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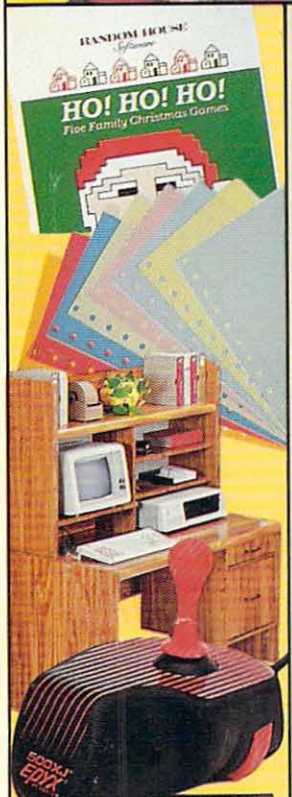

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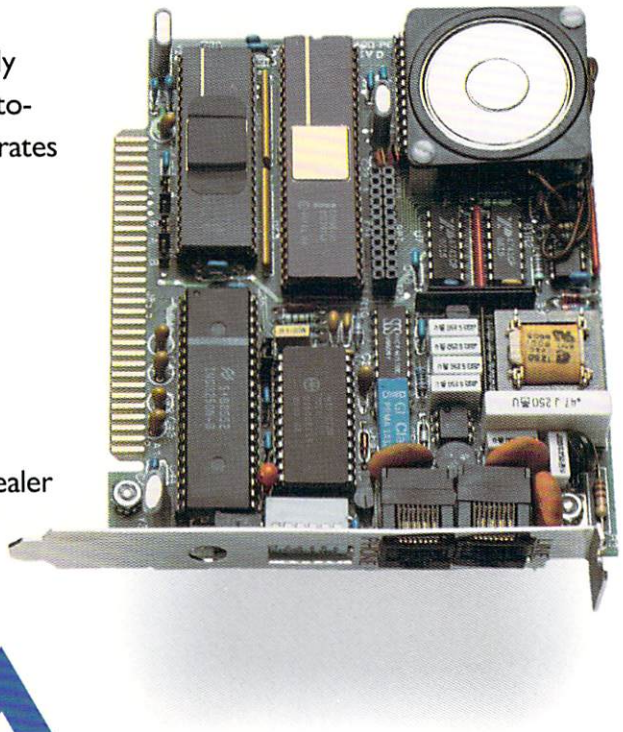

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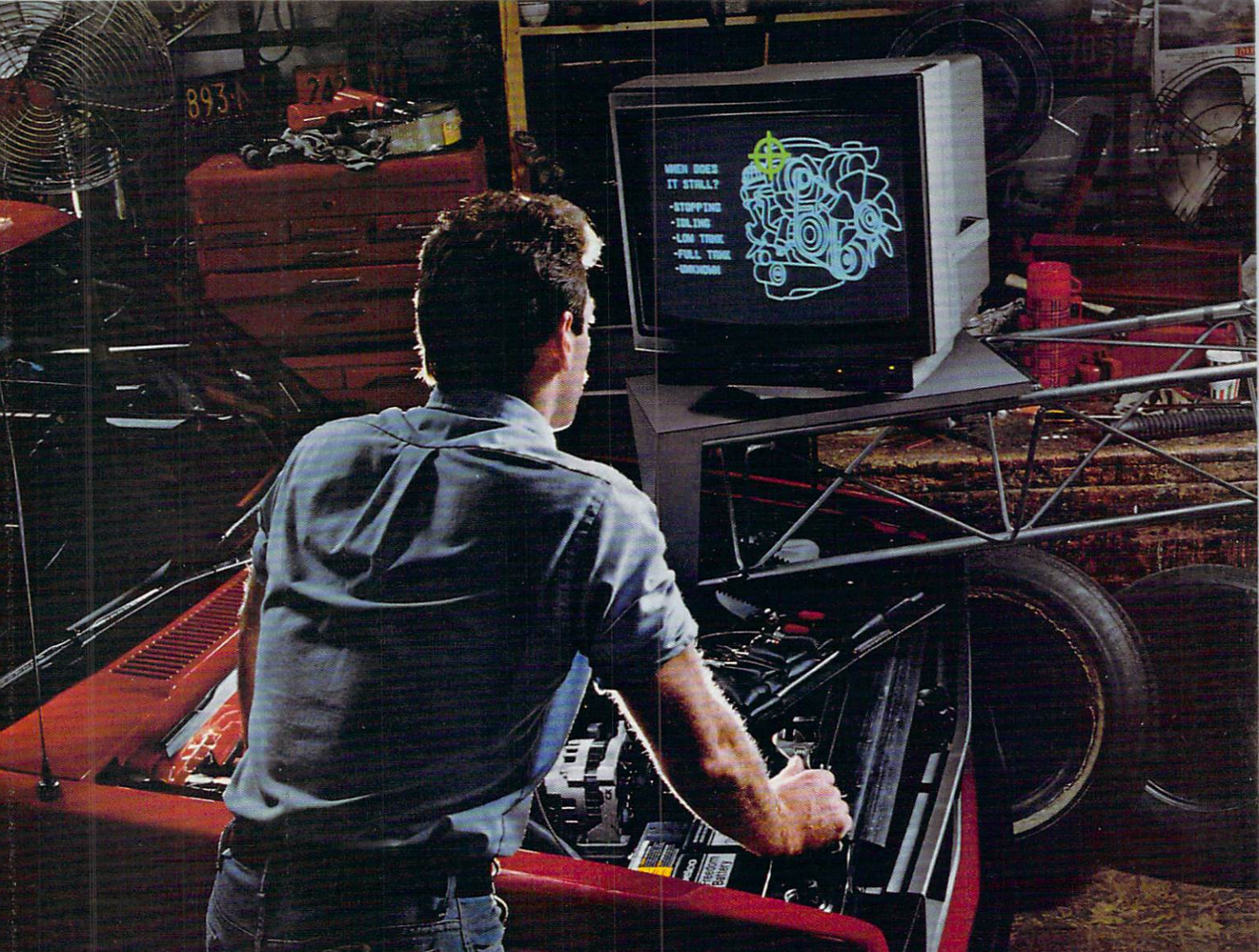

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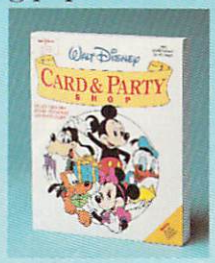

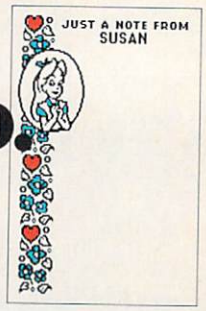

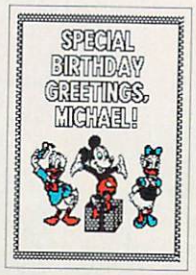

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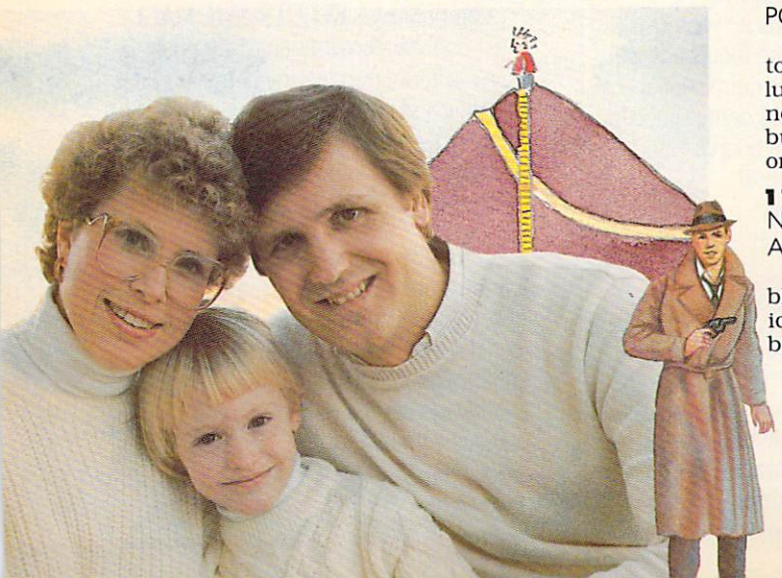

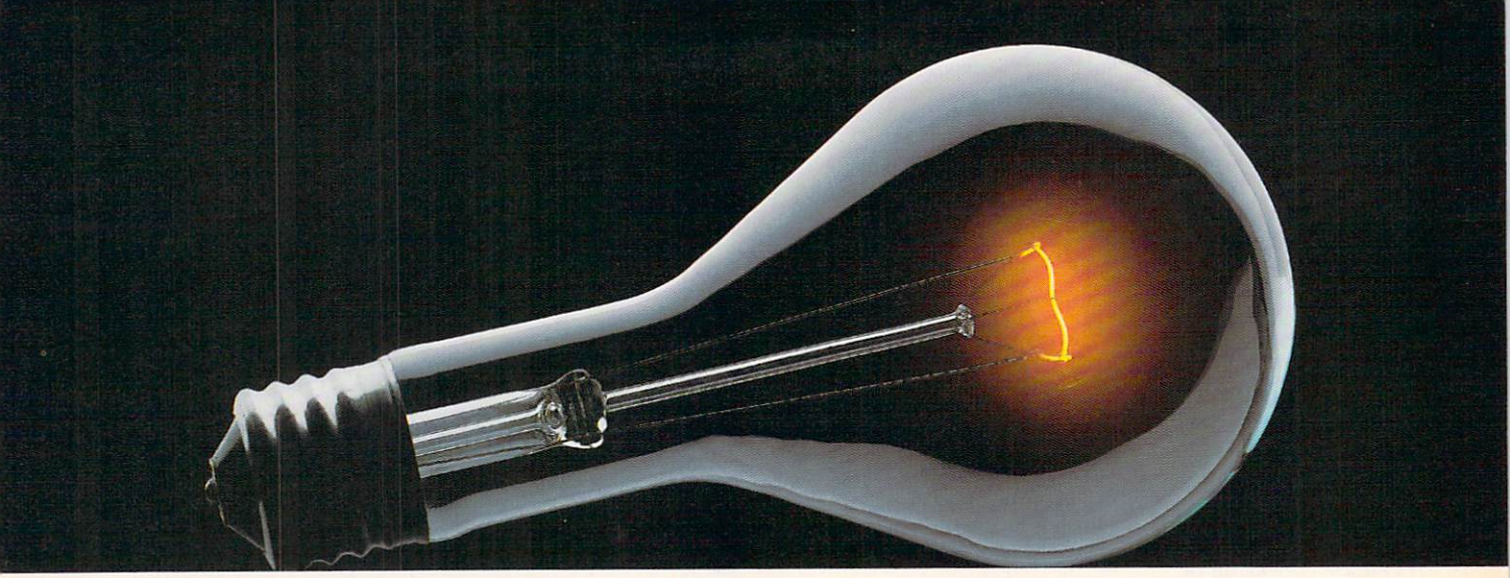

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EDITOR'S NOTE
FAMILY TRADITIONS

When I conjure up childhood memories, family is the first thing that comes to mind. Not any one individual, but the group, together. I remember the experiences we shared, especially the occasions that became our own special traditions.

For this holiday issue, I asked FAMILY COMPUTING's editorial staff about some of their families' special holiday memories. Over and over, I heard tales of far-flung families congregating to exchange stories, make music, and eat special holiday treats. A few of my favorites follow.

Managing Editor Charlotte Pierce grew up on a 90-acre farm in Eastern Washington, where, she told me, "Just before Christmas we'd trek into the woods, a thick forest of Douglas fir and pine, to harvest a Christmas tree. More than likely, my brother and I would have spotted our tree the previous summer or fall while gathering firewood or exploring. Henry would shinny up the tree if it were a tall one, and set to work topping it with axe or saw while the rest of us watched, commenting on his foolhardiness. He'd lower the tree down to us, and we'd catch the first strong, pungent odor of freshly cut evergreen. Dad then hoisted the tree on one shoulder while his 'elves' kept the tip from dragging on the way back to the farmhouse."

For Reviews Editor David Hallerman, the holidays meant Hanukkah, the Jewish holiday known as the Festival of Lights. David recalls, "My studies of Jewish history in Hebrew school heightened my awareness of the holidays, especially Hanukkah, which centered on the home and family. On each of the eight days of the holiday, we'd light an additional candle, receive gifts of money from our parents, and eat 'latkes,' potato pancakes. I remember the warmth and happiness I always felt during this time."

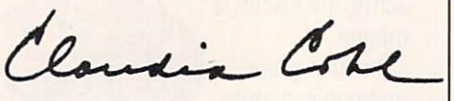
Researcher Stephanie Esters, who is about to spend her first Christmas away from her home in Mississippi, will especially miss "sitting down with my thirteen brothers and sisters to laugh and cry over my brothers' tall-tale-telling sessions—mostly at their sisters' expense."

Designer Vincent Ceci's favorite memories are of "an old Italian tradition of seven fish dishes. Each Christmas Eve, we'd have a seven-course dinner—all fish."

Editorial Coordinator Minerva Diaz Jimenez's favorite holiday tradition is the Christmas Eve gathering at her Aunt Nereida's house in New York City, where the family plays and sings Puerto Rican and Spanish music. "Uncle Benny is the lead singer, accompanied by the other uncles on the guitar, maracas, and guicharo, while the aunts and children sing. What I like most about these family celebrations is learning more about my background, my heritage."

In addition to all our personal traditions, here at FAMILY COMPUTING, we've started some of our own. This issue, which includes our "3rd Annual Best Ever Shopping Guide for Computer Lovers, " is one of them. Every year we collect in this one issue a wide-ranging assortment of holiday shopping and gift-giving tips. Armed with this and our November "Buyer's Guide to Computers," your annual shopping is sure to be a success. That's certainly the experience of our publisher, Shirrel Rhoades, who has started his own tradition of buying himself another computer every Christmas.

Most of all, we like the tradition of sending you our wishes for long-lasting happiness and good health at this holiday season.



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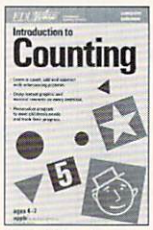

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LETTERS

LEMONADE-STAND MANAGEMENT

I enjoyed your article in the Personal Finance department of the September issue. It mentioned a program, *Lemonade* (MECC), that is now in the public domain. Because I have an Apple IIe for my children, this sounds like an excellent program to add to our home public-domain software library. Could you advise me as to how to obtain this public domain program?

HELEN M. ROBINSON
Wilsey, Kansas

EDITOR'S NOTE: *Users groups and electronic bulletin boards are good sources of public-domain software. However, MECC informs us that* Lemonade *is NOT in the public domain. You may purchase an enhanced version of MECC's popular* Lemonade *program, now entitled* The Market Place.

UNDAUNTED BY DATAS

I just wanted to thank you for continuing to support the fine TI-99/4A with programs like *School Days* in the September issue. The formidable-looking set of DATA statements might prevent some readers from typing in the program, but it is not at all that difficult, and the results are excellent. I hope that you will continue to print more programs of this kind, ones that are beyond the most elementary level.

BOB DUDLEY
Chess Enterprises Inc.
Coraopolis, Pennsylvania

I enjoy FAMILY COMPUTING very much. I own a Commodore, and we use TRS-80 and Apple computers at school, so it's wonderful to be able to run the same program on different computers when you print several versions.

I was, however, disappointed to find no Commodore version for *Word Search* or *School Days* in the September issue, and I urge you to consider including them in an upcoming issue.

JUDY WRIGHT
LaPorte, Indiana

READER SAYS THANKS

I have recently survived a class in Microcomputer Applications, and your magazine is the first I've come in contact with that I can understand and relate to. As one just starting to discover how fascinating computers can be, I'm looking forward to learning more. Thank you for the great magazine!

ANN M. BAUER
Marion, Ohio

WRITING WITH THE RIGHT WORD PROCESSOR

In "Finding the Right Word Processor," (*August 1986*), you didn't do justice to the *Bank Street Writer* program by Broderbund Software. You did mention that the Commodore version was reviewed, and I'd like to alert you to the dissimilarities of other versions.

The IBM version of *Bank Street Writer* displays 80 columns, has a maximum file size greater than 10 pages, and does both underlining and boldface. This version belongs with the Family/Professional programs. In fact, my college freshmen English students write all of their papers, including 15-page research papers, with the IBM version of *Bank Street Writer*, and I am writing this letter with it. Among inexpensive, easy-to-use programs, I think that *Bank Street Writer* is best.

MARLYS M. STYNE
Chicago, Illinois

I wish to alert you to a word-processing package entitled *Kwik-Write*, which was not included on pages 30-31 of your word-processing article in the August issue.

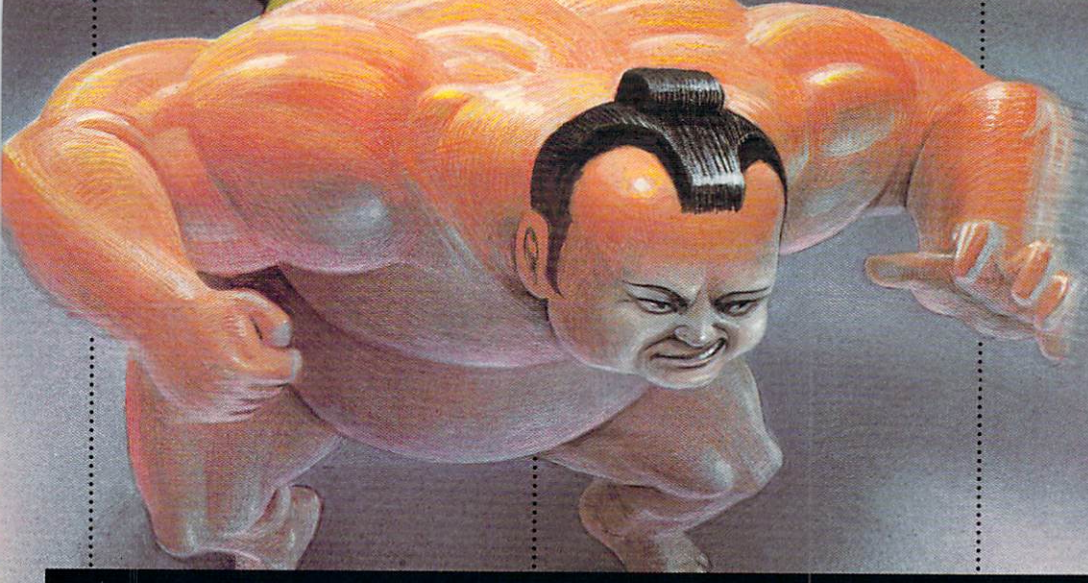
The package is published by Datamost and sells for under $20. It is easy to use, well-documented, and highly reliable. Additionally, it houses most of the features that higher-priced, more complicated word-processing packages offer. A spelling-checker program is available for *Kwik-Write*, too.

I have several *Kwik-Ware* programs. All are very inexpensive, and all are very good for my computer applications.

CHUCK GAGLIARDI
Philadelphia, Pennsylvania

EDITOR'S NOTE: *We've learned that Datamost has gone out of business. However, the software you mention should still be available, while supplies last.*

I am writing in reference to "Finding the Right Word Processor" in the August issue of FAMILY COMPUTING. Next to the *Letter Perfect* entry, it says the program can "display 80-column width." →



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There is a place, probably a long, long way from where you're sitting right now, where grown men actually wear dresses and throw telephone poles in the air as a sign of athletic prowess.

It is true.

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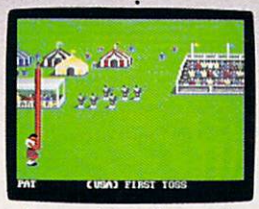

Anyone who can throw a telephone pole long distance is entitled to wear a dress.

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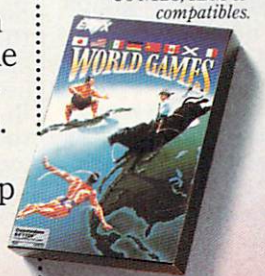

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CIRCLE READER SERVICE 33

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**Baron* not available for Atari.

CIRCLE READER SERVICE 25

LETTERS

I have *Letter Perfect* and an Atari 130 XE computer, but I have been unable to figure out how to get 80-column display.

GORDON OLDE
New York, New York

EDITOR'S NOTE: *According to David Young, owner of CDY Consulting ([408] 745-2004), the OmniView XE/XL ($40) will enable you to display 80 columns on your screen. However, the manufacturer of Letter Perfect (LJK, Inc.) does not recognize CDY's OmniView as a Letter Perfect enhancement. "LJK has made a decision not to support the product," said Ken Berry of LJK Customer Support ([314] 962-1855).*

I don't normally buy FAMILY COMPUTING magazine, since I am a more experienced computer user than most of your readers. But I picked up a copy of your September issue for the articles on word processing enhancements and desktop publishing. After absorbing these and the other articles and features, I have a couple of comments.

First: Absolute statements in this fast-changing business are risky. A case in point is the assertion on page 28 that thesauruses are found separately. *WordPerfect 4.1* has an integrated thesaurus that is fast, convenient, and thorough. Also, the spelling checker in *WordPerfect* uses a one-stage method in which the user corrects, accepts, or adds unmatched words as the program reviews the file. I find this much faster and easier to use than the two-step checks found in most other programs.

Second: What the home and hobby market needs now in desktop publishing programs is a combination of *The Print Shop* and *The Newsroom.* A new or upgraded offering would have the menus, borders, selections and ease of use contained in *The Print Shop*, plus the ability to handle and place text in different fonts and sizes embodied in *The Newsroom.* Ideally, the program could import text from word-processing programs as well as generate its own. Dot-matrix printer support would be standard, since few buyers own laser printers, but an optional extra-cost disk could have laser drivers for people who have access to one at work.

ROGER THOMAS
Lawrenceville, New Jersey

A CLINICAL QUESTION

I am writing in response to your September 1986 edition of Computing Clinic, specifically the incorrect answer given to Mike Gamache's question. I have also had problems loading the game *Hacker* (Activision) on my C 128 with my 1571 disk drive. The 1571 is the problem in this case. The 1571 is not 100-percent compatible with C 64 software. Even though I have found that *Hacker* is the only program that my 1571 does not load, I solved the problem by having both my 1571 and 1541 disk drives hooked up to my C 128 all the time. When I want to load *Hacker*, I have to turn on my 1541.

EILEEN BUSECK
Erie, Pennsylvania

EDITOR'S NOTE: *According to Activision customer support ([800] 227-9759), revisions have been made to* Hacker *to allow the C 128 with a 1571 disk drive to load the program.* Hacker *packages are now plainly marked with a blue dot to indicate that they are revisions. Activision will replace earlier versions of* Hacker*; call Activision for replacement information.*

RESOLUTION OF RAMISTAKES

While reading your "Buyer's Guide to Personal Computers" in the June issue, I came across a few mistakes in the Amiga listing in the comparison chart.

In the *RAM (Min/Max)* column, the Amiga's maximum RAM was stated as 512K. The Amiga's maximum RAM is actually 8.5 megabytes. In the *Maximum Resolution* column, the stated resolution of 640 x 200 is really the Amiga's medium resolution. Its maximum is 640 x 400.

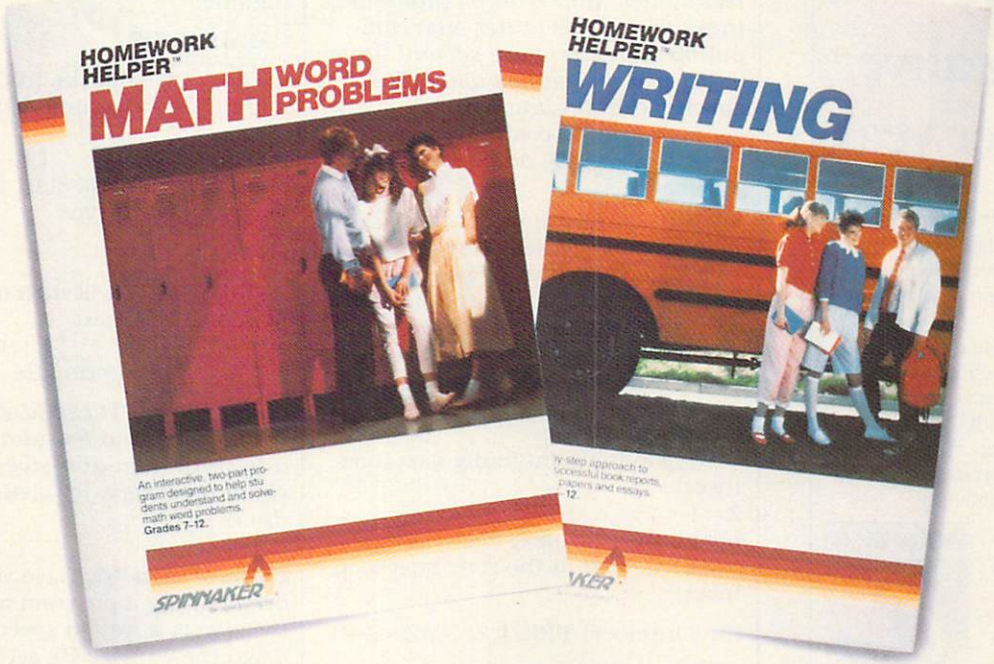
JOHN BRAITHWAITE
Trinidad, West Indies

CORRECTIONS

The telephone number for the International Council for Computers in Education was printed incorrectly in the October issue. The correct number is (503) 686-4414.

In the September "Buyer's Guide to the New Printers," the price listed for Okidata's Microline 292 is incorrect. The actual suggested retail price is $749.

WHY AREN'T YOUR TEENAGERS GETTING BETTER GRADES?



98% of all the students we surveyed have trouble doing homework. The result: frustration, confusion and poor test grades.

The biggest problem areas? Kids say writing skills and math word problems. Now there's a solution. THE HOMEWORK HELPERS™ from Spinnaker will help eliminate these problem areas.

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Ralph has $1.20 in nickels and dimes. If he has six more dimes than nickels, how many of each type of coin does he have?

	Nickels	Dimes	Total
Price/Unit	5 cents	10 cents	
# of coins	X		
Value			$1.20

DATA ENTRY: Represent the number of dimes in relation to the number of nickels.

MATH

MATH WORD PROBLEMS helps the student translate word problems into workable equations. A step-by-step tutorial uses a unique grid system for breaking word problems into manageable parts. And it shows students how any math word problem can be analyzed in a methodical way. There's even a built-in algebra calculator that removes the drudgery of doing tiresome calculations.

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WRITING helps the student define the goals of a writing assignment. By answering a series of questions posed by the computer, the student gets a quick and easy first draft. Then, the draft pops into the word processor, where the student edits it into a final essay or book report, spellchecks it, prints it out and hands it in.

BOOK REPORT CREATE IDEAS

What is the theme—the main idea—of **Great Expectations?** Type your answer.

Finding the theme sometimes takes a little digging.

Press Ctrl H for some common themes.

Some common themes are: the power of love, the triumph of persistence, the beauty of nature, greed, intolerance, alienation, escape from conformity, the journey of life.

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CIRCLE READER SERVICE 26

HELPFUL HINTS

EDITED BY CHARLOTTE PIERCE

Nearly every computer user develops personal shortcuts, cost-cutting techniques, and neat programming tricks that fit his or her own computing style. Here are several hints submitted by readers who have discovered that finding new ways to get more from a computer is part of the fun of having one.

Apple. Extensive use of DATA statements is an excellent way to establish a smooth-running program, but many typists find it hard to debug a program after they have entered it. When typographical errors are made in the DATA lines of a program, painstaking proofreading is often the only recourse.

To help pinpoint faulty DATA lines, insert

Z=1

before the FOR...NEXT loop you wish to check. *Within* the FOR...NEXT loop, insert:

[line number] PRINT Z;" ";:Z=Z+1

The number represented by the variable Z will tell you that you must count the commas in the DATA lines until that number is reached; the error will be in that general area of the program. These lines will disrupt the appearance of the program, but you'll have a great debugging tool. After the error is corrected, these lines should be removed.

MICHAEL FAHY
Central City, Pennsylvania

EDITOR'S NOTE: *This routine does not work if you have more than one variable per* READ *statement or more than one* READ *statement. The most common mistake people make in typing programs is adding an extra comma at the end of a* DATA *statement or between* DATAS.

Do you have a program that needs to access the disk drive frequently? You know that every time you have to read from or write to a disk, it takes the drive a half second to get up to speed. Here's a way you can eliminate that warm-up time.

By typing

POKE –16151,0

you can turn on the motor of the disk drive before you access it during a program. When you're done, type POKE –16152,0 to turn the motor off. This POKE can also be used to help you clean your second disk drive. First, put an initialized disk in drive 2 and type the following line:

CATALOG, D2

Then, take out the initialized disk and insert a cleaning disk. Type

POKE -16151,0

and the motor will start to spin. After 30 seconds, type

POKE -16152,0

and the motor will turn off, and your drive will be clean!

MICHAEL STARR
Morganville, New Jersey

EDITOR'S NOTE: *These hints have been tested and found to work. Use a wet/dry (non-abrasive) head-cleaning system for cleaning disk drives.*

Commodore 64. Have you ever been editing a program and wished there were a way to speed up or slow down the cursor? By setting the memory location of timer A (POKE 56325) to a number from 0 to 255 (0 being the fastest; 255 being the slowest), you can change the speed of your cursor. To return to normal, press the STOP and RESTORE buttons simultaneously.

JOE BENNETT
Williamstown, New Jersey

Atari XL series. If you're tired of hearing that awful "beep" while typing on your Atari 600 or 800XL, you can turn it off by typing

POKE 731,1

If you want the sound back, turn it back on with

POKE 731,0

You can also save your ON/OFF button from excessive wear when you have to turn it off and back on to run certain programs. Type

POKE 580,1

and press the RESET key.

JEREMIAH SHIMSHAK
Holmen, Wisconsin

If you have a Helpful Hint that you're willing to share with FAMILY COMPUTING *readers, send it to: Helpful Hints,* FAMILY COMPUTING, *730 Broadway, New York, NY 10003. For each hint published, we'll pay $25. We reserve the right to edit hints for clarity and accuracy.*

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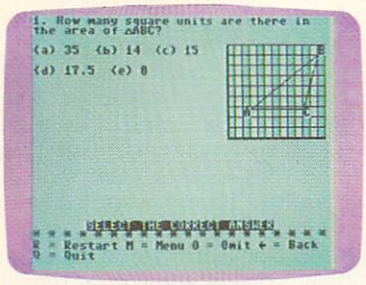
"Preparation courses improve SAT scores."

Educational Testing Service, creators of the SAT, quoted in USA TODAY

The HAYDEN SCORE IMPROVEMENT SYSTEM for the SAT provides students with a framework for approaching the exam. The program uses a unique system that customizes instruction for each student. Your children are unique, and the Hayden course will treat them as individuals.



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"The most complete set of explanations we've seen on-screen."

Family Computing Magazine

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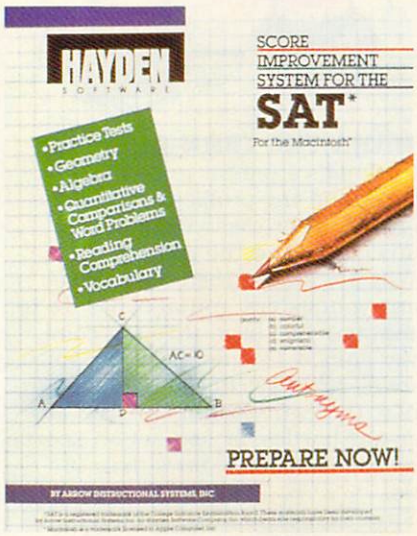

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From a study at the University of Texas

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Each of the three modules has sold separately for $40. Now, the HAYDEN SCORE IMPROVEMENT SYSTEM, which contains all three modules, is available for $40.* *Isn't a better score on the SAT worth $40?*

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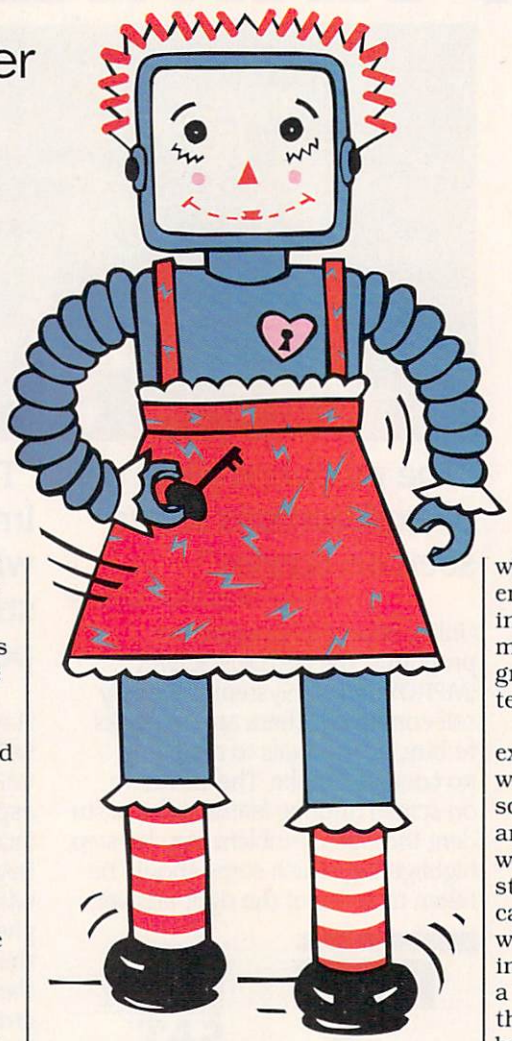
HOME·SCHOOL CONNECTION

BRIDGING THE TECHNOLOGICAL GENDER GAP

How to Get a Reluctant Daughter Interested in Computers

BY PEGGY SEALFON



"I gave my son a computer. It never occurred to me to give my daughter one," admits a father of two teenagers. Like many other parents, this father assumes computers are more appealing to boys than they are to girls. In part as a result of this assumption, girls are subtly influenced away from computers. By the time females reach their teenage years, many have already concluded that computers are unfeminine and strictly for the birds—and for boys.

Sandy, a high-school sophomore, was given a class assignment to use Dow Jones News/Retrieval. She reserved time at the computer media center during one of her free periods, but when she arrived at the appointed time, a boy was sitting at her assigned computer. Too intimidated to ask him to leave, she waited by the door, hoping he would finish. He didn't, and she never got to use the computer or fulfill her assignment.

The consequences of the "computers-are-for-boys" attitude may become painfully apparent when girls begin to enter the job marketplace of tomorrow. If girls shy away from computers now—and a national survey reveals that girls avoid computer usage as much as 80 percent more than boys do—they may well be limiting their career options for tomorrow.

PEGGY SEALFON, *a freelance writer, was project director of a New Jersey state project entitled "Computers: A Strategy for Equity."*

ILLUSTRATION BY WENDY FRIEDMAN

WHAT'S THE TURN-OFF?

So what's a parent to do? First, understand the problem: When given free time or elective choices, many girls avoid the computer.

Why are girls turned off? For many youngsters, initial exposure to computers has been through computer games. Frequently, such software features science-fiction encounters with death-dealing aliens, star-war battles, or fast-action sports that appeal more to boys than to girls.

Studies indicate that girls tend to be more people-oriented and to prefer programs that offer a tangible-end product. A national 28-month project, concluded this year, called the Computer Equity Training Project, has shown that boys will play at the computer just for the fun of it, while girls usually want the computer to do something *for* them. According to the study, girls are typically more social and prefer working in groups rather than individually interacting with machines.

In some cases, early educational experiences have made matters worse by relegating the computer to science, math, and programming, areas in which girls may be somewhat phobic. The stereotype of the student who excels at computers calls to mind the male math genius who wears thick eyeglasses, dresses in disheveled clothes, and is dubbed a "nerd." Many young girls exploring their identities as they reach puberty are afraid of any association with computers for fear of being thought of as a "geek" or "weirdo."

Another problem some girls report has been the aggressiveness from boys who physically capture computer time. When one 9-year-old girl was asked why she didn't use a computer at home very much, she responded: "My brother won't let me. He beats me up if I go near it."

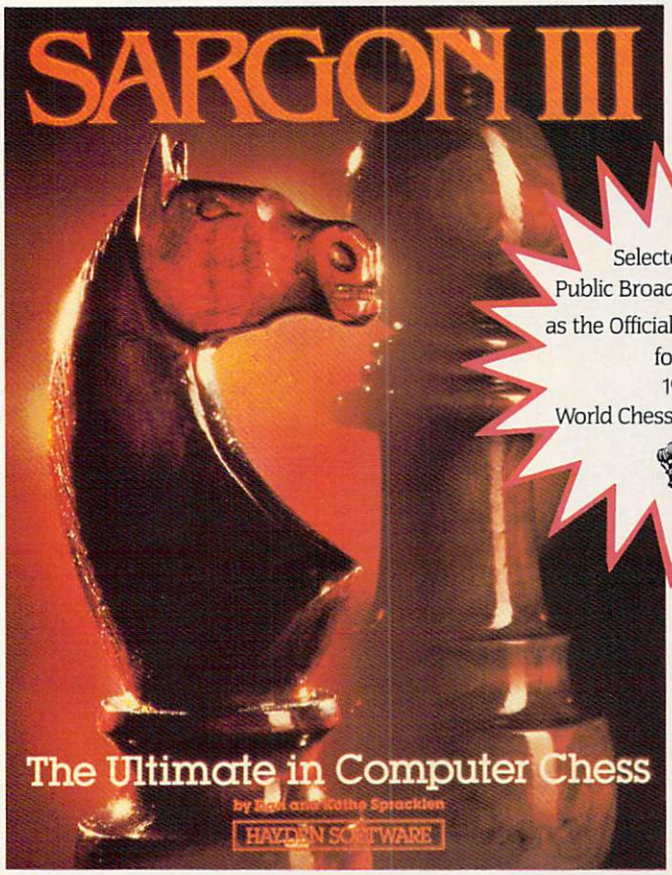
ADVICE FOR PARENTS

To help reluctant girls become more comfortable with computers and to entice them to the keyboard, parents might try some—or all—of the following strategies:

1. Give positive messages early. Don't make "male" toys taboo. At a very young age, provide your daughter with mechanical toys like robots and trucks and other nontraditional

CHECKMATE.

SARGON III. THE ULTIMATE IN COMPUTER CHESS.



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Family Computing Magazine

"If you are going to lose, you might as well lose to the best: Sargon."
PC Magazine

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A+ Magazine

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MacWorld Magazine

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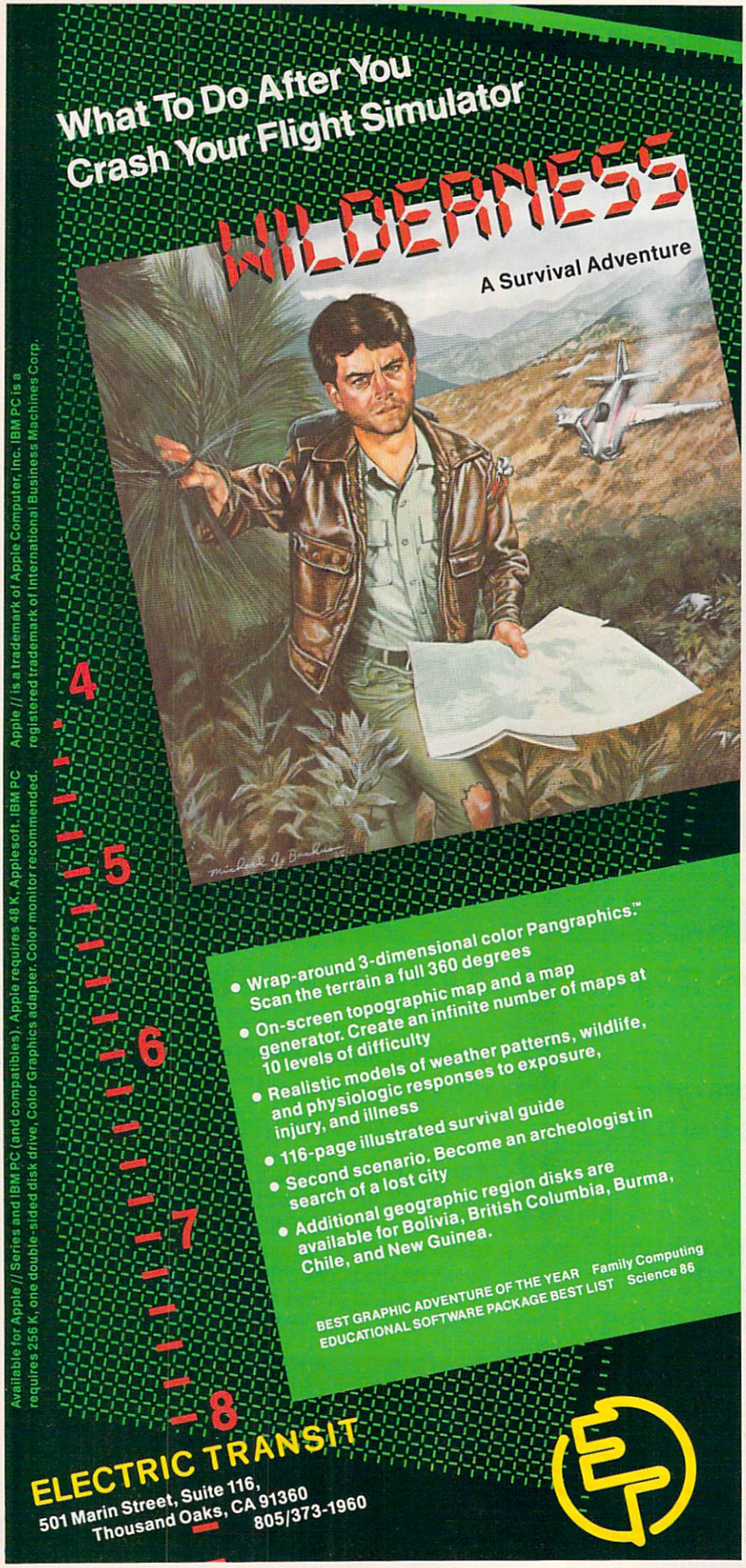

HOME-SCHOOL

female toys. She may eventually turn away from them, but at least she'll learn to make her own choices as she develops.

2. Break down sex stereotypes. Encourage your daughter to get involved in atypical female activities. If the toaster needs to be fixed or the oil in the family car needs to be changed, have your daughter participate in the process.

3. Keep home chores reasonable. Daughters are often saddled with responsibilities from babysitting to housecleaning that keep them from taking part in after-school activities. Allow—and even encourage—your daughter to join an after-school computer club or simply to use the school's computers after hours. Arrange to give her some free time.

4. Review computer courses. Check out computer courses being offered in your daughter's school that will expose her to basic applications of computers. Learning how to program is secondary. After all, when we learn to drive a car, we don't have to know how the engine works—just how to operate it and use it to take us where we want to go. If your daughter *does* seem interested in programming, encourage her to take advanced courses or consider sending her to a computer camp during the summer.

When Anne Haffner, 16, of Scarsdale, New York, was a freshman, she signed up for an introductory computing course—just to give computers a chance. "My parents had just bought my sisters and me a computer to use for educational purposes, but I wasn't using it. When I saw people programming, I thought 'How tedious! How could they sit there?' But I decided to give computing a try, since it was only a 3½-month class." Much to Haffner's surprise, she loved the class, excelled in it, and is currently enrolled in an advanced programming course.

5. Discuss career options. Initiate conversations about careers. Talk about computers and how they are being used. If you use one in your work, be sure to discuss your experiences. Haffner, currently a junior at the School of the Holy Child in Rye, New York, said her parents would like her to pursue a career involving computers. "My parents see me fiddling with the computer, and they think it's great. They encourage me to look into a computer-related career because it's important to

CIRCLE READER SERVICE 30

them—and it's important to my school—that I do something that I enjoy."

6. Allow equal access to the computer(s) in your home. If you own a computer, make sure everyone has access to it. "Everyone in our house can use the computer at any time—except if I'm using it, of course," laughed Tan Summers of Metairie, Louisiana, a mother of six. "If I'm playing *The Bard's Tale*, the family is welcome to watch!"

Studies have shown that computers are often situated in a father's work area or a son's room, which may be off-limits for daughters. Locate your computer in a central area. If the "boys" of the family begin to hog computer time, create and monitor a sign-up sheet to equalize usage.

7. Make sure mothers learn to use the computer. Mothers can set examples for daughters by enrolling in a basic computer course and making use of the family computer for work, household tasks, and creative ideas. Since Tan Summers is a freelance writer and does all of her writing with a word processor, she is being a positive role model for her four daughters.

8. Explore a variety of applications. Give your daughter a sense of the exciting range of computer activities and projects through real uses. Use a word processor to write letters. Use a data-base management system to keep track of records, videocassettes, recipes, books, etc. Try out an electronic service for research. With a graphics program, you can design holiday greeting cards or create original artwork.

And don't forget that game playing is an activity your daughter is sure to enjoy; you just have to find the right types of games. "My 15-year-old daughter, Laurel, loves to play games," said Summers. "She really enjoys the Infocom games, such as *The Mind Forever Voyaging* and the *Zork* series. They're quiet, thinking games. Laurel also likes games that have pretty music and nice scenery. She *doesn't* like the shoot 'em ups."

9. Stress the ease of homework. Encourage your daughter to use her computer to help her with her homework. Emphasize how much more easily she can write and correct reports, illustrate term papers, research, and keep track of data. If she doesn't have access to a computer at home, suggest that she use a school computer during free periods.

10. Encourage girls to work with friends. Suggest that your daughter get together with several friends to use a computer (either at home or at school). By encouraging girls to work in groups, parents can help shift peer pressure in support of computer usage. After all, if a girl's friends are computer users, then it's OK—and maybe even "cool"—if she is.

Said Summers: "My 11-year-old daughter, Cherry, has a best friend who is a computer fanatic. She comes over to our house to play games, and they swap games back and forth. On the other hand, when my 9-year-old son, Howard, brings his friends over, they usually don't go near the computer."

Finally, and most important, examine your own attitudes closely. Pay attention to the signals you're giving your daughter. The father who gave his son but not his daughter a computer was, by his very actions, restricting his daughter's expectations of her own place in the computer revolution. Keeping your eyes sensitized to seeing the gender gap is sometimes difficult, but worth it. Ultimately, you'll discover your daughter availing herself of rich opportunities as a well-adapted student of today and as a thriving citizen in the technological world of tomorrow. FC

GIRLS & COMPUTERS: SOME REVEALING STATISTICS

- A study concluded in February 1986 by the Computer Equity Training Project of the Women's Action Alliance—a national, 28-month project on computer equity for girls—showed that boys accounted for 74 percent of students who voluntarily used computers after school, in three schools that were part of a pilot.
- A 1986 report for a computer equity grant project at the South Brunswick Board of Education in New Jersey showed that the boy-girl ratio of free-time usage of the library computer center at the middle school during '85–'86 was 5 to 1.
- A 1984 report by the Project on Equal Education Rights (PEER) found that boys outnumbered girls 2-to-1 in high school computer programming class enrollments in three states.
- In 1983, sociologist Marlaine Lockheed found that 40.8 percent of the boys at Princeton High School used school computers in their free periods in school while only 8.3 percent of girls did.

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HOME OFFICE

GIFT IDEAS FOR HOME-WORKERS

Spruce Up That Make-do Office with Something Bright, New, and Useful

BY KAREN KANE

A sampling of practical gifts suited for the home office.

Most home offices are put together piecemeal, using old furniture found in attics or purchased at tag sales. While this is certainly the cheapest way to get started, rusty metal bridge chairs and flickering desk lamps become unacceptable the more time one spends with them. If you know someone working in a makeshift office, the holiday season is an ideal time to surprise him or her with a bright new object to spruce up the surroundings.

People's work habits are often peculiar and always particular. To choose the right office gift, fish for ideas and drop subtle suggestions to see what kind of reaction you get. Look around the home office and note what's missing or in bad shape. If you can, watch people while they work. Do they fidgit in their seats, squint or rub their eyes from improper lighting, or constantly shuffle disks and papers around in a disorganized mess?

These clues can lead you to the perfect gift. Here are just a few of the products available to make any home office more comfortable and complete. *(For more shopping tips and ideas, refer to "Setting Up Your Home Office," in the July 1986 issue.)*

FURNITURE & LIGHTS

The most important piece of furniture in an office is the chair. The Rolls Royce of ergonomically designed office chairs comes from Herman Miller, Inc. The Ergon Operational Chair ($500-$1,300) and Equa low-back work chair with arms ($485-$1,200) are a far cry from a rusty bridge chair and can be customized with any option—from pneumatic adjustments to leather upholstery. Even if you can't afford a Herman Miller, test one out and then shop for the features you find most appealing, at prices that are comfortable, as well.

Most office-supply stores have good ergonomic chairs, with five-pronged bases, a back rest, and seat controls. Prices for these ergonomic chairs start at about $100. For under $100, you're more likely to get a less sturdy "typing chair."

Another comfortable seating option is the Back Chair from RAM ($30). This inexpensive clone of the Danish Balans Chair lets you sit (or more accurately, kneel) in such a way that your weight is distributed between your legs and back. The chair also has wheels.

One product that few people think of is a footrest. But it certainly helps circulation in the legs. The Footrise adjustable footrest ($30) and the Foot Flexer with vibration ($70) from Computerise Inc. can reduce pressure on the legs and help relax the whole body.

A workstation should have both background light and an adjustable area (desk) lamp. The Electrix Halogen Lamp, available from Sharper Image (desk model, $99, floor model, $149), is specially designed to enhance a work area and occupy little space. Its fully adjustable arm lets you direct light exactly where it's needed. According to the manufacturer, the energy-saving light produced by this lamp is the closest approximation to natural sunlight available, and it reduces glare on the desk and computer.

TELEPHONES

Some people "live" on the telephone, and fancy new phones designed for various needs are one of the hot product areas this year. Here are just two of many choices.

The Free Hands Telephone Headset from Global Computer Supplies enables you to use both hands for your work while talking on the telephone. It comes with cushioned earpads, plugs into modular phones, and lets you alternate between a headset and conventional receiver by flipping a switch ($44.95 for one-ear sound, $64.95 for two-ear sound).

Sharp Speakerphone ($89) is a sleek two-way speakerphone that lets you carry on telephone conversations without lifting the receiver. You can also program it to dial your 20 most frequently called numbers.

DESKTOP SOFTWARE

Buying software for someone else can be a bit tricky. Be sure you know their computer model and the amount of memory it has, and look carefully at the requirements of the software. One type of software that

---

KAREN KANE *is the technical associate of* FAMILY COMPUTING. *She wrote "History Meets Technology" in the July issue.*

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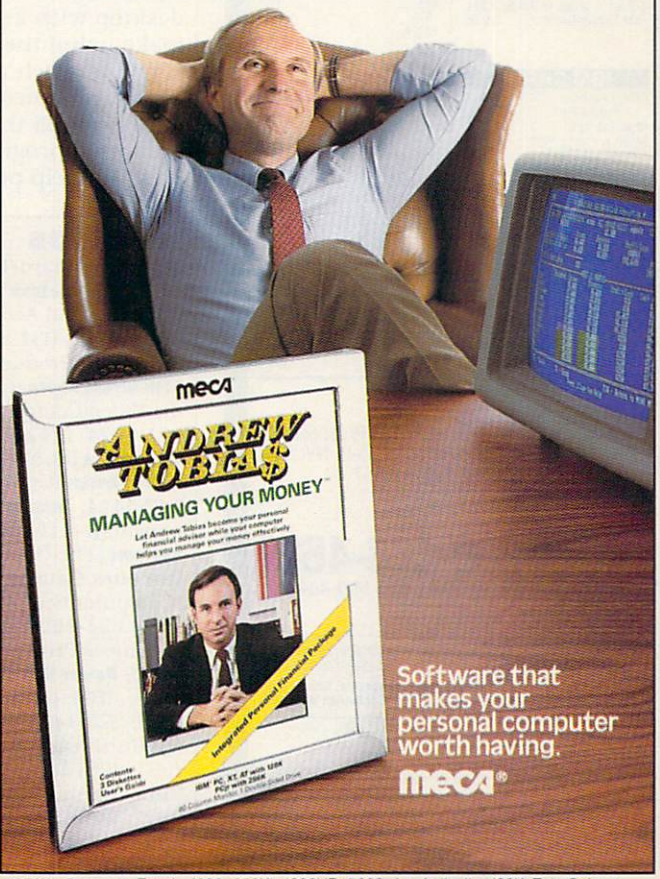

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is sure to please is a memory-resident desktop organizer—a program that resides in a corner of memory and lets you run other programs until you need to make a note, phone call, or calculation. (*See the MS-DOS column in Machine Specifics.*)

The granddaddy in this category is *SideKick*, from Borland International Inc. ($85-$100; for IBM PC/PC*jr* and compatibles and Macintosh). *SideKick* includes a notepad, calculator, calendar, appointment scheduler, auto dialer, and directory.

Traveling SideKick ($70; for IBM PC only), a companion to *SideKick*, comes in a vinyl binder with a solar calculator, dividers, forms, and a pen, so a traveling executive can record information while away. Later, the data can be input into *SideKick*.

Pinpoint ($88; Pinpoint Publishing) is a desktop organizer for the Apple IIc, enhanced IIe, and IIGS. It lets you print any text from the screen, turns your printer into a typewriter, lets you dial your modem, and more.

KEYBOARD OVERLAYS

If you know what software someone has, you can enhance his or her desktop with keyboard overlays that make using the programs easier. However, such a gift only makes sense for someone who can't always remember all the commands to a seldom-used program. Keyboard overlays also help people who are just learning a program.

The Microref Keyboard Templates from Educational Systems, Inc. include a complete listing of commands and illustrated function keys available for Lotus' *1-2-3*, *Multimate*, *WordStar*, *PC/MS-DOS*, *dBASE III*, *WordPerfect*, *DisplayWrite 3*, and *SideKick/Superkey*. You get three strips for $14.95 or five for $19.95.

Cheatsheet Products, Inc. has more than 50 keyboard overlays available for the C 64, 25 each for Apple IIe and IIc, and several for the C 128. The latter batch includes BASIC 7.0, *PaperClip 128*, and *Wordpro* Cheatsheets ($7.95 each).

Systems Management Associates, Inc. has PC-DocuMate overlays ($14.95 each) for business applications software on the IBM PC, PC/XT, PC/AT, AT&T 6300, and Apple IIe computers.

GADGETS & ACCESSORIES

A lot of people like to buy the main-office items (desk, chair, computer, etc.) themselves. If so, look for a friendly gadget that they wouldn't otherwise think of.

The Pyramid by Innovative Technologies holds up to 24 5.25″ disks and is ideal for professionals or students on the move. The triangular nylon case can be propped up to display disks and folds flat with velcro closures for easy portability. The Easel is a similar case for 3.5″ disks ($20-$22).

The Automatic Beverage Warmer from Brookstone plugs into any outlet to keep the busy executive's coffee steamy hot ($27.50). The warmer is great for a home-office coffee break, but liquids should be kept away from computer equipment.

Sanford manufactures Diskribe Markers, pens for writing safely on disks. Choose from silver, gold, red, green, and blue models ($2.50 each).

The Anti-Static Mat ($9.95) from ACCO will help drain the static electricity from you body when you touch it with your finger. It's small enough (2¼″ x 4¼″) to place just about anywhere.

The THiNgi copy holder from Sum-Pro International, Inc. ($14) attaches with velcro to the top of any monitor. The plastic arm extends to the side of the monitor where you can clip your manuscript copy or notes as you type at the keyboard.

The Solid Oak Wastebasket from Exeters ($39) includes brass rivets

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HOME OFFICE

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Clean-it and fix-it kits also make great gifts. The Case for Computer Care ($50; PerfectData) is packaged in a molded plastic case for easy portability and storage. It includes kits to clean disk-drive heads, printer heads, printer platens, and the CRT screen.

For the handyman/woman, the JTK-9 Personal Computer Service Kit ($49; Jensen Tools Inc.) simplifies user maintenance on personal computers and stores neatly away in a compact vinyl case. The kit includes Phillips screwdrivers, a penlight, an IC extractor, a key-cap puller, and other handy tools.

Portable Computer Support Group has a laptop computer carrying case ($69) measuring 16″ x 12″ x 10″. There's enough room to carry a disk drive, software, and manuals. It's made out of convertible-top canvas with leather handles, heavy duty zippers, and a padded shoulder strap.

If none of these products catches your fancy, order one of the many catalogs that stock computer-related and office merchandise and browse through them. Certainly you'll find something novel or useful for the home office worker—even if he or she is the kind of person who has everything. FC

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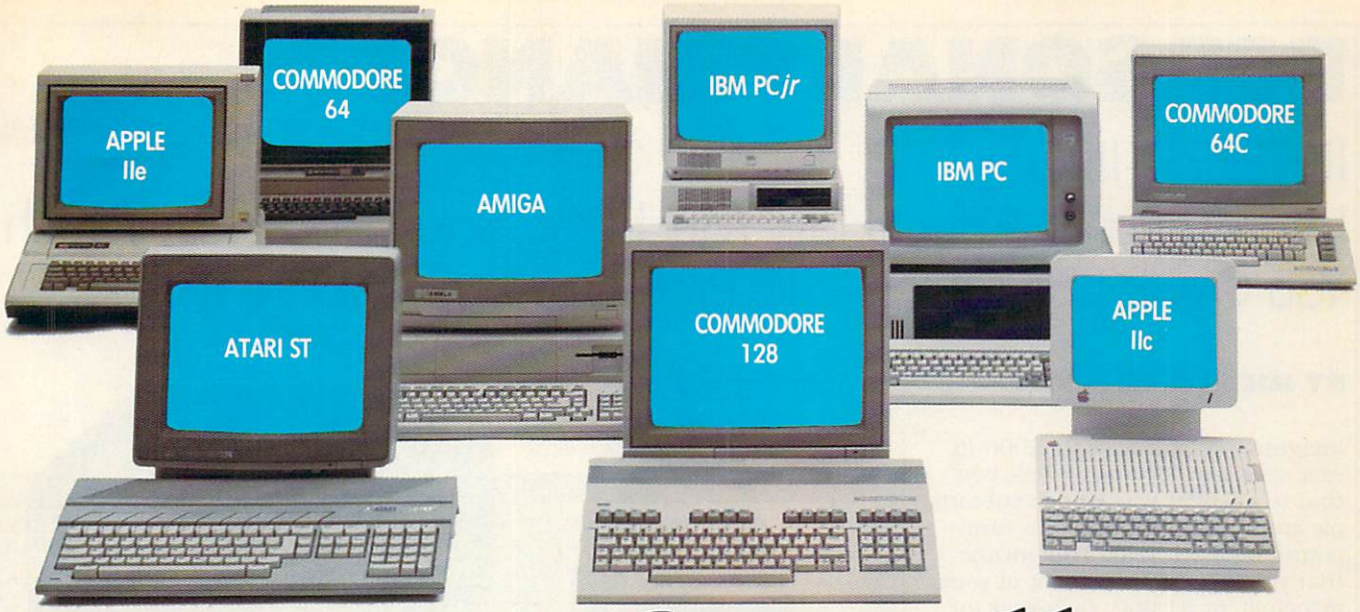

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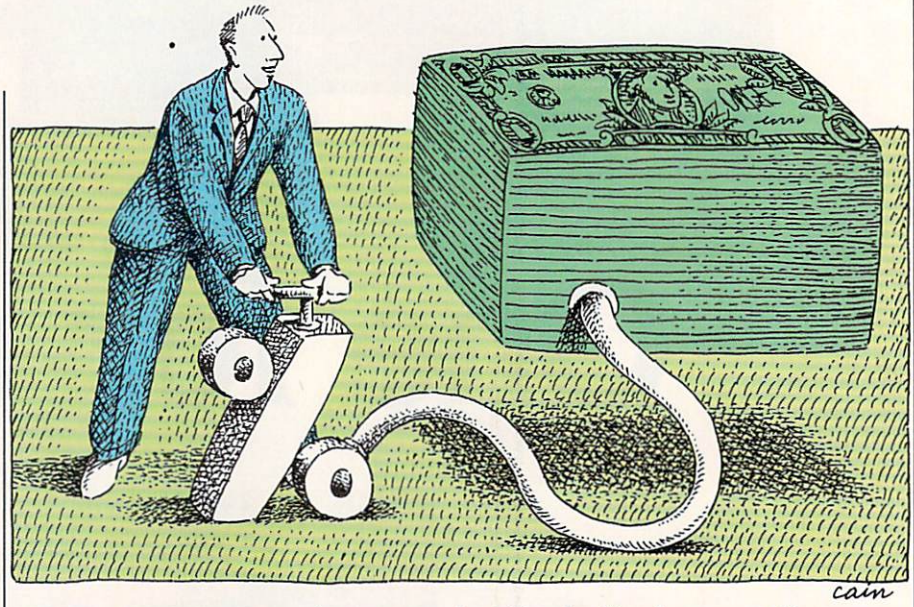
INTEREST-ING!

Interest Rates Affect How Much You Save and How Much You Owe. Use Our BASIC Program to Compare Rates.

BY MICHAEL W. ECKER



Imagine that you have $10,000 to save or invest. One bank tells you that it will offer you 10 percent simple annual interest (with no compounding) each year. This means that you will get 10 percent of your principal, or $1,000, each year for the next 10 years. The only restriction is that you keep the money in the account for a 10-year period.

Another bank, not so flashy, offers an 8 percent nominal annual rate for the 10 years, but the interest is compounded quarterly. This means that you get 2 percent interest four times a year, based on your account balances at those given four times.

Which of the two offers would you choose?

If my question makes you suspicious that the better choice is the 8 percent offer, you're right. The key lies in the fact that compounded interest garners interest not just on the original $10,000, but also on any interest accumulated along the way. Such growth is rapid—the mathematical equivalent of a snowball rolling down a hill.

After 10 years, you'd have $20,000 if your money was gaining 10 percent simple annual interest each year. After 10 years, you'd have $22,080 if your money was gaining 8 percent interest, compounded quarterly. That's useful information.

However, by using our BASIC program, you'll also be able to find that for a shorter period of time—say, up to five years—the 10 percent offer actually gives a better return. That's also useful information.

The question of interest—the incentive for providing a financial institution with your money—is important in our lives. It's impossible not to be conscious of interest, which plays a big part in virtually all economic activity. Most of us maintain bank accounts, use credit cards, take out loans, or have mortgages. Yet, somehow we don't always make the best decisions. And it's usually because we don't bother to calculate the potential benefits or detriments of a given interest rate.

DR. MICHAEL W. ECKER *is a mathematics professor, the editor and publisher of the* Recreational & Educational Computing Newsletter, *and the president of Recreational Mathemagical Software.*

HOW TO COMPUTE INTEREST

Unless you use a calculator or like to make scientific calculations by hand, the simplest way to find out how much money you'll have after a certain period—or how much you will owe—is to use a standard formula (shown below) incorporated into a computer program. You can just respond to the program's simple questions and get a dollars-and-cents readout of where you stand. Here are the variables involved:

PV = principal (present value), the amount of money on which the interest is based.

R = rate, the nominal annual interest rate.

YR = time, the number of years you leave the money in the account.

N = the number of compounding periods per year; i.e., the number of times per year interest is given.

FV = the final amount (future value), or the amount of money the account will have if you start with PV dollars, invested for YR years at interest rate R, with compounding N times per year.

Thus, the formula for calculating compound interest is as follows:

$$FV = PV\left(1 + \frac{R}{N}\right)^{N \times YR}$$

RUN THE PROGRAM

Type in the program, SAVE it, and RUN it.

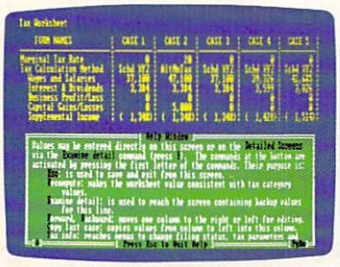
To start, the program will ask, HOW MUCH PRINCIPAL IS BEING DEPOSITED? Don't use dollar signs or commas (e.g., enter 10000 to represent $10,000). Then the program will ask: HOW MANY TIMES PER YEAR IS INTEREST BEING COMPOUNDED? If your bank advertises quarterly compounding, this means that it is giving interest four times per year, so you would use 4. For daily compounding, use 365 (some bankers use 360).

Next, the program will ask: WHAT IS THE NOMINAL ANNUAL INTEREST RATE (%)? Give the interest rate without the percent sign (e.g., enter 5 to represent 5 percent). At this point, the program will give you its first re-

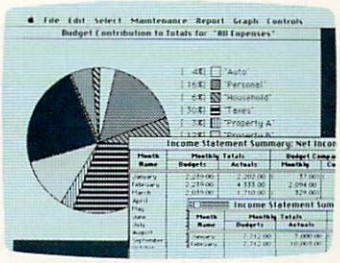
(Text continued on page 28)

ILLUSTRATION BY DAVID CAINE

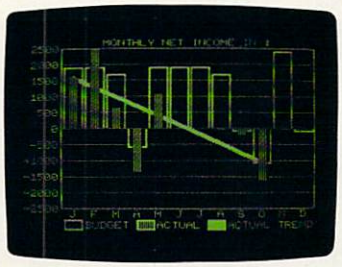
WE'VE PUT 200,000 PEOPLE INTO ANALYSIS.



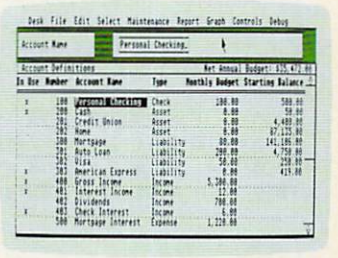
Making tax decisions before tax season. (Version 2.0/IBM® and compatibles)



Analyzing your financial position with graphs and reports. (Version 1.4/ Macintosh™)



Using graphics to capture your complete financial picture. (Version 1.5/ Apple® II family)



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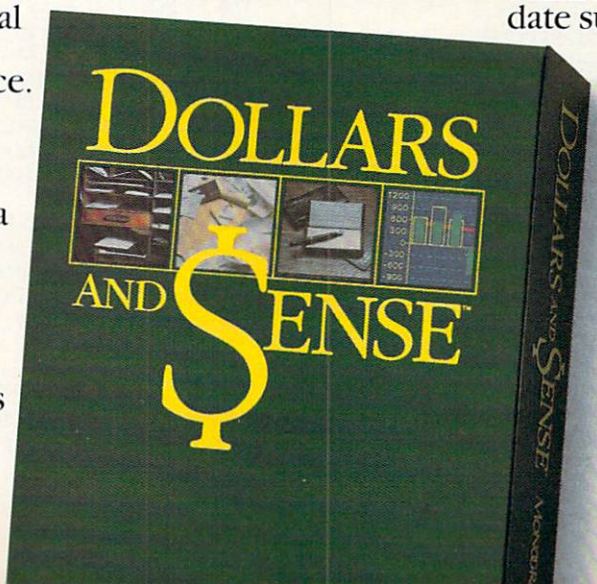
At which point, you may want to lie down.



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CIRCLE READER SERVICE 55

Apple II series/*Compound Interest*

```
10 DIM S$(1):HOME:S$(0) = "":S$(1) = "S"
20 PRINT "HOW MUCH PRINCIPAL IS BEING"
30 INPUT "DEPOSITED? ";T$
40 PRINT:PV = VAL(T$):IF PV <= 0 THEN 20
50 PRINT "HOW MANY TIMES PER YEAR IS INTEREST"
60 INPUT "BEING COMPOUNDED? ";T$:N = VAL(T$)
70 PRINT:IF N < 1 OR INT(N) <> N THEN 50
80 PRINT "WHAT IS THE NOMINAL ANNUAL INTEREST RATE";
90 INPUT "(%)? ";T$
100 PRINT:R = VAL(T$):IF R <= 0 OR R > 99 THEN 80
110 R = R/100:RR = 1:FOR L = 1 TO N
120 RR = RR*(1+R/N):NEXT L:RR = RR-1:RP = 100*RR
130 T = RP:GOSUB 1000
140 PRINT "NOTE: THE EFFECTIVE ANNUAL YIELD"
150 PRINT "IS ";T$;"%.":PRINT
160 PRINT "HOW MANY YEARS WILL THE PRINCIPAL"
170 INPUT "REMAIN IN THE ACCOUNT? ";T$:PRINT
180 YR = VAL(T$):IF YR <= 0 THEN 160
190 FA = 1+R/N:NP = N*YR:Z = INT(NP):IF Z < 1 THEN 160
200 FV = PV:FOR L = 1 TO Z:FV = FV*FA:NEXT L
210 T = FV:GOSUB 1000
220 PRINT "AFTER ";YR;" YEAR";S$(YR > 1);
230 PRINT " (";Z;" PERIOD";S$(Z > 1);"),"
240 PRINT "YOU WILL HAVE ABOUT $";T$;"."
250 IF Z <> NP THEN PRINT:PRINT "THE NUMBER OF PERIODS
 WAS ROUNDED DOWN":PRINT "TO A WHOLE NUMBER."
260 END
1000 IF T > 999999 THEN T$ = STR$(T):RETURN
1010 IR = INT(T):FR = T-IR:FR = INT(FR*100+0.5)/100
1020 T = IR+FR+0.001:T$ = STR$(T)
1030 T$ = MID$(T$,1,LEN(T$)-1):RETURN
```

Commodore 64 & 128/*Compound Interest*

```
10 DIM S$(1):PRINT CHR$(147);:S$(0)="":S$(1)="S"
20 PRINT "HOW MUCH PRINCIPAL IS BEING"
30 INPUT "DEPOSITED";T$:PRINT
40 PV=VAL(T$):IF PV<=0 THEN 20
50 PRINT "HOW MANY TIMES PER YEAR IS INTEREST"
60 T$="":INPUT "BEING COMPOUNDED";T$:N=VAL(T$)
70 PRINT:IF N<1 OR INT(N)<>N THEN 50
80 PRINT "WHAT IS THE NOMINAL ANNUAL INTEREST RATE";
90 T$="":INPUT "(%)";T$
100 PRINT:R=VAL(T$):IF R<=0 OR R>99 THEN 80
110 R=R/100:RR=1:FOR L=1 TO N
120 RR=RR*(1+R/N):NEXT L:RR=RR-1:RP=100*RR
130 T=RP:GOSUB 1000
140 PRINT "NOTE: THE EFFECTIVE ANNUAL YIELD"
150 PRINT "IS ";T$;"%.":PRINT
160 PRINT "HOW MANY YEARS WILL THE PRINCIPAL"
170 T$="":INPUT "REMAIN IN THE ACCOUNT";T$:PRINT
180 YR=VAL(T$):IF YR<=0 THEN 160
190 FA=1+R/N:NP=N*YR:Z=INT(NP):IF Z<1 THEN 160
200 FV=PV:FOR L=1 TO Z:FV=FV*FA:NEXT L
210 T=FV:GOSUB 1000
220 PRINT "AFTER";YR;"YEAR";S$(ABS(YR>1));
230 PRINT " (";MID$(STR$(Z),2);" PERIOD";S$(ABS(Z>1));
"),"
240 PRINT "YOU WILL HAVE ABOUT $";T$;"."
250 IF Z=NP THEN END
260 PRINT:PRINT "THE NUMBER OF PERIODS WAS ROUNDED DOW
N"
270 PRINT "TO A WHOLE NUMBER.":END
1000 IF T>999999 THEN T$=MID$(STR$(T),2):RETURN
1010 IR=INT(T):FR=T-IR:FR=INT(FR*100+0.5)/100
1020 T=IR+FR+0.001:T$=STR$(T)
1030 T$=MID$(T$,2,LEN(T$)-2):RETURN
```

IBM PC & compatibles (80-column version)/*Compound Interest*

This program has been tested and found to work on the following computers and hardware configurations, using the BASICs shown: IBM PC w/Color/Graphics Monitor Adapter or Monochrome/Printer Card, w/Disk BASIC D2.00 or Advanced BASIC A2.00. IBM PCjr w/128K RAM, 80-column monitor, and Cartridge BASIC J1.00. Tandy 1000 w/80-column monitor, and GW-BASIC 2.02 version 01.01.00. (IBM PCjr owner with 64K RAM should use the 40-column version.) It should also work on many other PC compatibles.

```
10 WIDTH 80:KEY OFF
20 DEFDBL F,P,R,T:DIM S$(1):CLS:S$(0)="":S$(1)="s"
30 INPUT "How much principal is being deposited";T$
40 PRINT:PV=VAL(T$):IF PV<=0 THEN 30
50 INPUT "How many times per year is interest being co
mpounded";T$
60 PRINT:N=VAL(T$):IF N<1 OR INT(N)<>N THEN 50
70 INPUT "What is the nominal annual interest rate (%)
";T$
80 PRINT:R=VAL(T$):IF R<=0 OR R>99 THEN 70
90 R=R/100:RR=1:FOR L=1 TO N
100 RR=RR*(1#+R/N):NEXT L:RR=RR-1:RP=100*RR
110 DF$=STRING$(LEN(STR$(INT(RP)))-1,35)+".##"
120 PRINT "NOTE: The effective annual yield is ";
130 PRINT USING DF$;RP;:PRINT "%.":PRINT
140 INPUT "How many years will the principal remain in
 the account";T$
150 PRINT:YR=VAL(T$):IF YR<=0 THEN 140
160 FA=1#+R/N:NP=N*YR:Z=INT(NP):IF Z<1 THEN 140
170 FV=PV:FOR L=1 TO Z:FV=FV*FA:NEXT L
180 DF$=STRING$(LEN(STR$(INT(FV)))-1,35)+".##"
190 PRINT "After";YR;"year";S$(ABS(YR>1));" (";
200 PRINT MID$(STR$(Z),2);" period";S$(ABS(Z>1));"), "
;
210 PRINT "you will have about $";
220 PRINT USING DF$;FV;:PRINT "."
230 IF Z<>NP THEN PRINT:PRINT "The number of periods w
as rounded down to a whole number."
240 PRINT:KEY ON:END
```

IBM PC & compatibles (40-column version)/*Compound Interest*

This program has been tested and found to work on the following computers and hardware configurations, using the BASICs shown: IBM PC w/Color/Graphics Monitor Adapter or Monochrome/Printer Card, w/Disk BASIC D2.00 or Advanced BASIC A2.00. IBM PCjr w/Cartridge BASIC J1.00. Tandy 1000 w/GW-BASIC 2.02 version 01.01.00. It should also work on many other PC compatibles.

```
10 DEFDBL F,P,R,T:DIM S$(1)
20 WIDTH 40:KEY OFF:CLS:S$(0)="":S$(1)="s"
30 PRINT "How much principal is being"
40 INPUT "deposited";T$:PRINT
50 PV=VAL(T$):IF PV<=0 THEN 30
60 PRINT "How many times per year is interest"
70 INPUT "being compounded";T$:PRINT
80 N=VAL(T$):IF N<1 OR INT(N)<>N THEN 60
90 PRINT "What is the nominal annual interest rate";
100 INPUT "(%)";T$
110 PRINT:R=VAL(T$):IF R<=0 OR R>99 THEN 90
120 R=R/100:RR=1:FOR L=1 TO N
130 RR=RR*(1#+R/N):NEXT L:RR=RR-1:RP=100*RR
140 DF$=STRING$(LEN(STR$(INT(RP)))-1,35)+".##"
150 PRINT "NOTE: The effective annual yield"
160 PRINT "is ";:PRINT USING DF$;RP;:PRINT "%.":PRINT
170 PRINT "How many years will the principal"
180 INPUT "remain in the account";T$:PRINT
190 YR=VAL(T$):IF YR<=0 THEN 170
200 FA=1#+R/N:NP=N*YR:Z=INT(NP):IF Z<1 THEN 170
210 FV=PV:FOR L=1 TO Z:FV=FV*FA:NEXT L
220 DF$=STRING$(LEN(STR$(INT(FV)))-1,35)+".##"
230 PRINT "After";YR;"year";S$(ABS(YR>1));
240 PRINT " (";MID$(STR$(Z),2);" period";S$(ABS(Z>1));
"),"
250 PRINT "you will have about $";
260 PRINT USING DF$;FV;:PRINT "."
270 IF Z<>NP THEN PRINT:PRINT "The number of periods w
as rounded down":PRINT "to a whole number."
280 PRINT:KEY ON:END
```

Tandy Color Computer/*Compound Interest*

```
10 CLEAR 200:DIM S$(1):CLS:S$(0)="":S$(1)="S"
20 PRINT "HOW MUCH PRINCIPAL IS BEING"
30 INPUT "DEPOSITED";T$:PRINT
```

→

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CIRCLE READER SERVICE 16

```
40 PV=VAL(T$):IF PV<=0 THEN 20
50 PRINT "HOW MANY TIMES PER YEAR IS"
60 INPUT "INTEREST BEING COMPOUNDED";T$:N=VAL(T$)
70 PRINT:IF N<1 OR INT(N)<>N THEN 50
80 PRINT "WHAT IS THE NOMINAL ANNUAL"
90 INPUT "INTEREST RATE (%)";T$
100 PRINT:R=VAL(T$):IF R<=0 OR R>99 THEN 80
110 R=R/100:RR=1:FOR L=1 TO N
120 RR=RR*(1+R/N):NEXT L:RR=RR-1:RP=100*RR
130 T=RP:GOSUB 1000
140 PRINT "NOTE: THE EFFECTIVE ANNUAL YIELD";
150 PRINT "IS ";T$;"%.":PRINT
160 PRINT "HOW MANY YEARS WILL THE"
170 INPUT "PRINCIPAL REMAIN IN THE ACCOUNT";T$:PRINT
180 YR=VAL(T$):IF YR<=0 THEN 160
190 FA=1+R/N:NP=N*YR:Z=INT(NP):IF Z<1 THEN 160
200 FV=PV:FOR L=1 TO Z:FV=FV*FA:NEXT L
210 T=FV:GOSUB 1000
220 PRINT "AFTER";YR;"YEAR";S$(ABS(YR>1));
230 PRINT " (";MID$(STR$(Z),2);" PERIOD";S$(ABS(Z>1));
");"
240 PRINT "YOU WILL HAVE ABOUT $";T$;"."
250 IF Z<>NP THEN PRINT:PRINT "THE NUMBER OF PERIODS W
AS":PRINT "ROUNDED DOWN TO A WHOLE NUMBER."
260 END
1000 IF T>999999 THEN T$=STR$(T):RETURN
1010 IR=INT(T):FR=T-IR:FR=INT(FR*100+0.5)/100
1020 T=IR+FR+0.001:T$=STR$(T)
1030 T$=MID$(T$,2,LEN(T$)-2):RETURN
```

Tandy Model III & 4 (Model III mode)/*Compound Interest*

```
10 CLEAR 200
20 DEFDBL F,P,R,T:DIM S$(1):CLS:S$(0)="":S$(1)="s"
30 INPUT "How much principal is being deposited";T$
40 PRINT:PV=VAL(T$):IF PV<=0 THEN 30
50 INPUT "How many times per year is interest being co
mpounded";T$
60 PRINT:N=VAL(T$):IF N<1 OR INT(N)<>N THEN 50
70 INPUT "What is the nominal annual interest rate (%)
";T$
80 PRINT:R=VAL(T$):IF R<=0 OR R>99 THEN 70
90 R=R/100:RR=1:FOR L=1 TO N
100 RR=RR*(1#+R/N):NEXT L:RR=RR-1:RP=100*RR
110 DF$=STRING$(LEN(STR$(INT(RP)))-1,35)+".##"
120 PRINT "NOTE: The effective annual yield is ";
130 PRINT USING DF$;RP;:PRINT "%.":PRINT
140 INPUT "How many years will the principal remain in
 the account";T$
150 PRINT:YR=VAL(T$):IF YR<=0 THEN 140
160 FA=1#+R/N:NP=N*YR:Z=INT(NP):IF Z<1 THEN 140
170 FV=PV:FOR L=1 TO Z:FV=FV*FA:NEXT L
180 DF$=STRING$(LEN(STR$(INT(FV)))-1,35)+".##"
190 PRINT "After";YR;"year";S$(ABS(YR>1));" (";
200 PRINT MID$(STR$(Z),2);" period";S$(ABS(Z>1));"), "
;
210 PRINT "you will have about $";
220 PRINT USING DF$;FV;:PRINT "."
230 IF Z<>NP THEN PRINT:PRINT "The number of periods w
as rounded down to a whole number."
240 END
```

MODIFICATIONS FOR OTHER COMPUTERS

Macintosh w/Microsoft BASIC 2.0 or 2.1/*Compound Interest*

Use the IBM PC 80-column version except change lines 10 and 240 to read as follows:

```
10 WINDOW 1,,(0,38)-(527,338)
240 END
```

(Continued from page 24)

sponse, saying, NOTE: THE EFFECTIVE ANNUAL YIELD IS XX%. (The XX's represent the percent your money actually grows in one year, and the computer will calculate and display this percentage for you.) If you experiment with the program, you'll find that the effective rate is usually higher than the nominal annual rate. Most banks list both rates in their ads.

Finally, the program will ask: HOW MANY YEARS WILL THE PRINCIPAL REMAIN IN THE ACCOUNT? If the figure is not a whole number, such as two-and-a-half years, enter a number with a decimal point, such as 2.5. If you have a number of months, such as 48, don't forget to divide by 12 to convert it to four years.

Now, the program will give you the answer you've been seeking: AFTER XX YEARS (XX PERIODS), YOU WILL HAVE ABOUT $XX.

CREDIT CARDS, BALLOON LOANS

You can apply this program to various situations, such as bank cards and balloon loans. For instance, suppose that you have a credit card that allows you to skip three months of payments. But remember that the interest you pay the bank continues to accrue. Let's say that you owe $1,500 and that the nominal annual rate is 19.8 percent—a high rate but a common one for many banks' MasterCards and Visa cards.

Enter 1500 as the principal. Since most of these cards compound daily, use 365 for the number of compound periods. For the rate, enter 19.8, and for the time, use .25, for one-quarter of one year. You'll see that after three months, you owe $76 in interest, in addition to your $1,500 debt, for a total of $1,576.

What about a balloon loan? Some balloon loans—as contrasted with installment loans—are loans in which you repay the entire principal, plus the accumulated interest over the life of the loan, at the end of the loan period. (The formula for monthly payments for installment loans is different and mathematically much more involved.)

Suppose that you borrow $3,000 from a financial institution and agree to repay the entire $3,000 plus interest at the end of three years, with interest compounded daily at a 15 percent nominal annual rate. Enter 3000 for principal, 365 for the number of times interest is compounded yearly, 15 for the rate, and 3 for the number of years. Do you get about $4,704.50?

Because of rounding, the answers from the program may sometimes differ slightly from your banker's estimate. Do not be alarmed. There are several reasons for this. One relates to rounding practices of banks. Another stems from the accuracy and precision of different computers. Using two calculators and two computers, I got three slightly different answers for the last question. (NOTE: *If you enter an amount that is too large, this program may give you an inaccurate amount.)*

FAST ANSWERS

You might enjoy experimenting with the program to see the effect of compounding more frequently or receiving higher interest rates, as well as evaluating the effect of different principals and time periods.

While you may instinctively know that more frequent compounding accrues interest faster, running this program will help you judge how much faster. Often, the difference is minimal and the amounts involved are minimal. But if you are carrying a big credit card debt, and 19.8 percent interest is being compounded daily, you might do well to take a closer look at the amount of money you're actually paying in interest. FC

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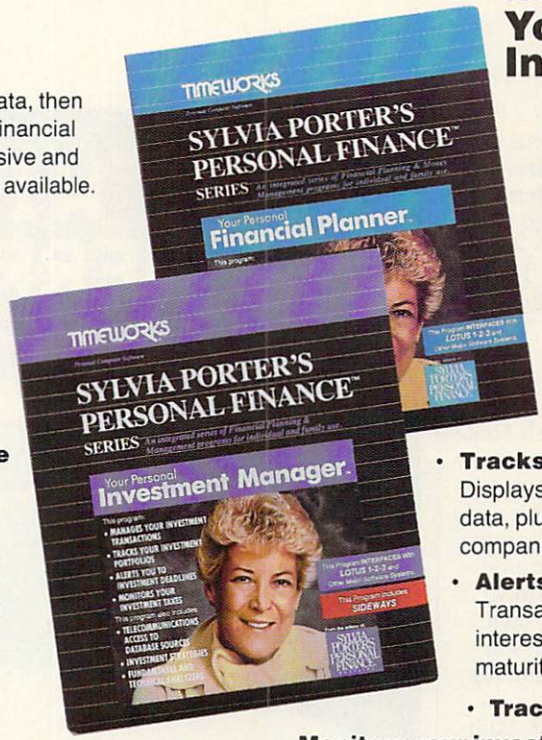

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**Volume 1 only

CIRCLE READER SERVICE 84

TELECOMPUTING

1986 IN REVIEW
What's Made News on the Networks

BY SHAY ADDAMS

In 1985, the major development in telecomputing was in hardware—the advent of the 2400-baud modem. In 1986, new offerings from large information services and electronic-mail networks made the big news. Here's a look at some of the most significant developments.

HALLMARK CARDS GO ELECTRONIC

CompuServe teamed up with Hallmark Cards to introduce *Color Mail*, an electronic greeting card that combines color graphics, animation, and sound effects. (Ordinary electronic mail is restricted to straight monochrome text.) Before signing on to CompuServe, you create your own "card" with special *Color Mail* software ($40; Apple II, Commodore 64/128).

The *Color Mail* program has 10 libraries from which you select up to five elements—backgrounds, cartoon characters, sound effects, and musical themes—and position them on the screen. Some graphics may be animated to move slowly across the screen. You can also type in a personalized message and "paint" portions of the card with your choice of 16 colors. "Happy Birthday" and nine more standard messages are already on the disk.

After the card is complete, you SAVE it on a disk, sign onto CompuServe, and send it via the EasyPlex mail facility (at a charge of $.25 per card).

To receive *Color Mail*, you work in reverse. SAVE the card to disk, load the file into your own *Color Mail* software, and view it after signing off the network. The greeting is recreated before your eyes.

An electronic greeting card created with Hallmark's *Color Mail*.

You can view (but not create) a greeting card if you don't own *Color Mail* software by downloading a program from the *Color Mail* Exchange Forum on CompuServe.

Also in this Forum are libraries containing fresh graphics and other effects—the Murderous Mystery Libraries have laughing skulls and a Psycho shower stall, Celebs I and Celebs II have caricatures of everyone from Whoopi Goldberg to Rambo. Each library costs $3.50-$5.

In other electronic mail news, CompuServe linked its EasyPlex facility with MCI Mail, enabling subscribers of either service to send mail to people on the other. MCI also linked up with the DEC Email service, "All in One," so those users can also send mail to CompuServe users. Thus, if you subscribe to CompuServe, DEC, or MCI, you can send electronic mail to over 500,000 people. (With MCI Mail, you can also send mail by computer that is printed and delivered as paper mail to anyone in the world.)

Finally, AT&T Mail, used mostly by corporate subscribers, has a Mail-Talk feature that lets you listen to your messages over a touch-tone telephone. Punch in your user name and a password and you'll hear a synthesized voice read your mail. The tinny voice sounds a bit like the robot from "Lost in Space"—"Danger, Will Robinson!"

WANTED—DEAD OR ALIVE

Ever wondered what the people you're "conferencing" with look like? Members of QuantumLink, the Com-

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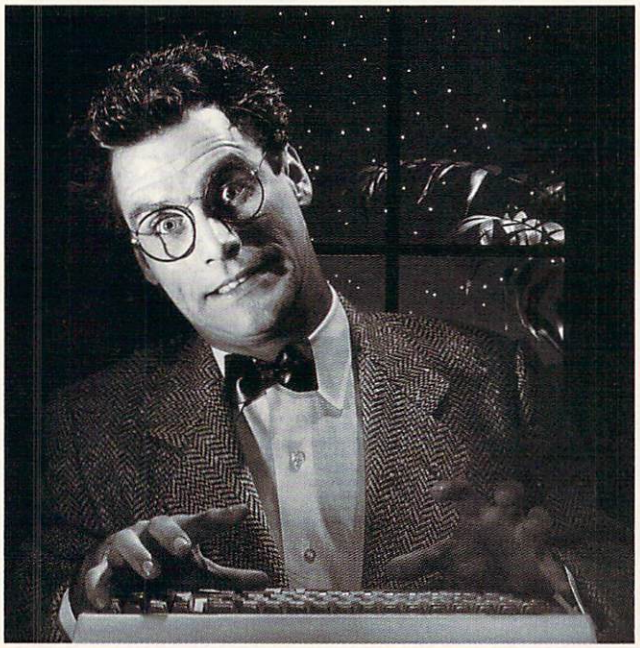
SHAY ADDAMS *is editor of* Questbusters, *a gaming newsletter. He also wrote the Commodore column in Machine Specifics and "Disk Drive Detectives" in this issue.*

"Online computing costs had me scared stiff..."



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The Source	X	X	X	no	X	X	$49.95	$10.00	$8.40	$10.80
CompuServe	X	X	X	X	X	X	$39.95	none	$6.00	$12.50
GEnie*	**X**	**X**	**X**	**X**	**X**	**X**	**$18.00**	**none**	**$5.00**	**$5.00**

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GEnie rates and services subject to change. Uploads are free during non-prime hours at 300 or 1200 baud. Third-party services offered on GEnie may include additional charges.

CIRCLE READER SERVICE 38

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CIRCLE READER SERVICE 90

TELECOMPUTING

modore-only network, can download picture files of each other from a data library called the Photo Gallery. First, they send in photos of themselves, which are digitized by Q-Link and stored in the Gallery. The pictures can be viewed or printed with free software that is also downloaded from the system.

CompuServe also has digitized photos on-line—some are even from the FBI's most wanted list!

PRICES SLASHED

Lower connect-time rates in 1986 made computer communications more affordable. American People/Link's rates for non-prime time (6 p.m. to 7 a.m.) are down to $4.25 per hour, and for local Chicago access this rate applies 24 hours a day. The charge for 1200-baud is $4.95 per hour, and for 2400-baud, $6.95. PLINK regularly announces special "PartyLine" rates of $3.49 per hour and "Happy Hour" rates as low as $1.99.

GEnie only charges $5 per hour for non-prime hours (300- and 1200-baud; $15 per hour for 2400-baud). Delphi charges $7.20 per hour for non-prime usage, even for 2400-baud. While you still pay $12.50 for 1200-baud usage on CompuServe, the system recently stopped charging for the connect time while you upload files in any of the data libraries.

PBS FUND RAISING

Delphi Boston (a local version of the national network) participated in the world's first "modem-athon" when they helped WGBH, the PBS station that produces the Nova series, raise money. The on-line auction was conducted simultaneously with the station's television fund-raising events. Deemed a success by both parties, the fund-raiser is on next year's schedule.

While Delphi has a local offshoot, CompuServe signed an agreement with two Japanese companies that will market and support the service in its existing form in that country. Right now there are only 750 subscribers in Japan. The two Japanese firms will also develop their own version of CompuServe in Japanese.

EASY ON, EASY OFF

EasyNet simplified the task of searching specialized data bases such as Dialog, BRS, NewsNet, and Magazine Index. Instead of forcing users to learn the idiosyncracies of each system's commands and protocols, EasyNet provides a "gateway" (to over 700 data bases) that relies on menus. You can choose the data base to search, or just pick a topic—and let EasyNet decide where to look. For the basic $8 search fee, you get titles and bibliographic information on the first 10-15 "hits." In addition, you don't have to subscribe to EasyNet; anytime you wish, just dial 800-EASYNET, and have your credit-card information ready.

Other versions of the EasyNet system are InFact on Western Union's EasyLink electronic-mail system, and IQuest on CompuServe.

FIND DRAGONS AND WIN MONEY

Multi-player science fiction games, like CompuServe's *MegaWars*, have always been popular, but fantasy role-playing games took the lead this year. In these games, hundreds of people enter the same environment to seek dragons, explore strange worlds, and complete various quests. CompuServe introduced *Island of Kesmai*, QuantumLink put up *Habitat* (developed by LucasFilms), Delphi offered *Quest*, and GEnie did *Stellar Warrior*.

In *Quest*, players who fulfill the goal win $100 of time on Delphi. QuantumLink and People/Link also started rewarding winners of its on-line game tournaments (chess, backgammon, and others) with free time.

DOWNLOAD WILLS

One of the more notable Special Interest Groups (SIGs) that started in 1986 was LawSIG on The Source. (SIGs are relatively new on The Source.) You can download wills, incorporation and other legal forms, and post messages about or engage in discussions on legal topics. The self-help section aims to serve non-professionals as well as attorneys and paralegals.

Who knows what will happen next year. Maybe we'll be able to download a lawyer and have a face-to-face negotiation. FC

PHONE NUMBERS

AT&T: (201) 221-2888; **GEnie:** (800) 638-9636; **Delphi:** (800) 544-4005; **EasyNet:** (215) 667-9026; **The Source:** (703) 734-7500; **CompuServe:** (312) 836-7374; **QuantumLink:** (703) 448-8700; **PeopleLink:** (312) 870-4260

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CIRCLE READER SERVICE 80

MACHINE SPECIFICS

NEWS, OPINIONS, QUOTES, & RUMORS ABOUT YOUR FAVORITE COMPUTER

APPLE

BY CHARLES H. GAJEWAY

Ah, December! Christmas is fast approaching, when Santa will perhaps see fit to slip something interesting into a stocking or under the tree. Let me share some of the neat little things that are on my Apple wish-list this year.

Way back in 1980, when software came in baggies and manuals were dot-matrix printouts, a couple of Apple wizards formed Beagle Bros Micro Software in San Diego and started selling games and utilities. From the moment I first saw their logo—two bearded faces similar to the Smith Brothers—appear on my monitor, I was hooked. Their programs and documentation perfectly captured the blend of whimsy, wonder, and practicality that is embodied in the Apple II. Here are a few good ones.

Power Print. First is *Power Print* ($39.95), a new utility for II Plus, IIc, and IIe that enables you to design and download custom printer fonts and graphics to most dot-matrix printers (Apple, Epson, Okidata, Star, Citizen, Brother, and others). Check to make sure that your printer can download fonts. Several fonts are included with the program, as well as an editor to create truly unique fonts. Since these fonts do not use the printer's graphics mode, printing occurs at full speed, with truly striking results.

Extra K. Then there's *Extra K* ($39.95), for 128K IIc's and IIe's. *Extra K* splits the computer into two 64K machines, taking advantage of the fact that few programs take up more than 64K of RAM. This enables you to have two programs in memory at once; use a full 64K for Applesoft programs and store data in the second 64K; create a RAM disk for storing programs; or use both DOS 3.3 and ProDOS.

Big U. Big U is an invaluable bag of tricks for ProDOS, equally useful for the novice and the advanced user. FAMILY COMPUTING's David Hallerman reviewed *Big U* in the May issue, and he thinks that the *File Mover* program alone is worth $34.95. I agree, although I wouldn't want to give up the 18 new ProDOS commands, either. This program is my Apple II candidate for Bargain of the Year!

Beagle Bag. For kids, there's the Beagle Bag ($29.50), a collection of low-res and text games and tricks that are endlessly entertaining and challenging enough for grown-ups to enjoy. My 9-year-old loves *Hang Person*, my 5-year-old likes to play *Sub Search*, and I like *Text-Train*. This is a classic must for any family Apple computer system.

Beagle Bros software is available from computer stores, mail-order dealers, or direct from the company (3990 Old Town Ave., Suite 102C, San Diego, CA 92110; [619] 296-6400).

Macintosh Wish List. Sorry, Beagle Bros doesn't have any Mac products. But, of course, some other folks do. The first on my list is *Tempo* (Affinity Microsystems, Ltd., 1050 Walnut Street, Suite 425, Boulder, CO 80302; [800] 367-6771). *Tempo* is a desk accessory that creates macros for Macintosh, enabling you to reduce very complex tasks to one keystroke. *Tempo* records mouse movements and keystrokes in the *Finder* as well as inside and between almost any application programs. Because *Tempo* records mouse movements and keystrokes, it is easy to start using right away.

The *BatteryPak* (Batteries Included; 30 Mural Street, Richmond Hill, Ontario L4B 1B5; [416] 881-9941) is a collection of nine powerful desk accessories, including a file-handling utility that allows you to manipulate files from inside an application. That alone is worth the $49.95 price of admission; *BatteryPak* is the hands-down Mac Bargain of the Year.

Click-on. Last, but certainly not least, is the *Click-On Worksheet* (COW) from T/Maker Company (1973 Landings Drive, Mountain View, CA 94043; [415] 962-0195). *COW* is a classic desk accessory that provides a small but highly functional worksheet (including graphics!) inside the Apple menu. It comes complete with several very useful templates, and at $79.95, it presents an attractive alternative to a full-scale spreadsheet program.

CHARLES H. GAJEWAY *can be reached on The Source* (ID: BBQ794).

ATARI

BY JOHN J. ANDERSON

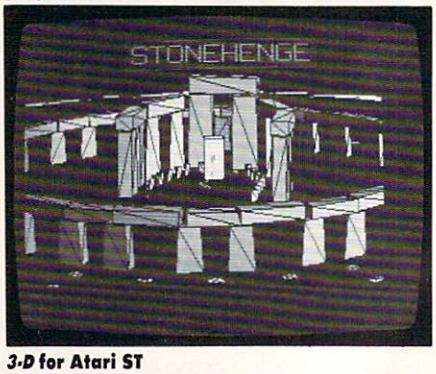
Our leadoff tidbit this month concerns a new piece of software for the ST, from one of the biggies. Microsoft will provide *Microsoft Write* for the ST series. *Write* is based on the popular *Microsoft Word*, for the Macintosh. We are told that *Microsoft Write* will make full use of the powerful monochrome and color graphics capabilities of the ST.

The ST series would certainly benefit from the appearance of a powerful, professional, and bug-free word processor. So far, we've had to tough it out with what's available.

Southern Cal Report. Matthew Stern, a FAMILY COMPUTING contributor, saw *Write* at the Southern California Atari FEST and files this report: "I got to work with *Write* for half an hour. It has almost all the features of the Macintosh version, including multiple documents, footnotes, page layout, and headers and footers. You can even highlight entire lines at a time, just like you can on the Mac version. It doesn't have split screens, and most important, does not yet support fonts and graphics. *Write* is expected to sell for $125 to $150.

"Now, back to you, John."

3D-3D-3D. Have you had a chance to play with *CAD-3D* from Antic Software ([800] 443-0100, ext. 133)? I have, and my problem now is finding a way to stop. The program, written by Tom Hudson (who wrote the magnificent *D.E.G.A.S.* paint package), is a masterpiece in solid modeling *and* in ease of use. In about an hour, you can learn enough to experiment, create, and play for dozens of hours more.



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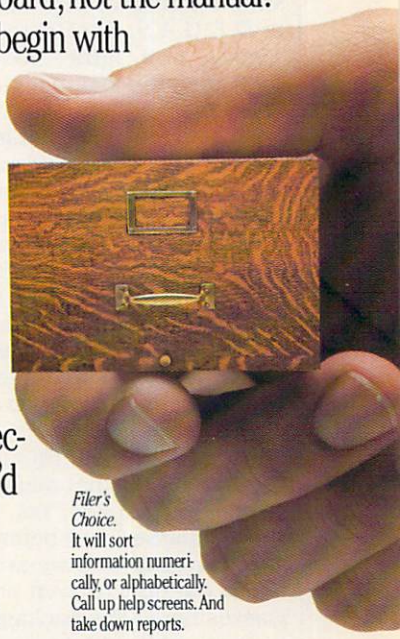

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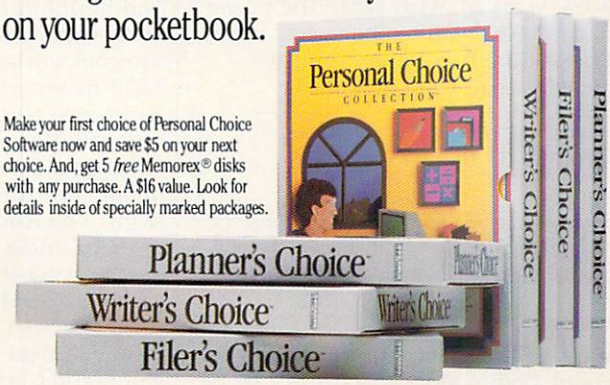

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CIRCLE READER SERVICE 3

MACHINE SPECIFICS

CAD-3D provides powerful tools for creating three-dimensional objects—and for viewing these objects from different angles, distances, and perspectives. In solid and outlined modes, you can control up to four "light sources" and create accurate, automatic shading.

The results are stunning. They can be viewed on a color or monochrome monitor, and saved as entire datasets, individual "objects," or simple screen dumps in *Neochrome* or *D.E.G.A.S.* Special tools act as a "jigsaw" or a "lathe," to make modeling three-dimensional objects a breeze.

The current program offers an animation module, but it necessarily slows in direct proportion to the complexity of the objects it depicts. A demo disk of a new, upgraded animation package (in progress) recently crossed my desk, and it is fantastic. It allows animation at up to 60 frames per second (150 with additional hardware) and packs an amazing amount of data onto a single disk.

The capper to all this is a forthcoming option that allows you to view objects in 3-D. Yes, it requires special glasses, but before you groan, realize that we are *not* talking about red-blue or even polarized glasses here. The package will utilize high-speed liquid crystal-shutter glasses, synched to the video scan of the ST monitor.

Rumor of the month: Our informed sources say there's a new computer coming from Atari in 1987, to be called the 2080 ST. If your first instinct tells you that the 2080 is an ST with twice the power of the 1040, you're absolutely right. The 2080 ST will pack over two megabytes of RAM on board.

JOHN J. ANDERSON *can be reached on CompuServe (*ID: 76703,654*).*

COMMODORE

BY SHAY ADDAMS

Many of the questions you could ask about Commodore machines can be found in a book—the problem is finding the right book. Here's a good list to point you in the right direction.

I Didn't Know You Could Do That with a Computer! includes nearly 200 offbeat programs—from self-hypnosis to managing a hog farm—for the 64 and 128 (COMPUTE! Books; [800] 367-6767; $14.95).

Home Applications and Games for the Commodore 64 (Little, Brown & Co; [617] 227-0730; $14.95) has short BASIC listings for 30 programs-such as a credit card manager and a calorie counter. The *Working C 16/Plus 4* consists of BASIC listings for pie chart graphing and other programs (TriMicro; [800] 826-4859; $14.95).

Printer Problems? Read *The Printer Book* for the C 64/VIC 20 before you shop for a printer. The book is also helpful if you've got a printer and are having interface nightmares or you want to adapt your own programs to work with it (Abacus Software; [616] 241-5510; $19.95). For do-it-yourselfers with disk drive trouble, the *Commodore 1541 Troubleshooting and Repair Guide* offers technical assistance (Sams; [800] 428-SAMS; $19.95).

If you want to learn how to program, look for these books: *BASIC Commodore 64 BASIC* (Hayden; [800] 631-0856; $17.95); *COMPUTE!'s 128 Programmer's Guide* (COMPUTE!; $16.95); or *Elementary Amiga BASIC* (COMPUTE! Books; $14.95). Experienced programmers can consult *The Commodore 128 Programmer's Reference Guide* (Bantam; [212] 765-6500; $24.95), which covers BASIC 2.0 and 7.0 commands, DOS, machine language, CP/M, memory map locations, and other technical data. *The Black Book of C 128* (Value-Soft; [800] 544-SOFT; $15.95 plus $2 shipping and handling) has memory maps and explains BASIC, CP/M, and the internal workings of the 1541 and 1571 drives. *A GEOS Programmer's Reference Guide* will be out in January (Bantam; $19.95).

Amiga Books. Written by a member of the Amiga development team, *The Amiga Programmer's Reference Guide* speaks authoritatively on the subject (Sybex; [800] 227-2346; $28.95). The *AmigaDOS Manual*, prepared by Commodore Amiga's technical staff, covers DOS commands, technical data on the hierarchical filing system, and includes a developer's manual for C and assembly language program development (Bantam; $24.95).

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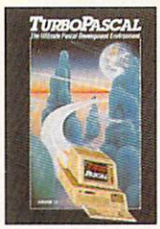
3 

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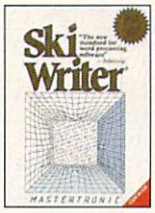
7 

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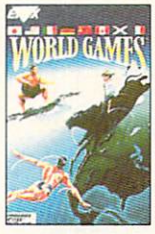
12 

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THE ATARI TEN COMMANDMENTS

IV

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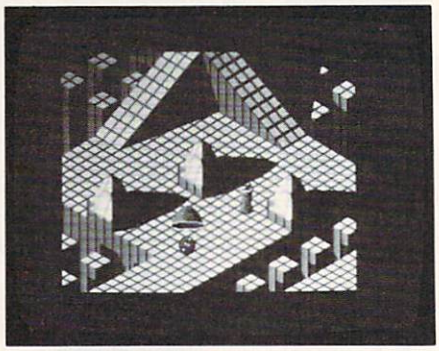
MACHINE SPECIFICS

son, and do I have some recommendations! For the 64/128: *Origin's AutoDuel* (action-style role-playing), *Moebius* (fantasy role-playing), and *Ultima I*, which has finally been converted. SSI also has a good one called *Roadwar 2000*; Electronic Arts' *Amnesia* is a solid text adventure; *Bard's Tale II* is a killer. All of Penguin/Polarware's games are going for $17.95 (64/128) and $29.95 (Amiga)—*Xyphus* and *Oo-topos* are my favorites.



***Marble Madness* for Amiga**

Sports fans will want to check out subLOGIC's *Pure-Stat Baseball*, which incorporates animated graphics with authentic statistics from the 1985 teams and eight classic ball clubs. For the Amiga, Electronic Arts has converted some sharp action games—*Skyfox* and *Archon II: Adept*—as well as an Amiga-only, *Marble Madness*. Their Amiga version of *Adventure Construction Set* is the best one so far. Commodore's *MindWalker* also unfurls brilliant 3-D graphics in an Amiga adventure.

SHAY ADDAMS *can be reached on CompuServe (*ID: 72267,601*) or QuantumLink (*ID: JB CHALMER*).*

IBM

BY PHIL WISWELL

IBM has introduced a new version of its XT personal computer called the PC/XT 286, so named because it uses the INTEL 80286 chip, the same chip at the heart of IBM's PC AT ($5,295). The basic PC/XT 286, which comes with 640K, a 1.2-megabyte floppy-disk drive, and a 20 Mb hard-disk drive, sells for $3,995.

Is it an XT or an AT? That depends on how you look at it. The new computer can power several remote terminals like an AT. And its internal memory can be extended to 12.6 megabytes, also like an AT. But

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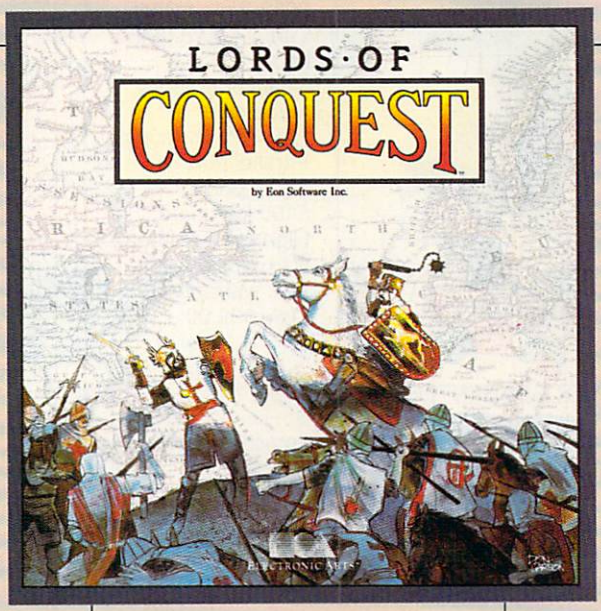

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...a built-in game editor powerful enough to be called a "Strategy Game Construction Set."

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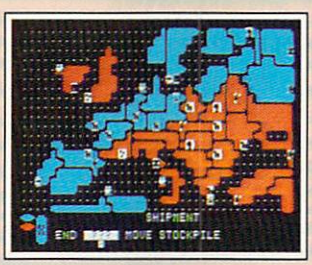

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THE ATARI TEN COMMANDMENTS

V

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CIRCLE READER SERVICE 6

MACHINE SPECIFICS

its 6-megahertz speed, though three times faster than an XT, is not that of an AT (8 megahertz). The PC/XT 286 is positioned between the old XT and the AT, both in price and performance.

How to Use Batch Files. If you aren't familiar with batch files, you don't know what you're missing. They can automate an endless range of tasks. Basically, batch files are lists of commands that you would type one after another. Perhaps the best explanation of a batch file will come by example. Turn on your PC and let's try an easy one.

Create batch files using a word processor without any special formatting, and end each line by pressing ENTER. Name this file REMOVE.BAT (all batch file names must end with the .BAT extension).

Its purpose is to keep you from erasing files by accident with the DOS command ERASE. If you issue the command ERASE *.*, the computer will ask you if you want to erase all files from the disk. Sometimes you might give commands such as ERASE *.DOC to remove all documents from a disk, or ERASE *.BAK to remove all backup files. These commands are useful and very powerful, but unless you have previously asked for a directory, you will not be sure what will be erased. The file REMOVE.BAT changes that.

Use the REMOVE command instead of ERASE or DEL when you want to delete multiple files at once. It will list the files you specified for deletion before they are deleted.

```
ECHO OFF
CLS
ECHO You are removing these files:
DIR %1
ECHO Press CTRL-C if you want to
abort this operation.
ECHO To remove %1.
PAUSE
ERASE %1
ECHO %1 files have been erased.
```

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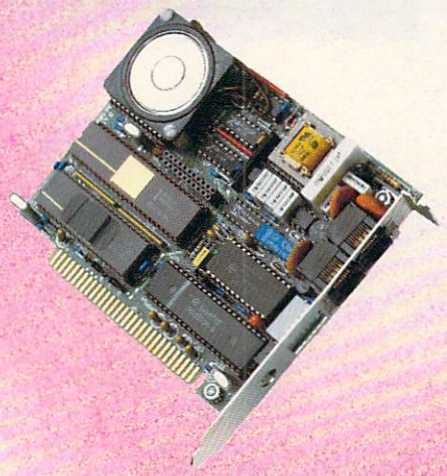

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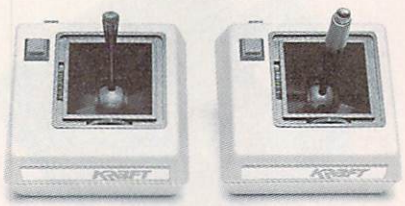

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THE ATARI TEN COMMANDMENTS # VI

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Atari was among the first in the personal computer business to do something for music.

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CIRCLE READER SERVICE 6

MACHINE SPECIFICS

The fourth line lists the files you specify for deletion. If you type REMOVE *.DOC, the list will contain only files with an extension of .DOC. If you type REMOVE *.*, all files on the disk will be listed. The next few lines instruct the user to press the CTRL-C key combination to abort the batch file or to press any key to continue. The next to last line in the file erases the specified files, and the last line reminds you which files were just removed. To use this batch file command, you will type REMOVE *.XXX, replacing the X's with the extension name of the files you want deleted, or REMOVE *.* to erase all files in the current directory.

PHIL WISWELL *is a small-business consultant and computer journalist.*

MS-DOS

BY STEVE MORGENSTERN

Some of the most exciting software releases for IBM PCs and compatibles in the past few years have been memory-resident programs. These useful tools include notepads, calculators, calendars, print utilities, and outline processors.

Unfortunately, users who try to keep several types of memory-resident software loaded at once often find that the programs don't get along well together; they can hang up the system in potentially ugly ways.

Fortunately, there's a new software category—memory-resident programs designed to manage other memory-resident programs.

PopDrop. (Infostructures Inc.; [602] 299-5962; $19.95). One strategy is simply to erase one memory-resident program from RAM to make room for another. This is accomplished neatly by an inexpensive utility called *PopDrop*. You get an easy-to-use program that displays your memory usage on-screen and lets you conveniently remove programs in layers, much like taking cards off the top of a deck.

Referee. *Referee* (Persoft; [608] 273-6000; $69.95) lets you remove memory-resident programs from memory. It also lets you selectively activate or deactivate individual

memory-resident programs (such as a thesaurus) without turning the computer off. You can even configure the system to automatically activate a specific group of memory-resident programs if the application program you are running allows this.

Playtime. (Electronic Arts; [415] 571-7171). Most of the notable new games for the MS-DOS world seem to fit the IBM corporate user image—lots of golf and business simulations. The manufacturer has provided two welcome alternatives to this grey-flannel world view.

Longtime Electronic Arts-watchers may well gasp in amazement at the news that *Starflight* has finally been released. This game was originally promised several years ago, and then mysteriously disappeared.

***Starflight* for IBM compatibles**

Starflight ($49.95) is a game of space exploration, and there's plenty to explore. The game galaxy includes 270 star systems, over 800 planets, and 1.5 billion locations in all (that's right, billion with a "b"). This is not a game you're going to conquer over the weekend.

I'm enjoying my *Starflight* explorations. However, I must admit that I've spent more time with a slightly less thought-intensive Electronic Arts release called *Super Boulder-Dash*. This arcade game, in the *Dig Dug/Lode Runner* tradition, has been a big hit on other computer systems. Hey, just because our computers can run Lotus' *1-2-3*, does that mean we shouldn't have some fun, too?

Incidentally, the game plays well with either keyboard or joystick control, and the $14.95 price makes it a bargain. Thanks, Electronic Arts!

STEVEN MORGENSTERN *can be reached on CompuServe* (ID: 72545,606).

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ORPHANS

BY PATRICK SPERA

Your kids are waiting for the newest cartoon heroes from Santa, and you picked up that item your spouse has been subtly hinting about. Even Rover has a package or two under the tree. But what about your computer? After doing all your dirty work for a year, doesn't it deserve a gift? Here are a few suggestions for those long-neglected "orphan" computers. (I've tried to include the postage in the listed prices.)

Gifts for the TS 1000/1500. Zebra Systems' ([718] 296-2385) selection includes Memotech 32K and 64K RAM packs for $24.95 and $49.95, respectively. RMG Enterprises ([503] 655-7484) will get you into telecommunications with the Byte-Back MD-2B modem for $67 (supplies limited). Markel Enterprises ([718] 627-1293) carries a line of business software including *Invoice Control* and *Financial Record Keeper*. Curry Computer ([602] 978-2902) has Timex 2040 printer paper for $6.95 (three rolls).

TI-99/4A Treasures. A must for your 99 is the Tenex Computer Express "The Everything Book" catalog. These people are not kidding! You can call (219) 259-7051 for more information. Bryght Data ([607] 272-4351) has the CorComp 32K add-on memory cartridge that plugs into the side of the computer. It has a feed-through to allow additional modules to be used. The cost is $99.95. Disk Only Software ([301] 369-1339) markets a 128K RAM card for $195. It can be expanded to 512K and includes a built-in RAM disk and printer spooler routines.

TS 2068 Presents. Knighted Computers ([315] 593-8219) has Spectrum programs that will run on a standard TS 2068. They cost between $13.95-$19.95. Sunset Electronics ([415] 665-8330) carries all the TS 2068 equipment. Call for availability. Zebra (*see TS 1000*) introduces *Sprites 2068*. This manual, which includes a cassette tape, will explain how to create sprite graphics. The cost is $19.95. Russell Electronics ([814] 364-1325) has improved their ROMSWITCH. This device allows your TS 2068 to act like a Sinclair Spectrum and run virtually all Spectrum programs. You will have to open the computer to install the card. It sells for $39.95.

Adam Delights. NIAD Adam User Group ([312] 961-3529) sells the ADAMLink modem for communicating with other computers ($69.95). NIAD also offers a complete line of software and supplies for the Adam. Astro International Inc. ([212] 889-1995) offers the Adam Extension Module #3, which converts ColecoVision into the Adam computer system for $165. Ask for Udy when you call. Alpha-One LTD ([718] 336-7612) has 10 Data Pack tapes for $29. M.W. Ruth Co. ([609] 667-2526) carries Digital Data Drives to fill that blank hole in your Adam. The price is $29.95 (limited supply).

PATRICK SPERA *can be reached on CompuServe* (ID: 76703,4350).

TANDY

BY STEVE MILLER

Nothing pleases most of us like a sale, and Tandy, unlike most other computer companies, has them frequently. An especially good time for a sale is during the holiday season, so Tandy is in the midst of its annual Christmas Sale.

Prices Slashed! Topping the list of holiday goodies is a free CM-5 RGBI monitor (valued at $299.95) with the purchase of either of the new Tandy 1000's, the EX, or the SX. The EX, which is geared for the home and educational markets, retails for $799.

With the introduction of the new Color Computer 3, the CoCo 2's (64K model) price has been cut to $99.95, down from an already reduced price of $159.95. Before the introduction of the CoCo 3, it was $199.95. The cost of a complete CoCo 2 system (minus a television or monitor) is reduced to $499.95. The system includes a 64K Color Computer, disk drive, OS-9 Profile, DMP 105 printer, and cable. The regular price of the package is $714.75.

The 128K CoCo 3 is also on sale. Until Christmas, it's going for $199.95, down from its regular price of $219.95. If you want to add a disk drive, the FD-501 Thinline has been reduced by $100 to $199.95. A similar $100 savings can be had for the DMP 130 printer. It now sells for $249.95.

CoCo Top 10. Sale or no sale, what's a CoCo (or any computer) without software? Since individual tastes and needs vary, it is difficult to make blanket recommendations about what package you might need. I thought, however, that it might be interesting and useful to know the best-selling Color Computer programs. The official Tandy top ten list is as follows: *DeskMate, Color SCRIPSIT, Personal Finance, Color Baseball, Dragonfire, Spectaculator, Flight Simulator I, Color Math, Pyramid, Downland, Dungeons of Daggorath*.

The sharp-eyed among you may have noticed that there are 11 items on the list. "I know that there are 11 programs on the list," chuckled a Tandy spokesperson, "but the last few are so close in sales that we decided to throw in an extra one."

There will be some new programs for the CoCo 3 available soon. *DeskMate 3, OS-9 Level II, Color SCRIPSIT II, Color File II* and *TSSpell* are definitely on the way. It's safe to assume that many of the current CoCo 2 packages (which will run on the CoCo 3 in the CoCo 2 mode) will be upgraded to take advantage of the CoCo 3's expanded capabilities.

Catalog Shopping. Before becoming interested in computers, I was not much for catalog shopping, but I now pore over them trying to decide which new gadget or program will make my computing life easier, more powerful, and more fun. Unfortunately, most computer catalogs are geared toward a narrow, technical audience. Few catalogs appeal to the whole family.

Tandy is one of the exceptions. In addition to the main catalog featuring all Tandy's computers and peripherals, two other catalogs list most of the software available through Tandy Computer Centers. All three publications—the *Tandy Computer Catalog*, the *Radio Shack Software Reference Guide*, and the *Radio Shack Educational Software Reference Guide*—are available free of charge through any Radio Shack Store or Computer Center. The only problem is that the catalogs have been out since late summer, and they rarely last long in the stores.

STEVE MILLER, *former computer columnist for UPI, is a freelance writer and computer consultant.*

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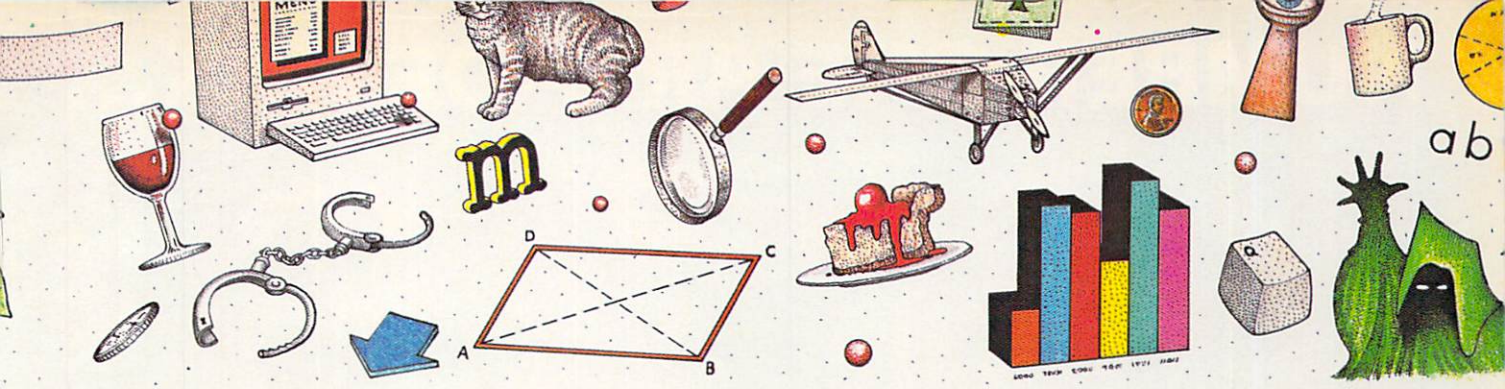

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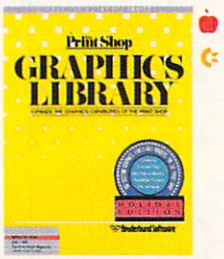

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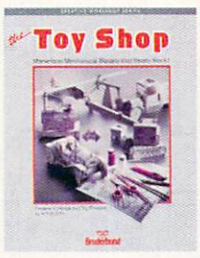

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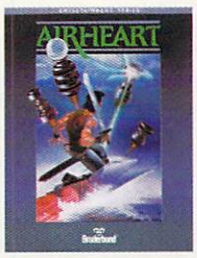

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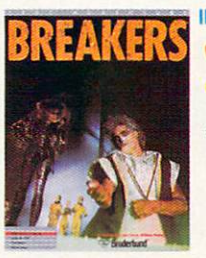
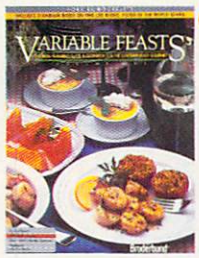


The Lau people have a slight problem. Out of control social misfits called Breakers. Help!



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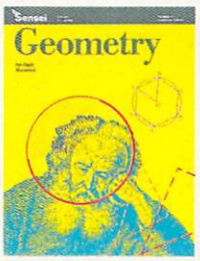

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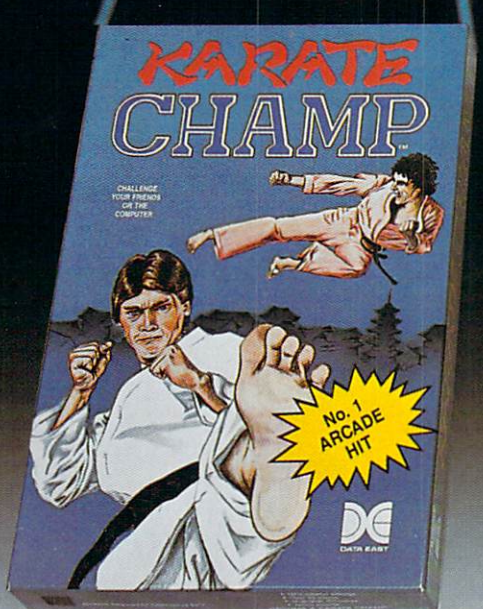

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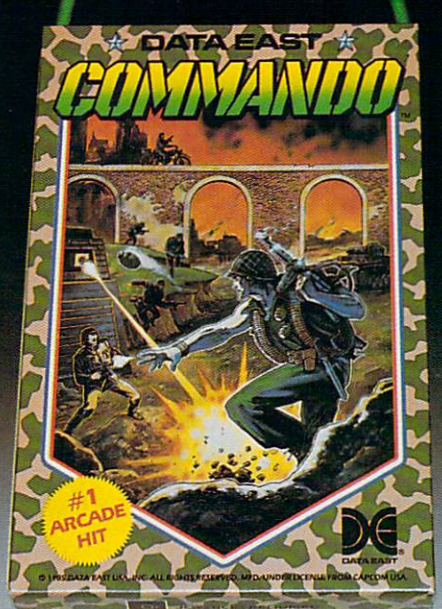

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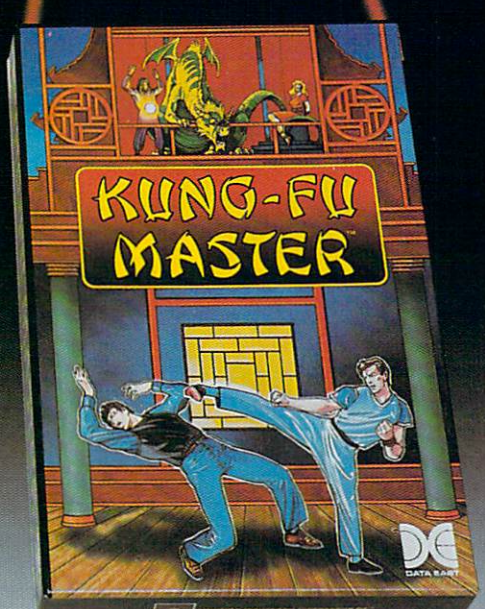

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3rd ANNUAL BEST-EVER SHOPPING GUIDE

At least once this month, you're likely to step into a computer store in search of a gift for a fellow computer enthusiast—or for yourself. To help you make the best buying decisions, FAMILY COMPUTING has compiled the "3rd Annual Best-Ever Shopping Guide."

Now a holiday tradition, our Shopping Guide is chock-full of gift ideas, hardware recommendations, and special bargains. Flip through "The Perfect Holiday Gift," a medley of gift ideas, priced from a dollar to more than $1,000. We've included the festive, the witty, the academic, the off-beat, the practical, and the extravagant. Also, check out "Best Hardware Picks of '86," our editors' roundup of top-rated hardware and great deals. And don't miss "Seasonal Software Specials," where we tell you about some great software deals we've found—such as manufacturer rebates and discounts.

In the following pages, there's something perfect for everyone—from the first-time user to the experienced programmer . . . just right for the executive or the student . . . suitable for all budgets. Happy Holidays!

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BY BERNADETTE GREY

3rd ANNUAL BEST-EVER SHOPPING GUIDE FOR YOUR WHOLE FAMILY

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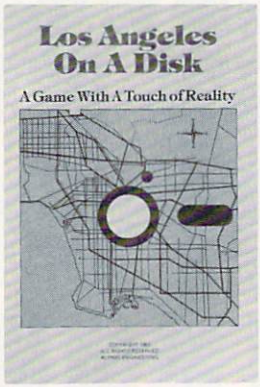
Micro Cookbook Busy cooks will savor this cooking treasure, a program filled with favorite recipes, cooking tips, and nutritional information. $50. For the Apple II series and IBM and compatibles. From Pinpoint Publishing, P.O. Box 133233, Oakland, CA 94661; (415) 654-3050.

Los Angeles On a Disk Add to your family's traveling know-how with a trek through Los Angeles to 300 authentic points of interest. To survive in this text/graphics adventure game, stop for food, entertainment, culture, sleep, and other needs. For 256K IBM PC AT and compatibles. $40 plus $2 for shipping and handling. From Klynas Engineering, P.O. Box 1666, Simi Valley, CA 93062; (805) 583-1029.



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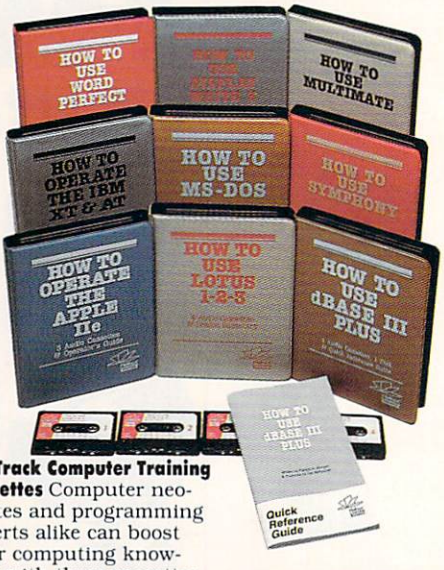
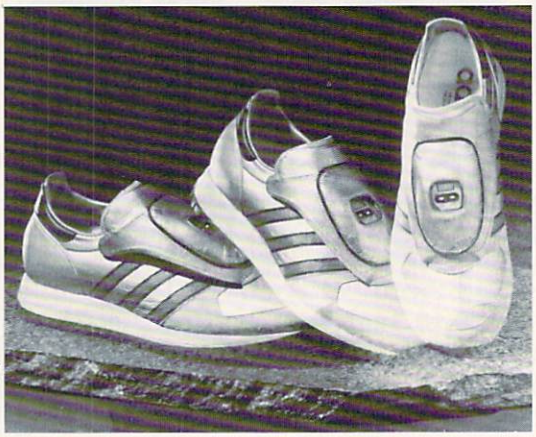


FlipTrack Computer Training Cassettes Computer neophytes and programming experts alike can boost their computing know-how with these cassettes. Pop 'em into a cassette player for up to 24 courses on specific computers, operating systems, and software. $40-$140. From FlipTrack Learning Systems, 999 Main St., Suite 200, Glen Ellyn, IL 60137; (800) 222-FLIP; (312) 790-1117 in Illinois.

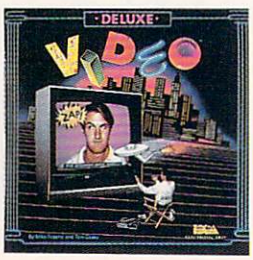


Micropacer NL A perfect gift for the fitness-minded. These computerized running shoes calculate distance, time elapsed, average pace, and calories burned. $110 for nylon/leather sneakers or $125 for all-leather. Adidas, 200 Sheffield St., Suite 300, Mountainside, NJ 07092; (201) 789-9292.

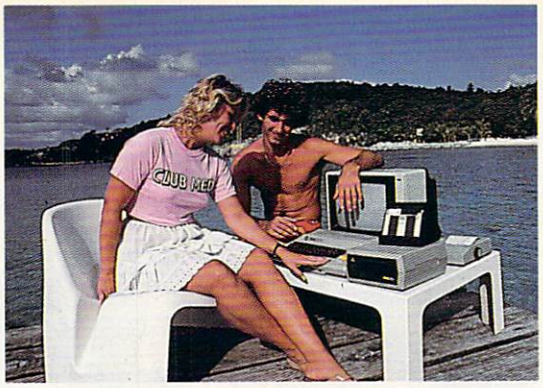
Yamaha CX5M Music Computer Foot-tapping, instrument-playing, and music-loving families will sing for joy when they find the Yamaha computer under the Christmas tree. Creates same tones as some of the company's synthesizers. Compose, play, and learn about music. $469. From Yamaha International Corporation, P.O. Box 6600, 6600 Orangethorpe Ave., Buena Park, CA 90620; (714) 522-9011.

The Computer Book Club Sign up the family to discover programs, projects, and other ways to use your computer. Select five books for only $3 and get two free gifts. For more information, write: The Computer Book Club, P.O. Box 40, Blue Ridge Summit, PA 17214; (717) 794-2191.

Blue Chip Personal Computer Looking for an inexpensive IBM PC XT clone? Need a business machine at home? This $700 IBM-compatible comes with one disk drive, 256K of memory (expandable to 640K), serial and parallel ports, monochrome and RGB ports (but no monitor), and MS-DOS. From Blue Chip Electronics, Inc., 7305 West Boston Avenue, Chandler, AZ 85226; (602) 961-1485.



DeluxeVideo Create videos on your Amiga and then play them back. Here's a program that's guaranteed to turn the whole family into video fanatics. $100. From Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404; (415) 571-7171.



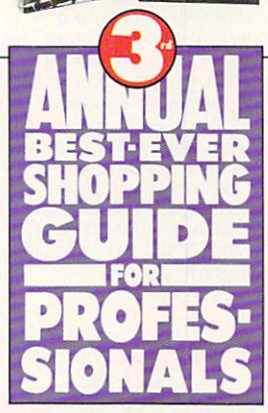
Club Med Computer Workshops For some computing fun in the sun or the snow, treat the family to a Club Med vacation. There are 23 Club Med resorts with computer centers, eight in the Western Hemisphere. For prices and other information, contact: Club Med, 40 West 57 Street, New York, NY 10019; (800) CLUBMED.

Jingle Disk and **Holiday PrinterPaper** Your computer can double as an elf and help you prepare for the holiday festivities. *JingleDisk* is a holiday card maker and animated greeting disk, and Holiday PrinterPaper is a computer paper and sticker package. $10 each. From Hi Tech Expressions, 2699 South Bayshore Drive, Suite 1000A, Coconut Grove, FL 33133; (800) 848-9273; (305) 854-2318 in Florida.

Ho! Ho! Ho! Five Family Christmas Games Romp through Christmas games with this spirited stocking stuffer. Corral Santa's reindeer, decorate cookies, kick around gift-wrapped presents, light the North Pole Christmas Tree, and get Santa on television. For Apple II Plus/IIe/IIc and Commodore 64/128. $10. From Random House Electronic Publishing, 201 East 50th St., New York, NY 10022; (212) 751-2600.

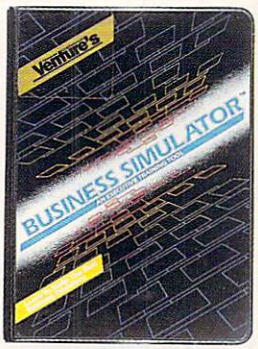
1987 Computer-Term-A-Day Calendar Improve someone's computer literacy every day in 1987. New computer lingo is sure to impress business peers, friends, and other family members. $8. From Antioch Publishing Company, 888 Dayton St., Yellow Springs, Ohio 45387; (800) 543-2397; (513) 767-7379 in Ohio.

Elephant CRT Screen Cleaning Kit Keep the family computer looking and feeling good. This $9 kit includes one spray pump bottle of CRT Terminal Cleaner and 50 lint-free clothes. From Dennison Manufacturing Company, Dennison Carter's Division, Framingham, MA 01701; (800) 343-8413; (617) 890-6350 in Massachusetts.



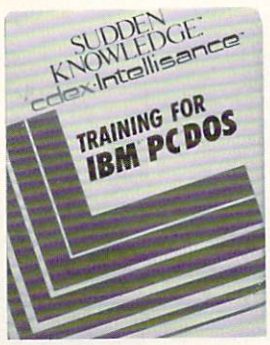
Compu-IREX VDT Glasses For a professional who spends his or her day staring at a computer terminal. These glasses, made of plastic, with lightweight lenses, promise to reduce eye strain and general visual fatigue. $65. From Bollé America Inc., 3890 Elm Street, Denver, CO 80207; (800) 22-BOLLE; (303) 321-4300 in California.

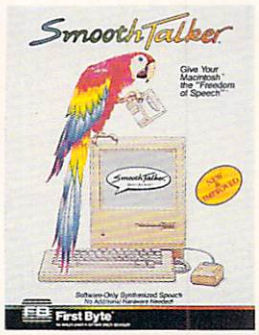
RainbowPak Color computer paper will help an executive's communication stand out, both inside and outside of the office. Available in nine colors. Three hundred sheets in three different colors cost $15. From Eastern Software Distributors, Inc. 3904 Hickory Ave., Baltimore, MD 21211; (800) 638-7563; (800) 492-2141 in Maryland.



Venture's Business Simulator Put an aspiring entrepreneur behind the President's desk of a start-up company and give him or her the chance to turn it into a multinational corporation. An executive-training program that helps develop business and management skills. Runs on 256K IBM PC/XT/AT and compatibles. $100. From Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404; (415) 571-7171.

Sudden Knowledge Training Programs Seminars on disk—lessons in areas ranging from learning how to use your computer to learning Lotus' *1-2-3*. $50-$200. CDEX-Intellisance Corporation, 1885 Lundy Avenue, San Jose, CA 95131; (800) 982-1213; (408) 263-0430 in California.





SmoothTalker Speech-synthesis software that gives the Macintosh a voice. Professionals can use to proofread letters, memos, and reports and verify data and numbers. $100. From First Byte, Inc., 2845 Temple Ave., Long Beach, CA 90806; (213) 595-7006.

Business Card Holder Add hi-tech charm to the desk of an executive turned computer hobbyist. Made of leaded glass, this one-pound card holder costs $29 plus $2 for shipping and handling. Available from Sweet Gum, Inc., 15490 NW Seventh Avenue, Miami, FL 33169; (800) 237-9338; (305) 687-9338 in Florida.

Diconix 150 Printer For the traveling executive who works on the go. This four-pound, battery-powered printer can work on trains, planes, and buses, or travel between home and work. $479. Diconix, A Kodak Company, 3100 Research Boulevard, Dayton, OH 45420; (513) 259-3100 or (800) DICONIX.

3rd ANNUAL BEST-EVER SHOPPING GUIDE FOR STUDENTS

Data Hi-Liter Fluorescent may not be *in* for today's fashion-savvy, but computer-savvy students think day-glow Hi-liters are right on the mark. Students can study for tests by highlighting computer printouts in yellow, green, blue, or pink. $1. From Dennison Manufacturing Co., Dennison Carter's Division, 300 Howard Street, Framingham, MA 01701; (617) 879-0511.

Workcenter Series 710 This hickory-grain work center will eliminate computer clutter. Priced at $544.75. Pieces also available separately. From O'Sullivan Industries, Inc., Nineteenth and Gulf Streets, Lamar, MO 64759; (417) 682-3322.

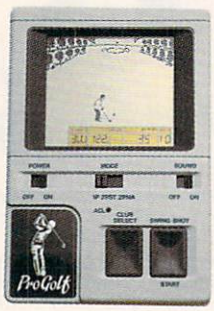
Spartan Upgrades a Commodore 64 to an Apple II Plus and provides students access to a wealth of educational software. This peripheral lets you use Apple II Plus peripherals and software, while retaining existing C 64 system. $299. From Mimic Systems, 18027 Highway 99, Building A, Suite I, Lynnwood, WA 98036; (800) 663-8527; (206) 775-4302 in Washington.

Homeworker Will help both the organized and disorganized start off the new year better prepared than in 1986. Includes a word processor, outliner, calendar, calculator, flash-card maker, grade keeper, student-organizer notebook, and study-skills book. $90. For Apple IIe/IIc. Davidson & Associates, Inc., 3135 Kashiwa Street, Torrance, CA 90505; (800) 556-6141 or (213) 534-4070.

Ticket to Paris Your favorite French student can dazzle the whole class with the culture picked up from this program. Takes users on a simulated jaunt through Paris. For ages 14 and up. Available for 128K Apple IIe/IIc, C 64/128, and IBM PC/PC*jr* and compatibles. $30-$40. From Blue Lion Software, Box 650, Belmont, MA 02178; (617) 489-2477.

3rd ANNUAL BEST-EVER SHOPPING GUIDE FOR GAME LOVERS

ProGolf Golf lovers can play any time and any place with this computer-animated calculator-size 18-hole course. $69. From The Sharper Image, 650 Davis Street, San Francisco, CA 94111; (800) 344-4444.

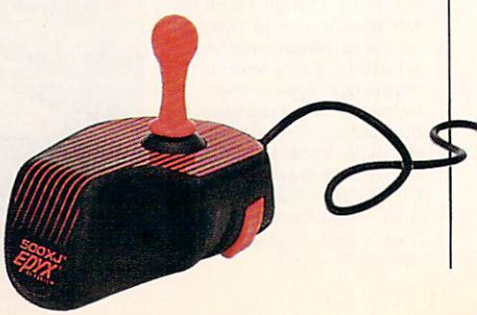


SciSys Turbo Chess Computer Promises to beat 92 percent of the world's chess players. A 16K computer with 17 levels of play—perfect for the avid chess player. $159. From The Sharper Image, 650 Davis Street, San Francisco, CA 94111; (800) 344-4444.

Computer Backgammon Challenge a backgammon player to countless matches. Here's a 4K battery-operated backgammon-playing computer. $69. From The Sharper Image, 650 Davis Street, San Francisco, CA 94111; (800) 344-4444.

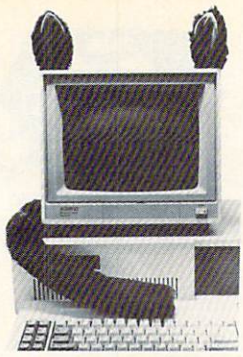
Sega Master System Thrill a game player—and get back your computer—with a hardware and software video game ensemble. $150. From Sega of America, Inc., 2149 Paragon Drive, San Jose, CA 95131; (408) 435-0201.

Epyx 500XJ The perfect present for the gamer in your life is a gift that promises precision. A joystick fits in the palm of the hand, and sensitive electronic microswitches let user hear as well as feel each move of the stick. Available for the Amiga, all Atari computers, C 64/128, and VIC-20. $16-$20. From Epyx, Inc., 600 Galveston Drive, Redwood City, CA 94063; (415) 366-0606.

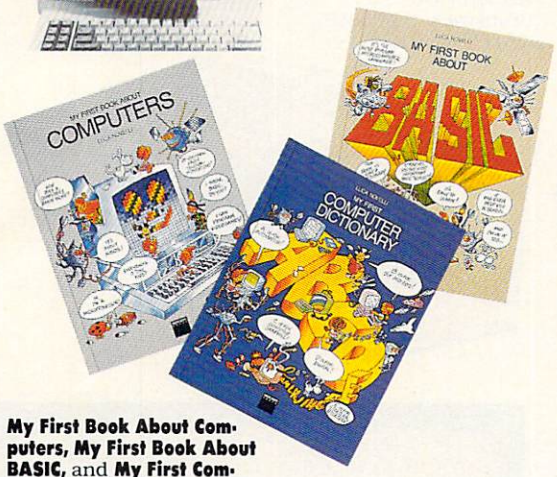


PHOTOGRAPHS COURTESY OF THE SHARPER IMAGE

3rd ANNUAL BEST-EVER SHOPPING GUIDE FOR CHILDREN



P.C. Beast This "furipheral," whose ears and tail attach to any monitor with Velcro, livens up any computer workspace and helps children shake off a beastly image of computers. $15. From Fundamental Design Group, 154 Magazine Street, Cambridge, MA 02139; (617) 354-5715.

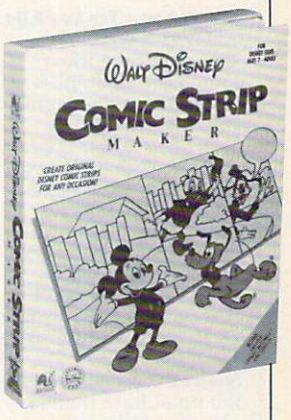


My First Book About Computers, My First Book About BASIC, and **My First Computer Dictionary** Introduce children (ages 10-12) to the fascinating world of computers with these three 64-page books. $10 each. From Microsoft Press, Box 97017, Redmond, Washington 98073; (800) 683-3030; in Maryland, call collect: (301) 824-7300.

Mouse-House A cuddly creature for the perplexed youngster who doesn't see the resemblance between a computer mouse and the real thing. This mouse cover fits snugly over any mouse. $8. From American Covers, Inc., 9192 South 300 West, Sandy, UT 84070; (800) 228-8987.

PartyWare, CardWare, HeartWare, WareWithAll Four different products you're sure to love. *HeartWare* and *CardWare* are animated greeting disks that print; *PartyWare* is a card and party design kit and a data base; and WareWithAll is a paper supply kit. Priced between $10 and $15. From Hi Tech Expressions, Inc., 2699 South Bayshore Drive, Suite 1000A, Coconut Grove, FL 33133; (800) 848-9273; (305) 854-2318 in Florida.

Paper Models: The Christmas Kit Have the best-dressed Christmas tree in the neighborhood. Contains all the tools needed to create three-dimensional Christmas ornaments and decorations. For Apple II series, IBM PC/PC*jr*, Macintosh, Tandy 1000, and C 64/128. $25-$30. From Activision, Inc., 2350 Bayshore Parkway, Mountain View, CA 94043; (415) 940-6044.

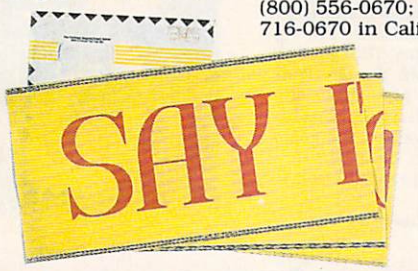


Walt Disney Comic Strip Maker Create comic strips using favorite Disney characters with inventive software. $40 (Apple II series), $30 (Commodore 64/128). From Bantam Electronic Publishing, 666 Fifth Avenue, New York, NY 10103; (800) 223-5870; (212) 765-6500 in New York.

Capsela 5000 Children 9 and up can create all kinds of fascinating motorized land and water toys with this remote-control, motorized construction system. Has 17 different functions, including beeping sounds, multi-colored lights, and a memory capacity of 94 commands. $120. Play-Jour Inc., 200 Fifth Avenue, Suite 1024, New York, NY 10010; (212) 243-5200.

Computer Camp Mix traditional summer fun with computer science at Marist College's Computer Camp. Offers two-week residential camps for ages 8-17 for $950 (includes room and board, instruction, materials, computer and laboratory use, activities, and accident insurance). Contact: Director, Computer Camp, Marist College, Poughkeepsie, NY 12601; (914) 471-3240, extension 345.

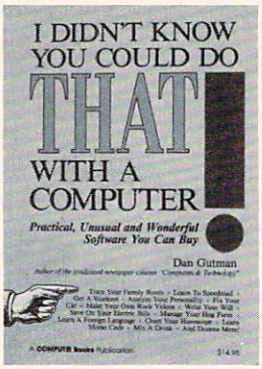
GiganticGram Send special friends holiday greetings in a big way. Computer Greetings Corp. will create and mail whatever message you wish on 15-foot banners. $8 plus $1 for shipping and handling. From Computer Greetings Corp., 22019 Vanowen Street, Suite K, Canoga Park, CA 91303; (800) 556-0670; (818) 716-0670 in California.



3rd ANNUAL BEST-EVER SHOPPING GUIDE FOR FRIENDS

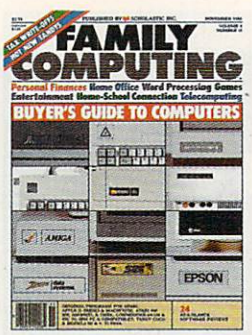
Print 'n Wear! Transfer Paper You can buy this iron-on transfer paper to make customized T-shirts, tote bags, aprons, and other gifts for your friends. To get started, all you need is a dot-matrix or thermal-ribbon printer and a graphics program or Koala Pad. A four-pack costs $9 and a 10-pack costs $20. Foto-Wear!, Inc., 62 Herbert Drive, East Brunswick, NJ 08816; (201) 257-6549.

I Didn't Know You Could Do That With A Computer! Know someone who doubts the usefulness of computers in the home? Treat that cynic to *I Didn't Know You Could Do That With A Computer!*, by Dan Gutman. An entertaining guide to more than 200 offbeat and unusual programs. $15. From Compute! Books, P.O. Box 5038, FDR Station, New York, NY 10150; (800)346-6767.

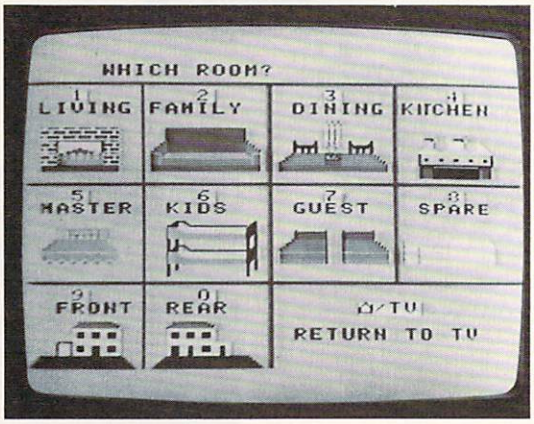


PetSter Know someone who's allergic to animals, has a grumpy landlord, or is just too busy for pets? A robotic cat, which purrs and locates its master, substitutes for the real thing. $40-$100. From Axlon, Inc., 1287 Lawrence Station Road, Sunnyvale, CA 94089; (408) 747-1900.

Family Computing magazine You must have friends who *should* be subscribing. Holiday gift subscriptions are available for $15.97 for the first one-year order and only $9.97 for each additional gift. Plus, there's a free FAMILY COMPUTING tote bag for you with your paid order of two or more subscriptions. Use gift subscription order form in this magazine. FAMILY COMPUTING, Scholastic Inc., P.O. Box 2508, Boulder, CO 80321; (800) 525-0643.



X-10 Powerhouse System Bring futuristic friends into the age of the Jetsons with this home-control device. Used with a computer, it saves energy and keeps homes secure by controlling lights and appliances. $70-$80 (for controller, cable, and software). Available for the Apple IIe/IIc, Commodore 64/128, IBM PC and compatibles, and Macintosh. From X-10 (USA) Inc., 185A Lagrand Ave., Northvale, NJ 07647; (800) 526-0027; (201) 784-9700 in New Jersey.



GEnie Families with modems can telecommunicate without breaking the bank. The hourly fee during non-prime time (6 p.m. to 8 a.m. weekdays; all times on weekends) is only $5; prime-time costs soar to $35. Sign someone up for just $18. Call or write: General Electric Information Services Co., 401 N. Washington St., Rockville, MD 20850; (800) 638-9636.

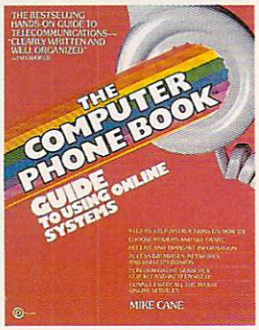
CompuServe Information Service Any telecommunicator would be grateful for a gift membership to this popular on-line service. Sign-up fee is $40. On-line costs run between $6 and $24.50 an hour. Contact: CompuServe, P.O. Box 20212, 5000 Arlington Center Blvd., Columbus, OH 43220; (800) 848-8199.

3rd ANNUAL BEST-EVER SHOPPING GUIDE FOR TELE-COMMUNICATORS

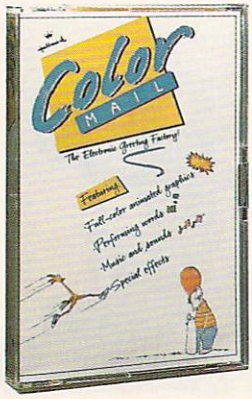
PlayNET A Commodore 64 owner would flip over a gift membership to PlayNET communications network. Costs $10 to join, $12 monthly, plus $2.75 an hour. Write or call: PlayNET Inc., 105 Jordan Road, Troy, NY 12180; (800) PLAYNET.

American Open University This electronic college, accessible by modem, offers individual classes for the non-matriculated, as well as three bachelor's degrees. Tuition is $145 a credit for residents of Long Island and New York City and $85 a credit for others, plus a $25 communications fee per on-line course. Contact: New York Institute of Technology, Central Islip, NY 11722; (800) 222-6948 or (516) 348-3300.

The Computer Phone Book: Guide to Using Online Systems Will help inexperienced telecommunicators learn the ropes of on-line communications. Author Mike Cane offers a comprehensive step-by-step guide into the hows, whys, and wheres of telecommunications. $15. New American Library, P.O. Box 999, Bergenfield, NJ 07621; (201) 387-0600.



Hallmark Color Mail Flamboyant characters on CompuServe would appreciate flashy holiday greetings. Send electronic messages to far-away friends, complete with graphics, sound, and music. $30. For more information, type GO COLORMAIL or contact Hallmark Cards, Inc., Hallmark Color Mail, 2440 Pershing Road, Suite G-40, Kansas City, MO 64108;(816) 274-4416.



(For other gift ideas for telecommunicators, check out "1986 in Review" in this month's Telecomputing column.)

BERNADETTE GREY *is* FAMILY COMPUTING*'s associate editor.*

If software is on your holiday wish list, check out these great deals and special offers that will knock your Christmas stockings off the mantle!

3rd ANNUAL BEST-EVER SHOPPING GUIDE

And, if you don't see something here that strikes your fancy, ask your local software dealer for details on other seasonal offerings.

SEASONAL SOFTWARE SPECIALS

BY KAREN KANE

COMPANY	PURCHASE REQUIRED	OFFER/VALUE	OFFER EXPIRES
Activision 2350 Bayshore Parkway Mountain View, CA 94043 (415) 940-6044 (800) 227-9759	None*	Coupon book available for $5-$10 rebates on software from Infocom, Electric Dreams, Gamestar, Personal Choice, and Activision	8/31/87
Adept Computers 5900 Sepulveda Blvd. Suite 550 Van Nuys, CA 91411 (818) 501-4798	*PhraseStar* (*WordStar* upgrade with 70 new commands, keyboard macros, additional printer support)	Reduced to $49 from $75	1/31/87
Aldus Corp. 411 First Ave. South Suite 200 Seattle, WA 98104 (206) 622-5500	*PageMaker*	Trip for two to Venice to winner of the *PageMaker* 1986 design competition. (Minimum $3,000 value)	12/31/86
Computer Easy 414 East Southern Rd Tempe, AZ 85282 (602) 829-9614	Any title purchased by mail order at regular $19.95 price. Call or write for catalog	Reduced prices on additional mail-order purchases ($10-$40 value)	1/31/87
Davidson & Associates, Inc. 3135 Kashiwa St. Torrance, CA 90505 (213) 534-4070	Apple or IBM version of *Algae-Blaster!*	Coupon enclosed for $5 rebate	4/30/87
	Speed Reader II	Coupon enclosed for free *Speed Reader II* Data Disk ($20 value)	one year from time of purchase with coupon, receipt, and warranty card
Electronic Arts 1820 Gateway Drive San Mateo, CA 94404 (415) 572-2787	Any of 14 popular titles (including *Music Construction Set*, *Julius Erving and Larry Bird Go One-On-One*, and *Archon*) *	Reduced to $14.95 ea. from $40	permanent (new price)
Epyx Computer Software 1043 Kiel Court Sunnyvale, CA 94089 (415) 366-0606	*World Games* and one other title from *Games* Series (*Summer Games*, *Summer Games II*, or *Winter Games*)	Receive third title from *Games* Series free ($40 value)	1/30/87
	Any three sports games (*World's Greatest Football*, *World's Greatest Baseball*, *Championship Wrestling*, *Super Cycle*, and *World Karate Championship*)	Free basketball, football, or soccer ball from Wilson Sporting Goods Co. ($17-$20 value)	1/15/87
Haba Systems/ Arrays Inc. 6711 Valjean Ave. Van Nuys, CA 91406 (818) 994-1899	Any of 40 selected software and book titles *	50 percent off	1/1/87
MECA 285 Riverside Ave. Westport, CT 06880 (203) 222-9087	December issue of FAMILY COMPUTING	Coupon enclosed for free *Managing Your Money* demo ($10-$20 value)	2/1/87
Microcomputer Games, Inc. 4517 Hartford Road Baltimore, MD 21214 (301) 254-9200	*Super Sunday*	Coupon enclosed for $5 rebate on *Season* update disk	none
	Tournament Golf	Coupon enclosed for $5 rebate on *Course* expansion disk	none
	Under Fire!	Coupon enclosed for $5 rebate on *Extended Units* and *Campaign* disk	none
	Computer Statis Pro Baseball	Coupon enclosed for $5 rebate on *Season* expansion disks	none
Mindscape Inc. 3444 Dundee Road Northbrook, IL 60062 (312) 480-7667	Any one of 10 specified titles (including *The American Challenge: A Sailing Simulation*, *Deja Vu*, and *Bank Street Music-Writer*)*	Receive a free 6-month subscription to FAMILY COMPUTING, *AmigaWorld*, or *MacUser* ($12-$24 value)	12/15/86
Sir-tech Software, Inc. 323 Washington St. Ogdenburg, NY 13669 (315) 393-6633	*Rescue Raiders*	Get one title free (*Galactic Attack*, *Star Maze*, or *Crypt of Medea*) ($30-$35 value)	12/31/86
Software Publishing Corp. 1901 Landings Drive Mountain View, CA 94043 (415) 962-8910	*PFS: First Choice*, an integrated word processor, spreadsheet, file manager, and communications package	Reduced to $149 from $199	12/31/86
	Click Art Personal Publisher	Also receive the *Holidays Image Portfolio* ($50 value)	12/31/86

*Contact the manufacturer or your local software dealer for complete details.

'TIS THE SEASON TO MAKE LISTS: BEST HARDWARE & BEST DEALS

3rd ANNUAL BEST-EVER SHOPPING GUIDE

1986 EDITORS' PICKS

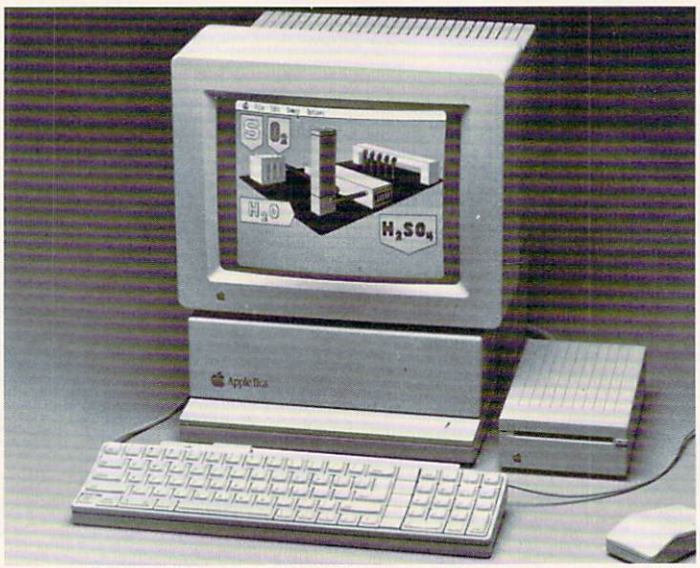
Picking the best products of the year is like picking the best college football team of the year. Each pollster (whether a coach, fan, or sportswriter) has a bias; each compares apples and oranges, and the result displeases everyone except the winner.

But, what can be done? It's the nature of humankind (genus Americanus) to make lists, especially at this time of year. And so, like the pigskin pundits who proffer prognostications, we have made our computer picks, given them a strong defense, and we now await the pies that are winging toward our faces. (Double the whipped cream and flavor with cognac—please!)

BEST HARD-WARE

These products, all introduced in 1986, have already distinguished themselves in the marketplace—because of their price, quality, innovation, or usefulness.

BEST OF 1986 COMPUTER



Apple IIGS

Apple Computer, Inc.
$999 (256K)

The new Apple IIGS reminds me of a talented young athlete whose amazing *potential* alone causes outstanding excitement. Apple has delivered a super high-res, 4,096-color graphics system, with built-in 15-voice sound capabilities, a Mac-like mouse interface, and room for megabytes of memory. All these factors promise delightful software to come. Although we have not seen any GS-specific software (only older products enhanced for it, such as *AppleWorks 2.0* and an improved *MouseWrite*), Apple Computer's strength almost assures wide support from publishers.

The Apple IIGS is the *child* of a great athlete, too, which makes it an immediate winner. The IIGS already runs almost all Apple II software—more than 90 percent, according to Del Yocam, chief operating officer of Apple. When you consider only more recent packages designed for the current IIe and IIc machines, compatibility approaches 100 percent. And it runs the older software about three times faster! Hardware compatibility has also been maintained. You can continue to use your older parallel or serial cards, disk drives, composite color or monochrome monitor, joysticks, and so on.

The IIGS control panel, burned into the machine's ROM, indicates some of the sophisticated features we can expect to see in forthcoming software. You make choices off a menu using the arrow keys, ESC, and RETURN, selecting separate elements such as text, background, and border colors from a palette of 15 hues. Internationalists can choose a screen display with special characters from eight different languages, such as French, Spanish, and German. Other control panel selections include a RAM disk, a built-in clock, and slide controls for the sound generator's volume and pitch.

The basic Apple IIGS sells for $999; it includes the CPU, 256K RAM, a detached keyboard, and a mouse. The AppleColor RGB Monitor (almost a requisite for great graphics) goes for $499. You can upgrade your older Apple IIe to the IIGS for $499. While the price for a full system is steep, we expect it to decline over the coming year.

To offer such promising potential in graphics and sound, yet to maintain compatibility with the great array of Apple II products already out there, was a great feat that no other computer manufacturer has attempted with a first-generation (8-bit) machine. —DAVID HALLERMAN

BEST OF 1986
PORTABLE

Toshiba 1100 Plus

Toshiba America Inc.
$1,999 (256K)

Toshiba's new 1100 Plus combines the best elements of many other machines on the market. It's small (10 pounds), battery-operated, runs MS-DOS software, and has a clear screen display. And it's every bit as attractive and well made as Toshiba's well regarded printers and video equipment.

The 1100 Plus has an LCD screen that is quite readable and displays a full 80 x 25 screen. In the past, hard-to-read LCD screens have been the Achilles heel of many portables. The computer comes with 256K memory (or 640K), two 3.5-inch 720K floppy drives, a clock/calendar, serial (for a modem) and parallel (for a printer) ports, and RGB and composite video outputs, so you can hook up regular-size monitors when not traveling. Or, you could use the Toshiba primarily as a desktop computer and dismantle it for an occasional weekend trip. A carrying case is included.

The Toshiba will operate on its built-in rechargeable Ni-Cad battery for up to eight hours, making it useful for working on the go, and it's small enough to integrate easily into the most cramped work spaces. The Toshiba comes with MS-DOS 2.11, manuals, a one-year warranty, and is backed by an Exceptional Care program that provides overnight replacement of a failed computer.

Assuming you want a portable IBM compatible, the main drawback to the Toshiba is the current difficulty of finding software in the 3.5-inch disk format. Many of the big business software titles are now being transferred, but educational or entertainment software probably won't be for some time. Toshiba offers a Floppy Link ($199) option that permits disk copy and file transfer between the 1100 Plus and a 5.25-inch disk drive. While this disk format problem is a slight nuisance, it is the price you pay for being one step ahead of the crowd. —CHARLES H. GAJEWAY

BEST OF 1986
PRINTER

Toshiba P-321

Toshiba America Inc.
$699

The Toshiba P-321 is a 24-pin dot-matrix printer that produces beautiful text. Like other 24-pin printers, the Toshiba can deliver letter-quality text in one pass of the printhead, unlike the double pass that older printers required for "correspondence" mode. Three type fonts are built in, and others can be added with a cartridge ($69) or by downloading them from a disk ($35-69). (To download fonts you need an additional board, [$89]).

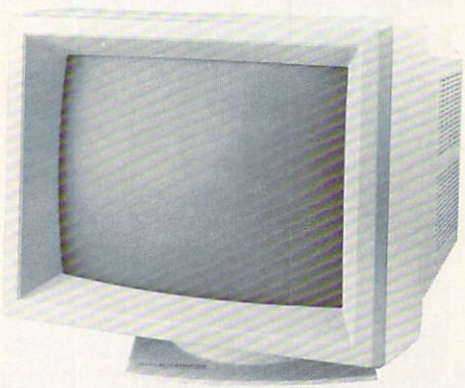
The Toshiba—which is sturdy and attractive—prints at 180 characters per second (cps) in "high-speed" mode, and 80 cps in "high-quality" mode. Only the most discerning eyes will be able to distinguish this from a letter-quality type. The high-quality mode is a bit noisy, but the results are worth it.

The optional tractor-feed mechanism ($99) makes loading continuous-form paper easy. You can also print single sheets, using the friction feed mechanism. A cut-sheet feeder that continually feeds single sheets is available as an option ($219). If your software doesn't have a Toshiba printer on its configuration menu, you can choose the Qume or Diablo configurations. The P-321 is available with a parallel or serial interface, or both. —NICK SULLIVAN

BEST OF 1986
MONITOR

NEC Multi-Sync Monitor

NEC
$899



Up until now, switching from one computer to another, or upgrading your video interface, meant upgrading the monitor as well. Switching from a monochrome to a color monitor, or from a composite color to an RGB monitor, meant buying another monitor. With the new NEC Multi-Sync monitor, however, we at last have a high-quality RGB monitor that can be connected to the RGB connector on just about any computer, including the Amiga and IBM's new Enhanced Graphics Adapter. In most cases, you can just connect the monitor to the video output of your system, and the internal interface automatically adjusts to receive the computer's video output. The image from an RGB input is first-rate—sharp and steady.

You can even connect the NEC to an IBM monochrome adapter, although it's not designed for that and the image may flicker slightly. Nonetheless, not having to buy separate monochrome and color monitors is obviously a great boon. Some computers and video interfaces may require a special cable (as is the case with all non-IBM compatible computers). Yet, this versatile display will work reliably with most popular systems, the standard AT&T 6300 video adapter excepted. At a frequently discounted price of $700 (available by mail order for under $600), the NEC is comparable in price to many high-resolution units but a better value because of its adaptability.

—CHARLES H. GAJEWAY

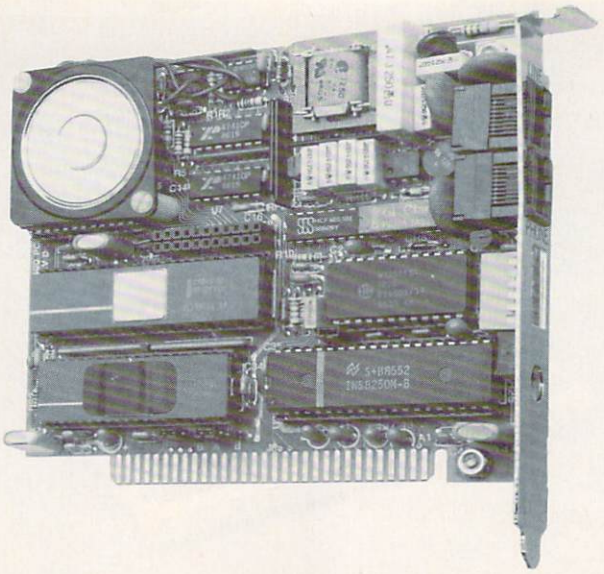
BEST OF 1986
MODEM

Leading Edge Model L

Leading Edge Products
$149

The Leading Edge Model L modem doesn't do anything special. But it does add 1200-baud communications capability to your Leading Edge, Tandy 1000 and 1000 SX, IBM PC, and other IBM compatibles, at an unprecedented price. Leading Edge also sells a 2400-baud modem for $289. Often the most obvious and simple ideas are the best.

The modem is on a short circuit card and will fit into both half- and full-size slots on IBM compatibles. You don't use the serial port or have to add a serial card. The modem has two jacks—one for the outside telephone line and one for the telephone handset.



Software (*BitCom*) is included, so you can start making phone calls with your computer right away. *BitCom* supports the widely used Xmodem file-transfer method and allows you to reconfigure the modem's setting while online. Most communications software doesn't allow this.

You may also see this modem sold under the name Amazing Things (Model A), a company set up to market a variety of "amazing" electronics products. Amazing Things is a subsidiary of Leading Edge World Trade, which is an affiliate of Leading Edge Products.

—NICK SULLIVAN

BEST OF 1986
ACCESSORY

StyleWriter

Carolina Engineering Laboratories $198

The wild success of print-oriented software, such as *The Print Shop* and *The Newsroom* and the great interest in desktop publishing, indicates that getting a printer to perform tricks is one of the great delights of computing. With StyleWriter, a hardware unit that attaches between your dot-matrix printer and computer, you can print letter-quality text in a variety of typefaces, even when using your regular word processor.

Each typeface comes on a ROM chip ($13 each), and up to five chips can be installed in the Stylewriter box (three come with the main unit). ROMs are available for Epson, Okidata, ImageWriter, and C. Itoh dot-matrix printers.

When you want to use your printer's regular capabilities, StyleWriter will pass the text or graphics through. But when you press a button to put this device in letter-quality mode, it uses your printer's graphics function to produce letter-quality text. Since it uses the graphics mode, StyleWriter prints somewhat slowly, but it does have an 8K buffer, so it can store about four pages while you work on something else.

—DAVID HALLERMAN

COMEBACK
OF THE YEAR

Macintosh

Apple Computer, Inc.
$1699 (512K)

A year ago, the Macintosh was the totem of a company that had soared high and was falling low. The computer itself had offered such promise when it was first introduced, but it was castigated for being slow and cumbersome and lacking a *VisiCalc* or Lotus' *1-2-3* software package to define it. What a difference a year makes!

With the new Macintosh Plus ($2,199; one megabyte, an 800K internal disk drive, and a new operating system) and upgrades for older 128K and 512K Macs, the machine is finally realizing its potential. The SCSI port on the Mac Plus means you can connect a hard-disk drive without using the slower serial port. And the surge in desktop publishing (programs like *PageMaker* and *Ready-Set-Go* have defined the Mac) is really propelling the Macintosh into corporate offices. Increased sales at the high end mean the price on the Macintosh 512K Enhanced (with 800K disk drive and improved operating system) has dropped into consumer range. It will continue to drop, especially if Apple introduces new enhancements for the Macintosh Plus next month, as expected.

Macintosh sales are surging, and the big software houses (Microsoft and Ashton-Tate among them) are developing new business programs. At the same time, software for virtually every other computer on the market is starting to look more and more like Macintosh software—with icons, windows, drop-down menus, and mouse control. The machine is on a roll that could not have been predicted last year.

—NICK SULLIVAN

BEST DEALS

These products are not necessarily new but have established themselves over the year as price-performance leaders.

ATARI 1040ST

Atari Corp.
$999 (w/monochrome monitor)

The Atari 1040ST is 1986's computer bargain of the year. The 1040ST was the first computer—and is still the only one—that sells for less than a dollar a kilobyte (K). It also includes a built-in disk drive that stores 720K, plus serial, parallel, hard-disk drive, and MIDI in and out ports. (The new Macintosh is the only other computer with a built-in hard-disk drive port.)

For $999, you get the monochrome monitor system, which is quite sharp and a pleasure for business tasks. For $1,199, you get the color monitor system, which displays the ST's eye-pleasing color graphics.

The mouse-controlled GEM operating system replaces cryptic commands with easy-to-use drop-down menus. All of this is driven by a Motorola 68000 processor with incredible speed.

A growing library of software takes advantage of the ST's features. Programs like *Microsoft Write* and *PaperClip Elite* make powerful word processing a reality. *D.E.G.A.S.* lets you create spectacular graphics in color or black and white. *Music Studio* can play music on the ST's three-voice sound (which plays out through the monitor's speaker) or with MIDI synthesizers. With its large selection of software, ease of use, sharp screen displays, and megabyte of memory, the 1040ST offers more capabilities at a lower price than any other computer.

—MATTHEW STERN

APPLE COLOR MONITOR II

Apple Computer, Inc.
$379

I don't know how Apple did it.The Color Monitor II offers 80-column resolution and NTSC (regular color monitor) compatibility at half the price of many RGB units. Every test I've run on it shows that text and graphics images are just as bright and clear as all but the most expensive RGB units. And you don't need an RGB interface. Because it's a standard composite monitor, the Color Monitor II can be plugged into any NTSC-output computer, video game, or VCR to give a stunningly sharp and colorful image.

I prefer the IIc version for its sleek, high-tech styling, but the more traditional IIe model will match more components. If you want good color and 80-column text displays from one monitor and don't care to shell out for an RGB monitor, check out the Color Monitor II.

—CHARLES H. GAJEWAY

COMMODORE 1670 MODEM

Commodore Business Machines
$200

Commodore has done more than any other computer manufacturer to make telecommunications affordable. The VICModem and then the 1660 were low-priced 300-baud units that you could plug right into a VIC 20 or Commodore 64/128, without any cables. The same is true of the 1670—a 1200-baud unit that works with the VIC 20, 64, 64C, 128, and Plus/4. Current 64C buyers get sign-on software for QuantumLink, the Commodore-specific information service. And anyone who owns *HomePak* owns *HomeTerm*, the wonderful communications program. These people have every incentive to buy a modem.

—NICK SULLIVAN

MacCHARLIE

Dayna Communications
$795

MacCharlie is a device that connects to the side of a Macintosh and runs IBM software. It comes with one disk drive and 256K, or two disk drives and 640K ($999). Thus, if you have a Macintosh, you can buy an IBM-compatible for $999. Most people probably don't need such a luxury peripheral, but it would give those running home/small businesses a computer that could run all the world's top business software.

Besides running both IBM and Macintosh applications programs, MacCharlie allows you to move data between programs. You could, for instance, move a portion of an IBM spreadsheet into a Macintosh word-processing program or page-layout program. Using *Switcher*, which comes with MacCharlie, one click of the mouse will switch you from a Macintosh program to an IBM program.

When MacCharlie was first introduced, it cost nearly twice as much as now and was not nearly as attractive. But now that the cost has been slashed, MacCharlie is a tempting product for the right person.

—NICK SULLIVAN

SIDER HARD-DISK DRIVE

First Class Peripherals
$695

Mail order is not new. And many companies that have made mail-order reputations are American institutions (e.g., L.L. Bean and Hammacher Schlemmer). But when First Class Peripherals began to advertise a 10-megabyte Apple II hard-disk drive for $695 (with a 20MB unit at $995), eyebrows were raised. (Through the end of 1986, you can buy a 10MB version for $499 and a 20MB version for $799, prepaid.)

Would people really buy something that expensive, complicated, and delicate through the mail, even with a 15-day money-back trial period and a one-year warranty? Yep. For two good reasons: The Sider drive works like water flowing downhill, and the company stands behind its product 110 percent.

No matter what operating system you throw at it—such as DOS 3.3, ProDOS, Pascal, and CP/M—the Sider can handle it. Copy-protected programs present a few problems, but that's true of nearly any computer with a hard disk. And you can back up your data to floppy disks, UniDisks, or tape.

Dealers don't carry the Sider because there's no profit for them. Competitors don't like it because they can't match the price through normal distribution channels. But for the user, the Sider is a no-lose product—a great performer at a stunning price. And once you've experienced the speed and convenience of a hard disk, you'll never want to go back to floppies.

—CHARLES H. GAJEWAY

TANDY MODEL 102

Tandy
$499 (24K)

What can you say about a classic? Like an L.L. Bean duck boot or a 1955 Thunderbird, the Model 102 (a lighter, thinner version of the popular Model 100) is endlessly delightful and functional. It has a built-in modem and built-in word processing, communications, and filing software. When you turn it off, your data is stored. You don't need anything else to use it (though you can connect it to an external cassette, disk drive, or monitor), and the three-pound computer will fit in your briefcase.

Best described as a modem with a keyboard attached, the Model 102 is easy to learn, incredibly versatile, and rock-reliable. I've used my 100 to make mailing lists, take notes at seminars, write memos, reports and articles, download data while traveling, perform complex computations, and even play games. You can easily transfer data from the 102 to a desktop computer using a serial cable and communications software. The Model 102 is a worthwhile peripheral for any computer system.

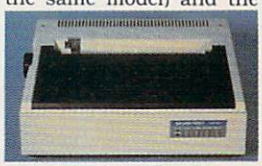
—CHARLES H. GAJEWAY

PRINTER BARGAINS

Epson, Brother, Panasonic, Silver Reed
$200 and up

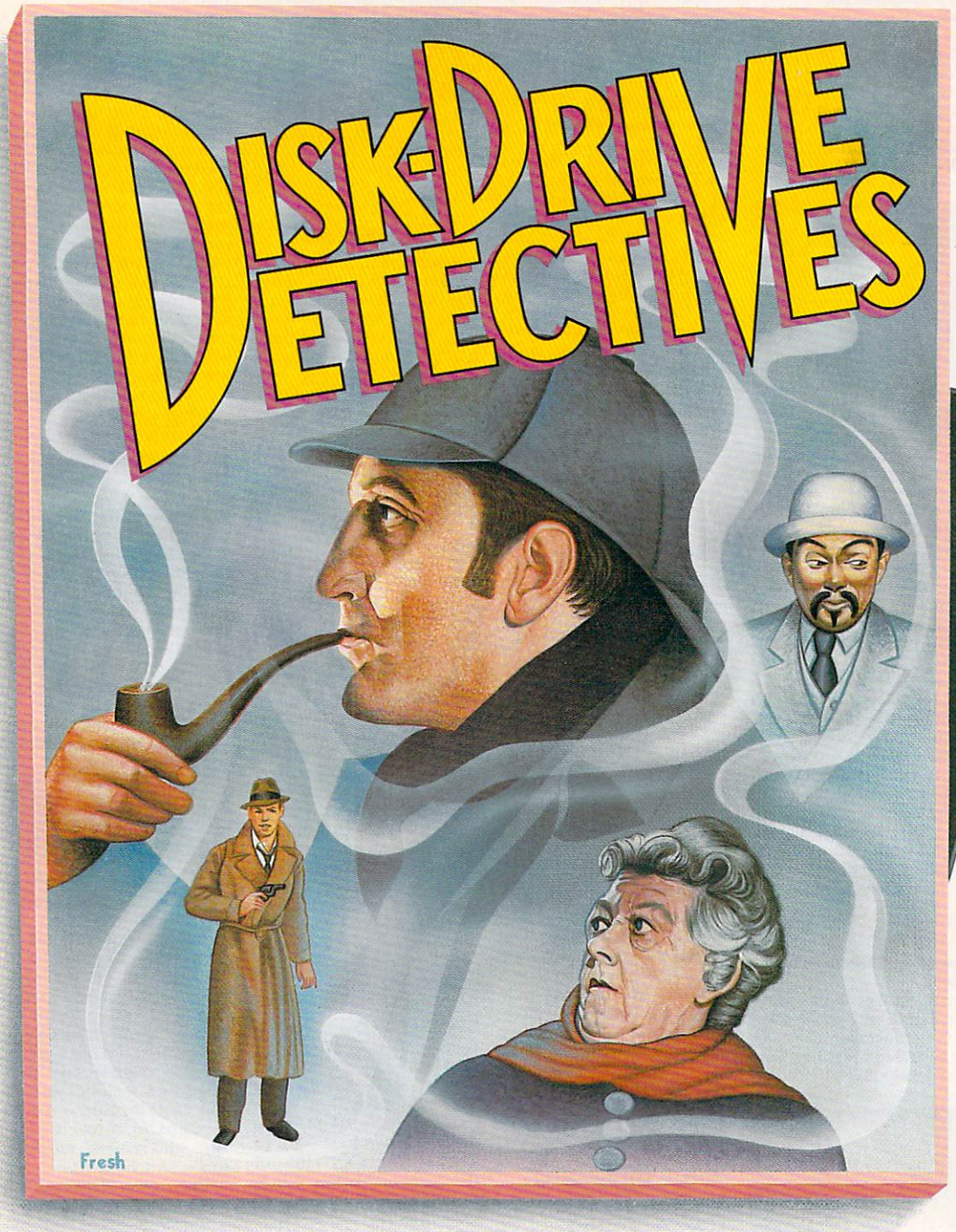
With the rapid advances in printer technology in 1986, including the introduction of the 24-pin dot-matrix printers and laser printers, older printers have been relegated to sell-off sales. But they can print, and many computer and discount stores have them in stock.

The Fortis-DX 15 and Brother HR-15 (virtually the same model) and the Silver-Reed EXP 400 are solid, letter-quality printers. They only print 12 or 13 cps, but to get anything significantly faster and better you're going to have to spend significantly more money. These printers are reliable and produce fine looking text. If you write business letters or want to throw a little spit and polish on your work, spit no further.



The Epson RX-80 series (100 cps), the Panasonic KX-P 1080 (100 cps) and KX-P 1091 (120 cps) are reliable dot-matrix printers, much faster than the letter quality, but with output not nearly so sharp and bold. And, they can print graphics. However, if you find a good deal on an Epson RX-80, make sure it has a tractor-feed mechanism. Not all do, and without one you'll have a hard time using continuous form paper. Any of these products would make excellent start-up printers or second printers in a two-computer household.

—NICK SULLIVAN



MAKE FICTION COME ALIVE WITH MYSTERY GAMES:

BECOME THE SLEUTH TRYING TO CRACK THE CASE

BY SHAY ADDAMS

LETTERING BY JAMES MONTALBANO

Half the fun of reading a mystery novel is trying to figure out "whodunnit" before you finish the book. Disk-drive detective games are even more fun because they transport you *inside* the story to solve a crime. Instead of passively reading about how a detective shrewdly digs up evidence and solves the mystery, *you* become the detective and actively participate in the drama. Cracking a case on your own—and you can't just flip to the last chapter to see who killed the butler—delivers a singular sense of accomplishment. Another important difference is that a novel's events always unfold in a fixed order set by the author. But many events in a detective game hinge on your decisions; arriving at the scene of the crime, you might choose to walk in the front door or sneak around back to look for footprints. And though they differ in presentation, the plot twists in disk-drive detective stories are often as surprising as those in a tale by Dashiell Hammett or Raymond Chandler.

Most are adventure games in which you type actions such as "open desk" or "inspect gun for fingerprints" into the program's parser, which interprets your commands and displays

ILLUSTRATION BY MARK FRESH

SHAY ADDAMS *wrote about "Board Games That Think" in the last issue of* FAMILY COMPUTING.

an all-text or illustrated response that varies with the program. A few detective games assume other forms that may appeal to the non-adventuring mystery fan. To get a range of gaming opinions, I asked some readers of *QuestBusters* (an adventure game newsletter I edit) and various inhabitants of CompuServe's Gaming Forum for comments on people's favorite mystery games. Their quotes follow throughout the article.

PUT ON YOUR FEDORA, AND GET TO WORK

Deadline, an all-text game from Infocom, elicited the biggest response. Patricia Fitzgibbons, who has played many mystery games, said, "I still have a soft spot for *Deadline*. I was amazed by the sophisticated prose and parser." One of the most difficult mysteries on disk, this story casts you as a police officer assigned to the murder of the wealthy Marshall Robner. In detective novels, *Deadline* would be called a "locked-room" mystery; the body is found in a study with a door that locks from the inside only. This means the first thing you must do is establish that the victim didn't commit suicide. The scene of the crime is a palatial, two-story Connecticut house, where you can grill the numerous suspects about each other as well as about any evidence you dig up. (As in most adventures, you'll have to draw a map of the game's many locations as you go along.) Your assistant, Duffy, will take items back to the station to have them analyzed for fingerprints, poison, or other clues.

Deadline's formula has been emulated often by subsequent games: After amassing enough evidence, you arrest one or more suspects, whose guilt or innocence is determined by a jury that reports its verdict months later. By talking to characters and discovering evidence, you must establish a motive, method, and opportunity in order to get a conviction. There are 24 alternative endings to *Deadline*, including one in which the grand jury dismisses the charges. (I was even arrested once and thrown off the police force!)

PRIVATE INVESTIGATORS SOLVE THE PUZZLES

A less common kind of mystery adventure has no provision for presenting evidence. It plays more like a typical adventure in which you solve a series of logical puzzles that lead to the final problem; that's when you apprehend the outlaw. One such game is *Masquerade*. Illustrated with cartoon-like graphics, *Masquerade* sends you after a major criminal and is as deadly as *Deadline*. The puzzles are equally hard, but because you are concentrating on object-oriented puzzles, not people, the sense of participating in a novel-like mystery is somewhat diluted.

This is also true of *Mindshadow*, in which the mystery is your own name (remember Robert Ludlum's *The Bourne Identity?*). From the opening scene, which finds you stranded on a desert island, to the exciting climax when you confront a gunman in a Luxembourg hotel room, the game features colorful graphics and the most interesting story line in the series of Interplay adventures from Activision. But you won't really solve the crime by arresting anyone, only by unriddling puzzle after puzzle until you reach the conclusion. Lazy typists will appreciate the list of commonly used nouns and verbs that covers one-third of the screen; in many instances, you can issue commands by choosing words with the joystick or mouse instead of typing them in. Brightly colored graphics cover the other two-thirds of the screen.

The same user interface is employed in *Borrowed Time*, in which you play a hard-boiled private eye patterned after trenchcoat-wearing P.I.'s like Mike Hammer and Sam Spade. This caper kicks off in your office. You must study files on the suspects before setting out to rescue a kidnap victim, nab an arsonist, and apprehend the town's crime czar (by showing evidence to the police). The crime boss has put a pair of hit men on your trail, and the tense chase scenes that result often prove deadly. Graphics sparkle with spot animation that shows heads turning when you enter the bar, a phone jangling off the hook, and other diverting special effects. The only disappointment with *Borrowed Time* is the characters. They're stereotypes straight out of a pulp novel and lack the personalities of the inhabitants in other mysteries, especially the talkative souls in the Infocom games.

One of those games, *The Witness*, transports you to a ritzy southern California suburb in 1938, where the victim is gunned down before your (reading) eyes. Did Phong, the oriental butler, do it? Only by interrogating everyone and securing some incriminating evidence will you find out. An all-text game, its best feature is the Chandleresque prose style, and authentic lingo and settings from the thirties enrich the sense of intrigue. While *The Witness* has been criticized by advanced players who were able to race right through it, that same ease-of-play makes it a good introductory case for new cops on the beat.

Another period piece, *Déjà Vu*, is set in Chicago in the forties. As often happens to detectives in mystery novels, someone has "slipped you a mickey" that wiped out your memory. You awake in Joe's Bar, where you struggle to solve a murder and kidnapping, as well as remember your name. Otherwise, you'll have to take the fall for the crime. The unique presentation uses icons and windows in addition to a type-in-the-words input. You can pick up objects by dragging an icon, shaped like a pistol or other item, into your inventory window; you examine things by "clicking" on them with the mouse.

If gangland Chicago is not your milieu, book a stateroom on a 19th-century paddle-wheel riverboat in *Murder on the Mississippi*. This animated tale lets you wear the gumshoes of Sir Charles Foxworth, a British sleuth vacationing on the Delta Princess, when he stumbles across a body. Instead of typing, you make your moves by choosing actions from a menu; you explore the staterooms by guiding Foxworth and his assistant, Regis Phelps, with a joystick. "It has good music and sound effects," said Susan Riley, an avid game player, "and I like using the menu for commands."

THE PRIVATE EYE AS AN AVERAGE GUY OR GAL

As mystery games proliferated, the "player as detective" perspective was joined by a fresh viewpoint in which you participate as an ordinary citizen who must solve the crime. In *Suspect*, a text-only adventure, you're a reporter attending a costume-party ball whose hostess is found strangled by a lasso that was part of *your* cowboy outfit. Unless you can lead the cops to the real killer, they'll arrest you. James Donnelly, a Gaming Forum habitue, called it his favorite mystery. "If you lose, you haven't just lost your job [in the game], but your life as well," he said.

It's off to the circus in *Ballyhoo*, where, as an innocent bystander, you have to rescue a kidnapped girl by participating in such big-top activi-

ties as walking a tightrope, visiting the fat lady, and taming a lion. And then you've got to save the girl from a runaway gorilla! Terry Clayton said, "I liked both *Deadline* and *Suspect*, but *Ballyhoo* is my favorite mystery because it requires a lot of puzzle-solving along with collecting evidence."

In *Earthly Delights*, you awake to find a burglar stealing a painting from your living room, and you must trail him to Paris to uncover an international gang of criminals with more than art theft on their minds. "It was like a real trip to Paris," recalled my son, Noel Moore. "I saw the Eiffel Tower, Napoleon's tomb, and the Can Can dancers. And there were no terrorists to worry about, either."

THE "REAL" DETECTIVES ENTER THE CASE

The latest trend is games based on the detectives that inspired the genre—games that let you assume the identity of your favorite crime solver. Sherlock Holmes, perhaps the most famous detective of all, is the subject of games from several companies (mainly because Holmes is in the public domain and the name doesn't have to be licensed). *Sherlock Holmes in Another Bow* is the title of a game that takes place on an ocean liner. It entails five related cases that must be unraveled before you polish off the main one. The cast includes historical characters such as Henry Ford and Gertrude Stein, and the graphics are well done. But it's not my idea of an adventure since it unfolds in a linear fashion, demanding that you be in the right place at the right time. I missed having the freedom to move about at will. And the parser, despite its 2,000-word vocabulary, makes communicating with the characters more frustrating than talking to a New York cabbie! However, Byron Byrd said, "I liked the graphics and writing style, and the plot was really good because the killer has you fooled all along."

I found *Baker Street Detective* more entertaining. It offers two murder cases to investigate: one victim is a bank president, the other a government witness in an extortion trial. As you cab back and forth across London (in 1893) to a variety of atmospheric locations, you'll notice that Holmes and Watson are portrayed more convincingly here than in *Another Bow*—even without graphics. This game employs a unique method for testing the results of your investigation with an eight-question quiz that you can take up to three times during each time around. A third Holmes program, *221 B Baker Street*, includes 30 crimes to solve, and it blends animation with text. It can be played solo or with up to four people in competition.

DETECTIVE GAME INFORMATION

221 B Baker Street (DS). Apple, Atari, C 64/128. $30. **Baker Street Detective (AX).** Apple, Atari, Atari ST, C 64/128, Macintosh. $10-$18. **Ballyhoo (IC).** Amiga, Apple, Atari, Atari ST, C 64/128, IBM PC/PC*jr*, Macintosh, Tandy Models I/III/4. $35-$40. **Borrowed Time (AC).** Amiga, Apple, Atari ST, C 64/128, IBM PC/PC*jr*, Macintosh. $30-$50. **Deadline (IC).** Amiga, Apple, Atari, Atari ST, C 64/128, IBM PC/PC*jr*, Macintosh, Tandy Models I/III/4. $45-$50. **Déjà Vu (MN).** Macintosh. $50. **Earthly Delights (DL).** Apple, IBM PC, Macintosh. $33. **High Stakes (MN).** Apple, IBM PC/PC*jr*, Macintosh. $40. **Masquerade (AE).** Apple, C 64/128. $35. **Mindshadow (AC).** Amiga, Apple, Atari ST, C 64/128, IBM PC/PC*jr*, Macintosh. $30-$50. **Murder on the Mississippi (AC).** 64K Apple, C 64/128. $35-$40. **Perry Mason: The Case of the Mandarin Murder (TS).** Apple, Atari ST, C 64/128, IBM PC/PC*jr*. $33-$50. **The Scoop (TS).** 128K Apple IIe/IIc. $40. **Sherlock Holmes in Another Bow (BS).** Apple, C 64/128, IBM PC/PC*jr*, Macintosh. $40. **Suspect (IC).** Amiga, Apple, Atari, Atari ST, C 64/128, IBM PC/PC*jr*, Macintosh, Tandy Models I/III/4. $40-$45. **The Witness (IC).** Amiga, Apple, Atari, Atari ST, C 64/128, IBM PC/PC*jr*, Macintosh, Tandy Models I/III/4. $35-$40.

PUBLISHER KEY

AC: Activision, (415) 960-0410.
AE: American Eagle, (312) 792-1227.
AX: Artworx, (716) 425-2833.
BS: Bantam Software, (212) 765-6500.
DL: Dan'l Leviton Co., (714) 639-8433.
DS: Datasoft/IntelliCreations, (818) 886-5922.
IC: Infocom, (617) 492-6000.
MN: Mindscape, (312) 480-7667.
TS: Telarium/Spinnaker, (617) 494-1200.

Unless otherwise noted, minimum memory requirements are 48K for Apple II series, 48K for Atari 800/XL/XE series, 128K for IBM PC/PC*jr* or compatibles, and 128K for Macintosh. Titles listed for the IBM PC/PC*jr* will also run on many IBM PC compatibles; owing to the proliferation of compatibles, check with the program's publisher or your dealer for compatiblity.

Perry Mason, the creation of novelist Erle Stanley Gardner, always uncovers the killer by cleverly manipulating witnesses until they break down in court and confess. As Mason in *Perry Mason: The Case of the Mandarin Murder*, you must defend a woman charged with her husband's death. Paul Drake, Mason's ace detective, will race from the courtroom to sniff out evidence or pursue leads. Meanwhile, you devote your time to the duties of a lawyer: introducing evidence, objecting to the prosecutor's line of questioning, and even "whirling to face the jury" and other courtroom theatrics. *Mandarin Murder* exhibits an unusual graphics presentation. Instead of showing a full-screen picture with text below, it hangs a vertical illustration on one side and text on the other. You're offered several alternative endings, among them a hung jury. "Getting to make objections was my favorite part of the game," according to QuestBuster Ken Jameson. "The judge overrules me most of the time, but I still enjoy it."

If the idea of staying inside a courtroom throughout an entire game makes you claustrophobic, head for the racetrack in *High Stakes*. Adapted from a novel by former jockey Dick Francis, it puts you in the saddle as a wealthy British horse owner out to foil a sinister (what else!) plot to cheat you. Also set in England, Agatha Christie's *The Scoop* casts you as a newspaper reporter assigned to unravel the murder of a Mrs. Tracy. Was she knifed by the same person who killed the first reporter researching the story? As in most mystery games, you'll become just another crime statistic if you're not careful. It uses a menu filled with words you select via joystick and incorporates animation into the full-screen graphics.

What's the next trend for disk-drive detective games? Since mysteries based on detective novels have been so well received, don't be surprised if television-show detectives soon apply for work in the world of computer entertainment. I've got my fingers crossed for *64K Colombo* and *Murder, She Programmed*. FC

BUYER'S GUIDE TO PORTABLE COMPUTERS

BY CHARLES GAJEWAY

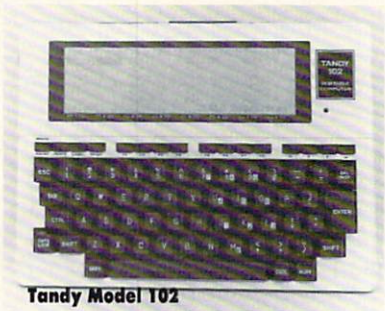
THE PERFECT LINK BETWEEN HOME AND OFFICE, OFFICE AND HOTEL, HOTEL AND HOME

Ah, memories! The very first article that I wrote for FAMILY COMPUTING was entitled "Commuting with Computers" (October 1983), and it detailed some of the adventures I had lugging an Apple II from the office—home and back again—until I finally installed my first permanent home system and saved myself a lot of sweat and pain. Carrying disks was easier than carrying computers.

Since then, a lot of other people and I have found that carrying a small computer is a perfect compromise. You can make notes, write memos, and make calculations on trains and planes or in hotel rooms. Then, when you return to your home or office, you can transfer your data into your desktop. Or, if your portable has a built-in modem, as many do, you can send data via the phone lines back to home base.

"Portable" computers range from concrete blocks with handles to three-pound units that slip easily into a briefcase. There are four distinct classes of portable machines: notebooks, laptops, totables, and luggables. Each class has its own set of uses, advantages, and disadvantages, as well as outstanding performers.

NOTEBOOKS



Tandy Model 102

About the size of a three-subject notebook, notebook computers weigh from three to six pounds and will fit in most briefcases. They have a small LCD screen (8 or 16 lines by 40 characters), run on batteries, usually have built-in modems, and always have software. A basic word processor, a communications program to make phone calls with the modem, and an address filer are standard.

Notebooks store data directly in RAM—even when the computer is turned off—although cassette recorders and disk drives can be connected. In short, notebooks are virtually complete systems, lacking only a printer. But they have both serial and parallel ports and work with a wide range of printers.

Notebooks are extremely useful for collecting small to moderate amounts of data that can later be uploaded into a larger PC or mainframe. Writers use notebooks to take notes and do rough drafts "on the spot." Businesspeople use them to store customer information and draft memos and reports on the road. Students find them handy for taking notes in the library and even accessing electronic information services.

Tandy 102 and 200. The classic notebook machine is the Tandy Model 100. Especially with recent price reductions, it provides a lot of power per dollar. I have owned a 24K Model 100 for some time and find it an invaluable writing assistant, allowing me to write or take notes any time or any place there is enough light to see comfortably. (All Liquid Crystal Display screens need good light to be readable.) The newer Tandy 102 (now replacing the 100) is virtually the same computer, except it is smaller and lighter than the Tandy 100 (*see chart*).

The Tandy 200 is bigger and heavier than the 100 and has more software, including Microsoft's *Multiplan*, a spreadsheet. Its screen display is 16 lines by 40 characters, about the largest LCD display that is easily readable.

LAPTOPS

Toshiba 1100 Plus

Also referred to as "clamshell" computers because their LCD screens fold down over the keyboard, laptops generally include an internal disk drive so that large files don't hog RAM all the time. Thus, they don't have built-in software. You use commercial software on a disk. With anywhere from 128K to 512K or more of RAM and generally battery-operated, laptops offer much of the functionality of a desktop PC to a mobile user.

However, you'd be hard pressed to fit them in a briefcase. Most are sold with their own shoulder-strap carrying bags. Also, the 80 column by 25 line LCD screens are dim and hard to read. "Is it turned on?" is a question that laptop users hear all the time, and, on occasion, ask themselves. Finally, battery life is generally limited due to the power drain of the disk drive motor.

IBM PC Convertible. Despite the hoopla and anticipation surrounding the IBM PC Convertible (*see "Machine Specifics" in the November issue*), it has been something of a disappointment. It offers little in the way of technological advancement and is difficult to configure. To connect a full-size monitor, the IBM LCD display must be disconnected. Moreover, you need a display adapter and a special monitor.

Two Toshibas. The new Toshiba 1100 Plus, however, is promising. It's lighter (nine pounds) and faster than the IBM PC Convertible and the screen is more readable. When you connect the 1100 Plus to a regular monitor,

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Contributing editor CHARLES GAJEWAY *owns a fleet of computers. Two of them—a Tandy Model 100 and a Compaq—are portable.*

you merely fold the LCD screen flat. An internal 1200-baud modem is optional.

The Toshiba 3100 offers even more. Its gas-plasma screen display is extremely clear and readable in the dark. But the background and type are both in red and might take getting used to. The 3100 has a 3.5-inch disk drive, as well as a 10-megabyte hard-disk drive. The 3100 has more computing power per square inch than any other machine on the market. However, it does not run on batteries and there is no proof that portable hard-disk drives are reliable storage systems.

Zenith Z-181. Known mostly for its radios and televisions, Zenith is emerging as a major computer company, and its latest laptop can only propel them along. The Z-181 has arguably the clearest, brightest, and largest screen display of any computer in its class. It looks much like a regular CRT monitor, except that it has blue text and graphics against a white background. Zenith says it's working on an internal 2400-baud modem for this computer. If you've avoided portables because you find their screen displays unreadable, now's the time to take a second look.

TOTABLES

Zenith Z-171

The newest class of portables is what I call the "totable," a machine the size of a portable stereo radio that weighs under 20 pounds. These systems offer backlit LCD screens, 5.25-inch disk drives, 512K or more of RAM, and standard serial and parallel interfaces. While they don't generally run (or run long) on batteries, backlit screens are readable under most reasonable conditions, even with dim lighting. Thus, they are truly viable alternatives to desktop machines, even for full-time users. They would appeal to someone who has a cramped workspace at home.

Sharp PC 7000. I recently had the opportunity to try out Sharp's new IBM-compatible portable. I used it at home, carried it to the office, and ran all kinds of MS-DOS software on its twin 5.25-inch disk drives. The screen was very readable, even in a darkened living room, although its wide "aspect ratio" creates elongated graphic images, sometimes with humorous effect. This, of course, happens with many laptops and portables, since they translate screen displays designed for regular monitors to smaller screens with different proportions. Major software manufacturers (like Lotus and Ashton-Tate) are readying new versions of their software that are designed to compensate for the aspect ratios of some portables.

The screen is monochrome, naturally, but there's a built-in RGB interface for applications requiring color or accurate graphics. The full-sized keyboard (with numeric keypad) has a light, responsive touch, and clips neatly over the front of the screen for carrying and storage.

Quadram's Datavue. Very similar in concept to the Sharp PC-7000—though somewhat more expensive—the Datavue operates from a battery pack and is capable of holding more RAM (up to 1.3 megabytes). The keyboard has an infrared beam, so it can be used at a distance without a cord.

Zenith Z-171. The IRS recently bought $28 million of these computers and Ford Motor Co. has ordered hundreds for its executives, shining a spotlight on this capable little system. Like the Sharp, the IBM-compatible Zenith has a readable backlit screen, but its keyboard has no numeric keypad (maybe the IRS is getting lax!). This, of course, means that it's slightly smaller in size. The Zenith has two slim 5.25-inch disk drives. While this makes the computer somewhat larger than those with 3.5-inch drives, there's currently much more software available in the 5.25-inch format.

LUGGABLES

Compaq II

Welcome to bodybuilding for hackers! Stuffing a 9-inch CRT, at least two disk drives, expansion slots, and up to 640K of RAM into a case with a carrying handle gives you a 25 to 30 pound heavyweight performer. It can be moved and used anywhere there's an electrical outlet and sufficient table space. Just eat your Wheaties and carry a spare can of spinach if you'll have to carry any more than a block or two.

Luggables primarily appeal to two types of people. First is the person who usually works in one spot but has a limited work area and/or occasionally needs to work elsewhere. This is my case, and I have been very happy with a Compaq Plus as my IBM-compatible machine (although I have been spotted drooling over the new Compaq II).

The other type of person is always on the go, but generally works from a car and rarely has to carry the machine very far—just out of the back seat into a building. CPAs,

BUYING TIPS

Disk Drives. If you want a briefcase-sized computer, you'll have to get one without disk drives. If you want a more powerful machine with disk drives, then you'll have to choose between 5.25-inch and 3.5-inch drives. The former run more software but take up more room; the latter store more data and allow for a smaller machine, but run less commercial software. To a certain extent, your decision depends on what kind of software library or other computers you already own.

Operating System. As in the "real" world of regular-sized computers, the portable-computer buyer must decide whether or not to go with an IBM compatible. The only reason to stray from the MS-DOS world would be to get the Tandy 100 or 200.

Screen Display. Most portables use Liquid Crystal Displays (LCDs), which react to video output more leisurely than regular CRT monitors. LCDs require good light to be readable, and some are unreadable under the best conditions. But only you can judge. Look hard before you buy.

The new totables have backlit LCD displays, so they provide their own light. These screens are much more readable, and they even work in semi-dark conditions.

Another factor to consider is the shape of the screen. Most portables have screens that are much wider than they are tall, whereas regular computer monitors are nearly square. Thus, graphics designed for the "square" screen sometimes become distorted on an oblong screen.

Portables with built-in interfaces for regular monitors are obviously preferable.

software developers, salespeople, engineers, and consultants all need the power of one of these systems, and they aren't bothered by their weight.

You still see a lot of luggables in airports, but I believe that most will be replaced by totables and the better laptops in the near future. It's nerve-wracking to wrestle a luggable into an overhead rack and frequently impossible.

Compaq II. The Compaq II and the Portable 286 offer the last word in speed, compatibility, and reliability in IBM-compatible luggables. Even mighty IBM, with the IBM Portable PC, couldn't shake Compaq's dominance in this market. Compaq's machines are a bit pricey, but quality materials and bullet-proof construction don't come cheap. You can buy the Compaq II with two 5.25 inch disk drives, or one floppy and a 10-megabyte hard-disk drive. You can run color graphics software on the green-screen monitor; on IBM PC and most compatibles you need a color monitor.

Macintosh. Don't forget the Macintosh! Slide a Mac with keyboard and mouse, an external drive, and a modem into one of Apple's carrying cases, and "voila"—you have a full-featured computer with a nine-inch CRT and two disk drives that weigh 25-30 pounds. Sounds like a luggable to me—and I've lugged one around enough to know. If MS-DOS is not your cup of computer tea, a Macintosh may be just the flavor you've been looking for.

POOLSIDE PROSE

What kind of portable is for you? My rule of thumb is to pick the lightest machine that will do what you want without external add-ons. If you want to write a few pages of your novel by the pool or dash off a quick memo while riding to the airport in a taxi, you'd be happiest with a notebook unit. But if you need to revise your whole novel or do spreadsheet projections to accompany that memo, it's laptop time. On the other hand, if you need to dial up the Dow Jones News/Retrieval and do portfolio analysis wherever you go, you need a totable. If your eyesight mandates a larger, more readable screen, a luggable is in order.

Totables and luggables also make fine second machines for the growing number of two-computer households. They are compact, easily moved around the house, and generally less expensive than desktop machines of equivalent power. The professional user or advanced student can have dedicated power when and where it's needed without affecting the rest of the family's computer enjoyment.

It's safe to say that computers to go are here to stay! FC

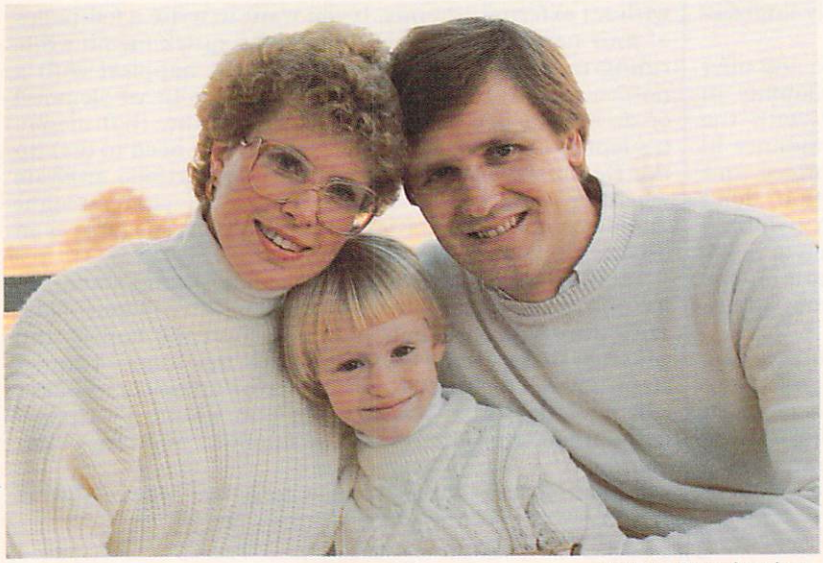
SELECTED PORTABLE COMPUTERS

Computer	Price	Memory (Min/Max)	Built-In Disk Drives?	Battery-Operated?	Weight in pounds	Text Display (Lines x Characters)	Software Included	Built-in Modem?
NOTEBOOKS								
Heath ZP150 (616) 982-3200	$699	32K/416K	No	Yes	7.7	16 x 80	Microsoft Works (wp, cm, ad, BASIC)	300-baud
NEC PC-8201 (312) 860-9500	$499	16K/96K	No	Yes	5	8 x 40	BASIC, wp, cm, sc	300-baud optional
NEC Starlet	$999	64K/192K	No	Yes	5.9	16 x 80	Wordstar-to-go, Calc-to-go, db, cm	300-baud
Tandy 102 (817) 390-3700	$499	24K/32K	No	Yes	3	8 x 40	BASIC, wp, cm, sc, ad	300-baud
Tandy 200	$799	24K/72K	No	Yes	4.5	16 x 40	BASIC, wp, cm, ad, sc, MultiPlan	300-baud
LAPTOPS								
H-P Portable PLUS (408) 293-2444	$2,695	256K/1.28Mb	No	Yes	9	25 x 80	MS-DOS, cm, ad	300/1200-baud optional
IBM PC Convertible (305) 272-2600	$1,995	256K/512K	Two 3.5-inch	Yes	12	25 x 80	PC-DOS 3.2, m, sc, c	300/1200-baud optional
Kaypro 2000 (619) 481-4300	$1,995	768K	One 3.5-inch	Yes	11.5	25 x 80	MS-DOS, BASIC, wp	No
Tandy 600	$1,599	32K/224K	One 3.5-inch	Yes	9.5	16 x 80	MultiPlan, wp, db, cm	300-baud
Toshiba 1100 Plus (714) 730-5000	$2,399	256K/640K	Two 3.5-inch	Yes	10	25 x 80	MS-DOS 2.11	300/1200-baud optional
Toshiba 3100	$4,499	640K	One 3.5-inch; One 10-Mb hard disk	No	15	25 x 80	MS-DOS 2.11, BASIC	300/1200-baud optional
Zenith 181 (312) 391-7000	$2,399	640K	Two 3.5-inch	Yes	11.8	25 x 80	MS-DOS 3.2	300/1200-baud optional
TOTABLES								
Sharp PC 7000 (201) 529-8200	$1,795	320K/704K	Two 5.25-inch	No	8.5	25 x 80	MS-DOS 2.11	No
Quadram Datavue (404) 923-6666	$1,995	256K/1.25Mb	One 5.25 (or 3.5-inch and 20 Mb hard disk option)	Yes	14	25 x 80	MS-DOS 2.11	300/1200-baud optional
Zenith 171	$2,399	256K/640K	Two 5.25-inch	Yes	14.3	25 x 80	MS-DOS 3.2, c, pl, sc	No
LUGGABLES								
Compaq II (713) 370-0670	$3,599	256K/2.1 Mb	Two 5.25-inch	No	25.6	25 x 80	MS-DOS 3.1 BASIC, optional	No
Apple Macintosh (408) 996-1010	$1,099	512K/4 Mb	One 3.5-inch	No	20	varies	Finder	No

KEY TO CHART
ad = *address book*; c = *calculator*; cm = *communications*; db = *database*; m = *memo*; pl = *phone list*; sc = *schedule*; wp = *word processing*.

Family Crisis

BY SUE EDISON-SWIFT



Author Sue, her husband, Paul, and Annie

HOW ONE FAMILY BUILT A SUPPORT SYSTEM OF FRIENDS AND RELATIVES WITH ITS COMPUTER AND THE U.S. POSTAL SERVICE

Our family computer has helped us manage the budget and the checkbook, but I'm most grateful for the role our computer played in helping us manage a crisis.

This story began last fall when our pediatrician found a lump in our daughter's abdomen. Four days and many tests later, we were given a diagnosis: Annie had neuroblastoma, a huge, inoperable, malignant mass.

Many people had the right to know this news. How do you tell family and friends that beautiful, 4½-year-old Annie would probably not live to see her sixth birthday? Repeating this news over and over on the telephone was not possible, and to ask someone else to make these calls was not fair. Since we have a computer system, we had another option. We chose to write a letter:

September 28, 1985

There is no way to say this easily. Annie has neuroblastoma, a large cancerous mass in the abdomen that has spread to bone marrow. Neuroblastoma is considered a terminal illness, treated but not cured with chemotherapy. Statistically, children with this kind of cancer are likely to survive less than two years.

We know you are devastated. We know that you care. For awhile though, please don't call us. We are hanging on by threads and would find phone calls draining, not supporting. We are good at delegating, and believe us when we say we'll contact you "if there is anything you can do." In the meantime, two kind neighbors have been elected to take calls. They have the latest information, and you should feel free to call them.

My husband, Paul, the computer enthusiast of the family, keeps an electronic address book using a data-base manager. Because this list is current, it was an easy task to select the people to receive the letter and print out address labels. In two hours, we had written, photocopied, stuffed, stamped, and applied labels to about 100 letters.

People complain about computer letters, but our family and friends were unanimously grateful to receive the news quickly—first hand from us. The one hundred letters generated an active support group of more than 1,000 people. Family, friends, and friends of friends sent cards and letters, mailed treasures to Annie, prayed for all of us, and did countless good works and kind deeds.

Happily, we had reason to mail a second letter seven days after the first. Annie's diagnosis had been made on the basis of several tests; the most important one was a bone-marrow biopsy. A hospital pathologist reviewed the biopsy slides and caught a slight inconsistency. As a result, an abdominal biopsy was ordered. Miraculously, the abdominal biopsy showed benign cells instead of neuroblastoma. It was unlikely, but suddenly there was a chance that Annie's tumor was not cancerous.

October 4, 1985

If the last letter we mailed you could have been entitled "despair," this letter can be called "hope." It seems there is a CHANCE that Annie has ganglioneuroma--the benign--not cancerous--mature form of neuroblastoma.

Surgery is scheduled for Wednesday morning, and the surgeon will try to remove as much of the massive tumor as he can. If the entire tumor is ganglioneuroma, Annie is CURED, and I can go back to worrying about the things most mothers worry about. If underneath this benign form of the tumor there is still neuroblastoma, then the prognosis is still bleak.

We are OK, in need of sleep, in need of more good news. Annie is a gift from God and is caring for us all. In the hospital playroom, she gives out her stickers to cheer up the other kids. "Don't worry," she told my friend Sibba. "I'll be all right." She gets scared and she cries, but she holds still and does what needs to be done.

The next time I write, I hope it can be titled "JOY."

Everyone on our mailing list liked the third letter best. Annie's football-size tumor was successfully removed and it was benign! It had been tricky, delicate surgery. It was a medical miracle. Our Annie was going to heal, and she was going to be all better.

October 14, 1985

JOY!

We have a miracle to report. On Wednesday, October 9, Annie's surgeon removed a football-size tumor from Annie's abdomen. He was able to remove 95 percent of the tumor which wound around, but did not invade, every

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SUE EDISON-SWIFT *is a technical writer, who lives in Middleton, Wisconsin.*

artery and organ in her abdomen (except the intestines). On Friday, the lab study proved that the entire tumor consisted of ganglioneuroma cells--the benign--not cancerous--form of neuroblastoma. This means Annie will be fine; she is CURED. No further treatment is needed.

The next letter mailed was a combination progress report, thank-you note, and holiday greeting. A letter timed for Thanksgiving seemed appropriate, for if any family had reason to be thankful, it was ours. Annie had healed quickly.

There were still worries. Annie's blood pressure had been elevated since her surgery, and her left kidney wasn't functioning at full capacity. We hoped both problems would resolve themselves with time.

Soon after Thanksgiving, it was clear that time was not helping. Annie would need a nephrectomy—her left kidney would have to be removed.

This time the surgery would be simpler and the prognosis clearer. Annie could easily manage with one kidney. We knew what to expect from surgery, and it wasn't anything fun. Annie returned to the hospital, and I returned to the computer, activating our support group once again.

December 5, 1985

Dear friends, once again we are asking for your help. Please pray that we be given the strength and courage to get through this. Please write us. Letters are concrete evidence of your concern, and they mean so much. Sending Annie "a little something" is always appreciated. Last time, the treasures she received did so much to lift her spirits and keep her occupied.

On December 19, we mailed our final letter. Annie's surgery went well, her blood pressure was normal, and she was recovering on schedule. *Have a merry, little Christmas*, I closed, *which is just what we intend to do.*

This story ended last year on Christmas Day, when we participated in a time-honored holiday tradition—traveling to Grandma's and Grandpa's house. My little girl had spent weeks in the hospital and had two major operations in two months. She was fine, and we were fine. It was a merry, little Christmas.

You see how our computer helped us deliver very personal messages. Paul's data base of addresses was used to help choose the families that would receive the letters, generate mailing labels, create a list of phone numbers to take to the hospital, and even keep track of gifts and kindnesses. Our word processor, spell checker, and grammar checker helped get the letters out. All of these things could have been done without our computer, but with it, the task was easier and faster. When managing a crisis, minimal stress and maximum speed are important.

Using the computer to write about Annie's progress had another, less obvious, benefit. Because we were essentially writing form letters, we could contact more people. Think of the important people in your life that you see or write to only occasionally. These were the people especially touched when we included them. In fact, some of the most comforting letters and greatest help came from people on the periphery of our lives. We wouldn't have had the time or strength to contact so many people any other way. A mass mailing allowed more people to be involved, to help, and to show they cared.

CREATE AN ELECTRONIC ADDRESS BOOK

Keeping an electronic address book is a nice way to integrate your computer into your life. Medical emergencies aside, you can use a single data base to: 1) make current address lists for invitations, announcements, and vacation postcards; 2) generate mailing labels; and 3) print out Rolodex cards for a computer-generated address book.

We keep our address book in *dBASE II* (Ashton-Tate). Each address is entered using this format.

LAST NAME (25 CHARACTERS)	*This is used for alphabetizing.*
FULL NAME (34)	*Entered as you want it to appear on a mailing label.*
ADDRESS LINE 1 (34)	*We limit the address fields to 34 characters so it will fit on a mailing label.*
ADDRESS LINE 2 (34)	
CITY, STATE, ZIP (34)	
PHONE 1 (25)	
PHONE 2 (25)	
PHONE 3 (25)	
CODES (10)	*We use codes to help select subsets from the data base. For example, C=Christmas card list, B=Business, F=receives all family mailings. A temporary code here will let you print out just the new entries.*

Using *dBASE II* and *WordStar* (MicroPro), you can print out Rolodex cards for each entry. Making multiple copies gives you access to current addresses and phone numbers everywhere you need them . . . by each phone, on the desk, or at the office. When crazy Aunt Sophie moves for the 20th time, you just enter in the new address, print out four new Rolodex cards, and everything remains neat and current (2¼" x 4" Rolodex cards are available at a stationery store as a continuous form for your printer for about $17 per 1,000 cards).

A MASS MAILING ALLOWED MORE PEOPLE TO BE INVOLVED, TO HELP, AND TO SHOW THEY CARED.

One year later, Annie's only apparent scar is the one spanning her tummy. Annie is a bright, happy, funny kindergartner who wants to be a singing-mommy-doctor when she grows up. The close of last year's Thanksgiving letter still rings true:

We are fine, the three of us. We learn from Annie how to put some of this experience behind us and some of it ahead of us. Instead of counting blessings we will try to use them. And we will always remember how the love of God, our love for each other, and the love from all of you, saved us. Our best wishes for happy holidays and a new year filled with joy.

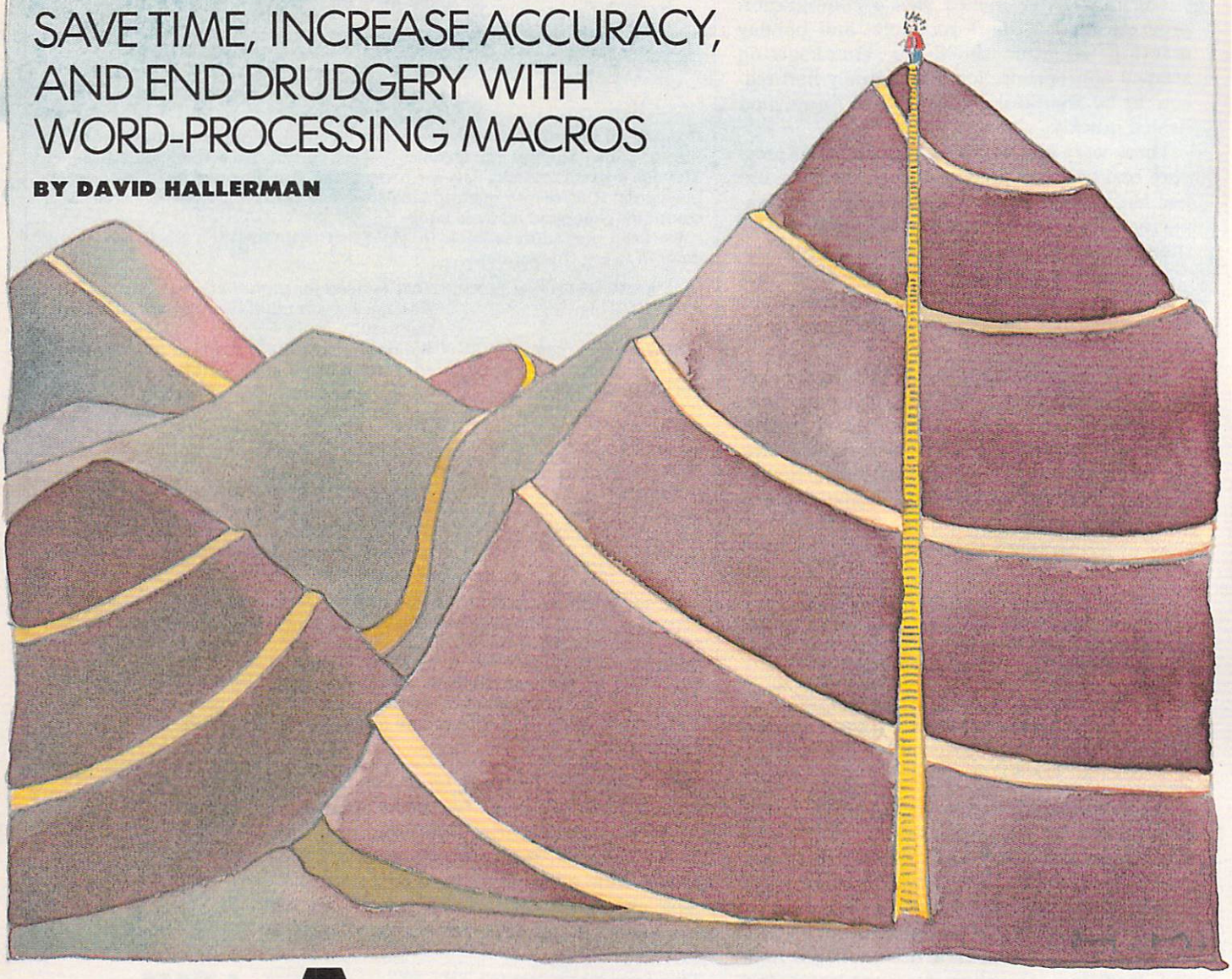
It's time for me to power up the computer and write my 1986 holiday greeting. It will probably be dull when compared to last year's letter. I don't think anyone will mind.

GUIDE TO WRITING WITH COMPUTERS: PART 5

Writing Shortcuts

SAVE TIME, INCREASE ACCURACY, AND END DRUDGERY WITH WORD-PROCESSING MACROS

BY DAVID HALLERMAN



As a teenager back in 1964-65, I regularly went to the New York World's Fair in my home borough of Queens. What fascinated me most were the colorful exhibits that portrayed a future of increasing automation, based on the up-and-coming "thinking" machine, the computer.

Now, more than 20 years later, computers have automated a multitude of tasks. Writing with a word processor is one of these. Yet our expectations from computers have become so high, we question the efficiency of automation when it can take seven keystrokes to check what files are on a data disk. And if it's necessary to write the same sentences over and over again in business letters, or repeat a long title in a school report, then the advantages of automation are not so apparent.

MACROS: THE ESSENCE OF PERSONAL IN COMPUTING

With a word-processing function called a *macro*, however, you can automate more of your writing. A macro is a collection of keystrokes for doing a particular task that has been converted into only one or two keystrokes. (*While not our focus here, other applications, such as spreadsheets and telecommunications, also benefit from macros.*)

One type of macro lets you insert text throughout your documents, anything from an abbreviation to a good-size paragraph. For

ILLUSTRATION BY MONA MARK

DAVID HALLERMAN *is reviews editor for* FAMILY COMPUTING.

example, you can create a text macro that—after you simultaneously press the ALT and the N key (N for name)—places your name and address in correspondence. Another example: I remember when I helped my non-word-processing wife put together her final paper for cooking school, a restaurant proposal for Marco Polo, an imaginary Italian-Chinese restaurant in Nyack, New York. Just as with a proposal for a real restaurant, a hefty (75-page) section was filled with recipes. I could only type "2 oz." or "1 tbl." or "tomatoes" so many times before going bananas, but macros kept me sane, with one for each measurement and ingredient. When you need to write the same words repeatedly, text macros reduce tiresome typing and make work flow smoothly.

The other type of macro can help you speed up the word-processor's functions, such as loading files or search and replace. Here's one instance. I often move from paragraph to paragraph by searching for the return character found at the end of a paragraph, but even that automation takes six keystrokes with my word processor, *Apple Writer* (Apple Computer). By using a macro to link those six keystrokes, however, I just tap the OPEN APPLE and the PERIOD keys simultaneously, and my cursor jumps from one paragraph to another.

I enjoy making macros. They let you customize a word processor with commands of your choice, according to your work patterns, not some inflexible structure. I'm fond of saying that macros put the "personal" in personal computers. In some cases, you can even enhance a program by adding new commands to your program that the publisher has not included. For example, with *Apple Writer*, you can normally delete a word only when the cursor is at the end of it. However, I wrote a macro that lets the cursor sit anywhere on a word, and I just press the OPEN APPLE and the D keys together to delete it.

If the sequence of commands represented by the macro is a complicated one, then you need to get it right only once, which eliminates errors and needless memorization. One helpful macro I use daily organizes the beginning of a letter for me by setting the correct tab stops and margins, embedding the needed printer codes to give me elite type, and then moving my cursor to the right side, where I can key in the date.

Unfortunately, not all word processors offer a macro function, although they're seen in a few family-level packages and are common in professional-level programs. (*See Part 1 of "The Guide to Writing with Computers" series in the August 1986 issue to find some programs that allow macros.*) If your writing software doesn't allow macros, but you have an IBM or compatible or a Macintosh, you can usually add a separate keyboard macro program (*see box, "Macros For All Reasons"*).

HOW TO MAKE A MACRO AND MAKE IT WORK

Before you register a sequence of keystrokes into a macro, you must assign those keystrokes to a single key, sometimes known as the "call key." Depending on your word processor, call keys can be numbers, letters, punctuation marks, symbols, and even control characters. When you want to replay any particular sequence, you press the call key you've chosen along with your program's particular key for invoking macros (some function key, such as ESC, ALT, OPEN APPLE, or F3). That's why you want to choose call keys that are easy to remember. For example, you might press a two-keystroke set such as ALT-C to cut a block of text or ESC-M to set up special margins.

FOR ELIMINATING DULL WORK, TEXT MACROS ARE NONPAREIL.

Again depending on your word processor, there are two ways to make a macro: Record it or write it.

Recording a macro is akin to recording music with a tape recorder. Instead of musical notes, though, it's keystrokes in a particular order that are captured. And rather than being saved on a cassette, a macro is recorded in memory, and then saved to disk. When you replay the macro, it rapidly retypes your original keystrokes automatically, while your hands stay off the keyboard.

With slight variations from program to program, here's how you record a macro:

1. Turn on the macro function's record mode.
2. Go through precisely the same steps you need to perform the task without the macro.
3. Turn off the record mode.

That's it. For example, to make a macro with Mindscape/Scarborough's *MasterType's*

MACROS FOR ALL REASONS

If your word processor doesn't deliver a macro function, yet you're working with an IBM PC or compatible or a Macintosh, macro help is available as separate, stand-alone software. These packages give you macros not just for your word processor, but for any program that uses the keyboard, such as a data base or a spreadsheet. While minor variations are found among macro generators, they all do pretty much the same thing. As a convenience feature, a macro program records a series of keystrokes, letting you play them back at the touch of one or two keys.

Macros are good for holding text, but they're even more impressive when it comes to automating tricky word-processing commands.

As an editor for Henson Associates, the producers of the Muppets, Louise Gikow writes scripts on her computer. She writes with *WordStar* (MicroPro International), a word processor known for its complex, multiple-keystroke editing and formatting commands.

Gikow's scripts require extensive centering, boldfacing, underlining, and indenting. "When I looked at the list of *WordStar* commands," she recalled, "I thought it would take me more time to make a script look right than to write the script itself."

A macro generator became the solution to her dilemma; her choice was the highly regarded *ProKey* (Rosesoft). (Two more macro programs are *SuperKey* from Borland for the IBM PC or compatibles and *Tempo* from Affinity Microsystems for the Macintosh.) New character names, type style, and placement on the page can be assigned to simple key combinations. Every time Gikow holds down the ALT key while pressing the letter K, Kermit's name appears, properly centered and boldfaced, and the word processor returns to non-centered, normal type mode for writing the lines he speaks. When it's Miss Piggy's turn, ALT-P performs the same function, and so on, through all of Muppetdom. Magnifique!

—STEVE MORGENSTERN

Writer (the C 64 or Apple II versions), you press CTRL-T to turn on record. Then type in your text or use the ESC, cursor, and RETURN keys to choose commands from the various menus. When done, press CTRL-T again to stop recording. The program automatically assigns each macro a number from 1 to 20. When you want to make one work, press ESC together with the corresponding number.

BUILD UP FILES OF STANDARD MACROS FOR YOUR EVERYDAY WORK AND CREATE CUSTOM MACROS FOR EACH PROJECT.

With word processors that make you write macros, however, the process is not as automatic. You commonly write a macro in a separate document used solely for macros. Instead of writing in full sentences, though, you string together keywords or special characters, such as <ESC> as a stand-in for the ESCAPE key or a] (right bracket) for the RETURN key. You need to be exact in writing macros; each character or keyword has a specific meaning and must be placed in a definite order. If you keep a scratch pad beside you, and note in order all the keystrokes and menu choices needed to do a particular task, writing a macro becomes relatively simple.

As an example, let's look at *AutoWorks* (The Software Touch), an add-on program that gives *AppleWorks* (Apple Computer), a macro function, among other new features. *AutoWorks* lets you either record macros and save them into a word-processing file or write them directly using the *AppleWorks* word processor. Here's how a macro written to catalog a data disk would look:

C: <MAIN> 5 <RETURN> 2 <RETURN>

You invoke this macro by pressing SOLID APPLE and C (the call key) together, which represent these five keystrokes: <MAIN> takes you to the main menu, and 5 highlights selection number five, "Other Activities." The first <RETURN> moves you to the next menu, and 2 highlights the choice, "List all files on the current disk drive." The final <RETURN> catalogs that disk.

THESE ARE A FEW OF MY FAVORITE MACROS

Since macros are used to combine common word-processing functions, the idea behind many macros is the same from program to program, even if the execution varies. You'll have to figure out the details yourself for the following macro suggestions, but that's part of the fun.

Text macros. The actual words you put into a macro are, of course, up to you. But for eliminating dull work, text macros are nonpareil. For example, you could create a set of macros with the call keys A, B, and C to insert three different opening paragraphs in a business letter. You would invoke macro A when writing to current customers, macro B for letters to old customers, and macro C for potential buyers. Or, if writing fiction, you might make up macros for your characters' names.

Search and replace. The search-and-replace commands combine well with macros. If you saw Part 3 of this series in the October issue, you'll remember some tips for using those functions. So, for instance, when I search for a place marker in my text, I insert the same character consistently as a marker, and automate the search for it with a single macro whose call key is that character.

Transpose two words. This macro one-step transposes two words. Before you call the macro, put the cursor on the word you wish to move.

1. Mark or highlight the word with your word processor's cut-and-paste function.
2. Cut the word, temporarily removing it from your document. At this point, your cursor should be sitting on the space where the word once was.
3. If you want to transpose the word to the right, continue the macro with a search for the next space to the right. If you want to transpose the word to the left, search for the next space to the left.
4. Paste back the word.

Would you like to make paragraphs trade places, too? Automate the same basic steps: cut, search, and paste.

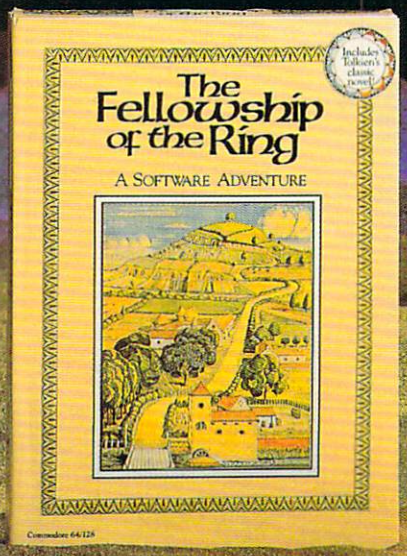
Save and load documents. While the mechanics of this next school of macros will vary with the program, the schemes are the same. Saving and loading documents are the basics of file handling. Although you manipulate files every time you write, calling them up and storing them consumes anywhere from three keystrokes and up, more often up—perfect jobs for macros. I suggest setting up a macro to load each file you're working on regularly—bypassing menus and extra keystrokes. And if your word processor demands more than a couple of keystrokes to save your current document, make a macro.

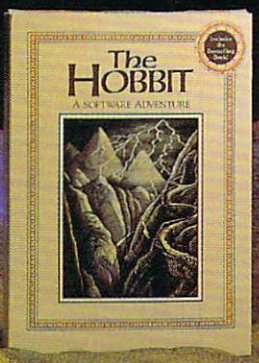
Change margins. When you reformat most word-processed documents by changing margins or setting up new headers or footers, you use several keystrokes without macros. Since I use the same six different margin settings all the time, each is assigned its own macro. Other print parameters, such as pica or elite type and single- or double-spaced lines, can be set with the same macro, or I use separate ones for finer tuning.

Remember, almost any word-processing task can be accomplished with a macro. Once you get used to making macros for your word processing, you'll not only build up files of standard macros for your everyday work, you'll probably learn to create custom macros for each project. When it comes to writing shortcuts, there's nothing like a macro. FC

NOTE: *Next month, we'll continue our word-processing series by showing you how to control your printouts.*

enter the world of Middle Earth





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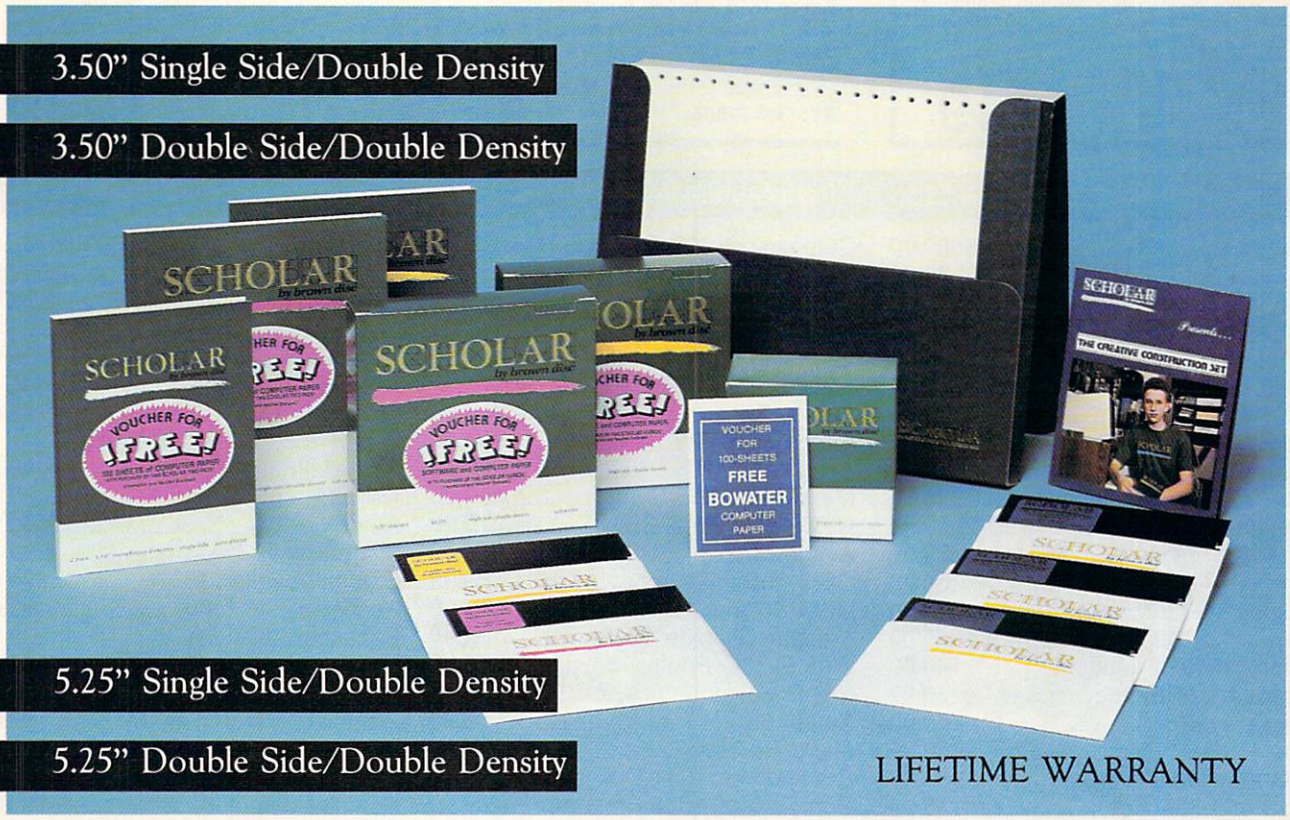

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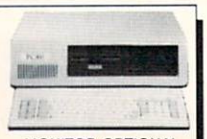

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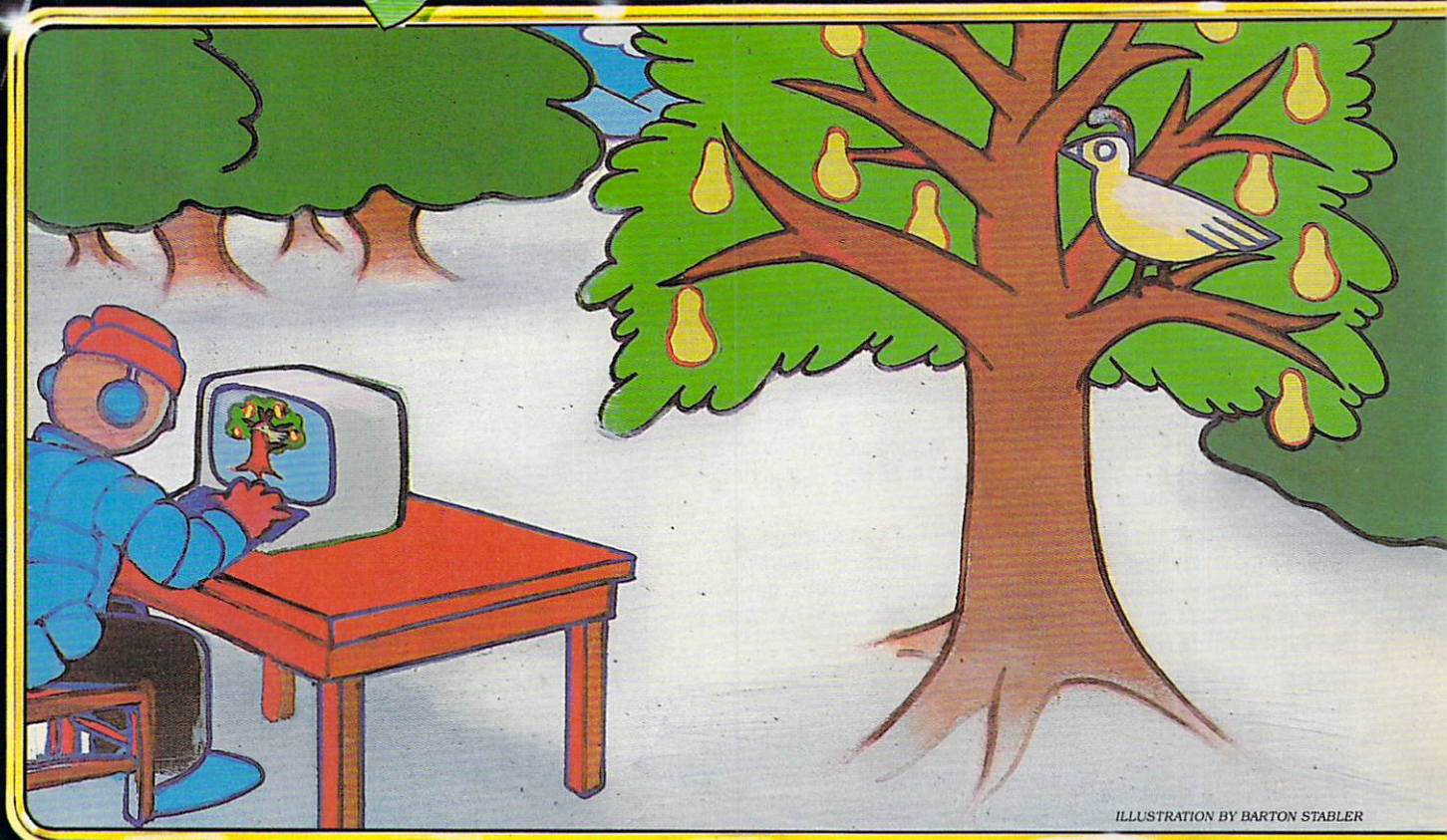

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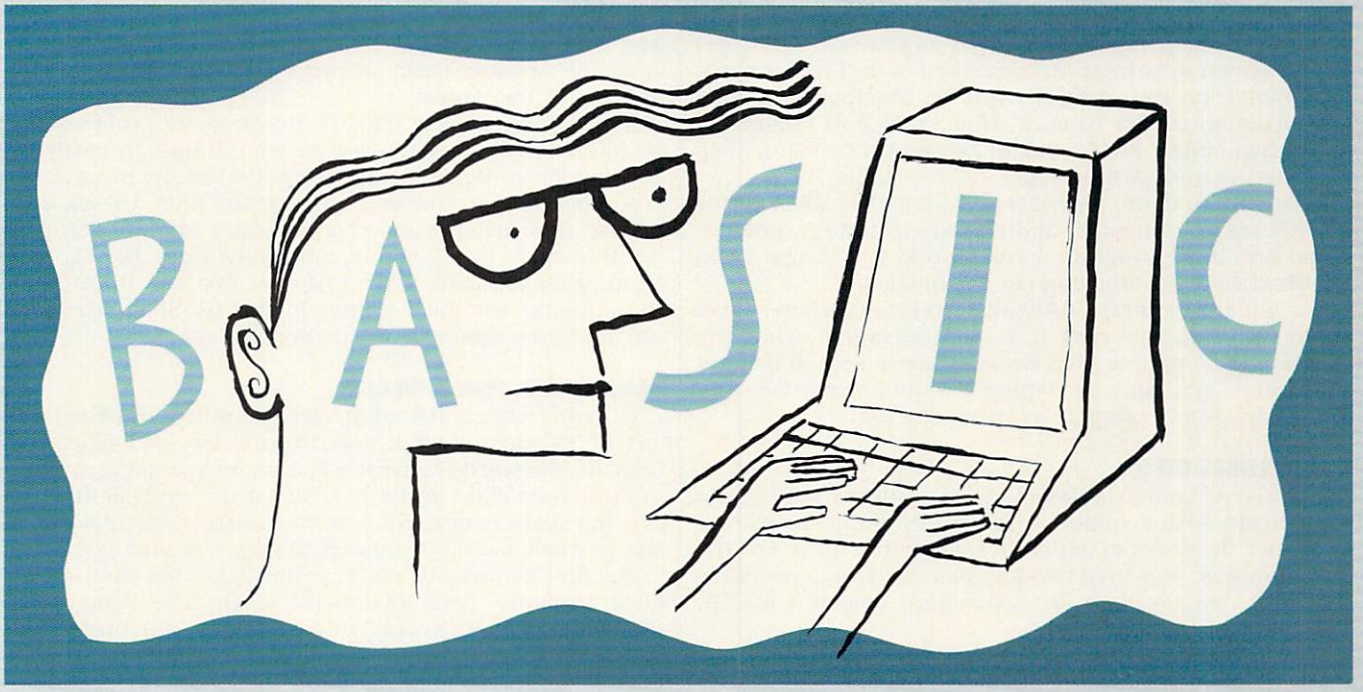
BACK TO BASIC

OUR NEW NUMBER GAME MAKES IT EASY TO START LEARNING BASIC

BY PASQUALE M. CIRULLO



Is there a new computer in the house this holiday season? Or do you finally have a little time to take the first step toward learning BASIC? Here's a good way to start programming. This month's *Back to Basic* features a short program that's both fun and easy to understand. We'll take you through each word in the BASIC language that the program uses and show you how the words work together. Along the way, we'll lead you on some simple explorations that will quickly have you "talking" to your computer—and your computer will understand and obey your commands. At the end, we'll suggest a few ways you can experiment with our program and actually create your own versions.

Of course, if you want, you can just type in and enjoy the program. But be brave! Read further, and you'll discover how easy it is to make sense of BASIC.

A JUMBLE OF NUMBERS

Numble is an entertaining, fast-moving and new cross-number game that tests your knowledge of the arithmetic tables and your ability to use numbers creatively. You can play on your own or compete against others.

When you type RUN, the screen clears and you see something like this:

```
TARGET NUMBER: 5

4 9 1 0
4 5 1 5
6 3 4 9
1 8 8 0
```

Your goal is to find as many different combinations of adjacent numbers as possible that can be strung together, with +, −, ×, and ÷ signs and parentheses inserted between them (e.g., (5 × 4) / (7 − 3)) to give the "target number" as a result. But you have to hurry; you only have a few seconds until the computer declares that you must "STOP!!"

In the grid above, you could choose the last 5 in the second row and the 0 at the end of the first row, inserting a minus sign to get 5 − 0; the 1 in the second row could be multiplied by the 5 on either side, or added to the 4 below, to get 5 × 1, 1 × 5, or 1 + 4; any of these results could be multiplied by the 1 in the first row to get (5 − 0) x 1, 1 x 1 x 5, or 1 x (1 + 4). These are just a few possibilities. But you can only move from one number to the number directly above, below, to the side, or diagonally connected to it, in order. Thus, you couldn't claim 4 + 1 by adding either 4 in the first two rows to either 1 in the same two rows, because they're not adjacent.

With a little practice, you'll find yourself uncovering more and more combinations that equal the target number. Your score is the number of different combinations you find before the computer calls STOP!!

To play against others, take turns typing RUN, and keep track of your cumulative scores; and of course you can play in teams, too.

TYPING IN YOUR FIRST PROGRAM

If this sounds like fun, but you've never typed a program into your computer before, never fear! It's really quite easy.

Gather together your computer's manuals and a disk or cassette (if you want to save your program to use again later). Check your disk-drive manual to find out how to

PASQUALE M. CIRULLO *is a technical editor for* FAMILY COMPUTING.

ILLUSTRATIONS BY JOSH GOSFIELD

format or initialize your disk; that prepares it to receive programs and data. Then check the program heads to determine which version will work on your computer. (The program for the Apple II series appears in "The Anatomy of a Program" on page 84.)

Next, check your manuals to find out how to get into BASIC. On some computers, this is as simple as turning the computer on; on others, you must load BASIC the same way you'd load a game or word-processing program.

Then check "Tips to the Typist" on page 106 for help with typing in the program. When you've typed in every line, LISTed the program (displayed all the lines in order) on the screen or printer, and checked every line for accuracy, SAVE it on your disk or cassette. (Again, check your system's manuals, or consult "How to Type in Programs" in the September 1984 issue of FAMILY COMPUTING for help with LISTing and SAVEing.)

When you're done, type RUN and press the RETURN or ENTER key . . . and start finding those number combinations! And if the program doesn't work, LIST it again and double-check each line against the magazine.

You got the program to work? Congratulations! Read on to find out how easy it is to understand what the program is doing. For best results, have a seat in front of your computer, and try typing in—and experimenting with—each short example as you come to it.

LINE NUMBERS

In most versions of BASIC, every line of a program must begin with a number. These line numbers tell the computer the order in which to execute the lines. For the line numbers, you may use any positive whole numbers you wish, usually with an upper limit of about 65000. These line numbers are OK:

```
100
1
0
65432
```

These are illegal:

-5 (must be positive)
2½ (must be a whole number)
98.6 (must be a whole number)
70000 (too large, on most systems)

What's important is that the line numbers increase from the beginning of the program to the end. You can type the lines in any order, but the computer will automatically arrange them in order from the smallest line number to the largest.

Often, programmers use line numbers that increase by 10 (500, 510, 520, etc.) so that more lines can easily be added later in case a line was forgotten or the program is expanded. If you number your program lines 10, 20, and 30 and then need to insert a line after line 10, you can call it line 15. But if you number your lines 10, 11, and 12 instead, you can't add a line after line 10 without first changing the numbers of lines 11 and 12. So it pays to be safe and leave space between your line numbers.

CLEARING THE SCREEN

You can't expect the computer to understand English, but BASIC does have a small vocabulary of English or English-like words to which it assigns special meaning. *Numble* uses eight of these: HOME (or the equivalent word in other dialects of BASIC), PRINT, FOR/NEXT, INT, RND (some also use RANDOMIZE, discussed below), TAB, and END.

The first command, HOME, is line 100—the first line of most versions. This command clears the computer's screen. It also moves the cursor (the block or underline,

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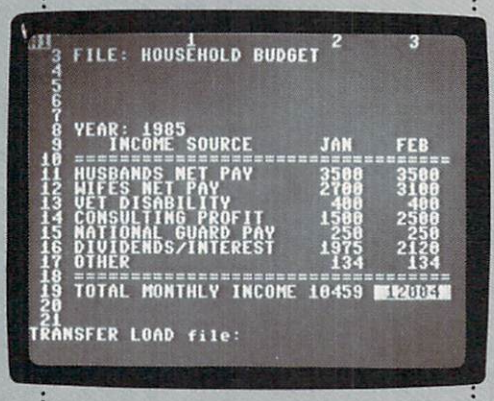

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usually blinking, that moves as you type to indicate your position on the screen) to the upper left-hand corner of the screen.

The command varies from one machine to another: on the Apple it's HOME; on the Atari, PRINT CHR$(125); on the Commodore, PRINT CHR$(147); and on the IBM PC, Macintosh, and Tandy computers, it's CLS. Though these commands look very different, they all accomplish the same thing.

To see this command in action, type HOME or the appropriate command for your computer, and press the RETURN key. (Some computers have an ENTER key instead of a RETURN key; it performs the same function.) Now type a few lines of anything just to fill up the screen and repeat the exercise. You should notice that the screen is erased. Though this command clears everything off the screen, it has no effect on the computer's memory.

You've just used what's called "immediate mode." When you type in a line that starts with a number, BASIC assumes that it's just one line of a longer program and stores it away, waiting for you to enter more lines or type RUN or LIST. When you type in a line that doesn't start with a number, BASIC assumes you want it to execute the command *immediately*, and does so if it can. That's why HOME clears the screen, but 100 HOME adds a line to the program in memory.

WRITING ON THE SCREEN

The PRINT command, found in lines 110, 120, 140, 170, 190, 230, and 240, is perhaps the most necessary command in BASIC because without it, you will not get answers or other information from the computer.

PRINT is BASIC's way of saying "display on the screen." The word PRINT (and not DISPLAY) is used in most versions of BASIC because the first users of BASIC weren't lucky enough to have monitors or any other kind of display screen; they communicated with their computers through teletypewriters, punched cards, and line printers (huge machines that print a line at a time). To get information out of the computer, they would give the command to PRINT on the teletypewriter, card punch, or line printer. When BASIC was moved over to microcomputers, the commands stayed the same while the equipment changed. That's why we PRINT to the screen, while some versions of BASIC use LPRINT to send output to a printer.

The PRINT command is very versatile, but it's also easy to write incorrectly. (If you do make a mistake, BASIC will complain that you've made a SYNTAX ERROR or words to that effect, and let you try again . . . and again, and again.) You can use PRINT to put words on the screen, to tell you the value of a function or formula, to display the result of a calculation, or to print a blank line to make your screen easier to read.

The simplest form of the PRINT command prints a blank line. You might use this to double-space your screen display or to print some things at the top of the screen and others at the bottom, leaving the middle blank.

To print a blank line, we just use the word PRINT with nothing else on that line. For example, when the computer encounters lines 120, 190, and 230 of the program, it will move down to the next line.

To have the computer print the value of a function or formula, just insert the function or formula after the word PRINT (see line 110 of *Numble*). To see how this works, type the following line:

```
PRINT 10*5-3
```

and press RETURN. The computer should respond with the answer 47, which is 10 × 5 − 3. (BASIC uses the

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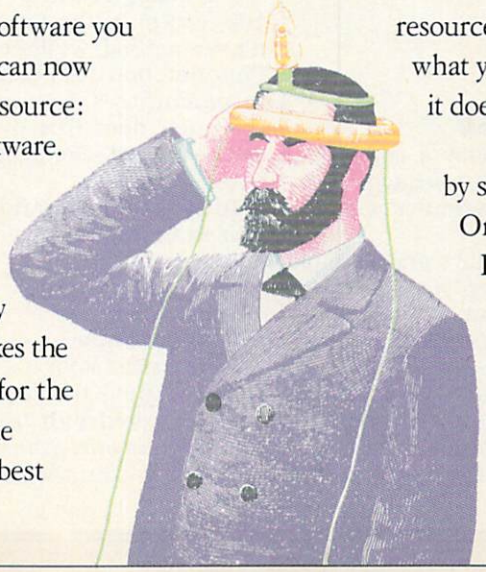

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asterisk to mean multiplication.) You can PRINT just about any formula you like; BASIC will let you use your computer as a big (and expensive!) desktop calculator.

Here's an example of how to use this kind of PRINT statement in a program:

```
10 A=10
20 B=7
30 PRINT A*B
RUN
```

A and B are *variables*. A variable is a number that the computer has stored in its memory. Line 10 gives the variable A the value 10, and line 20 makes the variable B equal to 7. If A equals 10 and B equals 7, A × B equals 70; and that's the value this program prints.

You can use the PRINT command to print the value of a variable by just putting the name of the variable you want printed after the word PRINT. Try this program to see:

```
10 X=10
20 Y=7
30 Z=X*Y
40 PRINT Z
RUN
```

You will notice that the computer gave the same answer as in the previous example. The two methods of doing a calculation are somewhat interchangeable. The second method is usually used when the calculations are complex, to give a little more clarity to a program, or when you want to use the result for further calculations.

The last way to use a PRINT statement is to have the computer print a phrase on the screen. You print it by enclosing it in quotes and putting it after the word PRINT, as on line 240 of the program. When the computer reaches line 240, it will print exactly what is between the quotes. (It doesn't print the quotes themselves, though.) See if you can make the computer print your name.

Sometimes you want to print more than one thing on a line. Any combination of items can be used in the same print statement as long as they are separated by a semicolon (;). (Some versions of BASIC let you use a space to separate items, with no semicolon, but a semicolon will always work.) Here's an example of printing two messages and the result of a calculation, all on the same line:

```
PRINT "HELLO. ";10*7;" HOW ARE YOU?"
```

A semicolon is a signal that there's more to come on the same line. When a semicolon is placed at the end of a print statement, the computer will print the contents of the next PRINT statement on the same line. So the following program prints the same thing as the statement above:

```
10 PRINT "HELLO. ";
20 PRINT 10*7;
30 PRINT " HOW ARE YOU?"
RUN
```

FOR/NEXT: TRAVELING IN CIRCLES

The third command, FOR/NEXT, is actually a combination of two commands that must always be used together. If you use one without the other, the computer will tell you that you have an error.

FOR and NEXT are used to mark the start and end of what is called a loop. A loop is used when you want the computer to execute a series of lines more than once or when you want the computer to count. *Numble* contains examples of both uses.

When the computer sees a FOR statement, it knows that you want it to start counting. You must give the computer a variable to store the count (called a counter or index), tell it what number to start counting from, and tell it when to stop counting (the upper limit). The NEXT command is used to tell the computer to go back to the FOR command and increase the index by one. All the commands that are between the FOR command and the NEXT command will be repeated until the computer reaches the upper limit. Try the following program:

```
10 FOR X=1 TO 100
20 PRINT X
30 NEXT X
RUN
```

In this program, we are telling the computer to print all the numbers between 1 and 100. Line 10 tells the computer to use X as the index (or counter), start by setting X equal to 1, and stop when X is greater than 100. Line 20 tells it to print the value of X. Line 30 tells the computer to go back to the matching FOR statement (in line 10), increase X by one (the computer always counts by 1's unless you tell it otherwise), and continue—unless X is now greater than the upper limit (100 in this example). If it is, the computer goes on with the next statement after the NEXT command.

Numble uses nested loops. Two FOR/NEXT loops are called "nested" if one is inside the other. We used nested loops because we need to print four lines with four numbers on each line. To see how a computer counts with nested loops, try the following short program:

```
10 FOR X=1 TO 5
20 FOR Y=1 TO 5
30 PRINT X, Y
40 NEXT Y
50 NEXT X
RUN
```

Note the comma used in line 30. When you separate items to be printed with a comma instead of a semicolon, the computer acts as if you've pressed the tab key on a typewriter: it moves over to its next preset tab location before printing the next item.

A FOR/NEXT loop can also be used if you want the computer to wait for a set amount of time, "not doing anything." This is called a delay loop. Take a look at lines 210 and 220 of *Numble*. In these lines, we ask the computer to stop and count from 1 to 3000 before continuing with the program.

YOUR FIRST FUNCTIONS

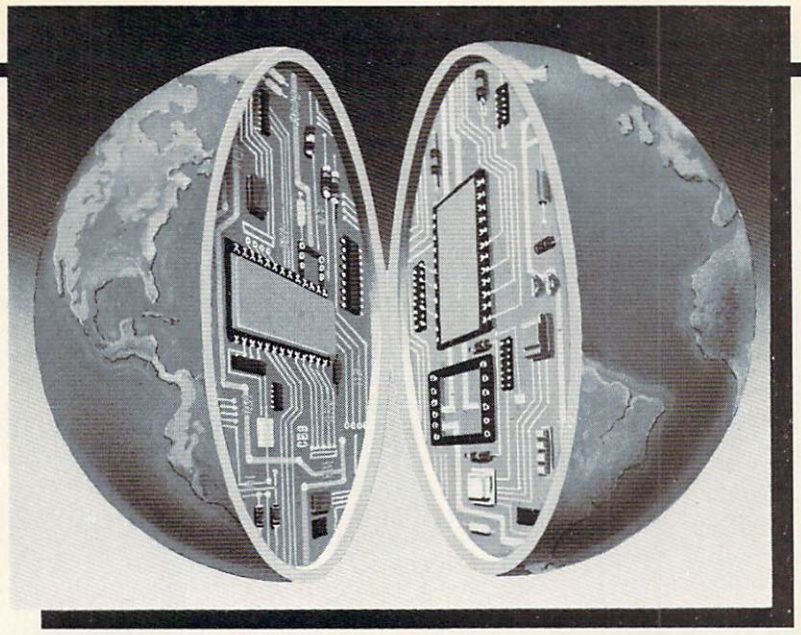
Most of the other words from BASIC's vocabulary used in *Numble* are functions. A function is a special command in BASIC that performs a specific operation, usually on a number.

For example, the INT function is used in lines 110 and 160 (except in the CoCo and Models III/4 versions, where it's not needed; we'll see why soon). INT stands for integer. This function tells the computer to convert the number in parentheses into an integer (a whole number). The computer does this by dropping all the digits after the decimal point. So INT always rounds to a lower number, never larger.

To better understand this command, type the following four examples. Don't forget to press RETURN after each line.

```
PRINT INT(7894)
PRINT INT(3.2)
PRINT INT(-576.563)
PRINT INT(999.9999)
```

If you typed the lines correctly, the computer should have answered with 7894, 3, -576, and 999, respectively. You can try your own examples by just substituting your own numbers within the parentheses. →



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This function comes in handy whenever you have to deal with integers instead of fractions. For example, in a game program, you may have to compute how many steps the purple monster should take. It can only take full steps, not part of a step.

PICK A NUMBER, ANY NUMBER

The RND function, also used in lines 110 and 160, is the computer's random-number generator. This function tells the computer to pick a (rational) number between 0 and 1, such as 0.00432564 or 0.9876543.

This function differs slightly from one computer to another. On the IBM PC and compatibles and Macintosh, each time you use RND in a BASIC line, it will be replaced by a different random number. On the Apple, Atari, Commodore 64, and Tandy Color Computer and Models III/4, you have to put a number (in parentheses) after RND: RND(1) will give you a number between 0 and 1.

Note that owners of IBM PC and compatible computers and Macintoshes need a companion command, RANDOMIZE, to give the computer's "bowl" of random numbers a good stir before picking out the first number. This command prevents the computer from picking the same series of numbers each time a program is run. It manages this by asking *you* to choose a number, called the "seed," used by the random-number generator to determine how much to "stir" the bowl of random numbers before starting to pick numbers out. When the computer encounters the RANDOMIZE command, it displays the following message on the screen:

```
RANDOM NUMBER SEED (-32768 TO 32767)?
```

Type in a whole number in that range and press RETURN. The number you type in won't be one of the random numbers produced thereafter by the RND function, but if you enter the same number every time you run the program, you'll get the same sequence of random numbers every time.

The Macintosh and many versions of BASIC for the IBM PC and compatibles have a way around this problem: the command RANDOMIZE TIMER. This instructs the computer to take its "seed" from the computer's internal clock rather than asking you to type in the seed. Since the computer keeps track of time by the microsecond, it's unlikely you'll get the same "seed" and the same sequence of random numbers twice.

To see the RND function in action, try the following program:

```
20 FOR X=1 TO 5
30 PRINT RND(1)
40 NEXT X
RUN
RUN
```

RUN (every time you type RUN, the program runs again from the start).

If you are using an IBM PC or compatible or Macintosh, use this version:

```
10 RANDOMIZE
20 FOR X=1 TO 5
30 PRINT RND
40 NEXT X
RUN
RUN
RUN
```

IBM and Mac owners may wonder what happens when line 10 is removed (by typing 10 alone on a line and pressing RETURN). Try it and see! You can also experiment with changing line 10 to read

```
10 RANDOMIZE TIMER
```

(Remember: some versions of BASIC for the IBM PC don't accept the word TIMER in this statement.)

So RND (or RND(1), depending on your computer) provides a number between 0 and 1, not including 0 and 1 (*exclusive*). But often we don't need a fraction, but rather a whole number in a certain range. For example, all the numbers printed on the *Numble* playing screen need to be between 0 and 9, including 0 and 9 (*inclusive*).

This problem is easy to handle. On the Tandy Color Computer and Models III/4, we just replace the 1 in parentheses with our upper limit. For example, RND(86) will give us a random whole number between 1 and 86, inclusive; RND(5) will give us 1, 2, 3, 4, or 5. Since RND(9) gives us a random number between 1 and 9, and we want one between 0 and 9, the CoCo and Model III/4 versions use RND(10) to get a number between 1 and 10, then subtract 1 from that result to get a number between 0 and 9.

On other computers, we can multiply the RND function by our upper limit, and apply the INT function to the result if we want whole numbers only. For example, here's how to print a number between 0 and 49:

Apple, Atari, Commodore 64: `PRINT INT(RND(1)*50)`

IBM PC & compatibles, Macintosh: `PRINT INT(RND*50)`

Tandy Color Computer and Model III: `PRINT RND(50) - 1`

Remember, RND and RND(1) produce a number between 0 and 1, *exclusive*. So RND*50 (or RND(1)*50) gives you a number between 0.0000001 (or thereabouts, depending on the accuracy of your computer) and 49.99999; and taking the integer part of these numbers produces a value between 0 and 49, *inclusive*.

PRETTYING UP THE SCREEN

The last function used in *Numble* is the TAB function, found in lines 110, 140, and 240. (Ataris don't have the TAB function, so the Atari version of *Numble* prints everything at the left margin. Atari owners can use the POSITION command, explained in the Atari BASIC manual, to place words in specific positions on the screen.)

Notice that the TAB function only appears in PRINT statements. TAB (short for "tabulate") tells the computer how far over on the line to go before PRINTing the next item. Depending on the computer, the number inside the parentheses after the word TAB represents either how many spaces to skip before printing the next item or the number of the column in which the next item should be printed. For example, TAB(20) either indicates a prompt to skip 20 spaces or to print the next item in column number 20. (This column will appear near the center of a 40-column screen, depending on whether your computer numbers its columns 0 - 39 or 1 - 40.)

This may sound complex, but a couple of minutes of trial and error will quickly show you how your computer's TAB function works. To start out, try the following program:

```
10 PRINT "12345678901234567890"
20 PRINT "--->"; TAB(8); "X!"
RUN
```

Depending on your BASIC, the X will appear either under the 8 (if your computer numbers columns starting at 1), under the 9 (if your computer numbers columns starting at 0), or under the second 3 (if your computer interprets TAB(8) to mean "skip 8 spaces"). Here's another example:

```
10 FOR X=1 TO 10
20 PRINT TAB(X); X
```

→

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ANATOMY OF A BASIC PROGRAM

Apple II series/*Numble*

```
100 HOME
110 PRINT TAB(13);"TARGET NUMBER: ";INT(RND(1)*10)
120 PRINT
130 FOR X = 1 TO 4
140 PRINT TAB(17);
150 FOR Y = 1 TO 4
160 NUMBER = INT(RND(1)*10)
170 PRINT NUMBER;" ";
180 NEXT Y
190 PRINT
200 NEXT X
210 FOR D = 1 TO 3000
220 NEXT D
230 PRINT
240 PRINT TAB(18);"STOP!!"
250 END
```

Start with a clear screen.

Indent 13 spaces, print TARGET NUMBER:. Pick and print a whole number from 0 to 9.

Skip a line.

Start a FOR/NEXT loop to print four lines of random numbers. X assumes the values 1, 2, 3, and 4 as the first, second, third, and fourth lines, respectively, are printed.

Indent 17 spaces. The semicolon at the end of the line makes the computer stay on the same line in preparation for the next PRINT statement.

Start a FOR/NEXT loop to print four random numbers per line. Y assumes the values 1, 2, 3, and 4 as the first, second, third, and fourth numbers are printed on a given line.

Pick a whole number from 0 to 9. Store that number in a variable by the name of NUMBER.

Print the number stored in the variable named NUMBER, followed by a space. Do not move down to the next line.

End the loop started in line 150: go back to line 150 and increase Y by 1, unless it's already equal to 4, in which case proceed to line 190.

Go to a new line (the semicolon at the end of line 170 had been holding us on the previous line).

End the loop started in line 130: go back to line 130 and increase X by 1, unless it's already equal to 4, in which case proceed to line 210.

Start a delay loop that will count from 1 to 3000 and then continue with the program.

End the delay loop.

Skip a line.

Indent 17 spaces and print STOP!!

End of the program.

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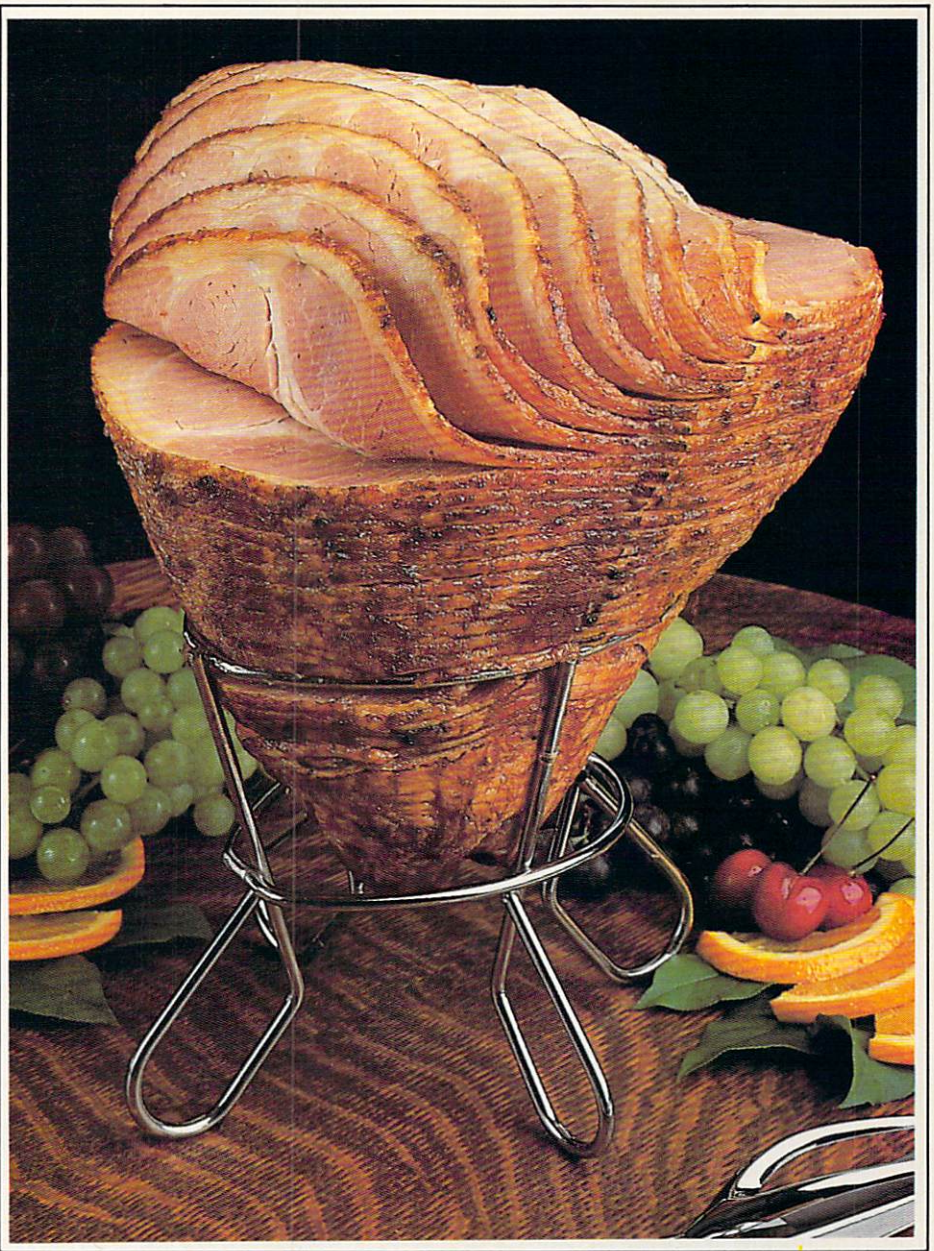

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```
30 NEXT X
RUN
```

This next example shows how easy it is to print in columns:

```
10 FOR X=1 TO 10
20 PRINT "LINE"; TAB(8); X
30 NEXT X
RUN
```

As you can see, like all other items you might use in a PRINT statement (numbers, formulas, messages, variables, etc.), the TAB function should be separated from the other items with a semicolon.

THE END

Finally, the END command tells the computer to stop working; it's reached the end of your program. This may be handy if your program ends somewhere other than at the last line. (It can happen!) It also serves as a reminder to you that you've typed in the whole program rather than having stopped in the middle.

NUMBLE REVISITED

With your new knowledge of BASIC, the *Numble* program should be much easier for you to understand. Turn to "The Anatomy of a Program" on page 84 and follow how the program works step-by-step. If you're unsure of how a line works at any point, try making a small change in the line to see what effect it has. Or you can type in the program line by line; type RUN after each line and watch each piece of the program perform. Remember, though, that whenever you have a FOR command, there must be a matching NEXT.

The best way to learn BASIC is to sit at your computer and experiment with different combinations and uses of BASIC commands. You can't hurt your computer by typing the wrong thing; usually, if you type something that BASIC doesn't like, you'll just see an error message saying that it isn't legal. In rare instances, you may have to press the BREAK or RUN/STOP key, or turn the computer off; but when you turn it back on again, it has completely forgotten any errors you might have made and is ready to start again.

With that in mind, you can try making a few modifications to *Numble* to design a program that's closer to your liking. Some changes might be easy; others will require you to do a little hunting in your BASIC manual. Here are some ideas:

The size of the square of numbers (4 × 4) is easy to change. It's controlled by the FOR statements in lines 130 and 150. You can make either or both dimensions larger or smaller. (Try a 3 × 6 rectangle.)

It's even easier to play with the delay loop in lines 210 and 220 to give yourself more—or less—time before the computer says STOP!!. The larger the number the computer is counting to, the longer it will take the computer to count.

If you change the numbers used in the TAB functions, you can move things around on the screen. (Atari owners need to use the POSITION command to do this.) You may want to add some PRINT statements to customize the computer screen to your liking.

A more difficult problem—to be tackled only when you're very confident that you understand all the commands used in *Numble*—is to change the program to print a square of randomly chosen letters instead of numbers, creating a word-search game. (*Hint: Look up the* CHR$ *function.*)

EDITOR'S NOTE: *Look for Part II of "Back to BASIC" in next month's issue for another short, fun program that will introduce you to more BASIC statements. We'll also include a list of resources for you in case you want to expand your BASIC knowledge.*

Atari 400/800, 600/800XL, & 130XE/*Numble*

```
100 PRINT CHR$(125);
110 PRINT "TARGET NUMBER: ";INT(RND(1)*10)
120 PRINT
130 FOR X=1 TO 4
150 FOR Y=1 TO 4
160 NUMBER=INT(RND(1)*10)
170 PRINT NUMBER;" ";
180 NEXT Y
190 PRINT
200 NEXT X
210 FOR D=1 TO 3000
220 NEXT D
230 PRINT
240 PRINT "STOP!!"
250 END
```

Commodore 64 & 128 (C64 mode)/*Numble*

```
100 PRINT CHR$(147);
110 PRINT TAB(12);"TARGET NUMBER: ";INT(RND(1)*10)
120 PRINT
130 FOR X=1 TO 4
140 PRINT TAB(13);
150 FOR Y=1 TO 4
160 NUMBER=INT(RND(1)*10)
170 PRINT NUMBER;" ";
180 NEXT Y
190 PRINT
200 NEXT X
210 FOR D=1 TO 3000
220 NEXT D
230 PRINT
240 PRINT TAB(17);"STOP!!"
250 END
```

IBM PC & compatibles (80-column version)/*Numble*

This program has been tested and found to work on the following computers and hardware configurations using the BASICs shown: IBM PC w/Disk BASIC D2.00 or Advanced BASIC A2.00. IBM PCjr w/128K RAM, 80-column monitor w/Cartridge BASIC J1.00. Tandy 1000 w/80-column monitor and GW-BASIC 2.02 version 01.01.00. It should also work on many other PC compatibles.

```
10 RANDOMIZE
100 CLS
110 PRINT TAB(32);"Target Number: ";INT(RND*10)
120 PRINT
130 FOR X = 1 TO 4
140 PRINT TAB(33);
150 FOR Y = 1 TO 4
160 NUMBER = INT(RND*10)
170 PRINT NUMBER;" ";
180 NEXT Y
190 PRINT
200 NEXT X
210 FOR D = 1 TO 3000
220 NEXT D
230 PRINT
240 PRINT TAB(38);"STOP!!"
250 END
```

IBM PC & compatibles (40-column version)/*Numble*

This program has been tested and found to work on the following computers and hardware configurations, using the BASICs shown: IBM PC w/Disk BASIC D2.00 or Advanced Basic 2.00. IBM PCjr w/Cartridge BASIC J1.00. Tandy 1000 w/GW-BASIC 2.02 version 01.01.00. It should also work on many other PC compatibles.

```
10 RANDOMIZE
100 CLS
110 PRINT TAB(12);"Target Number: ";INT(RND*10)
```

```
120 PRINT
130 FOR X = 1 TO 4
140 PRINT TAB(13);
150 FOR Y = 1 TO 4
160 NUMBER = INT(RND*10)
170 PRINT NUMBER;" ";
180 NEXT Y
190 PRINT
200 NEXT X
210 FOR D = 1 TO 3000
220 NEXT D
230 PRINT
240 PRINT TAB(18);"STOP!!"
250 END
```

Macintosh w/Microsoft BASIC 2.0 or 2.1/*Numble*

```
10 RANDOMIZE TIMER
100 CLS
110 PRINT TAB(23);"Target Number: ";INT(RND*10)
120 PRINT
130 FOR X=1 TO 4
140 PRINT TAB(24);
150 FOR Y=1 TO 4
160 NUMBER=INT(RND*10)
170 PRINT NUMBER;" ";
180 NEXT Y
190 PRINT
200 NEXT X
210 FOR D=1 TO 3000
220 NEXT D
230 PRINT
240 PRINT TAB(28);"STOP!!"
250 END
```

Tandy Color Computer/*Numble*

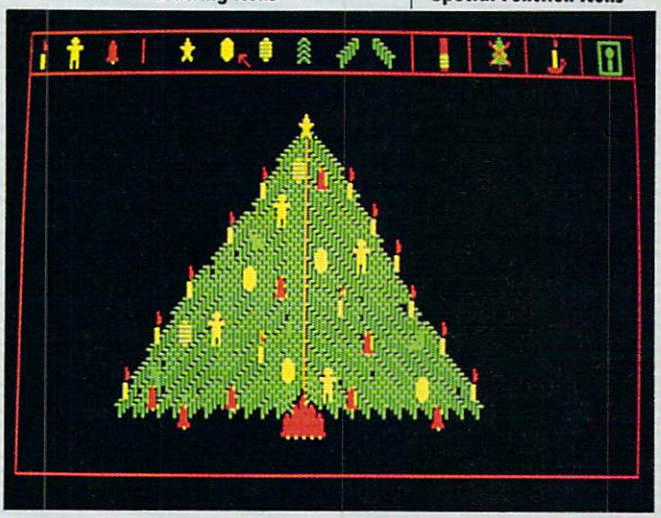
```
100 CLS
110 PRINT TAB(8);"TARGET NUMBER: ";RND(10)-1
120 PRINT
130 FOR X=1 TO 4
140 PRINT TAB(9);
150 FOR Y=1 TO 4
160 NUMBER=RND(10)-1
170 PRINT NUMBER;" ";
180 NEXT Y
190 PRINT
200 NEXT X
210 FOR D=1 TO 3000
220 NEXT D
230 PRINT
240 PRINT TAB(13);"STOP!!"
250 END
```

Tandy Model III or 4 (Model III mode)/*Numble*

```
100 CLS
110 PRINT TAB(23);"TARGET NUMBER: ";RND(10)-1
120 PRINT
130 FOR X=1 TO 4
140 PRINT TAB(24);
150 FOR Y=1 TO 4
160 NUMBER=RND(10)-1
170 PRINT NUMBER;" ";
180 NEXT Y
190 PRINT
200 NEXT X
210 FOR D=1 TO 3000
220 NEXT D
230 PRINT
240 PRINT TAB(28);"STOP!!"
250 END
```

CHRISTMAS TREE CONSTRUCTION SET

BY JOHN JAINSCHIGG



Since publishing the Atari, Commodore, and IBM PC (actually PCjr and Tandy 1000) versions of Christmas Tree Construction Set last December, we've been flooded with requests for translations for other computers. This year, we're presenting Apple and IBM PC versions of the program.

With *Christmas Tree Construction Set*, your family can create its own version of the "perfect" tree and decorate it—and redecorate it—right on your computer screen. You can let your Christmas creativity run wild: Create trees of different shapes and sizes, build wreaths, and generally "deck the halls" to your heart's content. Each family member can SAVE his or her best work on disk, so you can display a different tree every day. These trees don't need to be watered and never lose their needles—and you don't have to rearrange the furniture to set them up!

USING THE PROGRAM

Christmas Tree Construction Set, like the commercial "construction set" programs on which it's modeled, lets you use a joystick to select small pictures or "icons" (an ornament or a piece of tinsel, for example), and place them on a screen to form parts of a larger picture. Across the top of the screen you'll see the 10 images you can choose from, including evergreen boughs of various shapes and sizes. To the right are four boxes containing icons for special functions you can perform.

To draw on the screen, use the joystick to move the cursor to the symbol or icon you want. Then press the joystick button. The cursor disappears, and when you move the joystick, a copy of the icon moves with it.

When you've positioned the icon where you want it in the drawing area, press the button again, and a copy of the icon you are "holding" will be "stamped" on the screen. You can then move the icon and "stamp" it elsewhere in the drawing area, or you can return to the top of the screen and select a different icon.

To use one of the special functions, move the cursor to the box for that function and press the button. The eraser icon lets you clean up mistakes on the drawing screen. Just move the eraser over the area you wish to erase, while holding down the button. The "crossed-out tree" is for clearing the entire drawing screen and starting over; use it with caution. The large candle is for special effects; selecting it will play a tune to round out the cheery mood. Press the button again to continue drawing.

The disk icon is for SAVEing and LOADing your creations to and from disk. When you select it, you'll see another screen, where you'll be asked to enter an appropriate command and file name. (Don't worry—your picture is still safe until you actually LOAD another one over it.) If you decide you don't want to SAVE or LOAD a picture, just press RETURN or ENTER at the command prompt and you can continue drawing.

The simplicity of *Christmas Tree Construction Set* makes using it an ideal holiday pastime for young children, since it's easy to produce attractive results without a great deal of coordination and skill. Kids will be pleased at the quality of the designs they can create and will enjoy SAVEing them and showing them off.

Apple II series w/joystick & disk drive/*Christmas Tree Construction Set*

```
10 HM = PEEK(116)*256+PEEK(115):HIMEM: HM-23
20 DIM XX(14),YY(14),S(64)
30 FOR X = HM-22 TO HM:READ Y:POKE X,Y:NEXT X
40 FOR A = 1 TO 64:READ S(A):NEXT A
50 HGR:HCOLOR= 3:POKE -16302,0
60 IF FL = 1 THEN FL = 0:GOTO 100
70 POKE 232,0:POKE 233,96:SCALE= 1:ROT= 0
80 FOR I = 24576 TO 25091:READ V:POKE I,V:NEXT I
90 FOR I = 1 TO 14:READ XX(I),YY(I):NEXT I
100 HPLOT 1,0 TO 279,0 TO 279,191 TO 1,191 TO 1,0
110 HPLOT 1,20 TO 279,20:FOR I = 1 TO 14
120 HPLOT I*20-1,0 TO I*20-1,20
130 DRAW I AT (I-1)*20+XX(I),YY(I)
140 NEXT I:DRAW 1 AT 230,2
150 SN = 1:X = 140:Y = 80:XO = X:YO = Y
160 SF = PEEK(-16287):IF SF > 127 THEN 160
170 XDRAW 1 AT X,Y
180 XDRAW SN AT XO,YO
190 XDRAW SN AT X,Y:XO = X:YO = Y
200 IF PEEK(-16287) < 128 THEN 440
210 IF Y < 25 THEN 250
220 HCOLOR= 0:DRAW SN AT X,Y:DRAW SN AT X+1,Y
230 HCOLOR= 3:IF SN < 11 THEN DRAW SN AT X,Y
240 GOTO 190
250 XDRAW SN AT X,Y:SN = INT(X/20)+1
260 IF SN < 12 THEN 190
270 IF SN > 12 THEN 320
280 VAR = 31:GOSUB 1000:IF F THEN 150
290 VAR = 63:GOSUB 1000:IF F THEN 150
300 VAR = 31:GOSUB 1000:IF F THEN 150
310 GOTO 280
320 IF SN = 13 THEN FL = 1:GOTO 50
330 POKE -16301,0:HOME:VTAB 21
340 PRINT "<S>AVE, <L>OAD, OR <A>BORT? ";
350 GET A$:IF A$ = "A" THEN 500
360 IF A$ <> "S" AND A$ <> "L" THEN 350
370 PRINT:INPUT "FILENAME? ";N$:IF N$ = "" THEN 500
380 ONERR GOTO 480
390 IF A$ = "S" THEN 420
400 PRINT:PRINT CHR$(4);"BLOAD ";N$;",A$2000"
410 GOTO 500
420 PRINT:PRINT CHR$(4);"BSAVE ";N$;",A$2000,L$2000"
430 GOTO 500
440 X = X+2*(PDL(0) > 200)*(X < 276)
450 X = X-2*(PDL(0) < 60)*(X > 4)
460 Y = Y+(PDL(1) > 200)*(Y < 176)
470 Y = Y-(PDL(1) < 60)*(Y > 0):GOTO 180
480 PRINT "AN ERROR HAS OCCURED, PRESS BUTTON."
490 IF PEEK(-16287) < 128 THEN 490
500 POKE -16302,0:GOTO 150
1000 F = 0:FOR B = 1 TO VAR STEP 2
1010 X = S(B):Y = S(B+1):Y = 49980/Y
1020 X = X*(400-Y)*0.25
1030 I = INT(X/256):J = X-256*I
1040 IF PEEK(-16287) > 128 THEN F = 1:B = VAR:GOTO 106
0
1050 POKE 6,J:POKE 7,I:POKE 8,Y:CALL HM-22
1060 NEXT B:RETURN
2000 DATA 230,7,166,6,164,8,173,48,192,234
2010 DATA 234,234,136,208,250,202,208,242
2020 DATA 198,7,208,238,96
3000 DATA 2,196,3,262,1,262,4,262,4,294,3,330
3010 DATA 1,330,6,330,2,330,2,294,2,330,4,349
3020 DATA 3,247,4,292,4,262
3030 DATA 2,49980,2,392,2,393,2,330,6,440,2
3040 DATA 394,2,392,2,349,6,349,2,349,2,349,2
3050 DATA 294,6,392,2,349,2,349,2,330,4,330
4000 DATA 14,0,30,0,58,0,71,0,98,0,135,0,198,0,235
4010 DATA 0,8,1,34,1,63,1,89,1,132,1,147,1,212,1
4020 DATA 173,63,46,45,62,63,46,45,159,247,19,54,54
4030 DATA 54,13,36,36,36,13,54,54,54,254,31,110
4040 DATA 13,222,0,53,55,53,55,53,55,53,55,53,55,53
4050 DATA 55,0,54,31,54,54,54,31,110,13,36,36,36
4060 DATA 68,8,54,54,54,54,54,45,69,188,35,36,36
4070 DATA 36,92,0,254,254,54,54,54,54,78,36,36,36
4080 DATA 36,76,54,54,54,54,54,13,36,36,36,36,36,36
4090 DATA 78,54,54,54,54,54,76,36,36,36,36,204,0
4100 DATA 13,141,63,63,63,159,13,13,13,13,13,62,63
4110 DATA 63,63,63,55,13,13,13,13,13,13,62,63,63,63
4120 DATA 63,55,13,13,13,13,13,62,63,63,63,63,55
4130 DATA 13,13,13,13,13,62,63,63,63,63,55,13,13,13
4140 DATA 13,13,222,63,63,63,78,13,205,0,110,108,54
4150 DATA 54,54,54,110,36,36,36,36,36,252,108,108
4160 DATA 54,54,54,54,110,54,54,13,36,36,252,108,252
4170 DATA 36,36,36,78,182,110,108,54,0,54,31,54
4180 DATA 31,31,78,13,182,215,159,13,44,105,36,36
4190 DATA 36,76,54,13,13,222,31,182,141,141,31,220
4200 DATA 222,0,105,13,54,54,246,219,18,36,36,252
4210 DATA 31,222,155,106,13,54,54,246,219,18,36
4220 DATA 36,252,31,206,0,105,108,108,13,110,110,150
4230 DATA 250,252,252,31,254,254,150,106,108,108
4240 DATA 13,110,110,150,250,252,252,31,254,254
4250 DATA 206,0,251,31,54,54,118,73,18,36,36,108,13
4260 DATA 77,145,250,31,54,54,118,73,18,36,36,108
4270 DATA 13,94,0,45,45,53,63,63,55,45,45,53,63
4280 DATA 63,55,45,45,53,63,63,55,45,45,53,63,63,55
4290 DATA 45,45,53,63,63,55,45,45,53,63,63,55,45
4300 DATA 45,53,63,63,119,0,13,110,108,54,13,36,13
4310 DATA 54,76,116,33,36,108,54,0,53,53,53,30,54
4320 DATA 254,54,76,182,23,23,101,12,44,36,36,36,36
4330 DATA 36,72,54,54,62,46,54,54,28,54,54,110,36
4340 DATA 100,36,39,37,36,36,36,141,50,54,55,53
4350 DATA 54,55,53,55,54,77,41,28,39,39,12,13,36,222
4360 DATA 36,36,28,44,44,44,92,0,45,45,45,45,45
4370 DATA 45,45,53,54,54,54,54,54,54,63,63,63,63
4380 DATA 63,63,63,39,36,36,36,36,36,108,73,137,45
4390 DATA 46,62,39,63,29,46,46,181,63,46,53,63,46
4400 DATA 53,63,95,0
4410 DATA 8,3,9,5,8,6,8,5,8,5,2,8,8,5,12,3,2,5
4420 DATA 6,3,7,4,2,16,3,4,2,4
```

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```
10 DEFINT A-Z
20 DIM P(16),CI(50),CM(50),IT(15,52),MT(15,50)
30 DIM SAV(50),SCN(8000)
40 DIM M(46,3),FR(4,4)
50 SCREEN 0,1:CLS:WIDTH 40:KEY OFF:STRIG ON:PLAY "MF"
60 FOR I=1 TO 15:READ M(I,1),M(I,2)
70 M(I+15,1)=M(I,1):M(I+15,2)=M(I,2):NEXT I
80 FOR I=31 TO 46:READ M(I,1),M(I,2):NEXT I
90 FOR I=0 TO 3:READ P(I):NEXT I
100 FOR I=1 TO 4:FOR J=1 TO 4:READ FR(I,J)
110 NEXT J:NEXT I:FOR N=1 TO 15
120 READ IT(N,0),IT(N,1),IT(N,2)
130 FOR J=0 TO IT(N,2):READ IT(N,J+3):NEXT J
140 IF N<12 OR N=15 THEN FOR J=0 TO IT(N,2):READ MT(N,
J):NEXT J
150 NEXT N
160 LOCATE 10,10,0:COLOR 4:PRINT "*FAMILY COMPUTING*"
170 LOCATE 12,12:COLOR 2:PRINT "CHRISTMAS TREE"
180 PRINT TAB(11);"CONSTRUCTION SET":LOCATE 23,5
190 COLOR 14:PRINT "PRESS JOYSTICK BUTTON TO BEGIN."
200 FL=0:GOSUB 1000
210 GOSUB 2000
220 N=15:GOSUB 3000:X=150:Y=100
230 GET (X,Y)-(X+W,Y+D),SAV
240 PUT (X,Y),CM,AND:PUT (X,Y),CI,OR
250 JX=STICK(0):JY=STICK(1)
260 VH=4*(JX<30 AND X>4)-4*(JX>70 AND X+W<310)
270 VV=4*(JY<30 AND Y>4)-4*(JY>70 AND Y+D<194)
280 IF VH OR VV THEN 350
290 IF NOT STRIG(1) THEN 250
300 IF Y<=21 THEN 410
310 IF N=15 THEN 250
320 IF N=11 THEN PUT (X,Y),CM,AND
330 GET (X,Y)-(X+W,Y+D),SAV:IF N<>11 THEN 250
340 PUT(X,Y),CI,OR:GOTO 250
350 PUT(X,Y),SAV,PSET
360 X=X+VH:Y=Y+VV
370 IF Y<=21 AND VV<0 AND N<>15 THEN N=15:GOSUB 3000
380 IF N=11 AND STRIG(1) AND Y>20 THEN 320
390 GET (X,Y)-(X+W,Y+D),SAV:PUT(X,Y),CM,AND
400 PUT (X,Y),CI,OR:GOTO 250
410 IF X>200 THEN FC=INT((X-200)/30)+11 ELSE FC=INT((X
-8*(X<160))/20)+1
420 IF FC<12 THEN N=FC:PUT (X,Y),SAV,PSET:SOUND 600,2:
GOSUB 3000:GOTO 390
430 IF FC=12 THEN 210
440 IF FC=13 THEN FL=1:GOSUB 1000:GOTO 250
450 PUT(X,Y),SAV,PSET:GET (1,21)-(318,198),SCN
460 N=15:SCREEN 0:ON ERROR GOTO 630
470 CLS
480 PRINT "Please enter SAVE or LOAD"
490 PRINT "and filename, or just press"
500 PRINT "<RETURN> to continue drawing."
510 PRINT:INPUT F$:IF F$="" THEN 620
520 C$=LEFT$(F$,4):N$=RIGHT$(F$,LEN(F$)-5)
530 IF C$<>"LOAD" THEN 580
540 PRINT:PRINT "Loading ... please wait."
550 OPEN N$ FOR INPUT AS 1
560 FOR I=0 TO 8000:INPUT#1,SCN(I):NEXT I
570 CLOSE 1:GOTO 620
580 IF C$<>"SAVE" THEN CLS:PRINT "Please re-enter.":PR
INT:GOTO 480
590 PRINT:PRINT "Saving ... please wait."
600 OPEN N$ FOR OUTPUT AS 1
610 FOR I=0 TO 8000:PRINT#1,SCN(I):NEXT I:CLOSE 1
620 GOSUB 2000:PUT (1,21),SCN:GOTO 220
630 CLOSE 1:CLS:PRINT
640 PRINT "Error";ERR;"has occurred."
650 PRINT:RESUME 480
1000 MP=1
1010 SOUND M(MP,1),M(MP,2)*5:SOUND 100,.1
1020 MP=MP+1+46*(MP=46)
1030 IF NOT STRIG(1) THEN 1010:STRIG OFF
1040 FOR I=1 TO 500:NEXT I:STRIG ON:RETURN
2000 CLS:SCREEN 1,0:COLOR ,0:FOR I=1 TO 4
2010 LINE (FR(I,1),FR(I,2))-(FR(I,3),FR(I,4)),2,B
2020 NEXT I:FOR N=1 TO 14:GOSUB 3000:X=IT(N,0):Y=IT(N,
1)
2030 PUT (X,Y),CI,PSET:NEXT N:RETURN
3000 FOR J=0 TO IT(N,2)
3010 CI(J)=IT(N,J+3):CM(J)=MT(N,J):NEXT J
3020 W=IT(N,3)/2-1:D=IT(N,4)-1
3030 SAV(0)=IT(N,3):SAV(1)=IT(N,4):RETURN
4010 DATA 392,2,523,1,523,1,523,2,587,2,659,1,659
4020 DATA 1,659,2,659,2,587,1,659,1,698,2,494,2
4030 DATA 587,2,523,2,784,2,784,1,659,1,880,2,784
4040 DATA 2,784,1,698,1,698,2,698,2,698,1,587,1
4050 DATA 784,2,698,2,698,1,659,1,659,2,-1,4,2,1
4060 DATA 0,0,319,20,0,20,319,199,200,0,230,20,260
4070 DATA 0,290,20,5,4,8,8,14,2056,2570,2058,15360
4080 DATA 15420,15420,15420,8,14,-3085,-3056,-3088
4090 DATA -15361,-15421,-15421,-15421,20,3,16,16
4100 DATA 15,-16381,-4081,-4081,-16381,-1,-1,-4081
4110 DATA -4081,-4081,-4081,-4081,12300,12300,12300
4120 DATA 12300,16,15,16380,4080,4080,4080,16380
4130 DATA 0,0,4080,4080,4080,4080,-12301,-12301
4140 DATA -12301,-12301,40,5,12,16,11,-32766,-32766
4150 DATA -24566,-24566,-24566,-24566,-24566,-24566
4160 DATA -22486,-22486,-16384,16,11,16380,16380
4170 DATA 4080,4080,4080,4080,4080,4080,960,960
4180 DATA 16383,60,4,7,8,12,-32640,-32640,-32640
4190 DATA -32640,-32640,-32640,8,12,16191,16191
4200 DATA 16191,16191,16191,16191,80,4,12,16,11
4210 DATA 3,3,-16369,-16369,-769,-4033,-16369,-16369
4220 DATA -16369,-4036,12336,16,11,-4,-4,16368,16368
4230 DATA 768,4032,16368,16368,16368,4035,12337
4240 DATA 100,4,12,16,11,-16381,-4081,-961,-961
4250 DATA -961,-961,-961,-961,-961,-4081,-16381
4260 DATA 16,11,16380,4080,960,960,960,960,960,960
4270 DATA 960,4080,16380,120,4,12,16,11,-16381,20485
4280 DATA -961,21525,-961,21525,-961,21525,-961
4290 DATA 20485,-16381,16,11,16380,4080,960,960
4300 DATA 960,960,960,960,960,4080,16380,140,4,13
4310 DATA 16,12,16385,4100,1040,16385,4100,1040
4320 DATA 16385,4100,1040,16385,4100,1040,16,12
4330 DATA 16380,-12301,-3121,16380,-12301,-3121
4340 DATA 16380,-12301,-3121,16380,-12301,-3121
4350 DATA 160,4,22,24,14,0,21,256,256,81,4352,5376
4360 DATA 17,4097,20737,16,4113,4373,256,17,4097
4370 DATA 256,16,1,256,0,24,14,-1,-64,-769,-769
4380 DATA -244,-13057,-16129,-52,-12292,3324,-49
4390 DATA -12340,-13120,-769,-52,-12292,-769,-49
4400 DATA -4,-769,-1,180,4,22,24,14,84,16384,0,16453
4410 DATA 17408,0,21572,1024,64,17668,1088,68,17408
4420 DATA 84,16452,1024,64,16388,0,64,16384,24,14
4430 DATA -253,16383,-1,16176,13311,-1,819,-3073
4440 DATA -193,12531,-3265,-205,13311,-253,16179
4450 DATA -3073,-193,16371,-1,-193,16383,215,3,9
4460 DATA 8,16,-21846,-21846,-21846,-21846,-171
4470 DATA -171,-171,-21846,8,16,0,0,0,0,0,0,0,0
4480 DATA 240,2,25,24,16,1024,0,4,5408,10242,2581
4490 DATA 21770,616,-24427,-23040,128,16490,27137
4500 DATA 336,-28506,-27390,2720,26709,21801,8282
4510 DATA 520,2048,0,8,270,1,28,24,18,2048,0,8,2560
4520 DATA 0,10,2560,0,8,0,0,60,15360,0,60,15360
4530 DATA 0,10300,15360,34,8764,15360,2600,-24406
4540 DATA -22006,672,-32598,300,3,25,24,16,21845
4550 DATA 16469,256,64,16385,276,21824,16385,341
4560 DATA 21824,16385,276,64,16385,276,5184,16385
4570 DATA 276,5184,16385,276,64,21761,21845,150
4580 DATA 100,7,16,6,170,160,136,130,-32768,8192
4590 DATA 16,6,-256,-241,-205,-196,16383,-12289
```

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CIRCLE READER SERVICE 44

"The Twelve Days of Christmas"

BY JOEY LATIMER

"The Twelve Days of Christmas," a very old and unusual cumulative carol from England, has become one of the most popular Christmas carols in the 20th century. At FAMILY COMPUTING, we like it so much that we have put together a program making it possible for your computer to play the familiar melody, while simultaneously printing the lyrics on your monitor.

Once you have typed the program into your computer and SAVED it to disk or tape, you can gather your family and friends around the computer for a fun, old-fashioned singalong. If you get tired of the traditional lyrics included in the program, it's easy to replace them with your own verses, although they may not format easily, or try the extra set of lyrics the staff at FAMILY COMPUTING has put together (see below). This is done by replacing lines 1050-1160 with the following DATA statements:

```
1050 DATA AND A BRAND NEW ATARI ST.
1060 DATA "TWO PC CLONES,"
1070 DATA "THREE FAT MACS,"
1080 DATA "FOUR COMMODORES,"
1090 DATA "FIVE FLOPPY DISKS,"
1100 DATA "SIX KEYBOARDS CLICKING,"
1110 DATA "SEVEN SPELLING CHECKERS,"
1120 DATA "EIGHT MODEMS DIALING,"
1130 DATA "NINE DATA BASES,"
1140 DATA "TEN INTERFACES,"
1150 DATA "ELEVEN PRINTERS PRINTING,"
1160 DATA "TWELVE DISK DRIVES SPINNING,"
```

Apple II series/*The Twelve Days of Christmas*

```
10 DIM AD(597),AN(597),D(60),N(60),WC(13),WD(79,2)
20 DIM W$(27):HOME
30 PRINT TAB(5);"- THE TWELVE DAYS OF CHRISTMAS -"
40 FOR X = 1 TO 27:READ W$(X):NEXT X
50 FOR X = 1 TO 79:READ WD(X,1):NEXT X
60 C = 1:P = 1:Q = 16
70 FOR S = Q TO 16 STEP -1
80 WD(P,2) = S:P = P+1:NEXT S:Q = Q+1
90 IF P < 79 THEN 70
100 FOR X = 1 TO 60:READ N(X),D(X):NEXT X:NP = 1
110 READ Y,Z:IF Y = 1 THEN WC(C) = NP:C = C+1
120 FOR X = Y TO Z
130 AN(NP) = N(X):AD(NP) = D(X)
140 NP = NP+1:NEXT X
150 IF NP < 598 THEN 110
160 FOR X = 768 TO 804:READ A:POKE X,A:NEXT X
170 W = 1:C = 1
180 FOR X = 1 TO 597
190 IF X <> WC(C) THEN 220
200 HOME:PRINT W$(13);" ";W$(C);" ";W$(14)
210 PRINT W$(15):C = C+1
220 IF X <> WD(W,1) THEN 260
230 PRINT:IF C = 2 THEN PRINT MID$(W$(16),5):GOTO 250
240 PRINT W$(WD(W,2))
250 W = W+1
260 POKE 8,AN(X):POKE 6,AD(X)*38:CALL 768
270 NEXT X:END
999 REM --TEXT DATA--
1000 DATA FIRST,SECOND,THIRD,FOURTH
1010 DATA FIFTH,SIXTH,SEVENTH,EIGHTH
1020 DATA NINTH,TENTH,ELEVENTH,TWELFTH
1030 DATA ON THE,DAY OF CHRISTMAS
1040 DATA MY TRUE LOVE GAVE TO ME
1050 DATA AND A PARTRIDGE IN A PEAR TREE.
1060 DATA "TWO TURTLEDOVES,"
1070 DATA "THREE FRENCH HENS,"
1080 DATA "FOUR CALLING BIRDS,"
1090 DATA "FIVE GOLDEN RINGS,"
1100 DATA "SIX GEESE A-LAYING,"
1110 DATA "SEVEN SWANS A-SWIMMING,"
1120 DATA "EIGHT MAIDS A-MILKING,"
1130 DATA "NINE LADIES DANCING,"
1140 DATA "TEN LORDS A-LEAPING,"
1150 DATA "ELEVEN PIPERS PIPING,"
1160 DATA "TWELVE DRUMMERS DRUMMING,"
1999 REM --TEXT TIMING DATA--
2000 DATA 14,37,41,64,68,72,95,99,103,107,130,135,140
2010 DATA 143,148,171,176,181,186,189,194,218,224,229
2020 DATA 234,239,242,247,270,275,281,286,291,296,299
2030 DATA 304,327,332,337,343,348,353,358,361,366,389
2040 DATA 394,399,404,410,415,420,425,428,433,458,465
2050 DATA 470,475,480,486,491,496,501,504,509,532,537
2060 DATA 544,549,554,559,565,570,575,580,583,588,0
2999 REM --MUSICAL NOTE DATA--
3000 DATA 121,1,121,1,121,2,91,1,91,1,91,2,96,1
3010 DATA 91,1,81,1,72,1,68,1,81,1,72,4,60,2,81,1
3020 DATA 72,1,68,1,81,1,60,4,53,2,64,2,60,6,0,2
3030 DATA 60,1,68,1,72,1,81,1,91,2,68,2,108,2,91
3040 DATA 2,81,1,91,1,96,1,108,1,121,2,72,1,68,1
3050 DATA 60,2,53,1,68,1,72,1,91,1,81,2,91,5,0
3060 DATA 1,60,2,81,1,72,1,68,2,121,1,91,1,60,1,60,1
3070 DATA 121,0.5,121,0.5,72,3,60,1,81,0.5,60,0.5
3999 REM --MUSICAL ARRANGEMENT DATA--
4000 DATA 1,13,38,46,1,2,51,52,4,13,47,50,37,46,1,13
4010 DATA 47,50,47,50,37,46,1,13,47,50,47,50,47,50,37
4020 DATA 46,1,13,19,46,1,13,14,46,1,2,51,52,4,13,53
4030 DATA 54,15,18,14,46,1,13,14,18,53,54,15,18,14,46
4040 DATA 1,13,14,18,14,18,53,54,15,18,14,46,1,13,14
4050 DATA 18,14,18,14,18,53,54,15,18,14,46,1,1,55,56
4060 DATA 51,52,4,12,57,58,53,54,15,18,14,18,14,18,14
4070 DATA 18,53,54,15,18,14,46,1,13,14,17,59,60,53,54
4080 DATA 15,18,14,18,14,18,14,18,53,54,15,18,14,46
4999 REM --MACHINE-LANGUAGE MUSIC DRIVER DATA--
5000 DATA 165,8,201,2,176,2,169,2,74,133,10,164,8
5010 DATA 240,8,173,48,192,234,234,136,208,251,56
5020 DATA 165,7,229,10,133,7,176,235,198,6,208,231,96
```

Atari 400/800, 600/800XL, & 130XE/*The Twelve Days of Christmas*

```
10 DIM N(54),D(54),V1$(595),V2$(441),V3$(290)
20 DIM D1$(595),D2$(441),D3$(290),XX$(40)
30 DIM W$(1120),TEMP$(40),BL$(40),WC(13),WD(79,2)
40 POKE 709,255:POKE 710,33:POKE 752,1:POKE 82,0
50 D1$=CHR$(0):D1$(595)=D1$:D1$(2)=D1$
60 D2$=D1$:D3$=D1$:V1$=D1$:V2$=D1$:V3$=D1$
70 BL$=" ":BL$(40)=BL$:BL$(2)=BL$
80 PRINT CHR$(125);"    - THE TWELVE DAYS OF CHRISTMAS
 -"
90 POSITION 14,3:PRINT "TUNING UP..."
100 FOR X=1 TO 27:READ TEMP$:TL=LEN(TEMP$)
110 IF X>16 THEN TL=TL+1:TEMP$(TL)=","
120 IF TL<40 THEN TEMP$(TL+1)=BL$
130 START=X*40-39:W$(START)=TEMP$:NEXT X
140 FOR X=1 TO 79:READ WD:WD(X,1)=WD:NEXT X
150 P=1:Q=16
160 FOR S=Q TO 16 STEP -1
170 WD(P,2)=S:P=P+1:NEXT S:Q=Q+1
180 IF P<79 THEN 160
190 FOR X=1 TO 54:READ N,C
200 N(X)=N:D(X)=C:NEXT X:NP=1
210 READ Y,Z:IF Y=1 THEN WC(C)=NP:C=C+1
220 FOR X=Y TO Z:V1$(NP,NP)=CHR$(N(X))
230 D1$(NP,NP)=CHR$(D(X))
240 NP=NP+1:NEXT X
```

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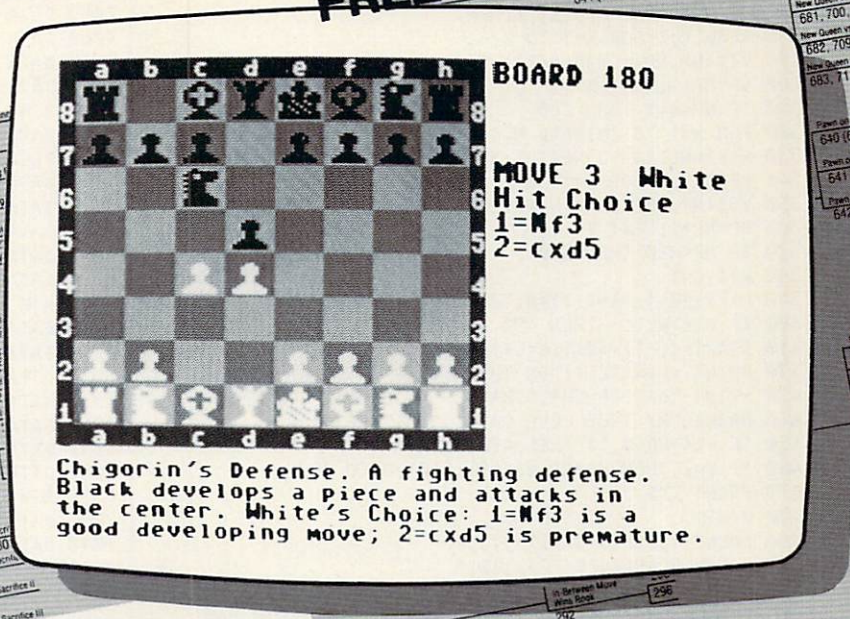

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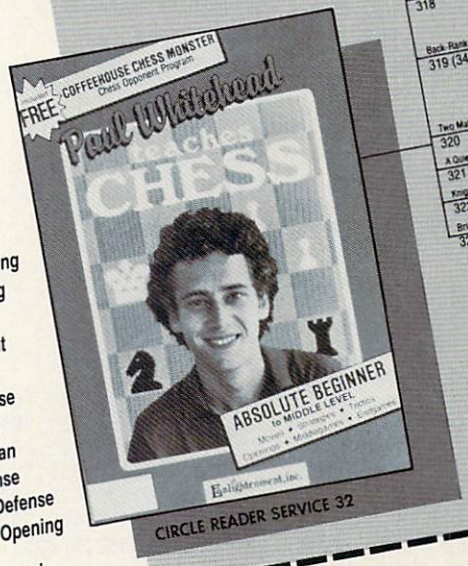

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```
250 IF NP<595 THEN 210
260 FOR X=1 TO 45:READ N,C
270 N(X)=N:D(X)=C:NEXT X:NP=1
280 READ Y,Z:FOR X=Y TO Z
290 V2$(NP,NP)=CHR$(N(X)):D2$(NP,NP)=CHR$(D(X))
300 NP=NP+1:NEXT X
310 IF NP<441 THEN 280
320 FOR X=1 TO 26:READ N,C
330 N(X)=N:D(X)=C:NEXT X:NP=1
340 READ Y,Z:FOR X=Y TO Z
350 V3$(NP,NP)=CHR$(N(X)):D3$(NP,NP)=CHR$(D(X))
360 NP=NP+1:NEXT X
370 IF NP<290 THEN 340
380 W=1:C=1
390 P1=1:P2=1:P3=1:T1=0:T2=0:T3=0
400 IF P1<>WC(C) THEN 450
410 START=(C-1)*40+1:C=C+1
420 PRINT CHR$(125);"ON THE ";W$(START,START+29)
430 PRINT "DAY OF CHRISTMAS"
440 PRINT "MY TRUE LOVE GAVE TO ME":PRINT
450 IF P1<>WD(W,1) THEN 490
460 IF C=2 THEN PRINT W$(605,640):GOTO 480
470 PRINT XX$
480 W=W+1
490 SOUND 1,ASC(V1$(P1)),10,10
500 SOUND 2,ASC(V2$(P2)),10,8
510 SOUND 3,ASC(V3$(P3)),10,6
520 IF P1>582 THEN FOR DE=1 TO 10:NEXT DE:GOTO 540
530 XX$=W$(WD(W,2)*40-39,WD(W,2)*40)
540 FOR DE=1 TO 22:NEXT DE
550 T1=T1+1:T2=T2+1:T3=T3+1
560 IF T1=ASC(D1$(P1)) THEN T1=0:P1=P1+1:SOUND 1,0,0,0
570 IF T2=ASC(D2$(P2)) THEN T2=0:P2=P2+1:SOUND 2,0,0,0
580 IF T3=ASC(D3$(P3)) THEN T3=0:P3=P3+1:SOUND 3,0,0,0
590 IF P1<>595 THEN 400
600 POKE 752,0:END
999 REM --TEXT DATA--
1000 DATA FIRST,SECOND,THIRD,FOURTH
1010 DATA FIFTH,SIXTH,SEVENTH,EIGHTH
1020 DATA NINTH,TENTH,'LEVENTH,TWELFTH
1030 DATA ON THE,DAY OF CHRISTMAS
1040 DATA MY TRUE LOVE GAVE TO ME
1050 DATA AND A PARTRIDGE IN A PEAR TREE.
1060 DATA TWO TURTLEDOVES
1070 DATA THREE FRENCH HENS
1080 DATA FOUR CALLING BIRDS
1090 DATA FIVE GOLDEN RINGS
1100 DATA SIX GEESE A-LAYING
1110 DATA SEVEN SWANS A-SWIMMING
1120 DATA EIGHT MAIDS A-MILKING
1130 DATA NINE LADIES DANCING
1140 DATA TEN LORDS A-LEAPING
1150 DATA 'LEVEN PIPERS PIPING
1160 DATA TWELVE DRUMMERS DRUMMING
1999 REM --TEXT TIMING DATA---
2000 DATA 14,37,41,64,68,72,95,99,103,107,130,135,140
2010 DATA 143,148,171,176,181,186,189,194,218,224,229
2020 DATA 234,239,242,247,270,275,281,286,291,296,299
2030 DATA 304,327,332,337,343,348,353,358,361,366,389
2040 DATA 394,399,404,410,415,420,425,428,433,457,463
2050 DATA 468,473,478,484,489,494,499,502,507,530,535
2060 DATA 541,546,551,556,562,567,572,577,580,585,0
2999 REM --MELODY NOTES--
3000 DATA 121,1,121,1,121,2,91,1,91,1,91,2,96,1
3010 DATA 91,1,81,1,72,1,68,1,81,1,72,4,60,2,81,1
3020 DATA 72,1,68,1,81,1,60,4,53,2,64,2,60,6,0,2
3030 DATA 60,1,68,1,72,1,81,1,91,2,68,2,108,2,91
3040 DATA 2,81,1,91,1,96,1,108,1,121,2,72,1,68,1
3050 DATA 60,2,53,1,68,1,72,1,91,1,81,2,121,5,0
3060 DATA 1,60,2,81,1,72,1,68,2,121,1,91,1,60,1,60,1
3999 REM --MELODY ARRANGEMENT--
4000 DATA 1,13,38,46,1,2,51,52,4,13,47,50,37,46,1,13
4010 DATA 47,50,47,50,37,46,1,13,47,50,47,50,47,50
4020 DATA 37,46,1,13,19,46,1,13,14,46,1,2,51,52,4
4030 DATA 13,53,54,15,18,14,46,1,13,14,18,53,54,15
4040 DATA 18,14,46,1,13,14,18,14,18,53,54,15,18,14
4050 DATA 46,1,13,14,18,14,18,14,18,53,54,15,18,14
4060 DATA 46,1,2,51,52,4,13,53,54,15,18,14,18,14,18
4070 DATA 14,18,53,54,15,18,14,46,1,13,14,18,53,54
4080 DATA 15,18,14,18,14,18,14,18,53,54,15,18,14,46
4999 REM --BASS NOTES--
5000 DATA 0,2,182,2,193,2,217,2,243,2,136,2,243,2
5010 DATA 182,4,144,1,121,1,136,1,121,1,108,2
5020 DATA 144,4,162,4,162,6,0,2,182,1,243,1,136,1
5030 DATA 121,1,108,2,182,1,243,1,136,1,121,1,108,2
5040 DATA 193,4,182,2,182,1,162,1,144,2,136,2,121,2
5050 DATA 121,2,91,5,0,1,182,2,121,2,144,2
5060 DATA 217,2,182,2,136,2,121,6,182,1
5999 REM --BASS ARRANGEMENT--
6000 DATA 1,8,31,37,1,8,28,37,1,8,23,37,1,8,18,37,1
6010 DATA 8,14,17,38,45,31,37,1,17,38,45,31,37,1,13
6020 DATA 9,17,38,45,31,37,1,13,9,13,9,17,38,45,31
6030 DATA 37,1,13,9,13,9,13,9,17,38,45,31,37,1,13
6040 DATA 9,13,9,13,9,13,9,17,38,45,31,37,1,13,9
6050 DATA 13,9,13,9,13,9,13,9,17,38,45,31,37,1,13,9
6060 DATA 13,9,13,9,13,9,13,9,13,9,17,38,45,31,37
6999 REM --HARMONY NOTES--
7000 DATA 0,2,144,2,0,2,144,2,0,2,108,1,0,1,96,1,0
7010 DATA 1,121,4,0,6,96,4,81,4,96,6,0,2,0,6,0,6,121
7020 DATA 7,0,3,182,1,0,3,136,2,144,5,0,1,193,6,0,1
7999 REM --HARMONY ARRANGEMENT--
8000 DATA 1,10,19,24,1,10,18,24,1,10,17,24,1,10,16,24
8010 DATA 1,10,12,24,1,17,25,26,19,24,1,11,11,17,25
8020 DATA 26,19,24,1,11,11,11,11,17,25,26,19,24,1,11
8030 DATA 11,11,11,11,17,25,26,19,24,1,11,11,11,11
8040 DATA 11,11,11,11,17,25,26,19,24,1,11,11,11,11,11
8050 DATA 11,11,11,11,11,17,25,26,19,24,1,11,11,11
8060 DATA 11,11,11,11,11,11,11,11,11,17,25,26,19,24
```

Commodore 64 & 128 (C 64 mode)/*The Twelve Days of Christmas*

```
10 DIM N(54,2),D(54),V1(595,3),V2(441,3),V3(290,3)
20 DIM WC(13),WD(79,2),W$(28)
30 POKE 53280,2:POKE 53281,2
40 S=54272:PRINT CHR$(147);CHR$(155)
50 PRINT TAB(4);"- THE TWELVE DAYS OF CHRISTMAS -"
60 PRINT:PRINT TAB(14);"TUNING UP..."
70 FOR X=0 TO 24:POKE S+X,0:NEXT X
80 POKE S+5,28:POKE S+6,192:POKE S+12,28
90 POKE S+13,192:POKE S+19,28:POKE S+20,192
100 POKE S+24,15:X1=S+4:X2=S+11:X3=S+18
110 FOR X=1 TO 27:READ W$(X):NEXT X
120 FOR X=1 TO 79:READ WD(X,1):NEXT X
130 C=1:P=1:Q=16
140 FOR SP=Q TO 16 STEP -1
150 WD(P,2)=SP:P=P+1:NEXT SP:Q=Q+1
160 IF P<79 THEN 140
170 FOR X=1 TO 54
180 READ N(X,1),N(X,2),D(X):NEXT X:NP=1
190 READ Y,Z:IF Y=1 THEN WC(C)=NP:C=C+1
200 FOR X=Y TO Z
210 V1(NP,1)=N(X,1):V1(NP,2)=N(X,2):V1(NP,3)=D(X)
220 NP=NP+1:NEXT X
230 IF NP<595 THEN 190
240 FOR X=1 TO 45
250 READ N(X,1),N(X,2),D(X):NEXT X:NP=1
260 READ Y,Z:FOR X=Y TO Z
270 V2(NP,1)=N(X,1):V2(NP,2)=N(X,2):V2(NP,3)=D(X)
280 NP=NP+1:NEXT X
290 IF NP<441 THEN 260
300 FOR X=1 TO 26
310 READ N(X,1),N(X,2),D(X):NEXT X:NP=1
320 READ Y,Z:FOR X=Y TO Z
330 V3(NP,1)=N(X,1):V3(NP,2)=N(X,2):V3(NP,3)=D(X)
340 NP=NP+1:NEXT X
350 IF NP<290 THEN 320
360 W=1:C=1:PRINT CHR$(28):POKE 53280,5:POKE 53281,1
370 P1=1:P2=1:P3=1:T1=0:T2=0:T3=0
```

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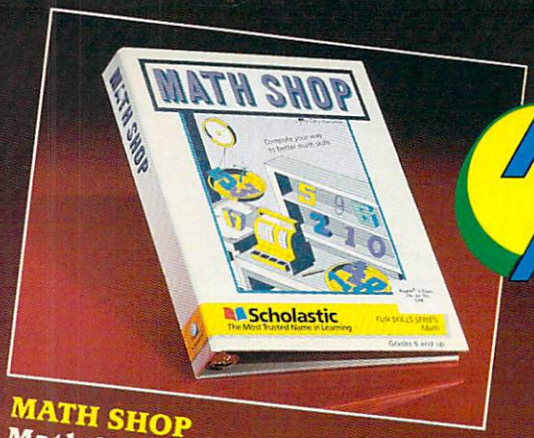

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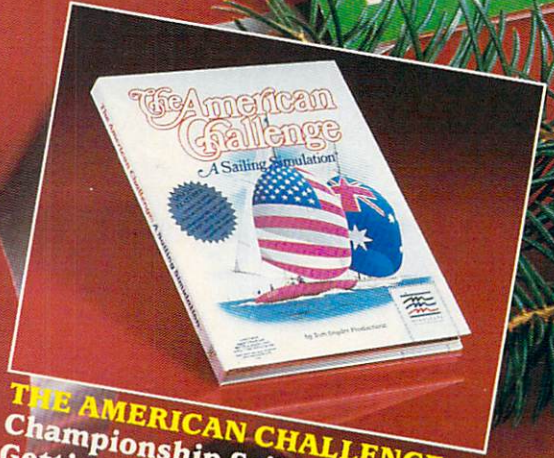

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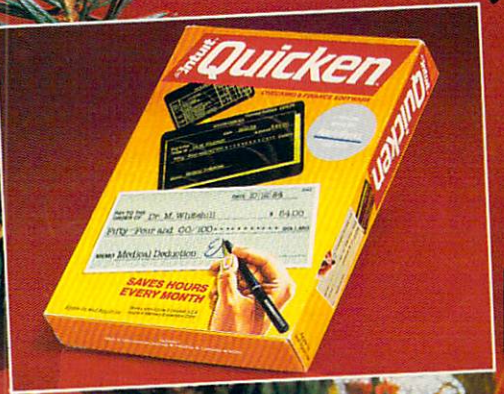

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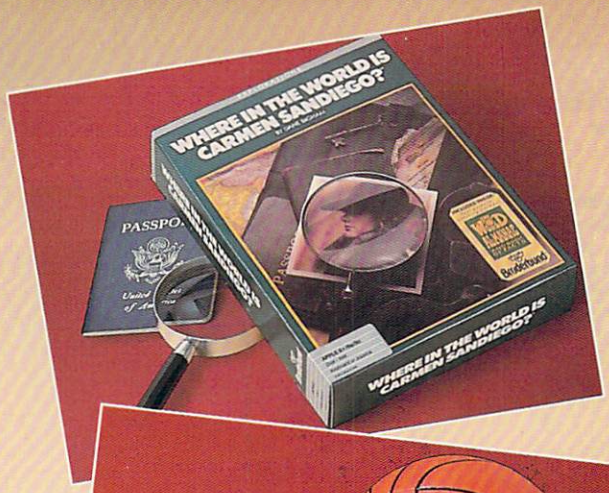

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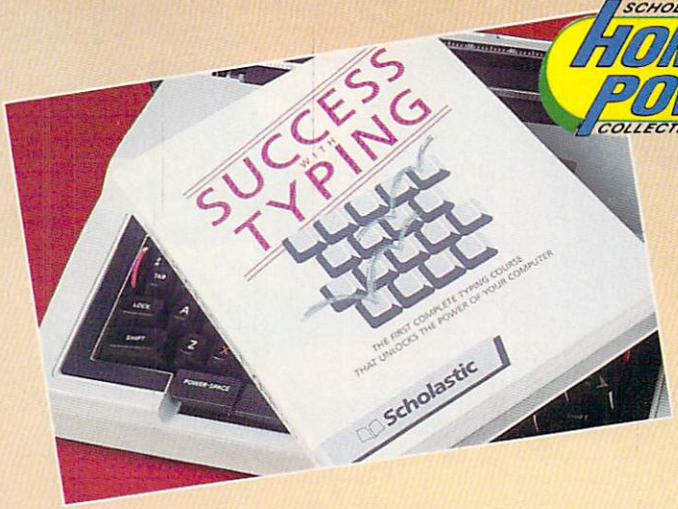

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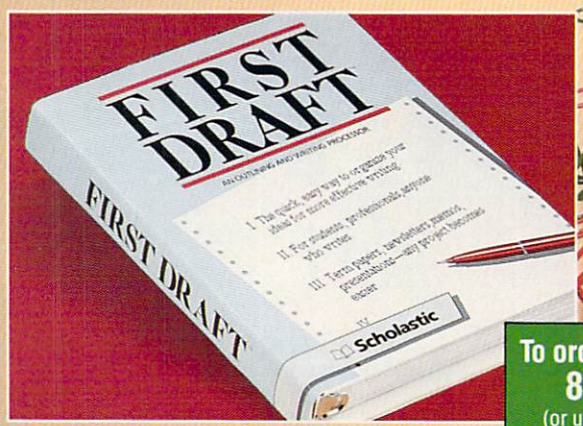

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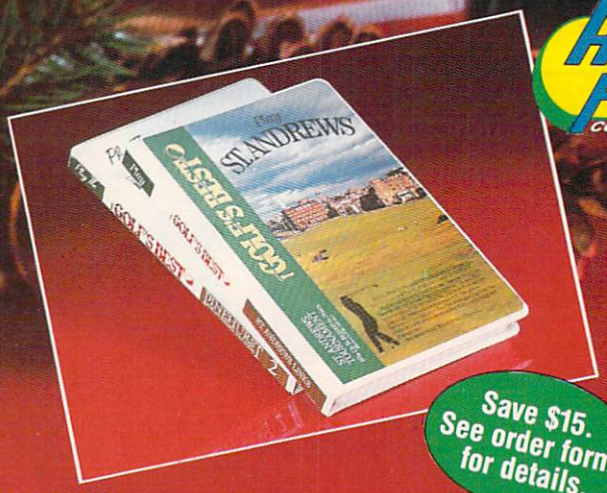

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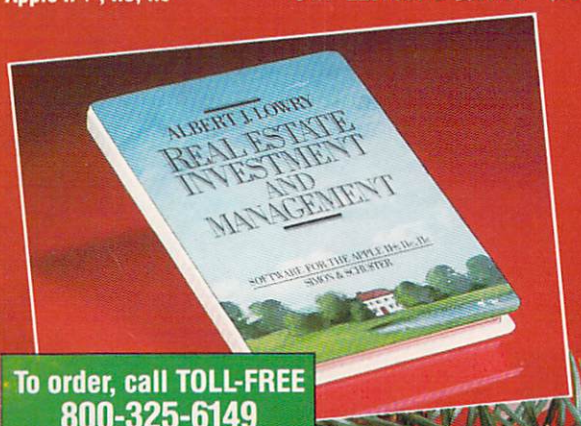

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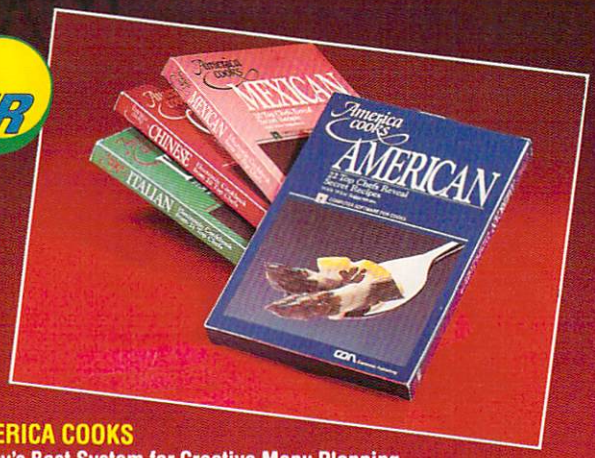

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```
380 IF P1<>WC(C) THEN 410
390 PRINT CHR$(147);W$(13);" ";W$(C);
400 PRINT W$(14):PRINT W$(15):C=C+1
410 IF P1<>WD(W,1) THEN 450
420 PRINT:IF C=2 THEN PRINT RIGHT$(W$(WD(W,2)),27):GOT
O 440
430 PRINT W$(WD(W,2))
440 W=W+1
450 POKE S+1,V1(P1,1):POKE S,V1(P1,2)
460 POKE S+8,V2(P2,1):POKE S+7,V2(P2,2)
470 POKE S+15,V3(P3,1):POKE S+14,V3(P3,2)
480 POKE X1,33:POKE X2,33:POKE X3,33
490 IF P1>582 THEN FOR DE=1 TO 10:NEXT DE
500 FOR DE=1 TO 35:NEXT DE
510 T1=T1+1:T2=T2+1:T3=T3+1
520 IF T1=V1(P1,3) THEN T1=0:P1=P1+1:POKE X1,32
530 IF T2=V2(P2,3) THEN T2=0:P2=P2+1:POKE X2,32
540 IF T3=V3(P3,3) THEN T3=0:P3=P3+1:POKE X3,32
550 IF P1<>595 THEN 380
560 END
999 REM --TEXT DATA--
1000 DATA FIRST,SECOND,THIRD,FOURTH
1010 DATA FIFTH,SIXTH,SEVENTH,EIGHTH
1020 DATA NINTH,TENTH,'LEVENTH,TWELFTH
1030 DATA ON THE," DAY OF CHRISTMAS"
1040 DATA MY TRUE LOVE GAVE TO ME
1050 DATA AND A PARTRIDGE IN A PEAR TREE.
1060 DATA "TWO TURTLEDOVES,"
1070 DATA "THREE FRENCH HENS,"
1080 DATA "FOUR CALLING BIRDS,"
1090 DATA "FIVE GOLDEN RINGS,"
1100 DATA "SIX GEESE A-LAYING,"
1110 DATA "SEVEN SWANS A-SWIMMING,"
1120 DATA "EIGHT MAIDS A-MILKING,"
1130 DATA "NINE LADIES DANCING,"
1140 DATA "TEN LORDS A-LEAPING,"
1150 DATA "'LEVEN PIPERS PIPING,"
1160 DATA "TWELVE DRUMMERS DRUMMING,"
1999 REM --TEXT TIMING DATA--
2000 DATA 14,37,41,64,68,72,95,99,103,107,130,135,140
2010 DATA 143,148,171,176,181,186,189,194,218,224,229
2020 DATA 234,239,242,247,270,275,281,286,291,296,299
2030 DATA 304,327,332,337,343,348,353,358,361,366,389
2040 DATA 394,399,404,410,415,420,425,428,433,457,463
2050 DATA 468,473,478,484,489,494,499,502,507,530,535
2060 DATA 541,546,551,556,562,567,572,577,580,585,0
2999 REM --MELODY NOTES--
3000 DATA 16,195,1,16,195,1,16,195,2,22,96,1,22,96,1
3010 DATA 22,96,2,21,31,1,22,96,1,25,30,1,28,49,1
3020 DATA 29,223,1,25,30,1,28,49,4,33,135,2,25,30,1
3030 DATA 28,49,1,29,223,1,25,30,1,33,135,4,37,162,2
3040 DATA 31,165,2,33,135,6,0,0,2,33,135,1,29,223,1
3050 DATA 28,49,1,25,30,1,22,96,2,29,223,2,18,209,2
3060 DATA 22,96,2,25,30,1,22,96,1,21,31,1,18,209,1
3070 DATA 16,195,2,28,49,1,29,223,1,33,135,2,37,162,1
3080 DATA 29,233,1,28,49,1,22,96,1,25,30,2,16,195,5
3090 DATA 0,0,1,33,135,2,25,30,1,28,49,1,29,223,2
3100 DATA 16,195,1,22,96,1,33,135,1,33,135,1
3999 REM --MELODY ARRANGEMENT--
4000 DATA 1,13,38,46,1,2,51,52,4,13,47,50,37,46,1,13
4010 DATA 47,50,47,50,37,46,1,13,47,50,47,50,47,50
4020 DATA 37,46,1,13,19,46,1,13,14,46,1,2,51,52,4
4030 DATA 13,53,54,15,18,14,46,1,13,14,18,53,54,15,18
4040 DATA 14,46,1,13,14,18,14,18,53,54,15,18,14,46,1
4050 DATA 13,14,18,14,18,14,18,53,54,15,18,14,46,1,2
4060 DATA 51,52,4,13,53,54,15,18,14,18,14,18,14,18,53
4070 DATA 54,15,18,14,46,1,13,14,18,53,54,15,18,14,18
4080 DATA 14,18,14,18,53,54,15,18,14,46
4999 REM --BASS NOTES--
5000 DATA 0,0,2,11,48,2,10,143,2,9,104,2,8,97,2
5010 DATA 14,239,2,8,97,2,11,48,4,14,24,1,16,195,1
5020 DATA 14,239,1,16,195,1,18,209,2,14,24,4,12,143,4
5030 DATA 12,143,6,0,0,2,11,48,1,8,97,1,14,239,1
5040 DATA 16,195,1,18,209,2,11,48,1,8,97,1,14,239,1
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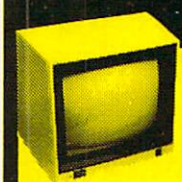

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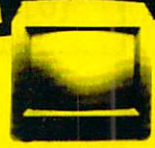

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HOLIDAY PROGRAM

```
5050 DATA 16,195,1,18,209,2,10,143,4,11,48,2,11,48,1
5060 DATA 12,143,1,14,24,2,14,239,2,16,195,2,16,195,2
5070 DATA 22,96,5,0,0,1,11,48,2,16,195,2,14,24,2
5080 DATA 9,104,2,11,48,2,14,239,2,16,195,6,11,48,1
5999 REM --BASS ARRANGEMENT--
6000 DATA 1,8,31,37,1,8,28,37,1,8,23,37,1,8,18,37,1
6010 DATA 8,14,17,38,45,31,37,1,17,38,45,31,37,1,13
6020 DATA 9,17,38,45,31,37,1,13,9,13,9,17,38,45,31
6030 DATA 37,1,13,9,13,9,13,9,17,38,45,31,37,1,13
6040 DATA 9,13,9,13,9,13,9,17,38,45,31,37,1,13,9
6050 DATA 13,9,13,9,13,9,13,9,17,38,45,31,37,1,13,9
6060 DATA 13,9,13,9,13,9,13,9,13,9,17,38,45,31,37
6999 REM --HARMONY NOTES--
7000 DATA 0,0,2,14,24,2,0,0,2,14,24,2
7010 DATA 0,0,2,18,209,1,0,0,1,21,31,1,0,0,1,16,195,4
7020 DATA 0,0,6,21,31,4,25,30,4,21,31,6,0,0,2,0,0,6
7030 DATA 0,0,6,16,195,7,0,0,3,11,48,1,0,0,3,14,239,2
7040 DATA 14,24,5,0,0,1,10,143,6,0,0,1
7999 REM --HARMONY ARRANGEMENT--
8000 DATA 1,10,19,24,1,10,18,24,1,10,17,24,1,10,16,24
8010 DATA 1,10,12,24,1,17,25,26,19,24,1,11,11,17,25
8020 DATA 26,19,24,1,11,11,11,11,17,25,26,19,24,1,11
8030 DATA 11,11,11,11,11,17,25,26,19,24,1,11,11,11,11
8040 DATA 11,11,11,11,17,25,26,19,24,1,11,11,11,11,11
8050 DATA 11,11,11,11,11,17,25,26,19,24,1,11,11,11
8060 DATA 11,11,11,11,11,11,11,11,11,17,25,26,19,24
```

IBM PC & compatibles/*The Twelve Days of Christmas*

This program has been tested and found to work on the following computers and hardware configurations, using the BASICs shown: IBM PC w/Color/Graphics Monitor Adapter or Monochrome/Printer Card, w/Advanced BASIC A2.00. IBM PCjr w/ Cartridge BASIC J1.00. Tandy 1000 w/GW-BASIC 2.02 version 01.01.00. It should also work on many other PC compatibles.

```
10 DIM AD(597),AN(597),D(60),N(60),WC(13),WD(79,2)
20 DIM W$(27):KEY OFF:LOCATE ,,0
30 CLS:PRINT TAB(5);"- THE TWELVE DAYS OF CHRISTMAS -"
40 FOR X=1 TO 27:READ W$(X):NEXT X
50 FOR X=1 TO 79:READ WD(X,1):NEXT X
60 C=1:P=1:Q=16
70 FOR S=Q TO 16 STEP -1
80 WD(P,2)=S:P=P+1:NEXT S:Q=Q+1
90 IF P<79 THEN 70
100 FOR X=1 TO 60:READ N(X),D(X):NEXT X:NP=1
110 READ Y,Z:IF Y=1 THEN WC(C)=NP:C=C+1
120 FOR X=Y TO Z
130 AN(NP)=N(X):AD(NP)=D(X)
140 NP=NP+1:NEXT X
150 IF NP<598 THEN 110
160 W=1:C=1:PLAY "MF"
170 FOR X=1 TO 597
180 IF X<>WC(C) THEN 210
190 CLS:PRINT W$(13);" ";W$(C);" ";W$(14)
200 PRINT W$(15):C=C+1
210 IF X<>WD(W,1) THEN 250
220 PRINT:IF C=2 THEN PRINT MID$(W$(16),5):GOTO 240
230 PRINT W$(WD(W,2))
240 W=W+1
250 SOUND AN(X),AD(X)*3.5-.1:SOUND 32767,.1
260 NEXT X:END
999 REM --TEXT DATA--
1000 DATA FIRST,SECOND,THIRD,FOURTH
1010 DATA FIFTH,SIXTH,SEVENTH,EIGHTH
1020 DATA NINTH,TENTH,ELEVENTH,TWELFTH
1030 DATA ON THE,DAY OF CHRISTMAS
1040 DATA MY TRUE LOVE GAVE TO ME
1050 DATA AND A PARTRIDGE IN A PEAR TREE.
1060 DATA "TWO TURTLEDOVES,"
1070 DATA "THREE FRENCH HENS,"
1080 DATA "FOUR CALLING BIRDS,"
1090 DATA "FIVE GOLDEN RINGS,"
1100 DATA "SIX GEESE A-LAYING,"
1110 DATA "SEVEN SWANS A-SWIMMING,"
1120 DATA "EIGHT MAIDS A-MILKING,"
```

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```
1130 DATA "NINE LADIES DANCING,"
1140 DATA "TEN LORDS A-LEAPING,"
1150 DATA "ELEVEN PIPERS PIPING,"
1160 DATA "TWELVE DRUMMERS DRUMMING,"
1999 REM --TEXT TIMING DATA--
2000 DATA 14,37,41,64,68,72,95,99,103,107,130,135,140
2010 DATA 143,148,171,176,181,186,189,194,218,224,229
2020 DATA 234,239,242,247,270,275,281,286,291,296,299
2030 DATA 304,327,332,337,343,348,353,358,361,366,389
2040 DATA 394,399,404,410,415,420,425,428,433,458,465
2050 DATA 470,475,480,486,491,496,501,504,509,532,537
2060 DATA 544,549,554,559,565,570,575,580,583,588,0
2999 REM --MUSICAL NOTE DATA--
3000 DATA 262,1,262,1,262,2,349,1,349,1,349,2,330,1
3010 DATA 349,1,392,1,440,1,466,1,392,1,440,4,523,2
3020 DATA 392,1,440,1,466,1,392,1,523,4,587,2,494,2
3030 DATA 523,6,32767,2,523,1,466,1,440,1,392,1,349,2
3040 DATA 466,2,294,2,349,2,392,1,349,1,330,1,294,1
3050 DATA 262,2,440,1,466,1,523,2,587,1,466,1,440,1
3060 DATA 349,1,392,2,349,5,32767,1,523,2,392,1,440,1
3070 DATA 466,2,262,1,349,1,523,1,523,1,262,0.5
3080 DATA 262,0.5,440,3,523,1,392,.5,523,.5
3999 REM --MUSICAL ARRANGEMENT DATA--
4000 DATA 1,13,38,46,1,2,51,52,4,13,47,50,37,46,1,13
4010 DATA 47,50,47,50,37,46,1,13,47,50,47,50,47,50,37
4020 DATA 46,1,13,19,46,1,13,14,46,1,2,51,52,4,13,53
4030 DATA 54,15,18,14,46,1,13,14,18,53,54,15,18,14,46
4040 DATA 1,13,14,18,14,18,53,54,15,18,14,46,1,13,14
4050 DATA 18,14,18,14,18,53,54,15,18,14,46,1,1,55,56
4060 DATA 51,52,4,12,57,58,53,54,15,18,14,18,14,18,14
4070 DATA 18,53,54,15,18,14,46,1,13,14,17,59,60,53,54
4080 DATA 15,18,14,18,14,18,14,18,53,54,15,18,14,46
```

Tandy Color Computer/*The Twelve Days of Christmas*

```
10 DIM AN(597),AD(597),N(60),D(60),WC(13),WD(79,2)
20 DIM W$(27):CLS
30 PRINT "- THE TWELVE DAYS OF CHRISTMAS -"
40 FOR X=1 TO 27:READ W$(X):NEXT X
50 FOR X=1 TO 79:READ WD(X,1):NEXT X
60 C=1:P=1:Q=16
70 FOR S=Q TO 16 STEP -1
80 WD(P,2)=S:P=P+1:NEXT S:Q=Q+1
90 IF P<79 THEN 70
100 FOR X=1 TO 60:READ N(X),D(X):NEXT X:NP=1
110 READ Y,Z:IF Y=1 THEN WC(C)=NP:C=C+1
120 FOR X=Y TO Z
130 AN(NP)=N(X):AD(NP)=D(X)
140 NP=NP+1:NEXT X
150 IF NP<598 THEN 110
160 W=1:C=1:PRINT:PRINT
170 FOR X=1 TO 597
180 IF X<>WC(C) THEN 220
190 CLS:PRINT W$(13);" ";W$(C);" ";
200 IF C=11 THEN PRINT W$(14); ELSE PRINT W$(14)
210 PRINT W$(15):C=C+1
220 IF X<>WD(W,1) THEN 260
230 PRINT:IF C=2 THEN PRINT MID$(W$(16),5):GOTO 250
240 PRINT W$(WD(W,2))
250 W=W+1
260 IF AN(X)=0 THEN FOR T=1 TO 80*AD(X):NEXT T:GOTO 28
0
270 SOUND AN(X),AD(X)*3
280 NEXT X:END
999 REM --TEXT DATA--
1000 DATA FIRST,SECOND,THIRD,FOURTH
1010 DATA FIFTH,SIXTH,SEVENTH,EIGHTH
1020 DATA NINTH,TENTH,ELEVENTH,TWELFTH
1030 DATA ON THE,DAY OF CHRISTMAS
1040 DATA MY TRUE LOVE GAVE TO ME
1050 DATA AND A PARTRIDGE IN A PEAR TREE.
1060 DATA "TWO TURTLEDOVES,"
1070 DATA "THREE FRENCH HENS,"
```

```
1080 DATA "FOUR CALLING BIRDS,"
1090 DATA "FIVE GOLDEN RINGS,"
1100 DATA "SIX GEESE A-LAYING,"
1110 DATA "SEVEN SWANS A-SWIMMING,"
1120 DATA "EIGHT MAIDS A-MILKING,"
1130 DATA "NINE LADIES DANCING,"
1140 DATA "TEN LORDS A-LEAPING,"
1150 DATA "ELEVEN PIPERS PIPING,"
1160 DATA "TWELVE DRUMMERS DRUMMING,"
1999 REM --TEXT TIMING DATA--
2000 DATA 14,37,41,64,68,72,95,99,103,107,130,135,140
2010 DATA 143,148,171,176,181,186,189,194,218,224,229
2020 DATA 234,239,242,247,270,275,281,286,291,296,299
2030 DATA 304,327,332,337,343,348,353,358,361,366,389
2040 DATA 394,399,404,410,415,420,425,428,433,458,465
2050 DATA 470,475,480,486,491,496,501,504,509,532,537
2060 DATA 544,549,554,559,565,570,575,580,583,588,0
2999 REM --MUSICAL NOTE DATA--
3000 DATA 89,1,89,1,89,2,133,1,133,1,133,2,125,1,133,1
3010 DATA 147,1,159,1,165,1,147,1,159,4,176,2,147,1
3020 DATA 159,1,165,1,147,1,176,4,185,2,170,2,176,6
3030 DATA 0,2,176,1,165,1,159,1,147,1,133,2,165,2
3040 DATA 108,2,133,2,147,1,133,1,125,1,108,1,89,2
3050 DATA 159,1,165,1,176,2,185,1,165,1,159,1,133,1
3060 DATA 147,2,133,5,0,1,176,2,147,1,159,1,165,2
3070 DATA 89,1,133,1,176,1,176,1,89,0.5,89,0.5,159,3
3080 DATA 176,1,147,0.5,176,0.5
3999 REM --MUSICAL ARRANGEMENT DATA--
4000 DATA 1,13,38,46,1,2,51,52,4,13,47,50,37,46,1,13
4010 DATA 47,50,47,50,37,46,1,13,47,50,47,50,47,50,37
4020 DATA 46,1,13,19,46,1,13,14,46,1,2,51,52,4,13,53
4030 DATA 54,15,18,14,46,1,13,14,18,53,54,15,18,14,46
4040 DATA 1,13,14,18,14,18,53,54,15,18,14,46,1,13,14
4050 DATA 18,14,18,14,18,53,54,15,18,14,46,1,1,55,56
4060 DATA 51,52,4,12,57,58,53,54,15,18,14,18,14,18,14
4070 DATA 18,53,54,15,18,14,46,1,13,14,17,59,60,53,54
4080 DATA 15,18,14,18,14,18,14,18,53,54,15,18,14,46
```

TI-99/4A w/TI Extended BASIC/*The Twelve Days of Christmas*

```
10 DIM AN(597),AD(597),N(60),D(60),WC(13),WD(79,2),W$(
27)
20 CALL CLEAR :: PRINT "THE TWELVE DAYS OF CHRISTMAS"
30 FOR X=1 TO 12 :: PRINT :: NEXT X
40 FOR X=1 TO 27 :: READ W$(X):: NEXT X
50 FOR X=1 TO 79 :: READ WD(X,1):: NEXT X
60 C=1 :: P=1 :: Q=16
70 FOR S=Q TO 16 STEP -1
80 WD(P,2)=S :: P=P+1 :: NEXT S :: Q=Q+1
90 IF P<79 THEN 70
100 FOR X=1 TO 60 :: READ N(X),D(X):: NEXT X :: NP=1
110 READ Y,Z :: IF Y=1 THEN WC(C)=NP :: C=C+1
120 FOR X=Y TO Z
130 AN(NP)=N(X):: AD(NP)=D(X)
140 NP=NP+1 :: NEXT X
150 IF NP<598 THEN 110
160 A$=SEG$(W$(16),1,26)&"  "&SEG$(W$(16),27,5)
170 SP$=SEG$(W$(16),5,LEN(W$(16))-4)
180 IF SEG$(W$(16),7,1)="P" THEN W$(16)=A$
190 W=1 :: C=1 :: FOR X=1 TO 597
200 IF X<>WC(C)THEN 230
210 CALL CLEAR :: PRINT :: PRINT W$(13);" ";W$(C);" ";
W$(14)
220 PRINT W$(15):: C=C+1
230 IF X<>WD(W,1)THEN 270
240 PRINT
250 IF C=2 THEN PRINT SP$ ELSE PRINT W$(WD(W,2))
260 W=W+1
270 CALL SOUND(AD(X)*200,AN(X),0)
280 NEXT X :: END
999 REM --TEXT DATA--
1000 DATA FIRST,SECOND,THIRD,FOURTH
1010 DATA FIFTH,SIXTH,SEVENTH,EIGHTH
```


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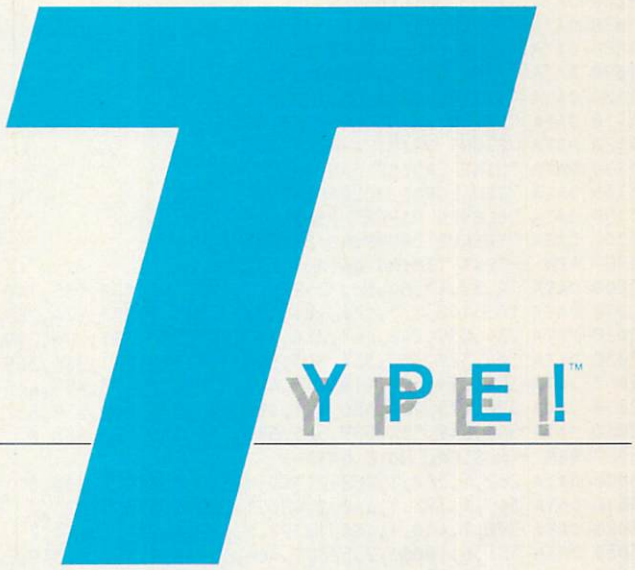

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```
1020 DATA NINTH,TENTH,ELEVENTH,TWELFTH
1030 DATA ON THE,DAY OF CHRISTMAS
1040 DATA MY TRUE LOVE GAVE TO ME
1050 DATA AND A PARTRIDGE IN A PEAR TREE.
1060 DATA "TWO TURTLEDOVES,"
1070 DATA "THREE FRENCH HENS,"
1080 DATA "FOUR CALLING BIRDS,"
1090 DATA "FIVE GOLDEN RINGS,"
1100 DATA "SIX GEESE A-LAYING,"
1110 DATA "SEVEN SWANS A-SWIMMING,"
1120 DATA "EIGHT MAIDS A-MILKING,"
1130 DATA "NINE LADIES DANCING,"
1140 DATA "TEN LORDS A-LEAPING,"
1150 DATA "ELEVEN PIPERS PIPING,"
1160 DATA "TWELVE DRUMMERS DRUMMING,"
1999 REM --TEXT TIMING DATA--
2000 DATA 14,37,41,64,68,72,95,99,103,107,130,135,140
2010 DATA 143,148,171,176,181,186,189,194,218,224,229
2020 DATA 234,239,242,247,270,275,281,286,291,296,299
2030 DATA 304,327,332,337,343,348,353,358,361,366,389
2040 DATA 394,399,404,410,415,420,425,428,433,458,465
2050 DATA 470,475,480,486,491,496,501,504,509,532,537
2060 DATA 544,549,554,559,565,570,575,580,583,588,0
2999 REM --MUSICAL NOTE DATA--
3000 DATA 262,1,262,1,262,2,349,1,349,1,349,2,330,1
3010 DATA 349,1,392,1,440,1,466,1,392,1,440,4,523,2
3020 DATA 392,1,440,1,466,1,392,1,523,4,587,2,494,2
3030 DATA 523,6,40000,2,523,1,466,1,440,1,392,1,349,2
3040 DATA 466,2,294,2,349,2,392,1,349,1,330,1,294,1
3050 DATA 262,2,440,1,466,1,523,2,587,1,466,1,440,1
3060 DATA 349,1,392,2,349,5,40000,1,523,2,392,1,440,1
3070 DATA 466,2,262,1,349,1,523,1,523,1
3080 DATA 262,0.5,262,0.5,440,3,523,1,392,0.5,523,0.5
3999 REM -- MUSICAL ARRANGEMENT DATA --
4000 DATA 1,13,38,46,1,2,51,52,4,13,47,50,37,46,1,13
4010 DATA 47,50,47,50,37,46,1,13,47,50,47,50,47,50,37
4020 DATA 46,1,13,19,46,1,13,14,46,1,2,51,52,4,13,53
4030 DATA 54,15,18,14,46,1,13,14,18,53,54,15,18,14,46
4040 DATA 1,13,14,18,14,18,53,54,15,18,14,46,1,13,14
4050 DATA 18,14,18,14,18,53,54,15,18,14,46,1,1,55,56
4060 DATA 51,52,4,12,57,58,53,54,15,18,14,18,14,18,14
4070 DATA 18,53,54,15,18,14,46,1,13,14,17,59,60,53,54
4080 DATA 15,18,14,18,14,18,14,18,53,54,15,18,14,46
```

VIC-20 w/8K or 16K RAM Cartridge/*The Twelve Days of Christmas*

```
10 DIM AN(597),AD(597),N(60),D(60),WC(13),WD(79,2),W$(
28)
20 PRINT CHR$(147);" - THE TWELVE DAYS -"
30 PRINT TAB(5);"OF CHRISTMAS"
40 SP$=CHR$(32):FOR X=2 TO 22:LI$=LI$+SP$:NEXT X
50 FOR X=1 TO 27:READ T$
60 IF X=16 THEN W$(28)=MID$(T$,5)
70 IF LEN(T$)<23 THEN 110
80 FOR Y=21 TO 1 STEP -1
90 IF MID$(T$,Y,1)=SP$ THEN T$=LEFT$(T$,Y)+LEFT$(LI$,2
2-Y)+MID$(T$,Y+1):Y=1
100 NEXT Y
110 W$(X)=T$:NEXT X
120 FOR X=1 TO 79:READ WD(X,1):NEXT X
130 C=1:P=1:Q=16
140 FOR S=Q TO 16 STEP -1
150 WD(P,2)=S:P=P+1:NEXT S:Q=Q+1
160 IF P<79 THEN 140
170 FOR X=1 TO 60:READ N(X),D(X):NEXT X:NP=1
180 READ Y,Z:IF Y=1 THEN WC(C)=NP:C=C+1
190 FOR X=Y TO Z
200 AN(NP)=N(X):AD(NP)=D(X)
```


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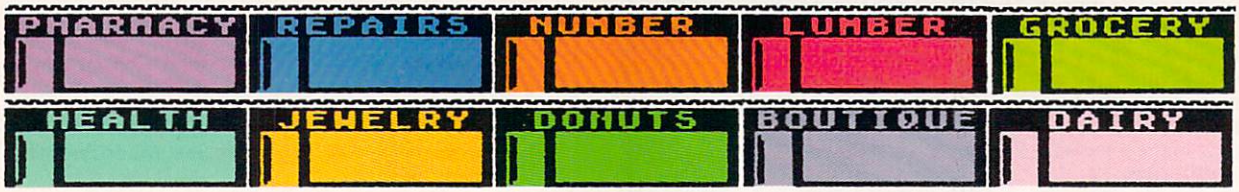

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```
210 NP=NP+1:NEXT X
220 IF NP<598 THEN 180
230 W=1:C=1:PRINT:PRINT:POKE 36878,15
240 FOR X=1 TO 597
250 IF X<>WC(C)THEN 280
260 PRINT CHR$(147);W$(13);" ";W$(C)
270 PRINT W$(14):PRINT:PRINT W$(15):C=C+1
280 IF X<>WD(W,1)THEN 320
290 PRINT:IF C=2 THEN PRINT W$(28):GOTO 310
300 PRINT W$(WD(W,2))
310 W=W+1
320 POKE 36876,AN(X)
330 FOR DE=1 TO AD(X)*125:NEXT DE
340 POKE 36876,0:NEXT X:END
999 REM --TEXT DATA--
1000 DATA FIRST,SECOND,THIRD,FOURTH
1010 DATA FIFTH,SIXTH,SEVENTH,EIGHTH
1020 DATA NINTH,TENTH,ELEVENTH,TWELFTH
1030 DATA ON THE,DAY OF CHRISTMAS
1040 DATA MY TRUE LOVE GAVE TO ME
1050 DATA AND A PARTRIDGE IN A PEAR TREE.
1060 DATA "TWO TURTLEDOVES,"
1070 DATA "THREE FRENCH HENS,"
1080 DATA "FOUR CALLING BIRDS,"
1090 DATA "FIVE GOLDEN RINGS,"
1100 DATA "SIX GEESE A-LAYING,"
1110 DATA "SEVEN SWANS A-SWIMMING,"
1120 DATA "EIGHT MAIDS A-MILKING,"
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1999 REM --TEXT TIMING DATA--
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2010 DATA 143,148,171,176,181,186,189,194,218,224,229
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2040 DATA 394,399,404,410,415,420,425,428,433,458,465
2050 DATA 470,475,480,486,491,496,501,504,509,532,537
2060 DATA 544,549,554,559,565,570,575,580,583,588,0
2999 REM --MUSICAL NOTE DATA--
3000 DATA 195,1,195,1,195,2,210,1,210,1,210,2,207,1
3010 DATA 210,1,215,1,219,1,221,1,215,1,219,4,225,2
3020 DATA 215,1,219,1,221,1,215,1,225,4,228,2,223,2
3030 DATA 225,6,0,2,225,1,221,1,219,1,215,1,210,2
3040 DATA 221,2,201,2,210,2,215,1,210,1,207,1,201,1
3050 DATA 195,2,219,1,221,1,225,2,228,1,221,1,219,1
3060 DATA 210,1,215,2,210,5,0,1,225,2,215,1,219,1,221
3070 DATA 2,195,1,210,1,225,1,225,1,195,0.5,195,0.5
3080 DATA 219,3,225,1,215,0.5,225,0.5
3999 REM --MUSICAL ARRANGEMENT DATA--
4000 DATA 1,13,38,46,1,2,51,52,4,13,47,50,37,46,1,13
4010 DATA 47,50,47,50,37,46,1,13,47,50,47,50,47,50,37
4020 DATA 46,1,13,19,46,1,13,14,46,1,2,51,52,4,13,53
4030 DATA 54,15,18,14,46,1,13,14,18,53,54,15,18,14,46
4040 DATA 1,13,14,18,14,18,53,54,15,18,14,46,1,13,14
4050 DATA 18,14,18,14,18,53,54,15,18,14,46,1,1,55,56
4060 DATA 51,52,4,12,57,58,53,54,15,18,14,18,14,18,14
4070 DATA 18,53,54,15,18,14,46,1,13,14,17,59,60,53,54
4080 DATA 15,18,14,18,14,18,14,18,53,54,15,18,14,46
```


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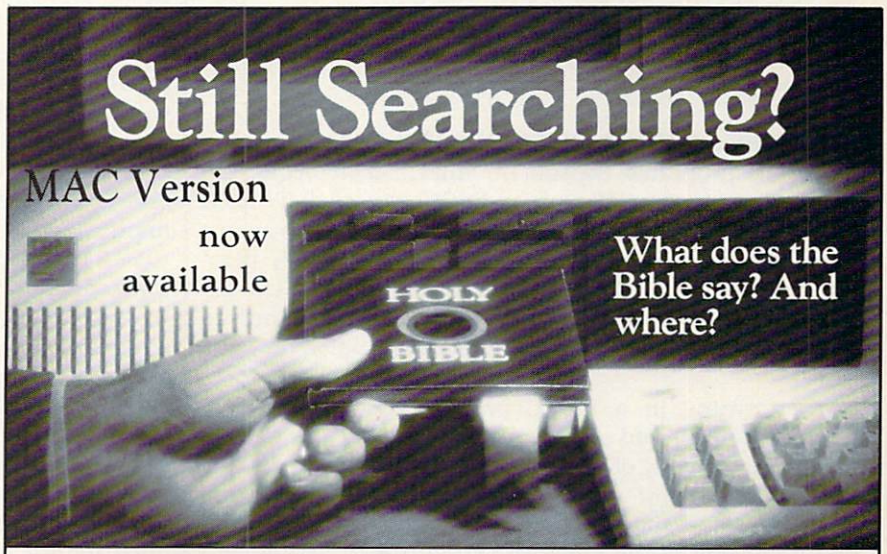

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TIPS TO THE TYPIST

BEFORE TYPING IN A PROGRAM . . .

1. Check to see if it will run on your computer under a version of BASIC you have available. Also check to see if special hardware—a disk drive, joysticks, or a printer, for example—is required. Unless the program heading indicates otherwise, you can assume that a program will run under any standard version of BASIC on any standard hardware configuration of your machine, with these exceptions:

- "Apple II series" programs will run under Applesoft BASIC on the Apple II plus (w/language card), IIe, and IIc. Programs requiring a disk drive will work equally well under DOS 3.3 or ProDOS.
- Compatibility of IBM BASIC Programs is determined by both the hardware and the version of BASIC used. Our "IBM PC & compatibles" programs are composed on IBM PCs & PC*jr*s and tested under most versions of BASIC available for those machines. They are then tested on a variety of IBM-compatible machines under the versions of BASIC supplied with them. Each IBM PC & compatibles program listing is supplemented by a rundown of the machines and versions of BASIC under which the program is guaranteed to work. Most programs will probably run on many other PC compatibles and under other versions of BASIC.
- TI programs not marked "w/TI Extended BASIC" should be run under standard (console) TI BASIC.

2. If you have a disk drive, prepare ("format" or "initialize") a disk so you can save the program once you're finished typing. Your DOS (Disk Operating System) manual or disk-drive manual will tell you how.

3. Get your version of BASIC fired up and ready. Read the introductory chapters of your BASIC manual for instructions.

WHILE TYPING, KEEP IN MIND THAT . . .

1. BASIC programs consist of "lines," each beginning with a line number (Macintosh BASIC "lines" don't need line numbers), containing letters, numbers, and punctuation marks of various kinds. Each "line" may be composed of several "statements"—instructions that tell the computer to perform various actions—and may continue over several physical lines on the page and/or on your screen.

When typing in a BASIC program, forget considerations of format and get the *content* of what you type to match the *content* of what you see on the printed page. Regardless of how margins may break up a program "line," it hasn't ended until you reach another line number or the end of the program listing. Begin typing with the line number, then continue on, typing every letter, number, space, and punctuation mark in the order it appears, ignoring margins. Where the "line" ends, there will usually be some trailing spaces (which you don't have to type in), followed by the next line number at the left margin of the listing. At this point, all you have to do is press the RETURN or ENTER key to register the "line" in memory, then continue with the next "line."

2. All marks in a program listing—including every letter, number, space, and punctuation mark—*mean* something to your computer. Moreover, even symbols that look very similar to you mean completely different things to the machine. For example, it is important to distinguish between "1" (number one) and "l" (small letter "L"), or "O" (capital letter "O") and "0" (digit zero). Note that zeros are slashed in most program listings to facilitate discrimination.

It's important, therefore, to duplicate every line exactly when typing. Otherwise you can't expect the program to work as it should, or even work at all. Even uppercase versus lowercase is important on certain computers; the words "PRINT" and "print" may mean completely different things.

3. Each computer has its own commands and keys for program "editing," and your user's manual will tell you how to use them. Besides the editing keys, there are two sure-fire ways of correcting errors in a BASIC program line. If you're just typing along and make a mistake, press the backspace-delete key (the back-arrow key on most systems) to rub out the offending character, and then continue typing. Once you've pressed RETURN or ENTER to register the line, mistakes are a little harder to fix. You must use the editing keys or type the line in again from the beginning (including the line number) and press RETURN or ENTER. The new line will replace the old one with the same line number in your computer's memory. This option is a little more work, but foolproof.

AFTER YOU'VE FINISHED . . .

1. Just type RUN and press RETURN or ENTER. If you've typed everything correctly, the program should work as described.

2. Of course, it almost never does, not even for seasoned programmers. Typing in a program and having it run off the bat qualifies as a small miracle. Usually there are one or more mistakes, major or minor, that have slipped past your careful scrutiny and are causing your computer to do unexpected things. Not to worry. Now comes what some people consider the most enjoyable part of the programming process: a procedure called "debugging"—finding and eliminating your mistakes. To review portions of your program on the computer screen, use the LIST command as explained in your BASIC manual. If you have a printer, you might find it more convenient to print out what you've typed (check your manual for the appropriate command). Look over each section of the program carefully, preferably with someone else's help. Make sure you haven't dropped a line or a character, miscounted spaces between a pair of quotes, mistaken a comma for a period, mixed up an "O" and a zero, or (most likely) all of the above. When you find a mistake, retype the offending line from the original listing, including the line number, and press RETURN or ENTER as explained above.

Naturally, mistakes tend to occur more frequently in certain areas of a program than in others. Complicated equations are easy to foul up by dropping or mismatching parentheses or math symbols. Data statements—program lines beginning with the usual number, followed by the word DATA—are another popular trouble spot. Check them carefully. And, of course, remember to SAVE a copy of the corrected program when you're finished.

Good luck!

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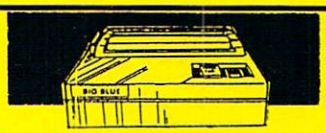

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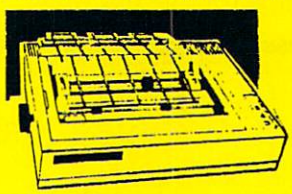

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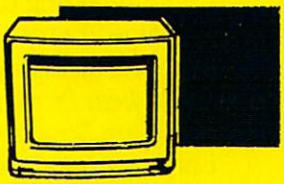

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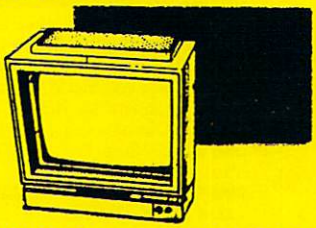

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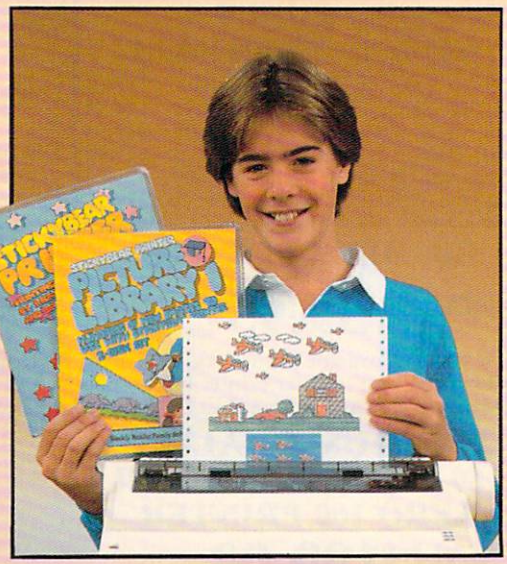

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This Month!!
GAME STRATEGY, page 112
COMPUCOPIA, page 116
CONTEST, page 117

K-POWER
Edited by Bernadette Grey
FOR THE COMPUTER GENERATION

Dash Through the Snow on Page 116

Dream Machines

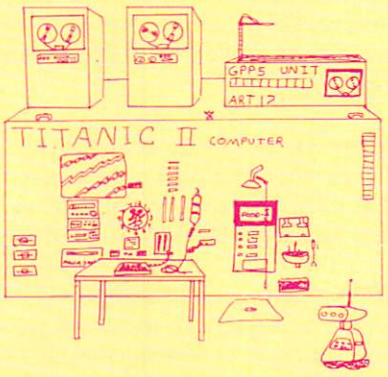
K-POWER Readers Design the Computers of Their Dreams!!

Last summer, when we held our "Design a Computer Contest," K-POWER readers planned, drew, and described their "perfect" computers. Some K-POWER readers proved themselves to be inventors, artists, engineers, draftspeople, and comedians all rolled into one. Boy, what vivid imaginations some of you have!!! Two computers stood out above the rest, and FAMILY COMPUTING awarded $25 to the creators of these machines. **Scott Doudera**, 15, of Alma, Illinois, designed the Titanic II, and **Jason Tucker**, 13, of Muncie, Indiana, designed the Eclipse Personal Computer. Here are their drawings and descriptions.

TITANIC II

The Super New Computer From SD Enterprises

- The most exciting feature of this new genre of computers is its revolutionary and new, artificial-intelligence brain. It has the exciting voice of, you guessed it, Ricardo Montalban! Oooooh! Don't pinch yourself. You're not dreaming.



Scott Doudera's outlandish computer.

- Handles make the computer totally portable.
- An I.V. bottle provides nourishment for the hacker who isn't able to go for food.
- A swimming pool, located majestically atop the artificial brain, gives hours of relaxation to the tired hacker.
- There's a manual override for data processing, which consists of a pencil and a ballpoint pen.
- A handy modem provides 300 baud to the patient user.
- An open-grill barbeque gives a good taste to all meats.
- A good shower is perfect for the user who labors at the keyboard for weeks at a time.
- A handy little robot provides defense against maniac burglars. Two built-in flame-throwers and five submachine guns provide adequate protection against most thieves.
- A food vac contains all vital (I mean vital) snacks that the hacker must have to survive, such as pizza, chips, and sodas.
- This machine costs only $399.98. —SCOTT DOUDERA, *15, Alma, Illinois*

Eclipse Personal Computer

Software included:

- A built-in word processor, game maker, and spreadsheet.
- EclipDOS 2.2 Disk Operating System
- EclipDraw graphics program

Hardware included:

- mouse
- 3½" dual disk drive
- 93-key keyboard
- RGB monitor
- numeric keypad

Other features included:

- 14 redefinable keys
- built-in speech and stereo sound
- one megabyte of RAM
- 512K of ROM
- Made in the USA, the machine costs only $2,000.—JASON TUCKER, *13, Muncie, Indiana (Jason's "Design a Computer Contest" entry was created with* Dazzledraw *by Broderbund.)*

Jason Tucker sent his designs to K-POWER on a disk. Above are two examples.

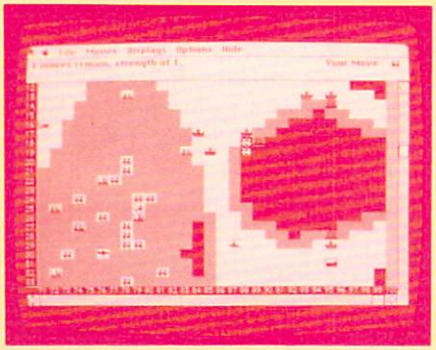
STRATEGY

TIPS, TRICKS, AND HINTS

STRATEGIC CONQUEST

PBI Software. Tactical/Strategy. Your mission: Explore and conquer a vast, unknown world. You must create land, air, and naval forces (such as armies, bombers, aircraft carriers, and submarines) and deploy them against a computer opponent who wants to conquer the world. (*Hints and game are for Macintosh.*)

Once you've taken control of the island you start on, it's important to determine the direction in which the computer opponent lies. If it's not within fighter range (10 squares), build a destroyer and send it out to search for the enemy. Meanwhile, build a transport, load it with armies, and send it out in a random direction (unless you've located another island when scouting with a fighter).



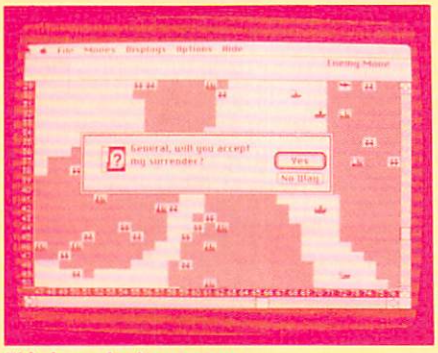
Block enemy harbors with battleships.

If the enemy is close by, you will have a good chance of capturing a city on its island before the enemy does. This is often a good idea, because if you are able to establish a firm beachhead, the computer will concentrate on beating you back rather than exploring and conquering additional territory.

If the enemy is not close to you, it is best to send transports to conquer an island within bomber range of its island. Then, if the computer's starting area is near the center of the map, try to go around it and conquer the territories on the other side. If the enemy is near an edge, surround the enemy as quickly as possible. The computer, however, is not going to just sit there and be idle, so it is wise to send ships to distract and engage its forces. Perhaps the best way to accomplish this is to scout its coastline with a destroyer and locate its port cities. Then bring in battleships (once you have two or three transports, start building battleships in your port cities), and place them directly next to the enemy port cities. This way, if the enemy builds a ship or transport, it will have to pass by your battleship, and you can sink it.

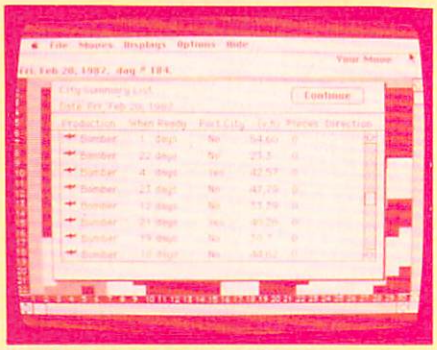
Surround your city with armies to block enemy bombers.

Before the first hundred days are up, build two or three bombers. Although they are not particularly effective, they make good "battleship busters." If you encounter an enemy battleship, it's best to simply bomb it because it can be difficult to sink.



This is a winning screen.

The key to the game is using the bomber. You really only need armies to conquer neutral cities and to maintain a defense against enemy invasions (which will be rare if you block enemy harbors). If you can get 10 to 20 cities all producing bombers at regular intervals (a new bomber every one or two days), you will be almost unstoppable. Every time a new bomber is made, fly it to an enemy island and bomb any city you can (stockpiling more than two or three bombers is not a good idea). Make sure you time your strikes so that when the bomber runs out of moves for the day, you leave it over the water but within 10 squares of the target city. This way, enemy armies can't attack you, and you are less likely to be discovered by enemy fighters. Soon after you start this saturation bombing, you will find it takes the enemy longer and longer to reclaim its cities. When it starts taking more than three days to do so, bring in your troops and capture the coastal cities. After this point, victory is almost certainly yours.

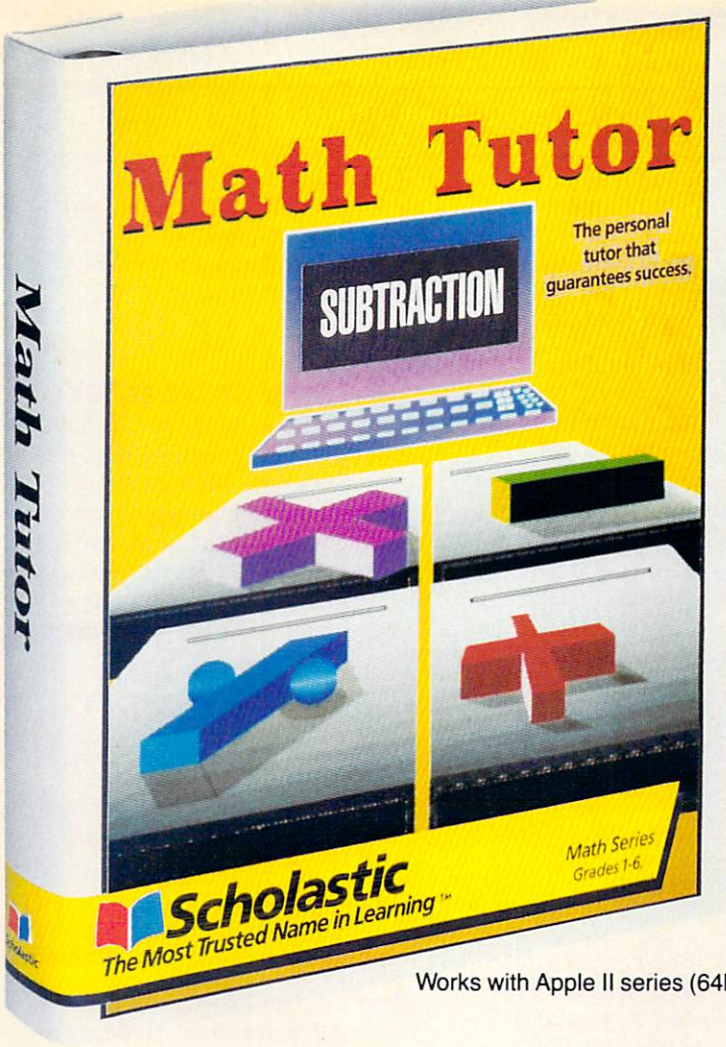


Bombers are the key to winning.

Battleships can also be used to lure enemy fighters. If you position a battleship near an enemy island, the enemy will start sending swarms of fighters after the battleship. The battleship will be able to destroy well over 15 fighters before it is sunk. And if you retreat in time, you can go to one of your harbors and repair the ship. This is an extremely effective way to drain enemy resources.

Do not try to contribute to the defense of a port city by placing a ship in it. A single enemy army can dispatch a battleship quite readily.

Submarines are not very effective because they move too slowly, and they don't possess enough strength to do serious harm. →



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HINT HOTLINE

XYPHUS, Penguin Software (Apple, C 64/128, Macintosh). Role-playing adventure. Your mission: With your party of four adventurers, you must slay the demon, Xyphus.

To get by the werewolves in level 1, keep all of your characters in the fort, except for an elf. Use the elf (elves move the fastest) to lure the werewolves close to the fort so that your characters can both fight and get healed.

In level 3, you can cross the river at its widest point.—TREAVOR BELLANDI, *15, Laurel, Montana*

THE BARD'S TALE, Electronic Arts (Apple, C 64/128). Role-playing adventure. Your mission: With a party of six adventurers, explore the city of Skara Brae and the many dungeons and towers it holds. Your eventual goal is to slay the wizard, Mangar, and free the city from his control.

To get into Kylearan's Tower, you must place the eye in the statue on the top level of the Castle. You will then be teleported to the front of the tower.

To enter Mangar's Tower, you must have the Onyx Key. This will let you into the staircase on the bottom level of the sewers, which brings you up to Mangar's Tower. Or, if you have the Master Key, which is found in Mangar's Tower, you can use it to enter directly through the gates.

Here are some useful coordinates (assuming you are on the starting point of the first level of the dungeon or tower):

The Eye: 19 north, 20 east, 2 down, Catacombs

Crystal Sword: 0 north, 19 east, 0 down, Castle

Silver Square: 0 north, 0 east, 1 up, Castle

Silver Triangle: 20 north, 2 east, 0 down, Kylearan's Tower

Silver Circle: 15 north, 4 east, 1 up, Mangar's Tower

Onyx Key: 13 north, 17 east, 0 down, Kylearan's Tower—KEVIN AND MICHELLE MILLIORN, *14 and 10, Aiea, Hawaii*

G.I. JOE, Epyx (Apple, C 64). Arcade. Your mission: Defeat the venemous forces of Cobra in person-to-person and vehicle-to-vehicle scenarios.

To reuse a captured character, place the marker next to the captured soldier's box on the character selection screen and simultaneously push the joystick toward the box and press the button.—MIKE MCINNIS, *14, Quispamsis, New Brunswick, Canada*

THE SEVEN CITIES OF GOLD, Electronic Arts (Amiga, Atari, C 64). Role-playing adventure. Your mission: Voyage to the New World seeking riches and glory as a Spanish explorer. Map uncharted territory as it was in the 1400s, or explore a fantasy world created by your computer.

If your expedition is lost or captured, remember where your ships were and save the game in Europe (as the "new expedition leader"). You can then sail to the New World and pick up your ships, along with whatever you left on them.—MICHAEL KRAACK, *12, Piqua, Ohio.*

Q & A

In *Zork III* (Infocom), what do I do with the potion that the sailor gave me?—CHULKI CHOI, *14, Philadelphia, Pennsylvania*

Drinking the potion will make you invisible just long enough to get by the Guardians.

In *Zork III*, how do I open the chest on the cliff ledge and keep all the valuables for myself, without help from that "friend"?—JASON RUTLEDGE, *14, Woodward, Oklahoma*

You'll have to get help from that friend. There's no other way to get the chest open. The only thing you'll need from the chest is the staff.

In *Zork III*, what's the purpose of the jewels in the cage and the black and gray machines? And can I get the caged jewels?—JASON RUTLEDGE, *14, Woodward, Oklahoma*

They serve no purpose. You can't get the caged jewels; the only jewel you need is the ring.

In *King's Quest II* (Sierra On-Line), how do I get the second key?—TOM BARTNIKAS, *10, Dorval, Quebec, Canada*

Once you get the oil lamp from the antique shop, rub it and you will get a magic carpet. Ride it to the top of the cliffs. There is a snake there, which you must get past (there are two ways to do this). Once you have done this, you will find a cave, wherein lies the second key.

In *King's Quest II*, how do I get the key to the magic door?—PAUL VAN ROMPAY, *13, Milton, Massachusetts*

You must read the inscription on the door. Then find the mermaid on the shore and give her the flowers. (Not the brooch as we said in the July issue. You can use the brooch, but you'll lose points. Thanks to the many readers who pointed this out.) When you reach King Neptune, give him the trident, and he will give you the key.

In *Crypt of Medea* (Sir-tech), how do I get by the web?—KEVIN DOLDAN, *12, Grand Island, New York*

You must open the vial and throw it at the web.

In *Serpent's Star* (Broderbund), how do you get past the monk and into the fabled monastery?—JOHN SHERWOOD, *13, Keansburg, New Jersey*

You must give him the scroll that you got from the wandering monk.

In *Ultima IV* (Origin Systems), what are the ingredients for the UNDEAD spell?—ROBERT MICHAEL GLOSENGER, *9, Portland, Oregon*

The proper mixture is one part sulphurous ash and one part garlic.

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COMPUCOPIA

SHORT PROGRAMS BY STEVEN C. M. CHEN

Type this in, RUN it, and let it snow, let it snow, let it snow!!!

ADAM/*SNOW* . . .

```
10 HOME:DIM dp%(30,1,11),ll%(30)
20 FOR l = 0 TO 30:dp%(l,0,0) = 70+RND(1)*169
30 dp%(l,1,0) = RND(1)*15:FOR y = 1 TO 11
40 dp%(l,0,y) = dp%(l,o,y-1)-INT(RND(1)*3)*3
50 dp%(l,1,y) = dp%(l,1,y-1)+14+INT(RND(1)*5):NEXT y
60 dp%(l,1,11) = 189:NEXT l:h = 0:v = 0
70 HGR2:HCOLOR= 3
80 hd = 0:tl = 0:p = hd:ll%(0) = 1
90 HPLOT dp%(0,0,0),dp%(0,1,0)
100 f = 0:FOR y = 1 TO 400
110 t = ll%(p):HCOLOR= 0
120 HPLOT dp%(p,0,t-1),dp%(p,1,t-1):HCOLOR= 3
130 HPLOT dp%(p,0,t),dp%(p,1,t)
140 ll%(p) = t+1:IF p = tl THEN 170
150 p = p+1:IF p > 30 THEN p = 0
160 GOTO 110
170 IF f > 0 THEN f = f-1:GOTO 200
180 HCOLOR= 0:HPLOT h,v:HCOLOR= 3:h = 60+RND(1)*169
190 v = RND(1)*150:f = 3:HPLOT h,v
200 IF y > 389 THEN 240
210 tl = tl+1:IF tl > 30 THEN tl = 0
220 ll%(tl) = 1:HPLOT dp%(tl,0,0),dp%(tl,1,0)
230 IF y < 11 THEN 250
240 hd = hd+1:IF hd > 30 THEN hd = 0
250 p = hd:NEXT y:HOME
260 FOR d = 1 TO 800:NEXT d:GOTO 70
```

APPLE II SERIES/*SNOW* . . .

```
10 HOME:DIM DP%(30,1,11),LL%(30)
20 FOR L = 0 TO 30:DP%(L,0,0) = 70+RND(1)*189
30 DP%(L,1,0) = RND(1)*15:FOR Y = 1 TO 11
40 DP%(L,0,Y) = DP%(L,0,Y-1)-INT(RND(1)*3)*3
50 DP%(L,1,Y) = DP%(L,1,Y-1)+14+INT(RND(1)*5):NEXT Y
60 DP%(L,1,11) = 189:NEXT L:H = 0:V = 0
70 HGR2:HCOLOR= 3
80 HD = 0:TL = 0:P = HD:LL%(0) = 1
90 HPLOT DP%(0,0,0),DP%(0,1,0)
100 F = 0:FOR Y = 1 TO 400
110 T = LL%(P):HCOLOR= 0
120 HPLOT DP%(P,0,T-1),DP%(P,1,T-1):HCOLOR= 3
130 HPLOT DP%(P,0,T),DP%(P,1,T)
140 LL%(P) = T+1:IF P = TL THEN 170
150 P = P+1:IF P > 30 THEN P = 0
160 GOTO 110
170 IF F > 0 THEN F = F-1:GOTO 200
180 HCOLOR= 0:HPLOT H,V:HCOLOR= 3:H = 60+RND(1)*189
190 V = RND(1)*150:F = 3:HPLOT H,V
200 IF Y > 389 THEN 240
210 TL = TL+1:IF TL > 30 THEN TL = 0
220 LL%(TL) = 1:HPLOT DP%(TL,0,0),DP%(TL,1,0)
230 IF Y < 11 THEN 250
240 HD = HD+1:IF HD > 30 THEN HD = 0
250 P = HD:NEXT Y:HOME
260 FOR D = 1 TO 800:NEXT D:GOTO 70
```

IBM PC & COMPATIBLES/*SNOW* . . .

This program has been tested and found to work on the following computers and hardware configurations, using the BASICs shown: IBM PC w/Color/Graphics Monitor Adapter, w/Disk BASIC D2.00 or Advanced BASIC A2.00. IBM PCjr w/Cartridge BASIC J1.00. Tandy 1000 w/GW-BASIC 2.02 verston 01.01.00. It should also work on many other PC compatibles.

```
10 RANDOMIZE:DEFINT A-Z:KEY OFF:CLS:SCREEN 1,0
20 DIM DP(30,1,14),LL(30)
30 FOR L=0 TO 30:DP(L,0,0)=90+RND*229
40 DP(L,1,0)=RND*9:FOR Y=1 TO 14
50 DP(L,0,Y)=DP(L,0,Y-1)-INT(RND*3)*3
60 DP(L,1,Y)=DP(L,1,Y-1)+12+INT(RND*5):NEXT Y
70 DP(L,1,14)=196:NEXT L:H=0:V=0
80 HD=0:TL=0:P=HD:LL(0)=1
90 PSET (DP(0,0,0),DP(0,1,0))
100 F=0:FOR Y=1 TO 400
110 T=LL(P):PRESET (DP(P,0,T-1),DP(P,1,T-1))
120 IF RND>.25 THEN PSET (DP(P,0,T),DP(P,1,T))
130 LL(P)=T+1:IF P=TL THEN 150
140 P=(P+1) MOD 31:GOTO 110
150 IF F>0 THEN F=F-1:GOTO 180
160 PRESET (H,V):H=80+RND*219
170 V=RND*150:F=3:PSET (H,V)
180 IF Y>386 THEN 210
190 TL=(TL+1) MOD 31:LL(TL)=1
200 PSET (DP(TL,0,0),DP(TL,1,0)):IF Y<14 THEN 220
210 HD=(HD+1) MOD 31
220 P=HD:NEXT Y:CLS
230 FOR D=1 TO 1000:NEXT D:GOTO 80
```

MACINTOSH W/MICROSOFT BASIC 2.0 OR 2.1/*SNOW* . . .

```
10 RANDOMIZE TIMER:DEFINT A-Z
20 DIM DP(30,1,16),LL(30)
30 CLS:WINDOW 1,"SNOW ...",(0,38)-(527,338)
40  FOR L=0 TO 30:DP(L,0,0)=120+RND*380
50 DP(L,1,0)=RND*20:FOR Y=1 TO 16
60 DP(L,0,Y)=DP(L,0,Y-1)-INT(RND*3)*3
70 DP(L,1,Y)=DP(L,1,Y-1)+14+INT(RND*6):NEXT Y
80 DP(L,1,16)=296:NEXT L:H=0:V=0
90 LINE (0,0)-(527,338),33,BF
100 HD=0:TL=0:P=HD:LL(0)=1
110 PSET (DP(0,0,0),DP(0,1,0)),30
120 F=0:FOR Y=1 TO 400
130 T=LL(P):PSET (DP(P,0,T-1),DP(P,1,T-1)),33
140 IF RND>.25 THEN PSET (DP(P,0,T),DP(P,1,T)),30
150 LL(P)=T+1:IF P=TL THEN 170
160 P=(P+1) MOD 31:GOTO 130
170 IF F>0 THEN F=F-1:GOTO 200
180 PSET (H,V),33:H=110+RND*380
190 V=RND*220:F=3:PSET (H,V)
200 IF Y>384 THEN 230
210 TL=(TL+1) MOD 31:LL(TL)=1
220 PSET (DP(TL,0,0),DP(TL,1,0)),30:IF Y<16 THEN 240
230 HD=(HD+1) MOD 31
240 P=HD:NEXT Y:LINE (0,0)-(527,298),33,BF
250 FOR D=1 TO 2000:NEXT D:GOTO 100
```

TANDY COLOR COMPUTER W/EXTENDED BASIC/*SNOW* . . .

```
10 CLS:DIM DP(30,1,11),LL(30)
20 FOR L=0 TO 30:DP(L,0,0)=70+RND(189)
30 DP(L,1,0)=RND(1)*15:FOR Y=1 TO 11
40 DP(L,0,Y)=DP(L,0,Y-1)-INT(RND(0)*3)*3
50 DP(L,1,Y)=DP(L,1,Y-1)+13+RND(5):NEXT Y
60 DP(L,1,11)=189:NEXT L:H=0:V=0
70 PMODE 4,1:SCREEN 1,0:PCLS 0
80 HD=0:TL=0:P=HD:LL(0)=1
90 PSET(DP(0,0,0),DP(0,1,0),1)
100 F=0:FOR Y=1 TO 400
110 T=LL(P)
120 PRESET(DP(P,0,T-1),DP(P,1,T-1),0)
130 PSET(DP(P,0,T),DP(P,1,T),1)
140 LL(P)=T+1:IF P=TL THEN 170
150 P=P+1:IF P>30 THEN P=0
160 GOTO 110
170 IF F>0 THEN F=F-1:GOTO 200
180 PRESET(H,V,0):H=60+RND(179)
190 V=RND(150):F=3:PSET(H,V,1)
200 IF Y>389 THEN 240
210 TL=TL+1:IF TL>30 THEN TL=0
220 LL(TL)=1:PSET(DP(TL,0,0),DP(TL,1,0),1)
230 IF Y<11 THEN 250
240 HD=HD+1:IF HD>30 THEN HD=0
250 P=HD:NEXT Y:PCLS 0
260 FOR D=1 TO 800:NEXT D:GOTO 80
```

HOW TO MAKE A FORTUNE

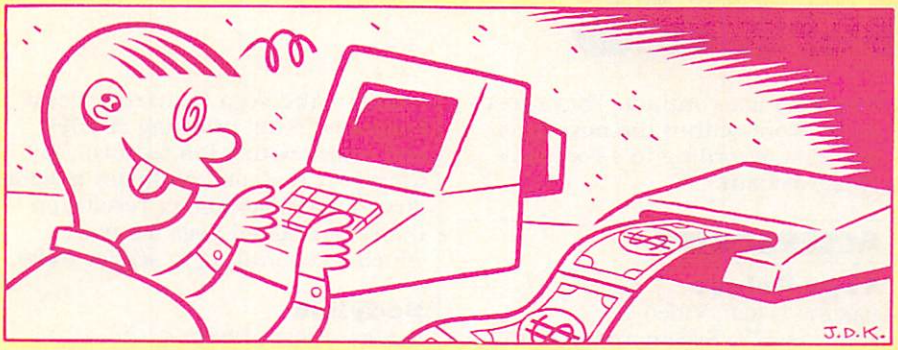

ILLUSTRATION BY J.D. KING

By now, you must have at least 1,001 uses for your computer. You may write letters, make music, play games, track your stamp collection, budget your allowance, and so on, and so on, and so on—all with your computer. But what's your *favorite* use for your computer? Game playing? "No way," said the hackers that hang around the FAMILY COMPUTING office. "Making money!" they all sang in unison. One kid works part-time at a company, typing results from a poll into a data base. Another fills his pockets with bucks by running his own computer business. And, of course, the SPECIAL Ks make money reviewing computer games, boning up on their gaming strategy, opening K-POWER mail, and judging contests like this one!!!

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CompuTitan

MANUFACTURER: Mitac Corporation
ADDRESS: 3385 Viso Court, Santa Clara, CA 95054; (800) 321-8344
PRICE: $1,695

One of the latest IBM clones from the Orient is Mitac's CompuTitan, due to reach U.S. dealers in time for holiday buying. The suggested retail price of this PC/AT-compatible system is $1,695; that gets you an Intel 80286-based CPU that runs at speeds of 6 or 8 MHz, one 1.2 Mb floppy-disk drive, a hard-disk drive

controller, and a healthy 640K of RAM. You can choose options such as a 20-, 30-, or 40-megabyte hard-disk drive or Mitac's own enchanced graphics adapter (EGA). A monochrome or RGB monitor and a display adapter must be purchased separately.

The standard configuration of the CompuTitan includes a battery-backed real-time clock/calendar, the keyboard and a standard 8742 keyboard controller, eight expansion slots, a 192-watt power supply, and the highly IBM-compatible Phoenix BIOS. If you're planning to use the computer for number-crunching, such as statistics or heavy finance applications, there's also a socket where you can add an Intel 80287 coprocessor chip. MS-DOS 3.2 and GW BASIC are also standard with the machine.

Lower production costs enable Mitac, a 12-year-old Taiwanese electronics manufacturing firm, to distribute a computer with all these features and options at such an appealing price. CompuTitans bought at dealers carry a six-month warranty, but there's a word to the wise: Mitac is still negotiating for a national service contract. They expect to have one within the next three months, according to a company spokesperson.

ACCESSORIES

Vega Deluxe

MANUFACTURER: Video-7
ADDRESS: 550 Sycamore Drive, Milpitas, CA 93035; (408) 943-0101
PRICE: $599

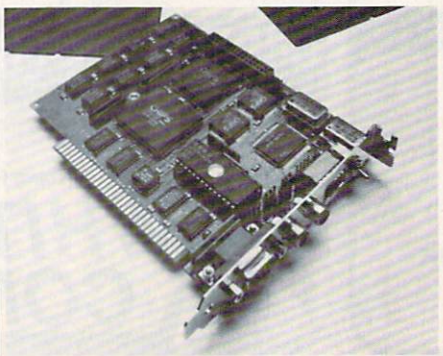
If you're the owner of an IBM or compatible computer and don't have a graphics adapter, that peripheral is probably high on your add-on wish list.

High resolution, IBM compatibility, and the flexibility to switch easily between different types of software are the hallmarks of a new high-resolution graphics adapter from Video-7. The Vega Deluxe also supports all major industry graphics adapter standards, such as the Monochrome Graphics Adapter, Color Graphics Adapter, Hercules Graphics Card, and Enhanced Graphics Adapter.

Microsoft Windows comes with the Vega Deluxe as an introductory offer until December 31, and you can buy the card in the standard EGA resolution of 640 x 350 or in optional resolutions of 640 x 480 and 752 x 410.

You won't have to think about changing modes once the program is up and running since the Vega Deluxe comes with menu-driven software. This enables the card to automatically select the right mode for emulation of the above graphics adapters. The Deluxe is a "short slot" graphics adapter that can be installed in any available slot of an IBM PC, PC/XT (including slot 8), PC/AT, or IBM-compatible computer.

Available now through computer



retailers, the Vega Deluxe carries a suggested retail price tag of $599 and comes with a limited two-year warranty. A second oscillator is what gives the Deluxe higher resolution than the original Vega adapter, which will continue to sell for $499.

Bodylink

MANUFACTURER: Bodylog, Inc.
ADDRESS: 34 Maple Avenue, Armonk, New York 10504; (914) 273-6480
PRICE: $150-$240

Your body is pumping out invisible signals 24 hours a day. Your heart is beating, your blood is pulsing, your temperature is rising, your muscles are in motion, and you're perspiring. You're hardly aware of it, but your body is a walking transmitter!

Bodylink, the new Commodore peripheral from Bodylog, Inc., transforms the signals from inside your body into something your computer understands (i.e., digital information), and transforms the data into something *you* understand (graphics and sound). You can use this information to "listen" to the signals your body is producing and learn to control them to relieve muscle tension; build muscles by computerized isometric exercises; play a computer game and get a workout at the same time; improve coordination; and monitor heart rate, blood pressure, temperature, muscle tension, respiration rate, and other processes of the body.

Bodylink is a peripheral that plugs into the Commodore 64/128 computer. Various sensors record internal body signals and relay them through Bodylink to the computer. When you buy a Bodylink package ($150-$240), it will include sensors and the appropriate cartridge software for one of four basic functions: muscle coordination, aerobic exercise, stress reduction, or isometric exercise. Depending on what additional body function you want to monitor, you can add sensors ($40-$100) to measure temperature, respiration, pulse rate, heart rate, blood pressure, and EEG (brain waves). Sensors must be used with the appropriate software, ranging from $30-$90; professional-applications software costs up to $180. A demonstration program comes free with each basic Bodylink package.

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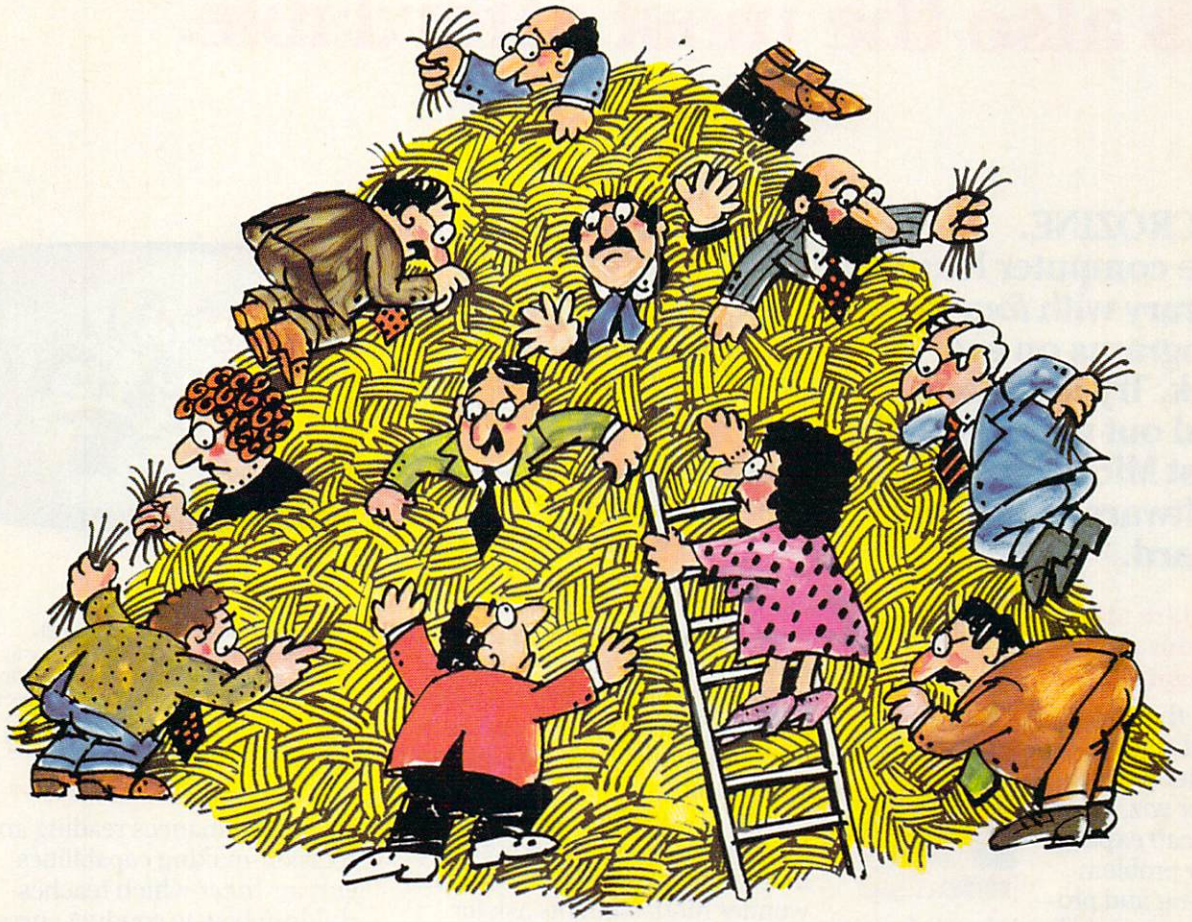

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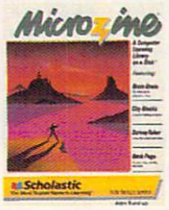

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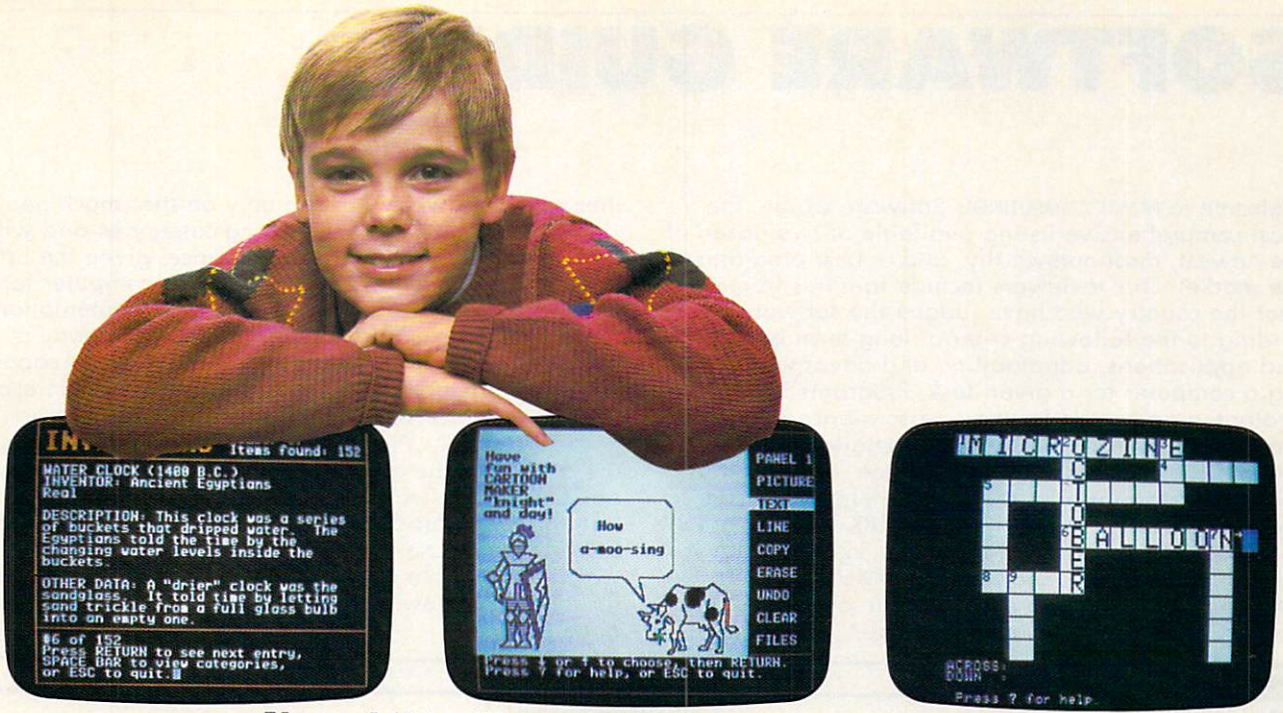

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SOFTWARE GUIDE

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 follow the chart. Unless otherwise noted, all programs are in disk format, and minimum memory requirements are 48K for Apple II series, 48K for Atari, 128K for IBM PC/PC*jr* or compatibles, and 128K for Macintosh. "Atari" alone denotes the 800/XL/XE series. "C 64/128" means the software will run on both a C 64 and a C 128 computer in C-64 mode; "C 128" alone means the software will run only on that machine.

Here's a rundown of the rating categories and what they mean: **O** = Overall performance, given the limitations 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.

EDUCATION/FUN LEARNING

Title Publisher Price	Brief description	Hardware/ Equipment required	Backup policy	Ratings O	D	EH	GQ	EU	V
ALICE: THE PERSONAL PASCAL Graham Software Corporation Four Kingwood Place Kingwood, TX 77339 (713) 359-1024 $95 ©1985, 1986	If you would like to write programs in Pascal, take a look at *Alice*. You can learn Pascal with this package, but it's best if you already have a basic knowledge of the language.† —PAAVOLA	256K IBM PC.* 320K, color monitor recommended.	30-day warranty. User makes backup.	★★★★	★★★	★★★★	N/A	A	★★★★
CERTIFICATE MAKER Springboard Software, Inc. 7808 Creekridge Circle Minneapolis, MN 55435 (612) 944-3915 $50-$60 (IBM) ©1986	Is there someone you'd like to honor? What about spoofing your friends? Then try this simple-to-use package that lets you create personalized certificates with either comic or serious graphics.† —SUTHERLAND	Reviewed on 64K Apple. Also for C 64/128, 256K IBM PC.* Joystick, 2nd drive optional. Color graphics card (IBM).	30-day warranty. $5 thereafter. $12 for backup. User makes backup (IBM only). 30-day money-back guarantee.	★★★★	★★★	★★★★	★★★	E	★★★
GEOMETRY Sensei Software, published by Broderbund Software 17 Paul Drive San Rafael, CA 94903 (415) 479-1185 $100 ©1986	Designed to be used along with a textbook as a resource for high-school or college students, this "animated blackboard" could also serve as a self-study course for an adult. Ten chapters offer tutorials and problem sets.† —ELTGROTH	512K Macintosh. 2nd drive.	90-day warranty. $7.50 thereafter. $15 for backup.	★★★★	★★★★	★★★★	★★★★	E	★★★
GRAMMAR GREMLINS Davidson & Associates, Inc. 3135 Kashiwa St. Torrance, CA 90505 (213) 534-4070 (800) 556-6141 $50 ©1986	With your encouragement, this comprehensive program for practicing grammar rules can help your 8-to-12 year old with parts of speech, sentence structure, etc. My daughter enjoyed the game more than the practice. —FRANK	Reviewed on 64K Apple. Also for IBM PC/PC*jr*.* Color graphics card (IBM).	5-year warranty. $10 for backup.	★★★★	★★★★	★★★★	★★★	E	★★★
UPTIME: VOL. 11—NOS. 1 & 2 Viking Technologies, Inc. 174 Bellevue Ave. Newport, RI 02840 (401) 849-4925 $16-$20 (Mac) ea. ©1984, 1985, 1986	*UpTime* presents two feature programs, games, product reviews, computer news, and more. Like any monthly magazine on a disk, you'll probably like some parts better than others. —FRANK	Reviewed on Apple. Also for Macintosh.	Money-back guarantee if not satisfied. User makes backup.	★★★	★★	★★★	★★	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

*Titles listed for the IBM PC/PC*jr* will also run on many IBM PC compatibles: owing to the proliferation of compatibles, check with the publisher of the program or your dealer for compatibility.

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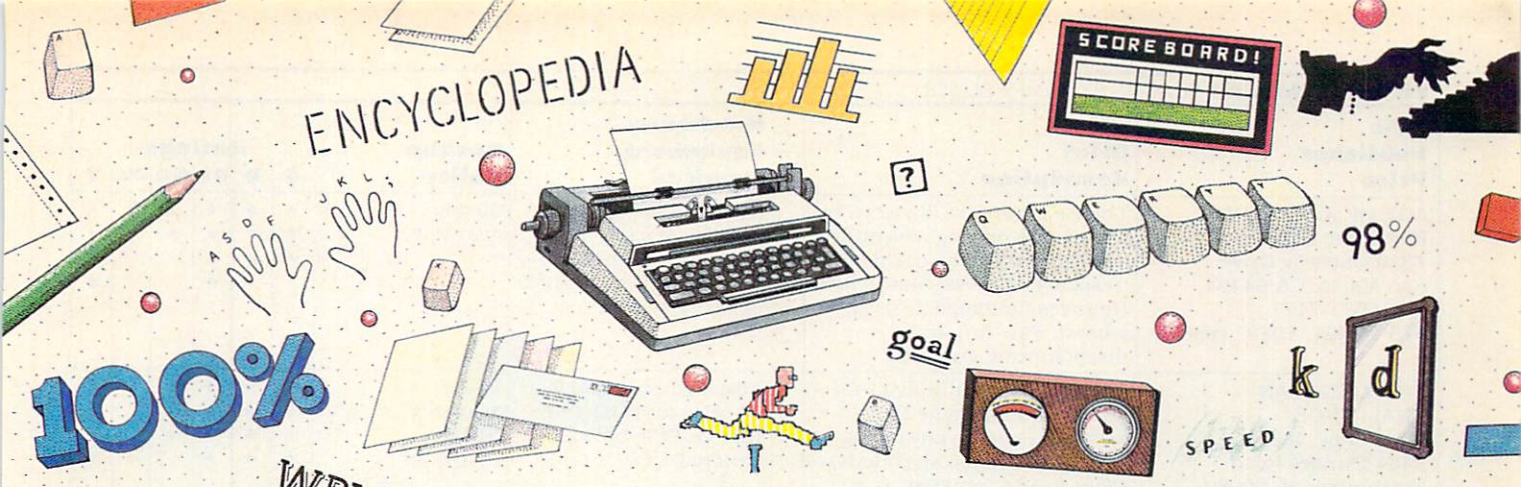
HOME BUSINESS & PRODUCTIVITY

Title Publisher Price	Brief description	Hardware/ Equipment required	Backup policy	Ratings O	D	EH	GQ	EU	V
COMMWORKS PBI Software, Inc. 1111 Triton Drive Foster City, CA 94404 (415) 349-8765 $95 ©1986	A powerful and comprehensive telecommunications program designed with an on-screen menu format similar to *AppleWorks*. While easy to use, it is not particularly easy to learn. —FRANK	Reviewed on 128K Apple IIe/IIc. Also for Apple IIGs. Modem. 2nd drive recommended.	30-day warranty. User makes backup.	★ ★ ★	★ ★	★ ★ ★	N/A	E	★ ★ ★
EASY-DRAW Migraph, Inc. 720 S. 333rd St., #201 Federal Way, WA 98003 (206) 838-4677 $150 ©1985, 1986	This paint program with high-quality printouts features a pop-up drawing-tools menu and two active drawing screens. The documentation is the only weak point here. —DAVENPORT	Atari ST. GEM in ROM.	90-day warranty. User makes backup.	★ ★ ★	★ ★	★ ★ ★ ★	★ ★ ★	A	★ ★
MACBILLBOARD CE Software 801-73rd St. Des Moines, IA 50312 (515) 224-1995 $35 ©1984, 1985, 1986	A terrific graphics package that lets you use any *MacPaint* image to create signs, "billboards," banners, greeting cards, and iron-on transfers for t-shirts. Great fun for everyone. —MANCINI	512K Macintosh.	90-day warranty. User makes backup.	★ ★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	E	★ ★ ★ ★
THE PERSONAL CHOICE COLLECTION Activision 2350 Bayshore Frontage Rd. Mountain View, CA 94043 (415) 960-0410 $100 (C 64)-$120 ©1986	This fully integrated word processor, data base, and spreadsheet should provide more than enough features for home use and for some small businesses, too. Each unit is also sold separately at $40 to $50 each.† —ZORNBERG	Reviewed on C 64/128. Also for 128K Apple IIe/IIc, IBM PC/PC*jr*.*	90-day warranty. $10 thereafter. $10 (C 64)-$15 each for backup.	★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	N/A	E	★ ★ ★ ★
PICASSO'S REVENGE Progressive Peripherals & Software, Inc. 464 Kalamath St. Denver, CO 80204 (303) 825-4144 $60 ©1986	What makes this paint program special? It comes with its own light pen, so you can "draw" directly on the screen. You can print your pictures, too. It lacks an undo feature for correcting errors. For amateur artists. —SUMMERS	C 64/128.	90-day warranty. User makes backup.	★ ★ ★	★	★ ★ ★	★ ★ ★	E	★ ★ ★
RIGHTWRITER 2.0 DecisionWare, Inc. 2033 Wood St., #218 Sarasota, FL 33577 (813) 952-9211 $95 ©1985	An aid for writers from high school and up that analyzes each sentence in your word-processed documents and inserts comments and suggestions for improvement. A "must buy!"† —MORRIS	192K IBM PC/PC*jr*.* 2nd drive.	90-day warranty. User makes backup.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	N/A	E	★ ★ ★ ★
THINKWORKS Megahaus Corp. 5703 Oberlin Drive San Diego, CA 92121 (619) 450-1230 $125 ©1986	Organize your thoughts with the outlines you create with this stand-alone or *AppleWorks*-compatible package. Then revise, merge, print, and save your outlines. But it's not easy to correct mistakes. —MORRIS	Enhanced 128K Apple IIe/IIc. 2nd drive recommended.	90-day warranty. User makes backup.	★ ★ ★	★ ★ ★ ★	★ ★ ★	N/A	E	★ ★
TIMELINK Batteries Included 30 Mural St. Richmond Hill, Ontario L4B 1B5, Canada (416) 881-9941 $50 ©1986	A time-management program for scheduling appointments, tracking how long you spend on projects, and monitoring expenses. Search for appointments by date or keyword. Perfect for the busy person who's also organized.† —STERN	Reviewed on Atari ST. Also for Macintosh.	Sold as is. $10 thereafter. User makes backup.	★ ★ ★ ★	★ ★ ★	★ ★ ★	N/A	E	★ ★ ★ ★
WHOOPS! Cornucopia Software, Inc. P.O. Box 6111 Albany, CA 94706 (415) 524-8098 $50 ©1985	You can see spelling errors as you write with this real-time spelling checker. But it often flags correctly spelled words, and it uses more memory than most resident programs. —ZORNBERG	IBM PC/PC*jr*.* 256K and 2nd drive recommended.	Sold as is. User makes backup.	★ ★	★ ★	★ ★	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

*Titles listed for the IBM PC/PC*jr* will also run on many IBM PC compatibles; owing to the proliferation of compatibles, check with the publisher of the program or your dealer for compatibility.



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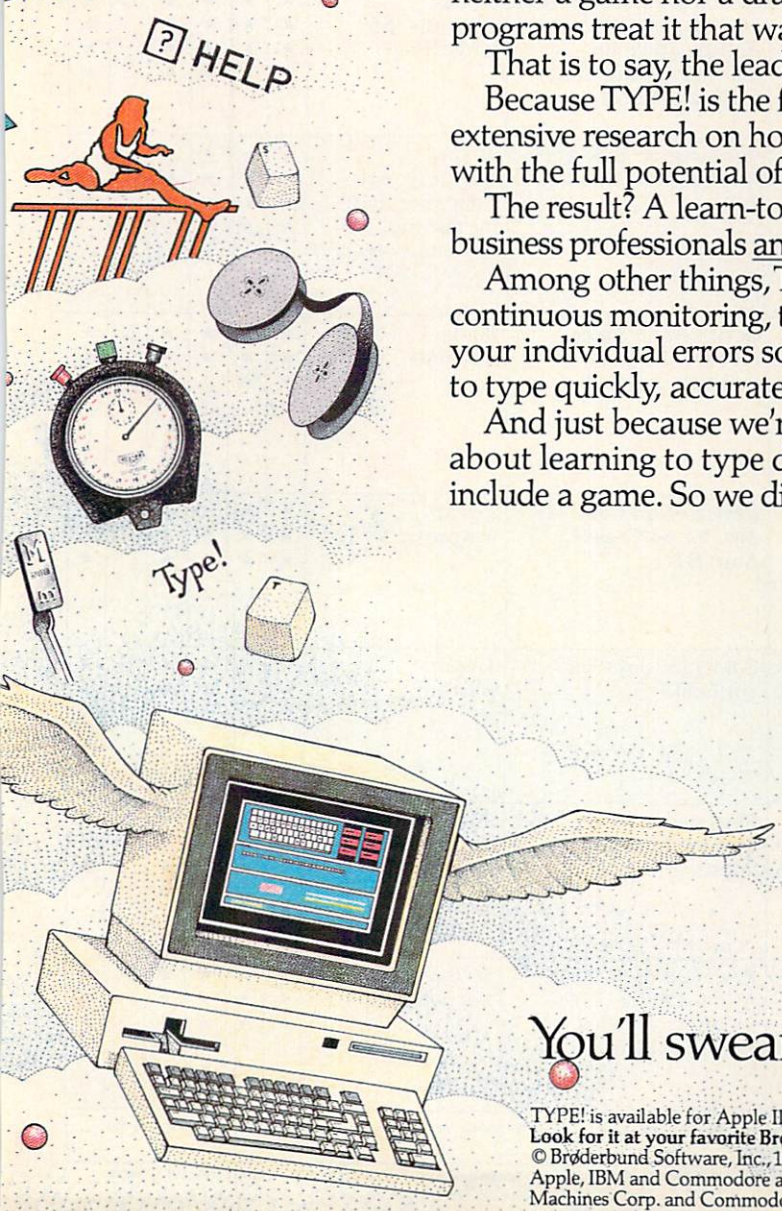

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ENTERTAINMENT REVIEWS BY JAMES DELSON

Title Publisher Price	Brief description	Hardware/ Equipment required	Backup policy	Ratings O	D	PS	GQ	EU	V
AGE OF ADVENTURE Electronic Arts 1820 Gateway Drive San Mateo, CA 94404 (415) 571-7171 $15 ©1981, 1983, 1986	There's adventure ahead in two classic role-playing adventures: *Ali Baba and the 40 Thieves* (rescue a princess) and *Return of Heracles* (accomplish seven labors). Fine fun, but disappointing graphics.	Reviewed on Apple. Also for Atari, C 64/128. Color monitor recommended. Joystick optional.	90-day warranty.	★★★	★★★	★★★	★★	E	★★★★
THE AMERICAN CHALLENGE Mindscape, Inc. 3444 Dundee Road Northbrook, IL 60062 (312) 480-7667 $30-$40 ©1986	A rewarding, but difficult-to-master sailing game that simulates small-craft racing. If sailing proves too strenuous, all races can be "entered" in a speedboat. Exciting and educational.†	Reviewed on Apple IIe/IIc. Also for C 64/128, IBM PC/PC*jr*.* Modem optional.	90-day warranty. $12.50 thereafter.	★★★★	★★★★	★★★★	★★	D	★★★★
BATTLE OF BRITAIN & BATTLE FOR MIDWAY Firebird Licensees Inc. P.O. Box 49 Ramsey, NJ 07446 (201) 444-5700 $20 ©1986	Both of these joystick-controlled war games deal with air and naval engagements in World War II. You can play them as regular strategy simulations or as arcade-style shoot-em-ups. Best for novices, but experts can enjoy, too. Ages 14+.	C 64/128. Joystick.	90-day warranty.	★★★	★★	★★★	★★	A	★★★★
THE CHESSMASTER 2000 Software Country 9713 Santa Monica Blvd. Beverly Hills, CA 90210 (213) 278-8450 $40-$45 ©1986	Packs in every feature available so far in a chess simulator, such as revolving 3-D and 2-D boards, a teaching mode, game analysis, and a new chess algorithm for improved tactical play.†	Reviewed on 256K IBM PC/PC*jr*.* Also for Amiga, Apple IIe/IIc, Atari, Atari ST, 512K Macintosh.	30-day warranty. $5 for backup.	★★★★	★★★★	★★★★	★★★★	E	★★★★
GETTYSBURG: THE TURNING POINT Strategic Simulations, Inc. 1046 N. Rengstorff Ave. Mountain View, CA 94043 (415) 964-1353 $60 ©1986	A remarkably detailed simulation of the most important battle of the Civil War. Using small units, players maneuver their armies from dawn to dusk each day. Combat is only part of this brilliant game.†	Reviewed on 64K Apple. Also for Atari, C 64/128.	30-day warranty. $10 thereafter. $12 for backup. 14-day money-back guarantee.	★★★★	★★★★	★★★★	★★★	D	★★★
INTRIGUE! Kinemation Four Winds Road, Box 3076 Peterborough, NH 03458 (603) 924-6720 $40 ©1986	Since it uses a multiple-choice format to advance the plot, this text/graphic detective game is recommended for those who want an easy adventure, but faults in play system reduce its challenges.	Reviewed on Apple. Also for C 64/128. Joystick optional.	90-day warranty.	★★★	★★★	★★	★★★	E	★★
QUIZAM! Interstel Corp. P.O. Box 57825 Webster, TX 77598 (713) 333-3909 $30 ©1985	Here's a strong entry into the trivia-game market, highlighted by a write-your-own-question feature. A great party game for 1-8 players that's educational as well as fun. For ages 10+.	Reviewed on C 64/128. Also for 64K Apple, Atari ST.	1-year warranty.	★★★	★★★	★★★	★★★	E	★★★
STINGER! Interstel Corp. (See above for address and phone) $20 ©1985	The pace is fast as you pilot a space fighter into danger. Over 60 different enemies fly across a scrolling screen. Some planning required, but mainly quick reflexes.	C 64/128. Joystick optional.	1-year warranty.	★★	★★★	★★★	★★	E	★★★
SUPER CYCLE Epyx 600 Galveston Drive Redwood City, CA 94063 (415) 366-0606 $30-$40 ©1986	The variety of courses in this top-notch motorcycle racing game get more difficult as you do better. Joystick gear-shifting allows speed control for passing and turns.	Reviewed on C 64/128. Also for Atari ST. Joystick.	90-day warranty. $5 thereafter.	★★★	★★	★★★	★★★★	A	★★★
ULTIMATE WIZARD Electronic Arts (See above for address and phone) $30 ©1986	An enjoyable strategy/arcade game that adds spell-casting to combat monsters. The construction option lets you build screens once you've played the 100 levels included.	Reviewed on C 64/128. Also for Apple. Color monitor. Joystick recommended.	90-day warranty.	★★★	★★★	★★★	★★★★	A	★★★

RATINGS KEY **O** Overall performance: **D** Documentation: **PS** Play System: **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

*Titles listed for the IBM PC/PC*jr* will also run on many IBM PC compatibles; owing to the proliferation of compatibles, check with the publisher of the program or your dealer for compatibility.

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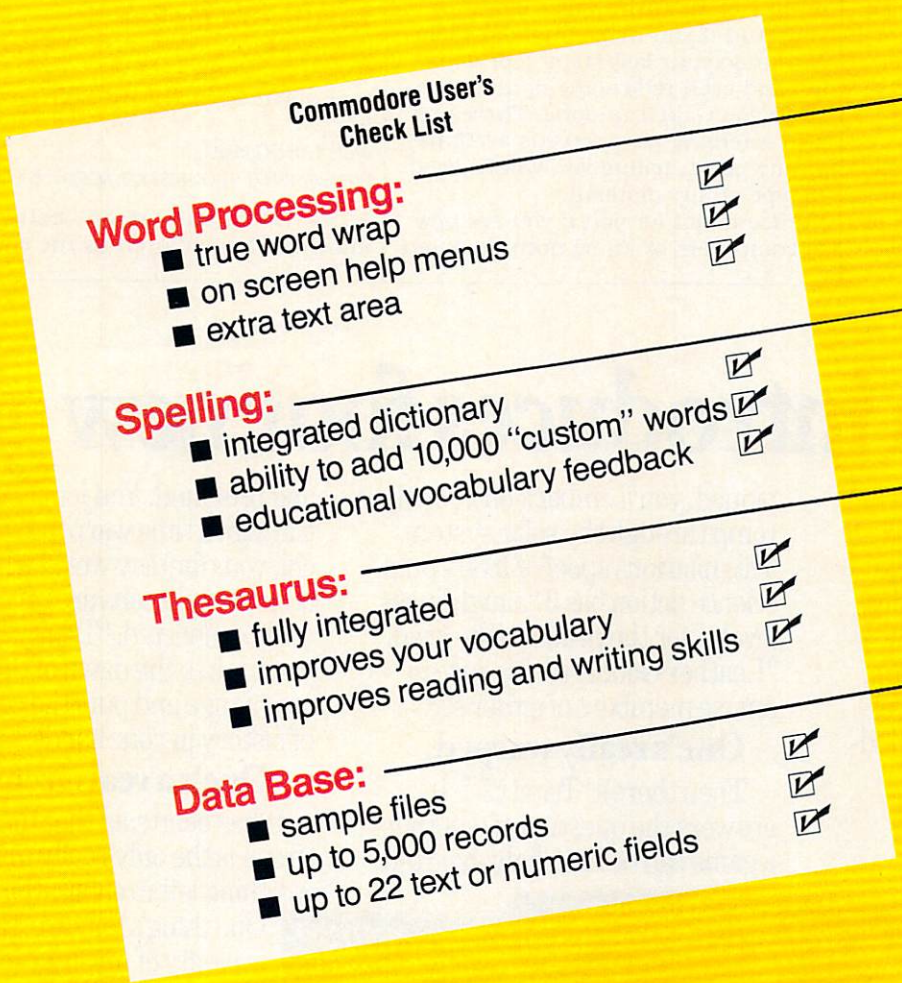

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CIRCLE READER SERVICE 60

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 122 for information such as backup policies and addresses of software publishers.

EDUCATION/ FUN LEARNING

Alice: The Personal Pascal

HARDWARE REQUIREMENTS: 256K IBM PC.
PUBLISHER: Graham Software Corporation
PRICE: $95
PUBLISHER'S SUGGESTED AGES: 13+

If you write programs in Pascal—or would like to—you owe it to yourself to take a look at *Alice*, a Pascal programming system unlike any other you've ever seen.

The heart of *Alice* is a Pascal interpreter. An interpreter, such as the BASIC interpreter that probably came with your computer, lets you enter and run a program as parts of one process. In contrast, most Pascal products, like Borland's best-selling *Turbo Pascal*, are compilers. When you use a compiler, you need to go through at least three steps (and sometimes more) to write and run a program.

But *Alice* is much more than an interpreter. It's a well-thought-out programming "environment," including a program editor that lets you type in a program with fewer keystrokes and never allows you to enter an illegal construct. This is especially handy for Pascal, where everything must be just so, or no go.

When you start up *Alice*, you see the outline of a program on the screen. All you do is fill in the blanks! For example, type WHILE and immediately the editor provides an outline of an entire WHILE block for you. And if you make mistakes, you can undo your last steps repeatedly—and even redo some or all of the steps you've just undone. There are also extensive HELP screens available at any point, telling you what's legal to type at any moment.

Alice is not for you if you are new to computers or know nothing about Pascal. While the tutorial manual takes you through the features in a clear and easy-to-follow way, it assumes you have a basic knowledge of Pascal programming. However, the publisher also sells a textbook that uses *Alice* to teach beginning programming concepts. And *Alice* is certainly much more useful to a novice than plain Pascals, most of which make little or no effort to help you learn the language's features.

On the whole, *Alice* is an extremely valuable programming system. It requires an investment in learning time, but it's well worth it. Once you try it, you may never want to write and debug Pascal programs any other way. —LANCE PAAVOLA

Certificate Maker

HARDWARE REQUIREMENTS: 64K Apple, C 64/128, 256K IBM PC.
PUBLISHER: Springboard Software, Inc.
PRICE: $50-$60
PUBLISHER'S SUGGESTED AGES: 8+

As Dr. David Sutherland—better known to his children as the com-

Infocom introduces four new gam

Infocom,™ the crazy people who brought you "Zork"® and "The Hitchhiker's Guide to the Galaxy,"™ has a habit of coming up with games that add a new dimension to interactive fiction. And the best keeps getting better. Case in point: "Leather Goddesses of Phobos."™ It has a scratch n' sniff card and a 3-d comic book to excite all your senses. Once your interest is piqued, you'll embark on a rowdy romp through the solar system. This hilarious spoof of 1930's pulp science fiction has 3 "naughtiness levels," for the prude to the lewd. "Leather Goddesses" is sure to amuse members of either sex.

One's really warped.

Then there's "Trinity."™ It answers the question of whether a game can be both light-hearted and profound. You journey through a time warp into a mischievous fantasy world where all atomic explosions are mysteriously connected. "Trinity" takes you back to the dawn of the atomic age and puts the course of history in your hands.

One's a real circus.

It has been said that the circus is the only really mysterious thing left in civilization. One thing's for sure, there is plenty of mystery in "Ballyhoo."™ While trying to locate the circus owner's kidnapped daughter, you are somersaulted into a three-ring world of deception and crime. To solve the crime

puter doctor—tore into the package, he gleefully exclaimed, "Wow, I've been wanting to try this!"

"This" is *Certificate Maker*, a simple-to-use software package that helps you create personalized certificates with both comic and serious graphics and themes. You begin by choosing MAKE CERTIFICATE from the straightforward, on-screen menu. As you're prompted for the number of the certificate template you want to use, you'll reach for the non-threateningly short manual where the 220 templates are pictured. They range from such comic choices as the

"Rude Awakening Award"—with a picture of a gorilla leering over a horrified man in bed—to scholastic, athletic, and religious awards. There are also blank awards, some with pictures and others with no graphics at all.

Next, you're asked for a border type (24 different patterns and a no border option). As the cursor lands on each type, that design is shown bordering the screen. Similarly, a sample is shown at the bottom of the screen when you're choosing one of the five type faces. A regular or a large type size is available for each line, and your text is automatically centered.

When you move on to the print menu, you can keep your startup printer configuration or change the setup. Dozens of dot-matrix printers are supported, so yours probably is, but check before buying. Printing out the certificates is easy, and the quality is very good.

Everyone in our home found the software fun while making awards for family and friends. Heather, age 7, and a new reader, managed with little assistance, while Davy, age 3, could join in making choices because of the package's use of graphics. *Certificate Maker* is also ideal for schools, clubs, and other organizations. —BETTY J. SUTHERLAND

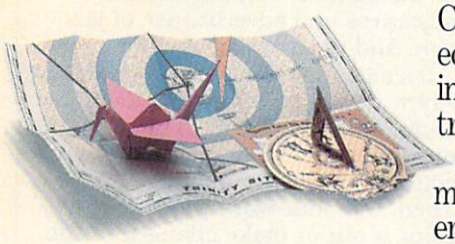
Geometry

HARDWARE REQUIREMENTS: 512K Macintosh.
PUBLISHER: Sensei Software, published by Broderbund
PRICE: $100
PUBLISHER'S SUGGESTED AGES: 15+

I always wished my geometry teacher had a blackboard that could be animated. *Geometry*, a new program for the Macintosh, makes that wish come true. Diagrams of triangles, parallelograms, and circles slowly rotate through several planes, displaying angles, lines, and relationships in a way I could understand far better than an unmoving book.

This package is an excellent resource for a geometry student since it can be customized to match the textbook used in class. It's even similar to a book: the program is ar-

es. One really smells.



Every package includes an integral set of props to excite your senses and enhance the game.

and save your hide from a permanent spot in the freak show, you'll need to stretch your puzzle-solving skills to the limit.

One's really haunting.

Wrapping up this new quartet is a classic gothic mystery set in a haunted castle on the mist-shrouded seacoast of Cornwall. In "Moonmist"™ you'll explore the darkest reaches of Tresyllian Castle and get involved with an eccentric cast of characters, including British nobility, while trying to save your best friend from a vengeful ghost. "Moonmist" offers four distinctly different sets of clues, problems, solutions and hidden treasures. So you'll die to replay it again and again.

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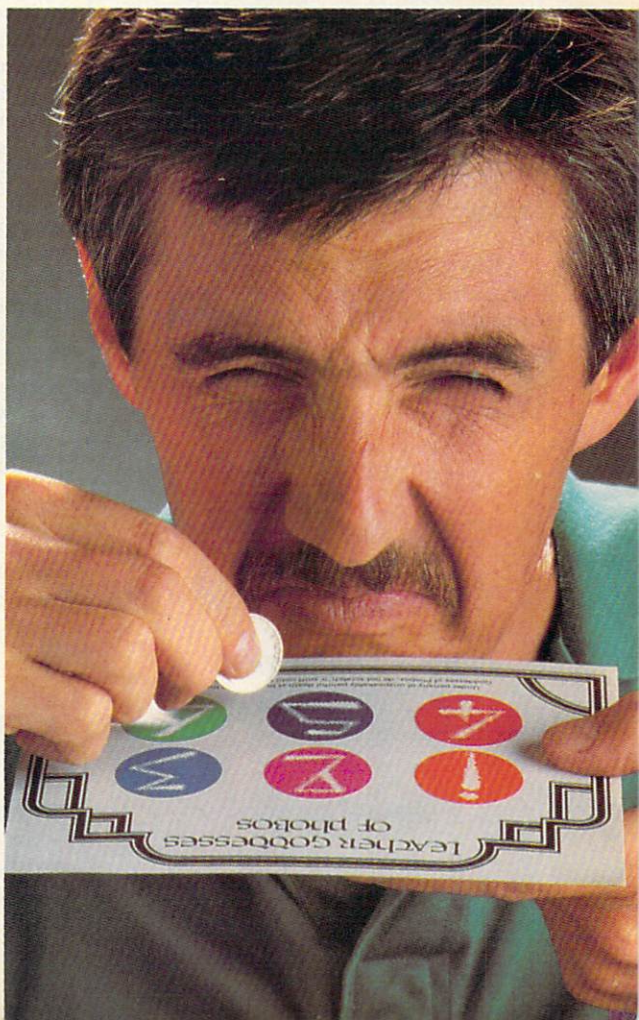
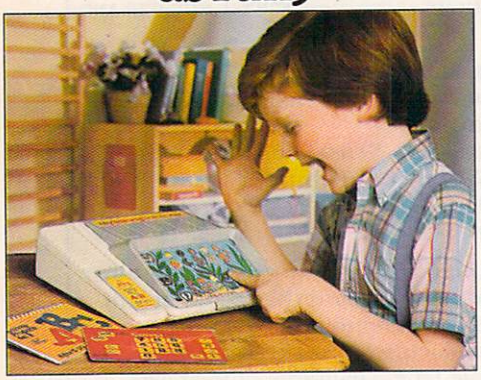


THIS IS LEARNING.
(cleverly disguised as fun)



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It comes with 22 learning activities and includes a *full function* talking calculator. It's even expandable.

The "clock" program has moveable hands for learning to tell time (analog and digital).*

More advanced programs for older children are available too.

Kids love My Talking Computer™ learning system for the fun. You'll love it for the learning.

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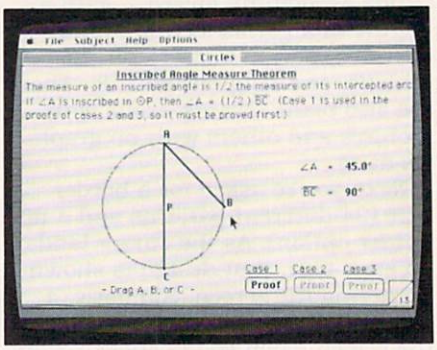
*Clock sold separately.

CIRCLE READER SERVICE 13

SOFTWARE REVIEWS



ranged by pages, and you "turn" an on-screen graphic page with the mouse button. The table of contents displays 10 chapters, starting with a discussion of points, lines, and planes; moving through congruence, parallel lines, parallelograms, etc.; and arriving at coordinate geometry and areas and volumes of solids. You also may select any chapter at any time, even if you're in the middle of a proof.

Two parallel streams run through the material: tutorials and problem sets. You can select to see only one at a time or a mixture of both. Tutorials take advantage of the Mac's click-selection capability and allow personalized study. For example, when discussing line segments, the program directs you to "click any bold-faced term to see an example." The examples are displayed upon a line segment containing a series of points and in turn flash to clearly demonstrate their features. Proofs are offered as tutorials and as problems. If you goof, the program tells you patiently "That is the wrong answer. Please try again."

At one point, I was reviewing the *Geometry* program at home with a borrowed Macintosh. My teen-age daughter, watching me struggle with the same proofs she was working on for school, asked when we were going to buy a Mac. When an educational program makes a teen-ager want to get a computer, that's one fine program. That's *Geometry*.

—MARLENE BUMGARNER ELTGROTH

HOME BUSINESS & PRODUCTIVITY

RightWriter 2.0

HARDWARE REQUIREMENTS: 192K IBM PC/PC*jr*.
PUBLISHER: DecisionWare, Inc.
PRICE: $95

You've just finished the first draft of a report. Since you are eager for the final draft to be especially well written, you seek the opinion of a professional.

"Your report is not difficult to understand, though you can improve it. For example, you might use the active voice more often. You can also shorten and simplify some of the sentences and paragraphs. In a few places you can eliminate weak language. And consider using more widely understood words."

"That's easy for you to say," you reply. "How about some specific examples?"

"Well, your first sentence is long; consider shortening it or breaking it into two separate sentences. The second sentence might be stronger if it didn't begin with the word 'But.' In the fourth sentence, consider omitting the weak phrase 'It would seem that . . .' In the same sentence, are you sure your readers will know the word 'sanguine'?" And on and on the comments go.

If your ego can tolerate such criticism, *RightWriter* may be the most useful software package you buy this year. The program analyzes each sentence in your document and inserts comments and suggestions for improvement where they are appropriate. In addition, it provides summary comments on overall readability, strength of writing, use of adjectives and adverbs, use of jargon, and unusual vocabulary.

It's so simple to use, too. Just type RIGHT, the name of the text file to be analyzed, and press RETURN. In almost no time, *RightWriter* puts an edited copy of your text on disk. Then, use your word processor to print it out or make changes in the original document.

That same simplicity makes *RightWriter* especially appropriate for family use. In addition, it only points to potential improvements in a document. You must then decide which suggestions would actually improve the writing. As a result, the more you use *RightWriter*, the more sensitive you will become to common weaknesses in your own writing. In the process, you learn how to differentiate between strong and weak writing.

I rarely recommend software as a "Must Buy!"—but in the case of *RightWriter*, four stars throughout!

—TONY MORRIS

The Personal Choice Collection

HARDWARE REQUIREMENTS: 128K Apple IIe/IIc, C 64/128, IBM PC/PC*jr*.
PUBLISHER: Activision
PRICE: $100-$120

While the word processor, data base, and spreadsheet that make up *The Personal Choice Collection* are all available separately (at $40 to $50 each), together they act as an integrated series. Reports from the spreadsheet and data base are easily transferred into the word processor.

Writer's Choice is a straightforward and comprehensive writing tool. Standard features include cut-and-paste, headers and footers, and a preview mode. On the C 128 version I looked at, it utilized the extra keys very well. Just a press of the HELP key, for example, called up immediate assistance when I ran into trouble. Included with *Writer's Choice* is *Spell Right*, a 50,000-word spelling checker. It worked well enough; unfortunately, it had to be booted separately, after I saved my document.

The data base, *Filer's Choice*, was more full-featured than I expected. Complete with a report generator, it lets you make calculations between fields and perform complex searches using such criteria as *greater than* or *less than*. I could design my form with fields anywhere on the screen, with the leeway to use up to 80 lines for the form.

Planner's Choice, the spreadsheet, is more like the word processor in the familiarity of its features. Cells are labeled from column AA to JU with 255 rows, giving you 65,025 cells (although all are not usable in a single spreadsheet). The screen can be divided into two windows, which let me compare two distant sections of any spreadsheet. Tapping the ALT key whisked me from window to window, so I could change information as needed.

While printing out a document from any of the three modules is easy, I was disturbed that the package did not support my printer's (the fairly common Okidata 92) capabilities for underlining or boldfacing. Everything worked fine on an Epson, but check to see if all enhancements work with your printer prior to purchasing this series.

All in all, while not special in any way, these productivity programs ran well and should be more than satisfactory for home or small business use. Considering the price, they're excellent values indeed.

—JUDITH ZORNBERG

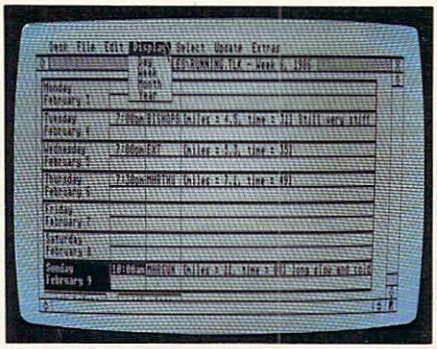
TimeLink

HARDWARE REQUIREMENTS: Atari ST, Macintosh.
PUBLISHER: Batteries Included
PRICE: $50

When I was in college, I always drew up a weekly schedule. It was the only way I could organize my classes, studying, working, and what social time I could squeeze in. Life after college has been more of the same, juggling work, writing assignments, meetings, dates, and golf games.

TimeLink is designed for busy people like me. This time management program does more than schedule appointments, though. It keeps track of how long you spend on a particular project or client, searches for activities by specific keywords or dates, calculates the time between two points, and prints your schedule.

Entering appointments is easy, since the program accepts the time and date in a variety of ways. For instance, you can enter 2:00 p.m. as 2:00p, 14:00, 2p, or simply 2 (hours for 1 to 7 are assumed to be p.m., since they're the afternoon hours of a normal business day). Dates are displayed in windows, and you can view appointments by the day, week, month, or year.



When writing an appointment's description, words wrap at the end of a line, just like on a word processor. Your text can be highlighted and cut or copied to be pasted in elsewhere. Entire appointments can also be copied. So, for example, if there's an activity you do every day, like jog or go out to lunch, just copy the entry and edit the time and date.

A keyword can be added to your appointment, which makes it easy to

CIRCLE READER SERVICE 14

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WOMAN (right) This one's been around for a long time. And it speaks.

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WOMAN (right) Math?

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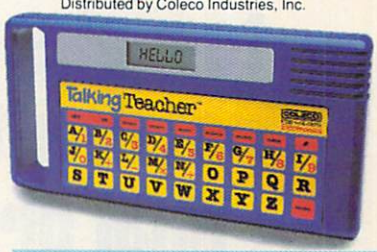

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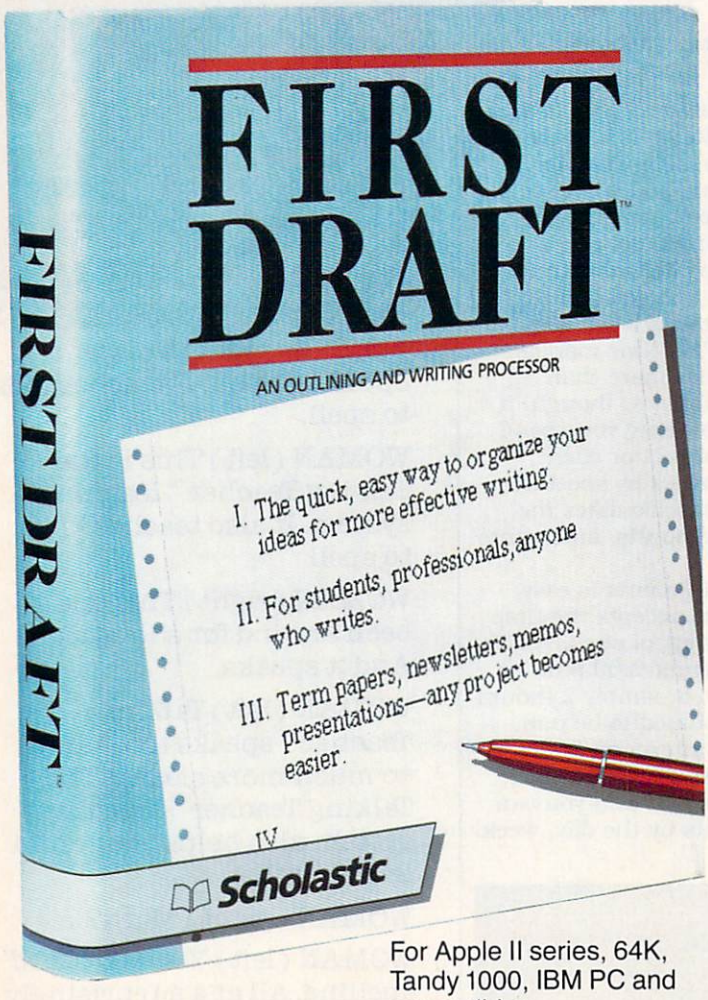

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SOFTWARE REVIEWS

search for a particular event. It also helps you figure out the time spent on a project, which, along with a feature that adds up expenses associated with an appointment, can help with billing.

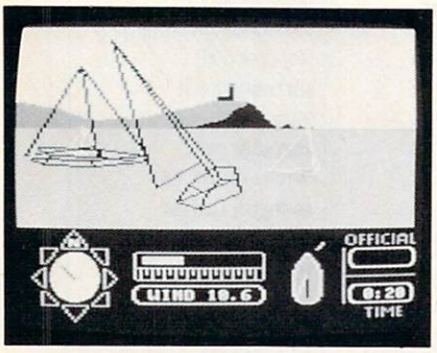
Best of all, *TimeLink* requires little time to learn, since it uses the Atari ST or Macintosh menus and point-and-click mouse techniques. The manual is brief but includes useful examples.

While *TimeLink* has obvious business applications, it's also useful at home to schedule daily appointments within a family or to track how much you spend on items such as take-out dinners. Besides my word processor, it's one of the most useful programs I own. It gives me a lot more information than my old, handwritten schedule could, and it's also fun to use. —MATTHEW STERN

ENTERTAINMENT

The American Challenge

HARDWARE REQUIREMENTS: Apple IIe/IIc, C 64/128, IBM PC/PC*jr*.
PUBLISHER: Mindscape, Inc.
PRICE: $30–$40
CRITIC'S SUGGESTED AGES: 10+



Adventures of a different kind await you in *The American Challenge*, a rewarding yet difficult-to-master sailing simulation. You begin to learn the basics of sailing by using the excellent documentation, which includes a tutorial on a 45-rpm record. Test your new skills in practice, then move on to the ever-more-challenging race courses provided on disk.

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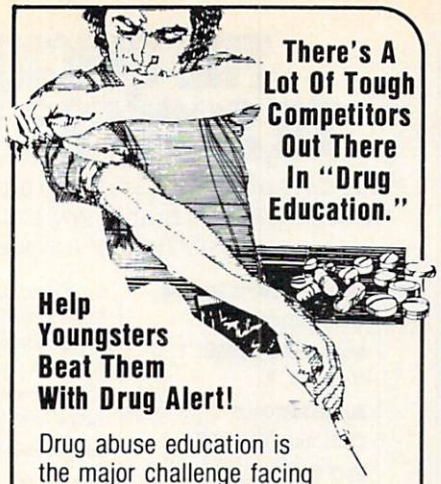

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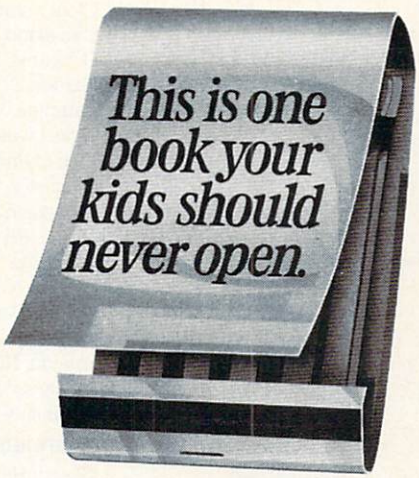

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SOFTWARE REVIEWS

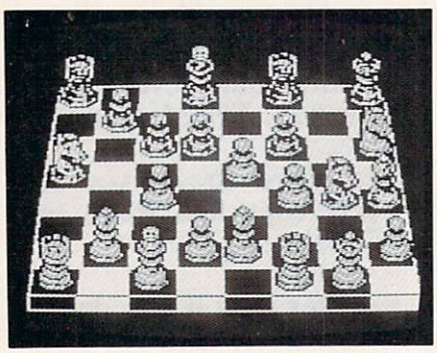
ing two computers lets gamers compete across the room or across the country by modem. It's exciting to see your and your competitor's ships on-screen simultaneously. You can even send brief messages to each other during the race.

For those who prefer speedboating (including those who are frustrated by the sailing game's tough play system), alternate races can be run in a fast, little motor boat.

As detailed as *Flight Simulator*, and with the same practical teaching applications, *The American Challenge* is a first-rate program.

The Chessmaster 2000

HARDWARE REQUIREMENTS: Amiga, Apple IIe/IIc, Atari, Atari ST, 256K IBM PC/PC*jr*, 512K Macintosh.
PUBLISHER: Software Country
PRICE: $40–$45
CRITIC'S SUGGESTED AGES: 10+



Not only does *Chessmaster 2000* pack in practically every feature we've run across in other chess simulators, it also incorporates a new chess algorithm that makes it a top-level player. Boasting the world's largest library of opening moves (over 71,000), this program works equally well as a tutor for beginners, an opponent for novice to expert players, and a crack analyst of your own game problems.

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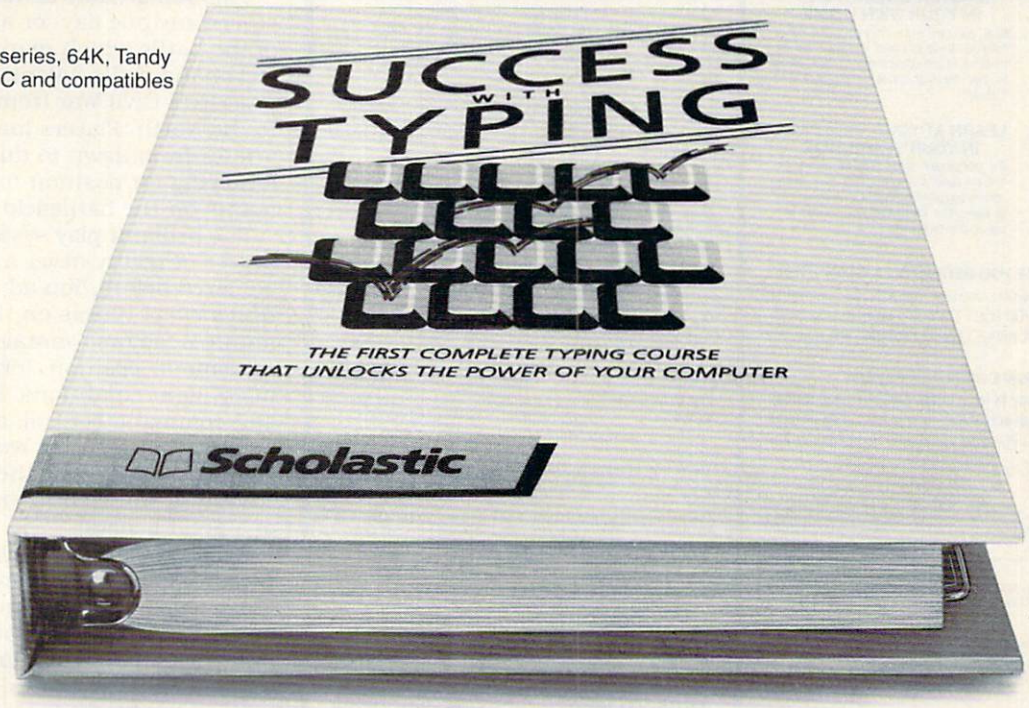

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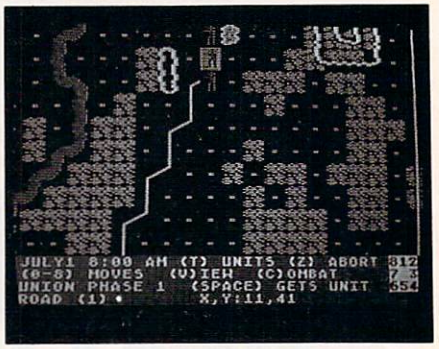
SOFTWARE REVIEWS

The graphics are superb, with revolving 3-D and 2-D boards giving you views from the side and overhead. Above all, there's the game itself—sophisticated yet easy to play with. *Chessmaster 2000* is one of the year's best.

Gettysburg: The Turning Point

HARDWARE REQUIREMENTS: 64K Apple, Atari, C 64/128.
PUBLISHER: Strategic Simulations, Inc.
PRICE: $60
CRITIC'S SUGGESTED AGES: 12+



When it comes to the Battle of Gettysburg, I've played every war game I could get my hands on. Yet none compare to the new computer simulation, *Gettysburg: The Turning Point.*

This remarkably detailed game covers any one day, or all three days, of the battle which many historians feel changed the balance of the American Civil War from the South to the North. Players maneuver their armies from dawn to dusk each day, jockeying for position to seize key points on the battlefield.

The brilliant play system allows a degree of reality never as well achieved before. You adjust your unit's effectiveness on the basis of multiple factors—morale, fatigue, movement, position, formation, visibility, light conditions, leadership, and command control, among others. The battle is not won or lost by combat alone but by the wide use of resources so essential in the makeup of a great general.

Variable play levels allow gamers, whether beginning or experienced, to play each other or the computer on a relatively equal footing, too. Add the usual fine options included in most SSI war games, and you have *Gettysburg*—the best strategy and tactics game we've seen this year. —REVIEWS BY JAMES DELSON

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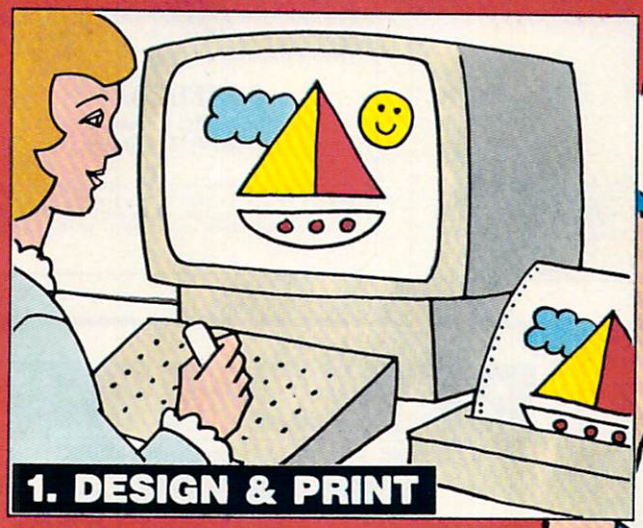

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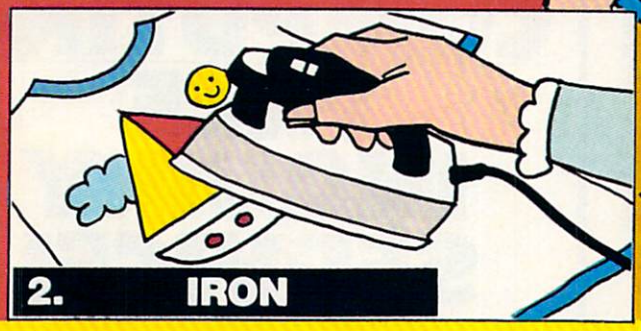

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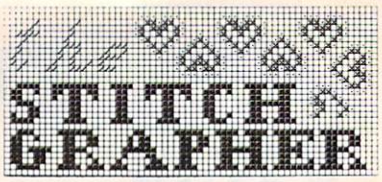

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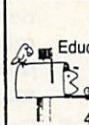
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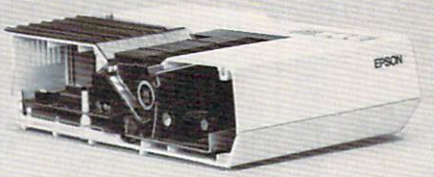

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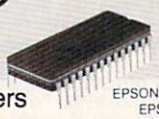

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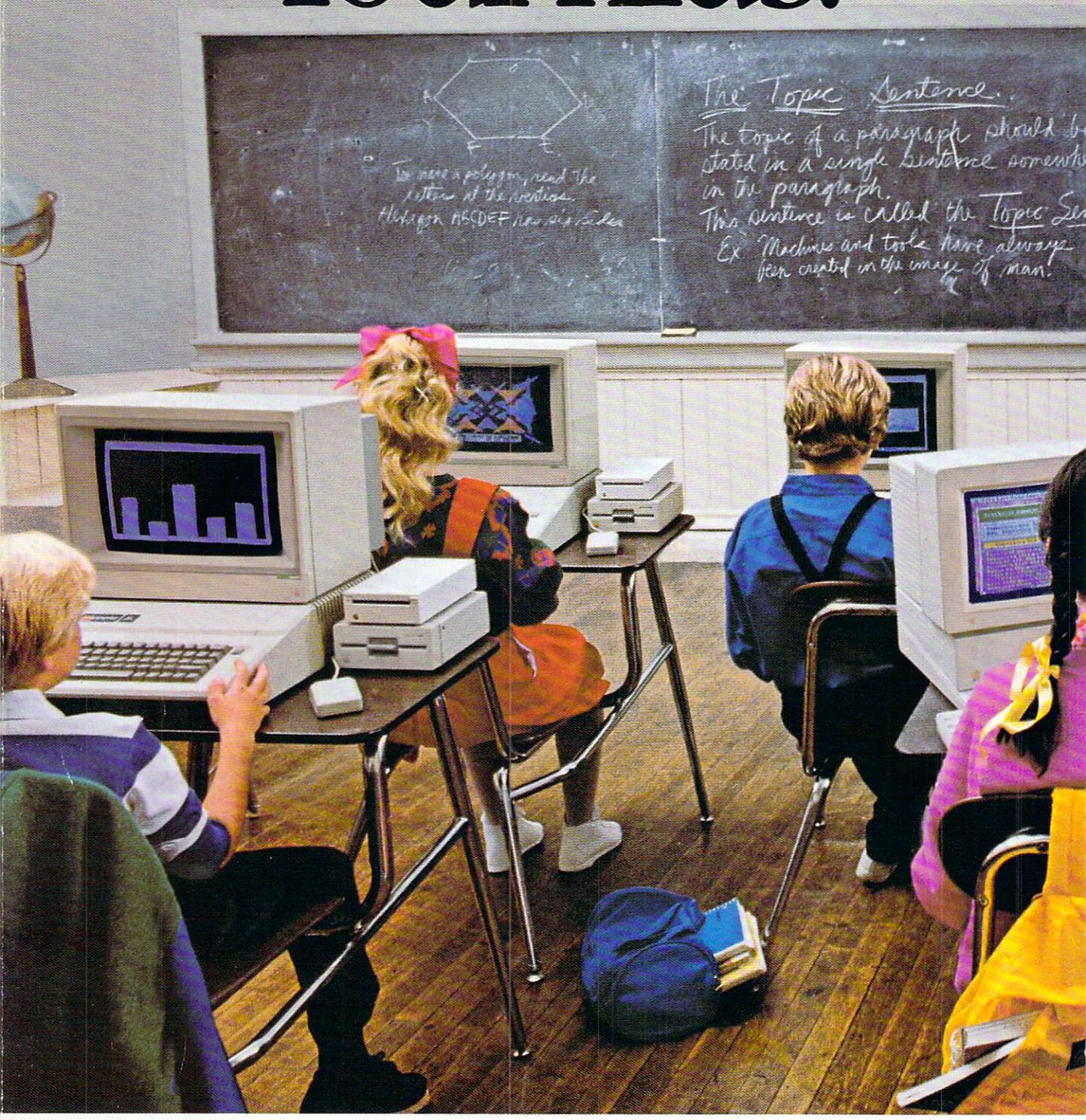

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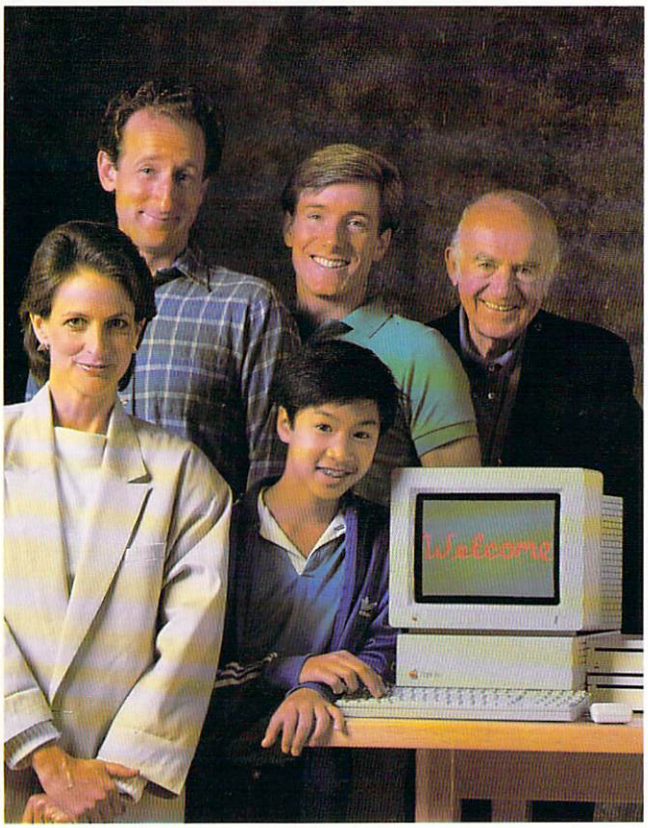

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Rest assured: when you show your support by buying an Apple II, we'll never stop showing ours.

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that's computerese for room to grow. So you can add everything from hard disk storage to the user-friendly, point-and-click AppleMouse.™

And with adult programs like AppleWorks™ — that can help you do everything from household inventories to tax preparation — you may be tempted to spend a few hours sitting at an Apple IIe yourself.

It's a workhorse of a computer that can start off simple and continue to expand as you see fit.

All the way up to the full capabilities of the brand new Apple IIGS™ — the little colossus parked on its right.

THE NEW APPLE IIGS. THE MOST POWERFUL APPLE II IN HISTORY. AND EVERY OTHER SUBJECT.

To say that the IIGS is the most amazing Apple II ever built would be an understatement.

It has all the features and high technology that at one time would have been reserved only for the very, very rich or certain covert government operations.

The G stands for Graphics. With a capital G.

Because it can reproduce 4,096 colors (for those at home keeping count, that's 4,024 colors more than you get in the jumbo pack of crayons). Everything from good old blue to pale violet to electric red to all those colors in between. All in high-resolution graphics.

The S in IIGS stands for Sound. As in Symphonic.

The IIGS has a 15-voice digital sound chip — the kind you find in sophisticated music synthesizers. So it can reproduce everything from the subtleties of human speech to the splendor of a philharmonic orchestra.

And the IIGS is easy to use. Because it works the same friendly way Macintosh™ does. With windows, pull-down menu bars and the now-famous AppleMouse.

How does the IIGS do all this? With a 16-bit microprocessor and 256K of memory (expandable to an awesome 8-megabytes).

Of course, the IIGS is still an Apple II. So it can run the vast library of Apple II software. But up to three times faster than any other member of the family.

And it's inherited the best traits of both its siblings. Like the IIc, it's ready to run right out of the box. And like the IIe, it can grow any which way you want.

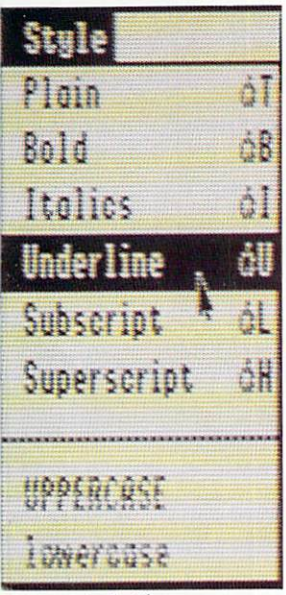
You can add options like an ImageWriter II. An Apple LaserWriter® printer. An Apple Personal Modem. Or Apple's new Hard Disk 20SC that can store up to 20,000 typewritten pages.

So even though it's great for teaching art and music to kids, it has enough power to run a fair-sized family business. Like Saudi Arabia.

Of course, the question remains: does this kind of power belong in the hands of a minor?

Yes.

Because as with every Apple II, it's nothing more nor less than the power to be your best.



Apple II's can now run Macintosh-like software with a mouse and point-and-click commands.

EVERY SEASON, YOU'LL BE SEEING MORE NEW PROGRAMS.

Of course, there are lots more programs for the Apple II family than for any other personal computer in the world.

And our software list is getting longer all the time.

Take educational software. We write our own programs, like Apple Logo, which teaches children to write *their* own programs. At the same time, we also encourage other education software developers to provide innovative learning solutions.

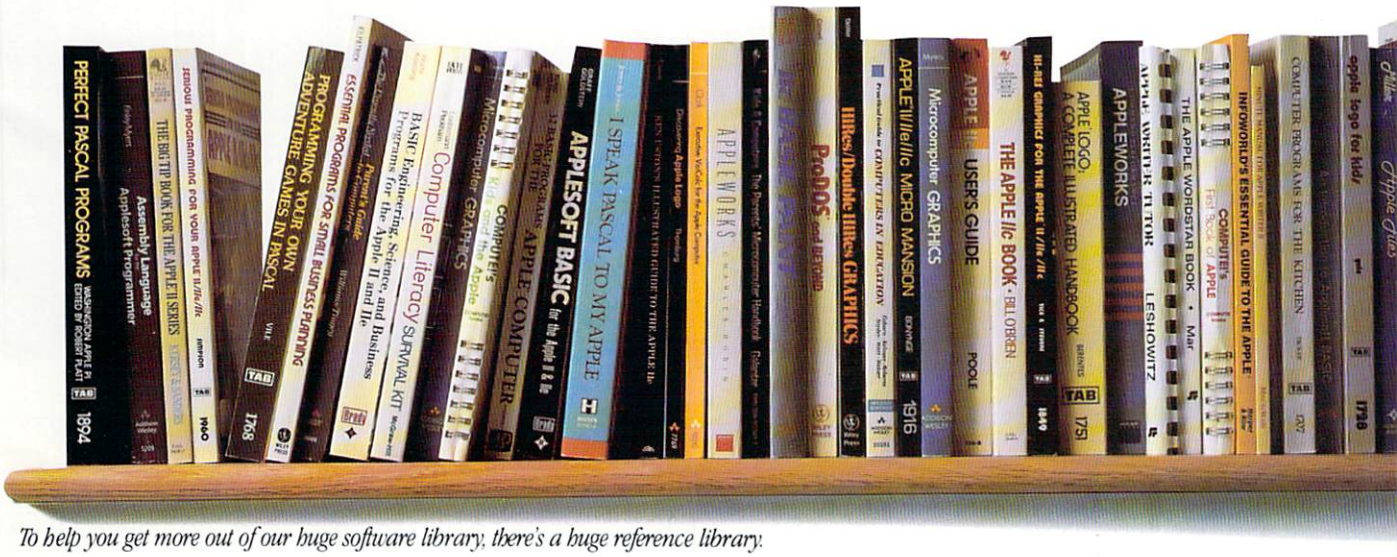
From special tools that help disabled students get an even break to courseware that helps ordinary students advance at extraordinary rates.

And education is just half the story.

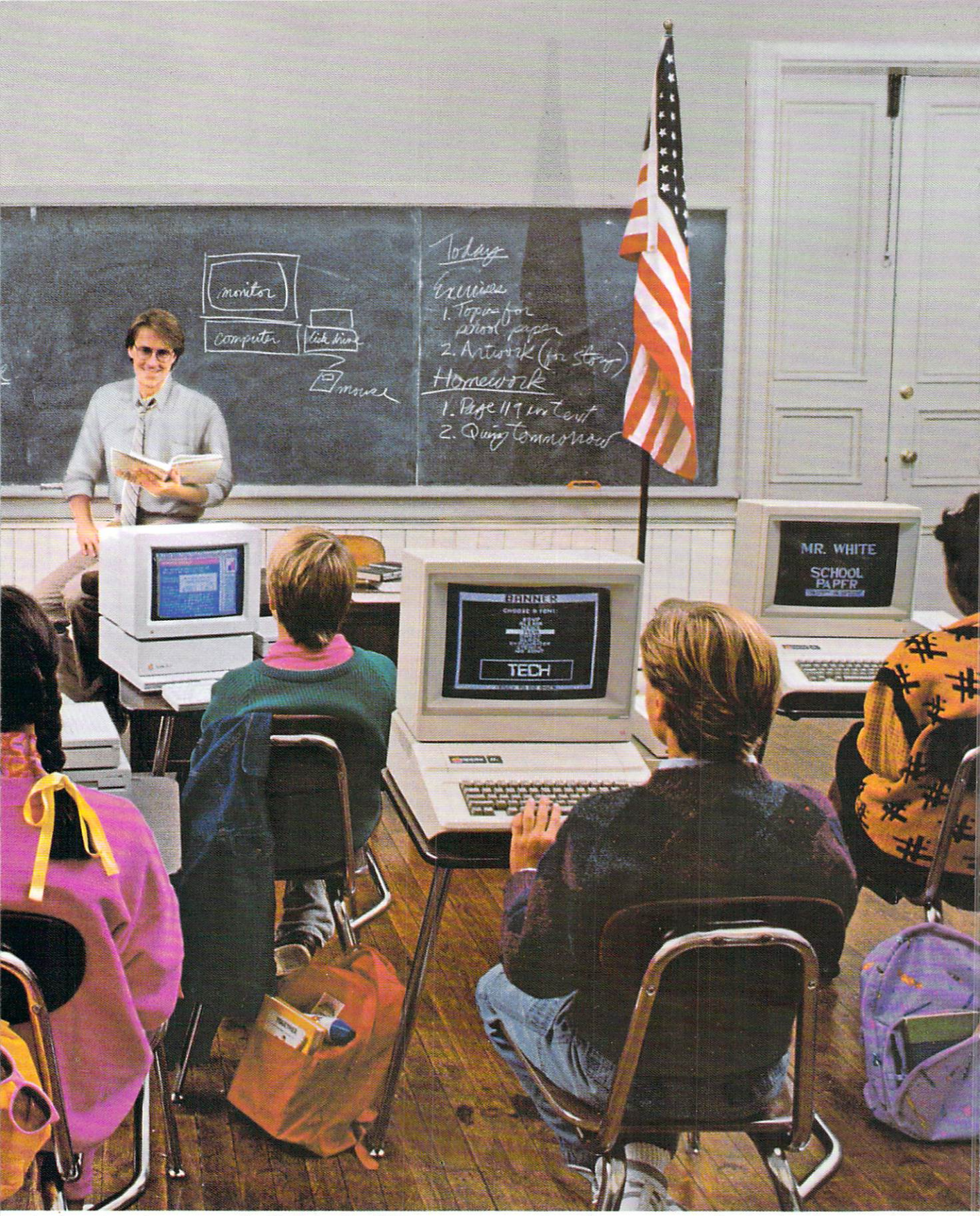
Some of the best-selling productivity software in the world runs on Apple II's. Word processing programs. Spreadsheets. Databases. Accounting packages. Even communications programs to tap into a whole world of electronic information services.

So when your kids aren't busy using the Apple II for their homework, you can use it for yours. Running your business, balancing the household budget, tracking the stock market or doing a hundred other things.

Maybe even something educational.



To help you get more out of our huge software library, there's a huge reference library.



they're using, chances are they'll say an Apple® II.

It's the leading computer in education.

And one of the most popular computers in the larger world. Nearly 3,000,000 Apple II's are helping people in virtually every field of human endeavor.

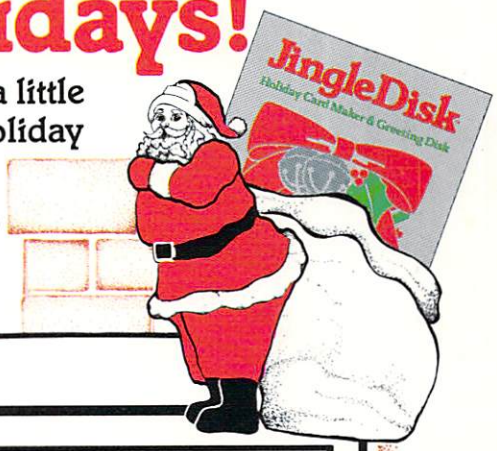
So you can get as much out of one as your kid can. Which is why it makes so much sense to consider having an Apple II at home.

Besides, it's the only sure way to make your experts as expert as they think they are.

Take Hi Tech Home For The Holidays!

All you need is JingleDisk, your PC and printer, a little Holiday PrinterPaper and you'll create unique holiday cards even Santa won't forget!

After the cards are out and the gifts are given, just boot up your computer, turn up the sound and let JingleDisk entertain with Yuletide carols and vivid animations.



Available for Apple, Atari, Commodore and IBM formats.

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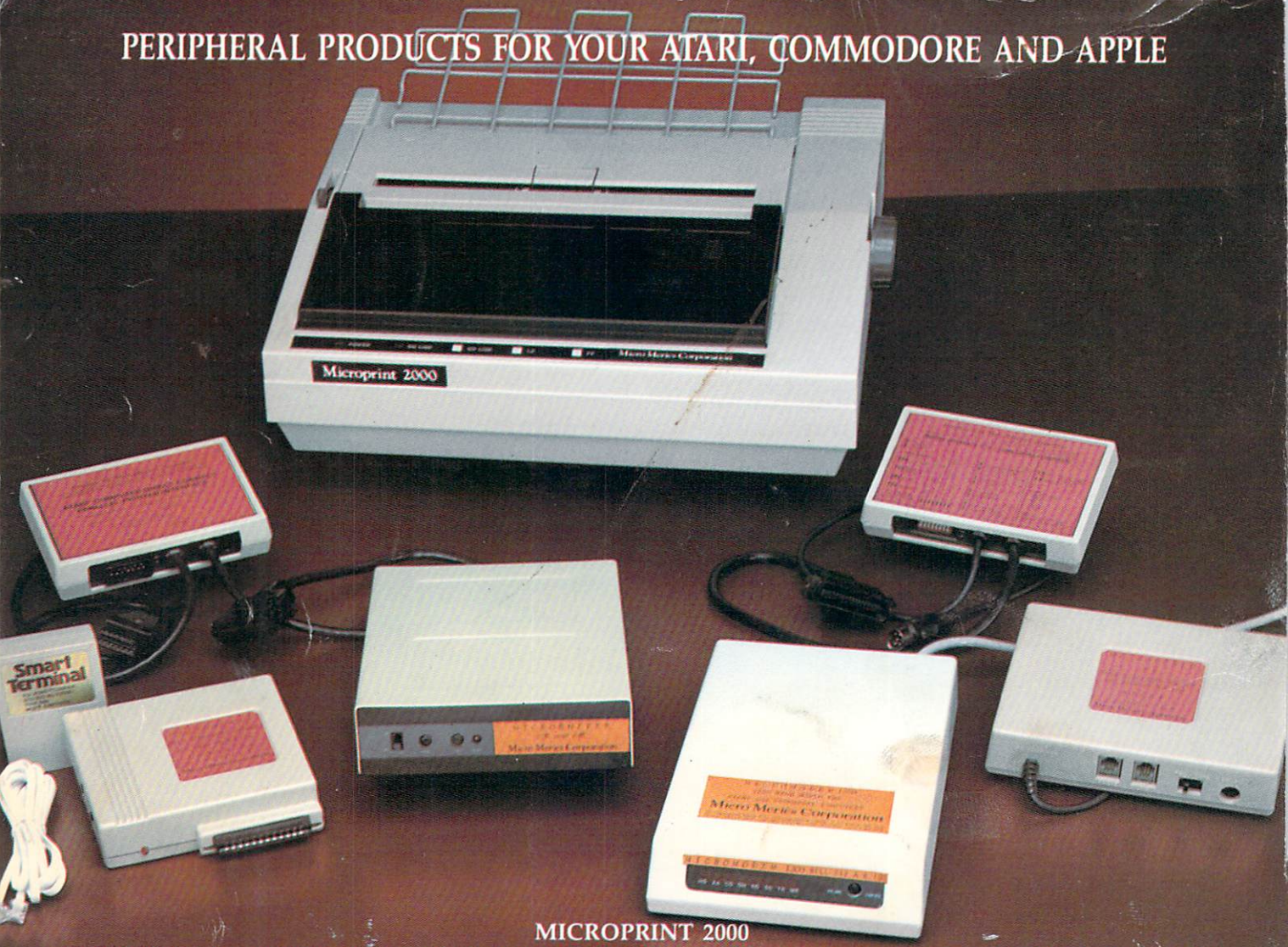

MICROPRINT 2000

MICRO MERICS MICROPRINT 2000 delivers big performance without knocking a big dent in your budget. This wonderfully affordable, fast 120 CPS, letter quality built-in, DOT MATRIX PRINTER has all of the features usually found only in more expensive models. MICROPRINT 2000 has graphics modes, tractor/friction feed, foreign language characters, bidirectional printing, snap-in cassette ribbon, user replaceable head, and standard parallel interface. With serial interface option, and fine near letter quality, it is no longer necessary to transfer your draft to the typewriter.

PARALLAX-AT

MICRO MERICS PARALLAX-AT is one of the best graphic and letter quality printer interfaces available for ATARI® computers. Guaranteed to meet all of your ATARI printer interface requirements, the PARALLAX-AT works with all ATARI® computers and all popular dot matrix printers. The PARALLAX-AT has an extra serial port to daisy chain other peripherals. It's easier to set up, has more printing modes, and a wider range of applications then any other printer interface on the market. PARALLAX-AT has a proven track record of being one of the most reliable printer interfaces available today.

PARALLAX-CD

MICRO MERICS PARALLAX-CD lets owners of all COMMODORE® home computers connect any letter quality or dot matrix parallel printer to their system. PARALLAX-CD emulates COMMODORE's own 1525 graphic printer when used with any other printer interface. All switches are externally accessible, and settings are clearly marked on the cover. PARALLAX-CD uses Compute Gazette mnemonics, and features 22 available print modes. It is simple to use, yet still allows the flexibility an expert programmer may need.

MICROBUFFER

MICRO MERICS MICROBUFFER lets you keep working while your printer keeps printing. Stationed between your printer interface and your printer it stores the output from your computer until the printer can finish printing. Available with 32K of memory, or, for larger jobs, 64K.

MICROMODEM-AT

MICRO MERICS MICROMODEM-AT is a standard 300 baud modem that provides excellent performance for the ATARI computer user. It is designed to connect directly to any ATARI computer and to a standard modular phone cord. It uses the Bell 212A/103 protocol to allow connection to any Hayes or Bell standard modem, and features both auto-dial and auto-answer.

MICROMODEM-CD

MICRO MERICS MICROMODEM-CD, like the AT, is a standard 300 baud modem, providing excellent performance and value for any COMMODORE computer user. It connects directly to a standard modular phone cord. It uses the Bell 212A/103 protocol to allow connection to any Hayes or Bell standard modem, and features both auto-dial and auto-answer.

MICROMODEM-1200

MICRO MERICS MICROMODEM-1200, is a full feature 300/1200 baud modem. MICROMODEM-1200 comes pre-cabled to directly connect to your ATARI or COMMODORE computer, or with an RS-232 cable to connect to APPLE®, IBM®, or other popular computers. MICROMODEM-1200 is fully compatible with the Hayes command set and uses the Bell 212A/103 protocol to connect with the most popular modems all over the world. MICROMODEM-1200 features 8 LED's to indicate High Speed, Carrier Detect, Receive Data, Modem Ready, Answer Mode, Off Hook, Send Data, and Terminal Ready. For ease of use you can reselect communication options through the MICROMODEM-1200's 8 outside accessible switches. A top of the line modem, at an amazingly affordable price, MICROMODEM-1200 is all the modem you need.

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