

APPLE IIc
A Hands-On Review

FAMILY COMPUTING

GIRLS AND COMPUTERS: MEETING THE CHALLENGE

**Adventure Games:
How to Get
Unstuck**

**Computerizing
Your Hobby—
Less Work/
More Play**

**24 At-A-Glance
Software Reviews**

**Original Programs
for ADAM, Apple,
Atari, Commodore,
IBM, TI, Timex,
and TRS-80**



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What should you look for in personal

Before you go looking for personal computer software, you should know what personal computer software looks like.

(You're not alone if you don't already know that software programs come in a package.)

Programs are "pre-recorded" on cartridges, tapes or diskettes. And, although you can't tell by looking at these cartridges, tapes or diskettes, the programs on them can be very different.

What you put in is what you get out.

What happens when you play a high-quality tape on a high-quality recorder? Superior sound.

This analogy can also hold true with software. The better the program quality, the better the result — be it improved productivity or creativity.

IBM Personal Computer Software is both tested and approved by IBM. And these programs are designed to take advantage of an IBM personal computer's many advanced hardware features.

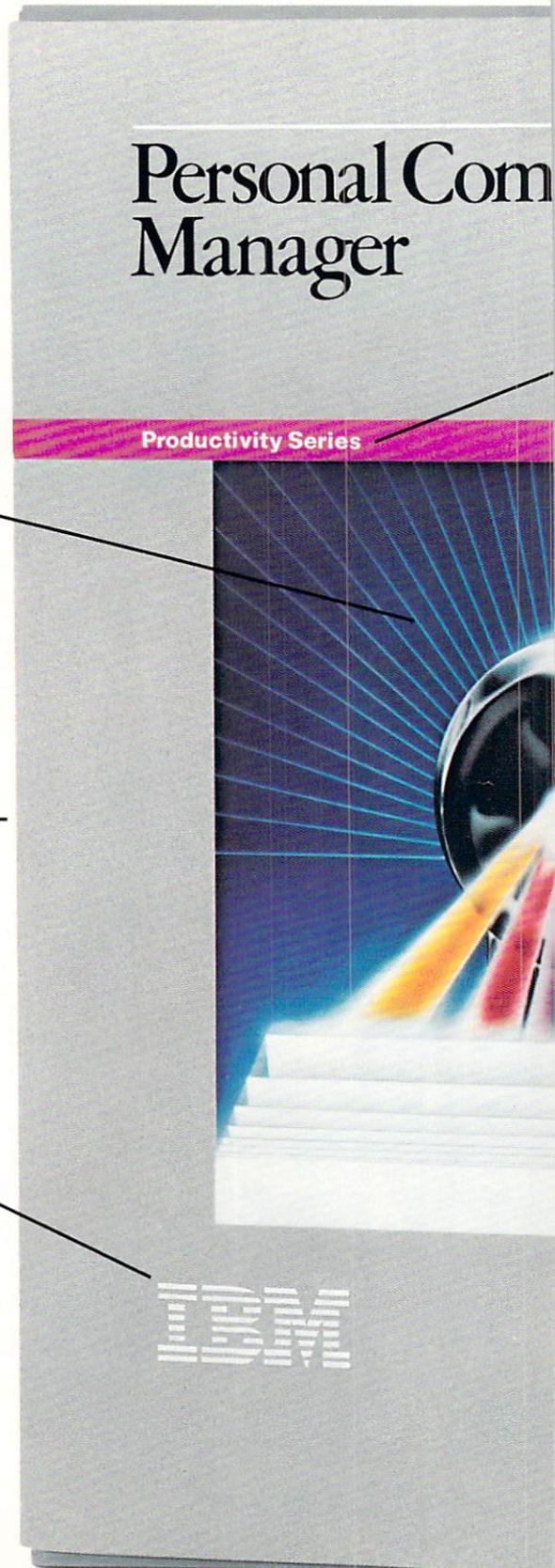
What the value is.

What are improved math skills worth? More efficient inventory control? Faster communications? What is accomplishment worth?

Any way you look at it, the value of personal computer software is the value of doing your best.

What compatibility means.

Many of the same software programs that run on the IBM Personal Computer you use at work will run on other IBM personal computers you use in other places. So you can, for example, continue in your family room what you started in the classroom or boardroom. (Or the other way around.)



computer software?

munications

What's available.

One software program can't satisfy everyone's computing needs. That's why IBM has such an extensive library of programs. You'll find a series for productivity, education, business, entertainment, lifestyle, programming or communications.

With IBM Personal Computer Software, you have a choice.

In word processing, for example, you may want a simple program for memo writing. You'll find that program in the IBM software library. If you want a sophisticated program for report writing, you'll find that in the library as well.

What's inside.

Sometimes learning a program is easy. Sometimes it's not. That's why inside every IBM software package are instructions that are clear and understandable.

What you can do right now.

There's more to look for in personal computer software than what you've read here. To find out more, look no further than your authorized IBM Personal Computer dealer. For one near you, call 800-447-4700. In Alaska or Hawaii, 800-447-0890.

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FAMILY COMPUTING

FEATURES

38 BRIDGING THE GENDER GAP

by Charlotte Beyers

Boys and girls show equal aptitude on computers when given equal opportunity. Find out how to make sure your daughter gets her fair chance.

42 SOFTWARE FOR GIRLS: MORE THAN SUGAR AND SPICE

by Marlene Anne Bumgarner

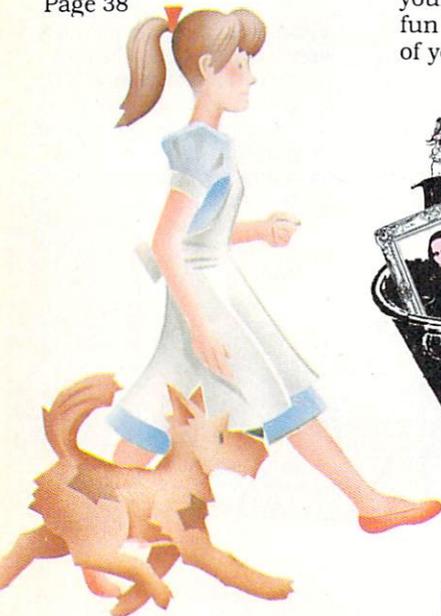
One mother's sampler of software that her girls go for . . . and yours might, too.

47 A HANDS-ON REVIEW: APPLE IIc

by Charles H. Gajeway

A test-run of Apple's newest product: a 7½-pound transportable.

Page 38



50 GETTING AS FIT AS AN OLYMPIAN

by Mindy Pantiel and Becky Petersen

Even weekend athletes can take advantage of the new sports technology. Inside: the latest innovations used by the pros.

56 BUYER'S GUIDE TO SPEECH SYNTHESIZERS

by Louis R. Wallace

Find out how to turn your computer into a talking machine.

60 FREEDOM ROAD

by Carole Houze Gerber

FAMILY COMPUTING talks to Steve Roberts, who is traveling across America on a bicycle built for two (computers).

62 COMPUTERIZING YOUR HOBBY

by Robin Raskin

Take the drudgery out of your hobby and put the fun back in, with the help of your computer.

Page 62



PROGRAMMING

67 THE PROGRAMMER

68 BEGINNER PROGRAMS

by Joey Latimer
Cool off on a hot day with our *Ice Cream Cone*; then try to stop the *Renegade Robot* before it catches you, with programs for ADAM, Apple, Atari, Commodore, IBM, TI, Timex, TRS-80, and VIC-20 computers.

84 PUZZLE

Brain Terrain: Help the Outer People return Mr. Winkler to earth in the proper year.

91 READER-WRITTEN PROGRAM

Hangman: Play an old-fashioned game without paper and pencil.

PRODUCTS

92 SOFTWARE GUIDE

95 SOFTWARE REVIEWS

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COVER ILLUSTRATION BY PAGE WOOD

DEPARTMENTS

6 EDITOR'S NOTE

8 LETTERS

10 BEHIND THE SCREENS

People, News, and Trends

14 HOME-SCHOOL CONNECTION

by Esther McCrumb
How to start a 4-H computer project.

20 HOME BUSINESS

by Charles Harrison
Shared Needs, Shared Solutions: A computer at home can provide new opportunities for handicapped employees—and for employers, as well.

26 GAMES

by James Delson
When the Going Gets Rough: What to do when you're stumped in an adventure game.

30 NEW TELECOMPUTING

by P. Gregory Springer
Choosing your first bulletin board.

34 COMPUTING CLINIC

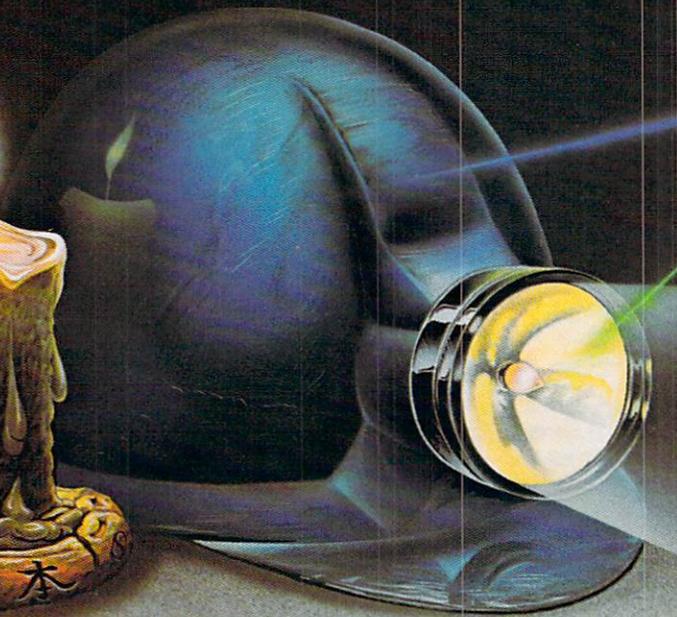
Questions from readers are answered.

55 BASIC BOOTH

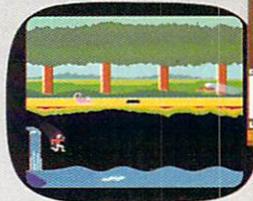
101 CLASSIFIED

104 ADVERTISERS' INDEX

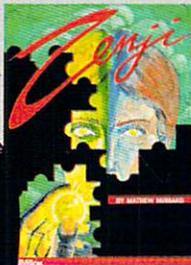
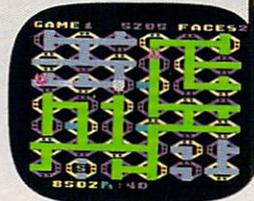
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You have heard the elder speak of one central source and a maze of unconnected grey paths. As you connect each grey path to the central source, what was grey becomes the green of life. When all are connected, then you have achieved "Zenji." But beware the flames and sparks of distraction that move along the paths. You must go beyond strategy, speed, logic. Trust your intuition. The ancient puzzle awaits. Designed by Matthew Hubbard.

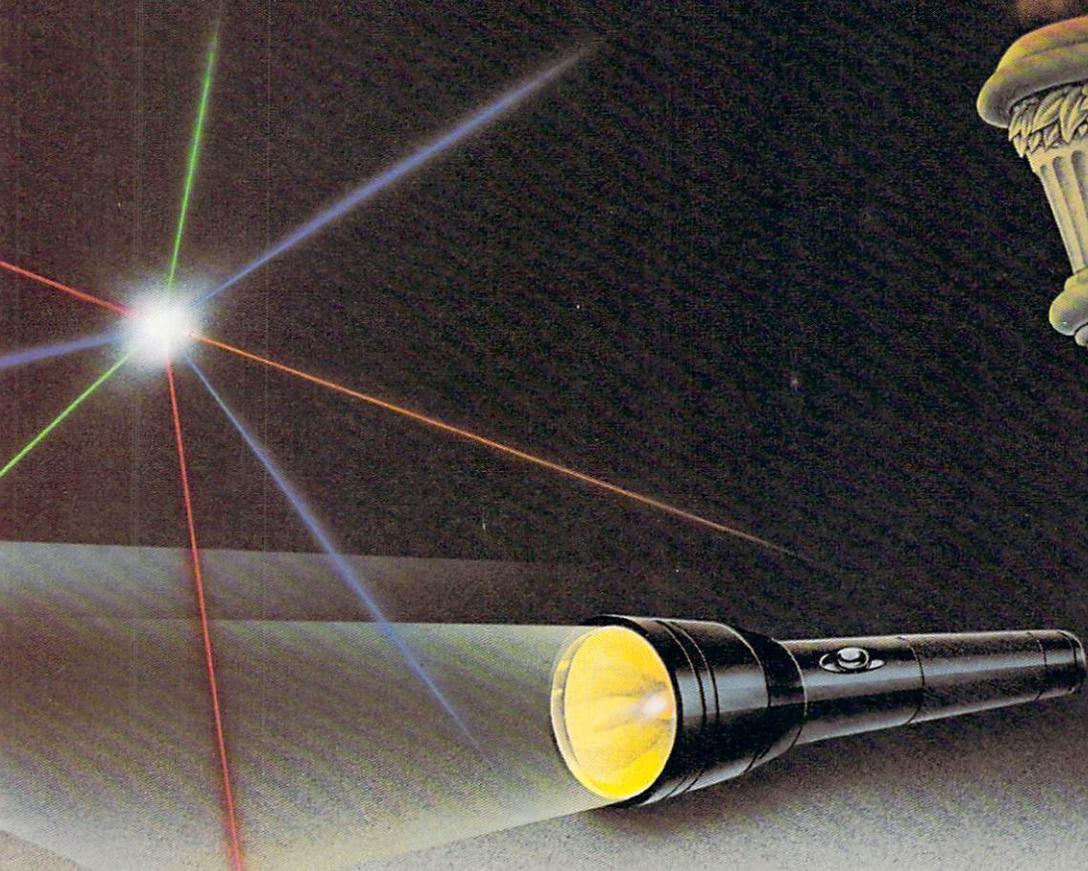


You strap on your helicopter prop-pack, check your laser helmet and dynamite. There's no predicting what you'll have to go through to get to the trapped miners. Blocked shafts, molten lava, animals, insects, who knows what lies below. But you'll go, you're in charge of the Helicopter Emergency Rescue Operation. The miners have only one chance. You. The opening shaft is cleared now, it's time to go. Designed by John Van Ryzin.



What if you were sitting in front of your Commodore 64™ programming your own Pitfall Harry™ adventure? It can happen with a little help from the creator of Pitfall Harry: David Crane. Just write your name and address on a piece of paper, tape 25¢ to it for postage and handling and mail to: The Activision C-64 Club, P.O. Box 7287, Mountain View, CA 94039. We'll send you David's Booklet, "Programming Pitfall Harry." It includes a written program that helps you create your own adventure. Go for it.

FOR YOUR COMMODORE 64. DIFFERENT LIGHT.



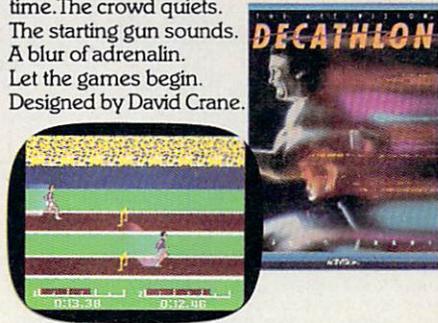
As you suit up you see the webbed forcefield surrounding your planet. Holding it. Trapped with no escape. No hope. Except you: The Beamrider. The freedom of millions depends on you. Alone you speed along the grid of beams that strangle your planet. You must destroy the grid sector by sector. Your skills and your reflexes alone will determine the future of your people. Take their future in your hands. Designed by Dave Rolfe.



You can almost hear the quiet. And it's your job to keep it that way. A toy factory at midnight. Did you hear something? Guess not. Wrong! Suddenly balloon valves open, conveyor belts move and a whole factory full of toys goes wild. Even the robot, their latest development, is on the loose and after you. Capture the runaway toys. Restore order. Restore peace. Restore quiet. Do something! Hurry! Designed by Mark Turmell.



You made it. The Olympics. You hear languages you've never heard. And the universal roar of the crowd. You will run. Hurl. Vault. Jump. Ten events. One chance. You will push yourself this time. Further than ever. Harder than ever. But then... so will everyone. The competition increases, now two can compete at the same time. The crowd quiets. The starting gun sounds. A blur of adrenalin. Let the games begin. Designed by David Crane.



EDITOR'S NOTE

ON BEING AHEAD

When I visited Detroit, my hometown, early this summer, everyone I saw had a bad case of "pennant fever." It was in sharp contrast to the gloomy faces I'd encountered when the automobile industry was in its recent slump. Of course, by the time you read this page, my beloved Tigers could be in the cellar, but every Detroiters has been touched by the magic of being associated with the team in the lead, the one ahead of all the rest. No matter what happens, stories of that early lead, of record-breaking play, will be told for many years to come. And all Tiger fans share that pride.

It may sound strange, but I see the same kind of pride in "being ahead" in many of the computer owners I know. Out there in the lead, that's where they are. But with computers, as with baseball, girls and women are usually found watching from the sidelines. And they're not just missing out on the fun of the "sport," they're losing out on an opportunity to develop that "can do" attitude, a sense of fair play, hard work, and team participation. These are all skills essential to living a rewarding life and to taking advantage of the broad range of options available in the future.

Parents play an important part in determining how involved their daughters will be with computers. When we began our research for FAMILY COMPUTING, long before the magazine actually existed, we found that among the families we surveyed, a computer was most often brought into the home by a father for his son or by a wife for her husband. Seldom was a computer bought only for a daughter or wife to use.

I find it hard to believe that there are still so many parents who worry more about their sons' professional futures than their daughters'. It seems equally archaic to me that computers are associated with ma-

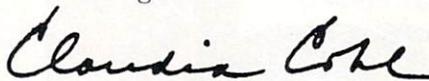
chines, equipment, math, science, and technology—and that these areas are still seen as being of interest to boys and men only. Anyone who understands computers knows that they do what we want them to, that with appropriate software, they can appeal to almost any conceivable personal interest—male or female or both.

Don't fall prey to the myths. With a little inventiveness, perseverance, and research into what's available, you can interest almost anyone in computers. If you're concerned about your children's interest in the computer, or access to it, why not start with our cover story, "Bridging the Gender Gap," (page 38)?

And since the right software can be the key to success at the computer, we turned to a mother and teacher for advice on what kinds of software her daughters and their friends like to use. "Software for Girls: More than Sugar and Spice" (page 42), will serve as a useful guide for parents who are exploring the software shelves.

If you're interested (as we are) in continuing to discover new ways to enjoy a computer, take a look at "Telecomputing," the new column we've introduced on page 30. This month we focus on how to choose your first bulletin board. We'll continue to explore the subject of telecomputing in future issues, so let us know what topics you'd like to see covered.

And remember: The Detroit Tigers may not win the pennant this year, but the important thing is that they had what it takes to take the lead. The same is true of girls and computers—especially with the help of parents. Together they can be part of a winning team.



CLAUDIA KOHL
EDITOR-IN-CHIEF

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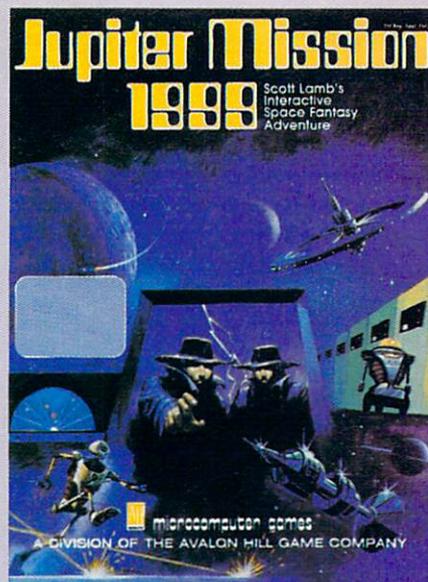
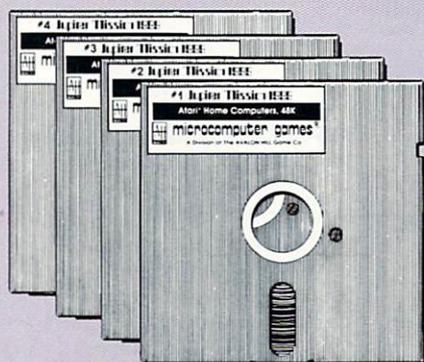
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RRRING!!! RRRING!!! RRRING!!!

Too early on a chilly January morning, I was jarred awake by the noxious blaring of my traitorous doorbell. As I moved to accost the unknown aggressor, with the full force of semi-conscious wrath, I pulled on my robe and lost my dignity to the pain of a stubbed toe. Now fully awake, I opened the door, prepared to educate the mysterious interloper on the meaning of manners. My determination to this end was somewhat shattered when I saw two large men clad in long overcoats and wide-brimmed hats. Instinctively, I tried to slam the door. My retreat to safety was denied by the advance of the strangers. Before I could protest their entry, my vision was drawn to the shining silver badges that hung from their now unfolded wallets. They were government agents.

Hesitantly, trying to remember any crimes that I had ever committed, I invited them into my home. At their request, I produced my driver's license and other forms of identification. After examining these credentials, they asked me to pack a bag for an extended journey. After some protest and argument, I was made to understand that my options in this matter were less than limited. My country needs me, they said—with the clear implication that either I pack and dress or I take an extended journey in my robe.

This is how my adventure began. From my cold apartment, I was taken to a towering vehicle for an emergency mission to Jupiter. My very life on the line and, possibly, the survival of the planet Earth as well, and only God knows what other kind of perils await.

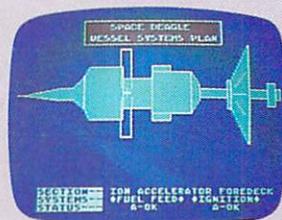
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Ship Status Display:
Damage report



Navigation Display:
Used to plot course

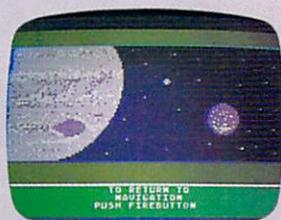


Science Lab Display:
Probe report



Science Lab Display:
Jupiter system diagrammatic

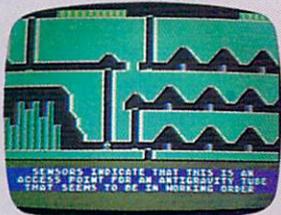
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Porthole View
of Jupiter and a moon



Lander Approach Display:
note descending spaceship



Exploring an
Alien Complex



Exploring an
Alien Space Station



Joystick required

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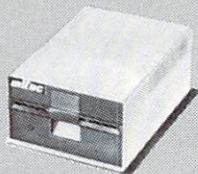
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LETTERS

TIPS FOR THE TEACHER

My daughter and I are most grateful to you for the lessons on computing. As a retired instructor, dedicated to providing the best (and latest) to our young people, I presented my daughter (a most dedicated teacher) with several computer magazine subscriptions (including FAMILY COMPUTING) to assist her. Like myself, she wants to be second to none in providing quality for her cherished students.

ERNEST SIGNORELLI
 Torrington, Connecticut

A NEW PROGRAMMING WHIZ

I've been into computers for one year. When I first bought your magazine, I didn't know about strings. Thanks to your magazine, I learned about them. Two days after learning about strings, I wrote my first program. Since then I've written about 12 programs and I'm working on many more. I use Apple and TI computers. I love your programs.

RYAN JOHNSON, age 11
 Redkey, Indiana

THE COLOR COMPUTER— A GOOD CATCH?

I read with interest your article "Fishing for a Computer" (May 1984) and agree with many of your opinions. However, the disregard shown for the TRS-80 Color Computer leaves me wondering if you have spent much time with this surprisingly versatile machine.

Although the initial support for the CoCo is somewhat embarrassing to Radio Shack, many other hardware and software suppliers seem to have realized its potential and devised programs that allow very impressive accomplishments on that which you regard as "primarily a home entertainment computer."

JERRY GROSS
 North Syracuse, New York

I must take exception to an article printed in your May issue ("Fishing for a Computer"). In this article, the author states that the TRS-80 Color Computer is "primarily a home entertainment computer." This is not true. First of all, I run two businesses on my machine, and second, the CoCo can run the most powerful and advanced software. It also can run

CP/M software and all kinds of graphics and word-processing packages. Furthermore, we have scads of terminal programs, including one that is similar to what they used in *WarGames*.

WAYNE WEINSTEIN
 Staten Island, New York

EDITOR'S NOTE: *We apologize. The statement was somewhat unfair and misleading. We didn't mean that you can't run a business with a CoCo, just that it's not primarily intended for that use. We know of people who run businesses with the Timex 1000. To be sure, computers are powerful and versatile.*

A MICROPROCESSOR MELTDOWN

I am a recent subscriber to your great magazine, and I have a few questions and comments concerning the article "A New Kind of Entertainment" (February issue).

I loved the article, and after reading it I couldn't wait to get my hands on that new game *Space Ace*, and play it 'til its microprocessor melted down into a lump of silicon-plastic. Fortunately, I was lucky enough to get the chance to play the game, and I found it very challenging.

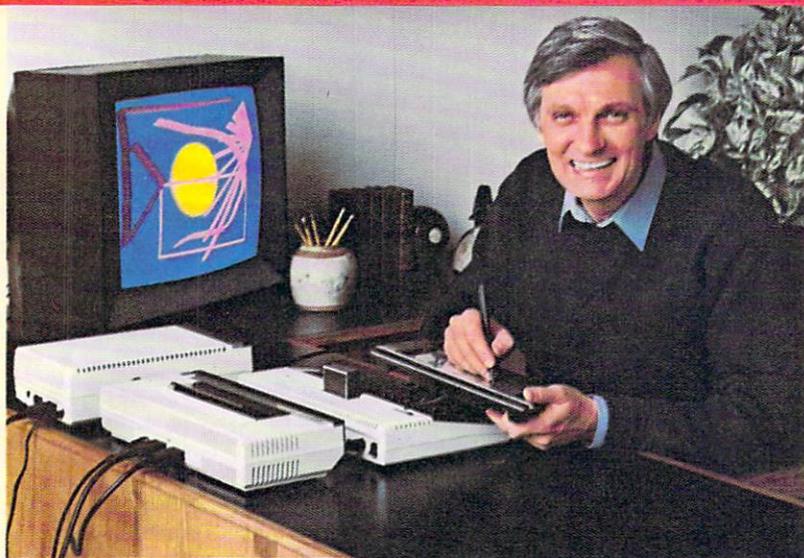
I have to admit that Don Bluth and company are on the right track, and I hope they continue making great games like *Space Ace*. I also hope their next game, *Dragon's Lair II*, will be a smash hit. If you happen to know the address where I could contact them to give my personal thanks, please tell me.

GERARD R. FERONE
 Chapman, Kansas

EDITOR'S NOTE: *We're sure that Don Bluth will appreciate your praise. You can write to Don Bluth Animation, 12229 Ventura Blvd., Studio City, CA 91604.*

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What would Cezanne say to an electronic orange? Surely Van Gogh would go for some flowers painted in phosphors (those glowing things in your TV screen). And you bet Beethoven would be blown away by a computer synthesized symphony.

Too bad. They were all born too early. But luckily you weren't. Because Atari makes several home computer products to help you create all these things and more.

First, there's ATARI Paint* the program that turns the joystick you already own into a computerized paintbrush that helps you explore the fascinating world of computer art.

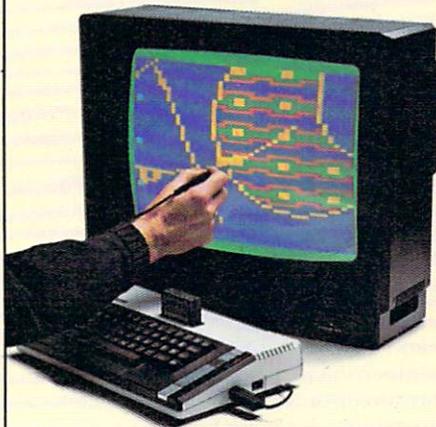
Get the magic touch with Atari Touch Tablet.

The ATARI Touch Tablet with Atari-Artist™ software cartridge turns your TV into a magic palette of 128 dazzling colors.

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*SuperBoots™ Software developed by Capital Children's Museum, Washington, D.C., licensed by Reston Publishing Company Inc. © 1982 Reston Publishing Company, Inc. All Rights Reserved.



DISCOVER WHAT YOU AND ATARI CAN DO.

BEHIND THE SCREENS

PEOPLE, NEWS, AND TRENDS

EDITED BY BILL CAMARDA

Credit, Where It's Due

If you'd like a computer to help keep your family's finances in the black, but you're too far in the red to afford one, consider a computer credit card. Both Radio Shack and Apple now offer credit cards for customers who are good risks but won't or can't use other credit lines. More than 150,000 people have used these computer companies' "plastic."

Since 1982, customers who fill out applications in a Radio Shack store can get credit decisions within an hour. They then choose a computer and/or peripherals, and agree to pay on a 30-month installment plan. Radio Shack's credit card bears a 21.5 percent interest rate. The card is free. If you wait for mail approval, Radio Shack sends you a coupon good for 10 percent off any computer-related purchase up to \$1,000.

Those who pick Apples at authorized dealerships can get quick credit if they have good credit histories and put down 10 percent of their purchase in cash. Their first purchase must be worth at least \$250. Interest rates vary widely from state to state.

None of the other major personal computer companies offers similar plans to individuals, though IBM and other manufacturers provide credit to businesses. —LINDA WILLIAMS

The Family Dog

Looking for a family dog? A computer program recently introduced at Bide-A-Wee Home Association, a New York pet adoption center, can help.

The program, *Choose-A-Pooch*, created by Dr. Randall Lockwood, a psychologist who specializes in pet/owner interaction, was developed to avoid mismatching dogs and people. Bide-A-Wee and other animal shel-

If you've got a good bite-sized piece of computer-related news involving people, trends, or innovations, let's hear it. We will pay \$25 for each item we publish. Write to Behind the Screens, c/o FAMILY COMPUTING, 730 Broadway, New York, NY 10003.

ters too often find themselves housing pets who proved incompatible with their adopted families' lifestyles. *Choose-A-Pooch*, by Lockwood's firm Humane Software, aims to prevent this problem.

After you answer a series of questions regarding your family's lifestyle, ability to care for a pet, and the characteristics you'd like in a dog, the computer displays the 10



Choose-A-Pooch gets a workout, as Dr. Randall Lockwood and pooch look on.

most suitable dogs for your family out of a possible 120 breeds. You can then find out any dog's size, temperament, coat care, exercise requirements, trainability, and general suitability for your family.

A home version of *Choose-A-Pooch*, designed for Atari Home Computers (disk only), will probably be available this fall. The Atari package, to be priced under \$50, will also include *Pick-A-Pet*, a similar program that helps you choose among many different kinds of animals, from gerbils to tropical fish.

If you don't have a computer, Lockwood offers a questionnaire instead; fill it out, and Humane Software will send you a printout detailing the 10 best dogs for you, along with general information on dog ownership. There is a \$5 charge for this service. Get in touch with Humane Software, c/o Bide-A-Wee, 410 E. 38th St., New York, NY 10016.

Lockwood is also developing three other home education programs. One will help families diagnose common ailments in their pets and offer advice. The others are games—

an animal trivia game and one geared to teach family members proper pet care. —SUZETTE HARVEY

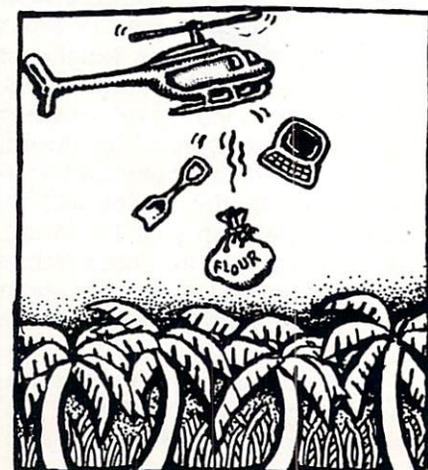
Join the PC Corps

"Ask not what your personal computer can do for you, but what you and your personal computer can do for the world." That's the message espoused by David Rothman of Alexandria, Virginia, a computer expert and author of the forthcoming book, *The Silicon Jungle: Computer Survival at Work and Home*.

"Low-cost computer networks would allow U.S. doctors, engineers, and others with vital skills to export their knowledge to their counterparts in the Third World," says Rothman. He'd like to see the U.S. Agency for International Development (U.S.A.I.D.) or the Peace Corps provide small, inexpensive, portable computers to Third World professionals working on projects for public benefit.

Rothman says his "Electronic Peace Corps" (EPC) would help doctors and veterinarians in coping with unusual illnesses, civil engineers in facing difficult road-building problems, and anyone in need of technical advice that isn't otherwise available.

"Thanks to satellites, communications costs are falling. Exporting knowledge is an economically realistic idea." A conventional international phone call transmitting a four-page message to an underdeveloped



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BEHIND THE SCREENS

country in Asia can cost about \$20. Using state-of-the-art technology that U.S.A.I.D. could finance, it could cost less than \$1, Rothman says.

There is already a model for the EPC. It's called Carinet, and it links computer users in the U.S., the Caribbean, Southeast Asia, and Africa. Carinet brings Third World buyers and sellers together and gives them advice on becoming more productive. For example, Carinet taught an African potter how to make a ceramic insulator he could then sell to his local phone company.

Rothman admits the EPC has some major political obstacles to overcome. The Peace Corps is neutral about his concept and no presidential candidate has endorsed it. Still, he says he's received an enthusiastic response from scores of technical and nontechnical people around the country. If you like his idea, he says, write your representative in Congress. —ROBIN RASKIN

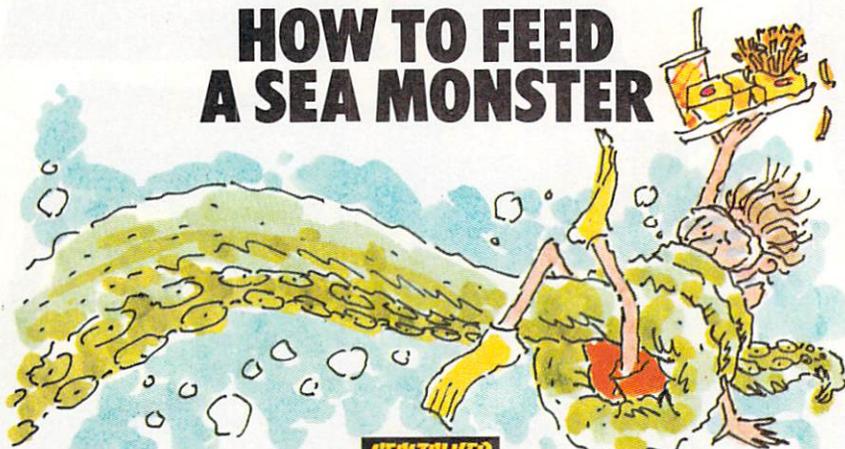
Nibbles

Computer as Art: The Mindset Personal Computer, a \$2,398 IBM-compatible with exceptional color graphics, is now a permanent part of the Architecture and Design Collection of New York City's Museum of Modern Art. The Mindset was chosen not for what it does, but for its design. It joins the Grid Compass portable computer, selected last year.

New Timex Resource: *The Timex Sinclair User's Encyclopedia* lists a wide variety of game, home management, business, and personal productivity software for the TS 1000, 2068, and Sinclair ZX81 computers. It also includes a programmer's guide. Published by Arrays, Inc., of Los Angeles, the \$14.95 book is available at bookstores and at some computer stores.

Provocative Quote: "One of the worst pieces of advice you can give to a young person is to go into programming. It seems like a good field right now, but it is inherently automatable and will be automated, and much of that will happen in the next 10 years."—Edward Feigenbaum, leading artificial intelligence researcher and coauthor of *The Fifth Generation*. 

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HOME-SCHOOL CONNECTION

HOW TO START A 4-H COMPUTER PROJECT Swine Program Wins Blue Ribbon

BY ESTHER McCrumb

Nowadays, both programmers and pigs win Blue Ribbons.

In 1982, when I set out to start a 4-H computer project in Weld County, Colorado, I didn't know much about computers. I did have a conviction that computers would be a household appliance before long. And, as a 4-H (Head, Heart, Hands, and Health) leader, a feeling that kids and computers were a natural combination. The project didn't get off the ground right away. But, after several false starts, it's running nicely now, with 18 kids preparing for this summer's computer competition at the County Fair.

In other areas of the country, 4-H projects are going beyond the fairgrounds and into the schools, where students and teachers alike are becoming computer literate. (The 4-H program originated in 1914 as an extension of the U.S. Department of Agriculture, which funded state universities to help bring education to rural areas.) 4-H agents in Kentucky, for example, each year cart 14 TRS-80 computers into schools in some 35 counties, give a basic introduction to computers, and often prompt administrators to make computer purchases.

As Jon Irby, a 4-H program leader in the U.S. Department of Agriculture, said, "It's not fair at this point to depend that heavily on the schools [to introduce students to computers]." He added that 4-H clubs, with help from their sponsoring state universities, could pool resources with public schools to benefit both groups. The 4-H computer project in Weld County, while not directly involving schools, does depend

ESTHER McCRUMB is a member of the school board in Fort Lupton, Colorado, where she lives with her husband and two children. She has been a 4-H leader for "about nine years," and writes news and features for several newspapers.



Byron Farquer (right), whose "Swine" program won a 4-H Blue Ribbon at a Colorado county fair. At left, Quentin Goodwin—the judge.

on area classrooms for its meeting space. A similar project could be organized almost anywhere.

WAY TOO TECHNICAL

To start things off, Natalie Chlop, then a systems analyst in the Weld County data-processing department, enlisted the interest of one of her co-workers, Johnna Rawlings. She, in turn, got a commitment from her husband, Austin. Austin, who was head of Greeley, Colorado's data-processing department, got permission from the city to make its UNIVAC mainframe computer and three terminals available to 4-H members one night a week.

The three computer experts mapped out a class for 4-H members and their parents. They would meet at City Hall for an hour's instruction, to be followed by an hour on the terminals. Sessions would run 16 weeks.

After the formal course was finished, instructors would be available to help 4-H'ers develop and debug their own programs. These would then be judged at the County Fair at the end of July. Sixteen 4-H members, ranging in age from 9 to 14, and eight parents started the course. Most got through the first five weeks. After that the attrition rate soared.

True to their training in data processing, the computer experts explained concepts such as flowcharts, binary code, and decimal and hexadecimal bases—all integral to serious programming. A few of the mathematically inclined youngsters absorbed these concepts, but most found them confusing.

The instructors dutifully completed seven sessions before deciding they had lost the interest of most of the kids. My own two children commented that the sessions were "too much like school." In a postmortem on the project, we decided that it had all been too technical. Knowledge of hexadecimal code isn't necessary to run a microcomputer, which is what most of the kids might ultimately have at home or meet in the classroom. So that project, which we had mistakenly entitled "Data Processing," was dropped.

I BUY A TI

Despite this somewhat inauspicious start and my own lack of knowledge, I still was convinced that kids and computers were a natural combination. To find out what micros were all about, I bought a Texas Instruments 99/4A computer. The first thing I learned was that the instruction during those first data-processing sessions was not very pertinent to the BASIC manual that came with the computer. And the BASIC manual itself was not particularly inspiring.

I enrolled in a computer class at Aims Community College (through its Eaton, Colorado, extension), which was about 40 miles from my home. I explained my dream of a 4-H project to Quentin Goodwin, who taught computer classes there. He thought it was a good idea, but shook his head when I said I wanted to write a generic manual that would cover the many microcomputers on

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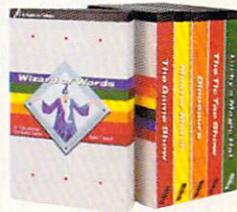
Look for enough variety to hold your child's attention over time. Some games are appealing in the short run, but are quickly mastered. Supplementary materials such as disks of added lessons can continue your child's interest and enjoyment.

The ability to modify a program is another form of extendability. Authoring systems can let you create lessons on your own topic areas for any age level and allow children to create and save original work, giving a sense of completion and pride vital to learning."

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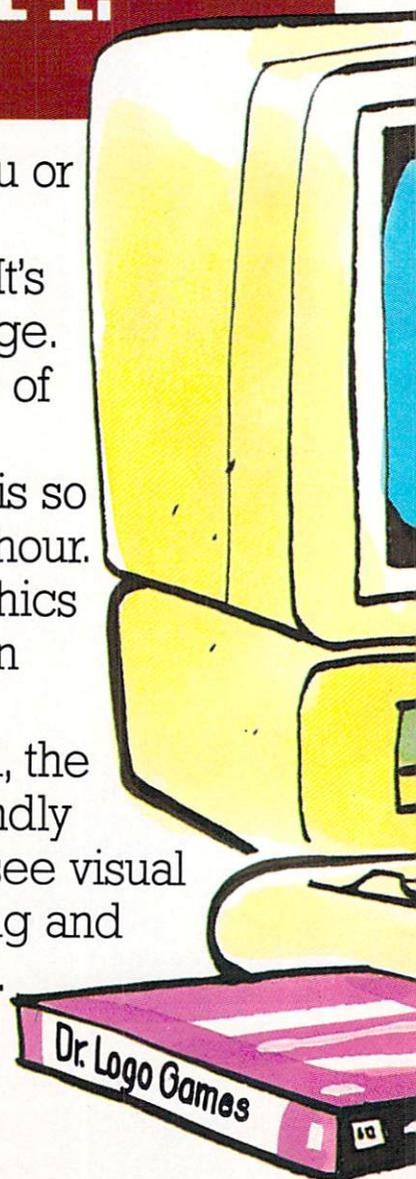
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HOME-SCHOOL CONNECTION

the market—in a fashion that would appeal to kids.

Through a questionnaire in the monthly 4-H newsletter—which Marion Krueger, a 4-H Extension Youth Agent, helped put together—we learned that 22 4-H members were interested in pursuing another computer project. One had an Apple II at home, one had an Atari, another a Commodore PET, a few had TRS-80s, and 12 had TI-99/4As. Several had access to Apples or TIs at school. Marion, who had also been attending seminars on micros, began collecting material that she thought would help me in my efforts to write an easy-to-understand manual—one general enough to let kids accomplish the same things on whichever computers they had access to.

PAY DIRT

Pay dirt was struck when Marion came up with draft copies of 4-H manuals developed in Kentucky for the TRS-80. Kentucky 4-H'ers have made remarkable advances involving some 15,000 young people with computers. Using the Kentucky Unit 1 4-H manual as a guide, I collected an Applesoft BASIC manual and one for the TRS-80, in addition to my own TI manual. I then wrote an introductory, generic manual that 4-H'ers could use on their own to begin a project, namely to write several programs for the County Fair.

Two members of our own Southern Funny Farmers 4-H Club, of which I am the leader, enrolled in the project: Craig Mayer, 12, who lives on a farm about a half mile from my home, and Byron Farquer, 18, who had just completed his junior year in high school. On his own, Byron had learned to operate a Timex 1000. Both boys had access to Apple computers at school and had a burning interest in computers.

After they received their manuals, they came to my home to work through the unit on my TI computer. Neither seemed to have any problem switching from the computers they were familiar with.

DAY AT THE FAIR

Marion began to contact computer dealers to find a judge for the fair. She learned that Quentin Goodwin, my community college instructor who also is a business partner in a company called Computer Consultants, would have a booth at the fair. He agreed to set up three sepa-

rate tests: beginner, beginner/intermediate, and intermediate. The beginner test required participants to write a program that printed their name, age, and address on the screen. The beginner/intermediate asked for a program with a loop that counted in increments of 5 (5,10,15, etc.). The intermediate asked for a program with a conversion table (Centigrade to Fahrenheit) that used a FOR . . . NEXT loop.

For the contest, Byron went one step further and developed an original program to give the average and median weight of up to 50 swine. After running the programs for Goodwin, Byron spent about an hour discussing them and his computer's limitations. "There's a boy I want to watch," Goodwin commented afterwards. Byron ended up as the Blue Ribbon winner in the senior division and as overall champion. Craig won second place (Red Ribbon) in the junior division.

CH-CH-CH-CH-CHANGES

While I was gathering material for a generic Unit II manual, Marion learned of Kentucky's 4-H Computer

STARTING A 4-H COMPUTER PROJECT

1. Contact your county's 4-H Extension Office (in your phone book). The office will probably refer you to a 4-H club in your area or enlist you as a county-wide project leader. Remember: If the idea of a computer project is totally new, you may have to put it together from the ground up.
2. Do a survey in a monthly 4-H newsletter to find out how many kids are interested and what computers they own or have access to.
3. Get 4-H Computer Project Manuals from your county's Extension Office. Study the Leader's Guide and use any of the many suggested formats for project meetings. If you're dealing with computers for which no 4-H instruction manual exists, use the format to write your own while referring to the computer's owners manual.
4. Set up a long-term project goal. Arrange a test for the County Fair competition and find a good judge.
5. Share what works and doesn't work with the local Extension Office. Ask them for information on projects in other states.

Project Manuals I, II, and III, plus a Leader's Guide, and specific manuals for TRS-80, Apple, and IBM microcomputers. In reviewing these manuals, I decided anyone who knows how to turn on a computer can learn to use one. Seeing no sense in reinventing the wheel, we have been using the Kentucky materials ever since.

I still have to write specific manuals for Atari, Commodore, Timex, and TI, but they will need to work as a goad only. My experience with 4-H kids is that you get them excited, offer some training and a lot of encouragement, and then stand back. In 1983, for instance, we had no regularly organized computer project. Kids worked at home on their own with my manuals and prepared projects for the fair.

This year, the project changed again. We sponsored a two-hour workshop every Saturday at Heath Junior High School in Greeley. Eighteen kids paid \$15 each for a six-week course. And guess who was back teaching? Austin and Johnna Rawlings, the data-processing mainframe experts—teaching about *micros*! Quentin Goodwin, for the third year in a row, will arrange and judge the 4-H computer competition.

4-H IDEAS

I believe computers, like cameras, can complement work done in other 4-H projects. Kids are encouraged to include photographs in their project's record-book narrative. Why not include a computer program that could help them judge projects, make decisions, figure rations, or adjust recipes? Why not a computer printout in the livestock record books for inventory, depreciation, rate of gain, sales, and profit or loss? The club secretary could use a word processor for club minutes, records, and correspondence. The treasurer could balance the checkbook and print out a monthly report.

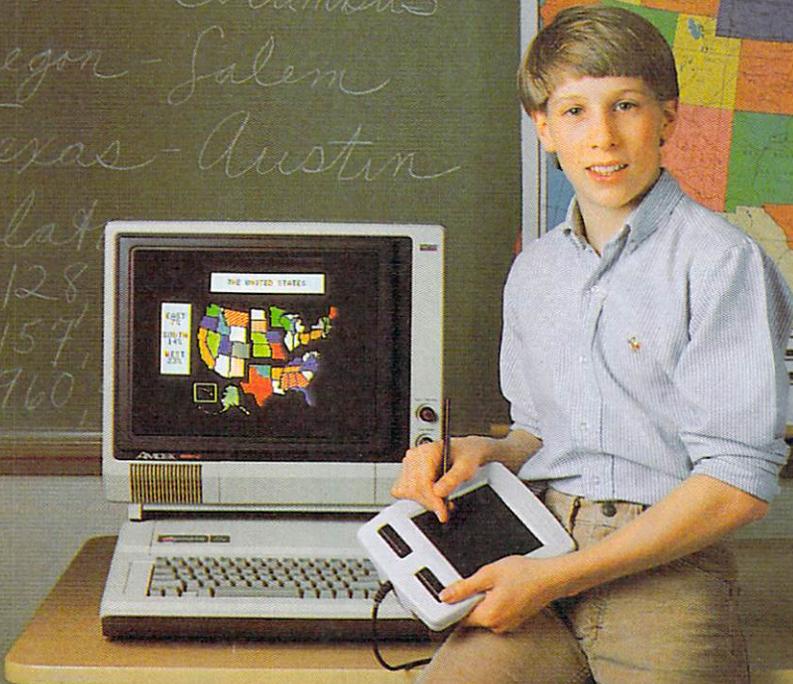
Once kids use computers to accomplish some time-consuming, unrewarding task—rather than just doing the textbook examples in most computer manuals—a sense of appreciation sets in. It's something like the accomplishment you feel when you wield a hammer to pound in a nail, instead of bludgeoning it with your shoe heel or some other inappropriate instrument. It's like the feeling of reward I've gotten from starting this 4-H computer project. ☐

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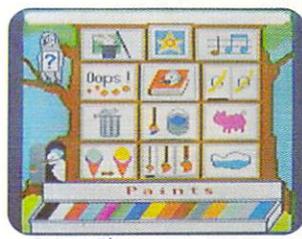
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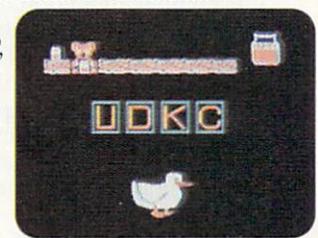
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HOME BUSINESS

SHARED NEEDS, SHARED SOLUTIONS

A Computer at Home Can Provide New Opportunities for Handicapped Employees—and for Employers as Well

BY CHARLES HARRISON

Jane Unger is a 40-year-old ex-teacher and ex-mountain climber who lives in a solar-heated house on a country lane a few miles north of picturesque New Hope, Pennsylvania. She works for Ray Schuh, the high-powered, no-nonsense director of corporate data processing for Lehigh Press. Its national headquarters in Pennsauken, New Jersey, is 30 miles away across the Delaware River. Unger doesn't go to the office. She's never met her boss and probably never will. And Schuh is frank in admitting that, had it been solely up to him, he probably never would have hired her.

This rather unusual situation exists for one reason: Unger has had multiple sclerosis for 10 years. She has been in a wheelchair for the last five years, and is now homebound. "We never would have considered hiring her," Schuh said, "because there are just too many problems." It is complicated enough in the data-processing center, where it is possible to communicate face-to-face with programmers, he said. "But if a programmer isn't even in the office, the situation is that much worse."

So, 1) how is it that Unger is working for Schuh, and 2) how does she do it?

The short answers are: 1) because of the Physically Handicapped Training Center at the hospital of the University of Pennsylvania, and 2) because Unger has learned to program at home using a new Compaq Plus, one of the most popular portable IBM PC-compatible computers on the market.

But there is more to the story—a lot more.

GETTING SPECIAL TRAINING

The Handicapped Training Center was one of the first computer programming projects designed for physically disabled persons. It was created in 1976 by state and federal

CHARLES HARRISON is a freelance writer in Woodstown, New Jersey, who specializes in writing about education.



rehabilitation agencies with guidance and support from IBM. For the past eight years, the Center has been extremely successful in preparing physically handicapped people to take positions in a wide range of businesses in the greater Philadelphia area. Ninety percent of all graduates find employment and earn up to \$23,000 a year.

Most of those graduates work in offices. They commute to and from their jobs like other employees, although often with some difficulty. Until recently, if any graduate's physical condition deteriorated to the point where he or she could no longer go to work and put in a normal work day, then the job had to be given up.

That's what happened to Jane Unger.

Shortly after she had to take to a wheelchair in 1979, Unger learned of the Center. She passed its entrance test and moved into a nearby dormitory room for about eight months. "She was No. 1 in the program," said John Connolly, assistant director of the Center. "She's extremely bright."

After completing her training, Unger went to work as a programmer for RCA in Morrisville, Pennsylvania, again traveling across the Delaware River. From the beginning, she found it difficult. As she puts it, she was "people-oriented rather than business-oriented." But she adjusted to the business climate. What bothered her most was the eight-hour work day broken only by short coffee

breaks and lunch. The job and the commute were just too taxing and she finally resigned. That was at the end of 1981.

Some handicapped people have been trained to work at home using a remote terminal connected to a company's mainframe. But many firms shy away from such an arrangement because they believe it may endanger the security of their data-processing system. Also, these employees usually are required to go to the office at least once a week.

Unger, however, found it increasingly difficult to leave her home at all. So, for two years she did almost nothing. Her newly acquired skills and independence slowly slipped away with the passing of each day, week, and month.

MAKING WAY FOR MICROS

While Unger struggled against her frustration, Ray Schuh at Lehigh Press faced his own, very different frustration. Eventually, the solution to his problem would turn out to be the answer to hers.

When personal computers came onto the market a couple of years ago, Schuh said, neither he nor anyone else in his company was prepared. The first reaction was that company executives in Chicago wanted to buy one brand, officials in Texas were partial to another, and personnel at corporate headquarters had still other ideas. "I had to scramble to do some research on what was on the market and how [personal computers] were being used," Schuh said. "I had to get control over what was happening."

Schuh finally decided to go with the IBM PC. But choosing a brand of personal computer did not entirely solve his problem. All his data-processing personnel were trained to use a mainframe and all were needed to continue doing their present work. "We wanted to promote the PCs as tools," Schuh said, "but we had no one on staff we could spare to develop PC software." Also, as he

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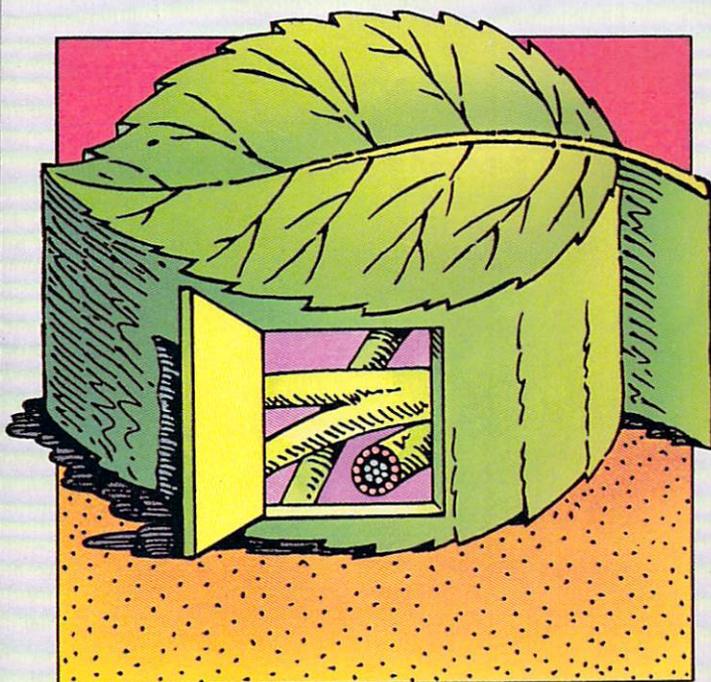
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HOME BUSINESS

HELP FOR THE HOMEBOUND

Since the mid-70s, there have been an increasing number of projects around the country designed to prepare physically handicapped people to be computer programmers. Unfortunately, nearly all of them are for people who are able to commute daily to their jobs and work a full schedule.

The Handicapped Training Center's new project and the 8-year-old LIFT, Inc., are the only current operations cited by authorities in the field that are designed to train physically handicapped people to work from their homes as computer programmers.

Here are some commonly asked questions and answers concerning the two projects:

Who is qualified for the projects?

People whose physical disabilities make it extremely difficult or impossible to work a normal schedule in an office.

How can someone enroll in one of the projects?

The new Center project, funded by the RSA, is limited to those who live in the greater Philadelphia area. However people from around the country can come to the Center, live in the nearby dormitories, and take advantage of its primary training program. The address is: Physically Handicapped Training Center, 4025 Chestnut St., Philadelphia, PA 19104; (215) 898-8108.

LIFT has its headquarters in Illinois, but has field directors around the country. For information about regional opportunities, contact LIFT, Inc., 350 Pfingsten St., Suite 103, Northbrook, IL 60062; (312) 564-9005.

Are the two projects exactly alike?

No. LIFT, which has so far found employment for 55 people, still trains the homebound to use a terminal connected to a company's mainframe. With one exception it

does not train people to program using a personal computer. Also, LIFT wants its homebound trainees and graduates to visit their employer's office at least once a week for staff meetings and to discuss assignments. LIFT and the Center project are similar in that they initially hire graduates of their programs for work which has been negotiated on contract with the employer. The goal of both programs, however, is to encourage the companies to eventually employ these graduates directly.

How long is the training period?

Approximately six months at LIFT and 10 months at the Center.

What does the training cost?

There is no cost. The training and equipment are supplied free of charge. Both the Center project and LIFT earn money from the companies with which they have contracts, in addition to the government funding they receive.

HOW TO BLOW UP A RUBBER RAFT



First, you need a reason to use a rubber raft. (That's a snap if you've got ZORK® I, the classic fantasy story from Infocom's interactive fiction line. Because you'll be hunting twenty fabulous treasures while dodging every kind of evil under the earth.)

Next, type in your command: BLOW UP THE RUBBER RAFT WITH THE AIR PUMP... But watch it, or you might just blow up the raft until you blow yourself to smithereens!

There's no telling what will happen next in ZORK I—because, like all of Infocom's interactive fiction, ZORK's



designed so that whatever you choose to do makes the next thing happen. And you won't run out of things to do, either. The underground empire of ZORK is so huge, your adventure can last for weeks or even months.

So if you want the closest thing on a disk to really exploring an underground world, get ZORK I*. But brace yourself for the action—it'll blow you away!

INFOCOM™

*It's compatible with almost every popular home computer. ZORK is a registered trademark of Infocom, Inc.

quickly discovered, software could be developed much more quickly—and, perhaps most important, at less expense—on a micro than on a mainframe.

Schuh knew he could probably hire some freelance programmers at \$35 an hour, but that was more than the company was paying its experienced personnel to work on the mainframe. Then he remembered the Handicapped Training Center where he had once attended an open house. He had been impressed by both the quality of the Center's computer science project and by the fact that its graduates were highly qualified, super-motivated, and worked for considerably less than \$35 an hour. He contacted John Connolly and asked whether the Center could develop software for IBM PCs. He wanted not only the services of its graduates, but also for the Center to assume responsibility for assigning and supervising the work.

Connolly said "Sure," even though at the time the Center had just acquired its own IBM PC and the staff had written only one program in BASIC. None of the handicapped students at the Center was being trained to use a personal computer.

OPPORTUNITIES OPEN UP
Connolly and James Vagnoni, the

When it comes to superior performance, we study our lines very carefully.

Superior printer performance is not a fluke. It evolves from analyzing printed line after printed line. Taking the time to test and retest. After 30 years of manufacturing precision parts, we know that there are no shortcuts.

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So far so good.

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instruction, giving Gemini-10X the capability to perform up to 16 operations with one command. We included as standard a paper feed system that has a friction and fully adjustable tractor feed. Then we even built in the dexterity to print graphics and text on the same line.

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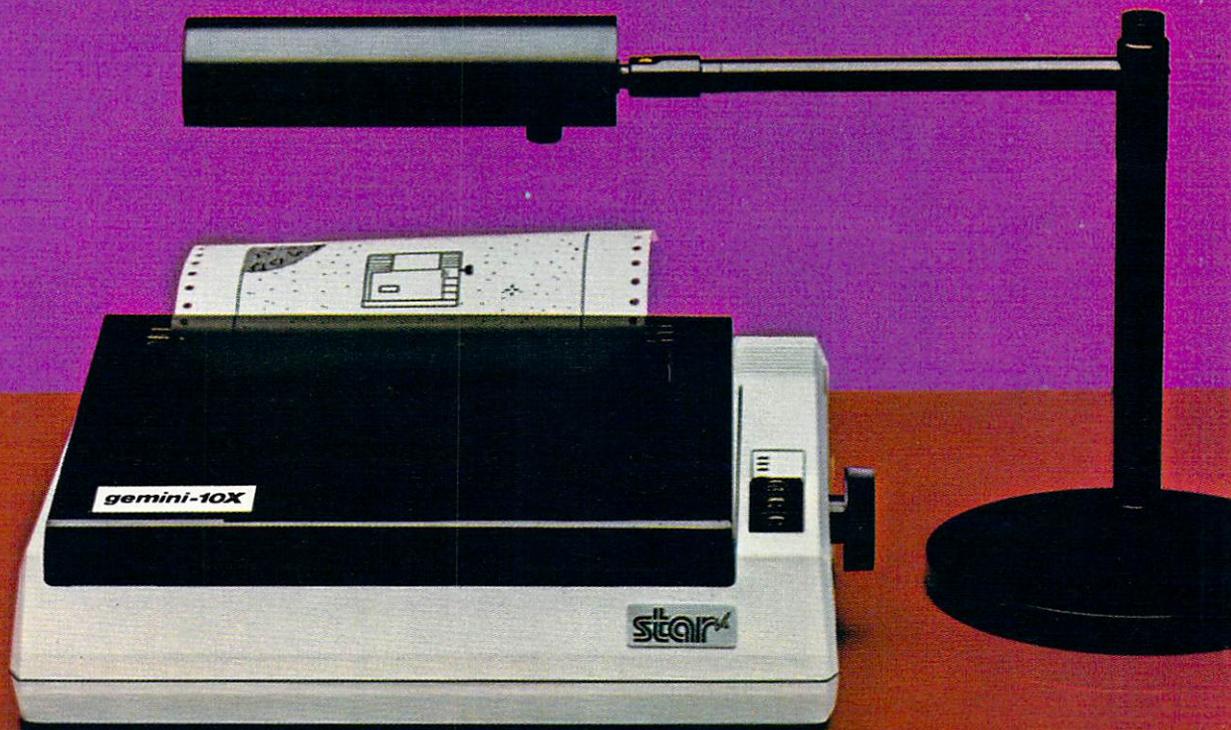
And, of course, staying the best means constant reviewing and fine-tuning. Keeping the Gemini easy to find, easy to afford and so reliable it can be warranted for up to twice as long as its major competitors.

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HOME BUSINESS

director of the Center, quickly realized two things. First, companies that previously wanted to hire Center graduates to work on a mainframe might now need people who could program using a personal computer. Second, the microcomputer made it possible for the homebound to program without connecting to a mainframe and worrying companies about system security.

The two men spent most of last summer writing a proposal to the Federal Rehabilitation Services Administration (RSA) for a grant to train 20 severely handicapped people to program on a personal computer. The proposal also asked for funds to hire additional staff and to purchase 20 personal computers for installation in the homes of the people being trained. The RSA approved the proposal last fall, but granted considerably less money than was requested. Consequently, the Center has been able to train only 10 people this year, although it expects the grant to be renewed for another two years.

Unger was one of the first people

contacted by Connolly when the grant was approved and she quickly enrolled in the training program. Connolly or another staff member traveled up from Philadelphia to Unger's home to show her how to re-apply the skills she had learned at the Center more than two years earlier.

Unger's new Compaq was set on a picnic table that Tom, her husband, brought in from outside and placed on two-by-four risers at one end of a large bedroom on the first floor. As Unger sits in her wheelchair at her computer, she can look through sliding doors on her left into the greenhouse, which is connected to the house and is an integral part of the solar heating system. Beyond the windows of the greenhouse are the large backyard and the rolling countryside of rural Bucks County.

SPECIAL PROBLEMS, SPECIAL SOLUTIONS

During Unger's retraining, Connolly noticed that her hands shook more than when she had first studied at the Center in Philadelphia.

The shaking (called "intention tremor") was so bad that Unger often had trouble depressing the correct key. The Center staff constructed a special Plexiglas template to fit over the Compaq keyboard. It requires Unger to place her finger through an opening in the template in order to strike a key. She cannot accidentally depress another key at the same time. Another problem Unger had was that she found it impossible to depress two or more keys at the same time using two fingers. Yet, nearly all commands required her to simultaneously depress the CONTROL key and at least one other key. The Center staff installed a "toggle switch" that enables her to depress the CONTROL key first and then other keys separately.

A recent job Unger did for Lehigh Press was to write a program so the company can mail promotional brochures, its annual report, and other materials on a selective basis to specialized audiences.

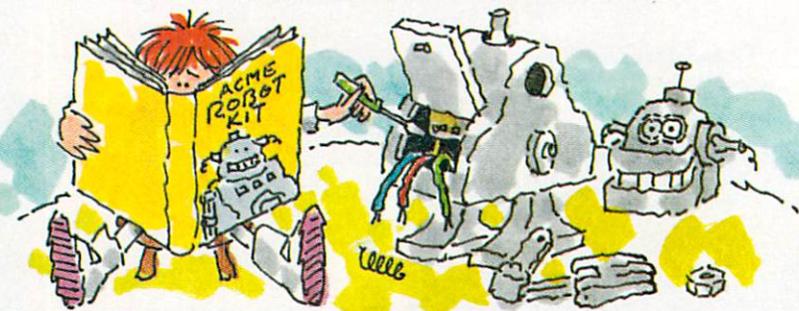
Schuh said his company has more work than it knows how to handle. He talked about Unger perhaps creating a program that would help the company discover whether it was getting the most from its considerable air-travel dollar, for example.

At least for this first year, Unger and others in the new Center project are considered trainees. Lehigh Press contracts its work through the Center, the Center staff assigns the work, and people like Unger transmit the finished program to the Center via modem. After reviewing the program, the Center in turn transmits it by modem to the employer. It is possible that eventually Unger will transmit directly to Lehigh Press or another employer, and ultimately she could be directly employed by the company. According to Connolly, Unger can expect to earn up to \$15,000 a year.

Multiple sclerosis robbed Unger of her identity as an active person who taught children at school and in her home, hiked, ran a summer camp in the mountains, and climbed the face of craggy cliffs. "At first it was hard to realize that I was no longer that person," Unger said. The new identity, of course, includes a handicap that precludes an active life. "But I'm a productive person again," she said, "and I am a person with ideas and the competence to express them."

"It's satisfying to know that someone outside the home still wants me." 

HOW TO MAKE FRIENDS ON OTHER PLANETS



First, go to another planet. (That's easy if you're traveling through space in PLANETFALL, the great science fiction comedy from Infocom's interactive fiction line.)

Next, find a robot nobody's using. Then, to make him start up, type in your command: TURN ON THE MULTIPLE PURPOSE ROBOT. ... You've just made a robot friend who'll follow you anywhere.

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so that whatever you choose to do affects what will happen next. And there'll be plenty happening—it's an adventure filled with everything from dread diseases to mutant monsters, and it can last for

weeks or even months. Get the closest thing on a disk to really going into outer space. Get PLANETFALL*. It's not just a great adventure—it's a great way to make friends!

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GAMES

WHEN THE GOING GETS ROUGH

What to do When You're Stumped

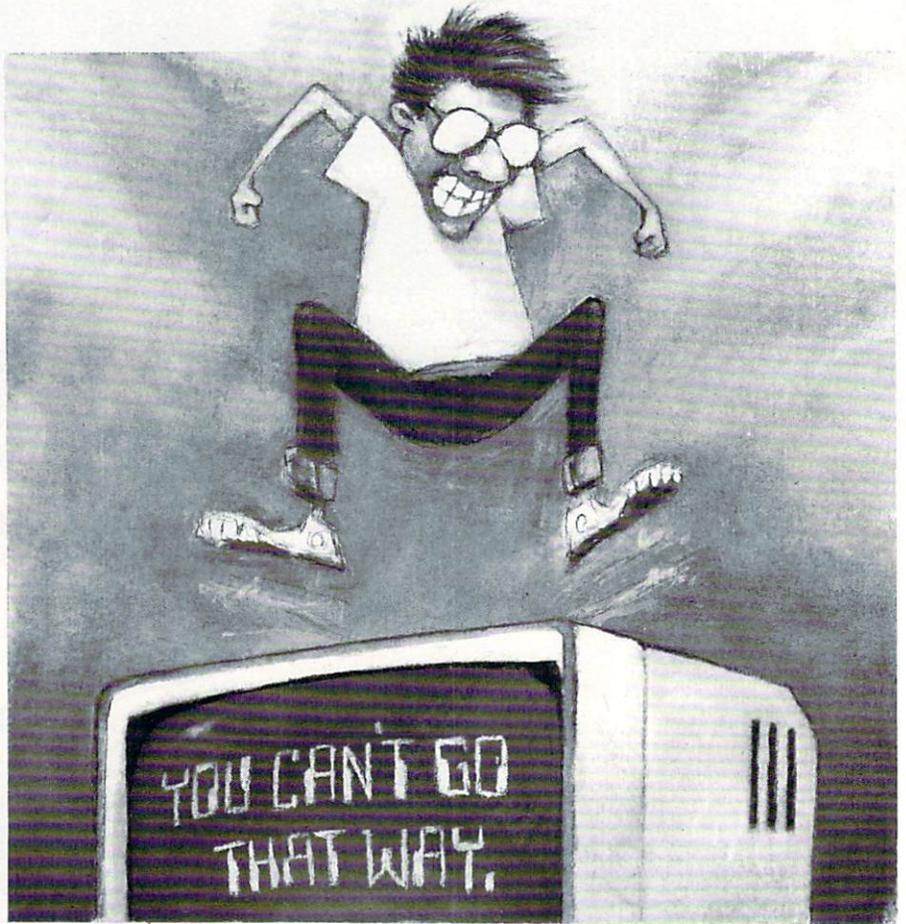
BY JAMES DELSON

How many times have you been playing a text adventure or a text/graphic adventure like the *Wizard and the Princess*, *Escape from Rungistan*, or *Enchanter* and been stumped by a puzzle, riddle, or clue?

Thirty seconds turn into a minute, then a quarter-hour, and even an hour in some cases. There you sit, glued to the TV screen, unable to solve the puzzle of Ulysses' wings or cast the proper spell to open the proper gate. You can't leave, but you can't make progress, either. Frustration sets in and you contemplate whether to kick in the monitor screen or settle for an easier game. Maybe if you come back to the trouble spot later, the answer will hit you.

Chronic player aggravation affects all of us at one point or another. Maybe you've given up on adventures altogether. Perhaps, for just those very reasons, you've decided against purchasing them in the first place.

But fear not. For all of us who've ever cursed the day we booted up the darn games, help is on the way. And there are a number of various paths to take. Different game-mak-



ing companies have taken measures to assure you of getting over the obstacles thrown in your way in their text and text/graphic adventures. No more wasting the entire evening puzzling through one unsolvable problem, or worse, giving up on especially difficult games such as *Blade of Blackpoole* or *Zork II*.

HOW TO SPELL RELIEF

There are two ways to get to the light at the end of the tunnel. One is by communicating with the game-making companies themselves. The other is to use books that have been issued especially for the purpose of revealing certain clues and hints to

help you along your way.

Datamost, maker of such challenges as *Bilestoad* and *Aztec*, puts out a book devoted to blazing trails for frustrated adventurers—*A Shortcut Through Adventureland*. And Infocom, renowned maker of tough all-text adventures like the *Zork* series, *Enchanter*, and *Sorcerer*, actually publishes its own set of pamphlets, *InvisiClues*, that cover the whole range of text adventures.

HOT TIPS OR COLD WATER ON THE FUN?

You may wonder whether such artificial aids can be considered fair game or not. Are hot tips to help you

When the going gets rough, James Delson, Family Computing's game critic, gets going.



You bought a computer to cultivate your kids' minds. Make sure it's bearing fruit, not growing vegetables.

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When it comes to cultivating adventurous young minds, the computer's potential is endless.

Unfortunately, the search for software that makes the most of that potential has been endless, too.

That is, until Spinnaker created the Learning Adventure Series. A unique collection of games that reward curiosity with



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You're in charge of an old-time railroad—and whether it turns into a bonanza or a bust depends on how well you run it. But either way you'll find that working on this railroad is a challenge—and a lot of fun! **Ages 10-Adult.**

hours of adventure and learning. So the time kids spend with our games will help them develop valuable skills. Instead of just tired thumbs.

But what really makes our Learning Adventure games unique—educational value aside—is how much fun they are. Which isn't too surprising when you consider you can do things like bargain with aliens, search a haunted house, or build your own railroad empire.



It's New! ADVENTURE CREATOR.™

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 fact, our games are so much fun, kids will really enjoy developing some very important skills. Deductive reasoning, note taking, and problem solving, for instance.

So, if you're in the market for software that will truly cultivate young minds, pick the Spinnaker Learning Adventure Series.

It's the best way to be sure your search will be fruitful.

Spinnaker Learning Adventure games are available for Apple,® Atari,® IBM® and Commodore 64™ home computers.



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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GAMES

along really just another form of cheating, like giving yourself a free ace in solitaire instead of having to work for it?

I've always believed that, first and foremost, games are meant for fun. Teaching tools, meaningful experiences—they are added benefits. If you've laid out good money for entertainment only to find that the actual playing of a game is more work and headache than you bargained for, by all means, seek help through whatever avenues are available. Reversing the gloom and putting the fun back into it—that's fair play.

Traditionally, game companies have fielded phone calls from stymied gamers. They'll answer written queries without charge as well. Many is the time I and my fellow war and adventure gamers have called or written to Avalon Hill or Strategic Simulations for readings on specific rules. We simply couldn't go on playing without their help. After all, it's really a form of customer service, designed to furnish you with a way out of frustration and loss of interest.

In most cases, you'll find that only occasional hints are sufficient to get you past the roadblocks in any given computer adventure. For this reason, the pamphlets supplied by Infocom (free of charge) are especially good.

Each comes with pages that look blank, except for boxes outlined in black below section headings and specific questions. When you feel too stumped to go on, look up the section you are trapped in, then take the felt tip marker which is included in each hint book package. Using the marker like a high-lighting pen, run the tip over the appropriate "blank" line. The answer, or part of it (this is a hint book, after all) will appear. Use the portion of the answer supplied to solve the puzzle if you can. Otherwise, go on to the next hint, or the one after it, to resolve your problem.

As the clue books' introductions state, the hints supplied range from a "gentle nudge" to a "full answer." The idea behind them is to enhance the fun. "The essence of all [Infocom games] is solving problems. The purpose of *InvisiClues* hint booklets is to maximize your enjoyment of the game by giving only those hints that you need to continue playing and complete the game."

Infocom's latest offering, *Sea Stalker*, for junior-level adventurers, even comes with its own set of clues.

SHORTCUT AROUND THE HEADACHE

Infocom's booklets are available, free, from the company. Write or call for the ones you need.

A *Shortcut Through Adventureland* can be found at book and computer stores. It's fairly expensive (\$9.95), perhaps too expensive if you only need help on one game. But if you're serious about your text/graphic games, it's practically a necessity. Besides, after five or six phone calls to Boston or Mountain View, California, the book will seem cheap in comparison. And it covers some games that require a lot of help.

Take *Wizard and the Princess*, by Sierra On-Line. When you first begin the game, you're going to venture

into the desert outside of a town. A number of people I know never got farther than the desert because they were so frustrated at being continuously lost, killed, or unable to move on, that they simply lost interest. But by using the hints provided in *Shortcut*, this and most other problems can be resolved and players can quest onward.

Other games covered in *A Shortcut Through Adventureland* include: *Death in the Caribbean* (Micro Fun); *Transylvania* (Penguin); *Mission Asteroid*, *Mystery House*, *Cranston Manor*, *Ulysses and the Golden Fleece*, *Time Zone*, and *The Dark Crystal* (all Sierra On-Line); *Blade of Blackpoole* and *Escape from Rungistan* (Sirius); *Sherwood Forest* (Softoon); and *The Mask of the Sun and Serpent's Star* (Ultra-soft). It's a shame they couldn't include such greats as *Gruds in Space*, *Kabul Spy*, and *Critical Mass* (all Sirius).

If you're neither an Infocom player nor the owner of one of the games included in *Shortcut*, there are other options to turn to. Try calling the game company. Many have a "hot line" for this purpose. Some software houses have toll-free numbers to call. If calling doesn't work and you can stand the wait, write to them and request hints.

WHAT FRIENDS ARE FOR

Of course, if you haven't already tried them, ask friends and acquaintances who may have played the offending game in question. Users' groups and computer networks are also good territory for important tip-offs. CompuServe, a popular computer network, even has a special interest group called GameSIG which contains an archive with hints to several of the more popular games around. You can also leave your questions on the group's "bulletin board." They may be answered by other interested, more experienced gamers. On a number of occasions I have made late-night calls to friends of friends, which have led to new friendships with distant gamers glad to serve as Yodas-in-residence and answer my pleas.

As computer gaming increases in popularity, there are bound to be a number of additional hint books of this sort on the market. I'll keep you up to date on what's out there, and if you happen to hear of anything that might be of help to your fellow readers, drop me a note. ☐

STEPS TO GETTING UNSTUMPED

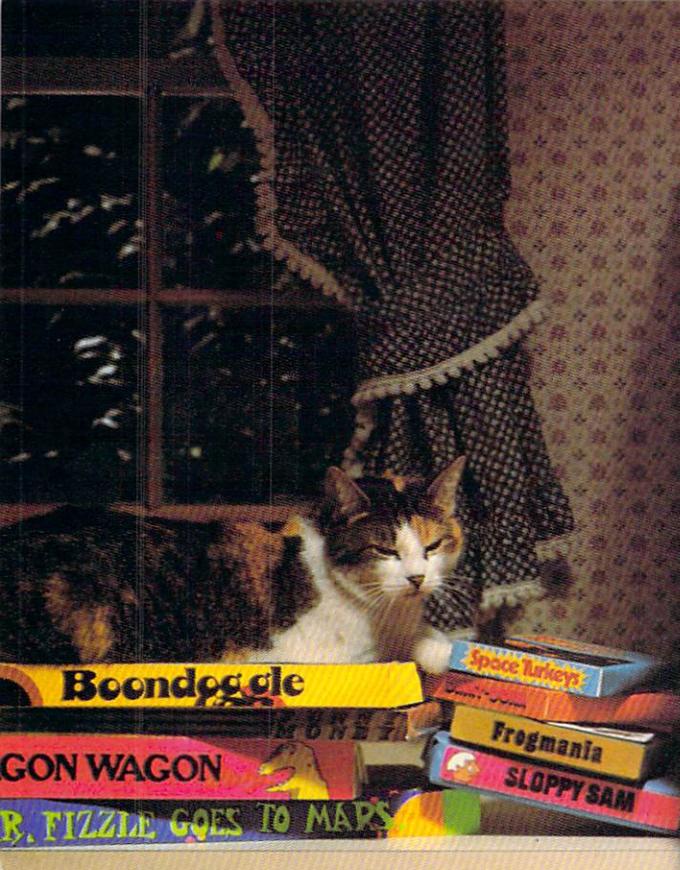
1. Check the documentation first. Helping hints are frequently embedded in the material that comes with the games.
2. Retrace your steps through the game. If you've made a map this shouldn't be too much trouble. Maybe you'll come across some tool or object useful to the puzzle at hand.
3. Refer to the *InvisiClues* pamphlets, or *A Shortcut Through Adventureland*, if your game happens to be covered there.
4. Take your questions to friends or friends of friends. Locate a users' group, or leave messages with GameSIG, a part of CompuServe, the computer network.
5. Call or write the company that manufactures the game.
6. Most of all, be patient, persevering, and have fun!

WHERE TO GO FOR TIPS

Datamost, Inc. publishes *A Shortcut to Adventureland*; \$9.95 (soft-cover); 2660 Nordhoff Place, Chatsworth, CA 91311; (818) 709-1202.

GameSIG (Games Special Interest Group) on CompuServe. Simply type GO GSA when you're asked to indicate what service you'd like to use.

Infocom issues *InvisiClues* pamphlets free of charge for all their text adventures: 55 Wheeler St., Cambridge, MA 02138; (617) 492-1031.



JOT-A-NOTE

Hey Everybody-
How about
a game of
Boondoggle
tonight? -
MOM

SURE,
JUST WAKE
ME UP WHEN
IT'S MY TURN.
-DAD

DEBBY
Not that game!
I always lose
anyway -
Debby

Sorry Mommy -
Captain
Whoogee
on T.V tonight -
Jenny

ARE YOU
NUTS?
FORGET IT!
TOM

OK. You Clowns -
Anybody got a
better idea? -
Mom

If getting the whole family together is a real challenge, maybe you need games that really challenge the whole family.

Introducing a new generation of computer games. Family Learning Games from Spinnaker.

Ever notice how a little fun with the family can be a little hard to arrange? Well, now there's a solution - Spinnaker's Family Learning Games. A whole family of great games that make getting the family together seem like child's play. And make "family fun" really seem like fun again. What's more, they'll even help your kids develop some very important skills.

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quite a bit more than they'd learn from a typical board game (if you could even get them to play a typical board game). So next time you want to get everybody together, don't get discouraged - get Spinnaker's Family Learning Games. You'll find the biggest challenge in family fun won't be on the refrigerator. It'll be on the computer.

Spinnaker games are available for ColecoVision® and for Coleco Adam,™ Commodore 64™ and Atari® home computers.



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Where do monsters lurk? And which islands have treasures to behold? Heed the oracle's words, for only his clues can lead you to riches and a safe return. **Ages 8 - Adult.**



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Design a challenging adventure game that everyone can play - or let the computer design one for you. It's exciting, creative - and utterly addictive!
Ages 12 - Adult.



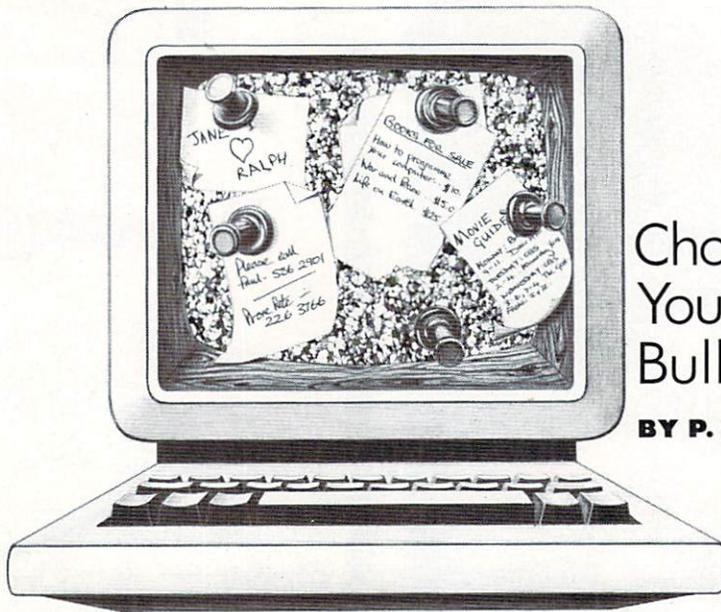
UP FOR GRABS.™
It's a wildly exciting crossword game where everyone has to think fast. More words will help you win - but don't get caught with leftover letters!
Ages 8 - Adult.



We make learning fun.™

Cartridges for: ColecoVision, Coleco Adam, Atari and Commodore 64.

TELECOMPUTING



Choosing Your First Bulletin Board

BY P. GREGORY SPRINGER

This is the first installment of a monthly column on telecomputing.

What do computers have to do with bulletin boards?

The new computerized bulletin boards bear little resemblance to the old cork ones, where dishwashing duty was assigned and messages posted. Today's computerized bulletin boards work with electronic pulses and sound, and—via your telephone—they can be read on your computer screen in your home.

A BBS (the most common abbreviation for a computer Bulletin Board System) is a computer program that almost always runs on a microcomputer and functions as a central information station. The BBS computer is connected to a regular telephone line through a device known as a modem (short for MOdulator-DEModulator, a device that translates computer language into tones that can be transmitted by telephone company equipment). The person responsible for operating a BBS from a home or office computer is known as a systems operator, or sysop. It's pronounced as though the word were divided up from its roots, "sis" from systems and "op" from operator: "sis-op."

You can use a BBS to obtain free

P. GREGORY SPRINGER, a freelance writer from Urbana, Illinois, is the author of a computer handbook for college students called *Electronic Notebook* (Lithium Press). He wrote "Typesetting by Modem," which appeared in the February issue.

programs, to leave and read messages, to play games, to order products (books, for example, by calling via modem: PMS [People's Message System], McGraw-Hill, New York, New York; [212] 512-2488), to gather information (movie reviews, by calling Dickenson's Movie Guide, Mission, Kansas, [913] 432-5544), and even to find romance (otherwise known as "matchmaker BBSs"). A good BBS can function as a town meeting, message board, library, and entertainment center rolled into one.

Ward Christensen and Randy Suess, two members of a computer club named Chicago Area Computer Hobbyists Exchange (CACHE), started the first bulletin board in Chicago in 1978. Their board, called CBBS #1 (Computer Bulletin Board System), is still in operation today. (It can be reached via modem at [312] 545-8086.) Soon, another board was started and the ball was rolling. According to Ric Manning, editor of *Plumb* newsletter (see "Suggested Reading") there are currently at least 1,500 BBSs in operation in the United States, although the number fluctuates every month.

THE MAIN ATTRACTION

As BBSs flourished, people began to find new ways of using them. Probably the most enticing use nowadays is the ability to obtain free programs transmitted directly to your computer over the phone lines. Public-domain games, word processors, spreadsheets, data bases, utili-

ties, and communications software are just a few of the types of programs available. Some of this software rivals programs you can buy in stores. Some of it is incomprehensible because of insufficient documentation. And some of it simply doesn't work.

Any computer can be used to call a bulletin board, regardless of what kind of computer is used to operate the board. All you need is a modem (\$70-\$500), a telephone, and communications software (often sold with the modem). (For more detailed information on how to get started, see "A Guide to Telecomputing" in the March FAMILY COMPUTING.) However, if you are looking for programs configured expressly for your computer brand, it may be best to find a board that operates on the same computer as yours.

WHERE TO LOOK

How do you go about finding a bulletin board? Your best bet is to inquire at a local computer users' group. You may discover that the users' group itself operates a board or that one of its members is a sysop. Old-fashioned cork bulletin boards and salespeople at computer stores are other possible sources of information (provided the free software on a BBS doesn't compete with programs for sale in the store). Computer newsletters, magazines, and books are other excellent sources of both new, untried boards and older, more established ones (although many of their listings may be outdated).



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TELECOMPUTING

Fortunately, BBSs are usually more cooperative than competitive. Many will gladly provide information about what other boards offer and how to contact them. (A good one to start with is the People's Message System, Santee, California; [619] 561-7277, which provides an extensive listing of BBSs around the country.)

When trying out your first BBS, it's best to start with one close to home, simply because the initial period of trial and error will be reflected in your phone bill at the end of the month. Bulletin boards operate over phone lines and calling one costs the same as a normal telephone call (although a few boards charge an additional membership fee, or charge you for time on-line).

If you can't find a board in your area, use the same precautions as you would in making a long-distance telephone call. If you're dialing a board that operates 24 hours a day, call during the late evening or on weekends, when phone rates are lowest. (However, you may discover that you're not the only person using this money-saving tip and may encounter many frustrating busy signals. Remember that BBSs usually operate from one individual's computer, and almost all are connected to a single telephone line, which limits them to receiving one call at a time.)

SOME HANDY TIPS

When you're ready to dial your first BBS keep in mind the following steps:

1. Make sure that your phone is connected to your modem and your modem to your computer, that everything is turned on and set correctly, and that your communications software is all ready to go.

2. Dial the number of the BBS you've selected (using either your telephone dial or your computer keyboard, depending on the type of terminal software and modem you have).

After one or two rings, you should hear a continuous, high-pitched tone. Get used to this. That is the sound of telecomputing and means that a modem has answered the phone.

3. If you've dialed with your keyboard, go to step 4. If you've used your telephone dial, do one of two things, again depending on the type of modem you have: A) Flip the switch on your modem to either

"data" or "terminal" and then hang up the phone; or B) unplug the cord from the back of your telephone and plug it into your modem.

4. Your computer should now be connected to the other computer

SUGGESTED READING

BOOKS

The Computer Phone Book

By Mike Crane
Plume Books; New York, NY;
(212) 697-8000
\$9.95, paperback.
Listings of some 400 on-line systems, with hours, fees, and general descriptions, as well as other useful information.

OMNI Online Database Directory

By Mike Edelhart and Owen Davies
MacMillan; New York, NY;
(212) 702-2000
\$19.18, hardcover.
Descriptions of more than 1,000 data bases, with information including telephone numbers and addresses.

NEWSLETTERS

Computer Shopper

Stan Veit, editor
P.O. Box F
Titusville, FL 32781;
(305) 269-3211
\$15 per year (12 issues).
Includes machine-specific articles, listings of users' groups and bulletin boards across the country, and classified advertisements.

On Line Computer Telephone Directory

Jim Cambron, publisher
P.O. Box 10005
Kansas City, MO 64111;
(913) 383-2229
\$9.95 per year; \$15.95 for 2 years.
A directory of new bulletin boards, with news of interest to bulletin-board users.

Plumb

Ric Manning, editor
P.O. Box 300
Harrods Creek, KY 40027;
(502) 228-3820
\$26.50 per year (8 issues).
With the stated purpose of "probing the world of personal telecommunications," the newsletter prints relevant news including new bulletin boards and listings for telecommunications software.

(sometimes the word "connect" will appear on your screen). It's up to you to initiate the conversation either by holding down your CONTROL key and pressing the "C" key, or by pressing your RETURN, ENTER, or BREAK key. (Sometimes you may have to press the RETURN or ENTER key twice.)

5. A message should now appear welcoming you to the BBS. You may then be asked to type in your name or a password for future use.

6. You are now free to roam around and see what the board has to offer. Most BBSs have a "menu" of options to choose from. To utilize these options, you will probably need to know some commands. These vary from board to board and will be listed when you first log on. Here are some of the more common ones you might encounter:

S (Scan messages); R (Retrieve or Read messages); E or L (Enter or leave messages); O (Other BBS numbers); and Q, B, or G (Quit, Bye, or Goodbye). Perhaps the most valuable command for the newcomer to know is H or ? for "Help!"

7. If all else fails, read your modem and communications software manuals.

A MIXED BAG

Enter the letter of the function you wish to use and press the ENTER or RETURN key. As you scout around within the limits of the board commands, you may discover that some boards are a waste of your time and money. When you find a worthwhile board that you intend to call regularly, save its menu information on disk, or jot it down on paper for future reference. That way you won't have to waste time (and money) relearning the commands each time you log on.

What a BBS is worth to you in terms of cost, time, and value will depend on your interest in exchanging information with other computer users. Apart from being fun, a computer bulletin board adds a human element to the hardware and software processes of your computer. The thoughts of individuals across the country can be summoned to appear on your screen. Day-to-day communications come to you from the real world outside, rather than only from predefined software routines. Watch as a whole new world opens up—right in your own living room. ☐



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Poster, Secret Filer and Double Feature Mystery/Adventure designed and developed by Information Technology Design Associates. Turtle Tracks designed and developed by Thomas R. Smith. Square Pairs designed and developed by Glenn M. Kleiman, Teaching Tools: Software, Inc.

COMPUTING CLINIC

APPLE AND COMMODORE INCOMPATIBILITY/ADAM'S BASIC/ROM AND RAM/A COMPUTER FOR EUROPE

BY JEFF BAIRSTOW

I recently took a programming class where I used an Apple IIe and stored my programs on disks. I have since purchased a Commodore 64 and was informed by the salesperson that my Apple IIe programs could be "read" by the Commodore 64 and would even run with a few simple changes. This does not work. Why?

RICHARD MARCIANI
Las Vegas, Nevada

Unfortunately, disks are not at all like phonograph records. A disk used to store data or programs from one computer will generally not run on another manufacturer's machine (except for those computers specifically designed to be compatible with, say, the IBM PC). Because the method of storing data and programs differs from computer to computer, Apple IIe disks cannot be read by a Commodore 64. Even if the Commodore 64 could read an Apple disk, it's unlikely that programs written in BASIC for the Apple would run on the Commodore without some modifications. If the programs use graphics, for example, the modifications might be quite extensive. I'm afraid the only suggestion I can make is that you retype your programs on the Commodore and try to run them.

The programs will almost certainly produce error messages that should help you in modifying them for the Commodore. I would recommend you have the BASIC manuals for both computers handy when you're debugging the programs.

Why, when I switch off my computer, do I lose the program in memory, but not the built-in BASIC?

PHILIP PALMER
Bangor, Pennsylvania

A computer usually contains two types of memory: random access memory (RAM) and read only memory (ROM). RAM is like a scratch pad, in that your programs and data can be stored in the memory, and you can alter or erase them any time you wish. ROM is more like a typeset

book, in that its programs have been recorded permanently by the manufacturer and cannot be erased by you.

In most personal computers, an operating system and a BASIC interpreter are stored permanently in the ROM. When the computer is switched on, the operating system "takes charge" and allows you to type in BASIC commands or statements. These are stored in RAM and stay there until the user erases them or the computer is switched off.

The RAM can store information only as long as power is applied to its electronic circuits. When the power is switched off, all the memory circuits switch off, so the memory appears "empty" the next time the computer is switched on. That's why user programs are "erased" when the computer is switched off.

Exceptions to this are the "lap" portable computers, such as Radio Shack's TRS-80 Model 100. These computers (using a different technology) have a RAM that is maintained by a small internal battery so programs can be stored in RAM for several weeks.

I understand that the Coleco ADAM SmartBASIC is source-code compatible with Applesoft BASIC. I know that not all Apple programs will work on the ADAM. Can you tell me the differences between the two BASICs?

JAMES POULIN
Rockledge, Florida

If you type an Apple program into your ADAM, you should not receive any syntax error messages because both BASICs use the same "reserved" words. However, the Apple program may not run correctly on the ADAM because the hardware is designed differently.

The Apple text screen is usually 40 characters wide, whereas in BASIC the ADAM screen is only 31 characters across. However, you can usually adjust any PRINT and TAB statements to make sure that you do not run off the screen on the right-hand side. You may also have to adjust any PLOT and HLOT statements to

avoid error messages.

Another source of trouble will be statements using POKES, PEEKS, or CALLS. These are frequently accesses to ROM or RAM routines and will be different for the two machines. The simplest thing to do is to avoid programs using these statements, unless you are an expert program translator and have a good understanding of machine language.

You may encounter other minor differences between the two computers as you program. That's because ADAM has a different microprocessor than Apple (Z-80 instead of 6502); ADAM's BASIC interpreter was written from scratch. While it is very similar to Apple's interpreter, it is not identical.

I plan to be in Europe writing for six months. Is there a personal computer that is adaptable to European current? Ideally, I'd like to get an IBM PC either here or there and use it with a monitor overseas.

MARIJANE OSBORN
Davis, California

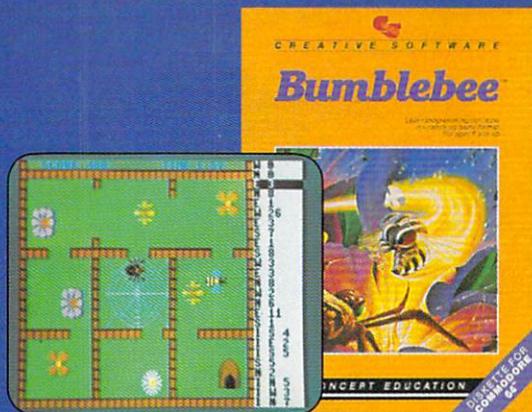
The IBM Portable PC would seem to fit the bill for you. This unit has a built-in monitor (amber screen) that is well suited to word processing. The Portable PC has a power supply that can be switched to U.S. or European voltage standards. Buy the computer here and check it out thoroughly before you leave.

When you travel with your portable, take your sales invoice and warranty card with you in case you need service overseas. Customs officials may ask to see those documents, too. Bear in mind that the IBM Portable PC weighs 30 pounds and will not fit under most aircraft seats. However, it should fit in one of the overhead compartments of a wide-body plane. I would not recommend checking a computer as baggage. ☐

JEFFREY BAIRSTOW, a technical journalist who lives in West Redding, Connecticut, was a founder and managing editor of Computer Decisions magazine. He has also taught math and computer science in England. His family, including two preschoolers, uses a variety of computers.

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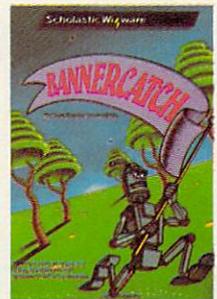
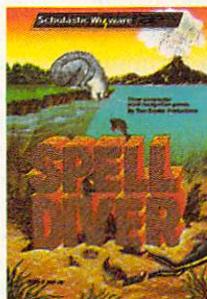
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Bridging the Gender Gap

MANY GIRLS APPROACH THE COMPUTER WITH RELUCTANCE. BUT BOYS AND GIRLS SHOW EQUAL APTITUDE ON COMPUTERS WHEN GIVEN EQUAL OPPORTUNITY. HERE'S HOW TO MAKE SURE YOUR DAUGHTER GETS HER FAIR CHANCE.

BY CHARLOTTE BEYERS



Open any teenage girl's school locker and you'll almost certainly find photographs of some of her heroes. That could mean Michael Jackson, Rick Springfield, Boy George, or Pat Benatar. It could be an Olympic athlete, or whoever was featured on the latest cover of *Seventeen* magazine.

Fourteen-year-old Cynthia Elias of Palo Alto, California, could no doubt name a whole list of favorite personalities. Yet, none of them adorns the inside of her locker. Last year, she had two pictures taped up: one of a Hewlett-Packard computer and another featuring a pair of disk drives.

"I get teased a lot because I have these photos in my locker," she said. "They call me a computer freak. I don't mind; I just ignore it."

Cynthia loves computers. When she has time, she invents games for the IBM PC she uses at school. "I have a slot-machine program. I made it so you can get three make-believe coins if you win." Now Cynthia has a new game in mind. "I am working on a program like *Space Invaders*. Creatures roam through space and you have to shoot the invader before it reaches earth," she explains.

As she enters ninth grade, Cynthia's proficiency with the computer includes knowledge of *Multiplan*, a spreadsheet program used at the computer center at the Jordan Middle School in Palo Alto. Now Cynthia is teaching herself assembly language. She has already studied BASIC, Logo, and PILOT.

Cynthia says she wants to be a computer programmer. Her father, an electrical engineer for Hewlett-Packard, is delighted. "Cynthia took to the computer like a fish to water. Whenever I bring mine home from the office, I can't keep her away." Soon Cynthia will have a computer at home. "I am so excited. I already have three grownups who want me to teach them how to use it," she says.

Learning about computers has increased Cynthia's self-confidence. "Knowing about

computers has helped me advance a lot in my math classes," she says, citing one example. She's grateful for her father's encouragement and wishes other parents would urge their daughters to learn about computers.

Unfortunately, Cynthia Elias is the exception, rather than the rule. In most cases, if girls just want to have fun, it's not with computers. The sad facts are that while ability is not in question, the gender gap is widening.

- First the good news. There is little difference in achievement between boys and girls who'd taken a required computer course, according to a survey of teenagers by a researcher at the Educational Testing Service of Princeton, New Jersey. The bad news: The study also uncovered a major gulf between the sexes when teens were asked how much they liked the computer and how often they used it. Describing their use of a school's computer center, a mere 7 percent of the girls surveyed said they went to the center outside of class time, compared to almost 40 percent of the boys who did.

- Boys outnumber girls nearly two to one in programming classes, according to a 1982 nationwide testing of 17-year-olds by the University of Minnesota.

- Who is to blame? To a large degree it's parents. According to a University of California study, 25 percent more boys than girls are coming home to a computer. Two Stanford University professors also have found that adults are reluctant to purchase computers for their daughters.

- The Stanford researchers learned that three times as many boys as girls attend computer camp. And, the more expensive the computers used at the camp, the greater likelihood that an even larger percentage of boys were enrolled.

- The gap grows wider after girls leave high school and become college women. In MIT's graduate computer-science department, the ratio of men to women is 7 to 1. At the University

CHARLOTTE BEYERS lives in Palo Alto, California, and writes frequently about education.



of California at Berkeley, less than a quarter of the computer-science majors are women.

WHAT'S A PARENT TO DO?

As computers become more and more common in the job market, many people predict that young women who shun computers will shut themselves out of a wide range of careers. "If girls go through school believing they can't cope with this kind of technology, they will lose out on all sorts of opportunities," says Ronald Anderson, a social scientist at the University of Minnesota.

Like other male-dominated endeavors, whether in grade school, graduate school, or on the job, women suffer from a lack of experience, not a lack of talent. "There is no evidence that girls have any less ability," says Irene Miura, one of the Stanford researchers. "The problem may be that they lack confidence or interest. Or that their parents do not provide the same encouragement they do for boys."

The challenge to gain equality is here. The arena for change is in your living room, your children's classrooms, or anywhere computers are to be found. What follows is a six-step guide for parents who are willing to help meet that challenge and make sure that the computer revolution is shared by all.

1. BE A ROLE MODEL

Mothers who shy away from the keyboard are setting a poor example for their daughters. If young women are to keep pace with their brothers and boyfriends, mothers must enter the computer age—and then their daughters will follow eagerly.

Like other household decisions, computer buying should be a family activity. If you get overwhelmed when you visit a computer store, take comfort in the fact that every experienced

computer user felt this way when first setting eyes on a disk drive. The first step towards shrinking the gender gap is having the confidence to admit that like the video arcade, computer stores are a foreign world, a place usually filled with men—men who may be speaking in strange tongues that are difficult to understand. And once you acknowledge that, you must march through the door anyway.

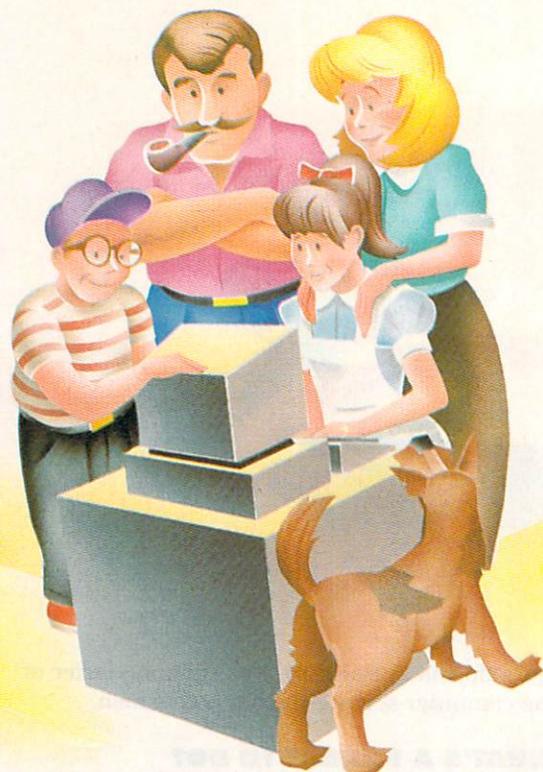
If knowledge holds you back, then an array of commonsense questions should be your guide. Let those in the know teach you what it's all about. Don't allow a lack of know-how to keep you and your daughter further in the dark. Even if you don't understand everything the computer salesperson says, you can show your daughter that it's perfectly OK to ask "dumb" questions. You can show your daughter that an interest in this subject is acceptable and appropriate.

"If [a woman] will admit that she doesn't know anything about computers, and will risk taking a course, she can go a long way toward encouraging her daughter," says Dr. Elizabeth Stage, a researcher for the EQUALS program at the University of California. EQUALS tries to alert teachers to the importance of encouraging their female students in technical subjects and works with parents to spur their daughters' interest in math-based fields.

One of the best-known examples of a successful role model is Leslie Grimm, a computer programmer for The Learning Company, which manufactures educational software. Her 13-year-old daughter, Cori, is now a consultant for the firm and as a mother-daughter team they have designed six games together, including the well-known *Bumble's Plot*. "We try to create friendly creatures who live in their own worlds," says Grimm. "Children identify with them and want to play with them." Cori, who uses the computer to design characters for the games, thinks that less violent programs with good pictures would attract more girls.

LEARNING ABOUT COMPUTERS HAS INCREASED HER SELF-CONFIDENCE.

ILLUSTRATIONS BY
RICHARD TIMPERIO



2. BUY THE RIGHT SOFTWARE

Children who enjoy doing things on a computer will want to turn it on. One of the most important steps is to take the time to discover what kinds of software your children enjoy. Is your daughter a sports enthusiast? Take a look at some of the exciting baseball-simulation or exercise programs on the market. Does she like to write poetry? Invest in a word-processing program. Is she a mystery fan? There are dozens of intriguing adventure games available. In the accompanying article, "Software for Girls: More Than Sugar and Spice," one mother describes the kinds of software that appeal to her daughters and their friends.

3. START THEM EARLY

Researchers say that sex-typing of school courses can begin as early as second grade. That means the odds are that your daughter will be steered away from math, science, and computer classes. And girls who ignore computer-science classes in grade school and high school often regret that lack of study when they reach the college level and want to consider pursuing a computer-related field.

Stage studied a group of boys and girls in the 4th through 12th grades. She asked them how they imagined they would use a computer when they reached the age of 30. The responses indicated just how much of an effect early socialization can have. More of the girls than boys surveyed believed they would use the computer for housework, while more boys than girls said they'd use the computer for financing, data processing, and playing games.

How can parents battle these preconceived notions? Start your daughter on the computer at a young age, is the experts' advice.

Pat Dickson, a professor of family studies at the University of Wisconsin who does research at a laboratory preschool, says that sex differences between toddlers are virtually nil. Why? "The use is tied to the software, not the interest in the computer *per se*," he says. "Much of the software for older children has them blasting asteroids out of the sky. Older girls report that this is 'boring.' But at the preschool level that type of software isn't as common, so there isn't a division along sexual lines. Where teachers or parents provide good software and a supportive environment, girls are just as interested as boys are."

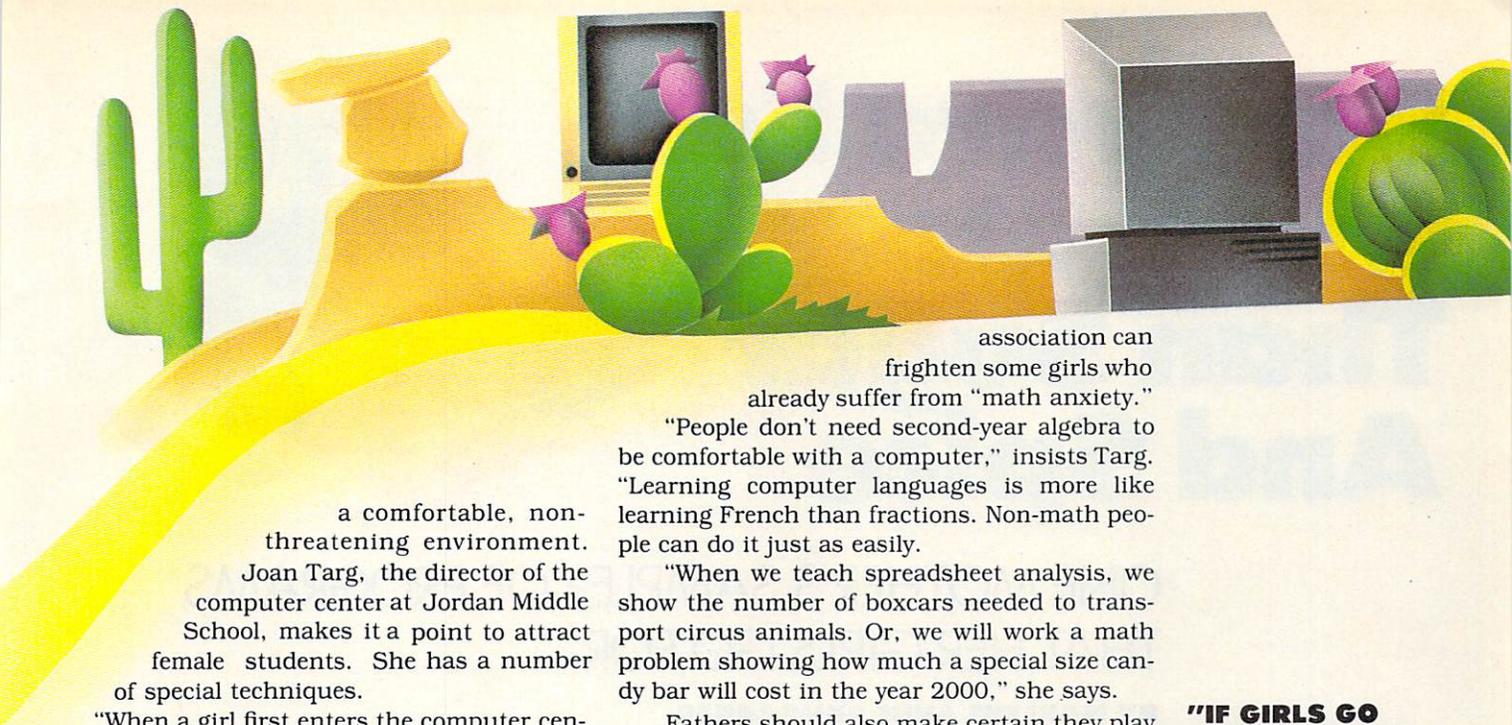
What Dickson and other researchers are pointing out is that early exposure to the computer gives a girl an opportunity to see the machine as a natural part of her environment. That gives her the freedom to pick and choose her fields of study so that signing up for a computer-science class becomes as natural as ordering lunch in the school cafeteria.

Not every child should be pushed toward the keyboard. Interest must develop naturally. In your eagerness to encourage your daughter, don't force her to use the computer. Give her the time to develop an interest on her own, with your continuing support and inspiration. The goal here is to present your daughter with the opportunity, not to put on the pressure. Some girls, like some boys, just aren't interested in computing. It's essential that parents let their children know that's OK, too.

4. AN ENCOURAGING ENVIRONMENT

A young woman who is just beginning to learn about computers needs to settle into

**"IF GIRLS WERE
ENCOURAGED TO
STUDY
COMPUTERS,
THEY WOULD DO
SO."**



a comfortable, non-threatening environment.

Joan Targ, the director of the computer center at Jordan Middle School, makes it a point to attract female students. She has a number of special techniques.

"When a girl first enters the computer center, she is encouraged to work with another girl who can serve as a mentor and who is a leader," says Targ. She encourages her students to teach each other. "Our girls find it natural to learn from other girls," she says, explaining that she has girls work in small groups where they can talk to each other. "Girls like to work with others of their own sex because boys tend to take things over."

If your daughter complains of being crowded out of her school computer class or after-school computer club, then you must search for alternative ways to give her access to a computer, in addition to lobbying at school to insure she gets equal time. If you can afford to buy a computer for your home, do so, since that will almost certainly provide your daughter with a comfortable and familiar place to experiment and develop her computer skills. Check to see if your local library offers computer instruction, or encourage your daughter to pursue the Girl Scout badge in computing. Talk to other parents in the neighborhood and see if it's feasible to organize your own local computer class, or set up special Saturday "girls-only" classes. Help your daughter raise a little extra money during the school year and save towards a trip to computer camp.

5. THE HOME-SCHOOL CONNECTION

Even if your family is providing a supportive environment for your daughter's computer education, the atmosphere at her school may not be as encouraging. Get involved with what your children are learning at school, join your parent-teacher organization, and make sure the right attitudes are being passed along by teachers and administrators. Are they providing appropriate role models for your daughters? Are they encouraging the female students as much as the male?

Since computer classes are often taught by the school's math or science teacher, that

association can frighten some girls who already suffer from "math anxiety."

"People don't need second-year algebra to be comfortable with a computer," insists Targ. "Learning computer languages is more like learning French than fractions. Non-math people can do it just as easily.

"When we teach spreadsheet analysis, we show the number of boxcars needed to transport circus animals. Or, we will work a math problem showing how much a special size candy bar will cost in the year 2000," she says.

Fathers should also make certain they play a role in encouraging their daughters to explore this field. "When kids choose their courses, the girls don't receive the same push from their fathers to study science and math," notes Palo Alto High School Principal James Shroyer. "If girls were encouraged to study computers, they would do so—just as they have learned to play soccer, formerly a male domain."

6. BATTLE THE MYTHS

In the popular movie *WarGames*, the teenage girl sits by as her male costar works himself into a troublesome adventure at the computer terminal. That's not an unusual picture. By now, any observer has noticed that computer magazines often feature men on the cover, that advertisements fail to include girls as often as boys when presenting a picture of computer users, and that software packages are rarely designed with a female audience in mind. That's because many people have come to believe in some common myths about girls and computers: That girls are not suited to abstract thinking and don't have the skill in higher mathematics that using a computer requires; and that since girls are generally not mechanically inclined, they will show less interest in these machines and less of an ability to manipulate them.

Not one of these myths is true. And more of us are becoming aware of that as imagemakers realize the problems of inequity in this field and the need to present a positive picture to that overlooked half of the population that needs extra encouragement. An ever-increasing number of young women are signing up for computer classes, majoring in computer-related fields, and entering previously male-dominated careers. The barriers to computer use can be hurdled. Parents who show a sensitivity to the problem and an interest in solving it will make the difference. 

"IF GIRLS GO THROUGH SCHOOL BELIEVING THEY CAN'T COPE WITH THIS KIND OF TECHNOLOGY, THEY WILL LOSE OUT ON ALL SORTS OF OPPORTUNITIES."

Software For Girls: More Than Sugar And Spice



ONE MOTHER'S SAMPLER OF PROGRAMS THAT HER GIRLS GO FOR

BY MARLENE ANNE BUMGARNER

Trying to get time on our family's computer can be quite a project. Eleven-year-old Dona's likely to be writing a letter or term paper. Her younger sister, Jamie (4), might be painting a picture in brilliant colors. And John (9), unless he's at soccer practice, can usually be found, joystick in hand, glued to an arcade game. We've talked about printing out a schedule for keyboard time. But no one's been able to get to the computer to work it out!

Like most parents, I've had my share of worries about how the kids were taking to the computer. My only concern with John was whether or not he'd ever let go of that darned joystick. But the girls were a different story. I'd read about how girls would be left behind in our increasingly computer-oriented society unless they became "computer-literate" at a young age. Seeing the enjoyment John was getting out of the new machine made me concerned that my daughters would be left out of the fun.

A lot of factors were involved in making sure that all my kids, daughters especially, were comfortable with the computer. The accompanying article, "Bridging the Gender Gap," touches on many of them. Watching our daughters and their friends at home, I know how important the software selection process is to making sure they get off on the right foot and stay on it—at ease with the computer and aware of its full potential.

A TOUGH PROCESS MADE TOUGHER

Selecting the right kinds of programs for your kids is hard enough as it is. Picking software that will appeal to your daughters and

make their early experiences with the computer as positive and enjoyable as possible is an even greater challenge.

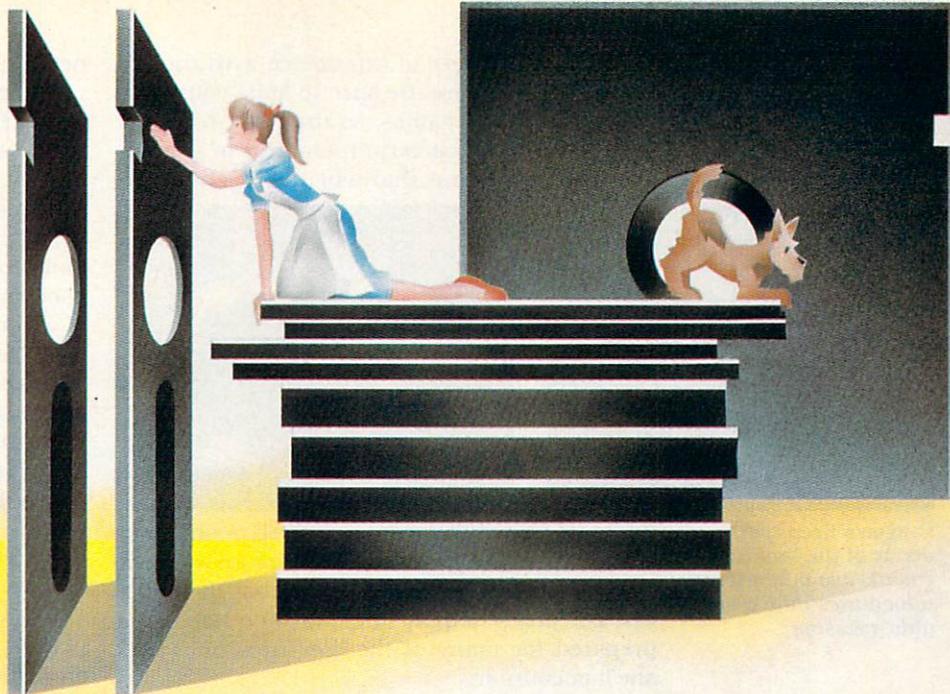
As a parent and teacher, I've observed that boys and girls often react differently to what's available and what's given to them. John is a confirmed gamer. *Frogger*, *Pac-Man*, *Crisis Mountain*, *Cannonball Blitz*—his list of favorites reads like an arcade-parlor lineup.

But Dona's and Jamie's tastes are different. Dona will pop in the *Choplifter* cartridge only occasionally (and usually when John's not around to nag and intimidate her). Keeping in mind that no two girls (and their preferences) are exactly alike, just as no two boys are alike, I can make a few generalizations about selecting software for girls.

First of all, remember that in order for software to go over well with your children, it should correspond to their individual tastes. This is true of boys as well as girls. But it may be especially significant when it comes to making sure your daughter is comfortable with a computer, since the odds are more likely that she's not. The arcade game and all its macho trappings, such as difficult time limits and boys looking on competitively, may not hook your daughter. But a personal filing system, in which she can store information about her favorite rock stars, just might. Or perhaps a painting program that lets her create colorful designs on screen. Or a music-making package that turns the computer into an instrument.

I've noticed that many girls take to programs that have some value beyond pure entertainment. Time limits placed on their achieve-

MARLENE ANNE BUMGARNER teaches kindergarten and college-level child-development courses. The sponsor of her school's computer club and leader of computer literacy workshops for kids in her community, she lives with her husband and three children in Morgan Hill, California.



ment of gaming goals turn them off. And they are simply not interested in the object of accumulating as many points as possible.

What Dona and her friends want are programs that have a tangible goal. Adventure games, for instance, in which you must map your way through a computerized fantasyland in search of treasure; puzzle-solving, word, and building games; music-making packages; even serious business programs such as electronic filing systems—this is the stuff my girls' software library is made of.

Perhaps a tour of our library will give you a better idea of how to proceed with buying software for your daughter. The following roster is by no means a complete list of software available and recommended for girls. But it may give you a place to start. Besides, who's to say what your daughter will go for? She's the only one who can tell you that.

THE SPIRIT OF ADVENTURE

Dona's first successful experience with the computer came with a pair of junior-level adventure games—*Dragon's Keep* and *Troll's Tale* (both from Sierra On-Line).

A lot of computerized adventure games around these days are much too difficult for beginners. Even the sharpest wits have trouble with these mysteries which require spending hours at a time puzzling through the plots and mapping out the fantasy terrain by typing commands into the computer.

Sierra On-Line, the publisher of many of these games, had the good sense to come out with junior-level versions for children. Both are treasure hunts in which players map their way to hidden animals and objects, selecting from a choice of different paths. A poster-size map of the territory covered in each game is included to help children chart their route to the hidden

loot. Its first evening at our house, Dona spent hours with *Dragon's Keep*, searching for the captive animals she could set free, covering several sheets of paper with notes in the process. She enjoyed keeping track of her direction on the map with the stickers provided.

After she developed her mapping skills and became comfortable with the computer and the idea behind adventuring, Dona was able to graduate to tougher challenges. *Ulysses and the Golden Fleece* (Sierra On-Line), *Snooper Troops 1 and 2*, and *In Search of the Most Amazing Thing* (all from Spinnaker Software Corp.) were entertaining adventure programs that taught her organization and planning at the same time that they enthralled her.

Of particular note is *Jenny of the Prairie* (Rhiannon Software/Addison-Wesley). It's an adventure game written especially for girls by two women who realized that girls were being left behind because of their lack of interest in arcade games. *Jenny* is the story of a pioneer girl abandoned in the prairie who must find food and shelter on her own for the winter. Your child directs Jenny to drink when she's thirsty, gather food when she's hungry, and build a shelter out of existing resources.

Unlike *Troll's Tale* and *Dragon's Keep*, in which children may lose interest after having located all the treasures, *Jenny* has various skill levels. But several girls complained about the logic of the game. For instance, when a snake, coyote, or mountain lion appears, Jenny is unable to use her tools as weapons against them. The girls felt defenseless and frustrated as Jenny was repeatedly eaten by prairie animals. Nevertheless, Dona learned a lot from this adventure, just as she did from the Sierra On-Line offerings.

More advanced adventures are impossible to play without a notebook, careful record-

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keeping, and a dose of experience with the adventure-game genre. Be sure to start your children out on easy games, so that they have the chance to develop a certain amount of gaming patience. You'll find that when your child em-



Dragon's Keep (left) and Jenny of the Prairie (right), two junior-level adventures that keep girls guessing.

barks on one of these games, she'll push to get on with the journey as quickly as possible. It won't be long before she realizes that the going can get pretty tough, and that she has to be prepared for many of the creatures or events she'll encounter.

One of the most exciting elements of these adventure games is the group play they encourage. Once she understands the goals of these adventures, Dona frequently invites her friends to join in the exploration. Decisions about where to go next, what to look for, and so on, often involve much loud discussion.

Adventure games feature a variety of different subjects and heroes. The film *Dark Crystal*, by Muppet creator Jim Henson, for instance, has been made into an adventure game by Sierra On-Line. This fall, Spinnaker, one of the leading manufacturers of games for young people, is coming out with its own line of computerized classics—allowing your daughter to “play” through the worlds of *The Wizard of Oz* or *Wind in the Willows*. Look for an adventure that will correspond with your daughter's tastes and imagination.

WORD AND PUZZLE PLAY

Another appealing feature of adventure gaming for my daughter and her friends is the puzzle solving they require. There's a whole breed of software games that walk the fine line between education and entertainment and revolve around puzzle solving. My girls and their friends enjoy fitting pieces together. Whereas most of the boys I've seen like fast paced, immediate response action, girls are willing to sit back and experiment.

Puzzle Mania (Reader's Digest Services Inc.) provides a choice of seven actual jigsaw puzzles. Dona and I are both puzzle lovers. We couldn't quite believe that the computer did such a good job of challenging us. Dona especially enjoyed being able to create her own puzzles and challenge her friends. Her younger sister could manage the easier levels in which she had to complete a picture with only two or three pieces missing. Especially nice for both the girls was the lack of a time limit. Many girls and preschoolers of both sexes find games that require racing against the clock thoroughly un-

nerving.

The ability to alter or tailor your own challenges is a valuable feature in any game. With puzzle and word games, children can quiz and test each other, further enhancing the interactive quality of the software and increasing its lifespan. *Square Pairs* (Scholastic Software) and *Match Wits* (CBS Software) are two such packages.

Dona's friends recognized *Square Pairs* right away: a computerized version of TV's “Concentration.” A preprogrammed set of matching games whetted their appetites. (They immediately selected “Dirty Words,” and dissolved into giggles when they discovered the challenge—matching words like “grime” and “muck.”) Before long they were creating their own games, matching the names of rock musicians with the groups they play in.

If your daughter's a word lover, if she likes playing games like Scrabble and Hangman, she'll delight in *Wizard of Words* (Advanced Ideas). Filled with a variety of different word games, including word scrambling challenges, *Wizard* contains a game editing option, so that you can make up your own quizzes.

A collection of logic puzzles, *Gertrude's Puzzles* (The Learning Company) is a favorite with both our girls. It helps if your child is old enough to read the introductory screens. Getting around the various “rooms” in which the different puzzles are located will be a lot easier if she is comfortable with directions and map skills. But shuffling the shapes and colors and working with the patterns in the game is something a preschooler could enjoy with minimum adult help.

In the kindergarten class I teach, and even in the junior-high-school computer club, I frequently find the girls leading the boys around from screen to screen in *Gertrude's Puzzles*. Although it's advertised as appropriate for ages 5 to 10, I've found that older girls enjoy it, too, particularly the option that allows shapes to be magnified and modified, or completely redrawn and inserted into the puzzles.

BUILDING GAMES

Some girls are good at spatial relations. Others, like me, have trouble figuring out how to fit all the furniture into one room. Both types of girls enjoy playing *Pipes* (Creative Software), a game that helps teach visual and spatial thinking, as well as resource management.

Pipes requires the child to select from a series of pipes and hook them up to houses and a water tank with the purpose of constructing a town's water supply. Dona discovered that it was a good idea to move screens around to see the entire housing development before setting out to select pipes from the factory. She had to plan ahead so that she didn't use up the limited supply of each kind of pipe.

Dona liked a number of the game's features. For one thing, there was no time limit. And she preferred the dollars-and-cents value

ONCE SHE UNDERSTANDS THE GOALS OF THESE ADVENTURES, DONA INVITES HER FRIENDS TO JOIN IN.

attached to constructing the system—more than merely racking up points. She appreciated being able to go back and rebuild the system in an attempt to save money.

THE SOUND OF MUSIC

We're all frustrated musicians at our house—except for my husband, who's a real one. We enjoy using the computer to play music because we can do it without years of lessons. Dona has just about worn out Epyx's *Fun With Music*. John and Dona play this one together—he excelling at the little arcade game included, and she explaining to him the ins and outs of music theory.

Though it provides a fine introduction to music and computers, *Fun With Music* has been surpassed by other programs for other machines. *SongWriter* (Scarborough Systems Inc.), for instance, uses the concept of a player piano to demonstrate the musical note entering and saving process. Its 62-page manual includes gems of musical theory and a glossary of terms. The program can be used by a variety of different ages over 5. (EDITOR'S NOTE: *Electronic Arts' Music Construction Set* is also worth looking into. See "Sing a Song of Software" in July's FAMILY COMPUTING for a comprehensive article on making music with your computer.)

MORE THAN A GOOD TIME

Our girls learned quickly—more quickly than their brother did—that the computer has value as more than a form of entertainment. Dona doesn't want to just play games on it. She wants to use it.

As soon as our family's computer arrived, she sat down and went through the entire tutorial disk. While her brother stood by, just itching to push buttons, Dona patiently familiarized herself with the keyboard and basic operating system. Now, she earns spending money by entering data I need stored into a computerized filing system (also known as a data-base management system). She enjoys seeing the names and addresses she's typed emerging from the printer on labels and letters.

There are a few home-oriented filing programs that you should consider for a girl who enjoys this kind of information storage and organization. *Secret Filer* (Scholastic Software) simulates a 3 × 5 card file. Though a good idea, it was found to be a bit small for the data she wanted to log. (EDITOR'S NOTE: *Phi Beta Filer* [Scarborough Systems Inc.] may be a more appropriate selection for girls who want to store lots of information. *Practifile* [Practicorp] and *Microfiler* [Microbits Peripheral Products] are also options, though they're a bit more complex to use.)

Word-processing packages are equally fascinating to Dona, who is torn between *Bank Street Writer* (Broderbund Software) and *Homeword* (Sierra On-Line). These two equally easy-to-use word-processing packages will

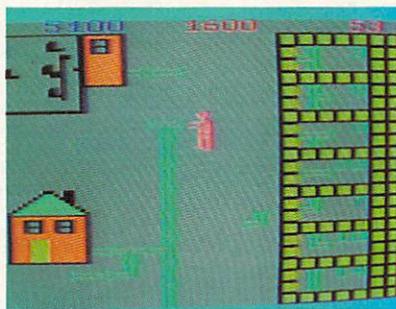
show your daughter just how powerful the computer is as a tool. She'll be able to write letters, stories, and even papers for school, and then print them out (if you have a printer).

Along the same lines, *Story Tree* (Scholastic Software) is a story-processing package. It takes the interest kids have with word processing and builds on it, encouraging them to make up their own tales with branching plots. They'll end up reading a bit like adventure games—with your child as the author. Three stories included in the package illustrate how the program works. For weeks two 7th-grade girls at our school (who wouldn't be caught dead in the computer club) have been working on their own story on the class computer after school hours. (EDITOR'S NOTE: *Learning Well* puts out a similar story-making package called *That's My Story*. *Spinnaker's Kidwriter* is a simpler version that won't let you print out the stories, but will allow your daughter to add graphics to her creations.)

TYPING TUTORIALS

For your children to be comfortable with the computer, they're going to have to be comfortable with the keyboard. A number of different programs on the market take a variety of approaches toward typing instruction. Dona prefers *Typing Tutor II* (MicroSoft Corp.) above all the programs she's tried. The tutorial frequently reminds her of how fast she's typing and which letters she's learning best.

We have two other typing programs at our house—both confusingly entitled *Typing Tutor*. *Typing Tutor* (Academy Software) includes an arcade-type game called "Word Invaders." *Type Attack*, *MasterType*, and *Wiz-Type* all use the arcade approach, which Dona finds less appealing, but may strike a chord with your daughter.



Typing Tutor III (Simon and Schuster Electronic Publishing) is the latest addition to our library. Though a bit text-heavy and intimidating in the introductory parts, it has several nice features, such as a log in which you can record your progress. It includes an arcadelike game as well, which I watched two girls—shrieking with excitement—play at around 20 words a minute.

VARIETY PACKS

One way of pinning down the kind of software your daughter goes for is by looking into the "variety packs" available. *Window* (Win-

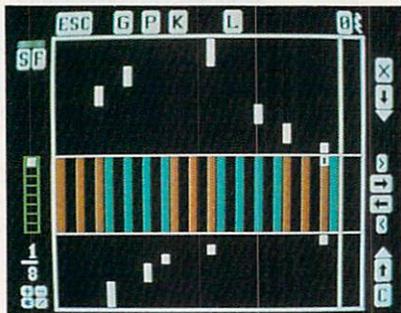
MANY GIRLS TAKE TO PROGRAMS THAT HAVE SOME VALUE BEYOND PURE ENTERTAINMENT.



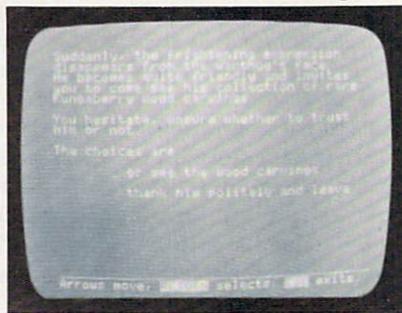
Pipes (left) and *Puzzle Mania* (right), games that appeal to the puzzle-solving streak in many girls.

dow, Inc.) and *Microzine* (Scholastic Software) are actually magazines on a disk, published several times a year and offering a sampling of different activities.

Window focuses on a theme for each issue: the programming language Logo was the subject of one issue, for instance, data-management and electronic-filing systems were explored in others. This is a great way of demonstrating the different uses for the computer.



SongWriter (left) will strike a chord with musicians and would-be musicians. *Storytellers* will enjoy *Story Tree* (right).



Microzine has a bit more variety. Any one issue usually contains four parts: an interactive story (like those she can create with *Story Tree*), a junior-size computer tool (like the electronic filing system called "Secret File"), an

instructive computer activity, and a purely fun arcade game. Each issue comes with a booklet that provides initial instructions for using the program and preparing extra data disks. You'll find that as girls work their way through these activities they'll learn valuable computer-management skills, all the while becoming more and more comfortable with the computer.

AS YOU EMBARK ON YOUR SEARCH

Remember that every girl has different tastes, in spite of the general likes and dislikes I've noticed and mentioned here—such as the appeal of applications software, girls' dislike of timed activities, and their preference for adventure and puzzle-solving games. Chances are, the kinds of things that they go for outside of the computer setting will also appeal to them on screen. Don't be overwhelmed by the task of finding appealing programs for your daughter. There's a vast store of software out there for you to choose from. It just takes a little digging to uncover the right thing. If you spend time with your daughter and enlist her help, she'll guide you to the packages that strike her imagination. ☐

SOFTWARE MANUFACTURERS

Academy Software

P. O. Box 6277
San Rafael, CA 94903
(415) 499-0850
Typing Tutor plus Word Invaders available for Commodore 64 and VIC-20. \$21.95 (cassette); 24.95 (disk)

Advanced Ideas Inc.

2550 Ninth St., Suite 104
Berkeley, CA 94710
(415) 526-9100
Wizard of Words available for Apple II series, 48K (disk); IBM PC/PCjr w/color card, 64K w/DOS 1.1, 128K w/DOS 2.0 or 2.1 (disk). Version planned for Commodore 64. \$39.95

Broderbund Software

17 Paul Drive
San Rafael, CA 94903
(415) 479-1170
Bank Street Writer available for Apple II series/III, 48K (disk), expanded version for IIc, 128K (disk); Atari Home Computers, 48K (disk); IBM PC/PCjr, 64K w/DOS 1.1, 2.0, or 2.1 (disk); Commodore 64 (disk). \$69.95; 79.95 (IBM)

CBS Software

One Fawcett Place
Greenwich, CT 06836
(203) 622-2525. *Match-Wits* available for Apple II plus/IIc/IIc, 48K (disk); Commodore 64 (disk); IBM PC/PCjr w/color card, 64K w/DOS 1.1 (disk). Version planned for Atari. \$29.95

Creative Software

230 E. Caribbean Drive
Sunnyvale, CA 94089
(408) 745-1655
Pipes available for Commodore 64 (cartridge) and VIC-20, 8K (cartridge); IBM PC/PCjr, 64K (disk). \$29.95

Electronic Arts

2755 Campus Drive
San Mateo, CA 94403
(415) 571-7171
Music Construction Set available for Apple II/II plus/IIc, 48K (disk); Atari Home Computers, 48K (disk); Commodore 64 (disk). \$40

Epyx, Inc.

1043 Kiel Court
Sunnyvale, CA 94089
(408) 745-0700
Fun With Music available for VIC-20, 8K (cartridge). \$39.95

Learning Company

545 Middlefield Road,
Suite 170
Menlo Park, CA 94025
(415) 328-5410
Gertrude's Puzzles available for Apple II series, 48K (disk). \$44.95

Learning Well

200 S. Service Road
Roslyn Heights, NY 11577
(800) 645-6564
That's My Story available for Apple II/II plus/IIc, 48K (disk). Version planned for IBM PC/PCjr. \$59.95

Microbits Peripheral Products

225 W. Third Street
Albany, OR 97321
(503) 967-9075
Microfiler available for Atari Home Computers, 16K (cartridge). \$49.95

Microsoft

10700 Northrup Way
Bellevue, WA 98004
(206) 828-8080
Typing Tutor II available for Apple II/II plus/IIc, 48K (disk). \$24.95

Practicorp

44 Oak St., The Silk Mill
Newton Upper Falls, MA 02164
(617) 965-9870
PractiFile available for Commodore 64 (disk). \$54.95

Reader's Digest Services Inc.

Microcomputer Software Division
Pleasantville, NJ 10570
(800) 431-8800
Puzzle Mania available for Apple II series, 48K (disk). \$39.95

Rhiannon Software/Addison-Wesley

Jacob Way
Reading, MA 01867
(617) 944-3700
Jenny of the Prairie available for Apple II series, 48K (disk). \$39.95

Scarborough Systems Inc.

25 N. Broadway
Tarrytown, NY 10591
(914) 332-4545
MasterType for Apple II series, 48K (disk); Atari Home Computers, 32K (disk) and 16K (cartridge); Commodore 64 (disk); IBM PC, 64K (disk). \$39.95; \$49.95 (IBM)
SongWriter available for Apple II series, 48K (disk); Atari Home Computers, 48K (disk); Commodore 64 (disk); IBM PC/PCjr, 64K (disk). \$39.95

Scholastic Software

730 Broadway
New York, NY 10003
(212) 505-3000
Microzine available for Apple II plus/IIc/IIc, 48K (disk). \$39.95 per issue
Secret Filer available for Commodore 64. \$24.95
Square Pairs available for Apple II plus/IIc/IIc, 48K (disk); Atari 400/800, 16K (cassette), 32K (disk); Commodore 64 (disk and cassette); VIC-20, 13K (cassette); TI-99/4A, 16K (cassette). \$19.95 (cassette); \$24.95 (disk)

Sierra On-Line

Sierra On-Line Bldg.
Coarsegold, CA 93614
(209) 683-6858

Dragon's Keep available for Apple II/II plus/IIc/III w/emulator, 48K (disk). \$29.95

Homeward available for Apple II series, 64K (disk); Commodore 64 (disk). \$69.95

Troll's Tale available for Apple II/II plus/IIc/III w/emulator, 48K (disk) \$29.95

Ulysses and the Golden Fleece available for Apple II series/III w/emulator, 48K (disk); Atari Home Computers, 32K (disk); IBM PC/PCjr, 40K (disk). \$32.95

Simon and Schuster Electronic Publishing

1230 Ave. of the Americas
New York, NY 10020
(212) 245-6400
Typing Tutor III available for Apple II/II plus/IIc, 64K (disk); Commodore 64 (disk); IBM PC/PCjr, 64K (disk). \$49.95

Spinnaker Software Corp.

1 Kendall Square
Cambridge, MA 02139
(617) 494-1200
In Search of the Most Amazing Thing available for Apple II series, 48K (disk); Atari Home Computers, 48K (disk); Commodore 64 (disk); IBM PC/PCjr, 64K (disk). \$39.95
Idrwriter available for Apple II series, 48K (disk); Commodore 64 (disk). \$34.95
Snooper Troops 1 and 2 available for Apple II series, 48K (disk); Atari Home Computers, 48K (disk); Commodore 64 (disk); IBM PC/PCjr, 64K (disk). \$44.95 each

Window, Inc.

824 Boylston St.
Chestnut Hill, MA 02167
(800) 852-5001
Window available for Apple II/II plus/IIc/III w/emulator, 48K (disk). \$29.95 per issue

APPLE IIc

AN APPLE TO GO

BY CHARLES H. GAJEWAY

The new Apple IIc combines the proven virtues of the IIe—reliability and a large software base—in a small portable package. Because of its size and usefulness, the IIc is consistent with the computer-as-appliance philosophy, that Apple has turned into a corporate theme song since last January's Macintosh introduction.

The IIc (\$1,295), with 128K of RAM and a built-in disk drive, is designed primarily for the nontechnical but serious home user—especially those with children. (See "Apple Heads For Home," a preview of the IIc in the June issue.) Though it's not built with the speed or power of true business computers, it's strong enough to work well in the business world.

SETUP

The IIc is impressively small and sleek (11.25 × 12 × 2.25 inches). It's also light, just 7.5 pounds (11 with the power supply). You can set up the computer rapidly with the aid of an excellent, fully illustrated guide. Because it sets up so easily, people might be tempted to carry the IIc around and use it more often than they would some other computers.

The carrying handle in back, which clicks in flush against the unit for packing, doubles as a prop to hold the computer at a comfortable angle for typing. It also helps ensure adequate ventilation without a fan.

A slimline disk drive is built into the right side of the unit. It stores 137K of data, the equivalent of about 90 double-spaced typewritten pages. All connections are made on the rear

panel, minimizing the tangle of connecting cables. There are built-in ports for a printer (serial), a modem (serial), a second disk drive, a monitor and TV, and a mouse or joystick.

In addition, an 80-column display is standard. Flicking a small switch just above the keyboard will put you in 40-column mode (or vice versa). A second switch nearby converts the normal keyboard to a Dvorak keyboard, which has a key arrangement that is said to be easier for children and nontypists to learn. The IIc is the only computer on the market with this unusual feature.

Unlike previous Apple II series machines, there is no provision on the IIc for user-installed interface cards. An Apple IIc owner need do nothing more complex than plug in a cable to attach a wide variety of equipment. In fact, just as with the Macintosh, opening the machine voids the warranty and is therefore definitely not recommended.

LEARN BY DOING

The IIc comes with six instruction programs on four disks (Logo, BASIC, etc.) and two manuals. The temptation to slide in a disk and just get started is overwhelming—a feeling that is encouraged by the user manual.

The demonstration disks are very good, covering all the major uses for the computer. They give the new owner plenty of hands-on experience with his or her new pride and joy.

Leo Logolover teaches you about Logo, the graphics-based programming language. Sherlock Capslock, private eye from Silicon Valley, reveals to you and Nancy Novice the computer's insides. Another program coaxes you into writing your own BA-



The Apple IIc and power supply in a carrying case (\$49) together weigh 11 pounds—about the same as a two- or three-month-old baby.

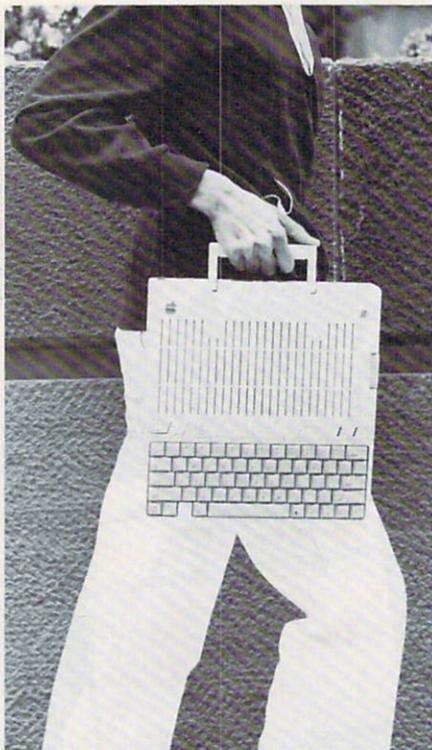
SIC program. And, by watching how Harry Walker, manager of the Big Boy Auto Wrecker Softball Team, puts his computer to work, you'll understand what integrated software (word-processing, data-base, and spreadsheet programs all rolled into one) can do for you.

New Apple software for the IIc—*Apple Logo II*, *Apple Access II* (a communications program), and *AppleWorks* (an integrated package)—also come with training disks.

NOTHING FOR THE TECHIE

The manuals, in Apple tradition, are models of clarity and organization. They are nontechnical and include plenty of examples and illustrations. My only complaint is about the lack of technical data for the advanced user. Apple has not included any coverage of operating systems or advanced programming. While the IIc is intended primarily for the general user, I feel that a computer in this price range should come with full instructions about all facets of its operation.

CHARLES H. GAJEWAY was recently made a contributing editor of FAMILY COMPUTING. His last article was "Whistle While You Word Process," in the June issue.



The carrying handle doubles as a prop to tilt the IIc at a comfortable angle for typing. Above the keyboard proper, from left to right: The RESET key; a 40- and 80-column switch; a Dvorak keyboard switch; a green disk drive in-use light; a red power-on light.

For instance, if you encounter problems using ProDOS, the primary operating system for the IIc (the others are DOS 3.3 and Pascal), you may not be able to wiggle out of it with the sparse documentation provided. And, if you want to do any serious BASIC programming, you'll have to purchase a manual.

Since the IIc user is encouraged not to learn the technicalities of computer operation, tools are supplied to minimize the need for such knowledge. For example, on the System Utilities disk that comes with the IIc, you can ask for help anytime while initializing or copying a disk, or doing any other "housekeeping" chore. The command for HELP is the same as it is on other Apple-designed IIc programs—a nice touch.

Another helpful tool, the vaunted Apple mouse, is not standard equipment on the IIc. It can be hooked up easily, however, and software developers have already published programs that utilize the mouse's point-and-click operation. In many ways, Apple has brought the alluring "cut-and-paste" method of computing from the Macintosh down to the IIc.

HANDS ON

The IIc operates much like the IIe. Turning on the power elicits the familiar clatter from the disk drive, fol-

FAMILY COMPUTING

R A T E S

APPLE IIc

	POOR	FAIR	GOOD	VERY GOOD	EXCELLENT
EASE OF USE			●		
DOCUMENTATION			●		
SOFTWARE BASE				●	
PERFORMANCE			●		
PRICE/VALUE			●		
OVERALL			●		

S U M M A R Y

The Apple IIc is the fourth model in the long-lasting Apple II line, which started in 1977. It runs most of the software written for its predecessors, has a sizable memory (128K) and a built-in disk drive, and is easy to learn about and use. The IIc is a versatile, general-purpose computer that can play games and crunch numbers equally well. And it's got some personality. Despite the price (\$1,295), the IIc represents a good value for the home.

SPECIFICATIONS

MEMORY: 128K RAM
 VIDEO DISPLAY: TV, color or monochrome monitor, RGB monitor (with special interface)
 TEXT DISPLAY: 40 char. × 24 lines; and 80 char. × 24 lines
 GRAPHICS: Several resolutions, ranging from 40 × 48 to 560 × 192
 COLORS: 16
 SOUND: One beeper with wide range of tones
 KEYBOARD: 63 typewriter-style keys
 SUGGESTED RETAIL PRICE: \$1,295 (with built-in disk drive)

lowed by the standard Apple display. I was a bit disappointed by this, as the design of the Apple IIc is so sleek and modern that its somewhat baroque color graphics seem outdated. What I would have liked here is some of the Macintosh razzle-dazzle, though that would have meant forsaking compatibility with IIe software.

The IIc does have a special color graphics mode built in that allows you to display 16 colors in hi-res. You can't do this on a 64K IIe. But a IIe, with the addition of an extended 80-column card (\$275), has this same 16-color capability. In fact, by inserting the proper interface cards, you can make the IIe do practically every-

thing the IIc does, and more. The IIc just comes in a prettier, more portable package.

The IIc's full-size keyboard, virtually identical to the IIe's in layout, is superb. Its action is light, with just the right amount of "clicky" feedback. The keyboard adapts easily to a wide variety of typing styles and everyone who tried the IIc—from a seven-year-old to an experienced touch typist—commented favorably on the size and feel of the keys. Apple keyboards have always been good, but the IIc's is exceptional.

TRUE PORTABILITY COMING

A full range of optional equipment is, or shortly will be, available. Made specifically for the IIc are an external, half-height disk drive (\$329), a sleek 9-inch monochrome monitor with an adjustable stand that looms over the system unit (\$199 for monitor, \$39 for stand), and a seven-color printer called Scribe (\$299). All three of these products were in very short supply at press time.

Both the 300-baud and 1200-baud Apple modems (\$225 and \$495) work with the IIc, as does the AppleMouse (\$99), and the Apple Imagewriter printer (\$595).

Sometime in the fall, Apple is expected to introduce a product that will make the IIc a true portable computer—a flat-panel LCD display. It will attach to the system unit and display 24 80-character lines. This is more than any of the current popular lap computers can display. For traveling, the LCD unit (around \$600) will detach and slip into Apple's padded carrying case (\$49)—along with the computer, power supply, and any needed software.

A third-party developer, Discwasher, is developing CARI, a carrying case with a built-in rechargeable power system that will run for about 5 hours. With CARI (\$250) and the LCD display, you will be able to carry and use the IIc anywhere—a plus for businesspeople. The total cost of this truly portable system will be around \$2,250.

When given a choice, the integrated, one-piece design of the IIc makes using Apple peripherals much easier and more attractive than third-party products. For example, the 12-inch monitor I used for my tests was larger than the IIc's. The monitor was awkward to use since it couldn't be placed on top of the system, as it can on the IIe. On the other hand, the tilting stand sold with the new IIc monitor blends perfectly with the system.

In addition, since Apple has moved to a serial printer port on both the

Macintosh and IIc, without providing a parallel port option, it's far simpler to connect one of Apple's serial printers than a third-party unit, since they usually require a parallel interface. However, if you own or wish to purchase a printer with a parallel interface, you will be able to find converters.

A JOY TO USE, WITH SOME CAVEATS

After several extended sessions with the IIc, I developed several strong impressions. On the good

HEARING THINGS... ...ABOUT THE IIc

While I had the IIc at home for review, I was generous enough to let other people try it out. I also talked with a number of people at a dealer where a IIc was prominently displayed. General feelings about the machine divided mostly along lines of experience.

Almost everyone admired the appearance and size of the machine. It is unthreatening and friendly, very unlike a full-blown desktop computer. Equally universal was an appreciation of the excellent keyboard, particularly in contrast to the one on the IBM PCjr. Kids said, "It's neat—kinda clicky," while more experienced typists appreciated its light touch, yet solid feel.

Novices loved the one-piece approach, the lack of wires, and the big library of Apple software. The manuals drew compliments and most everyone liked the instructional programs. In general, they felt it was a machine they could live with and not be intimidated by.

Experienced users were divided on the one-piece issue, depending on whether or not portability was important to them. In general, they were upset by the serial printer port (in place of a parallel port) and by the amount of IIe software (such as *VisiCalc*) that does not now run on the IIc. For these reasons, more than one of them remarked that a IIc might be difficult to integrate into a setting where IIes already existed. Surprisingly, the lack of flexibility and expandability—due to the inability to insert circuit boards—wasn't that much of an issue.

Overall, the reaction was definitely favorable and could easily be summed up as: This is a great machine for anyone who is new to computing and whose needs aren't unusual. It's a much better computer for the home than anything else on the market.

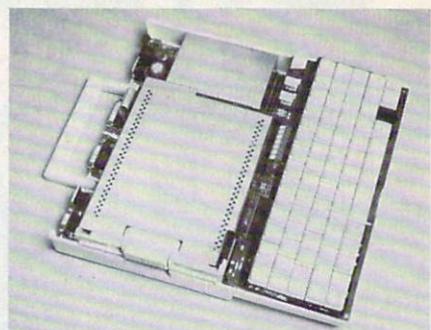
side, it is physically a joy to work with. Its small size lets you tuck it comfortably into cramped spaces (a dormitory room, a rolltop desk, on top of a TV, etc.), and its quiet, smooth operation is rock reliable. It can readily be carried from room to room or go on the road. It switches easily between an 80-column and 40-column screen display.

The IIc performs somewhat faster than the IIe (although the task must be exceptionally large for the improvement to be noticeable). Compared to its primary competition, the IIc is easier to learn and use than IBM's PCjr.

On the minus side, the age of the Apple II design is beginning to show in the display and sound generation (one beeper) capabilities, the closed-system approach limits flexibility, and only 33K of the 128K memory is available to the BASIC programmer.

The worst problem, at least for the moment, has to do with software compatibility. Due to a design change, inverse capital letters used on the Apple IIe are displayed as icons on the IIc. Many programs, such as *VisiCalc*, *AppleWriter IIe*, *PFS: File and Cut & Paste*, use inverse letters in menus. Word-processing programs are especially hard hit, displaying useless icons in place of letters. The notable exceptions are *Bank Street Writer* and *HomeWord*.

Since the vast majority of older Apple software works, Apple's claim of over 90 percent compatibility is probably accurate. But check with your



You're not supposed to take the IIc apart, but if you did, this is what you'd see. The unit is packed tight, with the disk drive (left) and power supply taking up almost all available space.

dealer, or make your own test, if there is a piece of software you are interested in. Indications are that many of the problem programs will soon be revised to accommodate the IIc display differences.

NO-FUSS MACHINE

Despite these current problems with the software, and the lack of pizzazz in graphics or sound, the Apple IIc is a fine machine that is well suited for its target market of serious home users. It's well made, reliable, attractive, and easy and fun to use. It is more than adequate as a game-playing computer (although without sprites or a good sound generator, it's not in the Atari or Commodore league) and it is a solid business machine. It straddles the line between those two categories like no other computer. 



With the tilt-stand (\$39), the viewing angle of the IIc monitor (\$199) can be adjusted to suit the user. The mouse (\$99) can be used to move the cursor or make choices from on-screen menus.

Getting as Fit as an Olympian

EVEN WEEKEND ATHLETES CAN TAKE
ADVANTAGE OF THE NEW
SPORTS TECHNOLOGY

BY MINDY PANTIEL
AND BECKY PETERSEN

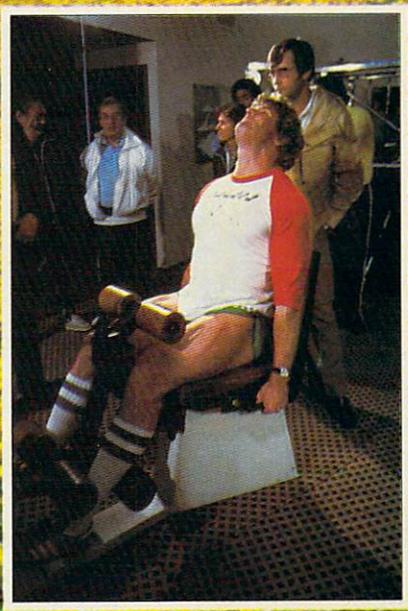
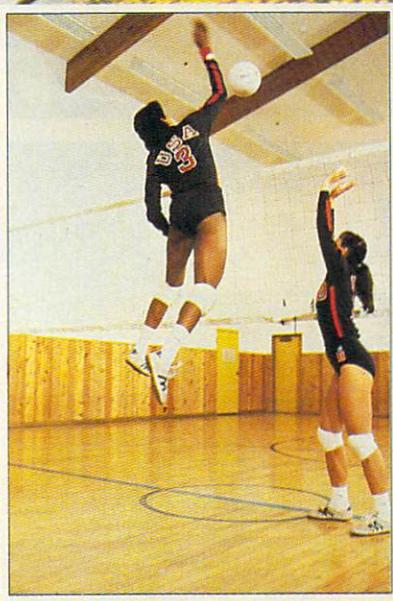
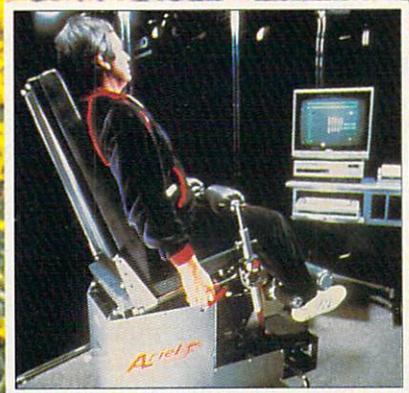
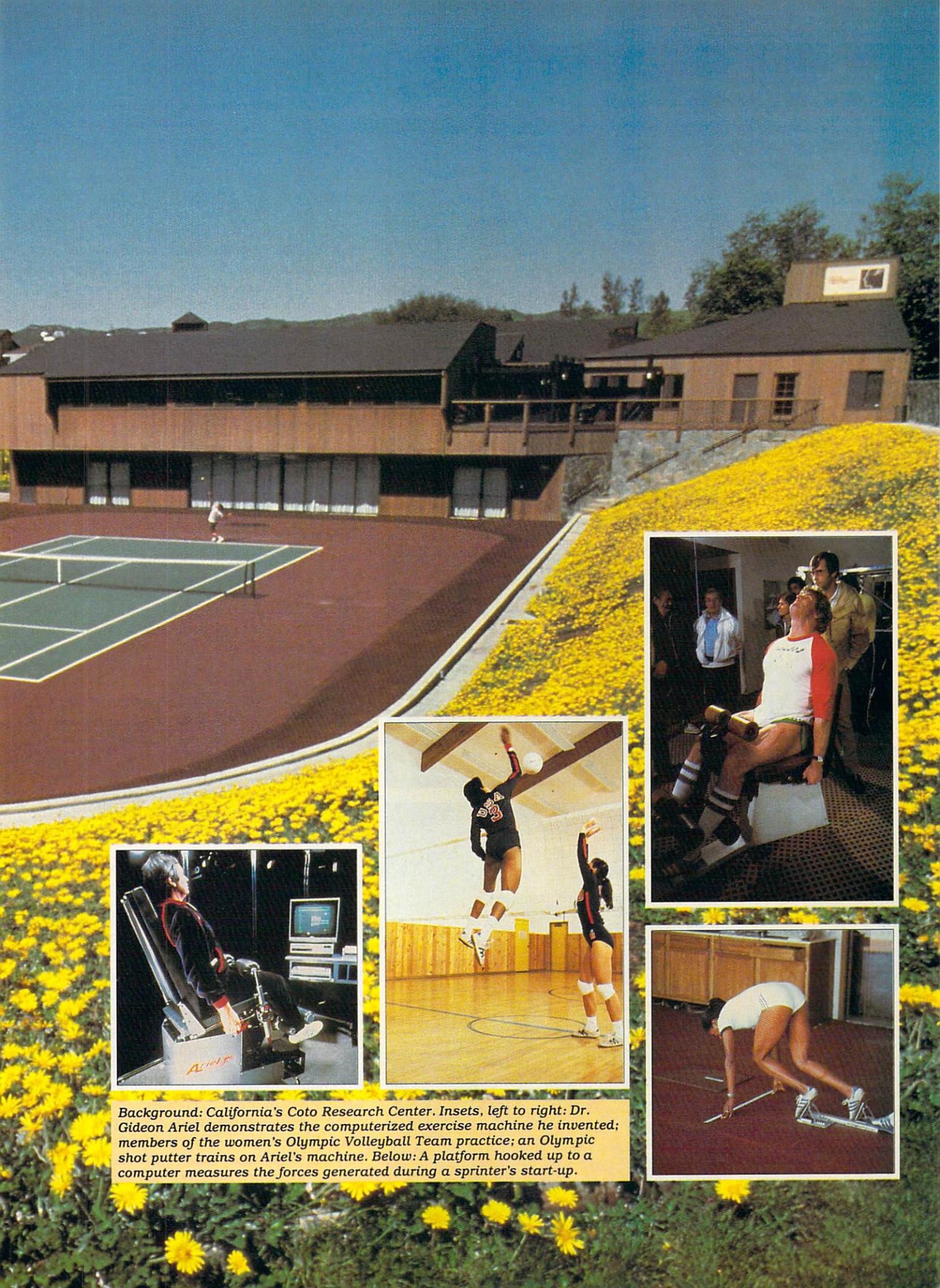
Flo Hyman is an Olympic volleyball player. Charlene Calabre does interior design for boats. Hyman works out with her team as much as eight hours a day. Calabre heads for the local fitness center three to five times a week for a two-hour workout.

A couple of years ago Hyman started using a computer as part of her training and her already phenomenal spiking ability became even more formidable. Calabre, the mother of two teenagers, began working out last August. She utilizes computerized testing apparatus to gauge her improvement, which has been impressive.

A trained Olympic athlete and an interior decorator from New Jersey—you wouldn't expect them to have much in common, but both of them are using the most modern technology to achieve their personal best. Who would have dreamed there would come a time when we could all train just like the Olympians do?

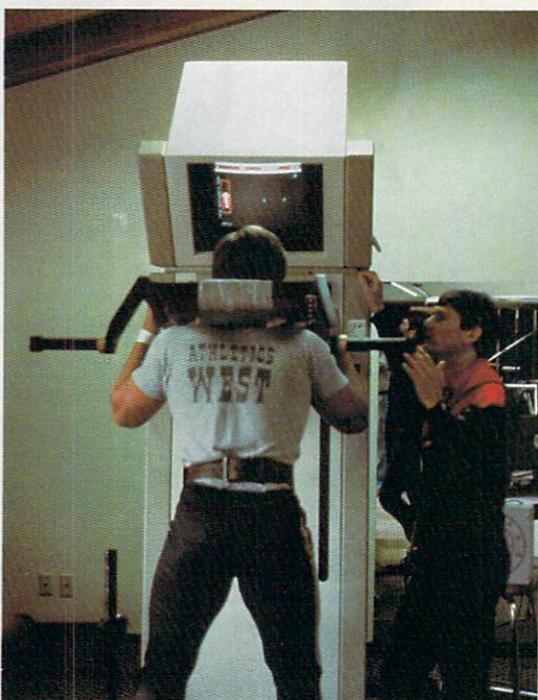
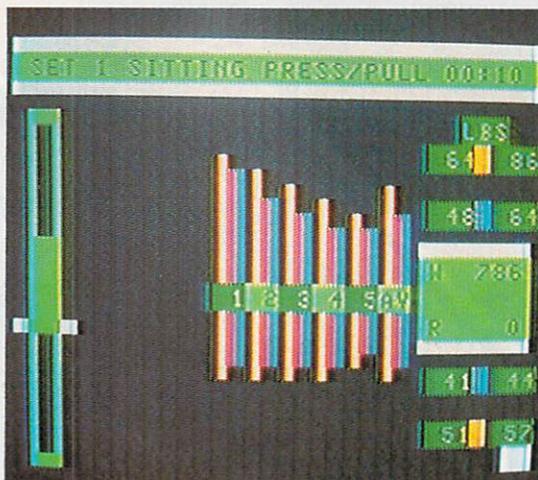
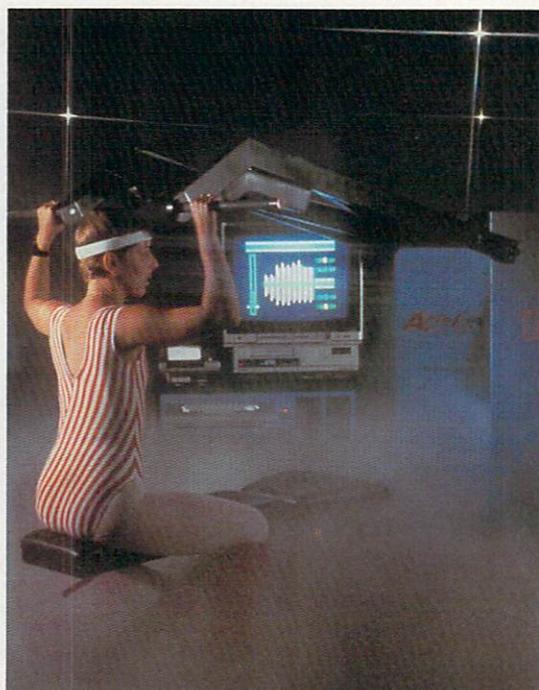
But, that time *has* come. Technology once reserved for the athletic elite is slowly seeping into the lives of recreational athletes as well. Sophisticated equipment like that developed at the Coto Research Center in Coto de Caza, California, is starting to pop up in health clubs across the country and in the near future will be available for home use.





Background: California's Coto Research Center. Insets, left to right: Dr. Gideon Ariel demonstrates the computerized exercise machine he invented; members of the women's Olympic Volleyball Team practice; an Olympic shot putter trains on Ariel's machine. Below: A platform hooked up to a computer measures the forces generated during a sprinter's start-up.

"OUR THEORY IS THAT EVERYONE IS A GOLD MEDALIST. WE WANT TO TRY TO ALLOW PEOPLE TO REACH THEIR MAXIMUM POTENTIAL IN SPORT."



Top to bottom: A Coto Center staffer exercises while carefully watching the computer monitor; the graph on the screen displays the force of each up and down movement; an Olympic discus thrower practices the squat as a computer measures how much force he uses for each motion.

Hyman and Calabre are both benefiting from equipment developed by Dr. Gideon Ariel at the Coto Research Center. Hyman, along with many other gold medal hopefuls, has been heeding the advice gathered from a complex computer process that begins with something called digitization.

First, highly sensitive instruments take pictures of the athletes and then transfer them, frame by frame, to a computer screen. There, the images, which appear as stick figures, can be viewed from above, below, or anywhere in between.

It is then possible to check the speed and acceleration of each athlete, and graphs are produced to show the center of gravity throughout the movement. Stored data can also be called up to compare an athlete's performance with past achievements and even with other athletes.

COMPUTERS + VOLLEYBALL = GOLD

The women's Olympic Volleyball Team began integrating computers into their training in 1980, when they were barely taken seriously as world-class contenders. In the past four years the combination of natural talent and technology has yielded the desired results, and the team is considered an excellent contender for the gold medal.

As their assistant coach, Marlon Fano, explained, "Through digitized figures we were able to determine the best ranges of movement for each player and change individual techniques. The change in Flo Hyman's range of motion in the spike has been the most drastic. By observing digitized movements, we've been able to refine our defensive technique as well."

Ariel and his team of researchers have also designed a complete line of body-building apparatus which connects directly to microcomputers, supplying continuous feedback to the athletes during their workout, and analyzing the range of motion for every knee jerk and muscle flex they make.

BACK AT THE HEALTH CLUB

Meanwhile, Calabre and other members of the LIFE (Laboratory of Isokinetic Fitness Exercise) health club in Point Pleasant, New Jersey, use computerized equipment to determine their muscle strength and endurance capabilities, and to develop individualized fitness programs based on the results. The machine they use is named the Ariel, after its developer. LIFE is one of a growing number of health clubs offering computerized analysis and exercise techniques to people from all walks of life and in all kinds of physical condition.

According to the resident exercise physiologist, Steve Soper, "We get all ranges of people here, from serious young athletes to middle-aged people who have been sedentary too long and need a fitness program.

"Participants love the computers and they especially like the fact that they get both visual

and audio feedback," he added. "Besides the graphics display, the computer makes a beeping sound which intensifies in pitch in direct proportion to accelerated movements."

Calabre echoed these sentiments. "It's a fantastic machine! It can give you a computer printout at exactly the moment you're doing something," she explained. "It tells you how much energy you're expending, evaluates your heart rate, and tells you which part of your body you're working the hardest."

Soper added, "With the Ariel they [members] get the added benefit of a very accurate day-to-day progress report on their power, endurance, strength, and cardiovascular ability."

Each club member receives a personalized disk with a physical profile detailing items such as strengths, weaknesses, body build, and aerobic capacity. When the disk is inserted, the machine responds with directions for a highly efficient workout tailored to the individual's needs and desires—for example, losing weight, toning muscles, or building bulk.

The computer prescribes the workout only after taking into consideration several variables gleaned from the member's daily personal profile. Based on this information, if the computer determines you're having a bad day, it adjusts your regimen; if you feel in top form, it responds accordingly. Meanwhile, the color screen keeps you apprised of your results throughout your workout.

In a short while, LIFE members will be able to use the complete Ariel exercise system, which will be installed in their club as well as in several others across the country. The machine, which resembles a component of the Nautilus weight system, hooks up to a micro-computer and allows participants to do all of their resistance and aerobic training with one piece of equipment.

VISION OF THE FUTURE?

So, are computerized exercise regimens part of the 1984 vision we all feared—computers analyzing our every move and providing instantaneous feedback on everything we do? When we tune into the Olympics in the coming weeks, will we observe a band of highly mechanized, robotlike athletes making an emotionless bid for those precious medals?

Such a grim picture is highly unlikely and certainly not the intent of the research scientists interested in bettering human athletic performances. Sandra Bauer, assistant to the director at the Olympic Training Center in Colorado Springs, believes the recent advances in sports medicine only support the human factor—they don't negate it.

"Our purpose is not to create superathletes," she said. "We [the scientists] are just there to provide a microscope for the coaches and to get information to them faster."

One example of the improvements scientists have brought to sports is recent advances in video equipment. Normal video operates at a

speed of 60 frames per second. This is of very little value to a gymnastics coach who wants to accurately view a vault that takes a mere second and a half to execute—the relatively slow video produces a blurred image.

However, thanks to technology, there are video cameras that can capture images at an incredible 200 frames per second. "Now coaches can really see what happened during a particular movement," Bauer explained. "They can then provide athletes with fast feedback on whether their leg was turned out or a toe was pointed incorrectly during a particular movement."

And, according to Bauer, any hesitancy on the part of the coaches to utilize the computer data has long since vanished. "Initially, there was some fear that they [coaches] would be eliminated, but now they understand that we only know the athlete mechanically. The coach is the only one who knows the athlete as a total human being—physically, emotionally, and psychologically."

Coach Fano agrees with Bauer. "There's no reason not to use computers. Other countries are already starting to get interested in them, but for right now, it's given us quite an edge," he said.

THE WINNING EDGE

A monumental feat like winning an Olympic medal is often dependent on myriad forces coming together in exactly the right way at precisely the right moment. Just how big a part computers will play in the summer games remains to be seen, but along with the volleyball team there are other athletes with the computer edge that should be worth watching.

One such person is Rick McKinney. Currently the No. 1 archer in the world, he is also the brains behind a program for testing the National Archery Team on a regular basis. Thanks to his efforts, since 1981 the country's top 20 archers have been sent to the Olympic Training Center in Colorado Springs each year to make training tapes utilizing biomechanical and physiological tests.

Because movement patterns in this sport are crucial, reporting them accurately to the athletes is extremely beneficial. The intent is to translate such data into as many bull's-eyes as possible.

Another computer success story reads more like a fairy tale and involves discus thrower Al Oerter. Winner of four consecutive gold medals from 1956 to 1968, Oerter, at 47, is old enough to be the father of many of this year's Olympic participants. Despite his age, Oerter wanted to stage a comeback and sought out Ariel's assistance in 1976. At the time, he was throwing well below his previous Olympic winning mark of 212 feet 6½ inches. With the help of computerized analysis, he was soon throwing better than 221 feet, nearly 9 feet farther than in his prime.

The computer was able to discern, in a way

IF THE COMPUTER DETERMINES THAT YOU'RE HAVING A BAD DAY, IT ADJUSTS YOUR EXERCISE REGIMEN.

Contributing Editors
MINDY PANTIEL and BECKY
PETERSEN wrote
"Computers and
Careers" for the April
FAMILY COMPUTING.

no human coach could, that Oerter was accelerating, then decelerating, then speeding up his motion again, when in fact, he needed to maintain a steady rate of acceleration throughout the movement. Oerter made the necessary changes and is a likely contender in Los Angeles despite his "old man" status.

And, of course, there are others who may change the speed of an arm movement while executing a dive, or shift the angle of a foot on the balance beam based on a computer's advice. These athletes all hope the investment in technology will pay off in golden dividends.

A HISTORIC PERSPECTIVE

The summer games in Los Angeles will not be the first time computers have done some Olympic coaching from the sidelines. In fact, it was almost a decade ago that the U.S. Olympic Committee assembled the best American discus throwers in Los Angeles and photographed them with high-speed film. The results were sent to Gideon Ariel (then working in Amherst, Massachusetts), who calculated the forces and acceleration of the athletes' body segments.

One person who benefited from the data was Mac Wilkins, who learned that his front leg was absorbing energy that could have gone into his throw. Wilkins literally had to change his concept of throwing. His success was evident: Wilkins went on to break the world record and capture the gold medal in Montreal in 1976.

The U.S. Olympic Committee Elite Athlete Projects Program, founded in 1980, applies computerized biomechanical and physiological tests to the nation's best performers in 16 different Olympic sports. Ultimately the knowledge garnered there will be disseminated through publications and coaching clinics so

all athletes, not just Olympians, can benefit.

And, earlier this year, the U.S. Ski Team turned in a dazzling medal-winning performance in Sarajevo, Yugoslavia. Were computers instrumental in their phenomenal results? The answer is Yes.

This year Texas Instruments started a six-year sponsorship program of the U.S. Ski Team, donating a variety of portable, desktop, and home computers, plus a minicomputer and a large number of terminals. The machines were put to use developing specialized programs, examining stress factors that affected performance, setting up training and diet schedules, and even helping young athletes on the road with their homework. The blend of athletic ability and technology proved to be a winning combination.

And now it's Flo Hyman's, Al Oerter's, and Rick McKinney's turn. But, according to Sandra Bauer at the Colorado Springs site, the best is yet to come. "It is just recently that the Olympic Committee has made an effort to support sports medicine, so the department is really new. That's not to say there won't be some noticeable results in Los Angeles, but the real impact will be seen on the 1988 team."

By 1988 not only will most Olympic athletes be realizing the potential of computer-assisted training, but more and more people like Calabre will have access to equally advanced equipment. As Ariel explained, "We are very concerned about relating our findings to general use. Our theory is that everyone is a gold medalist . . . so we want to try to allow people to reach their maximum potential in sport."

The trend in health club apparatus is definitely toward computer-operated equipment, and many clubs have already instituted fitness programs incorporating these machines. With a \$16,500 price tag, it's not the sort of thing the average American family would run out to purchase for the family room, but, according to Ariel, sometime in the future this kind of computerized exercise machine will be available at a much lower price for home use.

In addition to allowing you to establish personalized training regimens around an activity of your choice, the same unit will function as an indicator of success in certain sports. Just like the equipment currently used by Olympic athletes, the computer could analyze the potential of members of your family—right in your own living room. It may help your 14-year-old decide if he or she is better suited for the swimming team or the basketball team.

But, it is extremely important to remember that although the computer can serve as a valuable training tool, it cannot make someone gifted in a sport they simply are not suited for. As Ariel explains, "You cannot make a Volkswagen run like a Maserati; I don't care how you tune it. You first need the Maserati. If it's untuned, you have to know how to tune it. That's where the coaching comes in." **FC**



Above: Four-time gold medal winner Al Oerter (right) studies a three-dimensional view of his discus throw. Inset: A stick figure representation of Oerter's movements.

B A S I C B O O T H



"The groom is expected momentarily, Reverend. He's a computer hacker you know."

BUYER'S GUIDE TO SPEECH SYNTHESIZER

TURN YOUR COMPUTER INTO A TALKING MACHINE

BY LOUIS R. WALLACE

The original "talking machines" were the telephone, the phonograph, and the radio. They were invented, or came into prominence, in the first half of the 20th century. The talking machine of the second half of the century, which has not yet come into prominence, is the computer.

The ability to talk is not a native talent for microcomputers—at least the ones we have today. It's a function that has to be added. What's needed is a speech (or voice) synthesizer—a device that puts together different sounds to form words. With a synthesizer, you can add speech to programs you've written yourself or purchase programs with the speech option already built in.

A NEED FOR SPEECH?

What good are speech synthesizers? Even though speech synthesis is in its infancy and some of the speech-generating products on the market sound quite primitive, a couple of obvious uses come to mind. One is in education. Many users of voice synthesizers who have small children write spelling programs so that the computer speaks a word and asks the child to type it in.

Children respond to computers speaking in a matter-of-fact way, unlike us older individuals who are still staggered by the fact computers can talk at all. Children are particularly happy if the computer says, "That's terrific Sue!" in a friendly voice—instead of simply printing a message on the screen. Also, the addition of speech to any kind of program makes using it easier for very young children who have not learned to read.

Another good use of speech synthesis is as an aid for visually handicapped people. Many people have vision problems that prevent them from reading the computer screen. With a speech synthesizer, they can enjoy the benefits of computing. For instance, the computer might say, "That's right!" in an educational program; or, "Are you sure you want to erase?" in a word-processing program.

Poor eyesight is not the only handicap that can be helped by a talking computer. People with learning disabilities—slow readers, for instance—might be helped if the computer talks instead of presenting a message on the screen. Even people with speech problems could use these devices to record and send voice messages over the phone.

A lot of applications software could be improved with the addition of speech. For example, if you wrote a speech using a word-processing program, you could then direct your work to your speech synthesizer (on some models) to hear what it sounded like.

TWO TYPES OF SPEECH

There are two basic ways to generate speech from a computer. Speech can be recorded electronically and then played back. This is called **digitized** speech. Or, a set of sounds (phonemes) can be recorded and then combined to make words. This is called **phonetic** speech.

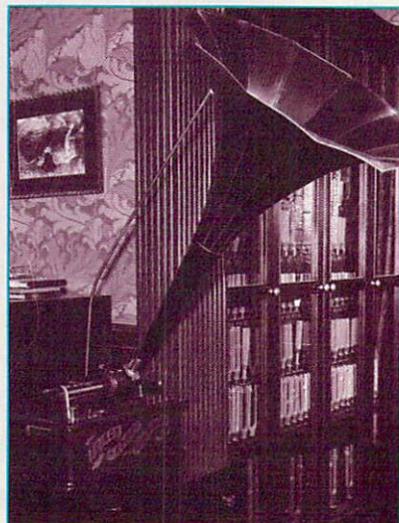
Digitized speech is the most understandable method of speech synthesis. That's because it's not really synthesized, i.e. put together from several disparate pieces, at all.



PHOTOGRAPH: AT&T CO.



PHOTOGRAPH: PHOTO WORLD



PHOTOGRAPH: EDISON NATIONAL HISTORIC SITE

It's an electronic recording of someone's voice, which picks up enough of the intonation and inflection to sound natural. Recorded messages from the telephone company, or those in cars reminding you to "Fasten your seat belts, please" are digitized.

The main problem with digitized speech is that it requires a large amount of memory. On a 64K computer the vocabulary is generally limited to a few hundred words. Also, the user cannot change the inflection of the voice, so the computer will always pronounce the same word the same way.

Creating speech from basic sounds, or **phonemes**, is a more versatile method. You are essentially manipulating the 64 sounds that make up all English words. By carefully using these prerecorded phonemes, you can program the computer (in BASIC) to say anything, with almost any inflection you wish. Software provided with some synthesizers provides BASIC commands, such as SAY or SPEAK, that allow you to program spoken words.

The phonetic method produces very clear speech, but is somewhat difficult to use. You must learn the phonemes to use them properly, and each synthesizer has a different way of representing them. Luckily, most manufacturers include a dictionary with common words already in phonetic form.

Instead of requiring you to program your own speech patterns, some synthesizers offer a **text-to-speech** mode—you type in a word and the computer says it. This is just another way of creating phonetic speech, except that the computer does it for you. For instance, you might command in BASIC, SPEAK "THIS IS THE COMPUTER", and the computer will say it.

This text-to-speech process has a set of built-in rules that allow the synthesizer to determine the correct pronunciation of a given word. This is great, except to get really good, clear words requires a very good internal set of rules. Some systems are definitely better than others. If you need an unlimited vocabulary (the computer will try to say anything you tell it to) and you don't have time to figure out what phonemes will make each word sound right, text-to-speech is the function for you. It's very easy to use and sufficient for most purposes.

HANDS-ON REVIEWS

Speech synthesizers are available for most personal computers. (As of this writing, the Coleco ADAM is one of the few microcomputers that cannot be used with a speech synthesizer.) Some synthesizers are specifically designed for certain computers and others can be connected to any computer with an RS-232C serial port. There are many different systems to choose from. Some are external devices and some are internal plug-in boards; some come with software and some don't; some can be used with a variety of ready-made programs and others must be programmed by the user.

For this Buyer's Guide, we tested several of the major speech synthesizers available—at least one for the Apple, Atari, Commodore, IBM, Radio Shack, Timex, TI, and CP/M-based computers. Here's a rundown of seven leading manufacturers.

Alien Group, 27 W. 23rd St., New York, NY 10010; (212) 741-1770.

If you are interested in something different, the Alien Group has something quite unique. It's called the Voice Box (\$129.95 for Apple, Commodore 64, and VIC-20; and \$169 for Atari). Besides being a fairly good synthesizer, the Voice Box also sings!

Speech can be generated both through text-to-speech and phonetic modes. The quality of the text-to-speech mode is not as good as on either the Votrax or Echo system. The phonetic mode, however, is comparable to the



POPULAR SPEECH SYNTHESIZERS

SYNTHESIZER	COMPANY	COMPUTERS	COMMENTS/PRICE
Personal Speech System	VOTRAX	All RS-232C and Parallel Computers	Very clear speech but hard to program; includes music synthesizer. \$395
Type'n-Talk	VOTRAX	All RS-232C Computers	About 20 programs use Votrax synthesizers. \$189
Echo	STREET ELECTRONICS	Apple C 64 IBM	<i>Echo Words</i> , a software library of 719 words, costs \$29. Apple-\$129; C 64-\$249; IBM-\$249
Voice Box	ALIEN GROUP	Apple Atari C 64 VIC-20	Can sing as well as talk. <i>Music Editor</i> and <i>Dictionary Editor</i> software available. \$129; Atari-\$169
Magic Voice	COM-MODORE BUSINESS MACHINES	C 64	<i>A Bee C's</i> , <i>Gorf</i> , <i>Wizard of Wor</i> , <i>Magic Voice Vocabulary Disk</i> , and education packages available. \$50
SAM	TRONIX	Apple Atari C 64	Synthesizer is on a disk; no hardware required; several programs included. \$59; Apple-\$99
Voice Master	COVOX	C 64 (Soon for Apple, Atari, IBM PC/PCjr)	Comes with microphone; you can program computer to speak in your own voice. \$89
COMvoice	GENESIS	C 64	Clear robotic speech; particularly good at numbers. \$99-\$140

others in sound, and much easier to use because there is some similarity between the phonemes and the sounds they represent. You have variable inflection controls, both by software and by external knobs on the synthesizer itself. The volume control is also on the synthesizer, which makes it easy to control but does not allow you to change it within your programs.

The really outstanding feature of the Voice Box is its ability to sing. The vocal qualities will never win any awards, but the Voice Box performs very well. Another factor that sets the Voice Box apart is the software available. The two programs, *Music Editor* (\$29.95) and *Dictionary Editor* (\$25), are "must have" items for any serious user. *Dictionary Editor* simplifies the work of breaking down your words into the proper phonemes, and then you can save the newly created words to disk. *Music Editor* allows you to write songs and lyrics.

The Commodore 64 version of *Music Editor* is especially good and it will work without the Voice Box, though just the music, and not the lyrics, will be heard. Both *Music Editor* and *Dictionary Editor* display a high-resolution face, in full color, with lips mouthing the words. It's really remarkable and something that must be seen to be believed. Note: *When I'm 64*, another package for the 64, has some demo songs parents might find objectionable.

Alien has just introduced three new synthesizers, which we have not yet tested. The Voice Box 3 series allows you to add intonation to words or phrases such as "I love you" without spelling them out in phonemes. The Voice Box 3m (\$129) plugs into any slot in the Apple II or IIe and includes a speaking program on a disk. Voice Box 3i (for "intelligent") costs \$219, also works on the Apple IIe, and appears to programs exactly as a printer does. According to Alien, you can send your word-processing file to your printer port, and hear it spoken on the synthesizer. Voice Box 3s (\$269) connects to any computer via the serial port. A printer can be connected to the synthesizer so that you can have two peripherals coming out of one port.

Commodore Business Machines, 1200 Wilson Drive, West Chester, PA 19380; (215) 431-9100.

Commodore has just released the Magic Voice Speech Module (\$50), which plugs into the expansion port on the Commodore 64. The built-in voice is not synthesized; instead, it is a digitized (or electronically recorded) female voice with a vocabulary of 235 words and phrases. These words require no memory, leaving the user with all of the BASIC workspace free. You access the words by using the command SAY, and the computer speaks the word, assuming it's one of the 235 words built in.

If 235 words are not enough for you, you'll be interested by the fact that Commodore is releasing a *Magic Voice Vocabulary Disk*, which has 10,000 words you can use, and also allows you to create some of your own. There is no software supplied with the Magic Voice, but Commodore sells a variety of cartridges that work with it. One is an educational package called *A Bee C's*. My three-year-old loved it and tried to answer the lady in the computer. There are two arcade games, *Wizard of Wor* and *Golf*, and

TI-99/4A OWNERS! SPEECH!

Triton Products, P.O. Box 8123, San Francisco, CA 94128; (800) 227-6900; in California, (800) 632-4777.

Triton Products, a mail-order company that has taken over marketing of TI and third-party products for the TI-99/4A, says it still has some TI Speech Synthesizers in stock. They cost \$49.95, plug into the right side of the TI, and can be programmed with the Extended BASIC, Terminal Emulator II, and Editor Assembler cartridges. About 10 reading and math programs utilize the synthesizer.

several educational packages. The games use a more robotic voice instead of the natural sounding female voice. The documentation includes information for both BASIC and machine-language programmers.

Covox, Inc., 675-D Conger St., Eugene, OR 97402; (503) 342-1271.

Covox's Voice Master, which is more of a voice digitizer than a synthesizer, plugs into the expansion port on the Commodore 64. Voice Master comes with a microphone that you speak into. You can store the resulting words or phrases and then play them back later. An accompanying program gives you nine commands, including LEARN and SPEAK. With these commands you can make the 64 say anything you wish. For instance, if you keyed in LEARN 1 and said "Hello" into the microphone, the computer would say "Hello" in your voice every time you typed SPEAK 1. You can have a maximum of 64 words or phrases in the computer's memory at one time. Other words can be stored on disk or tape files and loaded into a program, giving you almost unlimited speech capability.

Finally, you can use the speech without the Voice Master hardware. In other words, once you write a program using the Voice Master, and save it, you can run the program and hear it through the 64 itself. Thus, you can create programs and give them to friends. Covox says it is developing a voice-recognition software package that will work with Voice Master and that Voice Master will soon be available for Apple, Atari, and IBM computers.

Genesis Computer Corp., Ben Franklin Technology Center, Lehigh Univ., Bethlehem, PA 18015; (215) 861-0850.

Genesis' COMvoice is a cartridge that plugs into the Commodore 64's expansion slot and adds the new BASIC command, SPEAK. You can use the command to program your own words using the phonemes or you can use it with the direct text-to-speech mode. COMvoice uses a Votrax chip, which means it gives pretty good quality speech; but, as on the Votrax systems, it's somewhat unnatural sounding.

COMvoice is particularly good at speaking numbers and will correctly say any number between -999,999,999 and +999,999,999. You also have some control over the inflection by inserting commands into the phrase you want COMvoice to say. A version of COMvoice with an external speaker and volume control costs \$139. Genesis says that it will bring out an IBM PCjr version soon.

Street Electronics Corp., 1140 Mark Ave., Carpinteria, CA 93013; (805) 684-4593.

Street's Echo speech system is available in models for Apple, IBM, and other computers (Echo II, for Apple II, \$129; Echo PC for IBM, and Echo GP for other computers, \$249). It can be used in both the text-to-speech and phonetic modes. You have separate control over rate of speech and word inflection, as in the Votrax systems. There are many differences, however. For one thing, the Echo uses some of the computer's BASIC memory, leaving less room for the user to write programs. The sound is output through whatever speaker system your computer is using. Also, the Echo is powered by the computer.

Echo speech systems come with several programs on disk, including demonstrations and applications programs. In addition you can buy *Echo Words* for Apple or IBM (\$29.95), which is a library of 719 words in a clear female voice. When I heard the female voice after listening to the robotic voice that most systems use, I was very pleasantly surprised.

Street Electronics recently released a new system called Cricket. It has both natural and robotic voices, built-in music and sound synthesizers, and a clock. Though I have yet to hear it in action, Cricket looks like a direct competitor of Votrax's Personal Speech System, and it's priced

AND YOUR BIRD CAN SING



A humble cockateil

There are six people in our family: two adults and four children. Our family also boasts three ducks, a dog (Bonnie Belle Byrne), a gerbil (Gerber Jerber), and a cockateil (Charlie Bird). Added to the flesh-and-blood family members are three computers: a VIC-20 and two Commodore 64s. We haven't always considered our computers as part of the family. The deciding factor may very well have been the 64s' learning to talk.

We are now the proud owners of two economical, high-quality voice synthesizers for our Commodores: SAM, from Tronix, and Commodore's own Magic Voice speech module. After my husband, Dan, got over the shock of finding that *his* Commodore 64 would be talking to him in a *woman's* voice, we sat down to answer two questions: 1) Can the speech quality ever be good enough to make synthesizers more than an interesting curiosity? And 2) What real use can a family make of a computer voice?

With the Magic Voice, the answer to the first question is immediately apparent. Not only could our youngest (Molly, age 5) understand "her"—the speech is so natural that Bonnie (the dog) even barked at the strange new voice the first few times it spoke!

A program cartridge available for the Magic Voice, *A Bee C's*, went a long way towards generating a definite "Yes" to the question of usefulness. Molly immediately claimed it for her own and was prompted to use the joystick to participate in a game that helped her recognize the letters of the alphabet and differentiate between small letters and capitals. Now that we knew the program could be useful, we set out to find more ways to fit it into our daily computing family life.

First, I designed and Dan programmed some learning activities for Tim and James (7-year-old twins). The *A Bee C's* cartridge has a built-in vocabulary, which I scanned through to collect words that were at about the second-grade reading level. Then Dan wrote a program that would speak the words and allow the kids to type in the correct spelling. The kids, of course, took to the computer's new vocal ability like ducks to a swimming pool. Timmy began getting up early in the morning to program funny sayings to amaze his brother—which I certainly encouraged. But I had to put my foot down when James tattled that Tim was trying to make our computer swear!

By now, everyone is used to the idea that computer speech is a wonderful educational aid—but what else is it good for? Just ask Charlie Bird. Charlie came to live with us at Christmas. Of course we wanted him to be able to talk as well as the cockateils we had seen at the pet store—but he uttered nary a sound, except an extremely annoying wolf whistle that he always offered at the most inappropriate times! The book said that the best trainer for a bird was a child or a woman, a high-pitched voice being more natural to imitate. But the recommended time necessary to train him was out of the question what with our busy schedules. So . . . you guessed it! Timmy and I wrote a small program to repeat "Hi there!" over and over. And it works! We are currently attempting "1,2,3!" and hope to get him to say "Terrific!"

—BETSY BYRNE

considerably lower (\$179). It's available for the Apple IIc. An IBM PCjr model may follow. Chalkboard's *Bearjam*, a reading-readiness package for young children, is one of the first pieces of software that utilizes Cricket.

Tronix, 8295 S. La Cienega Blvd., Inglewood, CA 90301; (213) 215-0529.

Tronix's SAM is an entirely software-based voice synthesizer. There are no wires, equipment, or boards to install. Simply load SAM into your Apple, Atari, or Commodore disk drive, and you're in the speaking-machine business. SAM (\$59.95; \$99.95 for Apple) offers both text-to-speech and phonetic modes, and gives 10 BASIC commands.

One of the interesting features of SAM is the ease with which you can change its voice from Sam, to perhaps a little old lady, or maybe a fierce giant. SAM comes with several demonstration programs and there are a couple of packages on the market that use SAM to add speech to their programs. Futurehouse has a program called *Little Red Riding Hood*, which uses a light pen and SAM to tell children the story of the wolf's favorite little girl. SAM is a lot of synthesizer for the money.

Votrax Inc., 1394 Rankin, Troy, MI 48083; (800) 521-1350.

Votrax has two synthesizers that work with virtually any microcomputer: the Personal Speech System (PSS) and Type-'n-Talk system. Neither comes with any software, but Votrax has a list of about 20 programs you can buy that use its speech synthesizers.

The Personal Speech System is the more advanced of the two. It is a separate rectangular box that houses its own power supply and speaker system. It can be connected to any computer with a serial (RS-232C) or a parallel port. Votrax also makes connecting cables for the more popular microcomputers. Votrax synthesizers are treated like any external peripheral, such as a printer, and can be programmed from BASIC. That is, instead of sending output to a printer, you can send it to the synthesizer.

One way to use the PSS is in the text-to-speech mode, which means you simply enter the English spelling of the word you want and the synthesizer will convert it as best it can into sound. That can be quite a difficult feat for some English words, such as "read," which are pronounced differently depending on the context they are used in. However, Votrax's PSS has the best text-to-speech capability of the systems we tested for this article. The speech from the direct-text input was always clear and sharp, though it does sound somewhat like a robot speaking.

The phoneme-based speech sounds good, but the phonemes bear no resemblance to the sounds they represent, and are thus very difficult for the user to become acquainted with. In other words, it's not easy to write your own programs.

Though the PSS is expensive (\$395), it has several other features besides voice synthesis. The PSS has a 3.5K buffer, which means you can send quite a bit of data to it and let the computer go on to another task; a built-in clock, which many computers are not equipped with; and a reasonably good music synthesizer, so you can add simple music to your speech.

Votrax also markets the Type-'n-Talk speech synthesizer (\$189). Speech can be created through either the text-to-speech or phonetic modes. In these modes, the Type-'n-Talk is similar to the PSS, but it lacks some of the other features of its more expensive cousin. It does not have a clock, a music synthesizer, or a speaker. It can be used only with a serial connector. 

LOUIS WALLACE, who lives in Gainesville, Florida, with his wife and three young children, is a chemist at the University of Florida's Pesticide Research Laboratory. He worked as a designer on Graphics Magician (Abacus Software).

Freedom Road

STEVE ROBERTS IS TRAVELING ACROSS AMERICA ON A BICYCLE BUILT FOR TWO (COMPUTERS)

PHOTOGRAPH BY KATHERINE PEDEN

I'm writing this at the Hostel in the Woods of Brunswick, Georgia. I'm sitting by a lake in the late November sun; the word processor on my lap is plugged into a solar power system.

"That, perhaps, is an indication of the kind of technology that accompanies me on this 16,000-mile journey. My three-bedroom ranch in suburban Columbus, Ohio, is gone—replaced by a 135-pound package that I have fondly dubbed the 'Winnebiko.' It is a home, office, and human-powered recreational vehicle."

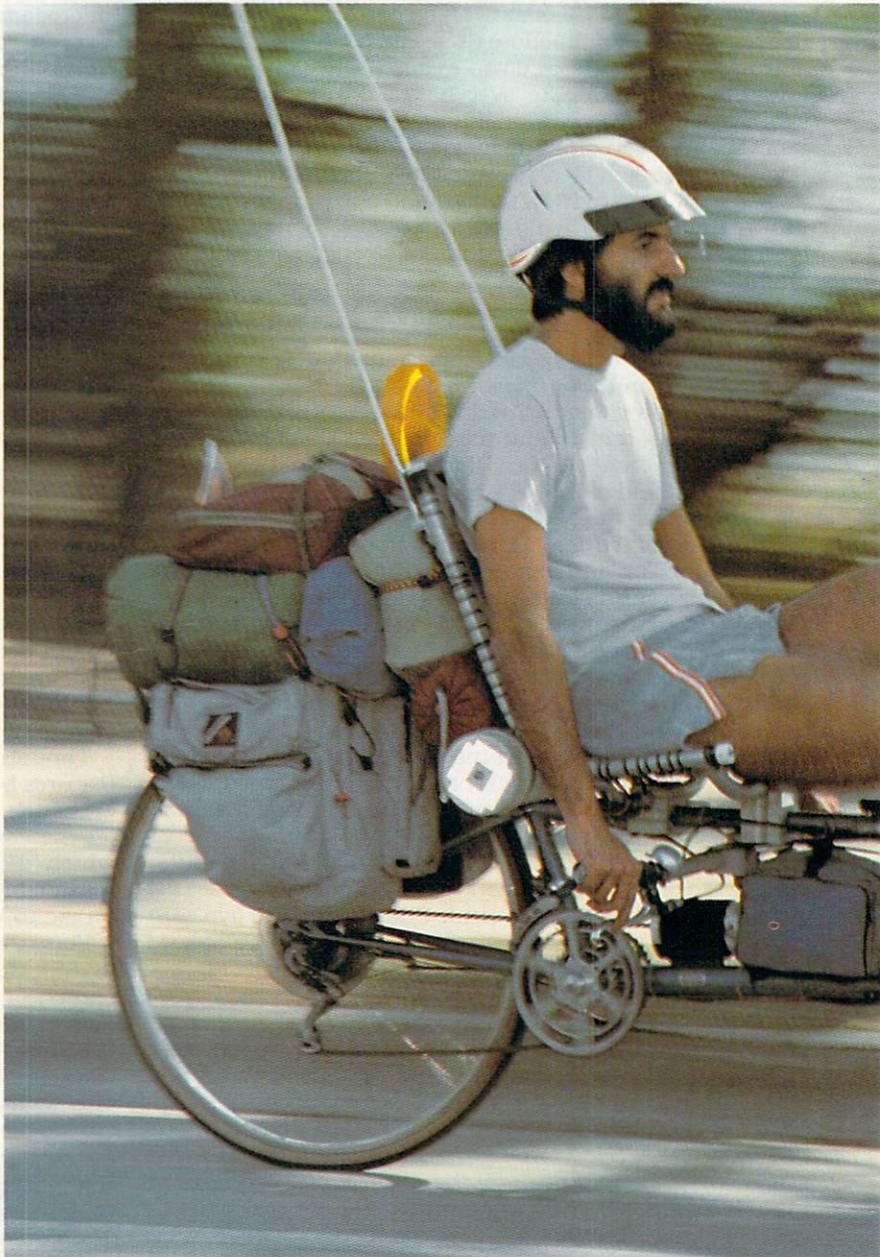
This is a segment of the on-line account of freelance writer Steven K. Roberts' planned 16,000- to 20,000-mile high-tech bicycle trip that will take him on a clockwise loop around America. Several months and some 5,000 miles after this entry in his electronic diary, Roberts' affection for his decidedly peculiar-looking method of transportation remains undimmed. "The Winnebiko isn't a trade-show exhibit or a celebration of future technology," he says. "It's a functional office on a bicycle, and it works."

Two computers—one on the bike that monitors time, speed, and distance via liquid crystal readouts, and a Radio Shack Model 100—are part of his mobile office. So are two solar panels, which Roberts mounted on the sides of the bike. The solar panels capture sunlight to power the 12-volt battery that operates the Model 100, as well as the bike's lights, security system, and radio gear. The battery is housed in an aluminum box along with a CB radio, a circuit to control the battery's charge, and the vibration-sensitive security system that triggers Roberts' pocket beeper if anyone tries to make off with the Winnebiko.

The custom-built box fits neatly into a handlebar bag equipped with meters that display the battery's voltage and charge current. An auxiliary battery charger takes over if extended overcast skies interrupt the solar power supply. A powerful headlight, taillight, yellow caution flasher, regular bicycle light, and strobe light make the bike roadworthy. Camping equipment stored in the saddlebags provides a home on the road.

MORE THAN A VACATION

Roberts uses a modem to "upload," or send over phone wires, what he writes at night on his Model 100 to CompuServe's mainframe computer. His manager, Kacy Branstetter, then "downloads," or receives, the files to her computer with the same numbers and passwords Roberts has used to store the information on CompuServe. In effect, he's given her a key, via a password, to his otherwise locked



CAROLE HOUZE GERBER is a freelance writer in Columbus, Ohio, and the author of *Turn Your Kid Into a Computer Genius*, recently published by E.P. Dutton.

**BY CAROLE
HOUZE GERBER**

files. Roberts sends all letters, articles, and book chapters via CompuServe, so Kacy can call them up to her computer screen to edit and mail at her leisure.

Roberts also uses CompuServe to chat with some of its 100,000 subscribers, to leave electronic-mail messages, and to file regular on-line accounts of his travels, which can be read by typing GO CAA (for "Computing Across America") at the appropriate CompuServe prompt. He also maintains a "hospitality file," where on-line friends can leave invitations for him to visit. So far, about 400 people have offered him a place to stay, and he's taken many of them up on it.

SEE THE U.S.A.

By spring, Roberts had pedaled (at a rate of about 70 miles a day) and word processed his way through placid country towns and bustling cities in Ohio, Indiana, Kentucky, North Caro-

Outfitted for both comfort and safety, Roberts' recumbent bicycle serves as a home and office on the road. The handlebars are below and beside the seat.



lina, Virginia, Georgia, Florida, Alabama, and Mississippi. Keeping to the backroads, and occasionally canal towpaths, Roberts sees a countryside that most travelers miss. The scenery, he reports, is gorgeous. From the seat of a bike he savors sights that, viewed from car windows, would pass as blurred images.

It's the people, though, who keep him from becoming lonely on his solitary journey. "Daily encounters range from the bizarre to the sublime," he chuckles. In addition to on-line friends he finally meets in person, Roberts has met scores of college students, senior citizens, farmers, tourists, a tattoo artist, and a prison work crew. Aside from nights spent in his tent, Roberts has stayed in homes, hostels, boats, dormitories, a school for delinquent boys, and an occasional hotel. He has cooked over campfires, been invited to dinner by curious strangers, and—ever mindful of expenses—eaten at dozens and dozens of greasy spoons. Adventure, he says, awaits him at every turn.

Most people Roberts encounters are friendly. From a group of Indiana University coeds came the yell, "Look at that awesome bike!" Many people are flabbergasted. "Is this a solar heater or some kind of tool kit?" asked a science teacher in Miami as she checked out the Winnebiko's paraphernalia. Some people are hostile. An unfriendly hotel clerk in Florida, nervously eyeing the empty parking lot, told him all rooms were booked. "You gotta be out of your mind," yelled a driver in Martinville, Indiana. And more than a couple of spectators are sure they have it all figured out. "You're with NASA, aren't you?" yelled an Indiana farmer as his pickup rattled by.

Roberts' journey isn't all fun, of course. Pumping a bike all day—even one as well-designed as his custom-built recumbent model—is hard work. Early on, Roberts discovered a bad knee that clicks with every stroke of his leg. Still, despite headwinds and tailwinds, rainstorms, and being nearly run off the road by careless drivers, he says he is enjoying the trip immensely.

Although he had originally planned to loop the country in one year, a much-needed rest of several weeks in the Florida sun slowed Roberts' progress. "It really doesn't matter how long it takes, because I don't want to reduce this experience to a series of stops along the way," he says. "Instead, I want to savor it all. The real point of this trip is the freedom technology has granted me to break away from my desk and make my home on the road."

Parts of this article are based on an on-line interview, conducted over CompuServe's network, between Carole Houze Gerber in Columbus, Ohio, and Steve Roberts in Gainesville, Florida.

If you want to contact Roberts, you can reach him through CompuServe. His User ID number is 70007,362 and his handle on CompuServe CB is "Wordy." 

can obtain the total value of your collection, or break it down by individual artist. If you belong to a sailing club and regularly exchange regatta statistics with other members, the data is no farther away than your fingertips. En route to a flea market to buy stamps? Print out a list of your entire collection and take it along to avoid duplication and help fill in the gaps.

In the long run, a computer will allow you more time for the pleasurable parts of your hobby by eliminating a lot of the drudgery. Rather than sift through dozens of notepads to track down when you last spotted a bay-breasted warbler, you can punch a few keys and gather the same information. Within minutes, you'll be well on your way to a comfortable perch, with your binoculars in hand.

Of course, not everyone will want to computerize their hobby, and not everyone should. Whether you do or don't will depend on a variety of factors, including the type of hobby you have and the volume of data you wish to store. For example, if you collect family recipes, a file box might be just as easy, or easier, to use. If you're a fly-by-night birdwatcher who enjoys the sights but doesn't record the details (time and location of sightings), you won't need a computer, or even a pencil and paper.

If you do decide to combine your hobbyist hankerings and computer skills, however, there are a few different tacks you can take. You can write your own program, use a database management system, or purchase hobby-specific software. Your decision probably will depend on how proficient you are at programming, how much time you're willing to devote to setting up a data base for your specific needs, or how much money you're willing to spend on commercial software.

Though the hobbyists I interviewed didn't always agree on the same approach, they all found that using a computer had made their hobbies more enjoyable. And their comments were convincing. After interviewing the bunch, I pulled out my old marble pouch and have been sorting my aggies and cat's-eyes ever since.

WRITE YOUR OWN PROGRAM

Creating your own program is certainly not the easiest route, but it will allow you the most flexibility. And, once you've designed your first data-base program, you can use it as a guide to write others. Though this method will probably require the greatest investment of your time, it should give you the most satisfaction.

Categorizing your coins. Gary Oppenheimer, a New York City photographer, is a supporter of the write-your-own-program approach. He has written two hobby-specific programs in BASIC—one to categorize his slides and one for his father's coin collection. "If you can program in BASIC, it's worth trying to write your own software." He notes that a lot of data bases are "too complicated to figure out. Sometimes it's easier to write it yourself."

The year-old program Gary wrote for his father's Commodore 64 is "nothing fancy—just a basic storage and retrieval system." Gary included fields for purchase value, grade, and date of purchase. "I could have included any kind of calculation, but I just incorporated what my father wanted."

The elder Oppenheimer admits he wouldn't buy a computer "solely to keep track of his hobby." But, the additional application has been a big help—especially on his coin-shopping excursions. He can now bring along a complete printout of his collection.

Tracking the airwaves. You need not be a collector of coins to take advantage of the computer's recordkeeping capabilities and your own programming expertise; you also can be a collector of data. Ham-radio operator Bill Ellison of New York City has been keeping track of his long-distance friends for more than 40 years. His TRS-80 Model III has been his assistant for two of those years. In a given evening, Bill will chat with new and old acquaintances

COIN AND STAMP COLLECTORS, BOWLING AND SAILING ENTHUSIASTS, AND COUNTLESS OTHERS HAVE TURNED COMPUTERS INTO THEIR HOBBYING ASSISTANTS.

5 TIPS ON COMPUTERIZING YOUR HOBBY

Here are some simple, but fundamental, steps you should follow to computerize your hobby.

1. Make a list of the information you want to store and retrieve from your computer.

2. Evaluate your categories. Are they primarily numerical or alphabetical? Do they contain a lot of text (i.e. historical information and comments)? Does your information require constant updating, deleting, record-modifying? Use this evaluation to help you write your own program or to help find the best commercial software.

3. Contact your local hobbyists' clubs and organizations and your local computer users' group. Someone already may have written a specific program for the same hobby, or researched commercial software. (This can save you a lot of groundwork.)

4. Do your software homework. Find out what sort of generalized data-base management programs are available for your computer brand. Also, check into hobby-specific programs. If you plan to keep track of a number of different hobbies and home records, a general information-management system is probably more cost effective.

5. Keep your hobby-related information on one separate and dedicated disk. Make certain you make a backup copy.

"WE'VE HAD OUR ATARI FOR NEARLY TWO YEARS, AND CATALOGING OUR ART IS STILL ONE OF ITS MAIN USES IN OUR HOME."

from Italy, Scotland, Wales, Belgium, South Africa, Australia, and Holland. Once Bill makes a long-distance radio connection, he swaps vital information with the other party. Then, using a BASIC program he wrote with a neighbor, he enters in the party's call ID, the date of the call, the address of the party, the name of the party, the frequency of the signal he used to speak on, and additional information.

For Bill, one of the major benefits of using the computer and developing his own program is the flexibility of the filing system. "I can ask the computer to give me a list of any calls made at a certain frequency. If I remember speaking to a guy named Bob, but I can't remember his call ID, I simply ask the computer to list all the Bobs I've contacted.

"I've been involved in radio a long time, but the computer adds a great deal to the hobby."

USE A DATA BASE

The evolution of commercial software—particularly data-base management programs—has eased the computing task for the hobbyist. It's no longer necessary to write your own program, unless, of course, that happens

to be one of your hobbies. Today's hobbyist has a wide variety of data-base systems to choose from in a broad range of prices. Some are organized like index-file cards, others like spreadsheets, and some like traditional data bases, which require you to specify your parameters.

Data bases are some of the most versatile programs available on the market. But, they also can be the most frustrating to figure out. However, if you do your research well, you can wind up with software to serve your hobby and a variety of other needs.

An artsy approach. Lester B., a New York trial lawyer and art collector, "would dread having to write a program to do anything." So, he turned to *File Manager* (Atari, Inc., 1312 Crossman Rd., PO Box 61657, Sunnyvale, CA 94086) and his computer-savvy son-in-law. With a little help and encouragement, Lester and his wife, Francine, determined what fields of information they needed to maintain. They keep track of the title and type of artwork, the artist, the value, the date and place of purchase, and the current location of the piece. *File Manager* is easy to use whenever they buy, sell, or move a piece of artwork.

SOME HOBBY-SPECIFIC SOFTWARE

CATEGORY	MANUFACTURER/ADDRESS	PRODUCT NAME/PRICE	MODEL
Astrology	NAVARONE INDUSTRIES, INC. 510 Lawrence Expressway, Suite 800 Sunnyvale, CA 94086; (408) 866-8579	<i>Astrology Horoscope Maker</i> \$49.95	TI-99/4A, 32K (disk); IBM PC/PCjr, 128K (disk). Version planned for Commodore.
Astrology	ATARI PROGRAM EXCHANGE P.O. Box 3705 Santa Clara, CA 95055; (800) 538-1862	<i>Astrology</i> \$24.95	Atari 800/XL series, 40K (disk).
Bowling	CDE SOFTWARE 2463 McCready Los Angeles, CA 90039; (213) 661-2031	<i>Bowling League Secretary</i> \$59.95	Kaypro, Osborne, TRS-80 Models I/III/4 w/CP/M, 56K (disk).
Coin Collecting	COMPU-QUOTE 6914 Berquist Ave. Canoga Park, CA 91307; (213) 348-3662	<i>Inventory of Coins</i> \$95	Apple II/II plus/IIe, 48K (disk); IBM PC/PCjr, 64K (disk); TRS-80 Models I/III/4, 48K (disk).
Coin Collecting	SOFTSHOE ENTERPRISES 10959 Kane Ave. Whittier, CA 90604; (213) 944-5541	<i>CoinMasstore</i> \$59	Apple II/II plus/IIe, 48K (disk).
Crosswords	ARTSCI 5547 Satsuma Ave. N. Hollywood, CA 91601; (818) 985-5763	<i>Crosswords</i> \$24.95	Apple II/II plus/IIe, 48K (disk).
Genealogy	ACORN SOFTWARE PRODUCTS 353 W. Lancaster Ave. Radnor Square Wayne, PA 19087; (215) 964-9103	<i>Your Family Tree</i> \$29.95	IBM PC/PCjr, 128K (disk); TRS-80 Models III/4, 64K (disk).
Genealogy	MICHTRON 6655 Highland Pontiac, MI 48054; (313) 666-4800	<i>Family Tree</i> \$29.95	TRS-80 Models I/III/4, 48K (disk or cassette).
Genealogy	QUINSEPT, INC. P.O. Box 216 Lexington, MA 02173; (617) 862-0404	<i>Family Roots</i> \$185	ADAM, 48K (cassette); Apple II/II plus/IIe/III w/emulator, 48K (disk); IBM PC, 128K (disk).
General	SOFTSHOE ENTERPRISES 10959 Kane Ave. Whittier, CA 90604; (213) 944-5541	<i>Masstore Collector</i> \$49	Apple II/II plus/IIe, 48K (disk).
Golf	SYSTEMICS, INC. 3050 Spring St. W. Bloomfield, MI 48033; (313) 851-2504	<i>GolfCap</i> 49.95	IBM PC/PCjr (enhanced), 64K (disk).
Ham Radio	RAK ELECTRONICS P.O. Box 1585 Orange Park, FL 32067; (904) 264-6777	<i>Vic Morse II</i> , \$12.95 (VIC-20); <i>C 64 Morse II</i> , \$14.95 (C 64)	VIC-20 (cassette); Commodore 64 (cassette).
Record Collecting	McGRAW-HILL 1221 Ave. of the Americas, Room 2688 New York, NY 10020; (609) 426-5245	<i>Record Collection Manager</i> \$29.95	Apple II plus/IIe, 64K (disk, CP/M, 80-column card); IBM PC/PCjr, 128K (disk); TRS-80 Models III/4, 48K (disk).
Stamp Collecting	SOFTSHOE ENTERPRISES 10959 Kane Ave. Whittier, CA 90604; (213) 944-5541	<i>StampMasstore</i> \$49	Apple II/II plus/IIe, 48K (disk).
Stamp and Coin Collecting	McGRAW-HILL 1221 Ave. of the Americas, Room 2688 New York, NY 10020; (609) 426-5245	<i>Stamp & Coin Collection Manager</i> \$29.95	Apple II plus/IIe, 64K (disk, CP/M, 80-column card); IBM PC/PCjr, 128K (disk); TRS-80 Models III/4, 48K (disk).

Their collection includes valuable pieces of exotic Oriental jade, woodcarvings, and ivory. Their walls display paintings and lithographs by artists such as Chagall, Miro, and Dali.

The couple enjoys "screening" their collection on their Atari 800. "Seeing them [the listings] on the screen is like paying them [the artwork] a visit," jokes Francine. "We've had our Atari for nearly two years and cataloging our art is still one of its main uses."

The stamp of approval. Like Lester, Philip Hinze, an assistant controller for the Greyhound Computer Corporation in Phoenix, was a novice when it came to programming. In fact, Philip, a stamp collector, had never touched a computer keyboard until nine months ago when he received an IBM PC as a Christmas gift.

He now uses his office's *Condor Database* program (Condor Computer Corp., 2051 S. State St., Ann Arbor, MI 48104) and his computer to manage his voluminous American stamp collection. Philip maintains detailed records for thousands of stamps, recording the catalog number, the kind of item (single stamp, line pair, plate block, etc.) he has collected. He records whether the stamp is mint or used, original "gum," hinged, and notes the number of perforations. He records the condition and centering of the stamp as a means of rating the overall quality. Finally, he keeps track of where and when he bought the stamp and what it cost.

"Now, it's so easy to tell someone where I obtained a particular stamp, whereas before it was a real nuisance to go searching through reams of paperwork for information."

A medal winner. And, the more data you have to store, the more useful a computer can be, as Lee Bishop of Santa Monica, California, quickly learned. A 20-year collector of British war medals, Lee uses his Apple IIe and *Instant Recall*, an information management system (available from Howard W. Sams & Co., 4300 W. 62nd St., Indianapolis, IN 46206). "After working with *Instant Recall* for 15 minutes, I thought of tons of uses that I'd never thought of before. It's terrifically utilitarian. If I want to know how many medals I have for the 'Black Watch' or the '73rd Highlanders,' I just hit a button, and there it is.

"The program works more like a file-card system than a data base, so you don't have to specify field or format. You can put your information in any format. That gives you a lot of freedom as to what sort of data you can put in. In addition to the name of the medal, the campaign, the regiment, and the individual recipient, I also keep track of the medal's condition, the purchase date and place, and the cost."

Lee's collection dates from the Napoleonic Wars (late 1700s) through the recent Falklands War. The medals have varying bars to commemorate participation in a certain action. They are given to an individual involved with a specific regiment. His collection not only in-

cludes medals, but the stories behind the battles and the people, as well.

Lee's wife, Jennifer, uses the computer for her hobby, too. With a program called *Family Roots* (see accompanying chart) she is tracing her family's history.

A new wave wonder. If you belong to a club or organization and share information with others, it is especially helpful to have an easy method to retrieve, calculate, and print data. Steve Vaughn, an electrical engineer from Saugerties, New York, uses his IBM PC to manage the affairs of the Kingston Sailing Club. He keeps the membership list on *PC-File*, (freeware, \$35 suggested, from Jim Button, P.O. Box 5604, Bellevue, WA 98006) and conducts all his correspondence on his word processor.

A friend of Steve's, also a sailor, developed an interesting application program on an Apple computer. The program, written in Applesoft BASIC, calculates the corrected finish times for the club's races. It takes the actual time and adjusts it based on the boat's handicap. "Sailing on the river is different from sea sailing. We have to modify some standard handicaps."

Steve recently transferred the original Apple version of the "racing formula" program to his IBM PC, and it's been smooth and calculated sailing on the Hudson River ever since.

HOBBY-SPECIFIC SOFTWARE

Back in the late 1970s, if you wanted software to organize your hobby, you had to write a program yourself. The software market has improved tremendously since those days. All types of data-base programs are available, and more recently, hobby-specific software has begun appearing on the market. These packages supply an appropriate format for your hobby, so you can avoid the painful steps sometimes associated with setting up a general data base. But, unlike the general filing systems, your hobby-specific software is limited to one application.

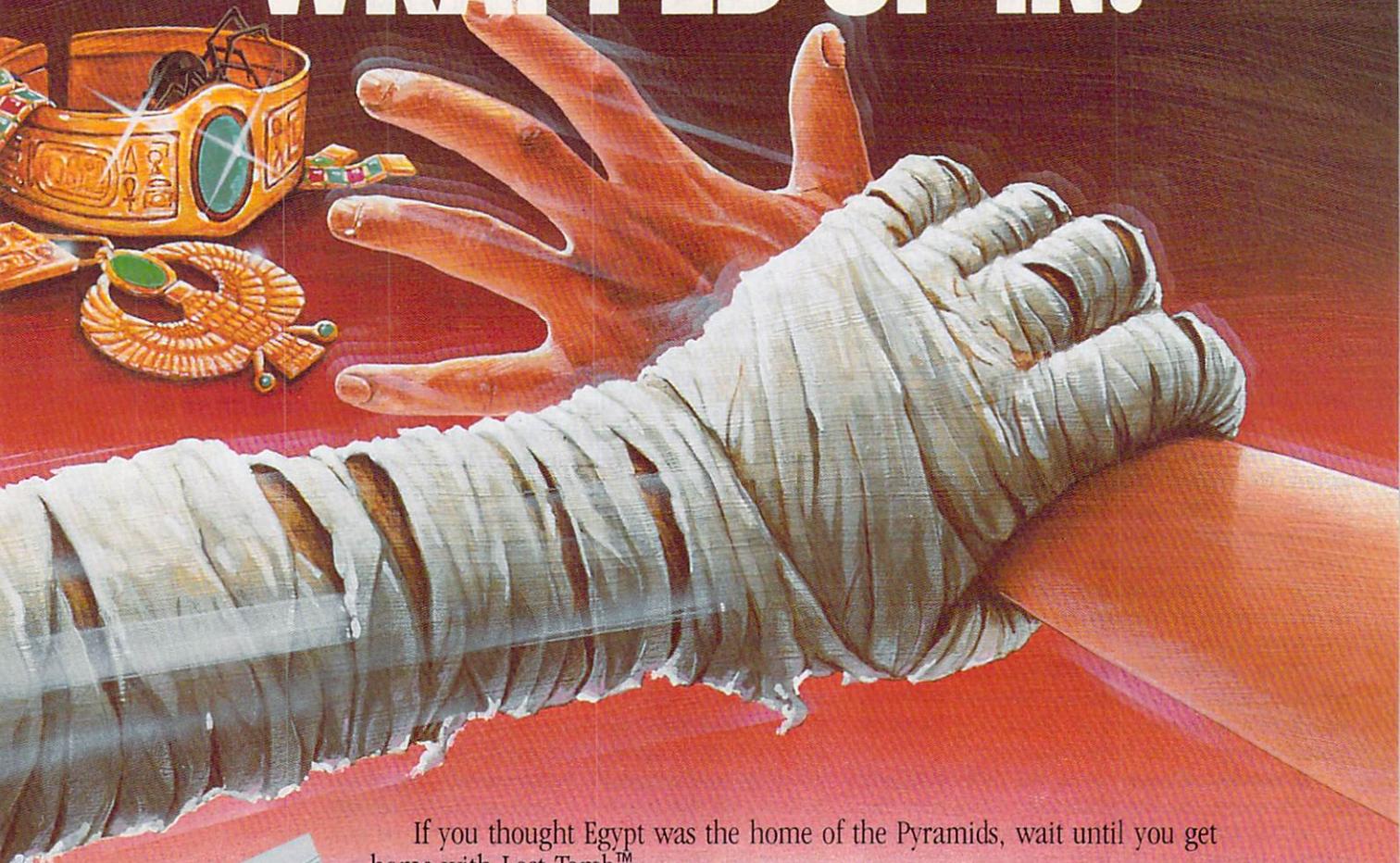
McGraw-Hill Software has announced the arrival of two hobbyist-dedicated packages (see accompanying chart). One is designed for stamp and coin collectors, and the other for record collectors (with options for classical and popular music collections). Many other software companies are sure to move in the same direction.

Odds are, your computer has already saved time you once spent typing second drafts, writing out mailing lists, or doing the household budget. You may suddenly find yourself with extra time on your hands. If you're an old-time hobbyist, pull out those forgotten shoeboxes and notepads from their dusty homes. If you're a novice hobbyist, take a second look at that collection or activity you'd almost abandoned. You'll find that the computer can be a wonderful co-hobbyist. And, best of all, it won't ask you to trade away your Brooklyn Dodgers baseball cards. 

"IF I WANT TO KNOW HOW MANY MEDALS I HAVE FOR THE 'BLACK WATCH' OR THE '73RD HIGHLANDERS,' I JUST HIT A BUTTON, AND THERE IT IS."

ROBIN RASKIN is a contributing editor to FAMILY COMPUTING. Her last article was "Computers That Earn Their Keep," for July's Home Business.

THE GAME YOU CAN GET WRAPPED UP IN.

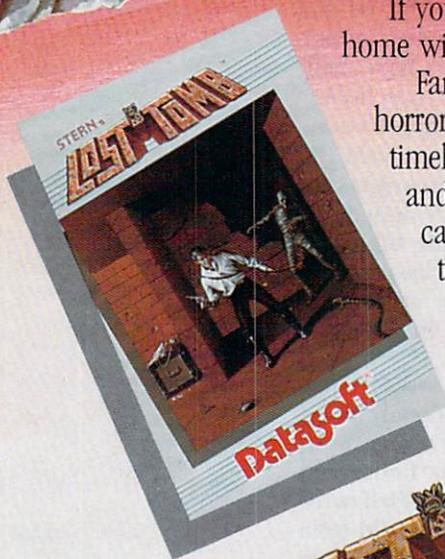


If you thought Egypt was the home of the Pyramids, wait until you get home with *Lost Tomb*.™

Far more than mere chambers of wonder, these chambers are filled with horror. Poisonous scorpions, screeching bats and terrifying mummies. And in the timeless tradition of the most daring expeditions, you'll pack a pistol, plenty of ammo and a whip to crack the curse of the pyramids. Earthquakes rumble along cavernous passageways. Walls crumble and crackle with gunfire. Your mission is to make it through all 91 chambers and 13 levels. And then make off with the loot. The only things we can't give you are the things you'll need most. Cool reflexes, uncanny instincts and the courage to use them.

Lost Tomb.™ Can you unravel the mystery?

Available now for Atari, Commodore 64, Apple II series and IBM PC and PC/JR. Suggested retail price \$29.95. Check with your local home computer software retailer for *Lost Tomb*.™ and to learn of other great programs from Datasoft® send for a free consumer catalog.



the PROGRAMMER

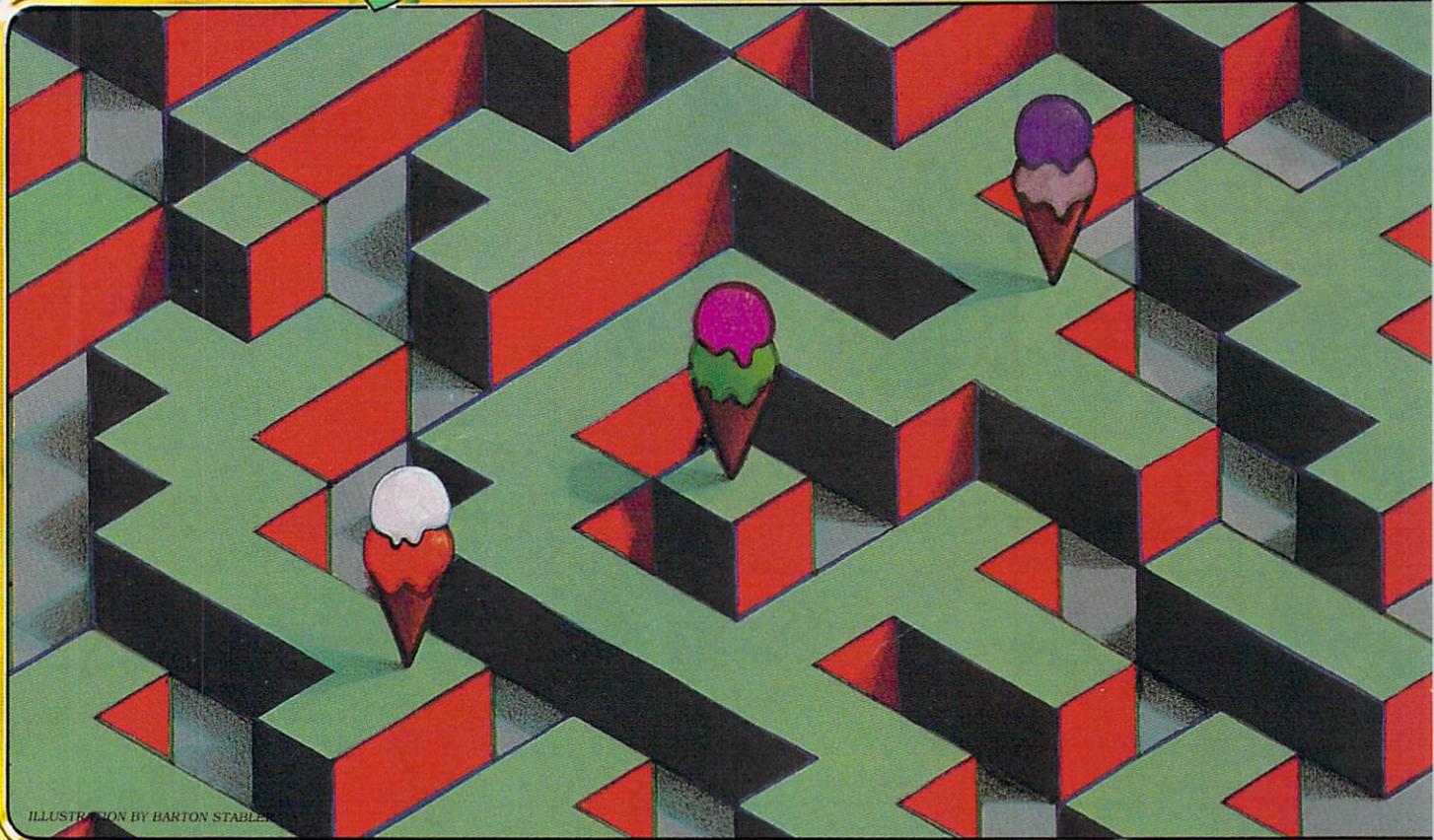


ILLUSTRATION BY BARTON STABLEY

★ A U G U S T ★

SUMMER PROGRAMS

Page 68

Cool off on a hot summer's day with our *Ice Cream Cone* program; then try to stop the *Renegade Robot* before it catches you!

PUZZLE

Page 84

MAN SNATCHED BY UFO! See details inside.

READER-WRITTEN PROGRAM

Page 91

Play an old-fashioned game of *Hangman* on your ADAM or Apple.

PROGRAMMING P.S. Page 83. Sorry, we goofed! Corrections to previous programs.

ILLUSTRATION BY JIM CHERRY III

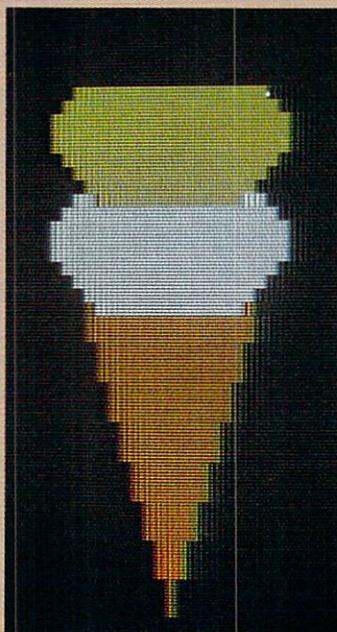
Cherry

ICE CREAM CONE

BY JOEY LATIMER

As you lie in your hammock on a hot summer's day, languidly fanning yourself with a copy of FAMILY COMPUTING, do you ever fantasize about eating a big, delicious, dripping ice cream cone? But does the thought of trudging through the hot streets to the neighborhood store require more energy than you can muster?

Well then, turn to your computer, select one of seven delicious flavors, and watch it dish up a treat that looks good enough to eat! (You may even get a surprise chocolate topping!)



Atari version of Ice Cream Cone.

ADAM/Ice Cream Cone

```

10 DIM scoop(2,22,2),cn(17,2),flav(8),fl$(8),ice(2)
20 FOR z = 1 TO 7
30 READ flav(z),fl$(z)
40 NEXT z
50 FOR x = 1 TO 2
60 FOR y = 24-12*x TO 33-11*x
70 FOR z = 1 TO 2
80 READ scoop(x,y,z)
90 NEXT z,y,x
100 FOR x = 1 TO 17
110 READ cn(x,1),cn(x,2)
120 NEXT x
130 TEXT
140 FOR x = 1 TO 7
150 PRINT x;" - ";fl$(x)
160 NEXT x
170 PRINT
180 PRINT "PLEASE PRESS THE NUMBER OF YOUR";"CHOICE."
190 FOR x = 1 TO 2
200 PRINT
210 PRINT "WHAT FLAVOR DO YOU WANT FOR";SPC(4);"SCOOP
#";x;"? ";
220 GET a$
230 IF a$ < "1" OR a$ > "7" THEN 220
240 PRINT a$
250 ice(x) = VAL(a$)
260 NEXT x
270 FOR d = 1 TO 200
280 NEXT d
290 GR
300 COLOR= 13
310 FOR ro = 1 TO 17
320 FOR co = cn(ro,1) TO cn(ro,2)
330 PLOT co,ro+22
340 NEXT co,ro
350 FOR z = 1 TO 2
360 COLOR= flav(ice(z))
370 FOR ro = 24-12*z TO 33-11*z
380 FOR co = scoop(z,ro,1) TO scoop(z,ro,2)

```

```

390 PLOT co,ro
400 NEXT co,ro,z
410 IF RND(1) > 0.5 OR ice(2) = 2 THEN 470
420 COLOR= 8
430 FOR co = scoop(2,0,1) TO scoop(2,0,2)
440 FOR ro = 0 TO RND(1)*15
450 PLOT co,ro
460 NEXT ro,co
470 FOR d = 1 TO 400
480 NEXT d
490 PRINT "PLEASE PRESS ANY KEY FOR","ANOTHER CONE.";
500 GET a$
510 GOTO 130
1000 DATA 15,VANILLA,8,CHOCOLATE,11,RASPBERRY,1,CHERRY
1010 DATA 14,BLUEBERRY,12,MINT,4,PISTACHIO
2000 DATA 15,23,14,24,13,25,13,25,12,26,12,26,12,26,12
2010 DATA 26,13,25,13,25,14,24,16,22,15,23,14,24,13,25
2020 DATA 13,25,12,26,12,26,12,26,12,26,13,25,13,25,13
2030 DATA 25,14,24,14,24,14,24,14,24,14,24,15,23,15,23
2040 DATA 16,22,16,22,16,22,17,21,17,21,17,21
2050 DATA 18,20,18,20,18,20,19,19,19,19

```

Apple/Ice Cream Cone

```

10 DIM SCOOP(2,22,2),CN(17,2),FLAV(8),FL$(8),ICE(2)
20 FOR I = 1 TO 29
30 READ S
40 POKE 767+I,S
50 NEXT I
60 FOR Z = 1 TO 7
70 READ FLAV(Z),FL$(Z)
80 NEXT Z
90 FOR X = 1 TO 2
100 FOR Y = 24-12*X TO 33-11*X
110 FOR Z = 1 TO 2
120 READ SCOOP(X,Y,Z)
130 NEXT Z,Y,X
140 FOR X = 1 TO 17
150 READ CN(X,1),CN(X,2)
160 NEXT X
170 TEXT
180 HOME
190 FOR X = 1 TO 7
200 PRINT X;" - ";FL$(X)
210 NEXT X
220 PRINT
230 PRINT "PLEASE PRESS THE NUMBER OF YOUR CHOICE."
240 FOR X = 1 TO 2
250 PRINT
260 PRINT "WHAT FLAVOR DO YOU WANT FOR SCOOP #";X;"? "
;
270 GET A$
280 IF A$ < "1" OR A$ > "7" THEN 270
290 PRINT A$
300 ICE(X) = VAL(A$)
310 NEXT X
320 FOR D = 1 TO 200
330 NEXT D
340 GR
350 COLOR= 13
360 FOR RO = 1 TO 17
370 FOR CO = CN(RO,1) TO CN(RO,2)
380 PLOT CO,RO+22
390 NEXT CO,RO
400 FOR Z = 1 TO 2
410 COLOR= FLAV(ICE(Z))
420 FOR RO = 24-12*Z TO 33-11*Z
430 FOR CO = SCOOP(Z,RO,1) TO SCOOP(Z,RO,2)
440 PLOT CO,RO
450 POKE 6,Z
460 POKE 8,240-CO*ICE(Z)
470 CALL 768
480 NEXT CO,RO,Z
490 IF RND(1) > 0.5 OR ICE(2) = 2 THEN 580
500 COLOR= 8

```

```

510 FOR CO = SCOOP(2,0,1) TO SCOOP(2,0,2)
520 FOR RO = 0 TO RND(1)*15
530 PLOT CO,RO
539 REM --PLAY A NOTE--
540 POKE 6,2
550 POKE 8,RO*10+100
560 CALL 768
570 NEXT RO,CO
580 FOR D = 1 TO 400
590 NEXT D
600 PRINT "PLEASE PRESS ANY KEY FOR ANOTHER CONE.";
610 GET A$
620 GOTO 170
1000 DATA 165,8,74,133,10,164,8,173,48,192
1010 DATA 136,234,234,208,251,165,7,56,229
1020 DATA 10,133,7,176,237,198,6,208,233,96
2000 DATA 15,VANILLA,8,CHOCOLATE,11,RASPBERRY,1,CHERRY
2010 DATA 14,BLUEBERRY,12,MINT,4,PISTACHIO
3000 DATA 15,23,14,24,13,25,13,25,12,26,12,26,12,26,12
3010 DATA 26,13,25,13,25,14,24,16,22,15,23,14,24,13,25
3020 DATA 13,25,12,26,12,26,12,26,12,26,13,25,13,25,13
3030 DATA 25,14,24,14,24,14,24,14,24,14,24,15,23,15,23
3040 DATA 16,22,16,22,16,22,17,21,17,21,17,21
3050 DATA 18,20,18,20,18,20,19,19,19,19

```

Atari/Ice Cream Cone

```

10 DIM FLAVOR(7,2),ICE(2),FL$(63),T$(9)
19 REM --SET DISPLAY TO FORTY COLUMNS--
20 POKE 82,0
30 OPEN #1,4,0,"K:"
40 FOR X=1 TO 63
50 FL$(X)=" "
60 NEXT X
70 FOR X=1 TO 7
80 READ A,B,T$
90 FLAVOR(X,1)=A
100 FLAVOR(X,2)=B
110 FL$(9*X-8)=T$
120 NEXT X
130 PRINT CHR$(125);
140 FOR X=1 TO 7
150 PRINT X;" - ";FL$(9*X-8,9*X)
160 NEXT X
170 PRINT CHR$(155);"PLEASE PRESS THE NUMBER OF YOUR C
HOICE."
180 FOR X=1 TO 2
190 PRINT CHR$(155);"WHAT FLAVOR DO YOU WANT FOR SCOOP
#";X;"? ";
200 GET #1,A
210 IF A<ASC("1") OR A>ASC("7") THEN 200
220 PRINT CHR$(A)
230 ICE(X)=VAL(CHR$(A))
240 NEXT X
250 FOR D=1 TO 200
260 NEXT D
270 GRAPHICS 5+16
280 SETCOLOR 0,1,2
290 SETCOLOR 1,FLAVOR(ICE(1),1),FLAVOR(ICE(1),2)
300 SETCOLOR 2,FLAVOR(ICE(2),1),FLAVOR(ICE(2),2)
310 COLOR 1
320 FOR X=18 TO 39 STEP 3
330 FOR Y=X TO X+2
340 PLOT 38-(39-X)/3,Y
350 DRAWTO 38+(39-X)/3,Y
360 NEXT Y
370 NEXT X
380 FOR N=2 TO 3
390 COLOR N
400 W=7
410 FOR Y=2+8*(3-N) TO 2+8*(4-N)
420 SOUND 0,Y,10,10
430 W=W+((Y-9+8*(N=3))<=3)-((Y-9+8*(N=3))>=6)
440 PLOT 38-W,Y
450 DRAWTO 38+W,Y
460 NEXT Y
470 SOUND 0,0,0,0

```

```

480 NEXT N
490 IF RND(0)>0.5 THEN 600
500 COLOR 1
510 Q=3
520 FOR X=27 TO 49
530 Q=Q-(X<=29)+(X>=48)
540 Y=INT(RND(0)*10)+4
550 PLOT X,Q+2
560 DRAWTO X,Y+2
570 SOUND 0,Y,10,10
580 NEXT X
590 SOUND 0,0,0,0
599 REM --CLEAR KEYBOARD BUFFER--
600 POKE 764,255
610 GET #1,A
620 GOTO 130
1000 DATA 0,14,VANILLA,3,4,ORANGE
1010 DATA 3,2,RASPBERRY,4,3,CHERRY
1020 DATA 7,5,BLUEBERRY,13,5,MINT,14,5,PISTACHIO

```

Commodore 64/Ice Cream Cone

```

10 DIM SCOOP(2,12,2),CN(12,2),FLAV(8),FL$(8),ICE(2)
20 READ SB,CB,S
30 FOR Z=1 TO 7
40 READ FLAV(Z),FL$(Z)
50 NEXT Z
60 FOR X=1 TO 2
70 FOR Y=12-6*X TO 19-7*X
80 FOR Z=1 TO 2
90 READ SCOOP(X,Y,Z)
100 NEXT Z,Y,X
110 FOR X=1 TO 12
120 READ CN(X,1),CN(X,2)
130 NEXT X
140 POKE 53280,0
150 POKE 53281,0
160 FOR E=S TO S+28
170 POKE E,0
180 NEXT E
190 POKE S+24,15
200 POKE S+5,17
210 POKE S+6,85
220 PRINT CHR$(147);
230 FOR X=1 TO 7
240 PRINT X;"- ";FL$(X)
250 NEXT X
260 PRINT
270 PRINT "PLEASE PRESS THE NUMBER OF YOUR CHOICE."
280 FOR X=1 TO 2
290 PRINT
300 PRINT "WHAT FLAVOR DO YOU WANT FOR SCOOP #";CHR$(X
+48);"? ";
310 GET A$
320 IF A$<"1" OR A$>"7" THEN 310
330 PRINT A$
340 ICE(X)=VAL(A$)
350 NEXT X
360 FOR D=1 TO 200
370 NEXT D
380 PRINT CHR$(147);
390 FOR RO=1 TO 12
400 FOR CO=CN(RO,1) TO CN(RO,2)
410 POKE SB+CO+40*(RO+12),86
420 POKE CB+CO+40*(RO+12),7
430 NEXT CO,RO
440 POKE S+4,33
450 FOR Z=1 TO 2
460 FOR RO=12-6*Z TO 19-7*Z
470 FOR CO=SCOOP(Z,RO,1) TO SCOOP(Z,RO,2)
480 POKE S+1,CO*ICE(Z)
490 POKE S,CO*ICE(Z)
500 POKE SB+CO+40*RO,160
510 POKE CB+CO+40*RO,FLAV(ICE(Z))

```

SUMMER PROGRAMS

```
520 NEXT CO,RO,Z
530 IF RND(1)>.5 OR ICE(2)=2 THEN 610
539 REM --DRAW CHOCOLATE TOPPING--
540 FOR CO=SCOOP(2,0,1) TO SCOOP(2,0,2)
550 FOR RO=0 TO INT(RND(1)*10)
560 POKE S+1,RND(1)*29
570 POKE S,RO*3
580 POKE SB+CO+40*RO,160
590 POKE CB+CO+40*RO,9
600 NEXT RO,CO
610 POKE S+4,0
620 FOR D=1 TO 400
630 NEXT D
640 POKE 198,0
650 POKE 214,23
660 PRINT
670 PRINT TAB(4);"PRESS ANY KEY";TAB(22);"FOR ANOTHER
CONE.";
680 GET AS
690 IF AS="" THEN 680
700 GOTO 220
1000 DATA 1024,55296,54272
2000 DATA 1,VANILLA,9,CHOCOLATE,2,RASPBERRY,10,CHERRY
2010 DATA 6,BLUEBERRY,14,MINT,13,PISTACHIO
3000 DATA 15,23,14,24,13,25,13,25,13,25,14,24,15,23
3010 DATA 15,23,14,24,13,25,13,25,13,25,14,24,15,23
3020 DATA 15,23,15,23,16,22,16,22,17,21,17,21,17
3030 DATA 21,17,21,18,20,18,20,19,19
```

IBM PC w/Color Graphics Adapter & IBM PCjr/Ice Cream Cone

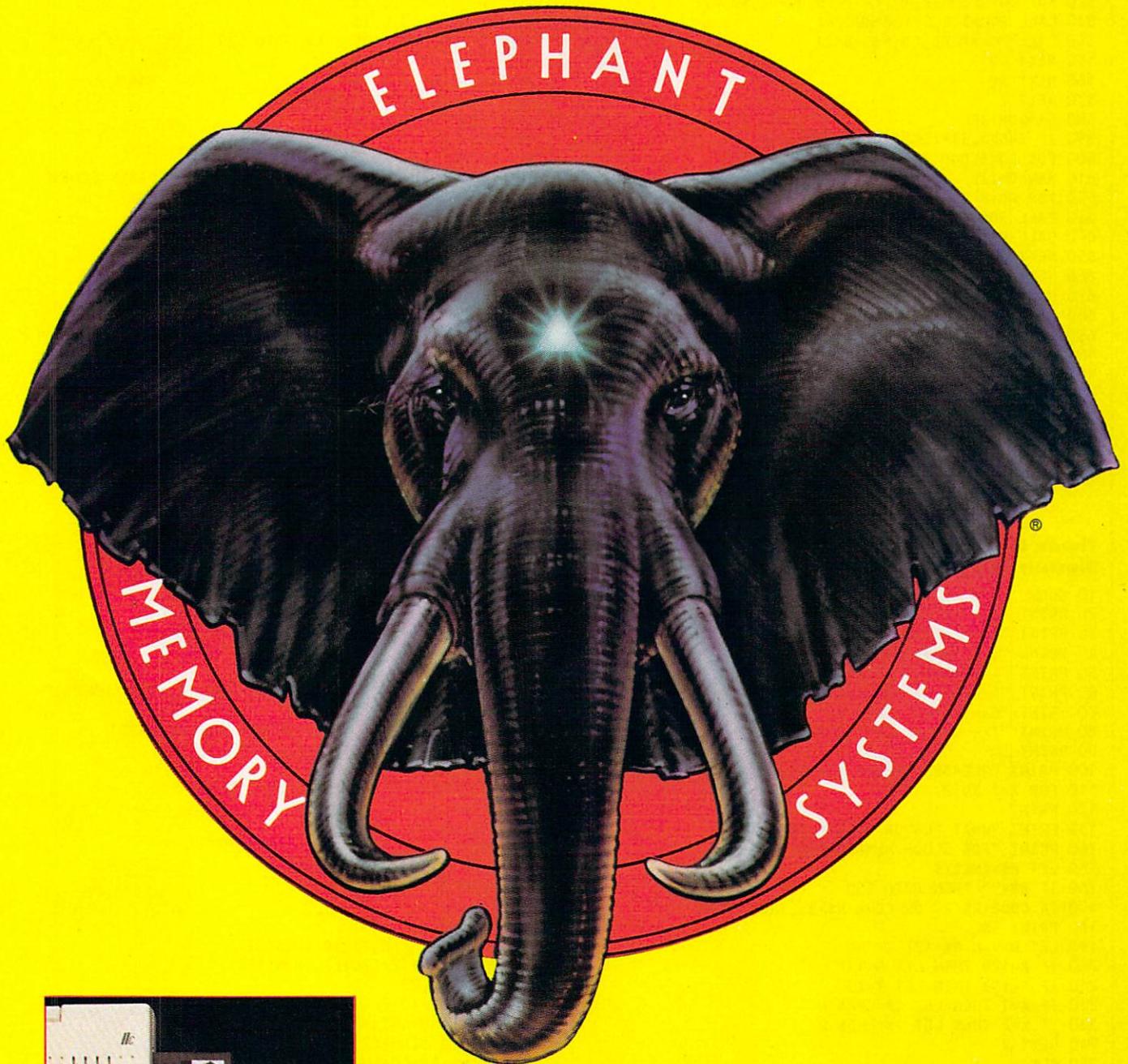
```
10 DIM SCOOP(2,12,2),CN(11,2),FLAV(8),FL$(8),ICE(2)
20 SCREEN 0,0
30 COLOR 7,0
40 WIDTH 40
50 LOCATE ,,0
60 KEY OFF
70 RANDOMIZE
80 FOR Z=1 TO 7
90 READ FLAV(Z),FL$(Z)
100 NEXT Z
110 FOR X=1 TO 2
120 FOR Y=12-6*X TO 19-7*X
130 FOR Z=1 TO 2
140 READ SCOOP(X,Y,Z)
150 NEXT Z,Y,X
160 FOR X=1 TO 11
170 READ CN(X,1),CN(X,2)
180 NEXT X
189 REM --ASK FOR FLAVORS--
190 CLS
200 FOR X=1 TO 7
210 PRINT X;"- ";FL$(X)
220 NEXT X
230 PRINT
240 PRINT "PLEASE PRESS THE NUMBER OF YOUR CHOICE."
250 FOR X=1 TO 2
260 PRINT
270 PRINT "WHAT FLAVOR DO YOU WANT FOR SCOOP #";CHR$(X
+48);"? ";
280 AS=INKEY$
290 IF AS<"1" OR AS>"7" THEN 280
300 PRINT AS
310 ICE(X)=VAL(AS)
320 NEXT X
330 FOR D=1 TO 400
340 NEXT D
349 REM --DRAW CONE--
350 CLS
360 COLOR 6,0
370 FOR RO=1 TO 11
380 FOR CO=CN(RO,1) TO CN(RO,2)
390 LOCATE RO+13,CO
```

```
400 PRINT "X";
410 NEXT CO,RO
419 REM --DRAW SCOOPS--
420 FOR Z=1 TO 2
430 FOR RO=12-6*Z TO 19-7*Z
440 FOR CO=SCOOP(Z,RO,1) TO SCOOP(Z,RO,2)
450 COLOR FLAV(ICE(Z)),0
460 LOCATE RO+1,CO
470 SOUND 100*CO,.5
480 PRINT CHR$(219);
490 NEXT CO,RO,Z
500 IF RND>.5 OR ICE(2)=3 THEN 580
510 COLOR 6,0
520 FOR CO=SCOOP(2,0,1) TO SCOOP(2,0,2)
530 FOR RO=1 TO RND*12
540 LOCATE RO,CO
550 SOUND RO*100+200,.5
560 PRINT CHR$(219);
570 NEXT RO,CO
580 FOR D=1 TO 800
590 NEXT D
600 COLOR 7,0
610 LOCATE 25,2
620 PRINT "PLEASE PRESS ANY KEY FOR ANOTHER CONE.";
630 AS=INKEY$
640 IF AS="" THEN 630 ELSE 190
1000 DATA 14,BUTTERSCOTCH,4,CHERRY,6,CHOCOLATE
1010 DATA 2,MINT,10,PISTACHIO,12,RASPBERRY,7,VANILLA
2000 DATA 15,23,14,24,13,25,13,25,13,25,14,24,15,23
2010 DATA 15,23,14,24,13,25,13,25,13,25,14,24,15,23
2020 DATA 16,22,16,22,17,21,17,21,17,21,17
2030 DATA 21,18,20,18,20,18,20,19,19
```

TI-99/4A/Ice Cream Cone

```
10 DIM SCOOP(2,13,2),CN(10,2),FLAV(8),FS(8),ICE(2)
20 CALL CLEAR
30 AS="FFFFFFFFFFFFFFF"
40 CALL CHAR(128,AS)
50 CALL CHAR(136,"8142241818244281")
60 CALL CHAR(144,AS)
70 CALL CHAR(152,AS)
80 CALL COLOR(13,11,11)
90 CALL COLOR(14,11,1)
100 FOR Z=1 TO 7
110 READ FLAV(Z),FS(Z)
120 NEXT Z
130 FOR X=1 TO 2
140 FOR Y=14-6*X TO 19-6*X
150 FOR Z=1 TO 2
160 READ SCOOP(X,Y,Z)
170 NEXT Z
180 NEXT Y
190 NEXT X
200 FOR X=1 TO 10
210 READ CN(X,1),CN(X,2)
220 NEXT X
230 FOR I=1 TO 8
240 CALL COLOR(I,15,1)
250 NEXT I
260 CALL SCREEN(2)
270 CALL CLEAR
280 FOR X=1 TO 7
290 PRINT X;"- ";FS(X)
300 NEXT X
310 PRINT
320 PRINT "PLEASE PRESS THE NUMBER OF","YOUR CHOICE."
330 FOR X=1 TO 2
340 PRINT
350 PRINT "WHAT FLAVOR DO YOU WANT FOR SCOOP #";CHR$(X
+48);"? ";
360 CALL KEY(3,K,P)
370 IF (K<49)+(K>55) THEN 360
380 ICE(X)=K-48
390 PRINT ICE(X)
```

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SUMMER PROGRAMS

```
400 NEXT X
410 FOR D=1 TO 100
420 NEXT D
430 CALL CLEAR
440 FOR RO=1 TO 10
450 FOR CO=CN(RO,1) TO CN(RO,2)
460 CALL HCHAR(RO+13,CO,136)
470 NEXT CO
480 NEXT RO
490 FOR Z=1 TO 2
500 CALL COLOR(14+Z,FLAV(ICE(Z)),1)
510 FOR RO=14-6*Z TO 19-6*Z
520 FOR CO=SCOOP(Z,RO,1) TO SCOOP(Z,RO,2)
530 CALL SOUND(1,CO*CO+200,2)
540 CALL HCHAR(RO,CO,136+8*Z)
550 NEXT CO
560 NEXT RO
570 NEXT Z
580 RANDOMIZE
590 IF (RND>.5)+(ICE(2)=2) THEN 670
600 FOR CO=SCOOP(2,2,1) TO SCOOP(2,2,2)
610 RANDOMIZE
620 FOR RO=2 TO 10*RND+2
630 CALL SOUND(150,RO*50+90,1)
640 CALL HCHAR(RO,CO,128)
650 NEXT RO
660 NEXT CO
670 PRINT "PRESS ANY KEY FOR ANOTHER.";
680 CALL KEY(3,K,P)
690 IF P=0 THEN 680 ELSE 260
1000 DATA 16,VANILLA,11,CHOCOLATE,9,RASPBERRY,7,CHERRY
1010 DATA 5,BLUEBERRY,4,MINT,3,PISTACHIO
2000 DATA 12,20,11,21,10,22,10,22,11,21,12,20
2010 DATA 13,19,12,20,11,21,11,21,12,20
2020 DATA 13,19,12,20,13,19,13,19,14,18
2030 DATA 14,18,14,18,15,17,15,17,16,16,16,16
```

Timex Sinclair 1000 w/16K RAM Pack & Timex Sinclair 1500/Ice Cream Cone

```
10 SLOW
20 PRINT "1 - CHOCOLATE"
30 PRINT "2 - PEANUT BUTTER FUDGE"
40 PRINT "3 - BUTTERSCOTCH"
50 PRINT "4 - PEPPERMINT"
60 PRINT "5 - MOLASSES LACE"
70 PRINT "6 - CANDY STRIPE"
80 PRINT "7 - CHOCOLATE CHIP"
90 PRINT
100 PRINT "PLEASE PRESS THE NUMBER OF YOUR CHOICE."
110 FOR X=1 TO 2
120 PRINT
130 PRINT "WHAT FLAVOR DO YOU WANT"
140 PRINT "FOR SCOOP NUMBER ";X;"? "
150 LET R$=INKEY$
160 IF R$="" THEN GOTO 150
170 IF CODE R$<29 OR CODE R$>35 THEN GOTO 150
180 PRINT R$
190 LET R=VAL R$+127
200 IF R=129 THEN LET R=137
210 IF R=132 THEN LET R=10
220 IF X=1 THEN LET I$=CHR$ R
230 IF X=2 THEN LET J$=CHR$ R
240 NEXT X
250 CLS
260 LET A=15
270 LET B=A
280 FOR R=20 TO 11 STEP -2
290 FOR C=A TO B
300 PRINT AT R,C;CHR$ 136
310 PRINT AT R-1,C;CHR$ 136
320 NEXT C
330 LET A=A-1
340 LET B=B+1
```

```
350 NEXT R
360 FOR C=9 TO 21
370 PRINT AT 7,C;I$
380 PRINT AT 8,C;I$
390 IF C<10 OR C>20 THEN GOTO 420
400 PRINT AT 6,C;I$
410 PRINT AT 9,C;I$
420 IF C<11 OR C>19 THEN GOTO 450
430 PRINT AT 5,C;I$
440 PRINT AT 10,C;I$
450 NEXT C
460 FOR C=10 TO 20
470 PRINT AT 2,C;J$
480 PRINT AT 3,C;J$
490 IF C<11 OR C>19 THEN GOTO 520
500 PRINT AT 1,C;J$
510 PRINT AT 4,C;J$
520 IF C<12 OR C>18 THEN GOTO 540
530 PRINT AT 0,C;J$
540 NEXT C
550 PAUSE 123
560 PRINT AT 21,1;"PRESS ANY KEY FOR ANOTHER CONE."
570 LET R$=INKEY$
580 IF R$="" THEN GOTO 570
590 CLS
600 GOTO 20
```

TRS-80 Color Computer/Ice Cream Cone

```
10 DIM SCOOP(2,8,2),CN(8,2),FLAV(8),FL$(8),ICE(2)
20 FOR Z=1 TO 7
30 READ FLAV(Z),FL$(Z)
40 NEXT Z
50 FOR X=1 TO 2
60 FOR Y=8-4*X TO 11-4*X
70 FOR Z=1 TO 2
80 READ SCOOP(X,Y,Z)
90 NEXT Z,Y,X
100 FOR X=1 TO 7
110 READ CN(X,1),CN(X,2)
120 NEXT X
130 CLS
140 FOR X=1 TO 7
150 PRINT X;"- ";FL$(X)
160 NEXT X
170 PRINT "PLEASE PRESS THE NUMBER OF YOUR CHOICE."
180 FOR X=1 TO 2
190 PRINT CHR$(13);"WHAT FLAVOR DO YOU WANT"
200 PRINT "FOR SCOOP #";CHR$(X+48);"? ";
210 A$=INKEY$
220 IF A$<"1" OR A$>"7" THEN 210
230 PRINT A$
240 ICE(X)=VAL(A$)
250 NEXT X
260 FOR D=1 TO 300
270 NEXT D
280 CLS(0)
290 FOR RO=1 TO 7
300 FOR CO=CN(RO,1) TO CN(RO,2)
310 PRINT@CO+32*(RO+7),CHR$(151);
320 NEXT CO,RO
330 FOR Z=1 TO 2
340 FOR RO=8-4*Z TO 11-4*Z
350 FOR CO=SCOOP(Z,RO,1) TO SCOOP(Z,RO,2)
360 SOUND RO+CO*10,1
370 PRINT@CO+32*RO,CHR$(143+FLAV(ICE(Z)));
380 NEXT CO,RO,Z
390 IF RND(0)>.5 OR ICE(2)=1 THEN 450
400 FOR CO=SCOOP(2,0,1) TO SCOOP(2,0,2)
410 FOR RO=0 TO RND(5)
420 SOUND RO*10+100,1
430 PRINT@CO+32*RO,CHR$(207);
440 NEXT RO,CO
450 FOR D=1 TO 600
```

SUMMER PROGRAMS

```
460 NEXT D
470 PRINT@480,"PRESS ANY KEY FOR ANOTHER CONE.";
480 AS=INKEY$
490 IF AS="" THEN 480 ELSE 130
1000 DATA 64,VANILLA,16,LEMON,48,RASPBERRY
1010 DATA 96,GRAPE,32,BLUEBERRY,80,MINT,112,ORANGE
2000 DATA 11,19,10,20,10,20,11,19,10,20
2010 DATA 9,21,9,21,10,20,10,20,11,19,12,18
2020 DATA 12,18,13,17,13,17,14,16
```

TRS-80 Model III/Ice Cream Cone

```
10 DIM SCOOP(2,16,2),CN(7,2),FLAV(8),FL$(8),ICE(2)
20 FOR Z=1 TO 7
30 READ FLAV(Z),FL$(Z)
40 NEXT Z
50 FOR X=1 TO 2
60 FOR Y=8-4*X TO 13-5*X
70 FOR Z=1 TO 2
80 READ SCOOP(X,Y,Z)
90 NEXT Z,Y,X
100 FOR X=1 TO 7
110 READ CN(X,1),CN(X,2)
120 NEXT X
130 CLS
140 FOR X=1 TO 7
150 PRINT X;"- ";FL$(X)
160 NEXT X
170 PRINT
180 PRINT "PLEASE PRESS THE NUMBER OF YOUR CHOICE."
190 FOR X=1 TO 2
200 PRINT
210 PRINT "WHAT FLAVOR DO YOU WANT FOR SCOOP #";CHR$(X
+48);"? ";
220 AS=INKEY$
230 IF AS<"1" OR AS>"7" THEN 220
240 PRINT AS
250 ICE(X)=VAL(AS)
260 NEXT X
270 FOR D=1 TO 200
280 NEXT D
290 CLS
300 FOR RO=1 TO 7
310 FOR CO=CN(RO,1) TO CN(RO,2)
320 PRINT@CO+64*(RO+8),CHR$(157);
330 NEXT CO,RO
340 FOR Z=1 TO 2
350 FOR RO=8-4*Z TO 13-5*Z
360 FOR CO=SCOOP(Z,RO,1) TO SCOOP(Z,RO,2)
370 POKE 15359+CO+64*RO,FLAV(ICE(Z))
380 IF ICE(Z)=5 AND RND(0)<.3 THEN POKE 15359+CO+64*RO
,137
390 NEXT CO,RO,Z
400 FOR D=1 TO 400
410 NEXT D
420 PRINT @966,"PLEASE PRESS ANY KEY";
430 PRINT @994,"FOR ANOTHER CONE.";
440 AS=INKEY$
450 IF AS="" THEN 440 ELSE 130
1000 DATA 191,VANILLA,194,CHOCOLATE CHIP
1010 DATA 243,PISTACHIO,248,MARBLED FUDGE,191
1020 DATA ROCKY ROAD,196,BUBBLE GUM,153,BUTTERSCOTCH
2000 DATA 23,38,20,41,18,43,20,41,22,39,24,37,21,40
2010 DATA 19,42,21,40,22,37,24,35,25,34,26,33,27
2020 DATA 32,28,31,29,30
```

VIC-20/Ice Cream Cone

```
10 DIM SCOOP(2,12,2),CN(9,2),FLAV(8),FL$(8),ICE(2)
20 READ SB,CB,S
30 FOR Z=1 TO 7
40 READ FLAV(Z),FL$(Z)
50 NEXT Z
60 FOR X=1 TO 2
```

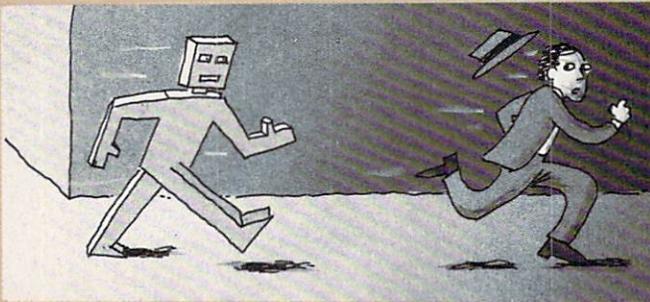
```
70 FOR Y=12-6*X TO 19-7*X
80 FOR Z=1 TO 2
90 READ SCOOP(X,Y,Z)
100 NEXT Z,Y,X
110 FOR X=1 TO 9
120 READ CN(X,1),CN(X,2)
130 NEXT X
140 POKE S+4,9
150 POKE S+5,8
160 PRINT CHR$(147);CHR$(5);
170 FOR X=1 TO 7
180 PRINT X;"- ";FL$(X)
190 NEXT X
200 PRINT CHR$(13);"PLEASE PRESS THE"
210 PRINT "NUMBER OF YOUR CHOICE.";
220 FOR X=1 TO 2
230 PRINT CHR$(13);"WHAT FLAVOR DO YOU"
240 PRINT "WANT FOR SCOOP #";CHR$(X+48);"? ";
250 GET AS
260 IF AS<"1" OR AS>"7" THEN 250
270 PRINT AS
280 ICE(X)=VAL(AS)
290 NEXT X
300 FOR D=1 TO 200
310 NEXT D
320 PRINT CHR$(147);
330 FOR RO=1 TO 9
340 FOR CO=CN(RO,1) TO CN(RO,2)
350 POKE SB+CO+22*(RO+12),86
360 POKE CB+CO+22*(RO+12),7
370 NEXT CO,RO
380 FOR Z=1 TO 2
390 FOR RO=12-6*Z TO 19-7*Z
400 FOR CO=SCOOP(Z,RO,1) TO SCOOP(Z,RO,2)
410 POKE S+2,CO*ICE(Z)+128
420 POKE SB+CO+22*RO,160
430 POKE CB+CO+22*RO,FLAV(ICE(Z))
440 NEXT CO,RO,Z
450 POKE S+2,0
460 IF RND(1)>.5 THEN 550
470 PRINT CHR$(144);
480 FOR CO=SCOOP(2,0,1) TO SCOOP(2,0,2)
490 FOR RO=0 TO INT(RND(1)*5)
500 POKE S+3,RO+10+128
510 POKE SB+CO+22*RO,230
520 POKE CB+CO+22*RO,15
530 NEXT RO,CO
540 POKE S+3,0
550 FOR D=1 TO 400
560 NEXT D
570 POKE 198,0
580 POKE 214,21
590 PRINT
600 PRINT CHR$(5);"PLEASE PRESS ANY KEY.";
610 GET AS
620 IF AS="" THEN 610
630 GOTO 160
1000 DATA 7680,38400,36874
2000 DATA 1,VANILLA,7,LEMON,2,RASPBERRY,4,GRAPE
2010 DATA 6,BLUEBERRY,3,MINT,5,PISTACHIO
3000 DATA 6,14,5,15,4,16,4,16,4,16,5,15,6,14,6,14,5,15
3010 DATA 4,16,4,16,4,16,5,15,6,14,6,14,7,13,7,13,8
3020 DATA 12,8,12,9,11,9,11,10,10,4,15,4,15,4,15,5,14
```

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RENEGADE ROBOT

BY JOEY LATIMER



The top-secret building where you work is guarded by a robot. One day you arrive at work and find the robot missing. Puzzled, you enter the building and immediately sense that something has gone wrong. Strange noises are coming from a distant corridor. You investigate and discover that it's the sound of the robot, twirling around in circles and crashing into walls. "Its wires must have snapped!" you think to yourself. "It's gone completely berserk!"

The instant the robot senses your presence it starts coming after you, red eyes flashing madly. Your only hope is to reach the center of the building

and turn off the power switch that controls the robot before it catches you. It won't be easy: The robot is smart and knows not only the floorplan by heart, but also why you're heading toward the building's center. You'd better get started; time is running out.

You can thwart the *Renegade Robot* with either your joystick (plug it into port #1) or your keyboard. Press the following keys to move: "U" (up left); "I" (up center); "O" (up right); "J" (left); "L" (right); "M" (down left); comma (down center); and period (down right). Elapsed time is recorded on the screen; the highest score will be displayed.

ADAM/Renegade Robot

```

10 GR
20 READ s,hr,hc,f
30 COLOR= 3
40 PLOT 19,17
50 PLOT 19,18
60 PLOT 20,17
70 PLOT 20,18
80 COLOR= 7
90 FOR x = 1 TO 24
100 READ a,b,c
110 FOR y = a TO b
120 IF x <= 12 THEN PLOT c,y:GOTO 140
130 PLOT y,c
140 NEXT y
150 NEXT x
160 h1 = INT(RND(1)*22)
170 h2 = INT(RND(1)*8)+32*(RND(1)>.5)
180 VTAB 22
190 HTAB 15
200 PRINT s;" "
210 s = s-1
    
```

```

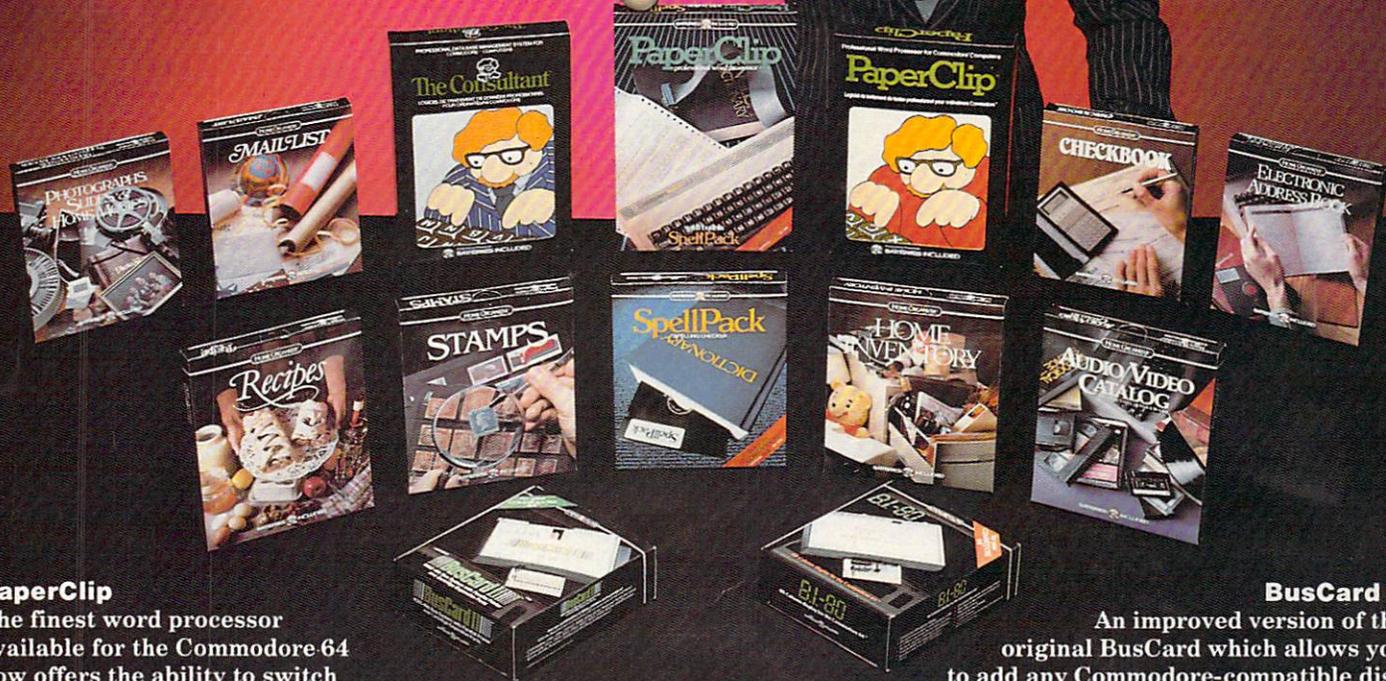
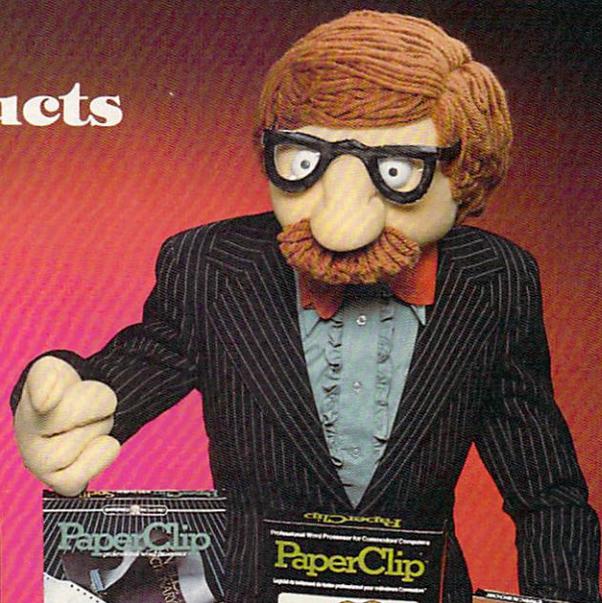
220 j = PDL(5)
230 ro = h1+(j = 4 OR j = 6 OR j = 12)-(j = 1 OR j = 3
OR j = 9)
240 co = h2+(j = 2 OR j = 3 OR j = 6)-(j = 8 OR j = 9
OR j = 12)
250 ro = ro-(ro > 39)+(ro < 0)
260 co = co-(co > 39)+(co < 0)
270 IF SCRN(co,ro) = 7 THEN ro = h1:co = h2:GOTO 350
280 COLOR= 0
290 PLOT h2,h1
300 COLOR= 13
310 PLOT co,ro
320 h1 = ro
330 h2 = co
340 IF (ro = 17 OR ro = 18) AND (co = 19 OR co = 20) T
HEN 530
350 ra = hr+(ro > hr)-(ro < hr)
360 ca = hc+(co > hc)-(co < hc)
370 ra = ra-(ra > 39)+(ra < 0)
380 ca = ca-(ca > 39)+(ca < 0)
390 IF SCRN(ca,ra) <> 3 AND SCRN(ca,ra) <> 7 THEN 450
400 d = 2*INT(RND(1)*2)-1
410 IF f THEN ra = hr+d:ca = hc:GOTO 430
420 ca = hc+d:ra = hr
430 f = NOT f
440 GOTO 370
450 COLOR= 0
460 PLOT hc,hr
470 COLOR= 11
480 PLOT ca,ra
490 hc = ca
500 hr = ra
510 IF ca = co AND ra = ro THEN 610
520 GOTO 180
530 TEXT
540 IF s > hs THEN hs = s
550 FOR t = 1 TO 50
560 PRINT CHR$(7);"YOU DID IT! ";
570 NEXT t
580 HOME
590 PRINT "YOUR SCORE IS ";s;"."
600 GOTO 630
610 TEXT
620 PRINT CHR$(7);"SORRY, YOU WERE CAUGHT!"
630 PRINT "THE HIGH SCORE IS ";hs;"."
640 PRINT "PRESS <RETURN> TO PLAY AGAIN.";
650 GET k$
660 IF k$ <> CHR$(13) THEN 660
670 RESTORE
680 GOTO 10
1000 DATA 1000,25,20,0
2000 DATA 6,18,8,20,33,8,12,13,12,15,24,12,26
2010 DATA 27,12,16,22,16,16,22,23,12,13,27,15
2020 DATA 24,27,26,27,27,6,18,31,20,33,31,10,19
2030 DATA 6,12,29,6,12,14,12,16,23,12,25,27,12
2040 DATA 16,23,16,18,21,22,12,14,27,16,23,27
2050 DATA 25,27,27,10,19,33,21,29,33
    
```

Apple/Renegade Robot

```

10 TEXT
20 HOME
30 PRINT "DO YOU WANT TO USE THE <K>EYBOARD"
40 PRINT "OR THE <J>OYSTICK?";
50 GET k$
60 IF k$ <> "K" AND k$ <> "J" THEN 50
70 KB = (k$ = "J")
80 HOME
90 GR
100 READ S,HR,HC,F
110 COLOR= 3
120 PLOT 19,17
130 PLOT 19,18
140 PLOT 20,17
150 PLOT 20,18
    
```

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SUMMER PROGRAMS

```

160 COLOR= 7
170 FOR X = 1 TO 24
180 READ A,B,C
190 FOR Y = A TO B
200 IF X <= 12 THEN PLOT C,Y:GOTO 220
210 PLOT Y,C
220 NEXT Y
230 NEXT X
240 H1 = INT(RND(1)*22)
250 H2 = INT(RND(1)*8)+32*(RND(1) > 0.5)
260 VTAB 22
270 HTAB 18
280 PRINT S;" "
290 S = S-1
300 IF KB = 0 THEN 340
310 RO = H1+(PDL(1) > 192)-(PDL(1) < 64)
320 CO = H2+(PDL(0) > 192)-(PDL(0) < 64)
330 GOTO 380
340 J = PEEK(-16384)-128
350 POKE -16368,0
360 RO = H1+(J = 44 OR J = 46 OR J = 77)-(J = 73 OR J
= 79 OR J = 85)
370 CO = H2+(J = 46 OR J = 76 OR J = 79)-(J = 74 OR J
= 77 OR J = 85)
380 RO = RO-(RO > 39)+(RO < 0)
390 CO = CO-(CO > 39)+(CO < 0)
400 IF SCRN(CO,RO) = 7 THEN RO = H1:CO = H2:GOTO 480
410 COLOR= 0
420 PLOT H2,H1
430 COLOR= 13
440 PLOT CO,RO
450 H1 = RO
460 H2 = CO
470 IF (RO = 17 OR RO = 18) AND (CO = 19 OR CO = 20) T
HEN 660
480 RA = HR+(RO > HR)-(RO < HR)
490 CA = HC+(CO > HC)-(CO < HC)
500 CA = CA-(CA > 39)+(CA < 0)
510 RA = RA-(RA > 39)+(RA < 0)
520 IF SCRN(CA,RA) <> 3 AND SCRN(CA,RA) <> 7 THEN 580
530 D = 2*INT(RND(1)*2)-1
540 IF F THEN RA = HR+D:CA = HC:GOTO 560
550 CA = HC+D:RA = HR
560 F = NOT F
570 GOTO 500
580 COLOR= 0
590 PLOT HC,HR
600 COLOR= 11
610 PLOT CA,RA
620 HC = CA
630 HR = RA
640 IF CA = CO AND RA = RO THEN 760
650 GOTO 260
660 TEXT
670 HOME
680 IF S > HS THEN HS = S
690 FOR T = 1 TO 150
700 PRINT "YOU DID IT! ";
710 A = PEEK(-16336)
720 NEXT T
730 HOME
740 PRINT "YOUR SCORE IS ";S;"."
750 GOTO 790
760 TEXT
770 HOME
780 PRINT CHR$(7);"SORRY, YOU WERE CAUGHT!"
790 PRINT "THE HIGH SCORE IS ";HS;"."
800 PRINT "PRESS <RETURN> TO PLAY AGAIN.";
810 GET K$
820 IF K$ <> CHR$(13) THEN 810
830 RESTORE
840 GOTO 80
1000 DATA 1000,30,19,0
2000 DATA 6,18,8,20,33,8,12,13,12,15,24,12,26,27
2010 DATA 12,16,22,16,16,22,23,12,13,27,15,24,27
2020 DATA 26,27,27,6,18,31,20,33,31,10,19,6,12,29
2030 DATA 6,12,14,12,16,23,12,25,27,12,16,23,16,18

```

```

2040 DATA 21,22,12,14,27,16,23,27,25,27,27,10,19
2050 DATA 33,21,29,33

```

Atari/Renegade Robot

```

10 OPEN #1,4,0,"K:"
20 GRAPHICS 0
30 PRINT CHR$(125);"DO YOU WANT TO USE THE <K>KEYBOARD"
40 PRINT "OR THE <J>OYSTICK?"
50 GET #1,KB
60 IF KB<>ASC("J") AND KB<>ASC("K") THEN 50
70 KB=(KB=ASC("J"))
80 GRAPHICS 3
90 READ S,HR,HC,F
100 POKE 752,1
110 COLOR 2
120 PLOT 19,9
130 PLOT 20,9
140 COLOR 3
150 FOR X=1 TO 24
160 READ A,B,C
170 FOR Y=A TO B
180 IF X<=12 THEN PLOT C,Y:GOTO 200
190 PLOT Y,C
200 NEXT Y
210 NEXT X
220 H1=INT(RND(0)*22)
230 H2=INT(RND(0)*7)+33*(RND(0)>0.5)
240 POKE 656,1
250 POKE 657,19
260 PRINT S;" ";
270 S=S-1
280 IF KB=0 THEN 330
290 J=STICK(0)
300 RO=H1+(J=5 OR J=9 OR J=13)-(J=6 OR J=10 OR J=14)
310 CO=H2+(J>=5 AND J<=7)-(J>=9 AND J<=11)
320 GOTO 370
330 J=PEEK(764)
340 POKE 764,255
350 RO=H1+(J=32 OR J=34 OR J=37)-(J=8 OR J=11 OR J=13)
360 CO=H2+(J=0 OR J=8 OR J=34)-(J=1 OR J=11 OR J=37)
370 RO=RO-(RO>19)+(RO<0)
380 CO=CO-(CO>39)+(CO<0)
390 LOCATE CO,RO,SC
400 IF SC=3 THEN RO=H1:CO=H2:GOTO 480
410 COLOR 4
420 PLOT H2,H1
430 COLOR 2
440 PLOT CO,RO
450 H1=RO
460 H2=CO
470 IF RO=9 AND (CO=19 OR CO=20) THEN 670
480 RA=HR+(RO>HR)-(RO<HR)
490 CA=HC+(CO>HC)-(CO<HC)
500 RA=RA-(RA>19)+(RA<0)
510 CA=CA-(CA>39)+(CA<0)
520 LOCATE CA,RA,CH
530 IF CH<>3 AND (RA<>9 OR (CA<>19 AND CA<>20)) THEN 5
90
540 D=2*INT(RND(0)*2)-1
550 IF F THEN RA=HR+D:CA=HC:GOTO 570
560 CA=HC+D:RA=HR
570 F = NOT F
580 GOTO 500
590 COLOR 4
600 PLOT HC,HR
610 COLOR 1
620 PLOT CA,RA
630 HR=RA
640 HC=CA
650 IF CA=CO AND RA=RO THEN 750
660 GOTO 240
670 GRAPHICS 0
680 IF S>HS THEN HS=S
690 FOR T=1 TO 75
700 PRINT "YOU DID IT! ";

```

```

710 SOUND 0,T,10,8
720 NEXT T
730 PRINT CHR$(125);"YOUR SCORE IS ";S;"."
740 GOTO 780
750 GRAPHICS 0
760 SOUND 0,123,10,10
770 PRINT "SORRY, YOU WERE CAUGHT!"
780 PRINT "THE HIGH SCORE IS ";HS;"."
790 PRINT "PRESS <RETURN> TO PLAY AGAIN."
800 SOUND 0,0,0,0
810 GET #1,A
820 IF A<>155 THEN 810
830 RESTORE
840 GOTO 80
1000 DATA 1000,13,19,0
2000 DATA 1,8,7,10,18,7,5,6,11,8,11,11,13,14,11,8,11
2010 DATA 16,8,11,23,5,6,28,8,11,28,13,14,28,1,8,32
2020 DATA 10,18,32,9,19,1,21,30,1,12,13,5,15,24,5
2030 DATA 26,27,5,17,22,8,18,21,11,12,13,14,15,24,14
2040 DATA 26,27,14,9,19,18,21,30,18

```

Commodore 64/Renegade Robot

```

10 FOR X=54272 TO 54296
20 POKE X,0
30 R$=R$+CHR$(17)
40 NEXT X
50 PRINT CHR$(147);CHR$(5);"DO YOU WANT TO USE THE <K>
  EYBOARD"
60 PRINT "OR THE <J>OYSTICK?";
70 GET KBS
80 IF KB$ <>"K" AND KB$ <>"J" THEN 70
90 KB=(KB$="J")
100 PRINT CHR$(147);
110 READ SC,CL,S,HR,HC,F
120 POKE 54296,15
130 POKE 54278,241
140 POKE 53280,13
150 POKE 53281,11
160 POKE 1484,102
170 POKE 55756,7
180 FOR X=1 TO 24
190 READ A,B,C
200 FOR Y=A TO B
210 IF X<=12 THEN POKE SC+C+40*Y,160:POKE CL+C+40*Y,14
  :GOTO 230
220 POKE SC+Y+40*C,160:POKE CL+Y+40*C,14
230 NEXT Y
240 NEXT X
250 H1=INT(RND(1)*22)
260 H2=INT(RND(1)*7)-34*(RND(1)>.5)
270 PRINT CHR$(19);LEFT$(R$,23);TAB(18);STR$(S);" ";
280 S=S-1
290 IF KB=0 THEN 340
300 J=15-(PEEK(56321) AND 15)
310 RO=H1-(J=2 OR J=6 OR J=10)+(J=1 OR J=5 OR J=9)
320 CO=H2-(J>=8 AND J<=10)+(J>=4 AND J<=6)
330 GOTO 390
340 GET JS
350 IF JS="" THEN J=0:GOTO 370
360 J=ASC(JS)
370 RO=H1-(J=44 OR J=46 OR J=77)+(J=73 OR J=79 OR J=85
)
380 CO=H2-(J=46 OR J=76 OR J=79)+(J=74 OR J=77 OR J=85
)
390 RO=RO+(RO>22)-(RO<0)
400 CO=CO+(CO>39)-(CO<0)
410 IF PEEK(SC+CO+40*RO)=160 THEN RO=H1:CO=H2:GOTO 490
420 POKE SC+H2+40*H1,42
430 POKE CL+H2+40*H1,11
440 POKE SC+CO+40*RO,42
450 POKE CL+CO+40*RO,7
460 H1=RO
470 H2=CO
480 IF CO=20 AND RO=11 THEN 680

```

```

490 RA=HR-(RO>HR)+(RO<HR)
500 CA=HC-(CO>HC)+(CO<HC)
510 RA=RA+(RA>22)-(RA<0)
520 CA=CA+(CA>39)-(CA<0)
530 CH=PEEK(SC+CA+40*RA)
540 IF CH<>160 AND CH<>102 THEN 600
550 D=2*INT(RND(1)*2)-1
560 IF F THEN RA=HR+D:CA=HC:GOTO 580
570 CA=HC+D:RA=HR
580 F=NOT F
590 GOTO 510
600 POKE SC+HC+40*HR,87
610 POKE CL+HC+40*HR,11
620 POKE SC+CA+40*RA,87
630 POKE CL+CA+40*RA,8
640 HR=RA
650 HC=CA
660 IF CA=CO AND RA=RO THEN 780
670 GOTO 270
680 PRINT CHR$(147);
690 IF S>HS THEN HS=S
700 POKE 54276,33
710 FOR T=100 TO 1 STEP -1
720 PRINT "YOU DID IT! ";
730 POKE 54273,T
740 POKE 54272,T+50
750 NEXT T
760 PRINT CHR$(147);"YOUR SCORE IS";S;CHR$(157);"."
770 GOTO 830
780 PRINT CHR$(147);
790 POKE 54272,135
800 POKE 54273,17
810 POKE 54276,33
820 PRINT "SORRY, YOU WERE CAUGHT!"
830 PRINT "THE HIGH SCORE IS";HS;CHR$(157);"."
840 PRINT "PRESS <RETURN> TO PLAY AGAIN.";
850 POKE 54276,0
860 GET KS
870 IF KS<>CHR$(13) THEN 860
880 RESTORE
890 GOTO 100
1000 DATA 1024,55296,1000,12,15,0
2000 DATA 3,10,7,12,20,7,7,8,11,10,13,11,15,16,11
2010 DATA 10,13,17,10,13,23,7,8,28,10,13,28,15,16,28
2020 DATA 3,10,32,12,20,32,9,19,3,21,30,3,11,14
2030 DATA 7,16,24,7,26,28,7,17,23,10,19,21,13,11
2040 DATA 14,16,16,24,16,26,28,16,9,19,20,21,30,20

```

IBM PC w/Color Graphics Adapter & IBM PCjr/ Renegade Robot

```

10 DEF SEG=0
20 KEY OFF
30 WIDTH 40
40 SCREEN 0,1
50 LOCATE ,,0
60 CLS
70 COLOR 7
80 RANDOMIZE
90 PRINT "DO YOU WANT TO USE THE <K>KEYBOARD"
100 PRINT "OR THE <J>OYSTICK?"
110 KB$=INKEY$
120 IF KB$ <>"J" AND KB$ <>"K" THEN 110 ELSE KB=(KB$="J"
)
130 CLS
140 READ S,HR,HC,F
150 COLOR 3
160 LOCATE 10,19:PRINT CHR$(219);CHR$(219)
170 COLOR 2
180 FOR X=1 TO 24
190 READ A,B,C
200 FOR Y=A TO B

```

SUMMER PROGRAMS

```

210 IF X<=12 THEN LOCATE Y,C ELSE LOCATE C,Y
220 PRINT CHR$(219);
230 NEXT Y,X
240 H1=INT(RND*22)+1
250 H2=INT(RND*6)+1-32*(RND>.5)
260 COLOR 2
270 LOCATE 23,18
280 PRINT S;" ";
290 S=S-1
300 IF KB=0 THEN 360
310 JO=STICK(0)
320 J1=STICK(1)
330 RO=H1+(J1<35)-(J1>50)
340 CO=H2+(JO<50)-(JO>65)
350 GOTO 420
360 J$=INKEY$
370 IF J$="" THEN J=0:GOTO 400
380 J=ASC(J$)
390 POKE 1050,PEEK(1052)
400 RO=H1-(J=44 OR J=46 OR J=77)+(J=73 OR J=79 OR J=85)
)
410 CO=H2-(J=46 OR J=76 OR J=79)+(J=74 OR J=77 OR J=85)
)
420 RO=RO+(RO>22)-(RO<1)
430 CO=CO+(CO>40)-(CO<1)
440 SC=SCREEN(RO,CO,1) MOD 16
450 IF SC=2 THEN RO=H1:CO=H2:GOTO 530
460 COLOR 0
470 LOCATE H1,H2:PRINT CHR$(2);
480 COLOR 4
490 LOCATE RO,CO:PRINT CHR$(2);
500 H1=RO
510 H2=CO
520 IF RO=10 AND (CO=19 OR CO=20) THEN 700
530 RA=HR-(RO>HR)+(RO<HR)
540 CA=HC-(CO>HC)+(CO<HC)
550 RA=RA+(RA>22)-(RA<1)
560 CA=CA+(CA>40)-(CA<1)
570 CH=SCREEN(RA,CA,1) MOD 16
580 IF CH<>2 AND CH<>3 THEN 630
590 D=2*INT(RND*2)-1
600 IF F THEN RA=HR+D:CA=HC ELSE CA=HC+D:RA=HR
610 F=NOT F
620 GOTO 550
630 COLOR 0
640 LOCATE HR,HC:PRINT CHR$(15);
650 COLOR 6
660 LOCATE RA,CA:PRINT CHR$(15);
670 HR=RA
680 HC=CA
690 IF CA=CO AND RA=RO THEN 800 ELSE 270
700 CLS
710 COLOR 7
720 IF S>HS THEN HS=S
730 FOR T=1 TO 75
740 PRINT "YOU DID IT! ";
750 SOUND 440+(T*2),1
760 NEXT T
770 CLS
780 PRINT "YOUR SCORE IS";S;CHR$(29);"."
790 GOTO 840
800 CLS
810 COLOR 7
820 SOUND 440,5
830 PRINT "SORRY, YOU WERE CAUGHT!"
840 PRINT "THE HIGH SCORE IS";HS;CHR$(29);"."
850 PRINT "PRESS <ENTER> TO PLAY AGAIN.";
860 IF INKEY$<>CHR$(13) THEN 860 ELSE RESTORE
870 GOTO 130
1000 DATA 1000,13,19,0
2000 DATA 2,9,7,11,19,7,6,7,11,9,12,11,14,15,11,9,12
2010 DATA 16,9,12,23,6,7,28,9,12,28,14,15,28,2,9,32
2020 DATA 11,19,32,9,19,2,21,30,2,12,13,6,15,24,6
2030 DATA 26,27,6,17,22,9,18,21,12,12,13,15,15,24,15
2040 DATA 26,27,15,9,19,19,21,30,19

```

TI-99/4A/ Renegade Robot

```

10 CALL CLEAR
20 PRINT "MAKE SURE THE <ALPHA LOCK>","KEY IS UP!"
30 PRINT
40 PRINT "DO YOU WANT TO USE THE"
50 PRINT "<K>EYBOARD OR THE","<J>OYSTICK?"
60 CALL KEY(3,KB,P)
70 IF (KB<>ASC("J"))*(KB<>ASC("K")) THEN 60
80 KB=(KB=ASC("J"))
90 CALL CLEAR
100 CALL SCREEN(2)
110 FOR KS=12 TO 16
120 READ KH,ST$,FG,BG
130 CALL CHAR(KH,ST$)
140 CALL COLOR(KS,FG,BG)
150 NEXT KS
160 READ S,HR,HC
170 CALL HCHAR(12,16,152,2)
180 FOR X=1 TO 24
190 READ A,B,C
200 FOR Y=A TO B
210 IF X>12 THEN 240
220 CALL HCHAR(Y,C,128)
230 GOTO 250
240 CALL HCHAR(C,Y,128)
250 NEXT Y
260 NEXT X
270 H1=INT(RND*22)+1
280 H2=INT(RND*3)-28*(RND>.5)+1
290 RO=H1
300 CO=H2
310 S=S-1
320 IF KB=0 THEN 370
330 CALL JOYST(1,J1,J2)
340 RO=RO-(J2=-4)+(J2=4)
350 CO=CO-(J1=4)+(J1=-4)
360 GOTO 400
370 CALL KEY(3,J,P)
380 RO=H1-((J=44)+(J=46)+(J=77))+((J=73)+(J=79)+(J=85))
)
390 CO=H2-((J=46)+(J=76)+(J=79))+((J=74)+(J=77)+(J=85))
)
400 RO=RO+(RO>24)-(RO<1)
410 CO=CO+(CO>32)-(CO<1)
420 CALL GCHAR(RO,CO,SC)
430 IF SC<>128 THEN 470
440 RO=H1
450 CO=H2
460 GOTO 520
470 CALL HCHAR(H1,H2,120)
480 CALL HCHAR(RO,CO,136)
490 H1=RO
500 H2=CO
510 IF SC=152 THEN 730
520 RA=HR-(RO>HR)+(RO<HR)
530 CA=HC-(CO>HC)+(CO<HC)
540 RA=RA+(RA>24)-(RA<1)
550 CA=CA+(CA>32)-(CA<1)
560 CALL GCHAR(RA,CA,CH)
570 IF (CH<>128)*(CH<>152) THEN 670
580 D=2*INT(RND*2)-1
590 IF F=0 THEN 630
600 RA=HR+D
610 CA=HC
620 GOTO 650
630 RA=HR+D
640 RA=HR
650 F=1+(F>0)
660 GOTO 540
670 CALL HCHAR(HR,HC,120)
680 CALL HCHAR(RA,CA,144)
690 HR=RA
700 HC=CA
710 IF (CA=CO)*(RA=RO) THEN 860
720 GOTO 310
730 CALL CLEAR
740 CALL SCREEN(12)

```

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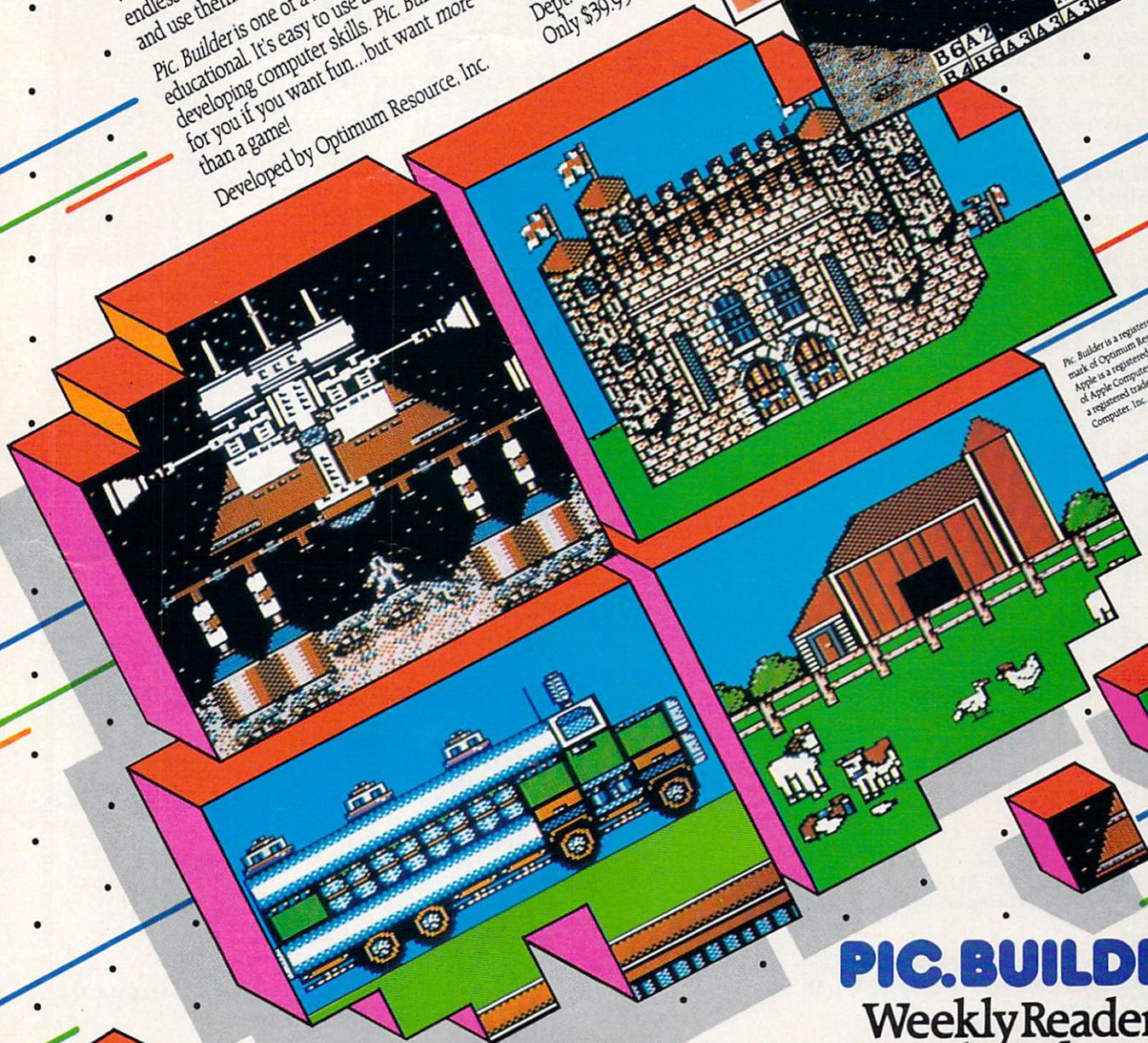
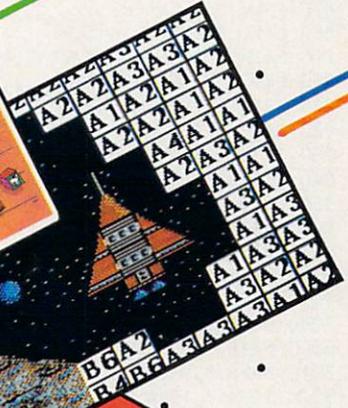
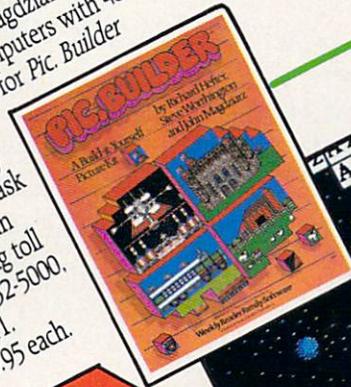
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SUMMER PROGRAMS

```

750 IF S<HS THEN 770
760 HS=S
770 PRINT TAB(8);"YOU DID IT!"
780 FOR T=1 TO 24
790 PRINT
800 CALL SOUND(2,T*200,1)
810 CALL SCREEN(INT(RND*7)+10)
820 NEXT T
830 CALL SCREEN(12)
840 PRINT "YOUR SCORE IS ";STR$(S);"."
850 GOTO 900
860 CALL CLEAR
870 CALL SCREEN(12)
880 CALL SOUND(10,440,4)
890 PRINT "SORRY, YOU WERE CAUGHT!"
900 PRINT "THE HIGH SCORE IS ";STR$(HS);"."
910 PRINT "PRESS <ENTER> TO","PLAY AGAIN.";
920 CALL KEY(3,K,P)
930 IF K<>13 THEN 920
940 RESTORE
950 GOTO 90
1000 DATA 120,FFFFFFFFFFFFFFF,2,2,128
1010 DATA FFFFFFFFFFFFFFFF,6,6,136,18183C3C3C2424
1020 DATA 12,1,144,1818FF3C3C2424,9,1,152
1030 DATA FFFFFFFFFFFFFFFF,3,3
2000 DATA 1000,17,16,4,12,5,14,21
3000 DATA 5,8,9,9,11,14,9,16,17,9,11,14,13,11,14,20
3010 DATA 8,9,24,11,14,24,16,17,24,4,12,28,14,21,28
3020 DATA 7,15,4,18,26,4,10,11,8,13,20,8,22,23,8,13
3030 DATA 20,11,15,18,14,10,10,17,12,21,17,23,23
3040 DATA 17,7,15,21,18,26,21

```

Timex Sinclair 1000 w/16K RAM Pack & Timex Sinclair 1500/Renegade Robot

```

10 SLOW
20 PRINT AT 4,2;"HERE ARE YOUR CONTROL KEYS:"
30 PRINT AT 6,13;"U I O"
40 PRINT AT 7,13;"J L"
50 PRINT AT 8,13;"N M ."
60 PRINT AT 10,2;"PRESS <ENTER> TO CONTINUE."
70 LET K$=INKEY$
80 IF K$<>CHR$ 118 THEN GOTO 70
90 CLS
100 FAST
110 LET SC=PEEK 16396+256*PEEK 16397+1
120 LET S=1000
130 LET HR=13
140 LET HC=15
150 LET F=0
160 LET HS=0
170 LET P1=1
180 LET P2=1
190 LET J=0
200 LET D$="6,25,3,10,21,6,12,19,8,14,17,11,10,21,14,6,
25,17,3,9,4,11,17,4,6,9,8,11,14,8,8,11,12,8,11,19,6,9,
23,11,14,23,3,9,27,11,17,27,"
210 PRINT AT 9,15;CHR$ 136
220 PRINT AT 9,16;CHR$ 136
230 FOR X=1 TO 16
240 GOSUB 1000
250 LET A=VAL N$
260 GOSUB 1000
270 LET B=VAL N$
280 GOSUB 1000
290 LET C=VAL N$
300 FOR Y=A TO B
310 IF X<=6 THEN PRINT AT C,Y;CHR$ 128
320 IF X>6 THEN PRINT AT Y,C;CHR$ 128
330 NEXT Y
340 NEXT X
350 LET H1=INT(RND*20)
360 LET H2=INT(RND*3)+28*(RND>0.5)
370 SLOW
380 PRINT AT 21,14;S;" "
390 LET S=S-1
400 LET J$=INKEY$
410 IF J$<>" " THEN LET J=CODE J$

```

```

420 LET RO=H1+(J=27 OR J=50 OR J=51)-(J=46 OR J=52 OR
J=58)
430 LET CO=H2+(J=27 OR J=49 OR J=52)-(J=47 OR J=51 OR
J=58)
440 LET RO=RO-(RO>20)+(RO<0)
450 LET CO=CO-(CO>31)+(CO<0)
460 IF PEEK(SC+RO*33+CO)<>128 THEN GOTO 500
470 LET RO=H1
480 LET CO=H2
490 GOTO 550
500 PRINT AT H1,H2;CHR$ 0
510 PRINT AT RO,CO;CHR$ 23
520 LET H1=RO
530 LET H2=CO
540 IF RO=9 AND (CO=15 OR CO=16) THEN GOTO 740
550 LET RA=HR+(RO>HR)-(RO<HR)
560 LET CA=HC+(CO>HC)-(CO<HC)
570 LET RA=RA-(RA>20)+(RA<0)
580 LET CA=CA-(CA>31)+(CA<0)
590 LET CH=PEEK(SC+CA*33+RA)
600 IF CH<>128 AND CH<>136 THEN GOTO 680
610 LET RA=HR
620 LET CA=HC
630 LET D=2*INT(RND*2)-1
640 IF F THEN LET RA=HR+D
650 IF NOT F THEN LET CA=HC+D
660 LET F=NOT F
670 GOTO 580
680 PRINT AT HR,HC;CHR$ 0
690 PRINT AT RA,CA;CHR$ 134
700 LET HR=RA
710 LET HC=CA
720 IF CO=CA AND RO=RA THEN GOTO 820
730 GOTO 380
740 CLS
750 IF S>HS THEN LET HS=S
760 FOR T=1 TO 50
770 PRINT "YOU DID IT. ";
780 NEXT T
790 CLS
800 PRINT "YOUR SCORE IS ";S;"."
810 GOTO 840
820 CLS
830 PRINT "SORRY, YOU WERE CAUGHT."
840 PRINT "THE HIGH SCORE IS ";HS;"."
850 PRINT "PRESS <ENTER> TO PLAY AGAIN."
860 LET K$=INKEY$
870 IF K$<>CHR$ 118 THEN GOTO 860
880 GOTO 90
1000 IF D$(P1)=" " THEN GOTO 1030
1010 LET P1=P1+1
1020 GOTO 1000
1030 LET N$=D$(P2 TO P1-1)
1040 LET P1=P1+1
1050 LET P2=P1
1060 RETURN

```

TRS-80 Color Computer/Renegade Robot

```

10 CLS
20 PRINT "DO YOU WANT TO USE THE"
30 PRINT "<K>EYBOARD OR THE <J>OYSTICK?";
40 KB$=INKEY$
50 IF KB$<>"K" AND KB$<>"J" THEN 40 ELSE KB=(KB$="J")
60 CLS
70 READ SC,S,HR,HC,F
80 FOR X=15 TO 17
90 PRINT@X+192,CHR$(154);
100 NEXT X
110 FOR X=1 TO 18
120 READ A,B,C
130 FOR Y=A TO B
140 IF X<=8 THEN PRINT@C+32*Y,CHR$(175);:GOTO 160
150 PRINT@Y+32*C,CHR$(175);
160 NEXT Y
170 NEXT X
180 H1=RND(16)-1
190 H2=RND(5)-1-27*(RND(0)>.5)

```



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SUMMER PROGRAMS

```

200 PRINT@493,S;" ";
210 S=S-1
220 IF KB=0 THEN 280
230 JO=JOYSTK(0)
240 J1=JOYSTK(1)
250 RO=H1+(J1<20)-(J1>43)
260 CO=H2+(JO<20)-(JO>43)
270 GOTO 330
280 J$=INKEY$
290 IF J$="" THEN J=0:GOTO 310
300 J=ASC(J$)
310 RO=H1-(J=44 OR J=46 OR J=77)+(J=73 OR J=79 OR J=85)
)
320 CO=H2-(J=46 OR J=76 OR J=79)+(J=74 OR J=77 OR J=85)
)
330 RO=RO+(RO>14)-(RO<0)
340 CO=CO+(CO>31)-(CO<0)
350 IF PEEK(SC+CO+32*RO)=175 THEN RO=H1:CO=H2:GOTO 410
360 PRINT@H2+32*H1,CHR$(143);
370 PRINT@CO+32*RO,CHR$(159);
380 H1=RO
390 H2=CO
400 IF RO=6 AND (CO>=15 AND CO<=17) THEN 570
410 RA=HR-(RO>HR)+(RO<HR)
420 CA=HC-(CO>HC)+(CO<HC)
430 RA=RA+(RA>14)-(RA<0)
440 CA=CA+(CA>31)-(CA<0)
450 CH=PEEK(SC+CA+32*RA)
460 IF CH>175 AND CH<154 THEN 510
470 D=2*INT(RND(O)*2)-1
480 IF F THEN RA=HR+D:CA=HC ELSE CA=HC+D:RA=HR
490 F=NOT F
500 GOTO 430
510 PRINT@HC+32*HR,CHR$(143);
520 PRINT@CA+32*RA,CHR$(189);
530 HR=RA
540 HC=CA
550 IF CA=CO AND RA=RO THEN 660
560 GOTO 200
570 CLS
580 IF S>HS THEN HS=S
590 FOR T=210 TO 245
600 PRINT "YOU DID IT! ";
610 SOUND T,1
620 NEXT T
630 CLS
640 PRINT "YOUR SCORE IS";STR$(S);"."
650 GOTO 690
660 CLS
670 SOUND 5,5
680 PRINT "SORRY, YOU WERE CAUGHT!"
690 PRINT "THE HIGH SCORE IS";STR$(HS);"."
700 PRINT "PRESS <ENTER> TO PLAY AGAIN."
710 K$=INKEY$
720 IF K$<>CHR$(13) THEN 710
730 RESTORE
740 GOTO 60
1000 DATA 1024,1000,11,12,0
2000 DATA 2,3,5,5,9,5,11,12,5,5,9,10
2010 DATA 5,9,22,2,3,26,5,9,26,11,12,26
2020 DATA 6,7,2,9,15,2,17,22,2,24,26,2
2030 DATA 10,22,5,12,20,9,6,7,12,9,15,12
2040 DATA 17,22,12,24,25,12

```

TRS-80 Model III/Renegade Robot

```

10 CLS
20 READ SC,S,HR,HC,F
30 FOR X=30 TO 33
40 PRINT@X+448,CHR$(149);
50 NEXT X
60 FOR X=1 TO 20
70 READ A,B,C
80 FOR Y=A TO B
90 IF X<=8 THEN PRINT@C+64*Y,CHR$(191);:GOTO 110
100 PRINT@Y+64*C,CHR$(191);
110 NEXT Y
120 NEXT X

```

```

130 H1=RND(16)-1
140 H2=RND(10)-1-54*(RND(O)>.5)
150 PRINT@990,S;" ";
160 S=S-1
170 J$=INKEY$
180 IF J$="" THEN J=0:GOTO 200
190 J=ASC(J$)
200 RO=H1-(J=44 OR J=46 OR J=77)+(J=73 OR J=79 OR J=85)
)
210 CO=H2-(J=46 OR J=76 OR J=79)+(J=74 OR J=77 OR J=85)
)
220 RO=RO+(RO>15)-(RO<0)
230 CO=CO+(CO>63)-(CO<0)
240 IF PEEK(SC+CO+64*RO)=191 THEN RO=H1:CO=H2:GOTO 300
250 PRINT@H2+64*H1,CHR$(128);
260 PRINT@CO+64*RO,CHR$(183);
270 H1=RO
280 H2=CO
290 IF RO=7 AND (CO>=30 AND CO<=33) THEN 450
300 RA=HR-(RO>HR)+(RO<HR)
310 CA=HC-(CO>HC)+(CO<HC)
320 RA=RA+(RA>15)-(RA<0)
330 CA=CA+(CA>63)-(CA<0)
340 CH=PEEK(SC+CA+64*RA)
350 IF CH<>149 AND CH<>191 THEN 400
360 D=2*INT(RND(O)*2)-1
370 IF F THEN RA=HR+D:CA=HC ELSE CA=HC+D:RA=HR
380 F=NOT F
390 GOTO 320
400 PRINT@HC+64*HR,CHR$(128);
410 PRINT@CA+64*RA,CHR$(190);
420 HR=RA
430 HC=CA
440 IF CA=CO AND RA=RO THEN 530 ELSE 150
450 CLS
460 IF S>HS THEN HS=S
470 FOR T=1 TO 150
480 PRINT "YOU DID IT! ";
490 NEXT T
500 CLS
510 PRINT "YOUR SCORE IS";STR$(S);"."
520 GOTO 550
530 CLS
540 PRINT "SORRY, YOU WERE CAUGHT!"
550 PRINT "THE HIGH SCORE IS";STR$(HS);"."
560 PRINT "PRESS <ENTER> TO PLAY AGAIN."
570 K$=INKEY$
580 IF K$<>CHR$(13) THEN 570 ELSE RESTORE
590 GOTO 10
1000 DATA 15360,1000,10,32,0
2000 DATA 2,6,10,8,13,10,6,9,14,6,9,21,6,9,42
2010 DATA 6,9,49,2,6,53,8,13,53,12,30,2,32,51,2
2020 DATA 14,17,4,19,44,4,46,49,4,21,42,6,25,38,9
2030 DATA 14,17,11,19,44,11,46,49,11,12,30,13,32
2040 DATA 51,13,149,170,282,293,735,853,873

```

VIC-20/Renegade Robot

```

10 FOR X=1 TO 22
20 R$=R$+CHR$(17)
30 NEXT X
40 PRINT CHR$(147);"DO YOU WANT TO USE"
50 PRINT "THE <K>EYBOARD OR","THE <J>OYSTICK?";
60 GET KB$
70 IF KB$<>"K" AND KB$<>"J" THEN 60
80 KB=(KB$="J")
90 PRINT CHR$(147);
100 READ SC,CL,S,HR,HC,F
110 POKE 36879,11
120 POKE 38608,7
130 POKE 7888,102
140 POKE 38609,7
150 POKE 7889,102
160 PRINT CHR$(5);
170 FOR X=1 TO 24
180 READ A,B,C
190 FOR Y=A TO B
200 IF X<=12 THEN POKE SC+C+22*Y,160:POKE CL+C+22*Y,6:

```

```

GOTO 220
210 POKE SC+Y+22*C,160:POKE CL+Y+22*C,6
220 NEXT Y
230 NEXT X
240 H1=INT(RND(1)*21)
250 H2=INT(RND(1)*2)-20*(RND(1)>.5)
260 PRINT CHR$(19);RS;TAB(8);STR$(S);" ";
270 S=S-1
280 IF KB=0 THEN 360
290 POKE 37154,127
300 J=PEEK(37152) AND 128
310 POKE 37154,255
320 J=J OR (PEEK(37137) AND 127)
330 RO=H1+SGN(J AND 4)-SGN(J AND 8)
340 CO=H2+SGN(J AND 16)-SGN(J AND 128)
350 GOTO 410
360 GET JS
370 IF JS="" THEN J=0:GOTO 390
380 J=ASC(JS)
390 RO=H1-(J=44 OR J=46 OR J=77)+(J=73 OR J=79 OR J=85)
)
400 CO=H2-(J=46 OR J=76 OR J=79)+(J=74 OR J=77 OR J=85)
)
410 RO=RO+(RO>21)-(RO<0)
420 CO=CO+(CO>21)-(CO<0)
430 IF PEEK(SC+CO+22*RO)=160 THEN RO=H1:CO=H2:GOTO 510
440 POKE SC+H2+22*H1,42
450 POKE CL+H2+22*H1,0
460 POKE SC+CO+22*RO,42
470 POKE CL+CO+22*RO,7
480 H1=RO
490 H2=CO
500 IF RO=9 AND (CO=10 OR CO=11) THEN 700
510 RA=HR-(RO>HR)+(RO<HR)
520 CA=HC-(CO>HC)+(CO<HC)
530 RA=RA+(RA>21)-(RA<0)
540 CA=CA+(CA>21)-(CA<0)
550 CH=PEEK(SC+CA+22*RA)
560 IF CH<>160 AND CH<>102 THEN 620
570 D=2*INT(RND(1)*2)-1
580 IF F THEN RA=HR+D:CA=HC:GOTO 600
590 CA=HC+D:RA=HR
600 F=NOT F
610 GOTO 530
620 POKE SC+HC+22*HR,81
630 POKE CL+HC+22*HR,0
640 POKE SC+CA+22*RA,81
650 POKE CL+CA+22*RA,2
660 HR=RA
670 HC=CA
680 IF CA=CO AND RA=RO THEN 790
690 GOTO 260
700 PRINT CHR$(147);
710 IF S>HS THEN HS=S
720 POKE 36878,7
730 FOR T=180 TO 255
740 PRINT "YOU DID IT! ";
750 POKE 36876,T
760 NEXT T
770 PRINT CHR$(147);"YOUR SCORE IS";S;CHR$(157);"."
780 GOTO 820
790 POKE 36878,10
800 POKE 36876,235
810 PRINT CHR$(147);"YOU WERE CAUGHT!"
820 PRINT "HIGH SCORE IS";HS;CHR$(157);"."
830 PRINT "PRESS <RETURN> TO","PLAY AGAIN.";
840 POKE 36878,0
850 GET KS
860 IF KS<>CHR$(13) THEN 850
870 RESTORE
880 GOTO 90
1000 DATA 7680,38400,1000,16,7,0
2000 DATA 2,10,2,12,20,2,5,6,5,8,14,5,16,17
2010 DATA 5,8,14,8,8,14,13,5,6,16,8,14,16,16
2020 DATA 17,16,2,10,19,12,20,19,4,9,2,11,17
2030 DATA 2,6,6,5,8,13,5,15,15,5,8,13,8,10,11
2040 DATA 14,6,6,17,8,13,17,15,15,17,4,9,20
2050 DATA 11,17,20

```

PROGRAMMING P.S.

Corrections to previous months' programs—and enhancements suggested by our readers

CORRECTIONS . . .

ADAM/Recipe for Disaster (June, page 98)

The expression NEXT i appears in both line 380 and line 390. It should only be in line 380; thus, line 390 should read

```
390 FOR d=1 TO 200:NEXT d:GOTO 210
```

ADAM/Mystery Manor (March, page 109)

In addition to the modifications indicated, you must also change line 330 to read as follows:

```
330 FOR I=1 TO 10:PRINT G(I);:FLAG=FLAG+(G(I)<>INT(SQR(GU(I)-9))):NEXT I:PRINT
```

Apple/Phone Cost Monitor (May, pages 64-65)

Lines 920, 930, and 1080 are incorrect as published. They should read as follows:

```
920 IF $$ = "1" THEN PRINT "YOUR MONEY IS SPENT!"
930 IF $$ = "2" THEN PRINT "TIME'S UP!"
1080 IF PEEK(-16384) < 128 THEN 990
```

Apple/Mystery Gadget (May, page 88)

In addition to the modifications indicated, you must also change line 510 of the Model 4 version to read as follows:

```
510 GET KS:GOTO 100
```

Atari/Recipe for Disaster (June, pages 96, 98)

Unless you use some of the Atari's tricks for entering extra-long lines, it won't let you type in a program line that's more than 114 characters long. Line 400 of *Recipe for Disaster* has 132 characters. One way to get around this problem is to break it up into two lines, like so:

```
400 SOUND 0,0,0,0:SOUND 1,0,0,0:SOUND 2,0,0,0:NEXT Y:F
OR D=1 TO 200:NEXT D:NEXT X
405 SOUND 0,90,8,15:FOR D=1 TO 10:NEXT D:SOUND 0,0,0,0
```

TI-99/4A/Disk Label Maker (June, page 78)

This program requires TI Extended BASIC.

TI-99/4A w/TI Extended BASIC/Recipe for Disaster (June, page 101)

The semicolon in line 110 should be a colon:

```
110 INPUT "YOUR NAME, PLEASE? ":NS::IF NS="" THEN 110
```

. . . AND ENHANCEMENTS

We encourage you to try translating our programs for other computers—especially the reader-written programs, which appear each month for only one computer. If you're willing, we'll publish your name and address here so that other owners of your brand of computer can write you (with a stamped, self-addressed envelope, of course) for copies of your translation.

A YEAR TO REMEMBER

BY PETER FAVARO

"MAN SNATCHED BY UFO!" was the headline on page two of the local paper. Just before the man disappeared, his wife, Mrs. Harry Winkler, reports, they were sitting quietly at home watching TV. All of a sudden she noticed her oven door opening and closing and the hands on her kitchen clock spinning wildly. Their dog, Bubba, "was turning somersaults and running around in circles in the backyard." Mrs. Winkler went outside to investigate and noticed mysterious red, blue, and green lights flickering across the sky. When she returned inside, Harry was gone. "I never saw anything like it!" Mrs. Winkler is quoted as saying. "Bub-

ba's been so depressed ever since Harry's not been around to take him on his nightly stroll."

MEANWHILE, LIGHT-YEARS AWAY...

The Outer People are a peaceful and scholarly race who live on a small planet tucked away in a dark corner of our galaxy. They are obsessed with keeping track of every fact and fad in the Milky Way's history and have developed a technique of traveling through time at high speeds to collect "samplings" from various planets. Although they always make a point of returning their "sampling" right back to the precise year when it was collected so as not to disturb the natural order of things, sometimes they goof. Such was the case with Mr. Harry Winkler. The Outer People simply couldn't remember which year they snatched him from.

Although the Outer People can't communicate directly with Mr. Winkler,

fortunately, they have constructed a machine to get them out of sticky situations such as this one. With their "Thought Recorder, Model XIV," the Outer People can view memories locked in Mr. Winkler's brain. By matching his memories of his final moment on earth with their detailed knowledge of the planet's history, they can piece together what year Mr. Winkler should be returned to.

HOW TO PLAY

First, set the Thought Recorder, Model XIV (your computer) to all uppercase letters and turn the volume up. Next, select the memory zone you wish to view (see illustration, below). Type in the first letter of the zone (for example, "A" for Audio). A memory concerning sound will appear on the screen. Type "A" again and a different memory may appear. To ensure that you have viewed every memory concerning sound, press the "A" key several

times before moving on to a different zone.

Pay particular attention to the strength signals accompanying each memory. A long flashing line indicates Mr. Winkler's final memories on earth, while a short flashing line refers to a less recent memory lodged deeper in his mind. Only the former are pertinent; they should be jotted down on paper.

Remember that Mr. Winkler was last seen on earth watching television, so his final memories will be partly a direct recollection of what was on the screen in front of him, and partly his own loose associations with the events he was viewing. Once you figure out what Mr. Winkler was watching on TV, and the corresponding year, type "G" to guess. Then input the year (use digits). If you guess an incorrect year, you can get a helpful clue by typing "H" for help. The solution to *Brain Terrain* will appear in next month's issue.

PETER FAVARO, PH.D., is an education and recreation video game design consultant whose fondest recent memory is marrying his wife, Theresa. He is currently writing a book on educational computing for Prentice-Hall and is the author of the *June* puzzle.

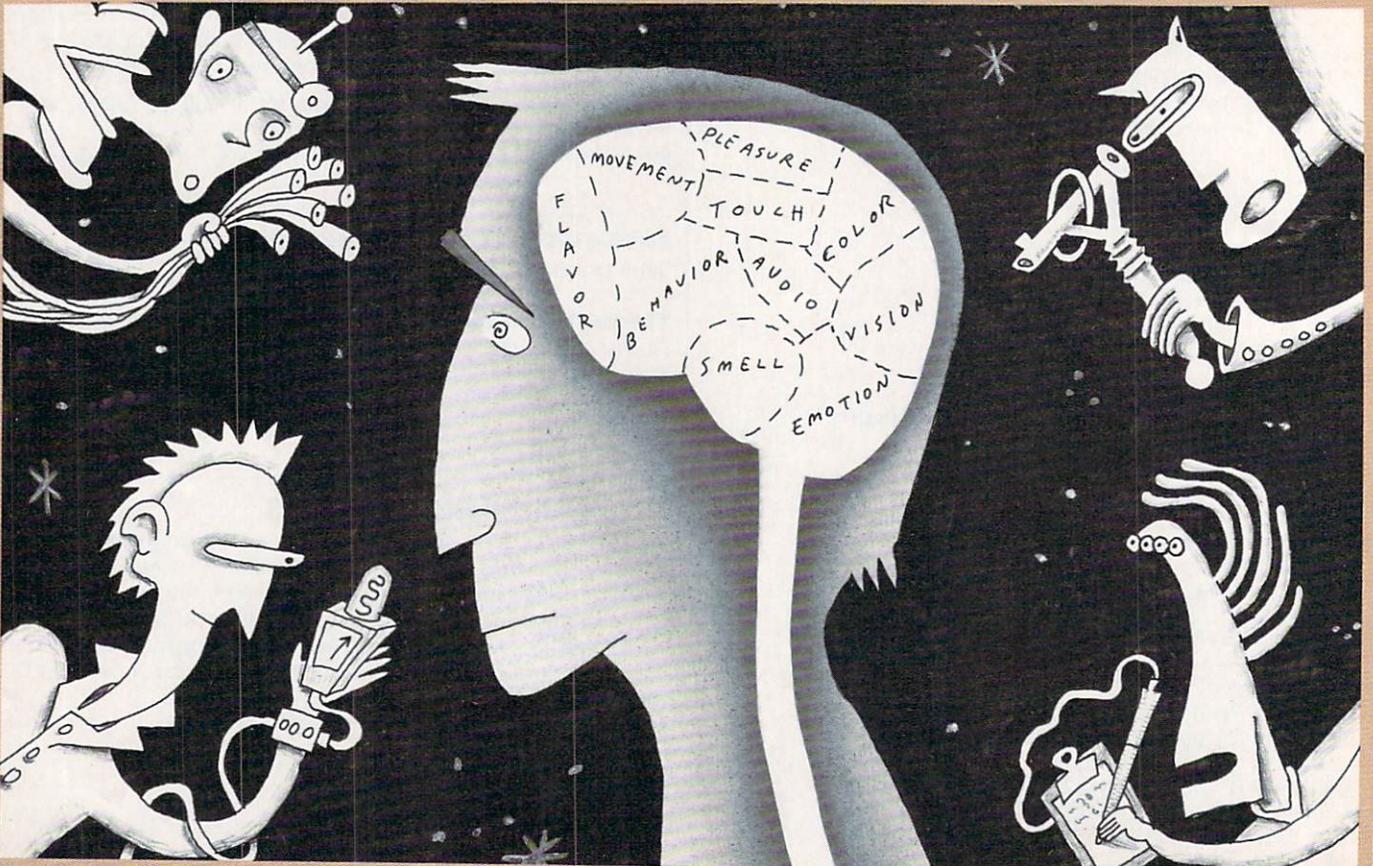
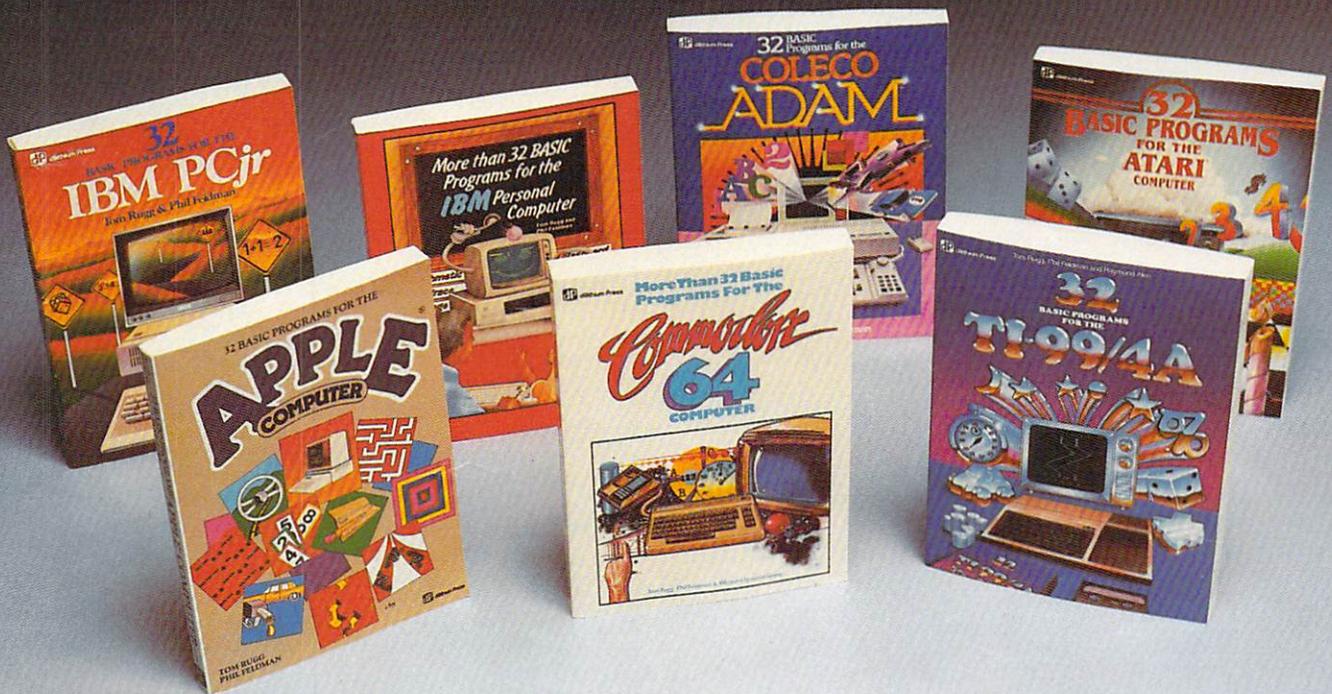


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PUZZLE

Base Version (TRS-80 Color Computer)/

Brain Terrain

```

10 CLEAR 900: DIM A$(11,4), N(11): WL=32: GW=0: M=0: Q$="" : C
LS
40 E$=CHR$(34): BL$=STRING$(WL,32): ST$=STRING$(WL,42)
50 READ V$: FOR X=1 TO 11: READ N(X): FOR Y=1 TO N(X)
60 READ D$: C=ASC(LEFT$(D$,1))-64
70 FOR Z=2 TO LEN(D$): N=ASC(MID$(D$,Z,1))-C
80 A$(X,Y)=A$(X,Y)+CHR$(N-26*(N<65 AND N+C>64))
90 NEXT Z: NEXT Y: NEXT X
100 CLS: RS="THOUGHT RECORDER, MODEL XIV": GOSUB 1000
110 RS="(PATENT PENDING)": GOSUB 1000
120 PRINT: RS="PRESS A ZONE KEY (A, B, C, E, F, M, P, S,
, T, OR V) TO ACCESS MEMORY"
130 IF GW=1 THEN RS=RS+" "+E$+"H"+E$+" FOR HELP,"
140 RS=RS+" OR "+E$+"G"+E$+" TO GUESS.": GOSUB 1000
160 TB=INT((WL-LEN(Q$))/2)
170 IF M=1 THEN NS=RND(TB) ELSE NS=RND(3)
180 N$=LEFT$(ST$,NS)+Q$+RIGHT$(ST$,NS)
190 PRINT@10*WL, BL$: PRINT@10*WL, "": GOSUB 2000
200 K$=INKEY$: IF K$="" THEN 170
210 IF K$="G" THEN 260
220 IF K$="H" AND GW=1 THEN 370
230 FL=0: FOR X=1 TO 10: IF MID$(V$,X,1)=K$ THEN FL=X: X=
10
240 NEXT X: IF FL=0 THEN 170
250 M=RND(N(FL)): Q$=A$(FL,M): GOTO 160
260 CLS: FOR X=1 TO 128 STEP 4: SOUND X,1: NEXT X
270 RS="SPACE/TIME MACHINE ACTIVE.": GOSUB 1000
280 PRINT: PRINT: PRINT: PRINT "INPUT YEAR";
290 INPUT Y$: IF Y$<>A$(11,1) THEN GW=1: GOTO 340
300 CLS: FOR X=1 TO 50: SOUND 40+RND(40),1: SOUND 200+RND
(40),1: NEXT X
310 N$="WHOOOOSH!": PRINT@8*WL, "": GOSUB 2000
320 PRINT: PRINT: RS="SUBJECT RETURNED HOME SAFELY!"
330 GOSUB 1000: END
340 CLS: FOR X=1 TO 30+RND(50): SOUND RND(255),1: NEXT X
350 RS="FAILURE! INCORRECT TIME FRAME."
360 GOSUB 1000: GOTO 390
370 CLS: RS="THE LAST WORDS MR. WINKLER HEARD WERE"
380 GOSUB 1000: PRINT: RS=A$(11,2): GOSUB 1000
390 Q$="": M=0: RS="(PRESS ANY KEY TO CONTINUE.)"
400 PRINT@12*WL, "": GOSUB 1000
410 K$=INKEY$: IF K$="" THEN 410
420 GOTO 100
1000 IF LEN(RS)<=WL THEN NS=RS: GOSUB 2000: RETURN
1010 J=WL+1: FOR I=WL+1 TO 1 STEP -1
1020 IF MID$(RS,I,1)="" THEN J=I: I=1
1030 NEXT I: N$=LEFT$(RS,J-1): GOSUB 2000
1040 RS=RIGHT$(RS,LEN(RS)-J): GOTO 1000
2000 PRINT TAB((WL-LEN(N$))/2); N$;
2010 IF LEN(N$)<WL THEN PRINT
2020 RETURN
4000 DATA ACVEFSBMP T
4010 DATA 4,LEFMFUO,UNXMPWWDIB,FLGYZ&ZGRQOTM,QAZEXCV
4020 DATA 2,MSNQRQ,DTMROS$XVMTIW,2,UIDBCO,KXTCZC
4030 DATA 3,IJFN,WYLOBALJ,AJSSJUBUJPO
4040 DATA 2,TILUHAY,MJVAGRETERRA,2,EXBJFY,HUQVB
4050 DATA 3,VNKYG6DQJPEJC,MTNETYVAT,MUNOVG
4060 DATA 2,QWCFRKZEX,AVQ!BOE!EPXO
4070 DATA 2,BDQWPEKPI,PICYBYDW
4080 DATA 2,KDHTDD+NSPPDP,RTJAKLDQ
4090 DATA 2,C4<9<,C%111#VPD00#VWHS#111%

```

Atari/Brain Terrain

```

10 DIM A$(209), D$(21), BL$(40), CL$(1), E$(1), NS(40), Q$(2
1), R$(99), ST$(40), V$(10), Y$(4), N(11), AS(11,4), AL(11,4)
20 WL=40: GW=0: M=0: E$=CHR$(34): CL$=CHR$(125): Q$=""
30 BL$=" ": BL$(40)=BL$: BL$(2)=BL$: ST$="*": ST$(40)=ST$:
ST$(2)=ST$
40 OPEN #1,4,0,"K:"
50 POKE 82,0: POKE 752,1: SETCOLOR 2,5,4: PRINT CL$;
60 READ V$: FOR X=1 TO 11: READ T: N(X)=T: FOR Y=1 TO T
70 READ D$: C=ASC(D$)-64
80 A$(X,Y)=LEN(A$)+1: AL(X,Y)=LEN(D$)-2
90 FOR Z=2 TO LEN(D$): N=ASC(D$(Z))-C
100 A$(LEN(A$)+1)=CHR$(N+26*(N<65 AND N+C>64))

```

```

110 NEXT Z: NEXT Y: NEXT X
120 NS="THOUGHT RECORDER, MODEL XIV": GOSUB 2000
130 NS="(PATENT PENDING)": GOSUB 2000
140 PRINT: RS="PRESS A ZONE KEY (A, B, C, E, F, M, P,
S, T, OR V) TO ACCESS MEMORY"
150 IF GW=1 THEN RS(68)=" ", RS(70)=E$: RS(71)="H": RS(7
2)=E$: RS(73)=" FOR HELP,"
160 RS(LEN(RS)+1)=" OR ": RS(LEN(RS)+1)=E$
170 RS(LEN(RS)+1)="G": RS(LEN(RS)+1)=E$
180 RS(LEN(RS)+1)=" TO GUESS.": GOSUB 1000
190 TB=INT((WL-LEN(Q$))/2)-1
200 NS=INT(RND(0)*3)+1: IF M=1 THEN NS=INT(RND(0)*TB)+1
210 NS=ST$(1,NS): N$(NS+1)=Q$: N$(LEN(N$)+1)=ST$(1,NS)
220 POSITION 0,10: PRINT BL$: POSITION 0,10
230 GOSUB 2000: IF PEEK(764)=255 THEN 200
240 GET #1,K: IF K=ASC("G") THEN 300
250 IF K=ASC("H") AND GW=1 THEN 440
260 FL=0: FOR X=1 TO 10: IF ASC(V$(X))=K THEN FL=X: X=10
270 NEXT X: IF FL=0 THEN 200
280 M=INT(RND(0)*N(FL))+1: IF M=AS(FL,M)
290 Q$=A$(F,F+AL(FL,M)): GOTO 190
300 PRINT CL$: NS="SPACE/TIME MACHINE ACTIVE."
310 GOSUB 2000: FOR X=0 TO 100
320 SOUND 0,RND(0)*100+X,10,10: SOUND 1,30,10,X
330 NEXT X: SOUND 0,0,0,0: SOUND 1,0,0,0
340 PRINT: PRINT: PRINT: PRINT "INPUT YEAR";
350 INPUT Y$: IF Y$<>A$(186,189) THEN GW=1: GOTO 400
360 PRINT CL$: POSITION 15,10: PRINT "WHOOOOSH!"
370 PRINT: PRINT: NS="SUBJECT RETURNED HOME SAFELY!": G
OSUB 2000
380 FOR X=0 TO 210 STEP 0.7: SOUND 0,X,8,10-((X>200)*8)
390 SOUND 1,X,10,4: NEXT X: END
400 PRINT CL$: POSITION 0,10: NS="FAILURE! INCORRECT TI
ME FRAME.": GOSUB 2000
410 Y=7: FOR C=1 TO 3: FOR X=150 TO 80 STEP -1.5
420 Y=-Y: SOUND 0,X+C*20,10,7+Y
430 NEXT X: NEXT C: SOUND 0,0,0,0: GOTO 460
440 PRINT CL$: NS="THE LAST WORDS MR. WINKLER HEARD WE
RE": GOSUB 2000
450 PRINT: NS=A$(190): GOSUB 2000
460 POSITION 0,20: NS="(PRESS ANY KEY TO CONTINUE.)"
470 GOSUB 2000: GET #1,K: Q$="": M=0: PRINT CL$: GOTO 120
1000 IF LEN(RS)<=WL THEN NS=RS: GOSUB 2000: RETURN
1010 J=WL+1: FOR I=WL+1 TO 1 STEP -1
1020 IF RS(I,I)="" THEN J=I: I=1
1030 NEXT I: NS=RS(1,J-1): GOSUB 2000
1040 RS=RS(J+1,LEN(RS)): GOTO 1000
2000 IF LEN(N$)<WL-1 THEN PRINT BL$(1,(WL-LEN(N$))/2);
2010 PRINT NS: IF LEN(N$)<WL THEN PRINT
2020 RETURN
3000 DATA ACVEFSBMP T
3010 DATA 4,LEFMFUO,UNXMPWWDIB,FLGYZ&ZGRQOTM,QAZEXCV
3020 DATA 2,MSNQRQ,DTMROS$XVMTIW,2,UIDBCO,KXTCZC
3030 DATA 3,IJFN,WYLOBALJ,AJSSJUBUJPO
3040 DATA 2,TILUHAY,MJVAGRETERRA,2,EXBJFY,HUQVB
3050 DATA 3,VNKYG6DQJPEJC,MTNETYVAT,MUNOVG
3060 DATA 2,QWCFRKZEX,AVQ!BOE!EPXO
3070 DATA 2,BDQWPEKPI,PICYBYDW
3080 DATA 2,KDHTDD+NSPPDP,RTJAKLDQ
3090 DATA 2,C4<9<,C%111#VPD00#VWHS#111%

```

TI-99/4A/Brain Terrain

```

10 DIM A$(11,4), N(11)
20 READ WL, GW, M, FA, V$
30 E$=CHR$(34)
40 FOR X=1 TO WL
50 ST$=ST$+"*"
60 NEXT X
70 FOR X=1 TO 11
80 READ N(X)
90 FOR Y=1 TO N(X)
100 READ D$
110 C=ASC(SEG$(D$,1,1))-64
120 FOR Z=2 TO LEN(D$)
130 A=ASC(SEG$(D$,Z,1))-C
140 A$(X,Y)=A$(X,Y)+CHR$(A+26*((A<65)*(A+C>64)))
150 NEXT Z

```



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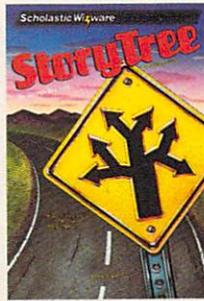
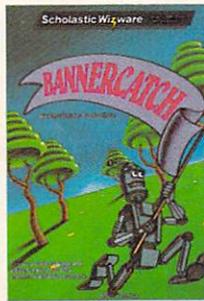
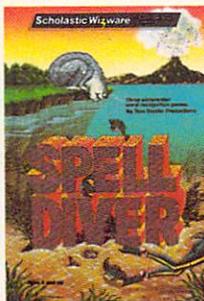
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PUZZLE

```

160 NEXT Y
170 NEXT X
180 Q$=""
190 CALL CLEAR
200 R$="THOUGHT RECORDER, MODEL XIV (PATENT PENDING)"
210 GOSUB 1000
220 PRINT
230 PRINT "PRESS A ZONE KEY (A, B, C, E, F, M, P, S, T
, OR V) TO ACCESS MEMORY"
240 IF GW<>1 THEN 260
250 R$=R$&"", "&E$&"H"&E$&" FOR HELP,"
260 R$=R$&" OR "&E$&"G"&E$&" TO GUESS."
270 GOSUB 1000
280 GOSUB 3000
290 IF FA=2 THEN 410
300 TB=INT((WL-LEN(Q$))/2)
310 FOR J=1 TO 15
320 NS=INT(RND*3)+1
330 IF M<>1 THEN 350
340 NS=INT(RND*TB)+1
350 NS=SEG$(ST$,1,NS)&Q$&SEG$(ST$,1,NS)
360 CALL CLEAR
370 PRINT TAB((WL-LEN(NS))/2);NS;
380 NEXT J
390 FA=2
400 GOTO 180
410 CALL KEY(3,R,S)
420 IF S=0 THEN 410
430 K$=CHR$(R)
440 IF K$="G" THEN 560
450 IF (K$="H")*(GW=1) THEN 830
460 FL=0
470 FOR X=1 TO 10
480 IF SEG$(V$,X,1)<>K$ THEN 510
490 FL=X
500 X=10
510 NEXT X
520 IF FL=0 THEN 410
530 M=INT(RND*N(FL))+1
540 Q$=A$(FL,M)
550 GOTO 300
560 CALL CLEAR
570 FOR I=200 TO 1200 STEP 20
580 CALL SOUND(1,I,0)
590 NEXT I
600 PRINT "SPACE/TIME MACHINE ACTIVE."
610 GOSUB 3000
620 INPUT "INPUT YEAR: ":Y$
630 IF Y$=A$(11,1) THEN 710
640 GW=1
650 CALL CLEAR
660 FOR I=1 TO 90
670 CALL SOUND(1,RND*3500+200,RND*20)
680 NEXT I
690 R$="FAILURE! INCORRECT TIME FRAME."
700 GOTO 880
710 CALL CLEAR
720 FOR I=1 TO 4
730 CALL SOUND(50,262,0,330,0,392,0)
740 CALL SOUND(400,262,0,330,0,392,0)
750 CALL SOUND(500,110,30)
760 NEXT I
770 NS="WHOOOOSH!"
780 GOSUB 2000
790 GOSUB 3000
800 R$="SUBJECT RETURNED HOME SAFELY!"
810 GOSUB 1000
820 END
830 CALL CLEAR
840 R$="THE LAST WORDS MR. WINKLER HEARD WERE"
850 GOSUB 1000
860 PRINT
870 R$=A$(11,2)
880 Q$=""
890 M=0
900 GOSUB 1000
910 GOSUB 3000
920 PRINT "(PRESS ANY KEY TO CONTINUE.)"

```

```

930 CALL KEY(3,R,S)
940 IF S=0 THEN 930 ELSE 190
1000 IF LEN(R$)>WL THEN 1040
1010 NS=R$
1020 GOSUB 2000
1030 RETURN
1040 J=0
1050 FOR I=WL+1 TO 1 STEP -1
1060 IF SEG$(R$,I,1)<>" " THEN 1090
1070 J=I
1080 I=1
1090 NEXT I
1100 NS=SEG$(R$,1,J-1)
1110 GOSUB 2000
1120 R$=SEG$(R$,J+1,LEN(R$)-J+1)
1130 GOTO 1000
2000 PRINT TAB((WL-LEN(NS))/2);NS;
2010 IF LEN(NS)>=WL THEN 2030
2020 PRINT
2030 RETURN
3000 FOR I=1 TO 12
3010 PRINT
3020 NEXT I
3030 RETURN
4000 DATA 28,0,0,1,ACVEFSBMPT
4010 DATA 4,LEFMFUO,UNXMPWWDIB,FLGYZ&ZGRQOTM,QAEXECV
4020 DATA 2,MSNQRQ,DTMRO$WXVMTIW,2,UIDBCO,KXTCCZC
4030 DATA 3,IJFN,WYLOBALJ,AJSSJUBUJPO
4040 DATA 2,TILUHAY,MJVAGRETERRA,2,EXBJFY,HUQVB
4050 DATA 3,VNKYG6DQJPEJC,MTNETYVAT,MUNOVG
4060 DATA 2,QWCFRKZEX,AVQ!BOE!EXPO
4070 DATA 2,BDQWPEKPI,PICYBYDW
4080 DATA 2,KDHTDD+NSPPDP,RTJAKLDQ
4090 DATA 2,C4<9<,C%111#VPD00#VWHS#111%

```

Timex Sinclair 1000 w/16K RAM Pack & Timex Sinclair 1500/Brain Terrain

```

10 FAST
20 RAND
30 DIM A$(11,4,22)
40 DIM N(11)
50 LET WL=32
60 LET GW=0
70 LET M=0
80 LET Q$=""
90 LET E$=CHR$ 11
100 LET B$=CHR$ 0
110 LET S$="*"
120 FOR X=1 TO 5
130 LET B$=B$+B$
140 LET S$=S$+S$
150 NEXT X
160 LET V$="ACVEFSBMPT"
170 LET L$="4223223222"
180 LET T$="A34L4TN,B4036NNUZS,HXSAB>BS3205Y,J32705Y,R
72565,C2VOX$564V2R5,9XSQR3,151AA7A,R206,Q2F154FD,50XX0
ZGZOUT,PEH0D64,VSEJPANCAAJ,WPTB7Q,I516C,F74SQ(XA39Y3W
,TA4LAFCHA,4MFGNY,EU03P8X2V,FA5(Q3T(T4C3,HT6C5U05Y,VOI
EHEJC,HAEOAA>UZWWAW,MYE5FG8L,O2A7A,D;$$$600ZZ:67S3:$$
$;,"
190 LET P=1
200 FOR X=1 TO 11
210 FOR Y=1 TO VAL L$(X)
220 LET D$=""
230 LET D$=D$+T$(P)
240 LET P=P+1
250 IF T$(P)<>CHR$ 26 THEN GOTO 230
260 LET P=P+1
270 LET A$(X,Y)=CHR$(LEN D$)
280 LET C=CODE D$(1)-27
290 FOR Z=2 TO LEN D$
300 LET N=CODE D$(Z)-C
310 LET A$(X,Y) (Z)=CHR$(N+36*((N<28) AND (N+C>27))+2
8*(N<0))
320 NEXT Z
330 NEXT Y
340 NEXT X

```

```

350 SLOW
360 LET R$="THOUGHT RECORDER, MODEL XIV (PATENT PENDING)"
370 GOSUB 1000
380 PRINT
390 LET R$="PRESS A ZONE KEY (A, B, C, E, F, M, P, S, T, OR V) TO ACCESS MEMORY"
400 IF GW=1 THEN LET R$=R$+" "+ES+"H"+ES+" FOR HELP,"
410 LET R$=R$+" OR "+ES+"G"+ES+" TO GUESS."
420 GOSUB 1000
430 LET TB=INT ((WL-LEN Q$)/2)
440 LET NS=INT (RND*3+1)
450 IF M=1 THEN LET NS=INT (RND*TB+1)
460 LET N$=S$( TO NS)+Q$+S$( TO NS)
470 PRINT AT 18,0;B$;
480 PRINT AT 18,0;
490 GOSUB 2000
500 LET K$=INKEY$
510 IF K$="" THEN GOTO 440
520 IF K$="G" THEN GOTO 620
530 IF K$="H" AND GW=1 THEN GOTO 760
540 LET FL=0
550 FOR X=1 TO 10
560 IF V$(X)=K$ THEN LET FL=X
570 NEXT X
580 IF FL=0 THEN GOTO 440
590 LET M=INT (RND*VAL L$(FL)+1)
600 LET Q$=A$(FL,M) (2 TO CODE A$(FL,M,1))
610 GOTO 430
620 CLS
630 LET N$="SPACE/TIME MACHINE ACTIVE."
640 GOSUB 2000
650 PRINT AT 4,0;"INPUT YEAR."
660 INPUT Y$
670 IF Y$<>A$(11,1) (2 TO 5) THEN GOTO 720
680 CLS
690 PRINT AT 10,11;"WHOOOOSH."
700 PRINT AT 13,1;"SUBJECT RETURNED HOME SAFELY."
710 STOP
720 LET GW=1
730 CLS
740 PRINT AT 6,1;"FAILURE. INCORRECT TIME FRAME."
750 GOTO 800
760 CLS
770 LET R$="THE LAST WORDS MR. WINKLER HEARD WERE"
780 GOSUB 1000
790 PRINT AT 3,6;A$(11,2) (2 TO 21)
800 LET Q$=""
810 LET M=0
820 PRINT AT 20,2;"(PRESS ANY KEY TO CONTINUE.)"
830 LET K$=INKEY$
840 IF K$="" THEN GOTO 830
850 CLS
860 GOTO 360
1000 IF LEN R$>WL THEN GOTO 1040
1010 LET N$=R$
1020 GOSUB 2000
1030 RETURN
1040 LET J=WL+1
1050 FOR I=WL+1 TO 1 STEP -1
1060 IF R$(I)<>CHR$ 0 THEN GOTO 1090
1070 LET J=I
1080 LET I=1
1090 NEXT I
1100 LET N$=R$( TO J-1)
1110 GOSUB 2000
1120 LET R$=R$(J+1 TO LEN R$)
1130 GOTO 1000
2000 PRINT TAB (WL-LEN N$)/2;N$;
2010 IF LEN N$<WL THEN PRINT
2020 RETURN

```

MODIFICATIONS FOR OTHER COMPUTERS

ADAM/Brain Terrain

Use the base version, with the following alterations:
Change CLS to HOME in lines 100 and 370. Add line 150:

150 FOR y=1 TO 10

Omit line 420. Finally, change lines 10, 40, 80, 170, 190, 200, 240-260, 300, 310, 340, 400, 410, and 2000 to read as follows:

```

10 DIM a$(11,4),n(11):wl=31:gw=0:m=0:q$="":HOME
40 e$=CHR$(34):FOR x=1 TO wl:bl$=bl$+CHR$(32):st$=st$+CHR$(42):NEXT x
80 a$(x,y)=a$(x,y)+CHR$(n+26*(n<65 AND n<c>64))
170 ns=INT(RND(1)*3)+1:IF m=1 THEN ns=INT(RND(1)*tb)+1
190 VTAB 10:HTAB 1:PRINT bl$;VTAB 10:HTAB 1:GOSUB 2000
200 NEXT y:GET k$
240 NEXT x:IF fl=0 THEN 150
250 m=INT(RND(1)*n(fl))+1:q$=a$(fl,m):GOTO 150
260 HOME
300 HOME
310 VTAB 10:HTAB 11:FLASH:PRINT "WHOOOOSH!":NORMAL
340 HOME
400 VTAB 20:GOSUB 1000
410 GET k$:GOTO 100
2000 PRINT TAB((wl-LEN(n$))/2+1);n$;

```

Apple/Brain Terrain

Use the base version, with the following alterations: Add lines 20 and 150:

```

20 FOR S=1 TO 29:READ A:POKE 767+S,A:NEXT S
150 POKE -16368,0

```

Change CLS to HOME in lines 100 and 370. Omit line 420. Finally, change lines 10, 40, 80, 170, 190-210, 250, 260, 300, 310, 340, 400, 410, 2000, and 3000-3020 to read as follows:

```

10 DIM A$(11,4),N(11):WL=40:GW=0:M=0:Q$="":HOME
40 E$=CHR$(34):FOR X=1 TO WL:BL$=BL$+CHR$(32):ST$=ST$+CHR$(42):NEXT X
80 A$(X,Y)=A$(X,Y)+CHR$(N+26*(N<65 AND N<C>64))
170 NS=INT(RND(1)*3)+1:IF M=1 THEN NS=INT(RND(1)*TB)+1
190 VTAB 10:HTAB 1:PRINT BL$;VTAB 10:HTAB 1:GOSUB 2000
200 K=PEEK(-16384):IF K<=127 THEN 170
210 POKE -16368,0:K$=CHR$(K-128):IF K$="G" THEN 260
250 M=INT(RND(1)*N(FL))+1:Q$=A$(FL,M):GOTO 150
260 HOME:FOR X=180 TO 10 STEP -5:POKE 6,10:POKE 8,X:CALL 768:NEXT X
300 HOME:FOR X=1 TO 40:FOR Y=1 TO 3:Q=PEEK(-16336):NEXT Y:POKE 6,9:POKE 8,RND(1)*60+190:CALL 768:NEXT X
310 VTAB 10:HTAB 15:FLASH:PRINT "WHOOOOSH!":NORMAL
340 HOME:FOR X=1 TO 40:POKE 6,RND(1)*20+1:POKE 8,RND(1)*25+5:CALL 768:NEXT X
400 VTAB 20:GOSUB 1000
410 GET K$:GOTO 100
2000 PRINT TAB((WL-LEN(N$))/2+1);N$;
3000 DATA 165,8,74,133,10,164,8,173,48,192
3010 DATA 136,234,234,208,251,165,7,56,229
3020 DATA 10,133,7,176,237,198,6,208,233,96

```

Commodore 64/Brain Terrain

Use the base version, with the following alterations: Add lines 20 and 30:

```

20 VL=54272:VH=VL+1:FOR X=VL TO VL+24:POKE X,0:NEXT X
30 POKE VL+24,15:POKE VL+5,32:POKE VL+6,32:POKE VL+4,17

```

Change CLS to PRINT CL\$ in lines 100 and 370. Finally, change lines 10, 40, 170, 190, 200, 250, 260, 300, 310, 340, 400, and 410 to read as follows:

```

10 DIM A$(11,4),N(11):WL=40:GW=0:M=0:Q$="":CL$=CHR$(147):PRINT CL$:CHR$(5)
40 E$=CHR$(34):FOR X=1 TO WL:BL$=BL$+CHR$(32):ST$=ST$+CHR$(42):NEXT X
170 NS=INT(RND(0)*3)+1:IF M=1 THEN NS=INT(RND(0)*TB)+1
190 POKE 214,10:PRINT:PRINT BL$;POKE 214,10:PRINT:GOSUB 2000
200 GET K$:IF K$="" THEN 170
250 M=INT(RND(0)*N(FL))+1:Q$=A$(FL,M):GOTO 160

```

FOR THE TI 99/4A

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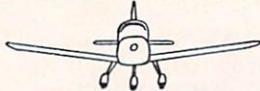
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PUZZLE

```
260 PRINT CL$:FOR X=1 TO 500:POKE VH,INT(X/2):NEXT X:P
OKE VH,0
300 PRINT CL$:POKE VL+4,129:FOR X=1 TO 500:POKE VH,INT
(X/2):NEXT X:POKE VH,0
310 NS="WHOOOOSH!":POKE 214,8:PRINT:GOSUB 2000
340 PRINT CL$:FOR X=1 TO 500:POKE VH,INT(RND(O)*254)+1
:NEXT X:POKE VH,0
400 POKE 214,12:PRINT:GOSUB 1000
410 GET K$:IF K$="" THEN 410
```

IBM PC/Brain Terrain

Use the base version, except change lines 10, 170, 190, 250, 260, 300, 310, 340, and 400 to read as follows:

```
10 KEY OFF:DIM A$(11,4),N(11):WL=80:GW=0:M=0:Q$="":WID
TH WL:CLS
170 IF M=1 THEN NS=INT(RND*TB)+1 ELSE NS=INT(RND*3)+1
190 LOCATE 10:PRINT BL$:LOCATE 10:GOSUB 2000
250 M=INT(RND*N(FL))+1:Q$=A$(FL,M):GOTO 160
260 CL$:FOR X=440 TO 1046:SOUND X,.01:NEXT X
300 CL$:FOR X=440 TO 1046:SOUND X,.03:SOUND 1500-X,.01
:NEXT X
310 NS="WHOOOOSH!":LOCATE 8:GOSUB 2000
340 CL$:FOR X=1 TO 128:SOUND RND*3000+37,.2:NEXT X
400 LOCATE 12:GOSUB 1000
```

IBM PCjr/Brain Terrain

If you have 128K of RAM and a monitor capable of displaying 80 columns, the changes indicated above for the IBM PC will work for you; otherwise, make those changes and then change WL=80 to WL=40 in line 10.

TRS-80 Model III/Brain Terrain

Use the base version, except change WL=32 to WL=64 in line 10 and change lines 260, 300, and 340 to read as follows:

```
260 CLS
300 CLS
340 CLS
```

TRS-80 Model 4/Brain Terrain

Use the base version, except change lines 10, 260, 300, 330, and 340 to read as follows:

```
10 DIM A$(11,4),N(11):WL=80:GW=0:M=0:Q$="":CLS:PRINT C
HR$(15)
260 CLS
300 CLS
330 GOSUB 1000:PRINT CHR$(14):END
340 CLS
```

VIC-20/Brain Terrain

Use the base version, with the following alterations: Add line 20:

```
20 VL=36875:POKE VL+3,15
```

Change CL\$ to PRINT CL\$ in lines 100 and 370. Finally, change lines 10, 40, 170, 190, 200, 250, 260, 300, 310, 340, 400, and 410 to read as follows:

```
10 DIM A$(11,4),N(11):WL=22:GW=0:M=0:Q$="":CL$=CHR$(14
7):PRINT CL$
40 E$=CHR$(34):FOR X=1 TO WL:BL$=BL$+CHR$(32):ST$=ST$+
CHR$(42):NEXT X
170 NS=INT(RND(O)*3)+1:IF M=1 THEN NS=INT(RND(O)*TB)+1
190 POKE 214,10:PRINT:PRINT BL$:POKE 214,10:PRINT:GOS
UB 2000
200 GET K$:IF K$="" THEN 170
250 M=INT(RND(O)*N(FL))+1:Q$=A$(FL,M):GOTO 160
260 PRINT CL$:FOR X=128 TO 255:POKE VL,X:POKE VL+1,X:N
EXT X:POKE VL,0:POKE VL+1,0
300 PRINT CL$:FOR X=128 TO 255:POKE VL+2,X:NEXT X:POKE
VL+2,0
310 NS="WHOOOOSH!":POKE 214,8:PRINT:GOSUB 2000
340 PRINT CL$:FOR X=1 TO 255:POKE VL,INT(RND(O)*254)+1
:NEXT X:POKE VL,0
400 POKE 214,12:PRINT:GOSUB 1000
410 GET K$:IF K$="" THEN 410
```

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LEARNING THE EASY WAY

BY ALAN DROGIN

I remember playing *Hangman* in fifth grade with my childhood friend, Joe. The only thing that I can remember about Joe is that he had five sisters and always wore an unbuttoned lumberjack shirt over a T-shirt. We would sneak in a game or two when we got really bored and the teacher wasn't looking, usually during multiplication table drills. Joe was an artist, so he would always draw the minutest details on the hanged man like fingers, toes, and even eyelashes. By then I'd had enough turns to guess almost every letter in the alphabet, so I usually won.

Many years later, while studying to become a teacher, I student-taught a class of fifth graders at Phillips Elementary School in Watertown, Massachusetts. Times had changed. All of a sudden, drills were turned into games and school was supposed to be fun. Teachers had to match the fast-paced entertainment of television. So I constructed lesson plans based on the old games Joe and I used to sneak in during class. *Hangman* became a classroom activity played out in the open to teach spelling.

HOW TO PLAY

Before playing *Hangman*, Player No. 1 should select a word or phrase (25



Alan, on the roof of the FAMILY COMPUTING building in Greenwich Village, New York City.

letters maximum including spaces between words) and type it into the computer when Player No. 2 isn't looking. (It's OK to use punctuation, such as commas or apostrophes.) A series of asterisks representing the word or phrase will appear on the screen. Player No. 2 should then guess a letter and type it in.

If the letter does not appear anywhere in the word or phrase, a part of the hanged man's body will appear on the screen. If the letter is correct, the computer will replace an asterisk with that letter wherever it appears in the word or phrase, and Player No. 2 will then get a chance to guess (without penalty) the entire word or phrase. All punctuation and spaces must be correct. If Player No. 2 chooses not to guess, he or she simply presses the RETURN key.

Player No. 2 wins by guessing the word or phrase before the drawing of the hanged man is completed on the screen. Thirteen wrong guesses are permitted.

(NOTE: *Hangman* was written for the ADAM, but can be played on Apple computers as well. Apple owners should enter the program using all capital letters for statements and variable names. Characters enclosed in quotes may be entered in lower case if your Apple allows.)

ADAM & Apple/Hangman

```

10 DIM p(25):TEXT:HOME:try = 0:FOR x = 1 TO 31:bl$ = b
l$+" ":NEXT x
20 PRINT "WHILE PLAYER #2 ISN'T LOOKING,"
30 PRINT "TYPE IN A WORD OR PHRASE"
40 PRINT "(NO MORE THAN 25 LETTERS LONG)"
50 PRINT "AND PRESS <RETURN>."
60 PRINT:PRINT "WORD OR PHRASE: ";:PRINT:GOSUB 1000:p$
= y$
70 IF p$ <> "" AND LEN(p$) <= 25 THEN 90
80 PRINT:PRINT CHR$(7);"PLEASE REENTER.":GOTO 60
90 nl = 0:FOR x = 1 TO LEN(p$)
100 j = ASC(MID$(p$,x,1))
110 IF (j >= 65 AND j <= 90) OR (j >= 97 AND j <= 122)
THEN p(x) = -j:nl = nl+1:GOTO 130
120 p(x) = j
130 NEXT x
140 IF nl = 0 THEN 80
150 HGR:HCOLOR= 3
160 HPLLOT 134,20 TO 134,10 TO 90,10 TO 90,140
170 HPLLOT 70,140 TO 110,140 TO 110,155 TO 70,155 TO 70
,140
180 HOME:GOSUB 2000
190 VTAB 22:HTAB 1:PRINT "GUESS A LETTER: ";
200 GET guess$:IF (guess$ < "A" OR guess$ > "Z") AND
(guess$ < "a" OR guess$ > "z") THEN 200
210 PRINT guess$:j = ASC(guess$):f = 0:FOR x = 1 TO
LEN(p$)
220 k = ASC(MID$(p$,x,1)):IF (ABS(j-k) = 0 OR ABS(j-k)
= 32) AND p(x) < 0 THEN f = 1:nl = nl-1:p(x) = -p(x)
230 NEXT x:IF nl = 0 THEN HOME:GOSUB 2000:FOR de = 1 T
O 200:NEXT de:GOTO 380
240 IF f = 1 THEN 330
250 try = try+1:if try > 1 THEN 300
260 FOR i = 1/15 TO 8*ATN(1) STEP 1/15
270 xf = SIN(i)*10+134:yf = COS(i)*10+30
280 HPLLOT xf,yf:NEXT i
290 GOTO 180
300 READ a,b,c,d:HPLLOT a,b TO c,d:IF try < 14 THEN 180
310 FOR d = 1 TO 10:PRINT CHR$(7);:NEXT d
320 TEXT:HOME:PRINT "YOU LOSE! THE ANSWER IS ...":PRIN
T:PRINT p$:GOTO 390
330 GOSUB 2000
340 PRINT:PRINT "GUESS THE WORD OR PHRASE,":PRINT "THE
N PRESS <RETURN>."
350 PRINT ">";:GOSUB 1000:IF LEN(y$) <> LEN(p$) THEN 1
80
360 f = 0:FOR x = 1 TO LEN(y$):j = ASC(MID$(y$,x,1)):k
= ASC(MID$(p$,x,1)):IF j <> k AND ABS(j-k) <> 32 THEN
f = 1
370 NEXT x:IF f = 1 THEN 180
380 TEXT:HOME:FOR x = 1 TO 100:PRINT "YOU WIN! ";:NEXT
x
390 PRINT:PRINT:PRINT "SWITCH PLACES AND PRESS":PRINT
"ANY KEY TO PLAY AGAIN."
400 GET k$:RUN
1000 y$ = ""
1010 GET l$:IF l$ = CHR$(13) THEN RETURN
1020 IF l$ <> CHR$(8) THEN PRINT l$;:y$ = y$+l$:GOTO 1
010
1030 IF LEN(y$) = 0 THEN 1010
1040 IF LEN(y$) = 1 THEN y$ = "" :GOTO 1060
1050 y$ = LEFT$(y$,LEN(y$)-1)
1060 PRINT CHR$(8);" ";CHR$(8);:GOTO 1010
2000 VTAB 21:HTAB (31-LEN(p$))/2
2010 FOR x = 1 TO LEN(p$)
2020 IF p(x) < 0 THEN PRINT "*";:GOTO 2040
2030 PRINT CHR$(p(x));
2040 NEXT x:RETURN
3000 DATA 134,40,134,80,126,48,142,48
3010 DATA 126,48,118,80,142,48,150,80
3020 DATA 126,80,142,80,126,80,120,130
3030 DATA 142,80,148,130,120,130,116,134
3040 DATA 148,130,152,134,134,28,135,32
3050 DATA 131,27,133,27,135,27,137,27
3060 DATA 131,34,137,34
    
```

ALAN DROGIN, 26, is a freelance programmer, writer, and music director for dance groups. He lives in a New York apartment with one computer and five guitars. The word that never fails to stump his friends when playing *Hangman* is "rhythm."

WHAT'S IN STORE SOFTWARE GUIDE

QUICK TAKES ON SOFTWARE— NEW AND NOTEWORTHY

Welcome to FAMILY COMPUTING's Software Guide, the most comprehensive listing available of two dozen of the newest, most noteworthy, and/or best programs on the market. Our reviewers include families from all over the country who have judged the software according to the following criteria: long-term benefits and applications, adaptability, and advantages of using a computer for a given task. Programs have been evaluated and rated for their performance in each of the categories listed below. More detailed reviews of some programs follow the chart.

Here's a rundown of the ratings categories and what they mean: **O** = Overall performance, given the limita-

tions and capacities of the particular computer for which the software is intended. **D** = Documentation, or the instructions and literature that accompany a program. **EH** = Error-handling, the software's capacity to accommodate errors made by the user—an especially important consideration with software for younger users. **PS** = Play system, in the games reviews, the quality of the game design and the game's playability. **GQ** = Graphics quality, also evaluated in light of each particular brand's graphics capabilities. **EU** = Ease of use after the initial learning period, which varies from computer to computer. **V** = Value for money, or how the software measures up to its price.

HOME BUSINESS AND HOME MANAGEMENT

Title Manufacturer Price	Brief description	Hardware/ Equipment required	Backup policy	Ratings					
				O	D	EH	GQ	EU	V
DATA MANAGER 2 Timeworks 444 Lake Cook Road Deerfield, IL 60015 (800) 323-5755 \$49.95 (Commodore 64) \$129.95 (IBM) © 1983	Electronic filing system helps keep track of family inventory, hobbies, collections. Has some special features (such as bargraph displays), but flawed by inadequate error handling and complicated procedures for setting up files. —AKER	Reviewed on Commodore 64 (disk). Version planned for IBM PC/PCjr (disk).	Defective disks replaced free; half price (retail) if user-damaged or for backup copy.	★ ★	★ ★ ★	★ ★	N/A	A	★ ★
64 DOCTOR Practicorp The Silk Mill, 44 Oak St. Newton Upper Falls, MA 02164 (617) 965-9870 \$24.95 (disk) \$19.95 (cassette) © 1983	Diagnoses ailing C 64, checking all parts of the system, including chips and memory. Helps answer frequently asked questions like: Is the problem in the hardware or software? Is it my disk or my drive?† —BYRNE	Reviewed on Commodore 64 (disk); available on 16K (cassette).	Defective disks replaced free w/in 90 days.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★	A	★ ★ ★ ★
PFS: WRITE Software Publishing Corp. 1901 Landings Drive Mountain View, CA 94043 (415) 962-8910 \$125 (Apple) \$140 (IBM) © 1983	Process letters, term papers, reports. Lacks some fancier features (such as right margin justification), but includes others (such as bold-facing). Designed especially for use with information-filing systems, PFS: File, and other PFS products. —WILSON	Reviewed on Apple IIe, 64K (disk). Also for Apple IIc (disk); IBM PC/PCjr, 128K (disk). (Earlier Apple version may require update for IIc.)	Defective disks replaced free w/in 90 days; \$15 fee thereafter or if user-damaged; backup copy provided to IIe users; IIc users make backup.	★ ★ ★	★ ★ ★	★ ★ ★	N/A	A	★ ★ ★
PAPERCLIP Batteries Included 71 McCaul St. Toronto, Ontario M5T 2X1 (416) 596-1405 \$89.95 © 1982	Word processor best for newsletters, reports, term papers, and other serious uses. Use basic features right away, learn fancier ones later.† —AKER	Reviewed on Commodore 64 (disk). Version planned for Atari Home Computers.	Defective disks replaced free w/in 1 year; \$10 fee thereafter or if user-damaged; user makes backup.	★ ★ ★	★ ★ ★	★ ★ ★	N/A	A	★ ★ ★
PHI BETA FILER Scarborough Systems 25 N. Broadway Tarrytown, NY 10591 (914) 332-4545 \$49.95 © 1983	Organize mailing lists, record collections—any kind of data you'd ordinarily file with small-scale electronic filing system. Best suited to home use. † —KRENGEL	Reviewed on Apple II series, 48K (disk). Also for Commodore 64 (disk); IBM PC/PCjr, 64K (disk).	Defective disks replaced free w/in 30 days; \$6 fee thereafter or if user-damaged.	★ ★	★ ★ ★	★ ★ ★	N/A	E	★ ★ ★

RATINGS KEY **O** Overall performance; **D** Documentation; **EH** Error-handling; **GQ** Graphics quality; **EU** Ease of use; **V** Value for money; **★** Poor; **★★** Average; **★★★** Good; **★★★★** Excellent; **N/A** Not applicable; **E** Easy; **A** Average; **D** Difficult; **†** Longer review follows chart

SOFTWARE GUIDE

EDUCATION/FUN-LEARNING

Title Manufacturer Price	Brief description	Hardware/ Equipment required	Backup policy	Ratings					
				O	D	EH	GQ	EU	V
FANTASY LAND Learning Well 200 S. Service Road Roslyn Heights, NY 11577 (800) 645-6564 \$49.95 © 1983	Sail from island to island, answering questions about written passages in game that gives practice in reading comprehension and drawing inferences. Best for ages 8-10. —MORRIS	Apple II/II plus/IIe, 48K (disk).	Defective disks replaced free w/in 30 days; \$20 fee for one year thereafter or for backup copy.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	E	★ ★ ★
GNOSIS VII Magnetic Harvest P.O. Box 255 Hopkins, SC 29061 (803) 783-3151 \$19.95 © 1983	Intriguing fantasy game teaches importance of humility, patience, determination, and generosity. For ages 12+.† —MORRIS	Reviewed on Apple II series, 48K (disk).	Defective disks replaced free w/in 15 days; \$5 fee if user-damaged; user makes backup copy.	★ ★ ★	★ ★ ★	★ ★ ★	N/A	A	★ ★ ★
MATCHBOXES Broderbund Software 17 Paul Drive San Rafael, CA 94903 (415) 479-1170 \$29.95 © 1983	Animated musical concentration game lets players as young as 4 or 5 match squares and uncover hidden word the computer selects, or one you enter yourself. Great family fun. —BYRNE	Reviewed on Commodore 64 (disk). Also for Atari Home Computers, 32K (disk), 16K (cassette). Joystick required.	Defective disks replaced free; \$5 fee if user-damaged.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	E	★ ★ ★
MICROZINE, VOL. 1, No. 4 Scholastic Software 730 Broadway New York, NY 10003 (800) 631-1586 \$39.95 © 1983	Magazine-on-a-disk includes interactive miniadventure, numerical data filer, interview with game-designer Tom Snyder, and arcade game. For ages 10+. —MORRIS	Apple II plus/IIe, 48K (disk).	60-day warranty; \$5 fee if user-damaged; after 60 days \$5 fee, \$10 fee if user-damaged; user makes backup copy.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	E	★ ★ ★
PLATO'S CAVE Krell Software Corp. 1320 Stony Brook Road Stony Brook, NY 11790 (516) 751-5139 \$49.95 © 1983	Discover the nature of hidden objects by bouncing light off them and studying results. Program intended to introduce ages 8+ to the "art of inquiry." —MORRIS	Reviewed on Apple II series, 48K (disk). Also for Commodore 64 (disk). Version planned for TRS-80 Models III/4. (disk).	Defective disks replaced free w/in 90 days; \$10 fee if user-damaged or for backup copy.	★ ★	★ ★	★ ★	★ ★	A	★
ROBIN'S HALLOWEEN Program Design Inc. 95 E. Putnam Ave. Greenwich, CT 06830 (203) 661-8799 \$24.95 (disk) \$19.95 (cassette) © 1983	Beginning readers 5+ use joystick to select appropriate words and help Robin aid spaceship in finding its missing powerpack. Includes game in which you fill in a word's missing letter.† —VAN DE CARR	Reviewed on Atari 400/800, 32K (disk); available on 16K (cassette). Data cassette and joystick required.	Defective disks replaced free; \$10 fee if user-damaged or for backup copy.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	E	★ ★ ★
TRAINS Spinnaker Software Corp. 1 Kendall Square Cambridge, MA 02139 (617) 494-1200 \$39.95 © 1983	Players ages 10 to adult direct trains to pick up raw materials and transport them to manufacturers, learning basics of resource management and industry in the process.† —WILDMAN	Reviewed on Commodore 64 (disk). Also for Atari Home Computers, 48K (disk). Version planned for Apple II series (disk). Joystick required.	Defective disks replaced free through dealer w/in 30 days; \$5 fee thereafter or if user-damaged.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	A	★ ★ ★ ★
VU-3D Timex Computer Corp. Waterbury, CT 06720 (800) 248-6439 \$19.95 © 1983	Design 3-dimensional objects. Rotate, shadow, modify, and magnify them, print them out with powerful, fascinating graphics program. Recommended for use by junior-high-level kids and adults.† —WILDMAN	TS 2068, 48K (cassette).	Defective disks replaced free; user makes backup copy.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	A	★ ★ ★ ★
WORD FLYER Electronic Arts 2755 Campus Drive San Mateo, CA 94403 (415) 571-7171 \$35 © 1984	Beginning and pre-readers use joystick to match letters and words with ones that fly through the air. Colorful letter- and word-recognition activity gives practice in spelling. —LAMB	Reviewed on Atari Home Computers, 48K (disk). Version planned for Commodore 64 (disk). Joystick required.	3-month warranty; \$7.50 fee thereafter or if user-damaged.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	D	★ ★ ★

RATINGS KEY O Overall performance; D Documentation; EH Error-handling; GQ Graphics quality; EU Ease of use; V Value for money; ★ Poor; ★★ Average; ★★★ Good; ★★★★ Excellent; N/A Not applicable; E Easy; A Average; D Difficult; † Longer review follows chart

GAMES									
Title Manufacturer Price	Brief description	Hardware/ Equipment required	Backup policy	Ratings					
				O	D	PS	GQ	EU	V
B-1 NUCLEAR BOMBER Avalon Hill Game Co. 4517 Harford Road Baltimore, MD 21214 (301) 254-9200 \$16 (cassette) \$21 (disk) © 1982	Pilot your bomber into Russia to destroy designated targets in exciting strategy game. Lacks interesting graphics, but its short play-length is a plus for younger gamers. For ages 12+. Not an arcade game. —DELSON	Reviewed on Atari Home Computers, 32K (cass.); available on 32K (d.). Also for C 64 (d. & cass.); IBM PC, 64K (d.); TI-99/4A, 16K (cass.); TRS-80 I/III/4, 16K (cass.), 32K (d.); TS 1000, 16K (cass.).	Defective material replaced free.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	A	★ ★ ★
BRUCE LEE Datasoft 19808 Nordhoff Place Chatsworth, CA 91311 (818) 701-5161 \$34.95 © 1984	Leap through the air delivering karate chops to eliminate adversaries. Beat the Wizard and take his gold in exciting arcade adventure for ages 10+. —DELSON	Reviewed on Atari Home Computers, 32K (d.); available on 16K (cass.). Planned for Apple II series; C 64; IBM PC/PCjr. Joystick required.	3-month warranty; \$7.50 fee if user-damaged or for backup copy.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	D	★ ★ ★
ENCHANTER Infocom, Inc. 55 Wheeler St. Cambridge, MA 02138 (617) 492-1031 \$49.95 © 1983	Seek out evil Warlock. Acquire spells, powers, and learn secrets in all-text fantasy-adventure game filled with wizards, magical creatures, and stimulating puzzles. † —DELSON	Reviewed on Apple II series, 32K (d.). Also for Atari Home Computers, 32K (d.); C 64 (d.); IBM PC/PCjr, 48K (d.); TI-99/4A, 32K (d.); TRS-80 I/III/4, 32K (d.).	90-day warranty; \$5 fee thereafter or if user-damaged. TRS and IBM users make backups.	★ ★ ★	★ ★ ★	★ ★ ★	N/A	D	★ ★ ★
FORT APOCALYPSE Synapse Software 5221 Central Ave. Richmond, CA 94804 (415) 527-7751 \$34.95 © 1983	Steer through underground maze and free prisoners, while heading for Fort Apocalypse itself, in exciting helicopter shoot-'em-up, with long play life and lively action for ages 10+. —DELSON	Reviewed on Atari Home Computers, 32K (disk); available on 32K (cassette). Also for Commodore 64 (disk or cassette). Joystick required.	Defective disks replaced free w/in 90 days, \$5 fee thereafter or if user-damaged.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	A	★ ★ ★
INTERNATIONAL SOCCER Commodore Business Machines, Inc. 1200 Wilson Drive West Chester, PA 19380 (215) 431-9100 \$34.95 © 1984	Compelling simulation recreates thrill, timing, and "feel" of soccer. Play computer's 9 skill levels or take on human opponent in beautifully animated game for ages 10+. —DELSON	Reviewed on Commodore 64 (cartridge). Joystick required.	Defective cartridges replaced free w/in 90 days; \$17.50 thereafter.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	A	★ ★ ★
LORDLINGS OF YORE Softlore Corp. 8714 Wellesley Manor San Antonio, TX 78248-2116 (512) 691-2800 \$39.95 © 1983	Hire troops, purchase spells, rule peasants, and collect taxes as you strive to become Lord over up to 3 other opponents in role-playing strategy-adventure game for ages 10+. † —DELSON	Reviewed on Apple II series, 48K (disk). Also for Apple III. Version planned for IBM PC/PCjr, TRS-80 CoCo.	Defective or user-damaged disks replaced free w/in 90 days; \$10 fee thereafter.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	E	★ ★ ★
MIG ALLEY ACE MicroProse Software 10616 Beaver Dam Road Hunt Valley, MD 21030 (301) 667-1151 \$34.95 © 1983	Fly solo, head-to-head, or cooperative missions as a North Korean or U.S. fighter pilot in fast-paced simulation with 4 skill levels and 5 game scenarios. For ages 8+. † —DELSON	Reviewed on Atari Home Computers, 48K (disk); available on 16K (cassette). Joystick required.	30-day warranty; \$10 fee thereafter, if user-damaged, or for backup copy.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	A	★ ★ ★
OIL'S WELL Sierra On-Line Sierra On-Line Bldg. Coarsegold, CA 93614 (209) 683-6858 \$29.95 (disk) \$34.95 (cartridge) © 1983	Direct "drill bit" through underground field to tap black gold and eliminate meanies. Addictive game may wear thin once you've mastered play system. Good for ages 8+. —DELSON	Reviewed on Apple II series, 48K (d.). Also for ADAM (cart.); Atari Home Computers, 40K (d. & cart.); C 64 (d. & cart.). Version planned for IBM PC/PCjr. Joystick.	90-day warranty; \$5 fee thereafter or if user-damaged.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	A	★ ★ ★
THE PHAROAH'S CURSE Synapse Software 5221 Central Ave. Richmond, CA 94804 (415) 527-7751 \$34.95 © 1983	Colorful, simple, skill/arcade treasure hunt takes place in underground caverns of the Pharaoh's tomb. Best suited for fans seeking nonstop action, ages 10+. —DELSON	Reviewed on Atari Home Computers, 32K (disk or cassette). Also for Commodore 64 (disk or cassette). Joystick required.	90-day warranty; \$5 fee thereafter or if user-damaged.	★ ★	★ ★	★ ★	★ ★	A	★ ★
ULTIMA II Sierra On-Line Sierra On-Line Bldg. Coarsegold, CA 93614 (209) 683-6858 \$59.95 © 1983	Roam continents and planets, take on monsters, and acquire treasures and experience points, traveling from age to age in role-playing adventure for ages 12+, 8+ with adult help. † —DELSON	Reviewed on Apple II series, 48K (disk). Also for Atari Home Computers, 48K (disk); Commodore 64 (disk); IBM PC/PCjr, 64K (disk).	Defective disks replaced free w/in 90 days, \$5 fee thereafter or if user-damaged.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	A	★ ★ ★ ★

RATINGS KEY O Overall performance; D Documentation; PS Play system; EH Error-handling; GQ Graphics quality; EU Ease of use; V Value for money; ★ Poor; ★★ Average; ★★★ Good; ★★★★★ Excellent; N/A Not applicable; E Easy; A Average; D Difficult; † Longer review follows chart

WHAT'S IN STORE SOFTWARE REVIEWS

On the following pages, you'll find in-depth reviews of some of the programs listed in the Software Guide. Refer back to the Guide on page 92 for information such as backup policies and addresses of software manufacturers.

HOME BUSINESS & HOME MANAGEMENT

PaperClip

HARDWARE REQUIREMENTS: Commodore 64 (disk). Version planned for Atari.
MANUFACTURER: Batteries Included
PRICE: \$89.95

After eight months of intensive word processing, I've only found one thing wrong with *PaperClip*. And I have yet to take advantage of all its capabilities. Both of these facts attest to its excellence.

The only problem is that the program allows you to start work on a term paper or other document even if you haven't finished with a previous writing task. This means that, if you're not careful, you may wind up losing a document and seeing hours of work go up with a single whir of the disk drive. (I've found that if you keep the disk drive empty at all times until you're ready to save or load your work, you can avoid such disasters.)

On to its many virtues. . . . *PaperClip* is extremely easy to use right away. A reasonably clear manual helps you into the program immediately. You'll find that as you go along, nearly everything you could wish for in the way of special features has been included.

For instance, you can tabulate rows or columns of numbers within documents such as financial reports or term papers. It's as if you had a built-in calculator. If you are writing a report that makes frequent use of certain words or phrases, you can give them special codes and have them automatically typed out with two keystrokes. Also, with the right kind of printer, *PaperClip* lets you italicize, boldface, and underline portions of your writing.

Many of these features aren't available on word-processing packages for the Commodore 64. And you probably won't need a lot of them right away. But as you use the word processor, you'll find yourself growing spoiled. You'll want to experi-

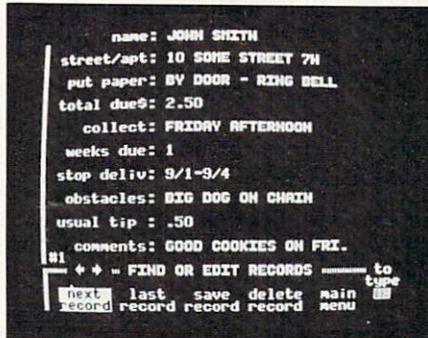
ment with the little details that can make a newsletter or term paper look that much more professional.

—SHARON ZARDETTO AKER

Phi Beta Filer

HARDWARE REQUIREMENTS: Apple II series, 48K (disk). Also for Commodore and IBM PC/PCjr.

MANUFACTURER: Scarborough Systems
PRICE: \$49.95



Holiday mailing lists, catalogs of record or book collections, hobbies, household inventories—this is prime territory for what business professionals refer to as data-base management. Most homes don't need the professional systems capable of storing thousands of records (and costing a pretty penny). A data-management system on the scale of *Phi Beta Filer*, however, can come in handy.

Phi Beta Filer turns your computer into an electronic file cabinet. You can enter large amounts of data and sort, organize, search through, and retrieve it in different categories.

The package comes with two disks: the main program or master disk, and a separate, pre-prepared disk called a "data disk" on which you can immediately start to file away those loose bits of information.

You can put up to 250 records on each file. That's like a file cabinet with 250 pieces of paper in it. Each record consists of 10 labels or spaces in which you can enter information. For instance, should you decide to get a handle on your book collection, you could devote the top category (called a label) to the title of the book. You could devote the second to the book's author, the third to the publisher, the fourth to the date of publication, and so on. Each label can't be more than 24 letters or numbers long. You can make up for this by devoting two or three extra labels to the same category.

Technically, *Phi Beta Filer* is a sound program. It's hard to make catastrophic mistakes—pushing a key, for instance, that would erase an entire file or half a day's work. And it is certainly appropriately sized for almost any home use. However, I do have a few complaints.

The accompanying manual is cumbersome. An introduction to the various features uses a sample address file that I found confusing. Giving up on it and turning to the reference section was of little additional help because it lacked an alphabetical index. Having unraveled the program's mysteries on my own, I found the program to be very slow in retrieving, sorting, and searching through files. Going through a full file can take four minutes!

Chances are you'll learn to adapt to the idiosyncracies of the program quickly—knowing when, for instance, to get up and leave the room to make yourself a sandwich. The program is marvelously easy to use. You can get at information in a variety of different ways: get to your book collection alphabetically by author, retrieve all addresses with a certain state or zip code, etc. *Phi Beta Filer's* got equally versatile print-out capabilities. Plus, there's an added option that lets you restructure your information, and turn it into a quiz format. Kids can type in history facts and dates and the program will spew them back in random multiple choice fashion, even tabulating them as quiz scores.

—LARRY KRENGEL

64 Doctor

HARDWARE REQUIREMENTS: Commodore 64 (disk or cassette).

MANUFACTURER: Practicorp
PRICE: \$24.95 (disk); \$19.95 (cassette).

Programs won't SAVE or LOAD? Must be the disk or tape drive, right? Wrong. The problem could just as easily be the 64's Input/Output chip. By the same token, lack of picture might be either the video interface chip or a problem with your monitor or video cable. You get the idea—but what's the answer? There used to be only one answer: pack up and lug all possible culprits—computer, disk drive, tape player, monitor, printer, not to mention cables, joysticks, and power supplies—down to the nearest computer hospital (if you're lucky enough to have one nearby!).

WHAT'S IN STORE SOFTWARE REVIEWS

64 *Doctor* is a disk that puts all the chips and components of a Commodore 64 system through their respective paces. Much like the program tool kit provided by Commodore to its service technicians for diagnosing sick 64s, *Doctor* lacks only the ability to fix what it diagnoses. It incorporates test programs for: KEYBOARD, VIDEO DISPLAY, AUDIO, JOYSTICKS, DISK DRIVE, PRINTER, MEMORY, and CASSETTE PLAYER. The user can select tests individually from a series of pictures indicating the various computer components, or execute AUTO TEST, which as its name implies will run the whole shebang automatically.

64 *Doctor* is certainly not a new idea. In fact, both the disk drive and the Commodore printers come packaged with a disks that contain self-tests. But 64 *Doctor* is considerably more comprehensive. Most users will welcome the *Doctor* with open arms, if only because it can provide peace of mind when the inevitable questions, "Is it my hardware, or is it the program?" crops up again and again.

—BETSY BYRNE

EDUCATION/ FUN LEARNING

Gnosis VII

HARDWARE REQUIREMENTS: Apple II series, 48K (disk).
MANUFACTURER: Magnetic Harvest
PRICE: \$19.95

Gnosis VII is a unique fantasy game that teaches some profound lessons about the conduct of life and the consequences of virtuous behavior. The game takes place in the Land of Gnosis, which is made up of seven principalities. During the course of your 65–80 year life, you move from principality to principality, acquiring skills, learning trades, and finding the raw materials indigenous to each place. Different locations value different skills. Each governing lord honors and accepts different offerings in exchange for knowledge and blessings. Later in life you can use the skills you've gained and the raw materials you've accumulated to render services to each principality. In return, each lord provides you with greater knowledge about the guiding principles of the land. If all seven lords confer their knowledge upon you, you achieve the highest possible level of wisdom.

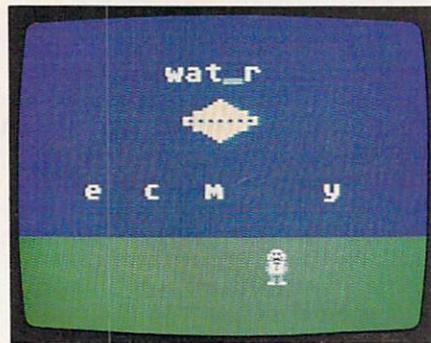
The lessons learned in this fantasy game are both subtle and profound. They focus on less obvious skills for living—values such as the virtue of dedicated work, the benefits of exploration, the advantages of learning a skill, and the value of give and take. In spite of its underlying seriousness, even 12-year-old players found it intriguing: "It's a good time. It makes you really think and keeps you involved."

A number of features contribute to the value of this program. More technically inclined tinkers can even modify the program—changing the kinds of work, names of lords, and types of tools players encounter. You can't save unfinished games and the graphic displays are unexciting, but *Gnosis*' extraordinarily low price and unique plot and subject make these shortcomings bearable.

—TONY MORRIS

Robin's Halloween

HARDWARE REQUIREMENTS: Atari 400/800, 32K (disk), 16K (cassette). Data cassette and joystick.
MANUFACTURER: Program Design Inc.
PRICE: \$24.95 (disk), \$19.95 (cassette).



Dressed up as a robot for Halloween, Robin encounters a spaceship that has been hit by a flying witch. A bat steals the power module for the spaceship and it's up to Robin to help the spaceship find the bat and get back the power source.

This interactive story with voice narration is intended to help teach spelling and word recognition. Throughout the course of the story a set of either three or six words appears at the top of the screen. Using the joystick, the child selects the appropriate word (prompted by the voice on tape). The right choice lets your child proceed. An incorrect selection makes Robin shake her head, and the child tries again.

As with other PDI interactive sto-

ries, there is also a simple game featuring the story character. In "Robin and the Missing Letters," the top of the screen displays a word with one or two letters missing, which the child, using the joystick to point to the appropriate letters, must fill in using the choices displayed beneath. Along with the 80 words provided with the program, you can add your own list if you have the disk version.

A flaw in this program lies in the selection of missing letters children must pick from. Because of a randomizing process in the program, two of the four possible answers might be correct. But the computer will accept only one. We were given S_AR, with both "T" and "O" listed as possible correct answers. "T" was the only letter Robin let us use. Try explaining that one to the quick-thinking early speller whose first impulse is to spell SOAR.

In addition to a concise manual, the package comes with "Robin's Book of Puzzles"—an assortment of word puzzles, matching puzzles, and games covering a wide skill range.

I appreciate the span of skill levels covered. My kindergarten-age daughter found the story inviting and managed to get around on her own with just a bit of coaching from Dad. At this point, the missing letter game is beyond her ability—something for her to tackle in a year or so.

—DEAN VAN DE CARR

Trains

HARDWARE REQUIREMENTS: Commodore 64 (disk). Also for Atari. Version planned for Apple II series. Joystick.
MANUFACTURER: Spinnaker Software
PRICE: \$39.95

As I pulled the train onto the sidetrack, I realized that I was falling behind schedule. Farms were reporting a surplus of produce and the local factory had to shut down for lack of raw materials. I barely had enough funds in my account to pay for a full load of coal and it didn't look like the situation would improve. Fortunately, a more skilled dispatcher/engineer was available. Jason, my 14-year-old son, took over the keyboard and started to turn a profit.

Trains simulates a small railroad system situated in the Midwest during the late 1800s. Using the joystick to control a train, you must make pickups and deliveries for up to four different industries: food,

lumber, fuel, and manufacturing.

Making money requires that you plan your movements carefully. If a surplus of oil accumulates, then the wells shut down operations and you're paid less for your next pick-up. If a consumer runs out of raw materials, then once again, your income suffers. Finally, you must plan refueling stops. If you run out of coal, the cost of its delivery to the train is double the coal yard price.



By working through a simulation of railroad management, you begin to appreciate some of the complexities involved in financial management and the economic theories behind industry. The program helps to illustrate some of the factors contributing to the development of the Western states. With superb graphics and sound, and variables such as different skill levels and different industries, *Trains* is recreation with substance, comparable to reading a good book. —KENNETH WILDMAN

VU-3D

HARDWARE REQUIREMENTS: Timex Sinclair 2068, 48K (cassette).

MANUFACTURER: Timex

PRICE: \$19.95

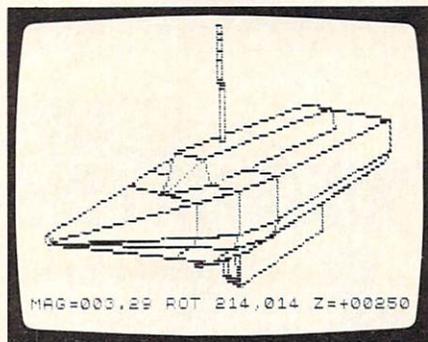
When Timex Computer Corp. began showing the TS 2068 Color Computer last fall, the star of every demonstration was a graphics package called *VU-3D*. It's a fascinating program that duplicates the capabilities of some of the lower end professional Computer Aided Design (CAD) systems which sold for tens of thousands of dollars only a few years ago.

With *VU-3D* you can create, in perspective, images of three-dimensional objects. Once drawn, these objects can be rotated, magnified, and made to look "solid" by removing lines that lie on unseen surfaces. You can "illuminate" them by creating shadows cast by hypothetical light sources located in any of nine positions.

To give you an idea of the power of the program, I can barely draw a straight line without the help of a ruler. With *VU-3D* and a few hours of work, I was able to design and modify the boat you see pictured here. To draw three-dimensional objects like this one, you use the cursor keys and a few special keystrokes.

The sailboat shown here represents my most ambitious attempt to date. It took several hours to plan and execute. It's actually my second sailboat effort. The first turned out rather lopsided and not very seaworthy. I developed this design in five stages, which corresponded to the ship's various components: hull, pilot house, mast, and two sections of the keel.

At first I made a "wire diagram" with all lines and corners visible. Then, in PICTURE mode, I removed the hidden lines and added shading. I could rotate the sailboat either horizontally or vertically while the computer quickly redrew the figure to simulate the changed perspective.



VU-3D gave me an insight into the draftsman's art and drawing techniques. From the enthusiastic responses of my two teenage sons, I'd recommend it as a fun computer activity as well as a valuable instructional tool. —KENNETH WILDMAN

GAMES

Enchanter

HARDWARE REQUIREMENTS: Apple II series, 32K (disk). Also for Atari, Commodore, IBM PC/PCjr, TI-99/4A, and TRS-80 Models I/III/4.

MANUFACTURER: Infocom

PRICE: \$49.95

Your hands tremble with the excitement of the moment as you break the seal on the parchment document. Lo! Here are the words of

some powerful and ancient magic users, commanding you, a fledgling enchanter, to undertake a most dangerous and exciting quest. Using only the spells you know and those you discover on your travels, you must seek out and vanquish the ultimate caster of evil. Here, in Infocom's *Enchanter*, good can only triumph over evil if you have the patience and will to prevail.

This is yet another text-only adventure from the folks who gave us the *Zork* series, *Suspended*, and a host of other games for the nimble of mind and fleet of finger. No hand/eye skills required here. Nothing but your imagination, a pad and pencil to map your way and uncover the numerous puzzles, and clues that will ultimately steer you towards your goal.

I would have preferred accompanying pictures to illustrate the journey. But plumbing the depths of their player/readers' imaginations (without the help of on-screen pictures) is what has put Infocom on the map. *Enchanter* is a stimulating mental exercise that conjures up images of wizards and creatures that have been lurking in my subconscious ever since I read Tolkien and the Brothers Grimm.

Like all Infocom games, *Enchanter* is difficult to breeze through. Take your time and try to work with a group of people so several minds can work at unraveling all the clues and puzzles together. Playtesters had different opinions of the game—many missed the visual stimuli, while others were unfazed by the screens full of text. If you haven't tried this breed, *Enchanter* would make a good introduction. Appropriate for ages 12 and up.

Lordlings of Yore

HARDWARE REQUIREMENTS: Apple II series/III, 48K (disk). Version planned for IBM PC/PCjr and TRS-80 Color Computer.

MANUFACTURER: Softlore Corp.

PRICE: \$39.95

This highly flexible strategy adventure offers up to four players the opportunity of becoming the lord of a mythical country in a heroic era. Each gamer begins as the feudal chief of a 7 x 7 square "shire," ruling peasants, collecting taxes, raising armies, and setting internal and external policies towards three neighboring feifdoms.

WHAT'S IN STORE

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By using the gold in your treasury, you may hire troops, purchase a number of exotic spells for your necromancer, bribe neighboring rulers, and win the loyalty of your citizens. As the game progresses, you may attack your neighbors to increase your holdings (and add to your tax coffers), form defensive and offensive alliances, protect your shire against attack, and occasionally wreak havoc in distant parts of the country by having your necromancer cast dangerous spells.

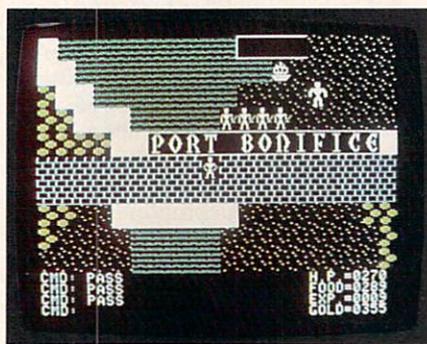
Strategy skills will certainly come in handy for newcomers to *Lordlings*. Playing out a few practice rounds, though, will help you get acquainted with the system before the actual game. A handicap option helps balance competition between players of different skills.

Playtesters who enjoy strategy games and scenarios that require a lot of thought were thoroughly absorbed by this game. They liked the options which let you bribe and appease your way to success (as opposed to merely charging and shooting). Suitable for ages 10 and up, *Lordlings of Yore* usually runs two-

to-eight hours in length and is ideal for group play in family or after-school sessions.

Ultima II

HARDWARE REQUIREMENTS: Apple II series, 48K (disk). Also for Atari, Commodore 64, and IBM PC/PCjr.
MANUFACTURER: Sierra On-Line
PRICE: \$59.95



If sprawling, role-playing adventures are your style, this enormous program (3 disk sides) might be just your cup of mead. Spanning five ages of time, all the earth's continents (shaped and reshaped as time passes), plus the nearby planets of

our galaxy, this is a program on which you'd better be prepared to spend six months. It's as challenging a game as I've seen, requiring patience, cunning, daring, and an unquenchable thirst for adventure.

You start by creating a character and endowing it with various degrees of agility, strength, charisma, and other attributes. Then you move across a scrolling mapboard and search for a town so you can buy weapons, food, spells, and information to begin your quest. Roaming the countryside, you'll encounter monsters, acquire their treasures, and gain experience points for killing them, thereby building up your character, personal wealth, and chances of survival. You use time portals to transport from age to age, continent to continent, and planet to planet.

By carefully mapping the numerous towns and villages through which you pass on your journeys, you'll be able to visit and revisit your favorite fast food parlors, spell emporiums, weapon depots, armor vendors, and even the one-of-a-kind hit-point seller. Keep up your stores of

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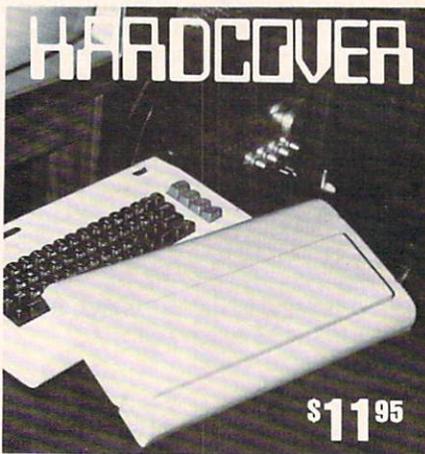
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strength and food to avoid dying of hunger. Learn how and where to fight. Steal sailing ships, airplanes, horses, and spaceships (buy some of these if you can) and your questing will be made easier.

You'll use single-key commands in order to move, make use of your possessions, and perform actions. You must learn dozens of commands before you can call yourself an experienced hand. But the work's worth the effort. This is not for a single afternoon's pleasure. It takes determination and time to get well acquainted with *Ultima II*.

For hardy souls, ages 8 (with parental help) and up, *Ultima II* will prove to be very gripping. Although only one character can play at a time, several players can work together, taking on different duties (mapping, moving, fighting, and cataloging possessions).

Mig Alley Ace

HARDWARE REQUIREMENTS: Atari Home Computers, 48K (disk); 16K (cassette). Joystick.

MANUFACTURER: MicroProse Software
PRICE: \$34.95



Though it's not nearly as fine-tuned as subLogic's *Flight Simulator* and *Flight Simulator II*, what *Mig Alley Ace* lacks in realism it sure makes up for in exciting play action.

Using a combination of joystick and keyboard controls, you take on another player or the computer (as U.S. or North Korean pilots). Fly solo, head-to-head, or on cooperative missions using seat-of-the-pants techniques to out-manuever the enemy.

Four levels of difficulty and five different day or night game scenari-

NOTE: There is a new ratings category in the Games section of the Software Guide. In that section, we've replaced Error Handling with Play System. This category refers to the playability and design quality of the game.

os, which pit aircraft of differing capabilities against one another, are just a few of the features that contribute to this game's outstanding flexibility. To survive the dogfights, you've got to have some experience under your belt. And victory demands that you perform a combination of traditional maneuvers, such as loops and "Immelmann turns," as well as some tricks of your own.

This game was a hit with playtesters, especially those with keen hand/eye coordination. The only drawback noted was in its lack of an "all-around" radar system to spot other planes that are not in your forward window or rear view mirror. Novices ages 8 and up can compete against veterans, a particularly good element for family or group flight.

—GAME REVIEWS BY JAMES DELSON

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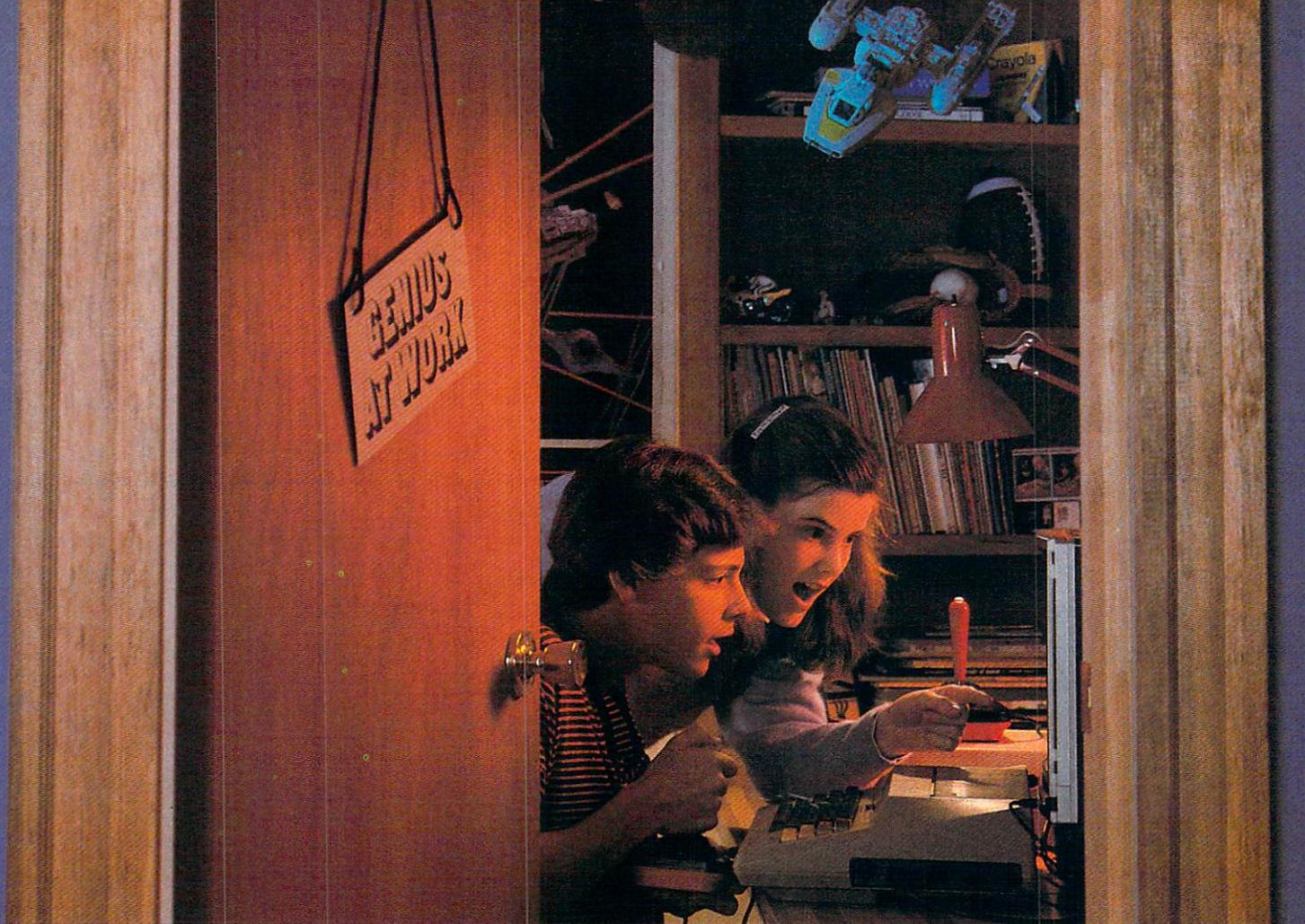
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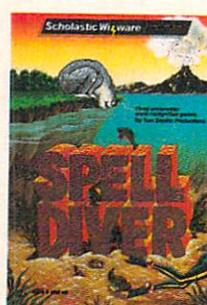
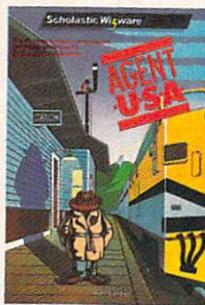
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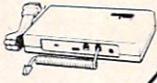
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2	Advanced Ideas	15
3	Argonaut	102
4	Atari	9
5	Avalon Hill	7
6	Barcroft	98
7	Batteries Included	75
8	Cass-A-Tapes	102
9	CHF	12
10	Classified	101
11	Coleco	25
12	Commodore	C4
13	Compuserve	31
14	Computer Discount of America	103
15	Computer Price Club	102
16	The Computer Shop	103
17	Computer Warehouse	90
18	Creative Software	35
19	Data Processing	99
20	Datasoft	66
21	Davidson	2
22	Dennison	71
23	Didactic Software	103
24	Digital Research	16,17
25	Dilithium	85
26	Discount Computer	8
27	Diversified Manufacturing	98
28	DOW	90
29	Extended Software	102
30	Great American Software Exchange	103
	Halix	98
32	IBM	C2,1
33	Infocom	12,22,24
34	Koala	19
35	M.W.Ruth	103
36	M.W.S.	102
37	Mars Merchandising	102
38	Maxwell	C3
39	Navarone	13
40	Scarborough	11
49	Simon & Schuster	81
41	Simplex Software	103
42	SMC	21
43	Spinnaker	27,29
44	Star Micronics	23
45	Utilico	102
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13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30
31	32	33	34	35	36
37	38	39	40	41	42
43	44	45	46	47	48

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49	50	51	52	53	54
55	56	57	58	59	60
61	62	63	64	65	66
67	68	69	70	71	72
73	74	75	76	77	78
79	80	81	82	83	84
85	86	87	88	89	90
91	92	93	94	95	96
97	98	99	100	101	102
103	104	105	106	107	108
109	110	111	112	113	114
115	116	117	118	119	120
121	122	123	124	125	126
127	128	129	130	131	132
133	134	135	136	137	138

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133	134	135	136	137	138

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19	20	21	22	23	24
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31	32	33	34	35	36
37	38	39	40	41	42
43	44	45	46	47	48

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79	80	81	82	83	84
85	86	87	88	89	90
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97	98	99	100	101	102
103	104	105	106	107	108
109	110	111	112	113	114
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133	134	135	136	137	138

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1	2	3	4	5	6
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30
31	32	33	34	35	36
37	38	39	40	41	42
43	44	45	46	47	48

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55	56	57	58	59	60
61	62	63	64	65	66
67	68	69	70	71	72
73	74	75	76	77	78
79	80	81	82	83	84
85	86	87	88	89	90
91	92	93	94	95	96
97	98	99	100	101	102
103	104	105	106	107	108
109	110	111	112	113	114
115	116	117	118	119	120
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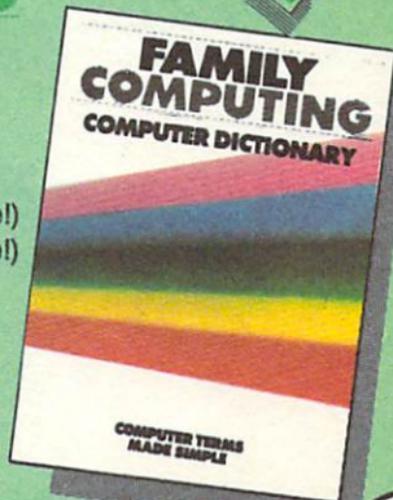
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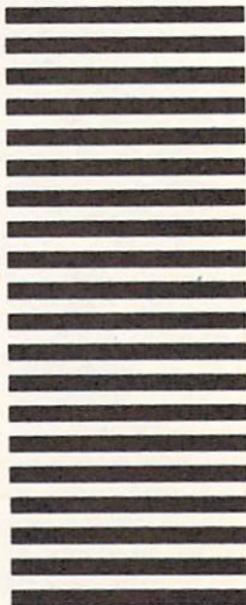
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Music Synthesizer	YES	NO	NO	NO
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Video Monitor Output	YES	YES	EXTRA COST	YES
INPUT/OUTPUT				
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*Prices shown are common retail and may vary slightly in different markets.
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