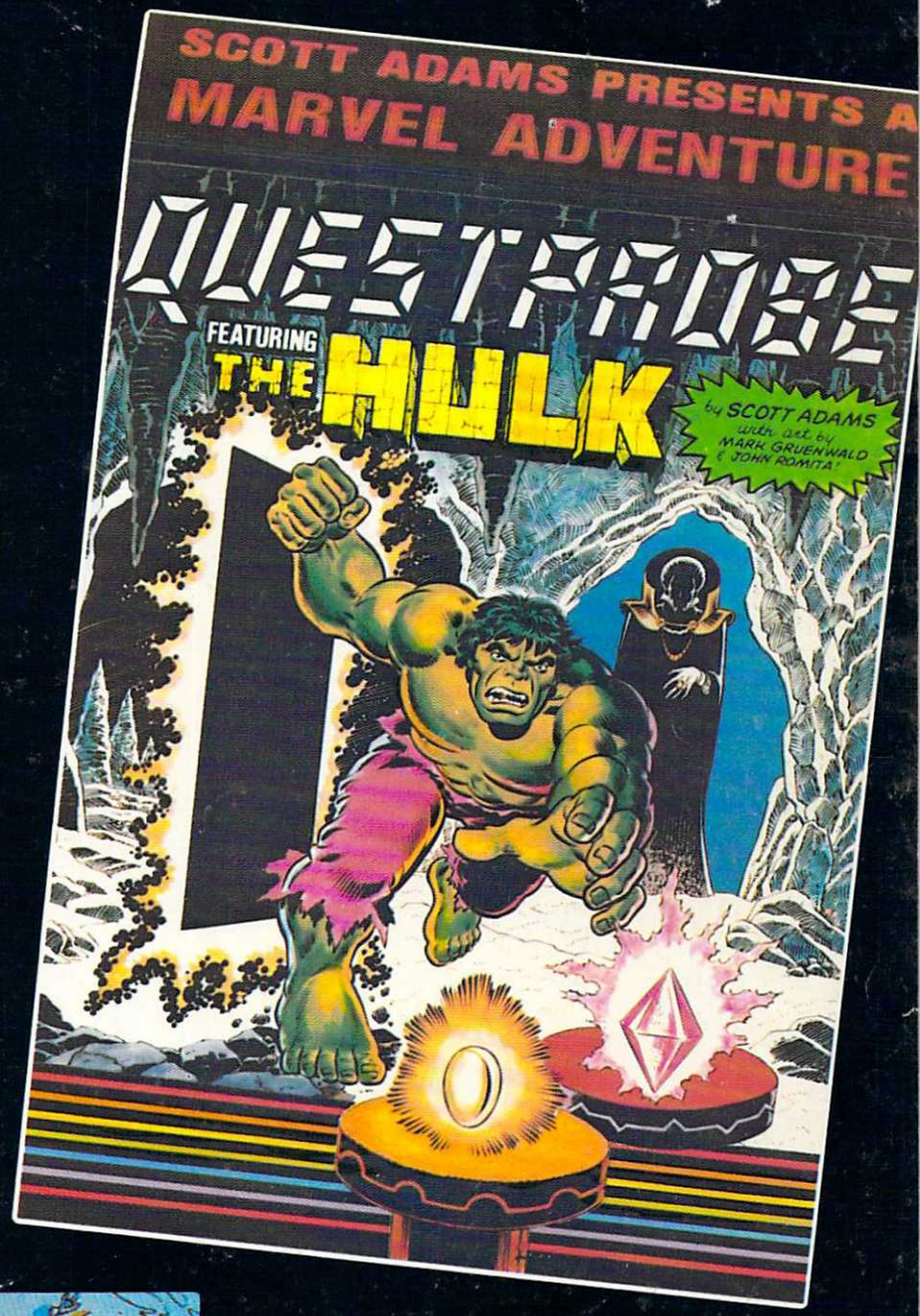
SCOTT ADAMS

TANGLE WITH THE HULK.™



True Believers, tangle with the Hulk — if you dare.

In this first of the QUESTPROBE series, you and your micro can actually command Bruce Banner's intellect and the Hulk's savage fury. Using logic, reason, imagination (the stuff educators recommend Adventures for), you'll encounter Marvel Comics characters Ultron, Ant-Man, and others in your attempt to unlock the riddle of the Chief Examiner. With the Marvel Comics Group and "Mr. Adventure" behind you, how can you go wrong?

'Nuff said.

For adventurers aged 8 to 800. Requires moderate skill level.

Scott Adams — recently named "Mr. Adventure" by Computer and Video Game Magazine.

Package and graphics by Mark Gruenwald, John Romita, Sr., and Kem McNair.

Most versions under $20 (£15). Limited signed editions available.

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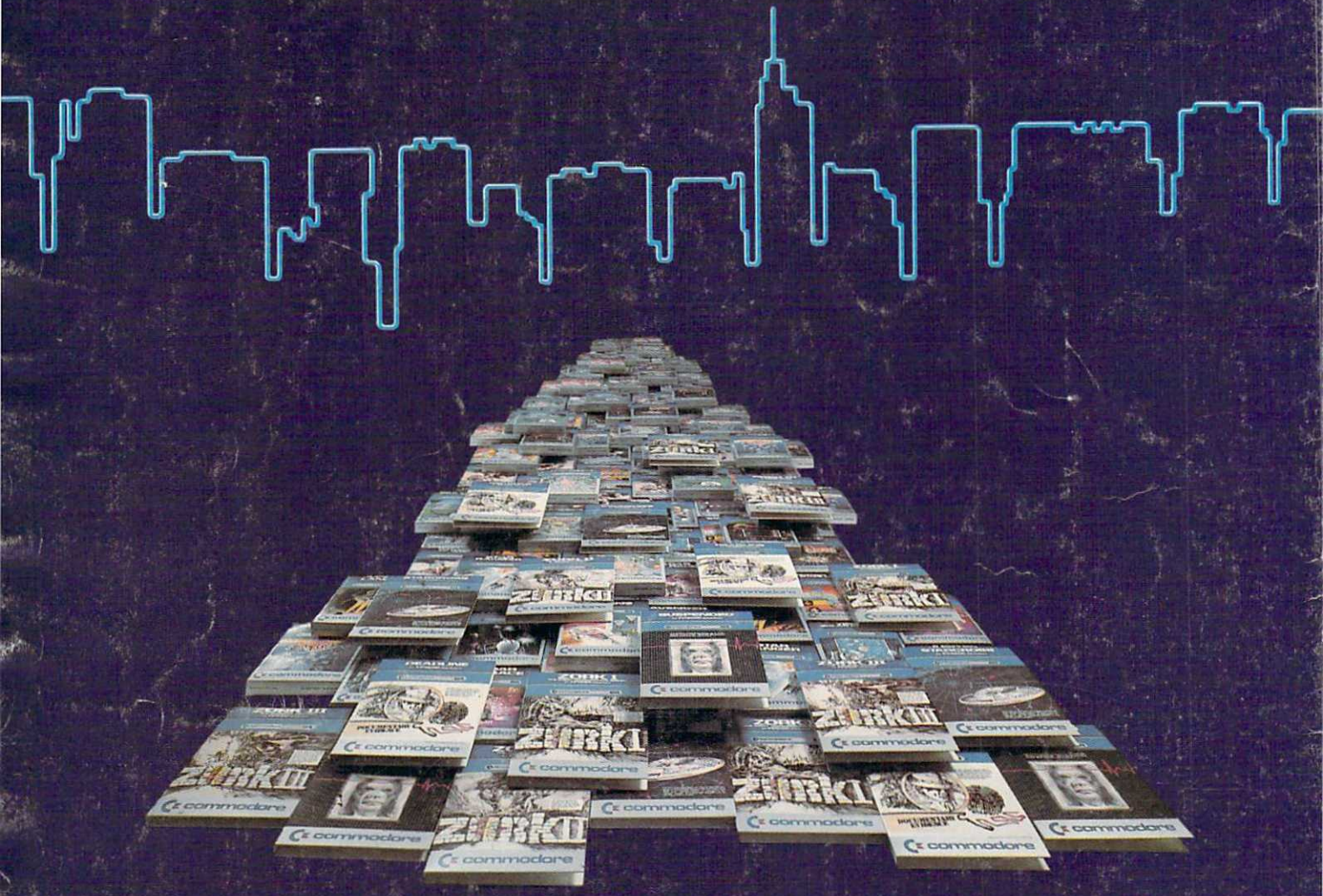

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