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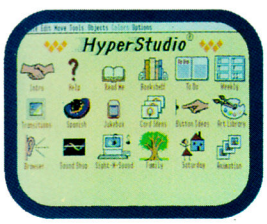

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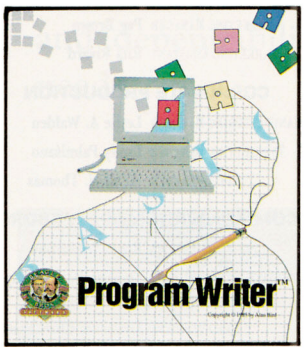

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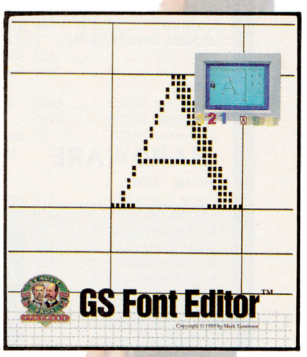

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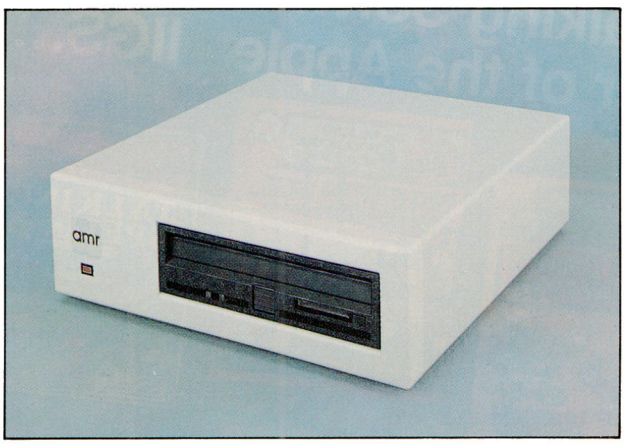

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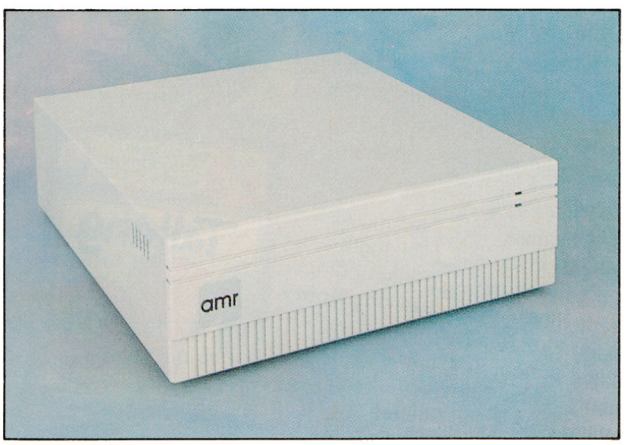

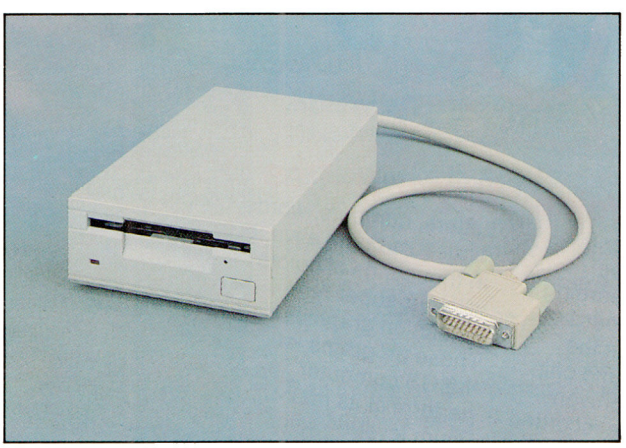

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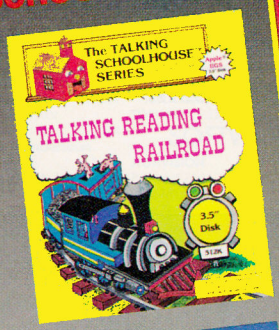
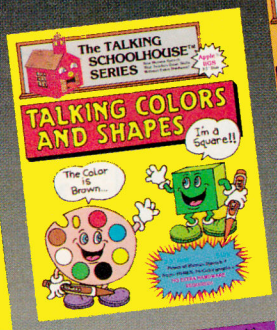
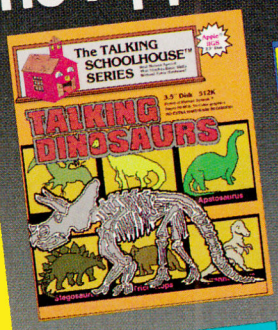
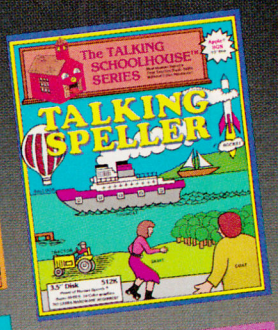
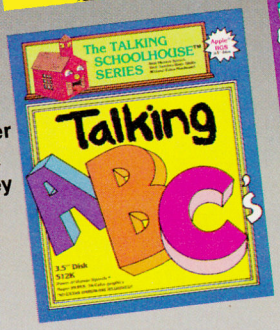
- Talking Addition and Subtraction
- Talking ABC's
- Talking Speller
- Talking Clock
- Talking Money

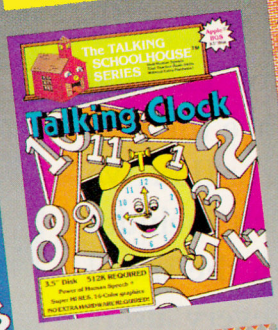


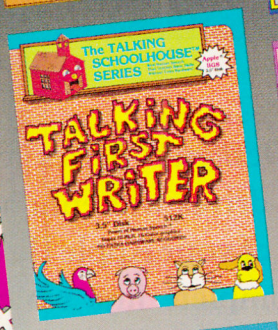


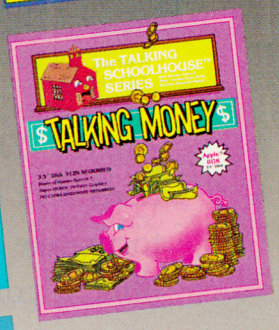












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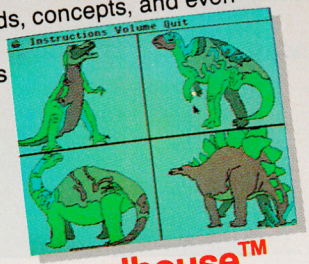

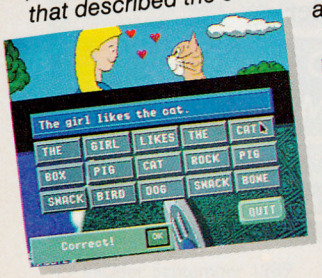

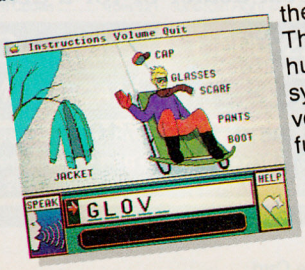

The Talking Schoolhouse™ Series

from Orange Cherry Software. All programs are currently available on 3.5" disks for the Apple IIGS. The suggested retail price is $49, $59 for the School Edition. To order, or for more information contact your dealer or call toll-free (800) 672-6002.

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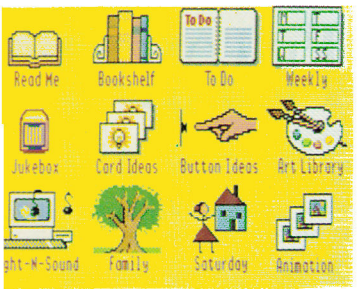

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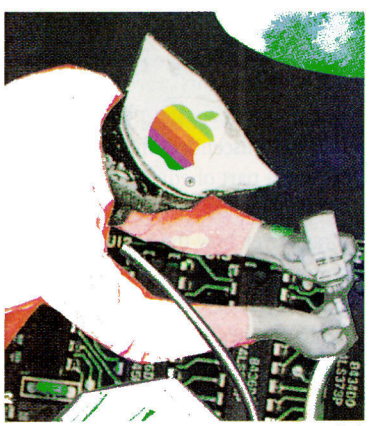

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Cover Photography • Larry Dunn

A2OL

INCIDER'S VIEW

THOSE WHO CAN, TEACH

By DAN MUSE + EDITOR IN CHIEF

The Information Age has changed the way we approach teaching. Computers have helped us realize that children learn better if education is pleasant as well as challenging.

I HATE IT WHEN PEOPLE START CONVERsations with the phrase "When I was a kid...." But when I was a kid, there didn't seem to be a lot of interest in comparing reading, math, and science test scores with scores from kids around the world. Of course parents and teachers were concerned with the quality of education—our parents didn't care any less about academic achievement.

But education, it seems, wasn't under the scrutiny it is today. I guess everyone just assumed kids in Texas could find Mexico on a map, or that by the time a student graduated from high school he or she could write a complete sentence and read the daily newspaper. You went to class every day; the teacher taught every day, usually with the same textbook he or she had used for the past five years, and you were expected to learn. My father was a teacher and principal for 30 years, so I grew up with a certain perspective on education—a firm impression of the educator's point of view. The concern was for learning, and educators and parents didn't necessarily care how the learning occurred. As my parents used to say, "School isn't supposed to be fun."

The Information Age, however, has changed the way we approach education. It's rare to find a classroom with a group of, say, 25 students listening to the teacher...well...teach. Now it's okay for education to be fun or at least enjoyable.

I think I would have grasped geography better through a program such as Where in the World Is Carmen Sandiego? rather than studying a globe and then taking a test—filling in names of countries on a blank world map. I'm not sure I'd be a better reader, however, if I'd been taught with software instead of having a teacher help me sound out the words I couldn't pronounce. The difference is that Carmen Sandiego brings a lot of life to what many students see as an "unexciting" topic. Other subject areas—to my way of thinking, anyway—require the personal touch.

Computers have helped us realize that children learn better if education is pleasant as well as challenging. As a medium, software is generally more versatile and inviting than textbooks. Even software that's labeled "drill and practice" is in many cases much more valuable and involving for the student than the old-fashioned kind of drill. You remember—the teacher handed the student a worksheet with 30 addition problems; the child tried to solve them, then waited for the teacher to go over the answers. With one of the several math programs available for the Apple II, the student gets immediate feedback. This approach also frees up time for the teacher to spend with other students who are struggling with the subject.

The question, then, isn't whether or not computers are appropriate, but rather how and when to use them. This is a question educators have wrestled with for years. The personal computer entered the classroom in the early '80s; teachers, administrators, parents, and students were confused about the role the computer should play. At some point, the computer transcended the programming class and became a part of education in general.

Debate continues to rage over how the personal computer should be used in classrooms. Should there be a computer on every desk? Should there be a computer only on the teacher's desk? Should computers be used only in labs? Before you can answer those questions, more complicated ones arise. How can local-area networks, hypermedia, CD-ROM, telecommunications, and so on improve the classroom experience? How can they make teachers' and administrators' jobs easier?

The problem isn't that students have too much information to manage, but rather that teachers have access to endless information through a variety of media.

Whether you're a teacher or parent (or both), you can expect *inCider* to help you meet the difficulties you'll face when you have to make hardware and software decisions. (See "Beakers, Test Tubes, and Apples," p. 50; "What's Happened to Math Literacy?" p. 56; and "How Do You Spell That?" p. 60.) And if there are areas in which you and your students need information, please educate us. □

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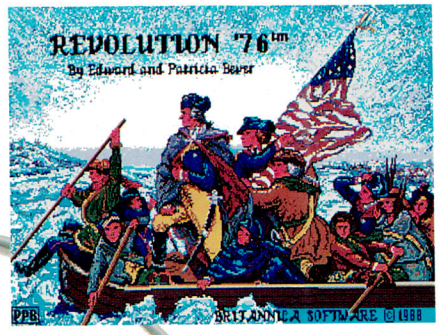

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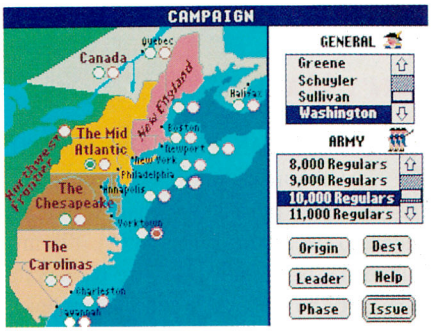

Look for Revolution '76 for your Apple IIGS, at your favorite software stores. Only $49.95. Or call us at 800/572-2272 (in CA: 415/546-1866).

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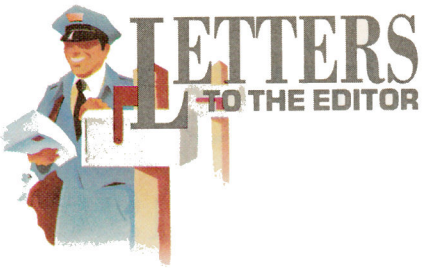

Don't Make Waves

SINCE DAN POTE MENTIONED Offshore Software as a supplier of Apple programs for ham operators (Letters to the Editor, June 1989, p. 12), my mailbox has been stuffed. I'd like readers to know that I do offer *one* product at this time: The Morse Code Generator for the Apple II. The program is designed for people learning Morse Code and is currently available only through mail order.

Offshore Software is a one-man operation aboard a 46-foot sailing ketch located here and there in the Pacific Ocean. My Apple IIc runs on 12-volt batteries through a 120-volt square-wave inverter. It has suffered four separate rainwater dousings and has endured exposure to the marine environment for five years.

On one particularly rough passage to the Santa Barbara Channel Islands, the boat heeled, and the unsecured computer, monitor, and disk drive flew eight feet across the cabin and crashed into a hardwood locker. My monitor stand is a little wobbly and there are scars on the plastic enclosures, but everything still works!

Gary E. Albers
Offshore Software
P.O. Box 22936
Santa Barbara, CA 93121

Apple Maniacs

THERE'S ONE VALUABLE APPLE II resource that remains conspicuous by its absence from *inCider*: the local Apple user group.

User groups provide what no computer magazine, software company, bulletin-board system, or Apple dealer can offer. They're an invaluable source of information, personal support, inexpensive assistance, and exchange. And they're just plain fun for novices and experts.

A recently released listing of Apple user groups shows approximately 1000 of them nationwide. Apple maintains careful contact with the user-group community and offers a toll-free number (800-538-9696) to help you locate the nearest one.

Daryl E. Witmer
Founder & President
Northwoods IIgs User Group
P.O. Box 262
Monson, ME 04464

Music Critic

I FEEL THAT MUSIC SHAPES DEserves better treatment than Sharon Webb's June 1989 (p. 40) review. This was done on an early version, 1.0, which sold briefly for $139 with a lifetime guarantee of updates. We've released two versions since then and plan to release a GS/OS version.

The review contained two good criticisms: moving the slider in the Time room, which we've fixed (you can also move it by clicking on another place in the line); and the IIe interface on the GS. We prefer a Rocky's Boots-type interface, which we like for children.

Music Shapes gives you a chance to design your own instruments with different waveform algorithms, as well as digitized percussion. It's the only program I know of that gives you both ways to use the sound chip, compose music, and play it back through MIDI.

We designed Music Shapes as a dynamic, active tool in which kids need to participate to further their own learning. It's a Logo-like environment for discovering the concepts of music (such as sound texture, pitch, rhythm, and note duration). The program uses graphics for critical and creative thinking.

Most adults could never imagine composing their own music. This premise is how we got excited about computers—they let a novice play with music in a way you never could before.

Mary Jane De Genaro, President
Music Systems for Learning
311 East Street, Suite 20C
New York, NY 10016

I WAS VERY DISAPPOINTED WITH Sharon Webb's review of Music Shapes (June 1989, p. 40). As a music therapist and educator, I've been using the program with regular and special-needs students for two years, and have enjoyed much success with it in the classroom. While Music Shapes isn't a razzle-dazzle program like others for the Apple II family, it's a unique applicaton of computer-based learning and music technology.

Music Shapes is based on discovery learning and creative problem solving. Anyone who wants to play sophisticated music at the touch of a button will be disppointed in the program. Those wishing to build important learning skills while composing music, however, will enjoy it.

Robert E. Krout, Ed.D., RMT-BC
State University of New York
New Paltz, NY 12561

Look for inCider's *music feature in the October issue—we'll be discussing the newest version of Music Shapes.* —*eds.*

Berkeley's Benchmarks

ALTHOUGH WE'RE PLEASED with the bulk of Eric Grevstad's assessments ("Brave New GEOS," June 1989, p. 67), we feel his criticisms of geoCalc's recalculation speed were unfair and ►

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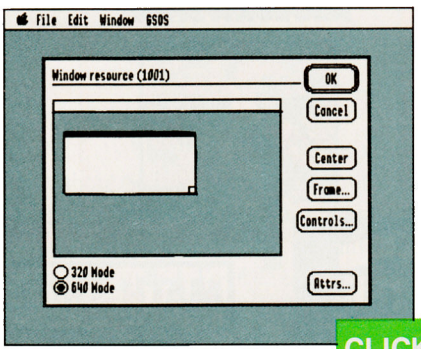
TML Pascal II

How would you create the next great Apple IIGS application? If you're using TML Pascal II it's simple. You just Point and Click!

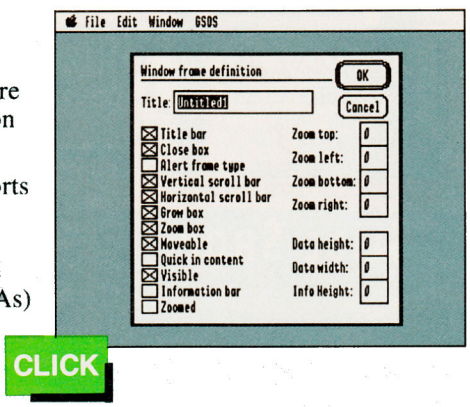


TML Pascal II takes you from product conception to finished product faster and easier than ever before.

A tightly integrated editor, compiler, linker, and debugging environment makes full use of the new features and capabilities of Apple's new GS/OS System Software v5.0 at lightning speeds.

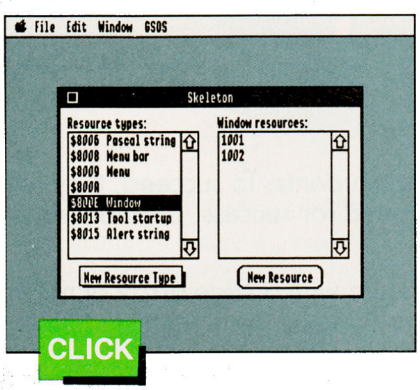
And, with TML Pascal II's new *Resource Editor*, your program's Desktop features (ie. menus, windows, dialogs, etc.) are graphically designed on screen with a click of the mouse. Instantly, your program's user interface takes on all of the features you have come to expect from your favorite IIGS products.

Using the Resource Editor, what would take hours now requires only minutes. And that means more time to dedicate to your application specific code.



Of course your programming efforts are not limited to only Textbook and Desktop applications. TML Pascal II also allows you to create both New Desk Accessories (NDAs) and Classic Desk Accessories (CDAs) with style. All within the same tightly integrated environment.

So, you see, whether you're a beginning or advanced programmer, TML Pascal II makes programming the Apple IIGS incredibly fast and easy. **Remember, you simply Point and Click!** Retail price $125.



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LETTERS TO THE EDITOR

misleading.

Apparently, Mr. Grevstad used only one spreadsheet in his benchmarks, and, by his own admission, this spreadsheet was specially contrived to be calculation intensive. Unfortunately, it was also "highly backward-dependent" and a poor example of a real-world spreadsheet.

The tests we performed in our lab indicate the following:

1. On recalculation that affects a large number of cells, AppleWorks is faster than geoCalc, but only slightly. We attribute this to the overhead required by more functions (both standard and user defined), true algebraic precedence, and an additional four digits of numerical accuracy.
2. On recalculations that affect only a few cells, geoCalc is faster because of its intelligent-recalculaion techniques. Provided you have a RAM disk large enough to make disk transfer time negligible, the larger the spreadsheet, the more dramatic the speed difference.

In addition, unlike AppleWorks, geoCalc always yields correct results because of its natural order of recalculation.

Leland J. Llevano
Vice President, Marketing
Berkeley Softworks
2150 Shattuck Avenue
Berkeley, CA 94704

Eric Grevstad responds that Mr. Llevano is right—a 1000-cell benchmark is more a worst-case scenario than a real-world worksheet. That's why he noted that for everyday work, "budgets or balances...with comparatively few [calculations]," geoCalc is an attractive program. —*eds.*

DREAM MACHINE

HILLIARD M. PAUL MAY NOT believe that AppleWorks GS is destined to become the Porsche of 16-bit software (Letters to the Editor, June 1989, p. 12), but I certainly do!

I purchased AppleWorks GS as soon as it hit the shelf. Because the program is so immense, I was overwhelmed initially by the new features. But I gave the program a fair chance, remained patient, and kept my mind open to this totally new environment. I called Claris when problems arose and it put me back on track. Most problems I encountered were "operator error," not software bugs. Yes, the pro-

Circle 243 on Reader Service Card.

gram demands a substantial hardware investment. AppleWorks GS is at its best when I use it with a hard drive, but today a hard drive is becoming standard-operation equipment.

With its six applications, this program is unrivaled in the software market and is the new workhorse for the IIGS. I've used AppleWorks GS for almost six months, and it has become an integral part of my computing life. With Claris' demonstrated customer commitment, I've got an entire company standing behind me ready to help.

Guy D. Fowler
4970-A Kela Place
Ewa Beach, HI 96706

CORRECTIONS

A typographical error appears in one of the formulas discussed in "From My Mailbag," AppleWorks in Action, June 1989 (p. 74). Formula C11, listed in column 2, is missing one parenthesis and should read:

@INT(@MAX(0,@MIN(2500, B10−2000)*.003075)*100 +.5000 005)/100

Two errors appeared in "Video Magic," Hints/Techniques, July 1989, pp. 100–102. You should adjust R2, not R3, to control video gain; and IC1 in Figure 2 is an LM6361N (not LM6316N).

UPDATE

Since publication of our review of Compu-Teach's skills program Stepping Stones: Levels I and II (June 1989, p. 112), we've learned that the company now offers a Bonus Pack—both levels at a combined total price of $49.95. (Separate modules are $39.95 each.) For more information, contact Compu-Teach at 78 Olive Street, New Haven, CT 06511, (800) 44-TEACH, (203) 777-7738.

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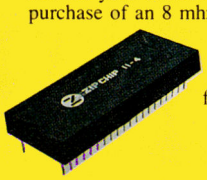

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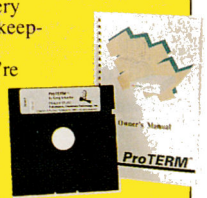

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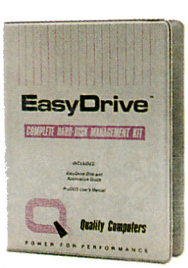

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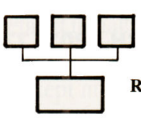

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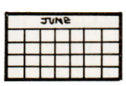

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WHAT'S NEW

By the *inCider* staff

MONEY IN THE '90s

SOFTWARE

The most popular financial programs for the Apple II have a new look for a new decade: **Dollars and Sense** (Monogram Software, 531 Van Ness Avenue, Torrance, CA 90501, 213-533-5120) and **Managing Your Money** (MECA Ventures, 355 Riverside Avenue, Westport, CT 06880, 203-226-2400).

Dollars and $ense, version 2.0, now runs under ProDOS 8. ProDOS' advantages include the ability to use the program on a 3½-inch drive, a hard-disk drive, or a random-access memory (RAM) disk. Plus, you can now use standard ProDOS utilities, such as the GS Finder, to back up and copy Dollars and $ense files. Apple IIGS, IIc Plus, IIc, and IIe computers with RAM cards will use the extra memory automatically to run Dollars and $ense faster.

Monogram President David Brewer says, "The market for personal and small-business management software is growing." This complete financial manager offers budgeting, check printing, and graphing of data in as many as 120 accounts and 12 checking accounts.

Managing Your Money handles financial-management tasks from basic checkbook budgeting to tax planning, life-insurance planning, and even complex portfolio management. MECA's vice president for marketing and sales, Garner Lester, says the company "incorporates new financial concepts, tax laws, and banking trends as well as suggestions from users into each annual update of Managing Your Money." Version 4.0 lets families and small businesses track automatic teller machine (ATM) transactions and biweekly mortgage payments, for instance. It also includes all the new 1989 tax-law changes. There's a new look to both 4.0's package and the program itself. The new user interface should make this simple program even easier to use.

For more information about Dollars and $ense (upgrade $39.95) circle number 352 on the Reader Service card. To learn all about Managing Your Money ($149.95) circle number 353.

—Paul Statt

New Boss at AE

Applied Engineering (Carrollton, TX), the leading manufacturer of Apple II peripheral hardware, has named Robert J. Carroll to succeed the company's founder and chairman, Dan Pote, as president and chief executive officer.

Dan Pote built a strong reputation for Applied Engineering with innovative products such as the RamWorks memory-expansion board and the TransWarp accelerator. Applied's products have often become the standard against which its competitors are measured; the company's newest offering is the Vulcan internal hard-disk drive for the Apple IIGS. Applied claims it commands 40 percent of Apple II peripheral product sales.

Robert Carroll is an experienced executive who comes to Applied Engineering from Intratec Systems, where he was president and CEO. He's led Computrac and Micom Data Systems, and has also worked for Xerox.

Dan Pote will continue with Applied Engineering as chief scientist and head of research and development.

—Paul Statt

OFF TO A GREAT START

Got a family? Got a computer? Broderbund Software makes buying family software simple with **The Family Software Library**, three award-winning programs for the price of one.

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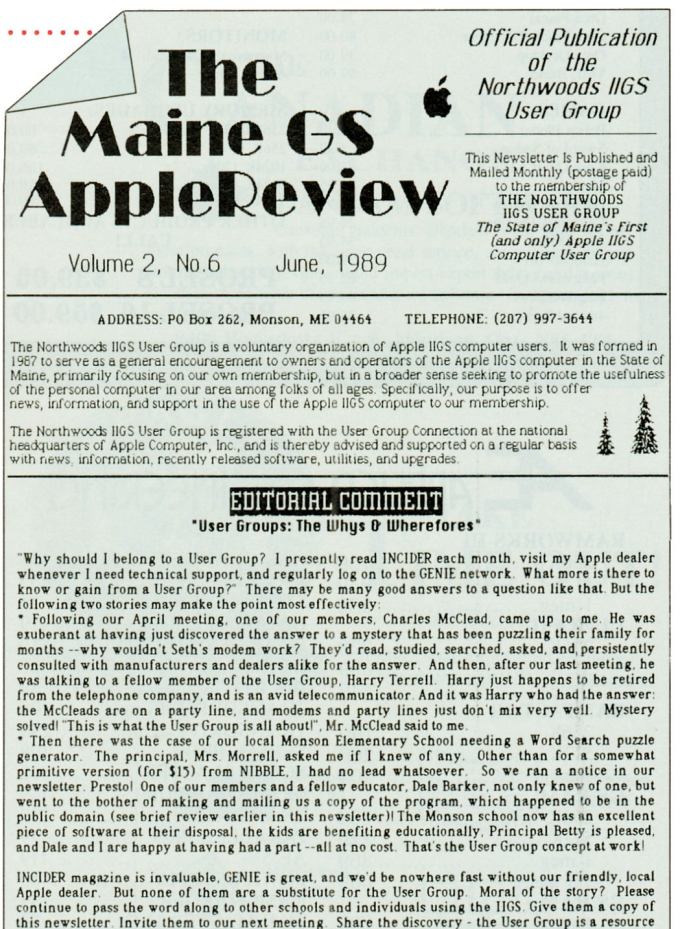
- Where in Europe Is Carmen Sandiego?, a detective game that lets you track down some of Europe's most-wanted thieves. You need to know your way around the old continent to play, so Broderbund thoughtfully includes the (paperback) *Rand McNally Concise Atlas of Europe*.

A special parent's guide to all this software is full of ideas for activities using Broderbund software. It's free with the $99.95 purchase of The Family Software Library, from Broderbund Software, 17 Paul Drive, San Rafael, CA 94903-2101, (415) 492-3200.

—Paul Statt



The Maine GS AppleReview

Official Publication of the Northwoods IIGS User Group

This Newsletter Is Published and Mailed Monthly (postage paid) to the membership of THE NORTHWOODS IIGS USER GROUP
The State of Maine's First (and only) Apple IIGS Computer User Group

Volume 2, No.6 June, 1989

ADDRESS: PO Box 262, Monson, ME 04464 TELEPHONE: (207) 997-3644

The Northwoods IIGS User Group is a voluntary organization of Apple IIGS computer users. It was formed in 1987 to serve as a general encouragement to owners and operators of the Apple IIGS computer in the State of Maine, primarily focusing on our own membership, but in a broader sense seeking to promote the usefulness of the personal computer in our area among folks of all ages. Specifically, our purpose is to offer news, information, and support in the use of the Apple IIGS computer to our membership.

The Northwoods IIGS User Group is registered with the User Group Connection at the national headquarters of Apple Computer, Inc., and is thereby advised and supported on a regular basis with news, information, recently released software, utilities, and upgrades.

EDITORIAL COMMENT

"User Groups: The Whys & Wherefores"

"Why should I belong to a User Group? I presently read INCIDER each month, visit my Apple dealer whenever I need technical support, and regularly log on to the GENIE network. What more is there to know or gain from a User Group?" There may be many good answers to a question like that. But the following two stories may make the point most effectively:

* Following our April meeting, one of our members, Charles McClead, came up to me. He was exuberant at having just discovered the answer to a mystery that has been puzzling their family for months --why wouldn't Seth's modem work? They'd read, studied, searched, asked, and, persistently consulted with manufacturers and dealers alike for the answer. And then, after our last meeting, he was talking to a fellow member of the User Group, Harry Terrell. Harry just happens to be retired from the telephone company, and is an avid telecommunicator. And it was Harry who had the answer: the McCleads are on a party line, and modems and party lines just don't mix very well. Mystery solved! "This is what the User Group is all about!", Mr. McClead said to me.

* Then there was the case of our local Monson Elementary School needing a Word Search puzzle generator. The principal, Mrs. Morrell, asked me if I knew of any. Other than for a somewhat primitive version (for $15) from NIBBLE, I had no lead whatsoever. So we ran a notice in our newsletter. Presto! One of our members and a fellow educator, Dale Barker, not only knew of one, but went to the bother of making and mailing us a copy of the program, which happened to be in the public domain (see brief review earlier in this newsletter)! The Monson school now has an excellent piece of software at their disposal, the kids are benefiting educationally, Principal Betty is pleased, and Dale and I are happy at having had a part --all at no cost. That's the User Group concept at work!

INCIDER magazine is invaluable, GENIE is great, and we'd be nowhere fast without our friendly, local Apple dealer. But none of them are a substitute for the User Group. Moral of the story? Please continue to pass the word along to other schools and individuals using the IIGS. Give them a copy of this newsletter. Invite them to our next meeting. Share the discovery - the User Group is a resource no GS users should be without! And every GS user has a right to know about it.

We receive many user-group newsletters, and we enjoy reading them. We liked this editorial comment from *The Maine GS AppleReview* enough to repeat it. Send us your user-group newsletter—if we like your message, we'll try to print it. Mail to What's New, *inCider*, 80 Elm Street, Peterborough, NH 03458.

GAMES

What's Playing

The newest game titles introduced at the Consumer Electronics Show in Chicago last May are remarkably similar to the newest movie titles—Indiana Jones and the Last Crusade, License to Kill (the latest James Bond movie), Star Trek V, Batman. Unfortunately, only one of those titles is coming out soon for the Apple II—Data East's arcade-action game **Batman**. Data East (San Jose, CA) is also working on a host of new sports games. We'll keep you posted as they develop.

Also showing at CES—even under the shadow of the immense Nintendo booth—were a lot of Apple II games introduced as nearly ready to ship or under development for the fall. The folks at Accolade (San Jose, CA), for instance, have certainly been keeping busy. **Hardball II**, the sequel to the company's immensely successful Hardball, adds some new player perspectives, game animation, and detailed statistical data.

Accolade has also ventured into adventure role-playing games, but you won't see any dragons or magic spells in **Conspiracy: The Deadlock Files**, **Don't Go Alone**, or **The Third Courier**. Conspiracy features more than 500 digitized photographs shot on location in New York, adding realism to the story as you try to locate seven files hidden throughout the city. They'll prove your innocence in a plot to overthrow the United States government.

Don't Go Alone has you exploring a haunted house to expel the demons that haunt its many rooms. In The Third Courier you're cast as Moondancer, the West's best agent, trying desperately to find three hidden pieces of NATO's stolen defense plan before a courier can gather them and sell them to Moscow. Accolade was also showing **Heatwave**, an offshore speedboat-racing game it's planning to do for the Apple II.

If you think you've finally kicked the Arkanoid habit on your Apple IIGS, think again. Taito's (Vancouver, BC) **Arkanoid II: The Revenge of Doh** should be available by the time you read this article.

Intracorp's Miami Vice, based on the popular TV show, features cars, speedboats, and drug raids.

Mindscape's Captain Blood gives you 30,000 planets to explore.

And if you never get around to reading this article, it must be because you already have Revenge of Doh.

Arkanoid II is similar to the first game—just higher-octane. There are more than 60 levels, with multiple barrels coming down at you so fast you barely have time to see what you've caught. And when you do, the barrels give you a whole new set of attributes, such as double paddles, rapid-fire lasers, and more balls than you could hope to count. True Arkanoid fanatics can even design their own levels. Taito's also nearing completion of an Apple IIGS version of the arcade concentration game **Qix**.

Epyx (Redwood City, CA) has introduced a more relaxing type of addiction. Remember Shanghai from Activision? **Ishido**'s along those lines in simulating an ancient Oriental game of tiles and patterns. The graphics screens are pure art, and the strategy—well, you're going to need some help from Confucius for this one. ►

Programming in the Gap

RESOURCES

Programming books are either too specific (look at the dozens of Apple technical manuals) or too generic (consider the many BASIC programming or 6502/65816 assembler texts). One common issue is "What do I need to know specifically, so I can write a useful program for my Apple IIGS?"

Ron Litchy and David Eyes answer that burning question in their new book, ***Programming the Apple IIGS in Assembly Language*** (Brady Books, Simon & Schuster, Inc.; available in bookstores or directly from the authors).

This 550-plus-page softcover book bridges the gap between general and specific by providing both a comprehensive 65816 assembly-language programming manual and a tutorial complete with examples on programming the GS desktop.

Mention the 65816 instruction set or mode registers, and the programming neophyte will usually close the book and search for another. But Litchy and Eyes keep that beginner's interest in GS assembly-language programming by disguising technical details with chapter titles such as "Making a Menu," "The Main Event Loop," and "Using Dialogs." That tactic continues to be effective for serious readers who'll find themselves learning 65816 assembler quickly by doing.

In the tutorial chapters, step-by-step programming instructions help you create several desktop applications and accessories that also illustrate GS toolbox access, Apple's Desktop Guidelines, and use of the Apple Programmers Workshop 65816 editor/assembler. A supplemental disk containing all source-code examples is also available from the authors for $20. And, when you've finished reading and have programmed all the projects, the text's many tables and appendices become excellent reference materials for even the most advanced assembly-language programmer.

Send a $32 check endorsed to Ron Litchy and David Eyes, P.O. Box 27262, San Francisco, CA 94127, and they'll return a "signed" copy.

—Bill Kennedy

On a lighter note, Epyx was showing **Purple Saturn Day**, which might be described best as mind-bending Olympics on a far-distant planet in the far-distant future. There's also **Project Neptune**, which Epyx was originally going to call Undersea Commando, but who cares—at long last there's finally going to be a scuba-diving game for the Apple IIGS.

Origin Systems (Londonderry, NH) also had a slew of Apple II titles on display—**Windwalker** (from the authors of Mobieus), **Space Rogue**, **Omega**, and **Knights of Legend**. Windwalker features excellent martial-arts animation sequences based on drawings of real people. Space Rogue combines a science-fiction adventure game with 3-D space-flight simulation. (One of the authors of Chuck Yeager's Advanced Flight Trainer from Electronic Arts did the 3-D simulation.)

California Dreams (San Jose, CA) had **Tunnels of Armageddon** on display. As in its previous games, the graphics screens are stunning. This new title, however, is a departure from its board-game "conversions" of old. Tunnels of Armageddon has you racing through a labyrinth at dizzying speeds.

Cinemaware (Westlake Village, CA) demonstrated work on its latest title, **It Came from the Desert**. This is the closest we've seen a computer game come to re-creating the movie experience. The graphics, animation, scrolling, and music are nothing short of astounding—two thumbs up.

Let's just hope Cinemaware doesn't concentrate too heavily on new developments instead of getting some of its previously promised titles out the door. Speaking of which, **Rocket Ranger**'s looking good and should be ready for the IIGS this month.

The folks at Intracorp (Miami, FL) were showing **Miami Vice**, based on the popular television series. This arcade-action game includes a car-chase sequence, a speedboat race, and a search through the warehouse district for a shipment of drugs.

Two new games appeared at Sierra On-Line's (Coarsegold, CA) booth: **Silpheed**, the space arcade-action game from the creators of Thexder, and **The Colonel's Bequest**, an adventure game in the Sierra tradition, with a plot similar to that of the popular board game *Clue*.

According to the folks at Interplay (Costa Mesa, CA), **Battle Chess** for the Apple IIGS should be ready shortly. We've been waiting anxiously for that one. They were also demonstrating their latest effort—**Dragon Wars**, a fantasy role-playing game set in the island world of Oceana.

MicroIllusions (Granada Hills, CA) has **Firepower**, the popular tank arcade game, ready for the GS. The company's also working on a **Flintstones** game for the IIGS and additional Hanna-Barbera titles in other formats.

Mindscape (Northbrook, IL) has two titles coming out for the GS—**Hostage** and **Captain Blood**. Hostage puts you in command of a six-person strike force assigned to rescue a band of hostages. Captain Blood is a graphically spectacular science-fiction game with more than 30,000 planets to explore and more than a dozen alien races to encounter.

Mastertronic (Costa Mesa, CA) is expanding its line of sports games for the Apple IIGS with **John Elway's Quarterback**, **Magic Johnson's Basketball**, and **Greg Norman's Ultimate Golf**. The company's also coming out with computer adpatations of **Monopoly** and **Clue** to round out the board-game series that began with Risk. It's also working on **Double Dragon II**, a sequel to its popular arcade-action game.

—Lafe Low

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Someone at **Crate Technology** (6850 Vineland Avenue, Building M, North Hollywood, CA 91605, 818-766-4001) must have realized that Apple II users are as eager as Macies for the benefits of mass storage and speed offered by **hard-disk drives**. Perhaps Crate noticed a jump in sales after our "exposé" of the MacCrate line ("Drives: Which One to Buy? Part 2," April 1989, p. 49). Crate's latest press releases highlight its Apple IIe/GS proprietary—but Apple-standard—SCSI card and support software, priced separately at $129 or bundled with its 20-, 40-, and 60-megabyte external drives ($645, $840, and $939 total, respectively).

Maybe Crate hasn't noticed what its competitors have: GS owners are also hungry for 80-, 100-, and 160-megabyte drives. GS/OS can handle more than the 60-megabyte limit allowed ProDOS-8 IIe users.

But Crate's press releases don't reveal that you can probably use its 45-megabyte removable ExpandaCrate hard drive (that's right—pull one disk out and put another in) with the IIe and IIGS. And, Crate, your tape-backup systems are Apple SCSI-compatible as well, right? A little software'll make 'em work just fine with the Apple IIe and IIGS. (Glen Bredon, are you listening?)

How about those internal drives, Crate? With some minor modifications to the Mac versions, can't they be made compatible with a GS? Several hard-drive manufacturers hope Crate won't notice. Show Crate that *you* notice, and circle number 350 on the Reader Service card.

—Bill Kennedy

COOL IT, MAN

Those of us who are old enough know that "Cool it, man!" is the "beatnik" command to be quiet as well as to regain one's composure.

There's now a beatnik in the Apple II fan club: *Cool-It* from Cirtech (UK) Limited (Currie Road Industrial Estate, Galashiels, Selkirkshire, Scotland TD1 2BP; distributed in the U.S. by A2-Central, P.O. Box 11250, Overland Park, KS 66207, 913-469-6502; $49). Cool-It is easy to install (Cirtech claims less than 2 minutes without tools) onto the side of your GS' power supply or under your IIe's keyboard. It's powered directly from the Apple's supply, thereby eliminating extra line cords and switches, and the danger of electrical shock that plagues other fans.

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—Bill Kennedy

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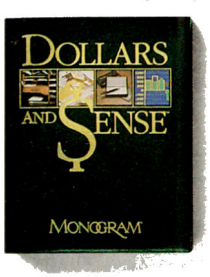

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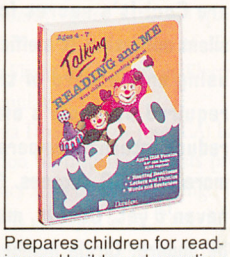

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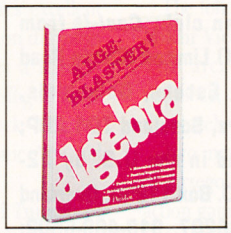

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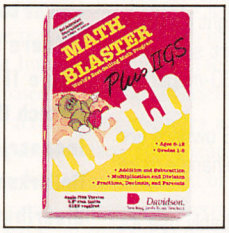

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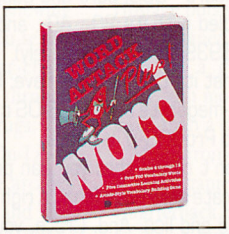

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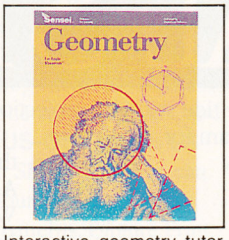

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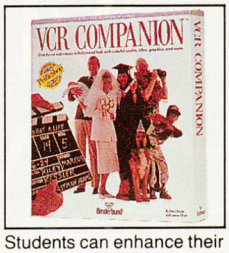

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JUST FIGURES

Now that you know how easy it is to manage your Apple's resources in hex and binary, aren't you a little embarrassed about your decimal bigotry?

By WILLIAM P. KENNEDY, Ph.D.

DEC TO HEX

THERE MUST BE SOME WAY TO convert machine-language addresses to numbers you can CALL, PEEK, or POKE from Applesoft BASIC. For example, if I BLOAD a program starting at memory location $300, what number do I CALL to execute it? CALL $300 and CALL 300 don't work.

David Starchman
Purcell, OK

David, the dollar sign ($) in your example indicates that the number is in hexadecimal notation. Applesoft BASIC requires decimal numbers for PEEKs, POKEs, and CALLs. You need to convert the number from hexadecimal to decimal, a procedure that as number conversions go is rather simple.

Just multiply each successive digit of the hex number from right to left by increasing powers of 16 and add the products. Conversion of your example, then, is $(0*16^0) + (0*16^1) + (3*16^2) = (0*1) + (0*16) + (3*256) = 768$. *CALL 768 is the Applesoft BASIC command to execute a machine-language program that was BLOADed starting at hexadecimal address $300.*

The reverse operation, conversion of a decimal number to hex, is a bit more tedious: Divide the original decimal number by the highest power of 16 that yields a quotient *of 1 or greater; then divide the remainder by successively lower powers of 16. For example, convert 4921 to hexadecimal:* $4921/16^3 = 1$; 825 *(remainder)*$/16^2 = 3$; 57 *(remainder)*$/16^1 = 3$; *and* 9 *(remainder)*$/16^0 = 9$. *The result is hexadecimal $1339.*

Algorithms and programs that perform number-base conversions for you have appeared in a variety of sources; inCider's *most recent example appeared in the December 1988 Hints/Techniques column as Base Converter by Gary Garner (p. 128).*

GS owners should also be aware that there's a simple, built-in decimal-to/from-hexadecimal number converter, a ROM-based utility you can access via "monitor" mode. From Applesoft CALL −151 to enable monitor mode or select the Visit Monitor *classic desk accessory (CDA) listed on the GS Control Panel when you press Control-Open apple-Escape. A star (*) prompt instead of the Applesoft bracket (]) will appear, indicating that you're in monitor mode.*

Type a hexadecimal number followed by an equal sign (=). The decimal equivalent will appear after you press Return. Or place the equal sign in front of a decimal number, and the hexadecimal value will be displayed after you press Return. Press Control-B to return to Applesoft or Control-Y to return to the CDA "dispatcher."

Why all the fuss? Weren't the number theories we groaned about in elementary math just a lot of bunk? It turns out that binary and hexadecimal number systems are sometimes conceptually and practically more efficient to use when programming computers than the decimal system with which we're most familiar. Just figures, doesn't it?

We're decimal bigots. We evaluate our world and use language to express quantities based on a system of ten digits, 0 through 9, which we assemble side by side to form a number. Mostly unconsciously, we "know" that the "place" of each digit in a decimal number, from right to left, represents a higher power of ten; ones, tens, hundreds, thousands, ten thousands, and so on. The number 583, for example, is $3*10^0$ *(or three ones) plus* $8*10^1$ *(or eight tens) plus* $5*10^2$ *(or five hundreds).*

Hexadecimal *numbers are based on a system of 16, rather than ten, digits whose "place" in a number represents a power of 16. That's why we multiplied each digit in your problem above by some power of 16. Also, because we have only ten numeric symbols in our decimal language, we borrow the alphanumeric symbols A through F to express digits larger than 9 in hex. So decimal 13 is expressed hexadecimally as* D.

Similarly, binary numbers have only two digits, 0 and 1, and each place in a binary number represents a power of two. In fact, any quantity can be expressed as a number in any "number base" we might choose. So 60 decimal (base 10) things represent the same quantity as $3C hexadecimal (base 16) or %111100 binary (base 2; the percent sign distinguishes a binary number) or 10 base 6 things. Notice that keeping points in a game using binary can yield some rather impressive scores compared with decimal or hexadecimal ones.

Digital computers, including the personal models like the Apple II that have permeated our lives in the last ten years, use electronic switches that can be either on or off, 0 or 1. Arranged side by side, these computer switches represent powers of two, hence, binary numbers. And you can use those binary numbers traditionally—that is, mathematically—to calculate your checkbook's balance, for example. Or you can use a binary number to symbolize a concept. For instance, each letter on this page was, at one time, entered into a computer using a word processor. The computer retained each character as a binary ►

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"ASCII-encoded" symbol where an A *is binary %1000001 and* a *is %1100001.*

Computers can be said to "think" in binary. In fact, binary is their only language. Talking to a computer requires that we use either binary directly or some interpreter that will convert words and numbers with which we're more familiar to binary. BASIC is an interpreter. So are all other computer-programming "languages," including machine-language assemblers. And each lets us use decimal numbers to converse with our Apples in pseudo English.

Commercial programmers prefer using binary numbers versus decimal ones for convenience and clarity. For example, you might want to test the state of several bits *(binary digits) in some data* byte *(8 bits). It's easy to see which bits are changed by comparing, for example, %10110011 with %00100010. It's not as clear comparing 195 and 34, the decimal equivalents of that same example.*

In addition, the computer's memory cells are arranged, for hardware as well as conceptual reasons, in pages *of 256 bytes,* blocks *of 512 bytes,* Ks *equal to 1024 bytes, or* banks *of 64K bytes: odd numbers in decimal, but quite clear in binary. The binary value %100000000 represents 256, for instance.*

Writing and manipulating binary numbers, however, can get very tedious even for the most dedicated programmer—all those 0s and 1s! (Write out the binary number for a megabyte if you're skeptical.) This is where hexadecimal notation comes in.

Translating binary to hexadecimal is easy and abbreviates binary digits without losing clarity. You can use one hexadecimal digit to express four bits, or a nibble, *in a binary number. Memory location 65535 becomes $FFFF. Similarly, $C represents %1100 and $9 is %1001. So %10011100 is $9C—quick and easy. Memory pages become multiples of $100; banks are multiples of $10000; a megabyte (1024K) is $100000.*

It's unfortunate that Applesoft BASIC doesn't recognize binary or hexadecimal notation, particulary for PEEKs, POKEs, and CALLs. The disk operating systems ProDOS and DOS 3.3 do. That's why you can use A *followed by a decimal number, or* A$ *followed by a hexadecimal one, to specify a starting address in a command such as BLOAD.*

Now that you know how easy it is to manage your Apple's resources in hexadecimal and binary, aren't you a little embarrassed about your decimal bigotry? Redeem yourself: Next time you throw darts or horseshoes, drive your friends nuts by keeping score in hexadecimal, or, better yet, use base 7.

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IIe Assembly Language

WANT TO LEARN ASSEMBLY-language programming for my Apple IIe. Could you recommend some books?

Dan Bachmann
Irvine, CA

I cut my proverbial teeth on 6502 assembly language using a generic primer called 6502 Software Design *by Leo J. Scanlon (Howard W. Sams & Co., Indianapolis, IN). It's very well written and contains data tables and charts I still use to this day.* Assembly Lines *by Roger Wagner (Roger Wagner Publishing, Santee, CA) is another popular Apple II assembly-language primer.*

Roger Wagner also publishes Merlin, an assembler/editor for the Apple II—something you'll need to create and edit your machine-language programs. (I don't recommend using the IIe/IIc/GS' built-in mini-assembler for learning the language.) ORCA/M from ByteWorks (Albuquerque, NM) is also very popular with assembly-language programmers.

Finally, I learn best by doing. I suggest you pick up an assembly "cookbook" or two. Assembly Cook-

book of the Apple II *by Don Lancaster (Howard W. Sams & Co., Indianapolis, IN) is one example. I'm sure you'll find many others on your bookseller's shelves.*

ProDOS Renumber

I CAN'T GET THE RENUMBER program that appears on Apple's DOS 3.3 System Master to work from ProDOS. The program will RUN okay and it'll correctly renumber an Applesoft BASIC program I type in fresh. But if I attempt to LOAD and renumber a BASIC program from disk, it bombs. Any suggestions?

Francis Vangeli
Columbia, MO

The simplest solution, Francis, is for you to visit your local software dealer and pick up a copy of Double-Take (Beagle Bros, 6215 Ferris Square, Suite 100, San Diego, CA 92121, $17.50). It has renumber and merge utilities similar to Apple's, but they work without modification under ProDOS.

Alternatively, ***Listing 1*** *shows the changes you can make to the original DOS 3.3 Renumber program so that its renumbering utility will work with ProDOS.*

Use Convert or an equivalent program on the Apple ProDOS System Disk to convert Renumber from a DOS 3.3 to a ProDOS BASIC file on disk. LOAD that converted ProDOS version; CALL −151 to enable your Apple's monitor mode (an asterisk prompt should appear); type the machine-language code and changes indicated in ***Listing 1****; press Control-B to re-enable BASIC; and, finally, SAVE the modified Renumber program. If you SAVE that modified version under some name other than Renumber, also update the Renumber instructions' program line 3950 to RUN that new name.*

When RUN, the new ProDOS-compatible Renumber's renumbering feature, including its optional parameters (first, inc, start, and end), will work just as it did under DOS 3.3. But it won't be disconnected by the HIMEM, FP, or MAXFILES command as it was under DOS 3.3. So be careful you don't RUN Renumber more than once per session, or you'll find your Apple's memory quickly slipping away.

Unfortunately, Renumber's merge feature won't work under ProDOS. That's because ProDOS shifts HIMEM up and down to create I/O (input/output) buffers for LOADing data files, SAVEing them, and so on, with apparent disregard for any of the original contents except those it recognizes as "valid," such as string data from a RUNning BASIC program. ProDOS ignores the original version of Renumber as it does any program "held" in a buffer just above HIMEM, until merged with another LOADed program. The modifications in ***Listing 1*** *relocate Renumber to a "safe" region just above ProDOS' general-purpose buffer; that's why it works now. But the merge feature still uses memory just above HIMEM; it isn't protected and hence won't work correctly. Grist for another Clinic response, perhaps?*

Listing 1. ProDOS Renumber.

```
AE7: A9 08 20 F5 BE 90 04 20 09
AF0: BE 60 85 41 8D F7 03 69
AF8: 08 85 43 A9 00 85 40 85
B00: 42 8D F6 03 A5 79 69 1F
B08: 85 3C 85 3E A5 7A 69 01
B10: 85 3D 18 69 08 85 3F D0 0E

1085: C4
```


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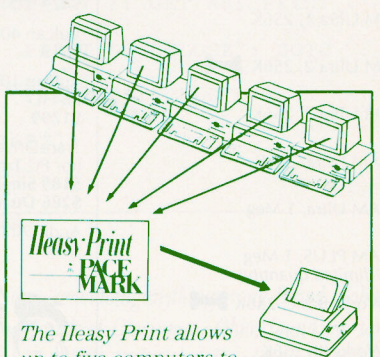

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Listing 2. Stripper update by Johnathan Mauch.

```
1  REM  Text file return STRIPPER  [4998]
2  REM  by Dr. William Kennedy  [4195]
3  REM  Copyright 1989, inCider  [5023]
5  REM  Modifications by Johnathan Mauch  [6395]
10 D$ =  CHR$ (4)  [759]
20  TEXT : HOME : VTAB 10  [892]
30  INPUT "ASCII file pathname?";N$: ONERR  GOTO 500  [5931]
40  PRINT : PRINT "One moment please...working."  [2389]
50  PRINT D$;"VERIFY";N$: PRINT D$;"OPEN";N$: POKE 21
    6,0  [5244]
60 N2$ = N$ + ".S": ONERR  GOTO 80  [1880]
70  PRINT D$;"VERIFY";N2$: GOTO 600  [3578]
80  POKE 216,0: PRINT D$;"OPEN";N2$  [2521]
90  ONERR  GOTO 200  [719]
95 FL = 0  [519]
100  PRINT D$;"READ";N$  [2556]
110  GET A$: IF A$ =  CHR$ (13) AND FL THEN FL = 0: GOTO
    120  [3175]
115  IF A$ =  CHR$ (13) THEN FL = 1: GOTO 110  [2263]
117  IF FL THEN A$ = " " + A$:FL = 0  [2232]
120  PRINT D$;"WRITE";N2$: PRINT A$;  [3427]
130 X =  FRE (0): GOTO 100  [1873]
200  REM  End of files  [1117]
205  IF FL THEN  PRINT D$;"WRITE ";N2$: PRINT  CHR$ (
    13);  [2269]
210  PRINT D$;"CLOSE"  [801]
220  PRINT : PRINT : PRINT "Done.  Press return to st
    rip another, or"  [3526]
230  PRINT "press esc to quit -->";: GET A$: PRINT A$
     [3159]
240  IF A$ =  CHR$ (13) THEN 20  [1426]
250  IF A$ <  >  CHR$ (27) THEN  PRINT  CHR$ (7);: HTAB
    1: GOTO 220  [3588]
260  END  [138]
500  REM  File not found.  [1197]
510  PRINT  CHR$ (7);: PRINT : PRINT "File not found.
    "  [4624]
520  PRINT "Press any key to go on...";  [5671]
530  GET A$: PRINT A$: GOTO 20  [1537]
600  REM  File already exists  [3931]
610  PRINT : PRINT  CHR$ (7);"Target file already exi
    sts..."  [7362]
620  PRINT "OK to overwrite it (Y or N)?";: GET A$: PRINT
    A$  [7237]
630  IF A$ = "N" OR A$ = "n" THEN  PRINT D$;"CLOSE": GOTO
    20  [3447]
640  IF A$ = "Y" OR A$ = "y" THEN  PRINT D$;"DELETE";
    N2$: GOTO 80  [5389]
650  PRINT  CHR$ (7): GOTO 620  [1672]
```

STRIPPER UPDATE

I DO A LOT OF APPLE IIC-TO-MAC transfers and have experienced the problem you discussed in "Returns Be Gone," (January 1989, p. 20)—extra carriage returns in the translated ASCII. Your Stripper program is just what I need. Unfortunately, while Stripper does a good job removing returns, it doesn't replace them with a space character, so the "stripped" document has words running together. Am I doing something wrong?

David Conroy
New York, NY

Noyou'renotdoinganythingwrong,David. Johnathan Mauch of Cincinnati, Ohio, found the same problem with the Stripper and modified it to append those missing spaces. ***Listing 2*** *is the corrected version. Many thanks, Johnathan.*

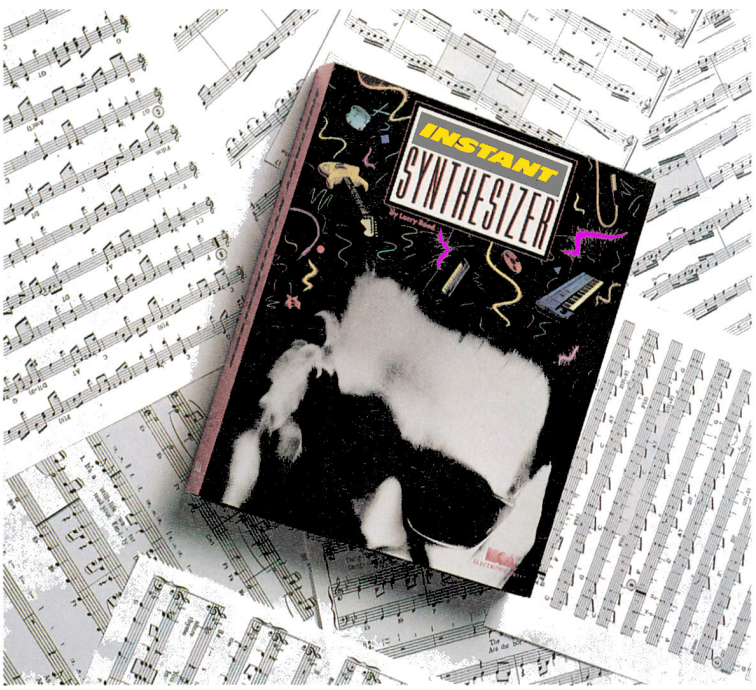
APPLE CLINIC IS A FORUM FOR ANSWERING YOUR QUESTIONS ABOUT APPLE II HARDWARE AND SOFTWARE. ADDRESS YOUR CORRESPONDENCE TO APPLE CLINIC, *INCIDER*, 80 ELM STREET, PETERBOROUGH, NH 03458. BECAUSE OF THE VOLUME OF LETTERS, MOST WON'T APPEAR IN PRINT, BUT WE'LL TRY TO RESPOND IF YOU ENCLOSE A SELF-ADDRESSED, STAMPED ENVELOPE.

REVIEWS

INCIDER'S RATINGS

Excellent—remarkable ◆ ◆ ◆ ◆ ◆ Very good—impressive ◆ ◆ ◆ ◆
Good—average ◆ ◆ ◆ Fair—flawed ◆ ◆ Poor—unacceptable ◆

INSTANT SYNTHESIZER



ELECTRONIC ARTS,
1820 Gateway Drive, San Mateo, CA 94404,
(415) 571-7171

Music synthesizer program; 768K Apple IIGS; $79.95

Rating: ❖ ❖ ❖ ❖

Something new has jumped onto the Apple IIGS music bandwagon and it doesn't intend to be ignored. Even before you open Instant Synthesizer's eye-catching package, you can almost hear it shout, "Hey, listen to me!"

And listen you should—Instant Synthesizer will tweak your Ensoniq chip as it's never been tweaked before. If you have your computer hooked up to amplified stereo speakers, you'll be amazed at the sound quality.

Instant Synthesizer comes with a nice set of voice patches, but you're not limited to these. It also lets you program your own sounds quickly and easily with its resident seven-stage envelope panel. If your GS is equipped with either a FutureSound or MDIdeas sampler board, you can digitize, loop, and edit anything you can squeeze through a microphone—your own voice, the dog's bark, or the percussive clink of silverware on china.

When you boot up Instant Synthesizer, you're greeted with a digitized picture from the front of the package and a song pack called I Sound. Then the fun begins. The main screen consists of two parts divided by a piano keyboard panel. On top is the Song Machine where you load and play songs, fills, and instruments with a click of the mouse. You can also control the tempo or trigger assorted fills.

By clicking the transposition arrows at either side of the keyboard display, you can adjust the pitch up or down an octave at a time. Clicking on a note sounds whatever voice you've highlighted above.

The bottom of the screen contains the heart of the program. Clicking on one of the four icons at the left—Synthesizer, Effects, Envelope, or Map—opens a work area on the right. The default is the Synthesizer Panel, which controls the volume, pitch bend, detuning, vibrato depth and speed, and vibrato attack rate. The Effects Panel allows true stereo panning and controls delays, echoes, and reverbs. You can also double an instrument here for a richer sound.

The Envelope Panel has six basic sound envelopes you can edit visually using a "rubberband" feature that redraws the sound's shape instantly. You can even do this on the fly while playing a tune in the Song Machine. After a moment's delay, you'll hear your new creation. If you think it sounds awful, click Reset to restore the original envelope.

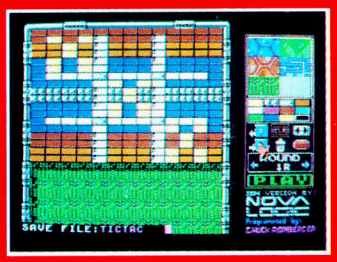
Although Instant Synthesizer can play only four instruments at a time, the Map Panel lets you split the keyboard for additional voices. For example, you could map the lower registers for an electric bass and the upper for guitar, or map a half-dozen percussion patches.

Instant Synthesizer is slick, fast, and innovative. Could you ask for anything more? Well, yes. It's important to realize that this program isn't a sequencer or a professional musician's tool. You can't write or save songs with it. Instant Synthesizer is limited to playing Simple Music (SMUS) files created by Electronic Arts' companion program Instant Music. Instant ►

RAGE!

DOH Rages On In Arkanoid® II!

Arkanoid was never like this! Arkanoid II is here with more menace and explosive action than ever. Loaded with powerful weapons, 67 outrageous force barriers, and intense graphics and animation, it takes lightning-fast reflexes and superior strategy to survive! But survival is just the beginning.



With the Arkanoid Construction Set, you create the game! IBM EGA/VGA screen.

You Take Control!

The new Arkanoid Construction Set™ gives you the tools to master the game. Build complex force barriers. Create exciting and original levels of play. Challenge the force of DOH! Arkanoid Construction Set available for Apple IIGS, IBM, and IBM compatible personal computers.

Smash 67 action-packed levels. IBM EGA/VGA screen.

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Blast through the force of DOH. Tandy 1000 screen.

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If you cannot find this product at your local retailer, Visa/MasterCard holders can order direct anywhere in the United States by calling toll free 1-800-663-8067.

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Circle 110 on Reader Service Card.

AT A GLANCE

Hometown, U.S.A. (August 1989, p. 38, by Sharon Webb), Publishing International, 533 West El Camino Real, Suite 222, Sunnyvale, CA 94087, (404) 738-4311, $39.95
Rating: ◆ ◆ ◆ ◆

With Hometown, U.S.A. you can create models of a modern city or a turn-of-the-century village. You could even build the Taj Mahal, or a gas station with a soda-fountain sign on one side and Big Ben on the other.

The disk comes with plans for 16 basic structures and suggestions for combining them to create many more. Accessory screens contain doors of all types, windows (including several stained-glass versions), staircases, ticket booths, skylights, awnings, and chimneys. The houses you build can range from simple to complex structures, with overhangs, porches, bay windows, and doors that open and shut.

You can construct your buildings of paper alone, but mounting the printouts on cardboard or thin balsa wood will make for sturdier models. You can also cover your buildings with clear plastic laminate or spray them with varnish for greater durability.

MacroMate (August 1989, p. 30, by Robert Tighe), Roger Wagner Publishing, 1050 Pioneer Way, Suite P, El Cajon, CA 92020, (800) 421-6526, (619) 442-0522, $49.95
Rating: ◆ ◆ ◆ ◆

MacroMate installs itself as a classic desk accessory when placed in the Desk.Accs folder, which means you can use it only with ProDOS 16 and GS/OS programs. The MacroMate disk comes with four prepared macro files. Two are demonstration files for use with the MacroMate tutorial. The other two are for use with AppleWorks and Applesoft BASIC.

If you want to create new macros or change an existing macro, you can either record a macro as you're using it or change it with the MacroMate macro

Continued

Synthesizer can't read standard MIDI files, so don't expect to hear your sequences play the voices you create.

Instant Synthesizer is a wonderful electronic instrument that sadly enough has only limited use. If you have either Apple's or Passport's MIDI interface, you can access an outside MIDI keyboard. Without Instant Music, though, your instrument will be limited to playing along with the Instant Synthesizer demos. You can sound the Apple's Ensoniq chip from your MIDI keyboard, but only in real time and only with one voice at a time.

The ideal program would let your standalone keyboard use the computer like a synthesizer-in-a-box—a keyboardless synthesizer module. The problem with this concept is that people who use computers with their MIDI setup are likely to use computer-run sequencers. A synthesizer program needs sequencing and MIDI file reading to fulfill this need.

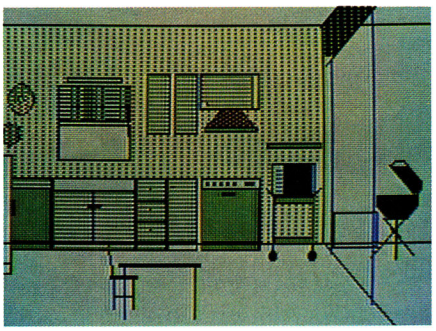
MIDI implementation within Instant Synthesizer is generally weak. The program doesn't support keyboard program (voice) changes, aftertouch, or velocity sensitivity. Although its menu bar lets you indicate which slot your interface uses and which MIDI parameters you need, it doesn't save this information to disk. You have to type in the information each time you reboot and reenable MIDI with each new song you load.

Instant Synthesizer comes on two disks—one with the program files and one with a nice selection of demos. The program isn't copy protected. The manual includes instructions for hard-disk installation, but they're a headache. The manual tells you to install the song, song pack, and instrument folders from the program disk, then create a second set of folders to store similar files from the data disk. The program obstinately refused to access the second set. I got rid of the second set of folders and added the data-disk files to the original folders transferred from the program disk with instant success.

Taken for what it is—an adjunct to Instant Music—Instant Synthesizer is an excellent program that can instruct and entertain. If you're a hobbyist who owns or plans to buy Instant Music, I heartily recommend Instant Synthesizer. But if you have 10 megabytes of standard MIDI files and were hoping to hear your GS join in with your bank of synthesizers to play sequenced compositions, look elsewhere.

Sharon Webb
Blairsville, GA

DESIGN YOUR OWN HOME: INTERIORS



ABRACADATA,
P.O. Box 2440, Eugene, OR 97402,
(503) 342-3030

Interior-design program;
1-megabyte Apple IIGS,
ImageWriter or LaserWriter printer; $89

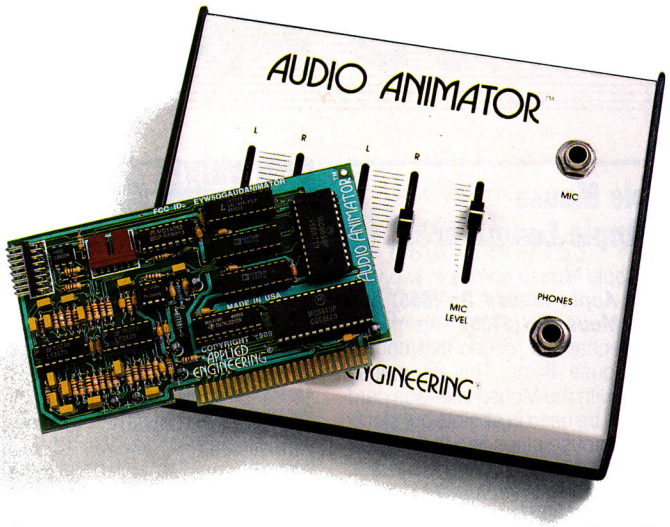
Rating: ◆ ◆ ◆

You've gone through 50 sheets of graph paper, you've broken ten pencils, and you're still not sure where to put the television. Should it go on the right wall opposite the love seat or on the far wall next to the aquarium in the new addition you're building this summer? Somehow it all seems a bit difficult to visualize. Well, not any more. Boot up Interiors on your Apple IIGS, and you'll have instant room designs.

Interiors, part of Abracadata's Design Your Own Home series, is now available in a IIGS-specific format that boasts improved speed, color-printing options, and even greater ease of use than its Apple II predecessor. In a nutshell, Interiors lets you create custom-room designs or modify any of the two dozen pre-drawn rooms provided on the data disk.

Much of the appeal of Interiors stems from its ease of use, a direct result of excellent forethought on the part of Abracadata. All the essential elements of design are developed as part of the program, eliminating the tedium inherent in more general drawing programs. For example, there are more than 100 furniture shapes you can call to the screen with a single keystroke.

Perhaps the best way to provide an overview of Interiors is to step quickly through the process of creating a room. First, select a room outline. You can either work with the rectangular room shape provided or customize an outline with the simple line-drawing tools. If you're customizing a room, rulers and on-►



Break the IIGS sound barrier

Audio Animator™. All of the Sonic Blaster's features plus MIDI and external mixer

Our new Audio Animator transforms your IIGS from a beep box to a boom box! We've combined a true MIDI interface with a stereo digitizer, a stereo playback machine, an external mixer, and enough powerful, feature-laden software to unleash the sound potential your IIGS was born with. Take full control over MIDI compatible instruments, or record and play back digitized sounds with unsurpassed accuracy and quality.

Digitizing

Record sounds from your own stereo, CD player, television, or VCR, even a microphone. Audio Animator's built in oscilloscope lets you control recording levels visually and analyze inputted data. The zoom function permits you to "see" what your recording looks like in a graphical format. You determine the optimal balance between desired fidelity and available memory.

Audio Animator even has an on-board Analog to Digital converter to sample at an extremely fast rate (37,000 times a second), and with sound quality near that of a compact disk. With it, you'll obtain far higher levels of fidelity than with the GS's Ensoniq chip alone.

Play back on your own speakers

The Audio Animator includes *input/output and thru* for MIDI (Musical Instrument Digital Interface) devices. Play and record melodies on a MIDI instrument, edit them and play them back through any MIDI compatible instrument. If fact, Audio Animator lets you daisy-chain up to sixteen MIDI devices.

Audio Animator comes complete with an external mixer to allow easy access to volume and record levels and microphone controls. Connect a drum machine, keyboard, stereo, CD player, even another computer... all without disturbing the GS.

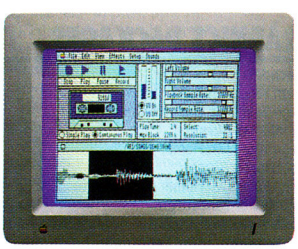
Software, Too.

The powerful, mouse driven software we include presents you with easy to use pull-down menus and SUPER HI-RES graphics that make the Audio Animator almost as much fun to see as it is to hear.

The MIDI portion of the software is an 8-track, 16 channel MIDI sequencer with separate channel record and playback filters and a number of editing functions like cut, copy, paste, punch in, punch out, and many more.

Features:

- Passport compatible MIDI interface
- Stereo input and output adjustable from external mixer
- Mixer has DIN connectors for MIDI in, MIDI out, and MIDI thru
- Compatible with all software utilizing the Ensoniq output
- On-screen oscilloscope to monitor inputs and VU meter
- Editing functions such as fade-in, fade-out, backwards, echo, silence, and amplify
- Compatible with standard MIDI file formats including AIFF (Apple Information File Format)
- Sequencer supports 2:1 and 2.67:1 file compression
- MIDI quantization to 1/32 resolution and transposition



Compare Audio Animator with any other MIDI device or sound digitizer on the market. For completeness of the package, ease of use, quality, and an unmatched list of features ... you'll choose Audio Animator.

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Memory requirement - 512K (1 MEG recommended)
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Programs & Peripherals

Apple Mouse by Apple Computer

The Apple Mouse comes in two versions, ***Apple Mouse IIc ($85)*** and ***Apple Mouse IIe ($125)***. This mouse is a mechanical mouse that comes with Mouse Paint. The *IIe* mouse comes with the Mouse interface card and may be used in all slots but slot 3. The IIc mouse plugs into the joystick port. The IIc mouse may also be used with the Laser 128 computers.

ACCELERATORS/RAMCARDS/Z-80/80 COLUMN

Apple Computer		GS-RAM *(256K to 1.5Meg)*	Call
Apple IIe Enhancement Kit	65.	GS-Ram Plus *(1MB to 6MB)*	Call
Apple IIe Extended 80 Col. Card	89.	GS-Ram Ultra *(256K to 4MB)*	Call
Applied Engineering		RamWorks Basic *(256K or 512K)*	Call
RamWorks III *(256K to 1MB)*	Call	Phasor *(II+, IIe, or IIGS)*	139.
Ram Express *(256K to 1 MB)*	Call	TransWarp Accelerator *(AP or IIGS)*	***Special*** Call
Ramkeeper or SlotMover *(Option)*	Call	ViewMaster 80 *(II+)*	129.
PC Transporter *(768K)*	399.	Z-80 Plus *(II+, IIe, IIGS)*	129.
PC Transporter Installation Kit		**Bits & Pieces** Rocket Chip	139.
(IIe or IIGS)	Call	**Orange Micro** RamPak 4GS	
RamFactor *(256K to 1MB)*	Call	*(512k Exp. to 4MB w/Utilities)*	139.
Z-RAM Ultra 1 *(256K or 512K)*	Call	**Zip Technology** Zip Chip 4 MHZ	***Special*** 129.
Z-RAM Ultra 2 or 3 *(256K to 1MB)*	Call	Zip Chip 8 MHZ	***Special*** 159.

Laser 128EX by Laser Computer

The ***Laser 128EX*** is the newest Laser Computer. Features include 192K of ram, 128K of user ram, 64K of video ram. Built-in Triple Speed Processor 1 mhz, 2.3 mhz and 3.6 mhz. Able to add up to 1 meg of ram on the internal motherboard. Built-in 5¼ disk drive, parallel port and serial port. Other options included are expansion slot, joystick/mouse port and 40/80 column card. ..... **$449.**

PRINTER INTERFACE CARDS

Apple SCSI Card	115.	**Orange Micro** Grappler C/Mac/GS	***Special*** 79.
Apple Super Serial Card	119.	ProGrappler *(Apple IIe or IIGS)*	84.
Applied Engineering Buffer Pro 32K	95.	Serial Grappler Plus	62.
BufferPro 128K	139.	**SMT** No Slot Clock	42.
Serial Pro *(II+, IIe, IIGS)*	119.	Print Tech II *(Parallel Interface)*	37.
Parallel Pro *(II+, IIe, IIGS)*	85.	**Thirdware** Finger Print GSi Ver 2 *(Incl. Desktop Accessories-IIGS)*	79.
Applied Ingenuity GS Juice Plus 1 MB	219.	Finger Print Plus *(Specify Cables: Parallel, Serial or ImageWriter II-II+ & IIe)*	89.
GS Juice Plus 2 MB	429.		
GS Juice Plus 4 MB	855.		

COMMUNICATION SOFTWARE

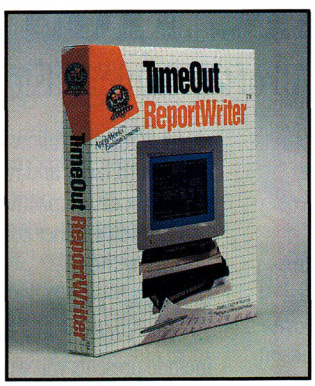
Activision		**Checkmate Technology**	
Teleworks Plus *(IIGS)*	66.	ProTERM *(IIGS, IIe, IIc)*	95.
Applied Engineering EasyLink	85.	**Compuserve** Compuserve Starter Kit	24.
Beagle Bros.		**United Software Industries**	
TimeOut TeleComm	45.	ASCII: Express Pro: Prodos	72.
Point-to-Point	65.	ASCII: Express Mousetalk 1.5	69.

UTILITIES & LANGUAGES

Absoft AC/BASIC *(16-bit BASIC Compiler for IIGS)*	84.	**The Byte Works** ORCA/M Assembler *(IIGS)*	39.
Big Red Computer		ORCA/Pascal Desktop Debugger *(IIGS)*	80.
PS Lovers' Utility Set *(AP or IIGS)*	29.	ORCA/C Desktop Debugger *(IIGS)*	80.
Micol Systems Micol Advanced Basic *(IIGS)*	99.	ORCA DeskTop *(IIGS)*	34.
Roger Wagner SoftSwitch *(IIGS)*	39.	**TML Systems** TML Basic *(IIGS)*	84.
Merlin 8/16 *(IIe, IIc, IIGS)*	79.	TML Pascal *(IIGS)*	84.
So What Software Disc Commander *(IIGS)*	29.	TML Source Code Library *(IIGS)*	35.
Hyper Launch *(IIGS)*	35.	TML Speech Toolkit *(IIGS)*	49.
		Zedcor ZBASIC 4.0 Interactive Compiler	39.

DISK DRIVES & HARD DISK SUBSYSTEMS

American Micro Research *(Micro Sci)*		**Chinook**	
AMR D20/APS 20MB HD		CT-20 Hard Drive *(AP & IIGS)*	529.
w/SCSI *(IIe & IIGS)*	599.	CT-20c Hard Drive IIc	645.
AMR D60/APS 60MB HD		CT-40 Hard Drive *(AP & IIGS)*	715.
w/SCSI *(IIe & IIGS)*	829.	**CMS** *"SD Series - Stack" Platinum IIe, IIGS*	
A5 D Half Height 5¼" Drive		20 MB w/SCSI II card	645.
(IIGS Daisychain)	155.	43 MB w/SCSI II card	845.
A.5 Half Height *(II+ & IIe)*	129.	60 MB w/SCSI II card	950.
A.5C Half Height *(IIc)*	129.	**First Class**	
Micro Sci C2 Controller	52.	T6 60MB Tape	709.
Applied Engineering Transdrive 360K	209.	D2 20MB HD *(IIe & IIGS)*	***Special*** 509.
Transdrive Dual 360K	305.	D4/A 40MB HD *(IIe & IIGS)*	645.
Transdrive Half Height 360K	119.	**Laser Computer, Inc.**	
Vulcan 20	525.	Universal Disk Controller	45.
Vulcan 40	689.	Laser DiskDrive *(IIGS)*	105.
Vulcan 100	1455.	Laser 800KB Drive	185.
Applied Ingenuity Inner Drive 20	449.	Universal Disk Controller/800KB	
Inner Drive 40	599.	Drive Bundle	219.

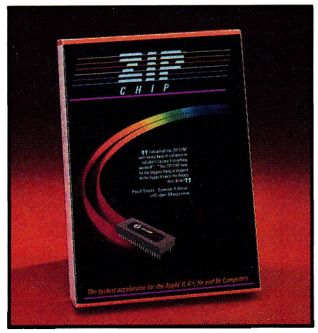


TimeOut ReportWriter by Beagle Brothers

TimeOut ReportWriter is a relational report generator that turns AppleWorks into a powerful business tool! Generate invoices, billing statements, order forms and more, right inside AppleWorks. Information from up to 11 different database, spreadsheet, and word processor files can be used by a singel report - no more limitations because AppleWorks is too small! And your reports will print out exactly how they look on the screen. ..... **$52.**

GRAPHICS PACKAGES

Abracadata		Print Shop *(IIGS)* or Fantavision *(IIGS)*	39.
Design Your Own Train	35.	Print Shop Companion	25.
Design Your Own Home: Architecture *(IIGS)*		Print Shop Graphics Library I, II, III	
or Interiors *(IIGS)*	65.	or Holiday Ed.	16.
Design Your Own Home:		Print Shop Graphics Lib. Sampler Ed. *(IIGS)*	24.
Landscape *(IIGS)*	65.	Print Shop Graphics Lib. Party Ed. *(IIGS)*	24.
Design Your Own Home: Architecture,		**Electronic Arts** DeluxePaint II *(IIGS)*	65.
Interiors or Landscape	49.	DeluxeWrite w/DeluxePaint II *(IIGS)*	85.
Architecture Library 1, 2, 3 or 4 *(AP or IIGS)*	21.	DeluxeWrite *(IIGS)*	55.
Interiors Library 1, 2 or Landscape		**EPYX** Art & Film Director *(IIGS)*	55.
Library 1	21.	Printmagic *(AP or C+)*	34.
Activision		Create-A-Calendar	21.
PaintWorks Gold or Draw Plus	66.	**Lynx Computer** Supergraphix 256	***Special*** 69.
Paint/Write/Draw *(Not Protected IIGS)*	80.	**Roger Wagner**	
Baudville		Graphic Exchange *(IIGS)*	35.
Award Maker Plus *(IIe & IIGS)*	24.	**So What Software** Iconix *(IIGS)*	35.
816/Paint *(Works On All Apples)*	46.	**Springboard**	
Berkeley Softworks GEOS *(C+)*	79.	Certificate Maker Library #1	19.
GEOPublish	69.	Springboard Publisher 2.0 *(IIe or IIGS)*	84.
GEOS, GEOCalc or GEOFile	49.	Certificate Maker or Newsroom	26.
GEOMouse *(AP & C+)*	39.	Fonts For Springboard Publisher *(IIGS)*	19.
Broderbund Dazzle Draw *(AP or C+)* or		Newsroom Clip Art Collection Vol. 1, 2 or 3	14.
Show Off *(IIGS)*	39.	**Thunderware** Thunderscan Apple	
Print Shop *(AP or C+)* or Fantavision	29.	*(IIGs, IIe, & IIc)*	159.



Zip Chip by Zip Technology

Speed up your Apple II, II+, IIc, *IIe*, Laser 128 and Franklin Computers. The ***Zip Chip*** from Zip Technology is an original new state of the art microprocessor that lets you speed through your classroom or office work *now* up to 4-8 times faster. Your *Zip Chip* order includes a free diagnostic/utility diskette with two memory testers and a Zip configuration program.

Circle 128 on Reader Service Card.

Overnight

Specials good through
September 30, 1989

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Monday thru Friday
9 a.m. - 9 p.m.
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Saturday
9 a.m. - 6 p.m.
(Eastern Time)

Sider D2 20M HHD by First Class Peripherals

The ***Sider D2 20 Megabyte Hard Disk Drive*** is a reliable, affordable mass storage solution for Apple IIe and IIGS owners. Shipped with all cards, cables and accessories required to operate, this drive supports four operating systems (ProDos, Dos 3.3, CP/M and Apple Pascal). Includes diagnostics package, 1 year warranty (parts and labor) and tech support. ..... **$509.**

ACCESSORIES

Advanced Gravis MouseStick ADB *(IIGS)*	85.	AntiGlare Filter IIGS	39.
Apple Computer Apple Mouse *IIe*	***Special*** 125.	System Saver *(Platinum or Beige)*	69.
Apple Mouse *IIc*	***Special*** 85.	System Saver *(IIGS)*	75.
Applied Engineering TimeMaster II H.O.	79.	New Turbo Mouse *(Reg. or ADB)*	119.
Sonic Blaster *(IIGS)*	109.	**Kraft** Universal 3 Button Joystick *(IIe or IIc)*	34.
IBM Style Keyboard	119.	**Koala Technologies**	
Audio Animator *(IIGS)*	185.	Koala Pad Plus w/Graphics Exhibitor	84.
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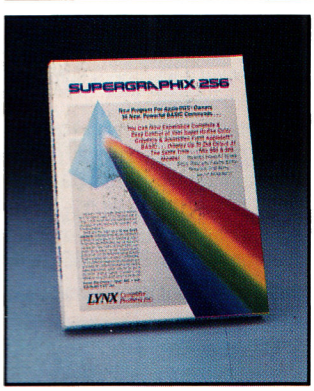

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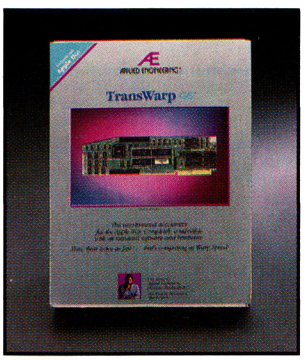

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AT A GLANCE

Continued

editor. Both methods are relatively simple.

First, you can record a macro within another program so that you can see what the macro is doing as you write it. To begin recording, press Control-Option-Escape. Type in the name of the macro, then the macro command lines.

You can create, change, and save macros without leaving your current application. The main attraction, however, is being able to use macros in programs other than AppleWorks.

MacroMate is well designed, easy to learn, and easy to use. It could be very helpful—even if you're already using another macro system.

Mad Match (August 1989, p. 36, by James Trunzo), Baudville, 5380 52nd Street SE, Grand Rapids, MI 49508, (616) 698-0888, $39.95
Rating: ❖ ❖ ❖

Basically, Mad Match is a game in which you select a matching pair of images from two of the six panes appearing on screen. The degree of difficulty, the time limit you have to make your choices, the type of penalty administered for an incorrect answer, and the number of panes replaced after a successful match add variety to the program's basic operation.

One or two players can play Mad Match. In the one-person game, you compete against the clock. When you compete against another player, you can either take turns or play simultaneously.

The images shown in Mad Match range from simple colored squares to detailed scenes of juggling clowns. Obviously, the more elements in each pane, the more variety possible, and the more difficult it will be to find the correct match.

Mad Match is a nice little game. It provides an enjoyable way to work on perception skills, and for younger children (recommended for ages 4 and up) it's an interesting diversion. □

screen measurements simplify the design of even the most oddly shaped area.

Once you've determined the room's size and shape, you can add the furniture. A Command Card lists the key or key combination you'll need to call up the appropriate furniture or fixture icon. For example, pressing Y bring up a rectangular bathtub while holding the shift key and pressing G will make a bar and barstools appear. Incidentally, the Command Card also lists dimensions and shows a picture of the object, a helpful feature because many objects come in various shapes and sizes.

After a piece of furniture "arrives" on screen, position it anywhere you choose by selecting it with the mouse and dragging it to the location of your choice. You can rotate furniture and fixtures in any of eight directions for the proper orientation.

Select finishing tools from the options menu and resize objects, change their colors, change border widths, and so on.

ROOM WITH A VIEW

You usually create rooms from a top view, but Interiors lets you transform top views into one of any four side views. This procedure requires nothing more than a click on the views icon. A side view gives you a three-dimensional perspective, an invaluable aid when trying to visualize a room.

When in a side view, you can add furniture and move it the same way you did in the top view. However, the top view is the "master view" and changes made in the side view won't carry over when you switch back. You have to save a modified side view if you want to keep it intact.

As easy as it is to create rooms with Interiors, the program does contain some unavoidable complications when dealing with dimension and perspective. When shifting from an overhead view to a side view, you might find furniture "floating" in the air. The problem is that while the rooms are 3-D, the objects are 2-D and you'll have to make minor placement adjustments to correct the illusion.

Also, when moving furniture in the side views, it's easy to lose sight of the fact that you're dealing with a 3-D picture. To facilitate movement up and down as well as backward and forward, Interiors uses a height bar to adjust furniture and the mouse to move furniture backward and forward.

Interiors contains many features that help you enhance your interior decorating as well. A powerful collection of color tools let you create and select thousands of colors and dozens of patterns to color your rooms and furniture and "wallpaper" your walls. You can explore color schemes to their fullest. Changing colors by clicking on a piece of furniture and the desired color makes the process so simple and quick you won't be reluctant to experiment.

Another feature that highlights Interiors' versatility is the ability to convert to scale automatically. Plans and furniture are both rescaled instantly when you need a conversion. One caveat that deserves mention is that changing scales after you begin to draw and place furniture instead of beforehand can result in some distortion owing to screen resolution, rounding, and other nuances of the program. Misalignment can also occur during the rescale process. Again, however, using the finishing tools usually rectifies any problem.

One final feature that will prove invaluable when creating your room is the Text Tool, which lets you add labels to your drawing. You can combine traditional fonts such as Courier, Geneva, Times, and Helvetica with styles such as bold, italic, outline and shadow to create impressive lettering for your layouts.

You can also size and arrange your text in many different combinations. You can place text horizontally or vertically and have it right or left justified, centered, or placed wherever the cursor resides.

When you're finished with your design, you can print it on an ImageWriter or a LaserWriter with the standard options. These include horizontal or vertical printing, smoothing (on the LaserWriter), print resolution, and color printing (when using an ImageWriter II and a color ribbon).

HOUSE HELP

Although the purpose of Interiors is to work on one room at a time, with a little creativity and planning it's simple to create a group of small rooms using the room-divider icons and drawing tools.

Abracadata has created a useful program in Interiors. Novices who simply want an idea of spatial design can use Interiors easily. Serious designers can employ the most powerful of Interiors' features with only a little more effort. By porting this segment of the Design Your Own Home series to the IIGS, Abracadata has made a good program even better.

James Trunzo
Leechburg, PA

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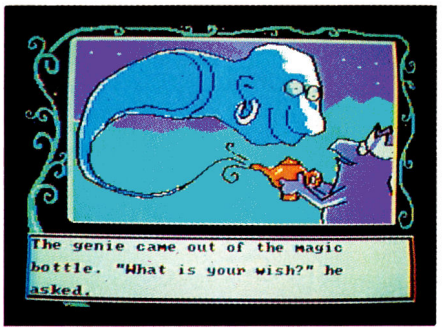
FLODD, THE BAD GUY



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Rating: ❖ ❖ ❖

Until now I have been skeptical about computers for very young children," says Tom Snyder on the cover of Flodd, the Bad Guy, one of the Reading Magic Library series. The software inside that cover is permeated with the same ambivalence toward technology. It lets young children sit "behind the wheel" of a computer without really touching the computer's power.

If this software were a car, you'd reach for the accelerator and find two pedals but no motor, like a Big Wheel bike. Perhaps this is appropriate for preschoolers, but few of us expect to pay as much for a Big Wheel as we do for our Fords and Toyotas.

The concept behind the Reading Magic Library is simple—you and your child read a story together. The primary differences between this computerized story and a book are that the pictures are animated, your child is addressed by name during the story, and you and your child can select a variety of ways to reach the story's climax.

After you boot the disk, the program asks you to type in your child's name, which it will insert later in the story. Then the tale begins—simple line drawings filled in with a few colors above several lines of easily legible text. The pictures are augmented with animation and a clicking noise whose speed varies to add an element of pace. Press a key to advance to the next screen, just as you would turn a page in a book.

The program wisely does not accept input just after a new screen appears, so your child can't flip through the "pages" endlessly by

Circle 68 on Reader Service Card.

pounding on the keyboard. Every half dozen or so screens, the program asks the two of you to press a specific letter to choose how the story should proceed. For example, you may press D to have King Alex search for Flodd in the dark tunnel of a cave or L to search the lit one.

THE PLOT THICKENS

There are at least two ways to think of Flodd. The first is to compare the plot, characterization, pacing, prose, and artwork with that of the average children's book. The plot of Flodd will hold most preschoolers' interest. When the story begins, all is well in the kingdom of Alex and his dog, Ollie. Then Flodd, the Bad Guy, comes to town and empties the water tower. The king and Ollie use magic wishes and their own ingenuity to refill the tower and to circumvent Flodd's other nasty tricks.

The authors of Flodd understand their audience well. Each sequence of events is less than a dozen screens, just right for youngsters' attention spans. The young hero king is made appealing through his relationship to his sidekick Ollie. The story is also dotted with vignettes to tickle the preschool sense of humor.

For instance, as King Alex and his dog Ollie travel down the dark tunnel to search for Flodd, we see only their eyes. Suddenly, the dog's eyes disappear. King Alex cries with great concern, "Ollie, where are you?" A moment later the dog's eyes reappear. "Sorry," says Ollie, "I had my eyes closed and my ears blocked." You're not laughing? But then, you're not 3 years old.

In addition to the strong plot, good characterization, excellent pacing, and childlike humor, Flodd also has moral messages. Hard on the trail of the bad guy Flodd, Ollie suddenly jerks to a hunting-dog point. Frightened, Alex asks what the dog has found. "Out there," says Ollie. "It's a fantastic sunset." When Alex remonstrates, Ollie defends himself by saying, "You've got to stop and enjoy your world more."

The main message of the story is even more insightful. After being thwarted by Alex several times, Flodd finally dognaps Ollie. With only one magic wish remaining, Alex was about to ask for Ollie's return. At the last moment, however, he changes his mind. Instead, King Alex wishes for Flodd to become happy. Instantly, Flodd shows up with Ollie and a smile, his maleficence dispelled forever. ►

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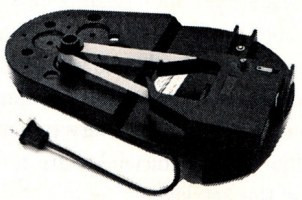

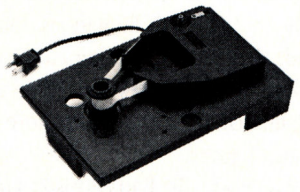

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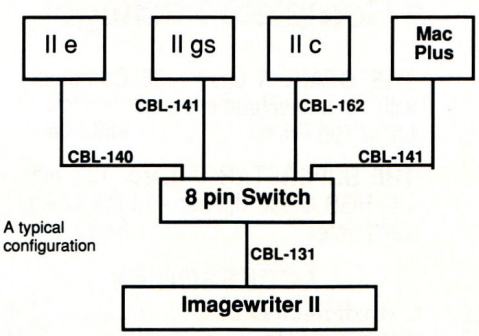

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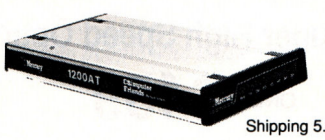

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Thus, as a book, Flodd would score quite well. There are a few weaknesses, of course. The utilitarian prose and blob-like illustrations are a long way from Maurice Sendak, even considering an Apple II's limitations. On the other hand, at least one reading curriculum employs only simple shapes like Flodd's because, it claims, children empathize more with simply drawn figures.

Regardless, Flodd, the Bad Guy isn't a book, just as a car isn't a bike. For some reason, Flodd has been put on a computer and that's where the questions arise. While the animation is mostly unobtrusive and occasionally delightful, I doubt that most parents would be willing to pay $30 more for it.

My daughter does enjoy controlling the story line. But she is just as entranced with her favorite storybooks and will listen to them reread infinitely—or at least as long as my patience holds out. As every parent knows, repetition and predictability are things children of this age love.

It's true that with Flodd preschoolers will begin to learn where a few letters are on the keyboard, as they select a plot option. This matching of screen letters with keyboard letters and identification of a letter with a keyboard position are early steps in learning to read and type.

ODDITIES

The most curious feature of Flodd is what happens just before you select a plot option. A marquée appears at the bottom of the screen with your child's name on one side and the word *Together* on the other. According to the instructions, this is supposed to determine whether your child selects the plot option alone or with your assistance.

Nothing different happens whether your child's name or the word *Together* lights up—nothing involving the computer, anyway. You need to wait only a few seconds to skip this process. It's not a major annoyance, although the music can become grating after the third or fourth time.

This extra step appears to be intended to encourage your child to interact with you instead of the computer, but this assumes that most parents and children won't interact naturally throughout a story without the computer's insistence. This interaction goes beyond ignoring the power of the computer; it uses the power of the computer inappropriately.

The whole design of Flodd and the Reading Magic Library is meant to urge parents to use the computer with their children rather than as a babysitter. While we all know that our children need us to share our time and attention with them, most parents would probably prefer a software program that lets them choose where and when not to be included.

IS IT WORTH IT?

Flodd, the Bad Guy is an excellent story for preschoolers. And like any good book, reading it with your child will help prepare him or her to read.

Parents who don't mind paying more for this storybook than for a Big Wheel bike will probably find their children delighted. The rest of us may feel that the prices of software packages, like the prices of cars and bikes, should have some relationship to the work and materials required to produce them. We all might buy quite a few Reading Magic Library stories if they cost only two or three times the price of a children's book.

Jeanne Dietsch
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HELP WANTED

The Perfect Career is simple to operate—just boot it up and follow the prompts. Single keystrokes advance you from one screen to another, while the Escape key returns you to the main menu. TPC isn't copy-protected, so it's easy to make a backup copy.

The Perfect Career asks questions, analyzes answers, and provides vocational guidance. The program functions as a desktop counselor, helping determine career options best suited to your individual interests and talents. It can advise high-school and college students who have little or no work experience, or guide skilled adults as they explore a career change or re-enter the job market.

The manual suggests that job seekers begin by typing in their name, date, and a password. Presumably the password is necessary to keep responses confidential. Every time I started the program, however, I received no such log-in instructions. I didn't have to enter my name or any password.

The program did warn me that "a file currently exists which contains answers you entered at an earlier time." It also inquired whether I wanted to use or discard the previous answers.

However, I was never greeted by a log-in screen. While formal file encryption didn't seem to be operational, individual files remain confidential, because the names don't appear on screen.

The main menu includes eight program options, one of which is a brief description of the other seven menu items. First-timers should read the description (option number eight), then move on to the introduction (option number one) for an overview of program objectives, a short summary of program modules, and suggestions for completing the guidance exercises.

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From the introduction, individuals with no work experience (typically high-school and college students) proceed to an interest inventory where they undergo testing to measure personal interest in more than 180 occupations arranged in 12 major career fields. The following areas are included: art, science, mechanics, industry, plants and animals, business detail, sales, accommodations, humanities, leadership and influence, and physical performance.

Because this module identifies occupations related to personal interests, job seekers are reminded to ignore factors such as salary levels, qualifications, and future employment opportunities if they want to obtain a true ►

Continued on p. 94

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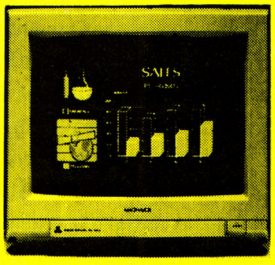

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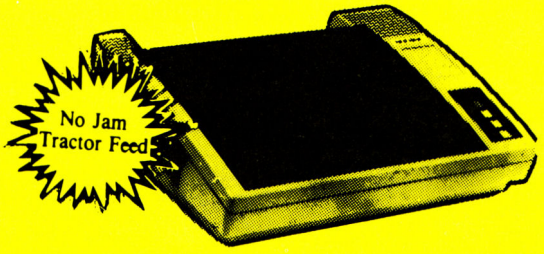

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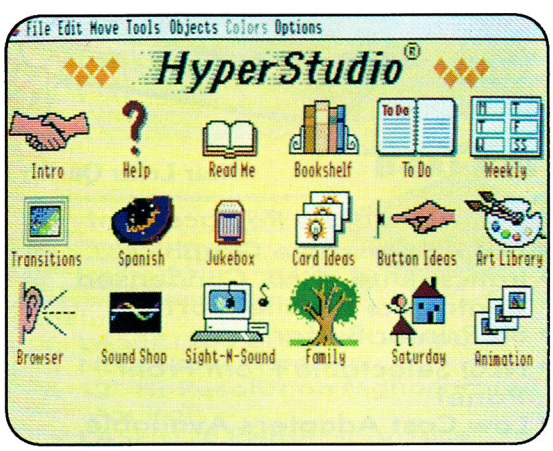
Does HYPERSTUDIO

By JEFF CABLE • WEST COAST EDITOR

Graphics, text, sound, video—put it all together in an interactive multimedia presentation, even if you've never programmed anything more complicated than your wristwatch. Harnessing the power and integration the GS has always promised, Roger Wagner's HyperStudio heralds the next generation of Apple II computing.



COMPUTER SOFTWARE HAS evolved steadily since the early 1980s, when practical, accessible applications such as VisiCalc emerged. This revolutionary spreadsheet program helped transform the personal computer from a hobbyist curiosity into a serious business tool. But, more importantly, VisiCalc changed our *perception* of computers. We no longer needed to compose BASIC commands to compute numbers. The screen became a worksheet on which we related and manipulated numbers.

Then in the mid-'80s AppleWorks added another twist to Apple II software—integration. Rather than making you learn separate commands and interfaces for a word processor, a spreadsheet, and a database manager, AppleWorks provided a consistent environment—the now-famous file-card interface—and the ability to move data easily among all three programs.

Not long after, the mouse-based graphical (iconic) interface came into being, originally on the Macintosh and subsequently with the release of the IIGS. *Point*, *drag*, *pull down*, and *click* were the new buzzwords around Apple.

Now in the late '80s comes the next generation of computer software: an interactive multimedia environment, commonly called *hypermedia*—the ultimate integration of everything you can do with your computer. Comparing hypermedia to traditional software is like comparing snapshots to motion pictures. Hypermedia on your desktop lets you and your Apple act as a conductor, directing the actions of text, graphics, sound, and even video.

The most successful, or at least the most widely known, implementation of hypermedia is HyperCard for the Macintosh. The buzzwords you hear associated with HyperCard on the Mac—*stacks*, *cards*, *buttons*—are same ones you'll hear when discussing Apple II hypermedia products, such as Roger Wagner Publishing's **HyperStudio** for the GS (see Editors' Choice, August 1989, p. 108) and Techware's **Tutor-Tech** for 8-bit Apples.

To understand hypermedia you'll have to throw out the traditional concept of computing. The basic premise behind hypermedia is that anyone can create audiovisual "databases"—infinitely varied, infinitely detailed presentations—on any subject.

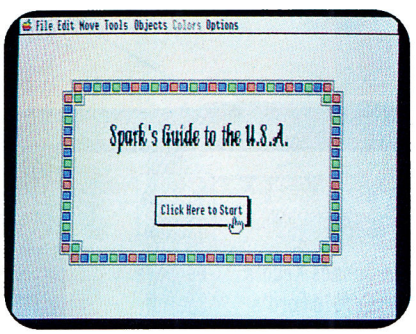
For example, let's say your first screen—that is, your first *card*—shows a drawing, a digitization, or a video of the world. Every country may represent a different direction the presentation can take. Selecting the United States, for example, reveals a more detailed map. Choose one of the 50 states, and you get a map of that state. This sequence could continue until you're in a screen that shows your living room.

You've progressed from the world, to the United States, to Iowa, to Des Moines, to Maple Street, to your house, to your living room. The impressive thing is that you could have selected Chile instead of the United States and gone in a different direction. Or you could have dialed your (actual) phone by selecting its icon from the living-room card. You'll be amazed to discover that creating such a presentation isn't difficult.

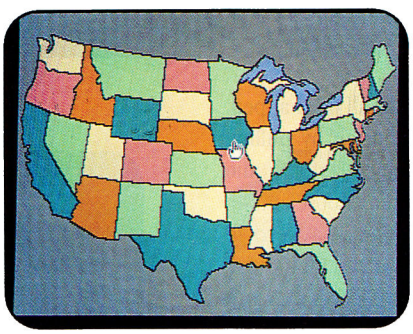
While Techware's Tutor-Tech has been available for the Apple IIe, IIc, and IIc Plus for a couple of years (see the accompanying sidebar),

Photography • Larry Dunn

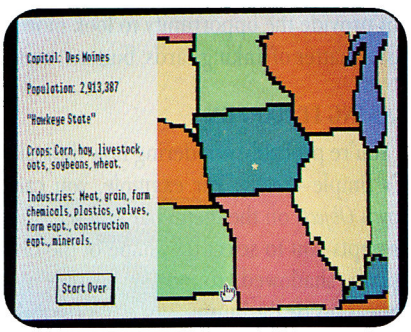
STACK UP?



Title screen from HyperStudio geography stack (application).



Next card shows 48 options; use the mouse to move the cursor and click on Iowa.



Zeroing in on Iowa gives you a summary of the state's vital statistics, plus the option to return to the U.S. map for another selection.

it's the sound, graphics, and operating-system capabilities of the GS that make hypermedia attractive for Apple II users. For that reason, Roger Wagner's HyperStudio is one of the most exciting Apple IIGS products to be announced. In fact, the GS' inherent sound and graphics combined with third-party software and hardware make it better suited for hypermedia than the Mac Plus or Mac SE.

Because HyperStudio is so different from any other Apple II product, it's hard to imagine what you can do with it. HyperStudio isn't a programming language, nor is it a painting program (although one is included). It's an "interactive authoring system" that lets you incorporate text, graphics, sound, music, video, and digitizations into your applications or, as HyperStudio calls them, *stacks*. Its software not only provides basic integrated applications you can use to create presentations, but through a series of step-by-step menus lets you bring together data you've generated in other programs that are not normally compatible with each other—a drawing from your usual paint package and a tune you wrote with your favorite music software, for example.

BUTTONS, CARDS, AND STACKS

When you launch HyperStudio, you'll see the "Home Card" first—the program's main menu. On the Home Card you'll see a number of colorful icons representing different stacks that were written with HyperStudio. (If you're booting into HyperStudio from the Finder, you can go directly to one of the stacks.) From the Home Card, you can click on any icon to load and run that particular stack. For example, you'll notice an icon that looks like a building. When you click on it, a picture of a house appears. You're now using that stack. HyperStudio stacks let you put together words, pictures, and sounds to explain and illustrate an idea easily and effectively.

A stack contains two or more cards; a card can contain text, sound, graphics, or any combination. On each card you'll position one or more *buttons*, icons (often rectangles or arrows) that let you move from card to card. You can move among cards in the same stack, or from a card in one stack to a card in a different stack. If you want the user of your stack to have several options or directions in which to go, you may want several buttons on the card. For example, one button could be a forward-pointing arrow letting you continue to the next card; a backward-pointing arrow would provide the option to go back to the previous card. A common button is an icon of a house, which returns your user to the Home Card.

THE FLOW OF IDEAS

It's important to remember that you don't have to move in a linear direction; that is, the user, not the software, determines what events will occur (within the choices or limits the application's designer has "programmed" into it). For instance, in the example above you could have moved on to a lesson on the history of Iowa, rather than to your home in Des Moines.

Linking cards is simply a way to connect ideas. For example, let's say you're a parent or teacher trying to explain the parts of a typical home ►

to a young child. Using any super-hi-res GS painting program, or the painting tools within HyperStudio, you can draw a typical home. This would be the first card in your stack. You'll want to put some buttons on your stack so that the child can point and click on some part of the house and see what's inside. If you create a button on the bedroom window, for example, when the child clicks on that window the house will disappear and a card showing the bedroom will appear. Or maybe he or she will want to see what the inside of the garage looks like. You can make the garage door a button. Using animation, you could open the garage door, revealing the next card—the interior of the garage.

Now that you're inside the garage you can program a whole new range of possibilities. For example, you can show a car, a bicycle, and some tools with corresponding buttons that will let your user examine each one in more detail. For instance, if he or she clicks on the car, you can provide the opportunity to look more closely at each part of it. It's just a matter of linking cards, buttons, and stacks in the order you want.

MAKING IT HAPPEN

You're probably wondering how difficult it is to make all this happen. It's simple—really. For example, you can create a button by pulling down *Objects* on the menu bar and selecting *Add a Button*. HyperStudio prompts you to select the shape of the button; you can choose among square, shadowed, round, or invisible styles. If you want a word to appear inside the button, just enter the appropriate text and hit Return.

HyperStudio then lets you position the button anywhere on the card. When you've determined the correct location for the button, a dialog box will appear and ask you what action should take place when the button is selected. You can have that button send the user to another card, for instance, or play a sound, or run an animation sequence you've created with Paintworks Gold or Paintworks Plus. You can even have HyperStudio keep track of correct inputs if you use the buttons for multiple-choice questions.

You can also determine the way one card links to the next. You can make it fade from black to white or scroll from left to right; you can watch blocks on screen disappear randomly, or create any number of other fancy effects. With a couple of simple commands, it's easy to make your cards look and sound like a professionally produced video presentation.

Not only does HyperStudio let you link one card to another, but you can also link one stack to another; you can even link your HyperStudio stack to another application. This means that you could write your own Finder or program launcher by creating a Home Card with icons for each of your favorite applications; clicking on an icon could direct HyperStudio to launch that particular program. You can preset HyperCard to return to the Home Card after exiting that program, to the Finder, or to the end of the stack from which you originally chose that program.

Top right, title screen reveals contents of next two levels of information.

Middle right, each card presents two suboptions.

Above and right, third level offers you a choice of several information cards.

HyperStudio's linked, multimedia databases mean that the user, not the software, determines the flow of events (within the limits the application's designer has "programmed" in).

DRESSING UP

Each screen you see in HyperStudio will probably display some high-resolution graphics. If you're not an artist, don't worry. You can use clip art from any of your favorite GS painting programs or you can choose from more than 250 clip-art images included with HyperStudio. Along with the art disk, you'll find another disk containing sound effects—animal noises to breaking glass—you can incorporate into your stacks. If you want to create your own sound effects, HyperStudio comes with Roger Wagner's program Sound Studio, a no-slot sound-digitizing card, a microphone, and a small amplified speaker. (The speaker isn't great, but it's better than your GS'.) Considering all the added features, the $129.95 price represents an exceptional value.

Don't forget that if you own or have access to a Pioneer 4200 LaserDisc player or compatible and the new Apple II Video Overlay Card (see

CARD TRICKS

"Roll Video," May 1989, p. 42, and "Reel-World Images," July 1989, p. 40, for details), you can produce interactive video with HyperStudio. Now if someone clicks on the picture of the car in your garage, your RGB (red-green-blue) monitor becomes a full video screen on which you can show movies of cars speeding down highways or of an automobile-manufacturing plant. With all these hardware and software options, the education, business, and home possibilities are endless.

Remember, too, that although it's easy and fun to produce your own HyperStudio stacks, you don't have to create them from scratch to enjoy this product—you can borrow stacks from other Apple II users. Log on to your favorite bulletin-board system (BBS) or AppleLink Personal Edition, or visit your local Apple user group and you're sure to find ►

Curing the 8-Bit Blues

If you own an Apple IIe or IIc and are suffering from a case of hyperlust, don't despair. Techware, of Altamonte Springs, Florida, offers an interactive cure that lets you use your 8-bit Apple to create and use HyperCard-like stacks.

Techware's *Tutor-Tech* ($195) is designed to let educators create multimedia lessons; appropriately, the software runs on a minimum of 128K of random-access memory (RAM) and one disk drive. While Apple and other vendors like to talk about AppleTalk networks running GSes and Macs, the 128K one-drive Apple II setup is still a common configuration in many schools. Tutor-Tech is hypermedia for the masses.

Tutor-Tech mimics the Macintosh HyperCard interface and uses the terms every user of hypermedia ought to know—*stacks*, *cards*, *buttons*, and so on. (See the accompanying article for details.) Tutor-Tech's ability to interact with the Pioneer 4200 laser-disc player and the Apple II Video Overlay Card lets you create high-quality interactive lessons that combine computer graphics and animation with video. Techware has also announced an incentive program that allows owners of the Apple II Video Overlay Card to take $50 off the price of Tutor-Tech software. The company says its products will soon support CD-ROM and will offer the ability to read HyperCard stacks created on the Macintosh.

In addition to compatibility with new products like the Overlay Card, Tutor-Tech works with digitizers such as ThunderScan and ComputerEyes. And if you don't own a mouse, you can control Tutor-Tech with a joystick as well as a variety of input devices such as the KoalaPad and Muppet Keyboard.

Tutor-Tech features a drawing program, but if design-your-own isn't one of your strengths, you can import clip art from MousePaint, The Print Shop, The Newsroom, Dazzle Draw, and other programs. (You must convert Newsroom and Print Shop graphics to ProDOS before you use them with Tutor-Tech, though.)

If you're one of the millions of Apple IIe and IIc owners, Tutor-Tech offers an exciting chance to experience the wonders of interactive technology. Keep in mind, however, that 8-bit Apples aren't as well suited for hypermedia as the GS; Tutor-Tech offers an attractive option, but the GS' outstanding sound and graphics capabilities as well as exciting third-party software and hardware products lend themselves better to interactive multimedia.

Techware has done a commendable job of bringing a HyperCard-like environment to the 128K world of Apple IIs in education. If you use an Apple IIe or IIc in the classroom and want to expose your students to interactive hypermedia, Tutor-Tech's the only game in town.□

interesting public-domain stacks. You'll see hundreds of different applications offering new perspectives on the Apple IIGS.

HYPERSCHOOL

HyperStudio is a natural for education; Roger Wagner Publishing recognizes that and offers site-license plans to make the product affordable for educators. Schools have the option of outfitting each of their Apple IIGSes with the HyperStudio software and all accompanying hardware for $65 per system. If you don't need the speaker, microphones, and digitizing card, you can purchase the software for $35 per computer. Apple's dominant share of the school market, coupled with the advent of the multimedia classroom and an aggressive pricing strategy, will make HyperStudio a hit in schools across the country.

HyperStudio's software requires an Apple IIGS equipped with 768K of random-access memory (RAM), although the program runs more efficiently with 1.25 megabytes. Other than the standard GS equipment, such as a color monitor and a 3½-inch disk drive, you don't need additional hardware or software. Some third-party products, however, complement HyperStudio particularly well. If you have Mediagenic's Paintworks Gold or Paintworks Plus, for instance, you can create animation and then import it directly into one of your stacks (as described above). And DeluxePaint II, from Electronic Arts, offers great graphics-editing features that will help you create fancy super-hi-res illustrations you can add to your HyperStudio cards.

Although a sound-digitizing card is shipped with HyperStudio, third-party digitizers, such as Applied Engineering's Sonic Blaster or Sound Ace from Parallax, offer superior sound samplings and more effects for your recordings. And a video digitizer, such as ComputerEyes from Digital Vision, will capture images from your videocassette recorder (VCR), laser-disc player, or video camera, adding even more graphics possibilities to HyperStudio. With all these products and HyperStudio you could create a multimedia family tree, for instance—digitized pictures of each member as well as a brief personal speech, both text and sound.

For home activities, schoolwork, and business presentations, whether it's a family tree, a house tour, or a lesson in European geography, HyperStudio offers you the programming flexibility to stretch your imagination and expand your creative horizons—plus countless new ways to use the full power of your Apple IIGS.□

PRODUCT INFORMATION

HyperStudio
Roger Wagner Publishing
1050 Pioneer Way
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$65/system site license
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"SCIENCE LITERACY IS DECLINING IN AMERICA," shout headlines nationwide. Where will the next generation of scientists come from? And will tomorrow's adults be able to understand issues such as acid rain, genetic engineering, and space exploration—well enough to make informed decisions?

Broderbund Software and Sunburst Communications are fighting back—joining teachers in the battle to make "hands-on science" a part of the classroom experience at all levels of education. Both companies publish Apple II home- and school-based products designed to foster science literacy among even the youngest students. Apple II users can choose from a wide variety of science-oriented programs from a number of publishers in the education market—but Broderbund's home and school versions of Science Toolkit and Sunburst's series of individual science products are among the best and should be of particular interest to the parent or teacher concerned with science education.

Broderbund's Toolkit series includes four hardware/software packages (sold separately) that teach different scientific principles through suggested experiments. (See the accompanying **Table** for details.) You must purchase the **Science Toolkit Master Module**, however, to use the other items in the series. The Master Module contains the Apple II interface (two connections for analog data input and two for digital), a thermistor kit, and a photocell assembly; the three additional modules in the Toolkit series are **Speed & Motion** (with balloon car and additional photocell assembly), **Earthquake Lab** (with seismoscope kit), and **Body Lab** (with spirometer assembly).

Using a variety of on-screen simulated equipment (timer, light meter, thermometer, strip chart, speedometer, tachometer, heart-rate meter, lung-volume meter, and seismograph), which respond to the thermistor or photocell interfaced to your Apple II, each Toolkit program records data generated during the suggested experiments. The software for each module comes on one floppy disk.

Sunburst offers six science packages. **Playing with Science: Temperature** and **Exploring Science: Temperature** include identical hardware—a three-connector computer-interface cable and three thermistor cable assemblies. These two programs provide on-screen recording and analysis of thermistor data, plus printing of analysis graphs.

Hands On: Temperature includes neither software nor hardware, but is instead a volume of noncomputer activities for the science lab. **Botanical Gardens**, **Geological History**, and **The Incredible Laboratory** are science simulations that don't use additional hardware. They're designed to teach problem solving, note taking, and analysis. (See the accompanying **Table** for a rundown of specific topics.)

It's more important today than ever that students receive a solid education in basic science. Two series of programs with accompanying lab hardware and suggested experiments help kids experience the excitement of discovery.

By JOHN PUSTAI

Illustration • Pat Morrison

EXTRAVAGANT OR ESSENTIAL?

But are computers *necessary* in school science labs? Is all that equipment and specialized software worth the investment? If we're to expose students to real science, not just abstract theory—*show* them science in action—the answer's an unqualified yes, and the Apple II makes it all the easier to do just that.

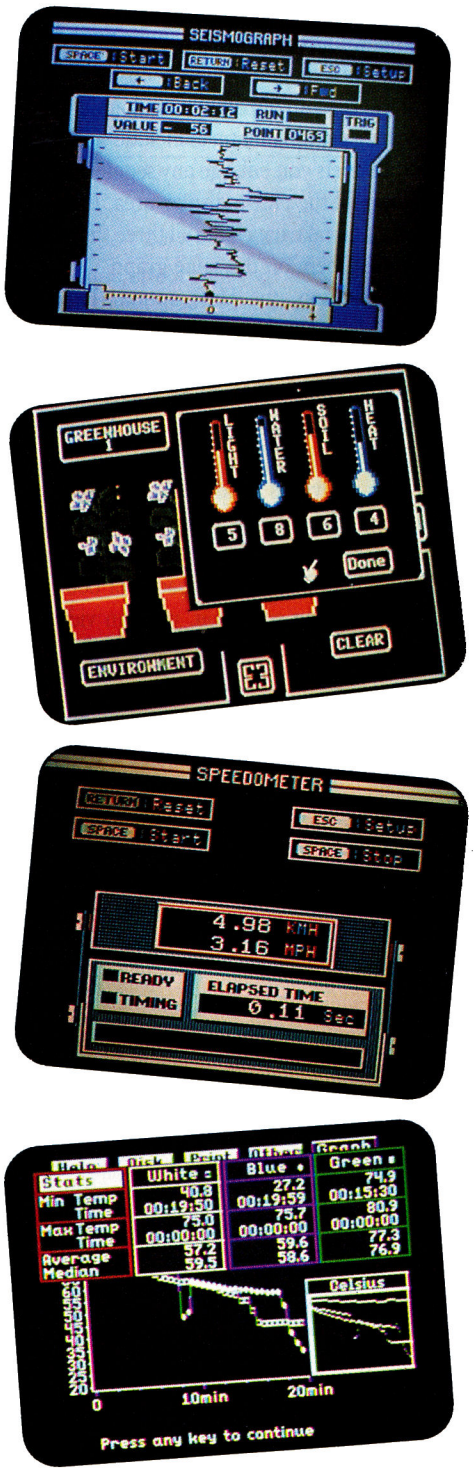
Is computerized lab hardware really that much more sophisticated than the pipettes and thermometers and balances kids have been using for years? Consider the advanced projects to which only kids with computers are exposed and judge for yourself: How many people have their own seismoscopes? How many people know how to measure their own lung volumes? How many people can calculate the cooling effect of evaporation?

Is software without extra hardware useless then? No—simulation software takes advantage of another of the computer's unique capabilities. How else, for instance, could you create a three-million-year geological cross-section, complete with sandstone and coal deposits, a reverse fault line, large anticline folds, and a batholith intrusion? Get the picture? In fact, when it comes to science software, pictures are the key. It's the graph you make from your data or the illustration you help the computer create from your simulation that's most educational. These visual imprints stimulate additional ideas, understanding, and awareness in a way textbooks may not.

All these opportunities exist because of software and hardware interfaced to your Apple II. Simulations alone won't do the trick; neither will hands-on experimentation with no foundation in basic principles.

TOOLS FOR THE BUDDING SCIENTIST

Science Toolkit is an impressive series. In general, Broderbund's graphics screens are crisper, more colorful, and more animated than Sunburst's; the entire series provides a greater array of fundamental measurement equipment and working hardware. Organization, consistency, and compatibility are the bywords of the Toolkit series. Once you boot the Master Module program, it's easy to switch from one add-on module to another. Menus and commands are identical.



Top to bottom, Earthquake Lab (Broderbund); Botanical Gardens (Sunburst); Speed and Motion (Broderbund); Exploring Science: Temperature (Sunburst).

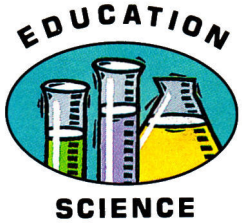
Broderbund's manuals are succinct and clearly written. The Master Module volume (123 pages), for example, offers bits of fascinating science history, amazing scientific facts, and profiles of scientists on almost every page. This approach provides students with the stimulation to go beyond just "getting through" the experiment. In addition, like the software itself, the manuals are consistent from module to module. Supporting artwork is uncluttered, and shows clearly how to set up the experiment in question. Experiments are clever, interesting, and described fully. The manual repeats safety precautions continually.

Even the most jaded scientist/parent or scientist/teacher will be amazed to see Broderbund's Strip Chart (Master Module) and Seismograph (Earthquake Lab) sections. Both pieces of on-sceen equipment have the look and feel of the real thing. Temperature (in Celsius or Fahrenheit) and photocell data (in footcandles) are recorded on the strip chart. You can move it backward and forward to review data, with exact dependent and independent variables displayed on screen; you can print all detailed data points—up to 4000 of them—as a function of time (over 5 minutes to 24 hours), although not the actual strip chart itself.

Science Toolkit does have some minor drawbacks. All accompanying manuals warn you to keep experiments away from the computer to avoid spills or accidents—but Broderbund fails to provide an extension cable for either the sensors or the interface. (Sunburst provides a mono-phone cable that lets you extend experiments 5 feet away from the computer area.) There's a simple solution, however: Get ahold of some RCA male/female standard cables, or a joystick extension cable.

Other shortcomings include an inability to print strip charts (as noted above), temperature graphs, or light-meter graphs; you can print only tabular data. In addition, you can plot data only for the heart-rate graph and the seismograph.

Note that Broderbund sells two versions of its Toolkit series—consumer (home) and school. Consumers, unfortunately, can't buy ►



the school version. If you're a teacher, make sure you ask for the school edition, available only through school purchases.

The school version is clearly the better value. For one thing, the Master Module includes an extra thermistor probe assembly. There's also a temperature screen that can graph two thermistor readings simultaneously; the consumer version graphs only one. The school-edition thermistors tout an improved temperature range—zero degrees to +212 degrees Fahrenheit.

In addition, the education version contains an excellent *Experiment and Teacher's Guide*, with lesson plans, extension activities, and detailed student worksheets. It's a full 8½ by 11 inches and lies open for easy photocopying of worksheets. And it's detailed—it devotes 200 pages just to the Master Module program.

ANALYZE YOUR DATA

Graphs, both on screen and printed, are the most impressive feature of the two Sunburst temperature packages. You can select any data points you collect during your experiment and print them anywhere on an original graph. You can also rotate or double them.

Other printing features include a zoom option that lets you enlarge any segment of your data to fill the entire display area, then print it. You can take data from all three thermistors and plot them on the same graph.

In addition, the Stats option (Exploring Science only) lets you print maximum, minimum, average, and median temperatures with the final graph. You can even tabulate all or selected data; you can print only line graphs, though.

Data analysis is another impressive feature. During temperature experiments, students can make several trial runs. These programs have a built-in storage capacity of 6000 data points. During collection, you can view data in any of three forms—line graph, bar graph, or numerical listing. Seeing plotted data as they take them gives students a concrete sense of increase and decrease in temperature as a result of a particular experiment. No other educational approach beats instantaneous visualization.

Another major strength of the Sunburst temperature packages is the "Experiment/Activity/Teacher's Guide" section in each of the accompanying manuals. These chapters are detailed and complete, almost to the point of emulating science workbooks. Each experiment section is divided into Equipment Needed, Concepts, Objectives, Experiment Description, Classroom Lesson, Getting the Idea, and Expanding the Idea. Worksheets are usually more than two pages, providing students with thought-provoking questions that relate directly to each experiment.

Plotting is again the strong point in Sunburst's simulation Geological History. Students can create any kind of geological cross-section imaginable; printing it allows for further analysis and discussion. There's no question

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PACKAGE	TOPICS AND SKILLS
Broderbund	
Science Toolkit: Master Module	time, temperature, light, heat, plant growth, chemical energy, acceleration, evaporation, gravity, solar heat, chemical refrigeration/heating
1: Speed and Motion	acceleration, speed, rust, pendulum physics, mass/acceleration/speed, tachometry, rpm, continuous light/flicker, digital data
2: Earthquake Lab	seimography, epicenter, tremor, tremor absorption
3: Body Lab	heart/respiratory rates, nervous system, response timing, forced/tidal lung volume, caffeine/exercise effects
Sunburst	
Playing with Science: Temperature	hot/cold, skin temperature, thermometer application, solar heat, evaporation, freezing, salt solutions, cooling/heating rates, microclimates, absorption
Exploring Science: Temperature	greenhouse effect, cooling/heating rates, microclimates, solar energy, body heat loss, heat sink, data manipulation, insulation, graph analysis
Hands On: Temperature	solution/fusion, reaction rate, catalysts, heat conductivity, insulation, radiation, evaporation, Hess' Law, inverse-square law, graph analysis, physiology
Incredible Laboratory	problem solving, memory, strategy, list organization, creativity, cognitive skills, data collection, patterns
Botanical Gardens	conservative focusing, analysis, list organization, patterns, variable control, data interpretation
Geological History	deposition, folding, faulting, tilting, time scale, intrusion, erosion, volcanoes, mountains, rocks

Table. Subjects covered in suggested experiments.

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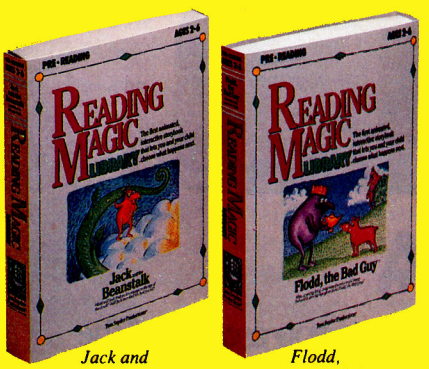

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EDUCATION

SCIENCE

that students from 6 to 60 will learn more from this package about geological processes than they ever thought possible.

In Botanical Gardens, students work with simulated plants and their environments. By changing water, soil, light, and temperature in the "Greenhouse," they must determine what combination improves plant growth. Again, even jaded scientists will feel a sense of success when they hit that "right" combination after many unsuccessful tries, and see their plant grow to full bloom on screen.

Botantical Gardens shines in its instruction and discussion of control of independent variables. The software is easy to use; even the youngest of students will be making variable changes, after only one walk through the on-screen menus. Editing options let teachers modify "seed" characteristics to create new challenges for their students.

Weaknesses you'll encounter in the Sunburst series manuals include only average descriptions of hardware and software operation and menu/screen setup. You'll also have to jump back and forth between chapters. In addition, the Incredible Laboratory module is downright difficult to use. Although pop-down menus are always present on screen, the function of certain options isn't apparent without referring to the manual.

Note also that Apple IIc and Laser 128 owners won't be able to use all three thermistor probes from the temperature packages simultaneously. Only two probes work in a IIc or Laser environment, but many of the experiments call for all three probes to collect and compare data. If you own an Apple II Plus, you'll have to buy a special 16-pin-to-9-pin cable adapter from Sunburst to connect the thermistor interface.

No science series can cover everything, but Broderbund and Sunburst have taken a step in the right direction. These "hands-on" packages work. They do an excellent job of describing scientific principles, theories, and experiments. In most cases, the experiment guides and teacher's manuals alone are almost worth the cost of the package.

Students, even the youngest, who work through all the experiments in even one of these packages *will* learn fundamental science. (Note that adult guidance is recommended for elementary-school kids.) The lab hardware is reliable and re-usable. Both series allow for data collection and storage on disk.

Of course you don't *have* to have an Apple II to conduct the experiments and activities these products support. Without an Apple II and one of these packages, though, you'd need sophisticated laboratory equipment—traditionally available only to college students and corporate research labs. Thanks to computers, some measure of equivalent experience is now accessible to elementary and high-school students—and that means a more genuine interest in science and a surer grasp of basic principles that they'll retain for the rest of their lives. □

PRODUCT INFORMATION

Botanical Gardens, $65
Geological History, $65
The Incredible Laboratory, $65
Exploring Science:
Temperature, $129
Hands On: Temperature, $30
Playing with Science:
Temperature, $129
Sunburst Communications
39 Washington Ave.
Pleasantville, NY 10570
(914) 769-5030
(800) 431-1934
(800) 247-6756 (Canada)

Science Toolkit:
Master Module,
$79.95 home, $89.95 home
1: Speed and Motion,
$39.95 home, $49.95 school
2: Earthquake Lab,
$39.95 home, $49.95 school
3: Body Lab,
$39.95 home, $49.95 school
Broderbund Software
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San Rafael, CA 94903-2101
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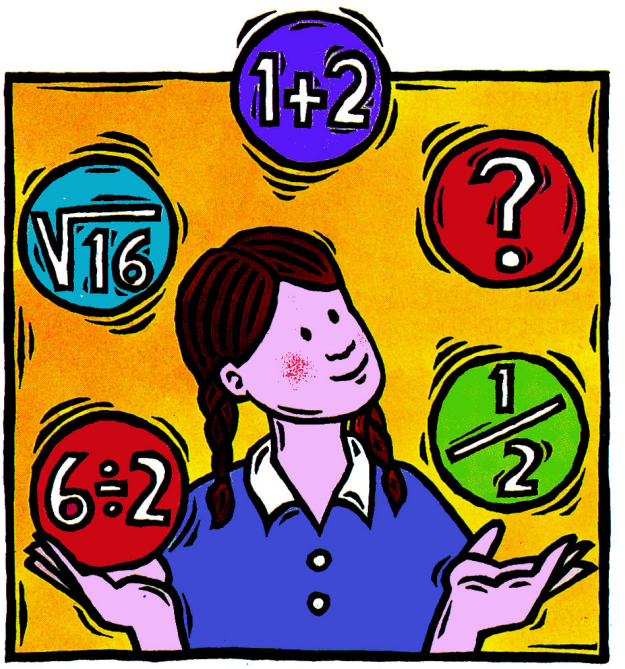
EDUCATION

MATHEMATICS

What's Happened To Math Literacy?



Can computers help resolve the crisis? From games to drill to thinking skills, Apple II software's in the forefront of a revolution in the way we teach math and the way kids learn.

By TAN SUMMERS

IN THIS AGE OF DRAMATIC technological advancement, something in U.S. math education just isn't adding up. We've produced a generation of young people who can't make change in the grocery store, figure a tip in a restaurant, cut a recipe in half, or compute their mileage.

Reports published earlier this year show that three out of four high-school graduates know too little math to deal successfully with the demands either of higher education or of the workplace. When their skills were compared with those of students in 17 other countries, American fifth-graders placed eighth, and ninth-graders tied for 14th place.

Fewer than half the American students in another study could solve two-step problems that were a breeze for 78 percent of Korean students who took the test; yet two-thirds of these same U.S. teenagers saw themselves as being good in math, while fewer than a fourth of their Korean counterparts did.

There's no single cure for America's math crisis. Educators agree that we must make radical changes, not only in the way we teach math, but in our attitudes toward it and the level of performance we expect from our children. Computers can play an important role in this process, notes Shirley Frye, president of the National Council for Teachers of Mathematics. For example, the computer can diagnose the shaky spots in a student's grasp of math and can tailor the content, length, or speed of practice to match those areas. It can give immediate feedback and increase the level of difficulty gradually. In well-equipped schools, a teacher can use computer-lab facilities to do something different with each child every day.

Not everyone finds computerized math instruction this beneficial. In his popular book *Innumeracy*, John Allen Paulos, a math professor at Temple University, complains that "programs...are too often transcriptions onto television monitors of unimaginative lists of routine exercises taken from the textbooks." He recommends that software provide instead an "integrated, coherent, and effective approach to arithmetic and its problem-solving applications." Edward G. Effros, a mathematics professor at the University of California at Berkeley, wrote in a letter to *The New York Times* earlier this year that computer programs "simply constitute a procedure for predigesting the material for students. . . . At best they transform the student into a spectator rather than a creator."

These criticisms are not entirely unfounded. Until recently many math-education programs were little more than electronic workbooks. Today, however, publishers are bringing new imagination and creativity to software. After discussing the problem of mathematics training with a number of educators, we assembled a five-point checklist of factors children need in order to develop solid mathematics

Illustration • Pat Morrison

ability. We then selected eight programs we believe can help your child become stronger in each category.

1. ESTABLISH BASIC SKILLS

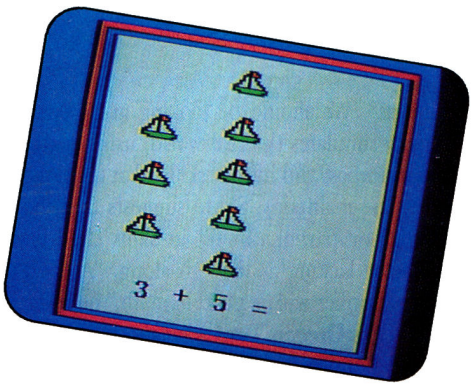
"Math is a learned behavior," says Tom Brodsky, a former high-school math teacher, now marketing director for Saxon Publishing Company. Saxon's mathematics textbooks provide continuous, rather than periodic, review of math facts and send standardized test scores soaring, so it's no surprise that Brodsky is in favor of repetition as a means of learning math. "Kids accumulate skills by doing the activity over and over as does a virtuoso athlete or artist," Brodsky explains. "Larry Bird does layups, Itzhak Perlman plays scales. Math students, too, have to automate their skills."

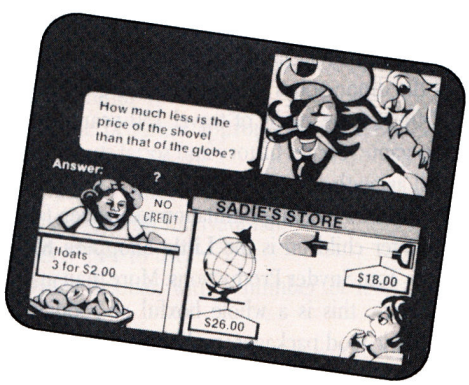
Brodsky pans traditional drill-and-practice software as boring. He recommends software that's interactive, programs that provide graphic demonstrations of the meaning of math.

One such successful program is Weekly Reader's **Stickybear Math**. Problems progress gradually and automatically from 1 + 1 to questions that require borrowing and carrying. At the easiest levels children can count butterflies and balls to help determine the right answer, then watch the balls roll and the butterflies flutter. Because the program checks frequently to see whether the child is ready for the next level, the mix of problems is pleasantly varied. An adult helper can set the program to begin at any level.

Stickybear rewards each correct answer with a puzzle piece. When the child has earned several, Stickybear puts them in place. When the puzzle's complete, animation follows: Stickybear crosses a bridge, a butterfly floats away. Although the math problems are just like the ones children see on flash cards, the element of suspense and the sense of progress the graphics screens bring keep kids playing long after flash cards would have been put away.

Drill-and-practice doesn't necessarily mean computerizing those flash cards, either. For example, **Jumping Math Flash** from Mindscape makes arithmetic practice an integral part of a fast-paced game. Math Flash, a tadpole, plays tag with fishy friends while jumping toward the number that answers a math problem at the bottom of the screen. There's no time to count on fingers, webbed or not. Children are so busy steering Math Flash away from fish in an effort to reach the right answer without being tagged that they hardly realize they're doing math.





Top, Weekly Reader's Stickybear Math presents flash cards with a twist: animation and an element of suspense.
Middle, MECC's Oregon Trail simulates the problems and perils pioneer families faced on their westward journey.
Bottom, DLM's Sailing Through Story Problems teaches math thinking skills—deciding what information you need, how to get it from a table or map, and how to label it.

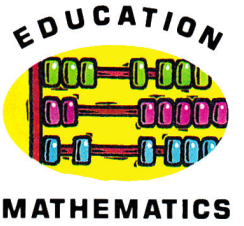
Players can choose between the addition/subtraction game and the multiplication game. Within each, problems progress in difficulty through 20-plus levels. Children move to the next level as soon as they get 90 percent of the answers before a fish gets them. Kids can also practice at a single level. The multiple-level, competitive game always starts at the easiest level (a drawback), but an adult helper can set the game speed.

2. BUILD PROBLEM-SOLVING SKILLS

Paulos points out in *Innumeracy* that children often don't know how to put their skills to work: "Understanding that if one drives 35 m.p.h. for four hours, one will have driven 140 miles...is, of course, not the same as simply knowing that 35 × 4 = 140." While software to make kids think used to be a rarity, we found three new programs that do just that.

It's yo-ho-ho and a bottle of pop when kids go **Sailing Through Story Problems** with DLM Teaching Resources. Players must decide what information they need to solve the game's nautical problems; often they must locate data in a map, table, or other graphics element. Extraneous facts in each problem preclude guessing. Once children have decided on an answer, they have to apply the correct label as well as provide the right numbers.

Sailing Through Story Problems is designed to teach problem solving, not arithmetic, so there's an optional on-screen calculator to help with computations. Twelve levels help children progress gradually from one- to two-step problems. The program decides when players are ready for the next level and makes sure students don't get the same problems repeatedly if they stay on one level for several rounds. An adult helper can determine the mastery level required to move to the next level. ►



Davidson's **Math Blaster Mystery** (this month's Editors' Choice) also tackles story problems and has a calculator, but it includes three other brain-stretching activities, as well. In "Weigh the Evidence" children move weights one at a time from one scale to another, ending with a specific total.

"Decipher the Code" combines arithmetic with logic as players try to guess a hidden formula; the computer records the results. Because the number of tries is limited, logic quickly replaces guessing as the *modus operandi*. "Search for Clues" gives players information about a mysterious number when they examine the furnishings of a Victorian room. Objects become animated before revealing mathematical clues to the number's identity.

Hints and clues are always available, and each game has four difficulty levels you can select from a drop-down menu. As with other Davidson games, Mystery lets adult helpers create their own files to personalize the game.

Only three of the 13 learning games in Mindscape's **Brainstorms** are math-oriented, but all stretch problem-solving skills. Each can be played alone or in competition with a friend. First, in "Roadmap" children have less than a minute to decide which numbered route will take them from Point A to Point F with an exact mileage total. It takes lightning-quick addition ability to test the possibilities and get the right answer before time runs out.

"Izzit" is almost the same guessing game as Math Blaster Mystery's "Search for Clues," but with less room for error. One wrong guess can be enough to lose the game. Kids will play again and again to prove one miss was an accident. "Solvit" keeps the rules of arithmetic fresh in children's minds as they insert parentheses and operands to create a logical formula. Kids practice basic facts as they work, too.

3. PREPARE FOR REAL-WORLD MATH

"Nobody in the real world says, 'Let's sit down and do 40 math problems,' " says Mark Share, program coordinator of curriculum for the Scottsdale, Arizona, Unified School District. "The power of the computer is in the application programs where the kids can harness that power and use it, not where the software is doing everything for them." The Scottsdale School District teaches AppleWorks to students beginning with the fourth grade and up.

Share also recommends simulations that combine math with social studies and other subjects. "We should be looking at how the activity simulates the real world, using math, social studies, and history skills all at the same time," he maintains. Share suggests that the teacher or parent can fill in skills children might be lacking as they go along. "A good logical thinker will be good in math," he adds.

MECC's **Oregon Trail** seems to be exactly the kind of program Share's talking about—a simulation of a 19th-century pioneer family's westward trek. Players choose an occupation and receive an appropriate amount of money. Bankers make the most and farmers the least, although farmers get more points if they survive the journey. They need to buy supplies, balancing available cash with possible dangers. The computer multiplies the amounts automatically, but children see the results and make the choices.

Estimation is an important part of this simulation. As players move westward, their progress is charted on a map. Players soon realize that food supplies are dwindling too quickly if half the food is gone before a quarter of the distance has been covered. A good depiction of the perils of travel 150 years ago, this game teaches history and social studies as well as math.

The most exciting simulation we've seen for younger children is the **Little Shoppers Kit** from Tom Snyder Productions. More than just software, this is a whole boxful of goodies. Realistic food packages, real brown bags, and a cash box with dividers to hold the authentic-looking cardboard money (even Susan B. Anthony dollars) bring this game to life.

The software lets eight children set up an entire grocery store. A manager marks off assignments as they're completed—stockers put food on shelves, baggers ready the counter for customers. The computer then becomes a cash register. As the cashier rings up purchases by entering one-letter codes, the prices register and total. When the shopper pays, a change-maker option helps children decide which coins to use. Although priced and planned for school use, this package is sure to inspire parents as well.

Neither Oregon Trail nor Little Shoppers involves practice with arithmetic. Neither does a real cash register, though. Creative adult helpers who want math practice as well as real-world applications will no doubt find many ways to make either of these programs serve a variety of purposes.

4. KEEP IT FUN

"When the fun and games run out, the software doesn't do the job," says Lynette Asay, an elementary-school mathematics teacher in Mackay, Idaho. Some programs that include excellent instruction may not hold children's interest long enough to be of help.

One program that's certainly an exception is Broderbund's **Geometry** (reviewed in July 1989, p. 80). Although it takes hard work to learn theorems and set up proofs, Geometry is so much fun to use that kids don't mind finishing their lessons. Instead of just explaining congruence, for example, Geometry demonstrates it with on-screen triangles kids can flip, move, and rotate. Students can stretch and squeeze prisms while watching the numbers representing perimeter and volume change. Hints and answers are available when students get stuck, although no further explanation is offered.

The program complements standard geometry texts. Theorems can be presented in either classic or simplified style, depending on the format used in class. Standard textbooks look dull indeed next to Geometry, though. When kids select a topic from Geometry's "Index," the program pops them directly into the page on which the topic is defined. A "Reference" option shows examples while they work. Students can select a lesson from the table of contents, or use the electronic bookmark to restart after a break. They can also review either the tutorial or the problems alone in a particular section instead of working through an entire lesson.

5. KEEP PARENTS INVOLVED

The positive involvement of parents, teachers, and other adult helpers is the real key to success with math, according to the educators we interviewed. "Most parents don't have the time to instruct their own children, but the most successful students are the ones whose parents are involved in their lives in and out of school," observes Brodsky. "We need to be dedicated to raising young children to have a value system believing that school is good." This is especially true where the computer is concerned. Adds Share, "You're wasting the kids' time if you're not involved with them."

PRODUCT INFORMATION

Brainstorms, $49.95
grades 4–7
Jumping Math Flash, $39.95
grades 1–4
3½-inch disk available
Mindscape Inc.
Educational Division
3444 Dundee Road
Northbrook, IL 60062
(312) 480-7667
(800) 221-9884
48K

Geometry
Broderbund Software
17 Paul Drive
San Rafael, CA 94903-2101
(415) 492-3200
(800) 521-6263
$79.95
512K GS, 3½-inch drive
high school–adult

Little Shoppers' Kit
Tom Snyder Productions
90 Sherman St.
Cambridge, MA 02140
(617) 876-4433
$109.95
64K
ages K–4

Math Blaster Mystery
Davidson and Associates
3135 Kashiwa St.
Torrance, CA 90505
(213) 534-4070
(800) 556-6141
$49.95
128K, 80-column card,
3½-inch drive
5¼-inch disk available
ages 10 and up

Oregon Trail
MECC
3490 Lexington Ave. North
Saint Paul, MN 55126
(612) 481-3500
(800) 228-3504
(800) 782-0032 (MN)
(800) 263-9677 (Canada)
$59 school
$39.95 home
64K
ages 5–adult

Sailing Through Story Problems
DLM Teaching Resources
One DLM Park
Allen, TX 75002
(214) 248-6300
$46
$115 lab pack
64K, 5¼-inch drive
grades 4–8

Stickybear Math
Weekly Reader Software/
Optimum Resource
10 Station Place
Norfolk, CT 06058
(203) 542-5553
(800) 327-1473
$39.95
48K
grades 1–4

The educators with whom we spoke also agreed that although software can supplement and reinforce the material the teacher has already presented, it may not be able to introduce new information adequately to every student. Our experience with Geometry confirms this. Although this excellent program presents information clearly and uses many examples, explanations are handled only one way. If the student doesn't understand the material the first time, the computer simply offers the same explanation again.

For the same reason, the computer may not be the best choice when children need remedial work. Students who aren't ready for abstract mathematical concepts, for example, may need to manipulate physical objects to understand the material being taught. Although graphics can simulate objects, the simulations remain intangible.

Despite these caveats, there is much that software can do to assist learning. To make it effective, choose carefully. Many factors combine to produce a mathematically literate child, and a variety of software types are needed to help facilitate the process for every child.

Software developers are aware of the need for better educational programs, so the products we've covered here are just the beginning. We've polled our experts for a list of suggestions to help you choose the best of the new software for your child:

- Is the program appropriate for the child's level of readiness?
- Does it reinforce material taught in class?
- Is it fun and motivational?
- Is it easy to use?
- Is it flexible, with a number of levels and options?
- Does it avoid the "electronic workbook" syndrome?
- Are the software's limitations clear?
- Will you be willing to use the program with your child?

Resolving America's math crisis is a job for everyone—textbook publishers, teachers, parents, students themselves. Apple computers plus creative software in school and at home add up to an important part of the solution. □

TAN SUMMERS IS A FREE-LANCE JOURNALIST COVERING THE APPLE II MARKET AND RELATED TOPICS. WRITE TO HER AT 4800 CARTHAGE STREET, METAIRIE, LA 70002. ENCLOSE A SELF-ADDRESSED, STAMPED ENVELOPE IF YOU'D LIKE A REPLY.

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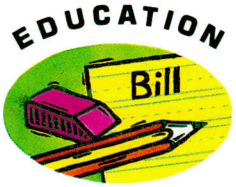
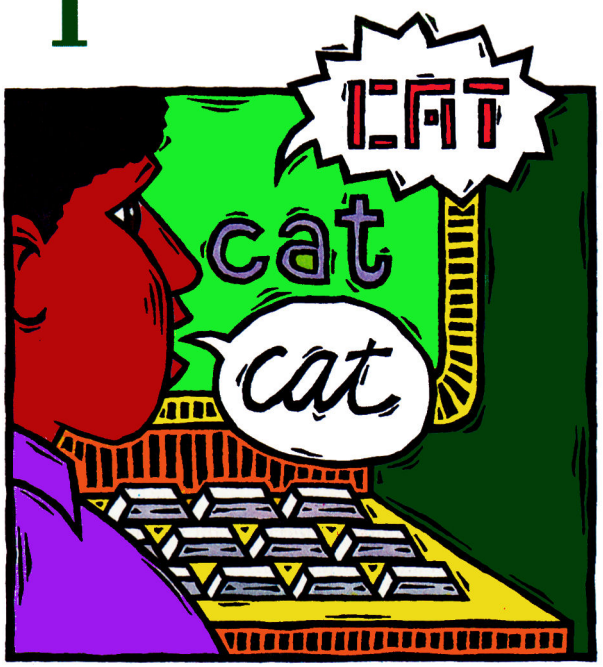


How Do You Spell That?



inCider examines three new Apple II programs representing the latest developments in skills research. Whether you favor drill, whole-language learning, or speech feedback, these products offer up-to-date approaches to improving your children's spelling.

By LESLIE EISER

HOW IMPORTANT IS CORRECT spelling? There's no question that spelling counts in books, magazines, memos, even in personal letters. A document filled with spelling errors looks sloppy and reflects badly on the author's credibility. After all, if the spelling isn't correct, what else might be at fault?

How should we go about teaching young people proper spelling? Children with good visual skills use conventional spellings almost naturally. With these students, simply going over the words a few times does the trick. For other children correct spelling seems an impossible goal. Despite constant reminders and long hours staring at lists of words, poor spelling habits plague them throughout their careers. They need a multi-pronged approach to spelling—one that teaches spelling strategies and uses each student's auditory and visual skills to the utmost.

Children start school with a huge spoken vocabulary. Memorizing the spelling of *every* word in that vocabulary is impossible—but there *is* something to be said for memorizing a broad base of fundamental words. The key to effective memorization is constant repetition. Historically kids were drilled on spelling by their parents at the breakfast table—but wouldn't it be better to take advantage of the computer's unending patience?

Many software publishers think so, and a wide variety of spelling packages are currently available. Let's focus on three of the newest: MECC's Spellevator, Scholastic's Talking Text Spelling, and The School Speller from Sunburst. Each takes a slightly different approach to instruction, but they all reflect some of the latest ideas on how to help children improve their spelling skills.

If you're concerned about the kinds of word clues used to teach spelling, **Spellevator** is an arcade-like drill-and-practice program that lets you customize the types of clues presented. If you're intrigued by speech technology and its application in educational software, check out **Talking Text Spelling**. This program attempts to teach spelling through the use of digitized speech. If whole-language learning is your interest, **The School Speller** is a spelling checker that creates personalized word lists for each user automatically. Deciding which program or combination of programs will be best for your children means understanding the differences among the programs and appreciating how these differences may affect kids' spelling.

SPELLEVATOR: CUSTOMIZED DRILL

An ideal drill-and-practice spelling program should offer a reasonable balance between practice and play, with enough recordkeeping to provide a purpose and to show progress. The best programs should also make the student *want* to practice.

Spellevator from MECC provides a partic-

Illustration • Pat Morrison

ularly appealing interface. The star of the program is Duster, a cute ball of dirt who roams the halls avoiding vacuum cleaners. He collects letters as he goes, letters the child must eventually unscramble to produce one of the spelling words on a list created by the teacher or parent. To move from floor to floor in the Speller Hotel, Duster must use the elevators, and inside each elevator is a spelling question to answer.

There's a list of Great Performers to provide a visible goal, and a lot of hidden recordkeeping as well. Spellevator neatly avoids spending more time playing than spelling by making the rules of the game simple, and rewarding the player with extra points if he or she gathers the letters quickly.

As we write, correct spellings should just flow, suggesting that the spelling of many words is kept in our long-term memory where they're available for immediate, automatic recall. One way to determine whether information has been stored in long-term memory is by interrupting the learning-and-testing process with an entertaining activity, then going back to testing the child's recall.

Spellevator uses this method extensively. The entertaining aspects of the scrambled-letter game ensure a sufficient time delay between tests of the same word. Continual score-keeping and the desire to make it onto the list of Great Performers act as goals to keep students practicing. Because the program offers no straightforward spelling test, however, the teacher or parent will have to confirm by oral quiz that the child is learning.

Reflecting much of the current thought on using drill and practice to teach spelling, Spellevator provides enough entertainment value to keep even the worst speller going. From "context sentences" and "definitions" to a timed word flash and a multiple-choice section, the variety of clue types dramatically improves the quality of the drill. Powerful management options, sophisticated record-keeping, and a stand-alone Spelling List Editor complete this excellent package.

As sold, Spellevator is a shell, and teachers or parents are expected to build individualized spelling lists themselves. To help out, MECC

Top, auditory learners benefit from phonic reinforcement of visual presentation in Scholastic's Talking Text Spelling. Middle, MECC's Spellevator alternates drill-and-practice with entertainment; a friendly interface keeps kids interested. Bottom, Sunburst's School Speller helps teachers create individualized word lists from students' own writing.

is currently developing a **Spelling Series Toolkit**. This collection of data disks will contain more than 6000 words, their definitions, and appropriate context sentences.

TALKING TEXT SPELLING: SPEAK UP

Recent research has shown that reading and writing, because they're auditory/visual skills, are enhanced by the addition of speech in classroom or home learning. The increasing availability of clear digitized speech on personal computers may have an enormous impact on future spelling programs, too, even though spelling is visual. For learners who are primarily auditory, this may be a critical improvement. (For a discussion of multiple-intelligence theory and styles of learning, see "Beyond IQ," Learning Curve, June 1989, p. 120.)

Of the three new programs discussed here, only Scholastic's Talking Text Spelling attempts to make use of speech to add phonic reinforcement to the visual presentation of words. It uses Street Electronics' **Echo IIb** board or the **Echo IIc** box for voice synthesis. Six data disks (available separately) contain digitized versions of hundreds of common words, organized by frequency of use and by grade level, and spoken in a remarkably clear female voice.

What if the word you want isn't on a data disk? You can create your own lists from scratch, but you'll be disappointed with the quality of the speech. Instead of a digitized female voice, your students will hear a robotic male voice that's not nearly as easy to understand.

With list-editing capabilities, detailed record-keeping, and practice and test modes, Talking Text Spelling clearly takes a traditional approach to spelling instruction (despite sporting the latest in speech-synthesis technology). In practice mode, the program pronounces the target word, spells it, and uses it in a sentence before asking the child to type in the word. Once the student has typed the entire list correctly, practice is finished.

Moving on to the testing section, the program pronounces the target word and uses it in a sentence. The student then types in the word and presses Return. This routine is ►

repeated until every word has been tested. After encouraging the student to correct any words that look wrong, the computer begins its own check. A handy print option provides the student with a copy of the word list to take home for further practice.

Despite a noticeable lack of structured repetition, Talking Text Spelling is an interesting example of what software developers can do with today's speech technology.

THE SCHOOL SPELLER: HIT LISTS

Of increasing importance to many parents and professional educators is the source of the spelling words used in schools. Standardized texts, called *basel readers*, and their accompanying spelling lists have long been considered the fundamental source of spelling words for young children. Whole-language-learning enthusiasts, who encourage writing as an offshoot of individual student interests, like the idea of creating spelling lists from student writing rather than from standard lists. They see spelling tests that don't take personal interests and goals into account as counterproductive. But developing these personalized lists has always been both time-consuming and difficult for teachers who are already swamped by their other responsibilities.

The School Speller from Sunburst is a spelling checker designed to complement the educational word processor **Magic Slate II** and to respond to the needs of teachers working in a whole-language environment. It does so by making it easy to develop spelling lists based exclusively on a child's own writing. As the student uses The School Speller to check his or her work, corrected words are stored on the data disk for later use. Once accumulated, these individualized spelling lists contain the original word, the replacement word, and the total number of times the word was corrected.

Using the toolkit supplied with The School Speller, the student can print a list for further study, or for review by the teacher. Teachers can use word lists created this way as a basis for further individualized spelling efforts, as a source of additional words to be discussed in class as a whole, or even as a focus for future writing. Utilities available separately on **The School Speller Manager** let you combine files and create "hit lists" of spelling words based on the writings of an entire class.

MAKING THE RIGHT CHOICE

Remember that it's the way you use the computer that makes all the difference. If one of these programs becomes an additional facet in a well-rounded approach to spelling instruction, it can't help but be an effective tool. An entertaining interface guarantees a more enthusiastic student, and the willingness to repeat a lesson over and over is hard to find in a human tutor. Once spelling lists have been designed for each child, either from standard lists or from student writing, the computer can even supervise practice time.

Whether you're a teacher thinking about adding a computerized component to your spelling curriculum or a parent searching for help for a child who seems unable to remember how to spell even simple words, spelling programs can lend a hand. As the child's skill develops, the improvement in his or her self-esteem is extraordinary. And if you're a parent, don't be put off by the school bias of these programs. Teaching happens at home, too!□

LESLIE EISER IS A LECTURER AT MCGILL UNIVERSITY AND A CONSULTANT IN EDUCATIONAL COMPUTING. WRITE TO HER C/O *INCIDER*, 80 ELM STREET, PETERBOROUGH, NH 03458

PRODUCT INFORMATION

Echo IIb, $129.95
Echo IIc, $149.95
Echo Headphones, $19.95
Street Electronics
6420 Via Real
Carpinteria, CA 93013
(805) 684-4593

Magic Slate II, $65
40- or 80-column version
The School Speller, $75
40- or 80-column version
The School Speller Manager, $65
Sunburst Communications
39 Washington Ave.
Pleasantville, NY 10570-2898
(800) 431-1934
(800) 247-6756 (Canada)
(914) 769-5030 (collect)

Spellevator, $59 school
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Spelling Series Toolkit, price undetermined at press time
MECC
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St. Paul, MN 55126
(800) 228-3504
(800) 782-0032 (MN)
(612) 481-3500

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Jefferson City, MO 65102
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(800) 392-2179 (MO)

Games Spellers Play

Spelling is often taught using a variety of game formats as clues. Depending on the specific skill you're trying to tap, different games offer different advantages and drawbacks.

The use of context clues as pictures, in sentence form, or as definitions is considered to be one of the ideal ways of teaching or testing spelling. This method forces the student to think of the word and to recall it in a way similar to that used when actually writing. When incorporated into a drill-and-practice sequence, not only is the correct spelling of the word stressed, but the connection between meaning and spelling is reinforced. *Talking Text Spelling* provides context clues by reciting a sentence containing the spelling word.

***Spellevator* provides visual context clues, including simple definitions and sentences with the target word replaced by a blank, in addition to a number of other game options. The old game of Hangman, for instance, teaches spelling through pattern analysis, and in *Spellevator*, Hangman-like clues provide hints when the student asks for help.**

Scrambled-letter clues and misspellings as options in multiple-choice answers have been used to evaluate spelling skills for a long time. Currently, the use of misspellings in multiple-choice questions is the focus of considerable debate, because students may spend time concentrating on incorrect spellings, rather than on the correct visual representation of the word. Some of the newest research shows that the more students are exposed to misspellings, the more likely they are to use them. Although one of the clue types in *Spellevator* uses this format, management options permit turning it off.□ —L.E.

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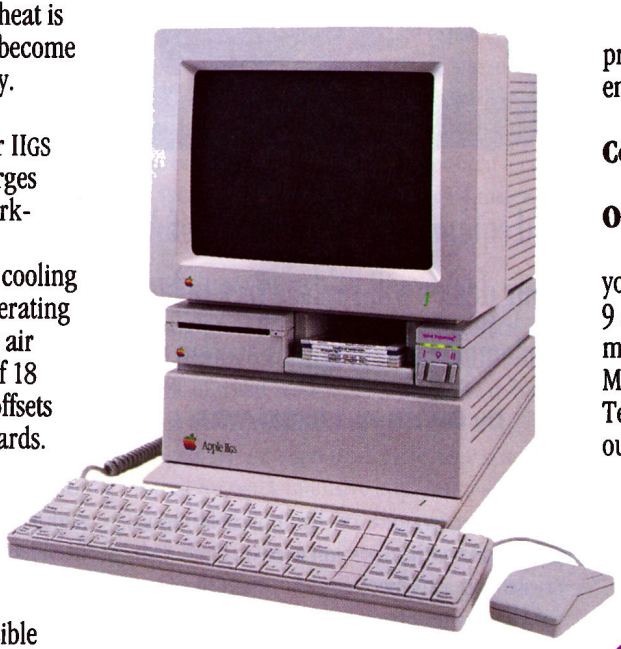

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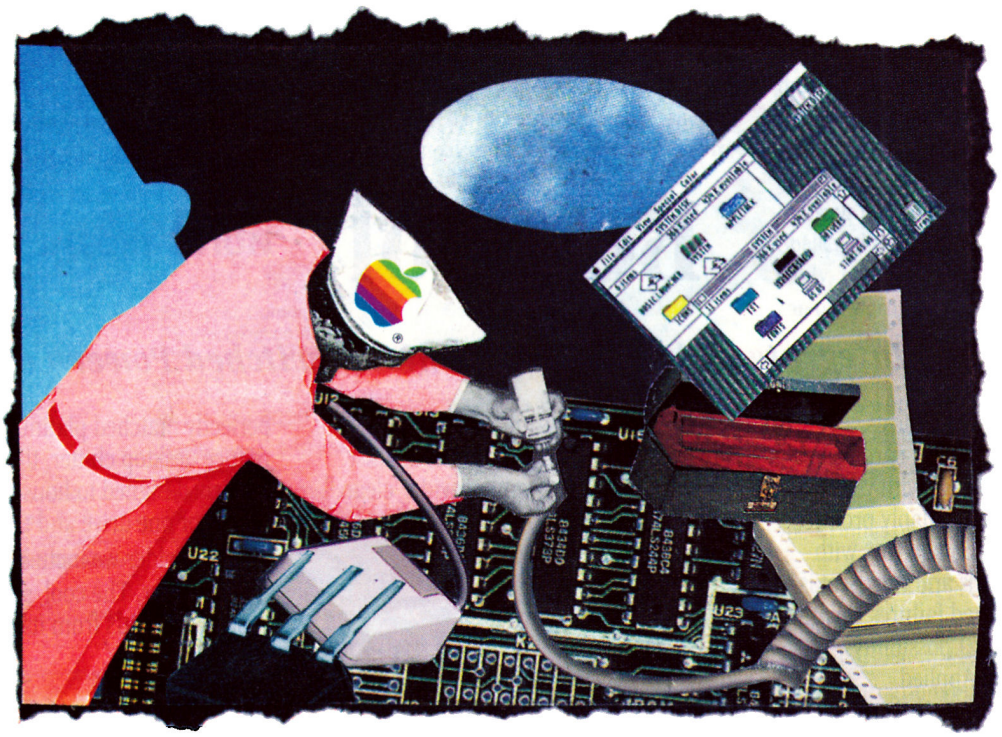


For the latest parts and equipment, check our list of Apple upgrades—ten chips and boards your dealer will replace free to keep your machine's drives, interfaces, memory, and graphics system running smoothly.

By OWEN W. LINZMAYER

LIKE DETROIT, APPLE Computer recalls some of its products to fix bugs, ensure compatibility, and add new features. Every Apple II owner should be aware of the generous free-update program Apple offers and shouldn't hesitate to take advantage of it. It's one of the benefits to which you're entitled after paying a premium for a product with the rainbow logo.

All updates listed on these pages should be provided at no charge by any authorized Apple dealer. But before you lug your system down to his or her doorstep, call ahead to make sure your dealer is aware of the applicable service policy and has the parts you need on hand. Otherwise you may be charged unnecessarily or your computer may just sit in the shop for days as you wait for parts to arrive.

For the location of the Apple dealer nearest you, call (800) 538-9696. If your dealer pleads ignorance of a specific update program, refer him or her to the "Product Notice" section of the *Service Program Manual*, or tell your dealer to use AppleLink/Industrial Edition to contact Apple Technical Support. If that fails, call the people at Apple Customer Relations at (408) 252-2775 and let them know about the difficulty you've been having with your dealer.

APPLE 3.5 DRIVE

Many Apple IIGS owners with both 3½- and 5¼-inch disk drives are plagued by a problem known as *phantom access*: Drives that turn on inexplicably and keep spinning until you press Control-Reset. Once they've stopped, you can't access any Apple 3.5 drives connected to the SmartPort daisychain until you turn off your computer and reboot. The drive, system, and software suffer no damage ordinarily.

Illustration • Jamie Hogan

Apple has diagnosed the problem and blames the daisychain interface board inside the Apple 3.5 drive. (UniDisk 3.5 drives don't have this problem.) Dealers will fix afflicted drives without charge. The solution is to update to a revision B interface (identified by the part number CDX1085B on the gate-array component on the underside of the board). Drives with serial numbers preceding Y7A0058 have revision A daisychain boards. All drives with a 6 as the second digit of their serial numbers and all drives with a 7 as the second digit and a number 1 through 9 as the third digit have a revision A board.

APPLE PROFILE

If you want to use your Apple ProFile hard-disk drive under GS/OS, the interface card needs a new ROM (read-only memory) chip. For the free ROM, ask your dealer for part number 341-0299, revision B.

APPLE DUODISK DRIVE

There's a faulty component inside Apple DuoDisk drives that can harm some copy-protected software irreparably. These drives have been known to damage disks (programs from Software Publishing and Electronics Arts in particular) when you reboot by pressing Control-Open apple-Reset. This problem seems to be triggered at random by certain copy-protection schemes, so a working disk may simply "die" after 30 boots, for example.

Have your dealer check the part number on the analog board. Boards with part number 676-X101 or 676-X102 are suspect. The fix involves clipping two capacitors off the board, an operation that should not affect the use of any other application programs.

APPLE II SCSI CARD

If you want to use the AppleCD SC CD-ROM drive or any SCSI (small-computer-systems interface) hard-disk drive under GS/OS, you must have the revision C EPROM (erasable, programmable, read-only memory) installed on your Apple II SCSI card. Look at the large 28-pin socketed chip on the card. If its label reads 341-0437A, you already have the necessary chip. Otherwise, see your dealer for a free upgrade.

APPLE IIE LOGIC BOARD

If you have an early Apple IIe system, you may have a revision A logic board. You must upgrade to a revision B board if you want to take advantage of double-hi-res graphics or use a slot 7 card requiring "color ref" and synchronization signals. Also, if you want to get the 65C02 microprocessor and add MouseText capability to your computer with the Apple IIe Enhancement Kit (a $70 option), you must have a revision B logic board (free).

APPLE IIC TERMINAL MODE

Some software applications that enable terminal mode in the serial-port firmware on the Apple IIc (not the IIc Plus) may experience problems. The most common symptom is garbage on screen when you try to use terminal mode through the serial port. A new ROM that corrects this problem is identified by the label "Revision B" stamped on the chip. Your dealer should exchange older ROMs free if you can show proof of purchase for a modem or demonstrate the problem.

APPLE IIC SERIAL PORT

A timing variation of the serial ports on the original Apple IIc logic board causes communication problems with some serial devices. Non-Apple modems exhibit this glitch most frequently, but it can occur on any type of serial device, including printers.

Your logic board should be replaced free if you show proof of purchase for a non-Apple modem, or can duplicate the problem with another serial device. The serial-port revision can be identified by a silver component located at location UC7 on the logic board instead of a black LS161 integrated circuit.

APPLE IIGS MEMORY EXPANSION CARD

Apple GS RAM boards manufactured during the last two weeks of 1987 and the first week of 1988 were built with NEC dynamic random-access memory (DRAM) chips employing the wrong refresh cycle. One symptom is that memory-intensive applications, such as AppleWorks, crash into the system monitor, then display an error code on screen.

For the card to function properly, column address selection must precede row address selection in the refresh cycle. In other words, the chips must be "CAS before RAS." Some of the memory chips soldered into locations UA1 through UA8 may not satisfy this requirement and can be identified by one of two codes on the chip: "UK" stamped beneath the NEC name, or "Japan" stamped beneath the NEC name with the letter P as the first letter in the date code. If any chip soldered on the card has one of these markings, the entire board should be replaced at no charge.

Some of the Apple II 256K Memory Expansion Kits used with the IIGS Memory Expansion Card are also affected by chips that aren't "CAS before RAS." Dealers will replace at no cost only affected chips you purchased as part of the Apple kit. You can identify a faulty chip by the letter A marked on its lower-left corner. If you purchased generic chips from a third-party supplier, contact that company regarding exchange for the "CAS before RAS" chips the GS needs.

GS VIDEO GRAPHICS CONTROLLER

The VGC chip is responsible for generating the video your Apple IIGS can display, which includes all IIe/IIc graphics and text modes and GS-specific super-hi-res graphics. Early GSes have VGCs that cause annoying fringing effects in text and double-hi-res graphics. You can fix the problem with new chips. If the first three numeric characters of the serial number on the bottom of your GS are 703 or lower, the computer needs the new VGC.

APPLE IIGS ROM

There's also a new system ROM available that corrects several minor bugs in the monitor and the toolsets. It doesn't include any additional tools, however. Its modest new features include a system-monitor command (#) for installing two CDAs (classic desk accessories) called Visit Monitor (for entering monitor mode) and Memory Peeker (for inspecting blocks allocated by the memory manager); a Monitor command (Control-N) for putting the 65816 microprocessor into full 16-bit native mode; and an extension of the maximum RAM-disk size option in the Control Panel to 8128K, up from a previous limit of 4096K.

There are two ways to tell whether your GS needs the new ROM. If the words *ROM Version 01* don't appear at the bottom of the screen when you boot the computer, or if the first three numeric characters of the serial number on the bottom of your GS are 724 or lower, you should update to the new ROM.□

OWEN LINZMAYER IS AN ASSOCIATE EDITOR OF *MACUSER*. HE WOULD LIKE TO THANK APPLE COMPUTER EMPLOYEES RENEE MENSOR, SERVICE PRODUCT MANAGER, AND JEANNE TOULOUSE, SERVICE PLANNING, FOR HELP IN PREPARING THIS ARTICLE. WRITE TO OWEN LINZMAYER C/O *INCIDER*, 80 ELM STREET, PETERBOROUGH, NH 03458.

The SOFTWARE'S

Does mail-order shopping deliver the goods? Are the convenience and savings worth the risk of damaged or inferior merchandise?

By CYNTHIA E. FIELD, Ph.D.

HEAVEN HELP THE Keatons, of TV's *Family Ties*, when daughter Mallory finally discovers long-distance "power" shopping! But caricatured as she may be in some respects, Mallory isn't so odd. In fact, according to the Direct Marketing Association, in 1987 alone nearly 88 million American adults shopped by mail. For growing numbers of consumers—including the harried, the housebound, and the handicapped—ordering products or services by mail, phone, modem, or fax is becoming a favorite way to shop.

Apple II users, it seems, are quickly latching onto the trend. Whether it's hardware, software, supplies, or accessories you need, buying them through mail-order catalogues, magazine advertisements, or direct-mail solicitations can save you time and money. Why fight traffic when you can simply pick up the phone and dial—sometimes 24 hours a day and often toll-free?

But there *are* potential risks involved in buying Apple II equipment and software sight unseen. Is mail-order shopping too good to be true? Let's take a look at the hazards and benefits of long-distance purchase and develop a plan of action for prospective customers.

If product variety is the spice of the computer lover's life, a veritable feast awaits the Apple II mail-order shopper. Browse through a handful of computer-supply catalogues, or a single issue of *inCider*, and you'll encounter more products than you're likely to find in the average computer retail store.

Suit yourself—pay for your purchases by check, money order, or credit card. If you prefer not to prepay, select a company that will ship products C.O.D. Choose the delivery method that's convenient for you. If you need a product fast, a courier service can deliver it overnight. (For basic training for long-distance shopping, see the accompanying sidebar, "Ten Tips for Shopping at Home.")

One commodity mail-order firms *don't* offer

Illustration • Michael Klein

in the MAIL

If you're in the market for Apple II equipment and software, some sound advice from *inCider* beats a roll of the dice.

is expensive retail floor space. Yet a series of well-targeted ads can reach hundreds of thousands of prospective customers. This combination of relatively low overhead and potentially high volume means that mail-order companies can offer discounted prices foreign to most retail stores.

Moreover, mail-order companies (as of this writing) aren't required to collect sales tax from out-of-staters (although at the behest of the nation's governors Congress may soon eliminate that advantage). If you live in Massachusetts, for instance, you can save that 5 percent by buying from a mail-order company operating outside your state.

Retailers often argue that shopping at home deprives you of interacting with knowledgeable salespeople. Not so. Growing numbers of mail-order firms employ trained customer-service representatives or technical-support personnel who can answer your questions.

Despite the many benefits of shopping at home, disappointments do arise. Sometimes products aren't delivered on time; they may not be delivered at all (although that's rare). The merchandise may not meet your expectations. But you can avoid many of these shop- ►

Ten Tips for Shopping at Home

1. Know what you want. Talk with other Apple II users and read published reviews. Bulletin-board systems (BBSes) and online information services are good resources for getting the scoop on Apple II products. Don't wait until a software package arrives in your mailbox to find out that it lacks features that are important to you.

2. Don't procrastinate. According to Federal Trade Commission (FTC) regulations, a mail-order company has 30 days (more if specified in an ad) to ship products to you. If you plan to give your niece the latest super-hi-res graphics adventure for her birthday, don't wait until the last minute to order the game. Note that the FTC's 30-day rule doesn't cover orders you place by phone unless you send payment by mail.

3. Shop around. When you decide on a product, compare prices among several mail-order firms. You may be surprised how prices vary, especially on expensive hardware items such as memory boards and hard-disk drives. When figuring the final cost, be sure to tally shipping and handling charges, sales tax, and surcharges (if any) for using credit cards.

4. Narrow the search. Call targeted companies and ask them specific questions. Find out whether the product is in stock and when it will be shipped. Ask about restocking charges if they're not specified in the ad.

5. Be precise. Even if you're ordering by phone, fill out an order form legibly and completely; you want to keep a written record. Check your math. If you're buying by phone, ask the order taker to repeat the information back to you if he or she doesn't do so as standard practice. If you're buying by mail, keep a duplicate of your completed order.

6. Use credit to advantage. Paying by credit card offers a host of benefits. Many mail-order companies won't charge your card until they actually ship merchandise. And shipment is often more timely on credit-card orders because the company doesn't have to wait for your check to clear. In certain circumstances, the bank that issued your credit card can help you solve any disputes. Still, be prudent when it comes to giving out your credit-card number, especially in response to unsolicited phone calls from telemarketing firms. Instead of ordering on the spot, ask the company to send you a copy of its catalogue.

Continued

at-home pitfalls by using common sense before, during, and after you place your order.

First, become more educated about shopping at home *before* signing your check or giving out your credit-card number. Free booklets abound, including *Guidelines for Telephone Shopping* and *Shopping at Home* from the Direct Marketing Association (6 East 43rd Street, New York, NY 10017, 212-689-4977) and *Shopping by Mail* from the Federal Trade Commission (Division of Enforcement, Washington, DC 20580, 202-326-3768).

Second, contact the Better Business Bureau. According to Jackie Corea, Rhode Island operations manager, your local Better Business Bureau may not have information on an out-of-state company, but it can refer you to the bureau that does.

Ordering merchandise from an *inCider* advertiser? Call Marketing Assistant Rita Rivard at (800) 441-4403 to learn if there have been complaints about a particular company. "Most of our advertisers," Rivard reports, "have been around awhile and are reputable."

As a final tactic, call the company itself. Inquire about merchandise availability and fees incurred should you return an item. As Rivard cautions, "Many companies have restocking fees, and they can be as much as 20 percent."

It's almost inevitable that sooner or later you'll encounter a problem with merchandise you order by mail or by phone. Sometimes the difficulty can be traced to unforseeable circumstances. Sometimes human error is at fault. Let the company know about your problem right away. Most firms want to settle disputes amicably. After all, satisfied customers are crucial to a business' survival.

The rare company that balks may need persuading by the Better Business Bureau or the Direct Marketing Association's Mail Order Action Line. Document your complaint in writing, and watch these advocates go to work.

Should intermediaries fail, and depending on the nature of the dispute, you can ask for assistance from various governmental agencies, including your local postmaster, your state attorney general's consumer-protection division, and the Federal Trade Commission.

Knowing where to turn if problems arise should help eliminate any vestiges of shop-at-home phobia you may have. For millions of Americans the benefits of long-distance shopping far outweigh the risks. It's just a matter of time before Mallory Keaton catches on! □

CYNTHIA FIELD IS A CONTRIBUTING EDITOR AND COLUMNIST. WRITE TO HER AT 60 BORDER DRIVE, WAKEFIELD, RI 02879. ENCLOSE A SELF-ADDRESSED, STAMPED ENVELOPE IF YOU'D LIKE A PERSONAL REPLY.

Ten Tips (continued)

7. Stay organized. Keep all outstanding purchase orders in a special place and check them periodically to ascertain that products you've ordered are arriving in a timely fashion. FTC rules for orders placed by mail require companies to send notices of delays and spell out your options. Cash refunds must be made within seven days; credit-card refunds, within one billing cycle. You can agree to a known or indefinite delay, but even so, you can still cancel your order and request a refund at any time before shipment.

8. Inspect all orders. When your order arrives, check its contents immediately for damage. Be sure everything listed on the packing slip is actually contained in the shipment. Ideally, companies will not charge your credit card for back-ordered items until those items are actually shipped. The best companies waive shipping/handling fees on items they've back-ordered, so you pay only one delivery charge. Save all packaging materials, just in case you have to return merchandise.

9. Handle problems immediately. Compare your original purchase order with the packing slip. If there are any unexplained discrepancies, call the company right away. Then follow up the phone call with a letter. Keep a copy of all correspondence. If the company seems unwilling to answer your complaint, ask other agencies (see the accompanying article) to assist you in resolving the dispute.

10. Keep a list. Compile a mental or written list of those companies with whom you've dealt successfully in the past. They've worked hard to earn your trust, and they deserve your future business and your recommendation. □

—C.F.

The Menu Software Guide

Most mail-order firms don't carry every Apple title available. Where can you find a complete list of packages? *The Menu Software Guide for Apple II Computers* (The Menu Company, P.O. Box MENU, Pittsburgh, PA 15241, 412-746-6368, 866 pages, $19.95; available in bookstores and computer stores or order directly) is probably the best reference you could ask for.

***The Menu Software Guide* is a catalogue of more than 11,600 titles for Apple IIs. It contains a number of sections that help readers find programs quickly and easily. First is a "Subject Category Index," which divides the various programs into groups based on purpose, such as entertainment, education, even industries.**

Each category is then further subdivided. For instance, under the Education heading, you'll find all available French programs together, all the math, and so on. Each individual listing includes product name, retail price, ISPN number, publisher name, compatible systems, memory requirements, disk sizes available, brief description, and additional requirements.

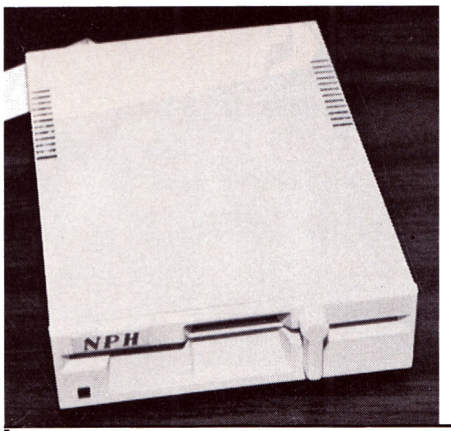
Following the "Subject Category Index" is the "Product Index," a list of all programs alphabetically by name. If you know the title of a package, you can quickly find the page containing its supplementary information.

Next is a "Vendor Index," listing names of publishers in alphabetical order, plus a rundown of the pages containing their products' descriptions. Following the index is a "Vendor Directory" with company names, addresses, and telephone numbers.

And here's another bonus: If you need more information on a particular program, you can call The Menu Company and request a *SoftReport* ($3.50 each), a detailed printed description of the software in question.

***The Menu Software Guide* is a must for any Apple II user. It's an outstanding reference, and it's updated yearly. Pick up a copy soon and find that program you've been searching for.** □

—Tim Moore



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SALESMANSHIP

AppleWorks' spreadsheet lets you analyze the performance of your sales force and evaluate long-term market trends for maximum profitability.

By RUTH K. WITKIN

YOU MAY BE GETTING LESS FOR YOUR selling dollar than you think, simply because you need more facts about your sales force. For example, how much does each salesperson really cost for each dollar of volume? Why are sales in some territories so expensive to get? How do sales fluctuate from month to month or season to season?

The spreadsheet in **Figure 1** can help answer these questions. Assume you manage a five-person sales force. When you enter the number of customers in each territory, customer calls during the month, number and dollar amount of orders produced, and salary and expenses for each salesperson, the formulas calculate the following:

- calls-per-customer ratio (calls per month as a percentage of total number of customers)
- orders-per-call ratio (orders per month as a percentage of number of calls)
- cost-per-sale ratio (cost of sales as a percentage of sales generated)
- average order, commission, and total cost per salesperson in terms of salary, commission, and expenses
- total number of customers, calls, orders, sales, and costs for the entire sales force
- monthly averages of customers, calls, orders, sales, order amounts, salaries, commissions, expenses, total salesperson costs, and all ratios
- month-by-month and year-to-date sales and salesperson costs

Analyzing one salesperson's performance over another's, as well as trends over time, can uncover the need to consolidate or eliminate territories, reassign salespeople, reduce travel or entertainment expenses, or limit calls to low-volume, low-potential accounts.

One of the stars of this spreadsheet is an IF formula that either copies sales and costs for the month or retains the amount currently in the formula cell, depending on the month number (1 for January, 2 for February, and so on to 12 for December).

Now load the AppleWorks program, and create a new spreadsheet file named **SALES FORCE**. Use the following summary to start the spreadsheet:

Long lines. Enter a double line across row 2 in columns A through F: Place the cursor on A2 and type quotation marks. Hold down the equal-sign key until the sign reaches the right edge of F2, and hit Return. Leave the cursor on A2, and copy the row to the clipboard: Press OA-C to start the Copy command. Type **T** to select *To clipboard* and press Return.

Now copy the row from the clipboard: Place the cursor on A5. Press OA-C and type **F** to select *From clipboard*. Now place the cursor on A23. Again, press OA-C and type **F**. And, finally, place the cursor on A40, press OA-C, and type **F**. In the same way, enter a single line across row 7, and copy the row to the clipboard. Then, with the cursor on A25, copy that line from the clipboard.

Column width. Use the Layout command (OA-L) to increase column A from nine to 24 characters, and columns B through F from nine to ten characters each.

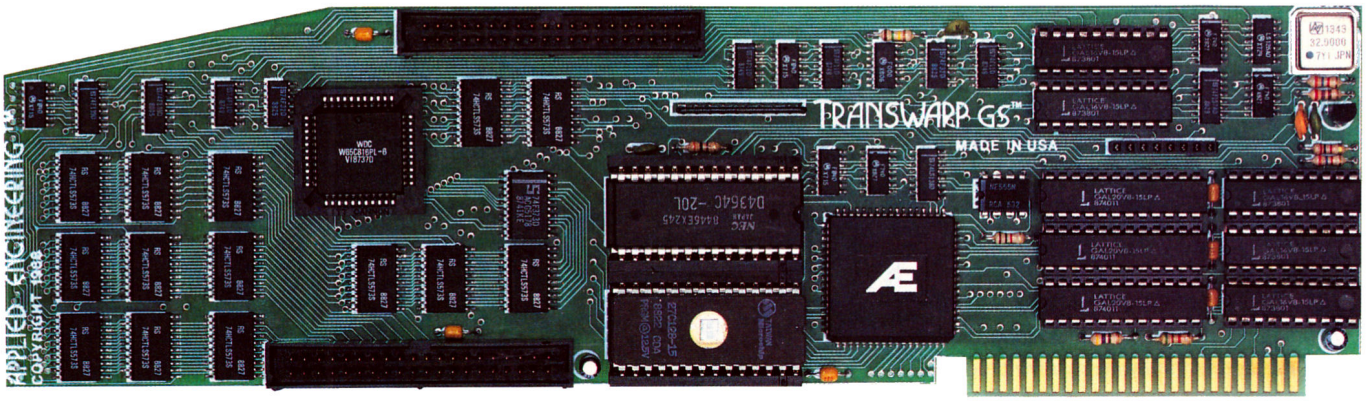
Short lines. Enter short lines in E38 and F38: With the cursor on E38, type quotation marks, and press the spacebar once. Type nine minus signs and move the cursor to F38. Type quotes again, press the spacebar, type nine minus signs, and hit Return.

Labels. Referring to **Figure 2**, enter *only* the labels in row 1 through 24 and in column D, rows 25 through 39. (Yes, you can substitute your own names for those shown in row 6.) To indent the label in A10, A15, and A21, type quotation marks, and press the spacebar once before typing.

The labels in column A in rows 8 through 21 are the same as those in rows 26 through 39. Copying will save you keystrokes: With the cursor on A8, press OA-C, and hit Return. Move the cursor to A21 and hit Return again. Now move the cursor to A26 and hit Return.

Formats. Use the Value command (OA-V) to set a standard *Value format* of *Commas* with zero decimal places and a standard *Label format* of *Right justify*. Use the Layout command (OA-L) to reformat the following value cells for *Percent* with one decimal place: B10 through F10, B15 through F15, and B21 through F21. Ignore for now the percentage cells below row 27 in column C. Use OA-L to left-justify the label cells from A6 through A39. Press OA-S to store your work on disk.

Formulas perform your calculations. First read how the formula works, then place the cursor on the cell receiving the formula. Move the cursor to the cell locations shown in the formula, and type everything else. When the formula is complete, compare each character on your screen with the way it appears here. If everything agrees, press Return. If something's amiss, press Escape and start again. ►



Fan mail GS

"TransWarp GS has performed flawlessly ... I've become addicted to computing at warp speed ... once you get a taste, you'll wonder how you ever got anything accomplished with your IIGS lumbering along at an unaccelerated pace ... it's an improvement you're going to appreciate every time you place your fingers on the keyboard."

— Owen Linzmayer, Technical Editor, A+

"I'm stunned ... bordering on speechless. I used to dread waiting and waiting to run GS/OS. I don't anymore. TransWarp GS breathes new life into my computer. Thanks AE, you guys are in a class by yourselves."

— Joe Kohn, The Source

"Once I started using the original TransWarp in my old IIe, I found I couldn't do without it, TransWarp GS promises to be equally indispensable."

— Lafe Low, Review Editor, Incider

"This is the card you want. Sell whatever secondary peripherals you must in order to get a TransWarp GS plugged in."

— Joe Abernathy, Houston, TX

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— George Dombrowski, Jr., Chicago, IL

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— Greg Dacosta, GEnie

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FORMULA 1: CALLS PER CUSTOMER

Formula 1 divides the number of calls (B9) by the number of customers in the salesperson's territory (B8) to produce the calls-per-customer ratio in B10.

Cell location: B10

Formula: +B9/B8

Formula 1 has no numbers to work with, so *ERROR* appears. Error will remain in this and other formula cells until you enter the practice numbers later on.

You'll soon be copying Formula 1 to other cells. Protect it now against any change, and AppleWorks will copy the protections also. Press OA-L and hit Return. Type **PN** (for *Protection Nothing*).

FORMULA 2: AVERAGE ORDER

Formula 2 divides the sales (B13) by the number of orders (B12) to produce the size of the average order in B14.

Cell location: B14

Formula: +B13/B12

Protect Formula 2 (and all other formulas immediately after creating them) the same way you protected Formula 1.

FORMULA 3: ORDERS PER CALL

Formula 3 divides the number of orders (B12) by the number of calls (B9) to produce the orders-per-call ratio in B15.

Cell location: B15

Formula: +B12/B9

Figure 1. Spreadsheet analyzes sales productivity.

	A	B	C	D	E	F
1		SALES FORCE ANALYSIS				
2						
3	ENTER NEW MONTH/YEAR HERE------>	JANUARY 1990				
4	ENTER NEW MONTH NUMBER HERE---->	1				
5						
6	SALESPERSON	THOMPSON	GOLDEN	VAGLICA	MEROW	SOONG
7						
8	CUSTOMERS	256	175	320	125	375
9	CALLS	75	62	83	51	81
10	CALLS/CUSTOMERS RATIO	29.3% [1]	35.4%	25.9%	40.8%	21.6%
11						
12	ORDERS	35	17	42	11	38
13	SALES	25,565	30,100	45,600	15,500	42,300
14	AVERAGE ORDER	730 [2]	1,771	1,086	1,409	1,113
15	ORDERS/CALLS RATIO	46.7% [3]	27.4%	50.6%	21.6%	46.9%
16						
17	SALARY	2,400	1,800	2,700	1,650	2,850
18	COMMISSION	0 [4]	5	780	0	615
19	EXPENSES	1,750	1,850	2,200	1,250	2,450
20	SALESPERSON COST	4,150 [5]	3,655	5,680	2,900	5,915
21	COST/SALES RATIO	16.2% [6]	12.1%	12.5%	18.7%	14.0%
22						
23						
24	MONTHLY SUMMARY	TOTAL	AVERAGE	YTD	SALES	COST
25						
26	CUSTOMERS	1,251 [7]	250 [8]	JAN	159,065 [9]	22,300 [10]
27	CALLS	352	70	FEB	0	0
28	CALLS/CUSTOMERS RATIO		30.6%	MAR	0	0
29				APR	0	0
30	ORDERS	143	29	MAY	0	0
31	SALES	159,065	31,813	JUN	0	0
32	AVERAGE ORDER		1,222	JUL	0	0
33	ORDERS/CALLS RATIO		38.6%	AUG	0	0
34				SEP	0	0
35	SALARY	11,400	2,280	OCT	0	0
36	COMMISSION	1,400	280	NOV	0	0
37	EXPENSES	9,500	1,900	DEC	0	0
38	SALESPERSON COST	22,300	4,460		---------	---------
39	COST/SALES RATIO		14.7%	TOTAL	159,065 [11]	22,300
40						
41						

FORMULA 4: SALES COMMISSION

Formula 4 produces one of two possible answers—a 5 percent commission on sales over $30,000 or no commission.

The Test statement looks at sales in B13. If sales are greater than 30000, the Then statement calculates 5 percent of sales minus 30000. If, on the other hand, sales are equal to or less than 30000, the Else statement enters a zero instead.

Cell location: B18

Formula: @IF(B13>30000,.05
*(B13−30000),0)

Cell B13 is empty (that is, equal to zero), so Formula 4 enters a zero.

FORMULA 5: SALESPERSON COST

Formula 5 adds salary (B17), commission (B18), and expenses (B19) to produce the salesperson cost in B20.

Cell location: B20

Formula @SUM(B19.B17)

FORMULA 6: COST PER SALE

Formula 6 divides salesperson cost (B20) by sales (B13) for cost-per-sale ratio in B21.

Cell locaton: B21

Formula: +B20/B13

You need the same formulas for each salesperson, so copy Formulas 1 through 6 into columns C, D, E, and F: Place the cursor on B10, press OA-C, and hit Return. Press OA-5 to highlight the cells to B21, and hit Return again. Move the cursor to C10, type a period, move the cursor to F10, and hit Return.

AppleWorks now asks whether B9 is an absolute or relative reference in its new locations. Every reference in every formula is relative, so type **R** now and each time a cell location is highlighted (a total of 12 times). When you've finished, you should see lots of ERRORs and a few zeros across the screen.

FORMULA 7: TOTAL CUSTOMERS

Formula 7 adds the customers in each salesperson's territory (row 8, columns B through F) for total number of customers in B26.

Cell location: B26

Formula: @SUM(B8.F8)

Copy formula 7 into other cells (even those that don't need it) in column B: With the cursor on B26, press OA-C, and hit Return twice. Press the down-arrow key, type a period, move the cursor to B38, and hit Return again. To tell AppleWorks each cell reference is relative, type **R** twice.

Repeating the copy process takes time. It may be quicker to copy a formula into a column of contiguous cells, as you just did, then blank the cells that don't need the formula: Place the cursor on B28, and press OA-B. Type **B** (for *Block*), press Down Arrow, hit Return, and type **Y** to clear the protected cells.

Follow the same procedure to blank B32 through B34: With the cursor on B32, press OA-B and type **B**. Press the down-arrow key twice, hit Return, and type **Y**.

Figure 2. Labels and lines in sales-force spreadsheet.

```
==========A=========B=========C=========D=========E=========F=====
 1|                      SALES FORCE ANALYSIS
 2|=============================================================================
 3|ENTER NEW MONTH/YEAR HERE------>  JANUARY 1990
 4|ENTER NEW MONTH NUMBER HERE---->
 5|=============================================================================
 6|SALESPERSON            THOMPSON  GOLDEN    VAGLICA   MEROW     SOONG
 7|-----------------------------------------------------------------------------
 8|CUSTOMERS
 9|CALLS
10|  CALLS/CUSTOMERS RATIO
11|
12|ORDERS
13|SALES
14|AVERAGE ORDER
15|  ORDERS/CALLS RATIO
16|
17|SALARY
18|COMMISSION
19|EXPENSES
20|SALESPERSON COST
21|  COST/SALES RATIO
22|
23|=============================================================================
24|MONTHLY SUMMARY         TOTAL     AVERAGE   YTD       SALES     COST
25|-----------------------------------------------------------------------------
26|CUSTOMERS                                   JAN
27|CALLS                                      FEB
28|  CALLS/CUSTOMERS RATIO                     MAR
29|                                           APR
30|ORDERS                                     MAY
31|SALES                                      JUN
32|AVERAGE ORDER                              JUL
33|  ORDERS/CALLS RATIO                       AUG
34|                                           SEP
35|SALARY                                     OCT
36|COMMISSION                                 NOV
37|EXPENSES                                   DEC
38|SALESPERSON COST                                    --------- ---------
39|  COST/SALES RATIO                         TOTAL
40|
41|=============================================================================
```

FORMULA 8: AVERAGE CUSTOMERS

Formula 8 produces the average number of customers in C26. The AVG function adds the customers in each salesperson's territory (row 8, column B through F) and divides by 5 (the number of salespeople).

Cell location: C26

Formula: @AVG(B8.F8)

Now copy Formula 8 down its column: With the cursor on C26, press OA-C and hit Return twice. Press Down Arrow, type a period, move the cursor to C39, and hit Return again. Both cell references are relative, so type **R** twice.

Now blank the cells containing unnecessary formulas: Place the cursor on C29, press OA-B, hit Return, and type **Y**. With the cursor on C34, press OA-B, hit Return, and type **Y**.

Certain cells in column C display contents as a percentage with one decimal place: With the cursor on C28, press OA-L, and hit Return twice. Type **P** (for *Percent*), type **1**, and hit Return again. Do the same for C33 and C39.

FORMULA 9: MONTH-BY-MONTH SALES

Formula 9 produces one of two answers depending on the month number you enter in C4. The Test statement looks at C4. If it contains a 1 (corresponding to January), the Then statement copies the total sales from B31. If the month number is anything other than 1 (2 through 12, corresponding to February through December), the Else statement retains the amount already in its cell, either amount of sales from a previous month or zero.

Cell location: E26

Formula: @IF(C4=1,B31,E26)

FORMULA 10: MONTH-BY-MONTH COSTS

Formula 10, like Formula 9, produces an answer depending on the month number in C4. If it's 1, the Then statement copies the total costs from B38. If the month number is anything other than 1, the Else statement retains the amount already in its cell.

Cell location: F26

Formula: @IF(C4=1,B38,F26)

Copy Formulas 9 and 10 down their columns: Place the cursor on E26, press OA-C, and press Return. Press Right Arrow and hit Return again. Press Down Arrow, type a period, move the cursor to E37, and hit Return.

To identify which cell reference is *No change* and which is *Relative*, hit Return twice, type **R**, press Return twice, and type **R**.

Each formula is now geared to respond to the number 1 in C4. You want formulas to react when you type numbers corresponding to other months, so edit them: With the cursor on E27, press OA-U to display the formula on the entry line. Press OA-E to switch to the overtype cursor (a flashing rectangle). Now press the right-arrow key seven times to move the cursor atop the 1 in the formula. Type **2** and hit Return.

Now for the next formula: Move the cursor to E28 and press OA-U. Again, move the cursor atop the 1, type **3**, and hit Return.

Continue this way, editing all other sales formulas in E29 through E37 so that they each contain a number corresponding to the month. (For October through December, switch to the blinking cursor, and enter the correct digit to the immediate right of the 1.) When you've finished, do the same for the cost formulas in F27 through F37.

FORMULA 11: TOTAL SALES

Formula 11 adds the amount each month (E26 through E37) to produce year-to-date sales in E39.

Cell locaton: E39

Formula: @SUM(E37.E26)

Copy Formula 11 into F39 so that it calculates year-to-date costs: Leave the cursor on E39, press OA-C, and hit Return twice. Now press Right Arrow, hit Return, and type **R** twice. This completes the formulas, so press OA-S to store them safely on disk.

PRACTICE NUMBERS

Before entering practice numbers, turn off automatic recalculation: Leave the cursor where it is and press OA-V to bring up the Standard Values screen. Type **RFM** (for *Recalculate Frequency Manual*).

Referring to **Figure 3**, enter the practice numbers: Place the cursor on C4, type **1** (for January), and move the cursor to B8. Type **256** and move the cursor to C8. Type **175** and move the cursor to the next cell needing a number. As you type, those cheery ERROR ►

messages start to disappear.

Continue typing and moving the cursor until you enter all the numbers in rows 8, 9, 12, 13, 17, and 19. After you type the last number, press Return. To recalculate the formulas, press OA-K twice. Your spreadsheet should now look like the completed one in **Figure 1**. Press OA-S to store it on disk.

This spreadsheet is 74 characters wide and prints at 10 characters per inch. Press OA-O to bring up the Printer Options screen. Now set the margins: Type **LM** (for *Left Margin*) and press Return. Type **.3** and hit Return again. Now type **RM** (for *Right Margin*) and press Return. Type **.3**, and hit Return again. Type **TM** (for *Top Margin*), press Return, type **.5**, and hit Return again. Press OA-S to save.

Now turn on your printer and run off your spreadsheet: Press OA-P and hit Return. Press Return to confirm the printer (or type a printer number, then Return). Type today's date and hit Return twice (the second time to confirm one copy). The printer whirs and here's your spreadsheet.

Assume that January is over and you've analyzed the results. You're about to enter figures for February. Here's how to start the new month.

Figure 3. Practice numbers.

```
=============A=========B=========C=========D=========E=========F=====
 1|                          SALES FORCE ANALYSIS
 2|=============================================================================
 3|ENTER NEW MONTH/YEAR HERE------>  JANUARY 1990
 4|ENTER NEW MONTH NUMBER HERE---->          1
 5|=============================================================================
 6|SALESPERSON              THOMPSON    GOLDEN    VAGLICA     MEROW      SOONG
 7|-----------------------------------------------------------------------------
 8|CUSTOMERS                     256       175        320       125        375
 9|CALLS                         75        62         83        51         81
10| CALLS/CUSTOMERS RATIO
11|
12|ORDERS                        35        17         42        11         38
13|SALES                      25565     30100      45600     15500      42300
14|AVERAGE ORDER
15| ORDERS/CALLS RATIO
16|
17|SALARY                      2400      1800       2700      1650       2850
18|COMMISSION
19|EXPENSES                    1750      1850       2200      1250       2450
20|SALESPERSON COST
21| COST/SALES RATIO
22|
23|=============================================================================
```

First, blank out (OA-B) the old information in rows 8 (customers), 9 (calls), 12 (orders), 13 (sales), 17 (salaries), and 19 (expenses). You can overtype them, of course, but you may miss a few, so blanking is safer. Unless customers and salaries fluctuate from month to month, leave these entries until there's reason to change. All these cells are in standard Commas format, so there's no need to reformat after blanking.

Then enter the new month in C3, new month number in C4, and the number of calls, orders, sales, and expenses for each salesperson. Press OA-K twice to recalculate, and the formulas will take care of the rest.

Another approach, one that eliminates the need to blank any cells, is to keep a master spreadsheet with labels, formats, and formulas but no numbers. Simply rename the spreadsheet each month and make your new entries. You'll have to enter the monthly sales and cost totals, however, in columns E and F. At the beginning of a new year, re-enter the monthly sales and cost formulas from scratch, so that you start with a zero in those cells.

Next month, you'll calculate your net worth. To get a head start, review your records, including cash, checking accounts, retirement funds, mortgages, loans, personal property, and real estate. □

RUTH K. WITKIN IS THE AUTHOR OF THE POPULAR TEMPLATE/HANDBOOK SERIES *SUCCESS WITH APPLEWORKS I–IV* (*INCIDER*, IDG COMMUNICATIONS/PETERBOROUGH), *MANAGING WITH APPLEWORKS* (HOWARD W. SAMS & CO.), AND *PERSONAL MONEY MANAGEMENT WITH APPLEWORKS* (JOHN WILEY & SONS). WRITE TO HER AT 5 PATRICIA STREET, PLAINVIEW, NY 11803. ENCLOSE A STAMPED, SELF-ADDESSED ENVELOPE IF YOU'D LIKE A REPLY.

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DO-IT-YOURSELF

Easy-to-learn graphics programs make creating your own artwork as simple as painting by number.

By CYNTHIA E. FIELD, Ph.D.

A LITTLE TALENT CAN GO A LONG way. You don't have to be a professional illustrator to create custom artwork for flyers, ads, or newsletters. But you *do* have to be knowledgeable about the way the many available Apple II creativity products can help you design attractive charts and diagrams.

This month we'll focus on two such resources—**Graph It!** and **Dazzle Draw** (both require 128K)—to design two illustrations we'll incorporate later into October's Press Room project. These two graphics will help us gear up for next month's four-page newsletter template, which we'll create with Timeworks' **Publish It! 2**. Our prototype newsletter will spread the word about National Crime Prevention Month, but you can use the template, as is or with modification, to share information about a broad spectrum of topics.

GRAPH IT!

Whether you're touting the benefits of pork bellies or long-haired Persians, you'll probably want to transform statistical information into graphs or charts. Thanks to Graph It!, Timeworks' latest Platinum Series program, you can easily—and just about instantaneously—create column, bar, or line graphs; area or pie charts; and scatter plots. Best of all you can save these double-high-resolution charts on a data disk and import them directly into Publish It! 2 graphics areas.

Graph It! sports pull-down menus, scroll arrows, and dialog boxes. Because the program screen is drawn with mousetext characters instead of full graphics, Mac-like accoutrements aren't as elegant as they tend to be in graphics-based programs such as Publish It! 2. For example, during pauses Graph It! displays an hourglass symbol rather than the stopwatch icon to which GS users especially may be accustomed.

A few irksome features are off-putting at first, but they seem trivial after you give this program a chance to strut its stuff. For instance, *Save* isn't a default selection in the Save As dialog. You have to click on the Save button precisely instead of hitting Return almost absent-mindedly when you want to store a file on disk. Despite bottlenecks like this one, you can create your first graph in less than an hour by following the tutorial in the Graph It! *User's Manual*. If you've created more than a few charts and graphs painstakingly by hand, you'll soon agree that Graph It! is the way to fly.

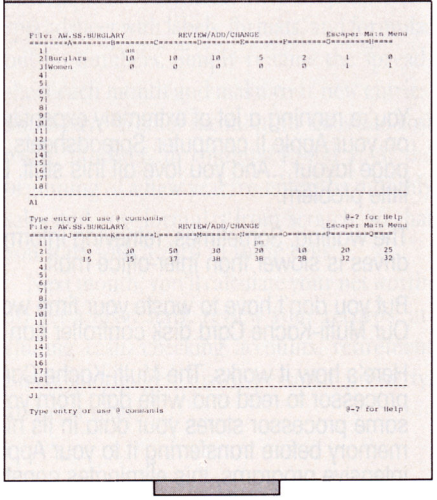
Enter information directly into Graph It!'s Data Display window, a spreadsheet-like working area, or import data in the form of an ASCII file from a spreadsheet program such as **AppleWorks Classic**. Let's test-drive Graph It! and create **Figure 1** for our newsletter.

Research shows that burglars are most likely to strike when homes are unoccupied. This translates into daytime, when many women work outside the home. Our planned newsletter will address the significance of this phenomenon, so we'll begin by extrapolating data from the book *Suburban Burglary: A Time and a Place for Everything*, by G. Rengert, Ph.D., and John Wasilchick (Charles C. Thomas Publishers, Springfield, IL, 1985).

First prepare a spreadsheet of these data using AppleWorks Classic. At the AppleWorks Main Menu, select *Add Files to the Desktop*, then create a *Spreadsheet from Scratch*. Name the spreadsheet file AW.SS.BURGLARY.

Column titles in your spreadsheet become X-axis category names in Graph It! and row titles become legend names. Graph It! plots numeric data along the Y-axis. Here our data are the percentages of burglars on the prowl while people are on the job.

Figure 1. Spreadsheet with data.



The spreadsheet's 25 columns and three rows span the block from A1 through Y3. (**Figure 1** shows a portion.) Save the spreadsheet file as an AppleWorks file (Open apple-S), in case you want to rework it later on.

To prepare these crime statistics for import into Graph It!, save the data as an ASCII file. ►

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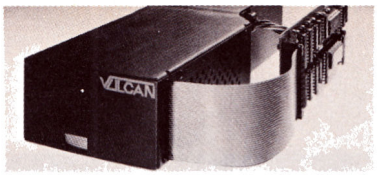

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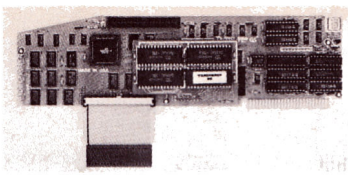

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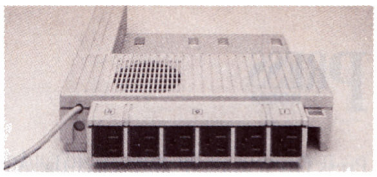

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Press Open apple-P and select the ASCII file option. Name the file /DATA/AW.SS.BURGL.TXT. (Replace /DATA with the name of your ProDOS disk.) Quit AppleWorks and start up Graph It!.

When Graph It! loads, select *Open* (File menu or Open apple-O). In the submenu, select *AppleWorks Text File* as the information source, and in the Specify Size window, change the default spreadsheet array of 20 rows and 20 columns to three rows and 25 columns.

In no time your original spreadsheet data appear in Graph It!'s Data Display window. Before proceeding, save this information (File menu or Open apple-A) as GI.DATA.BURGL.

Graph It!'s formatting defaults make charting a breeze. To observe a fully formatted column chart of these newly imported spreadsheet data, select *Graph* (Graph menu) or press Open apple-G. Voilà! Your nearly completed chart appears on screen. (GS users, remember to activate the monochrome-display setting in the Control Panel.) Press Escape to return to the Data Display window.

Experiment with various kinds of charts. Choose a graph form (stacked column, area, 3D, and so on) from the Type menu, press Open apple-G, and blink your eyes: The new chart's already on display! Certain kinds of data work best with particular types of charts; experience and the program's assistance (on-line and in the manual) should help you decide which type of graph best demonstrates your objective. Pull down the Labels menu and select *Edit Title*. Enter a custom title of up to 42 characters. Edit the X-axis and Y-axis labels from the same menu.

Notice that I added a three-dimensional effect to the columns in the completed graph (**Figure 2**) by selecting a column depth of five units from the Format menu and column-depth dialog box. I turned off a number of default options such as *Show Major Marks* (Axis menu), and changed others including the border pattern surrounding the chart. Save your completed chart (*Save Chart* or *Save Chart As* in the File menu) as GI.FIGURE.1. Publish It! 2 will treat this type of file as a graphics picture.

Of course, you don't need to own Publish It! 2 to use Graph It! efficiently. This program prints standard charts approximately 8 inches wide and 3 inches high. Graph It! also supports double-high, rotated, and double-wide printing. Combine effects—double the height *and* the width—to create 8-by-15-inch poster-sized charts. The program's double-strike printing mode generates extra-crisp black-and-white printouts from many popular dot-matrix models. You can print multicolor graphs with an ImageWriter II and four-color ribbon. With or without Publish It! 2, Graph It! presentations add a professional touch to brochures and newsletters, as well as to business reports and science-fair displays.

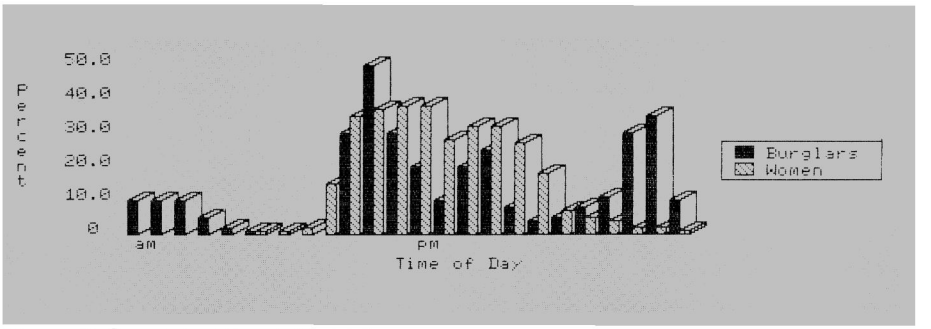

Figure 2. Completed Graph It! chart.

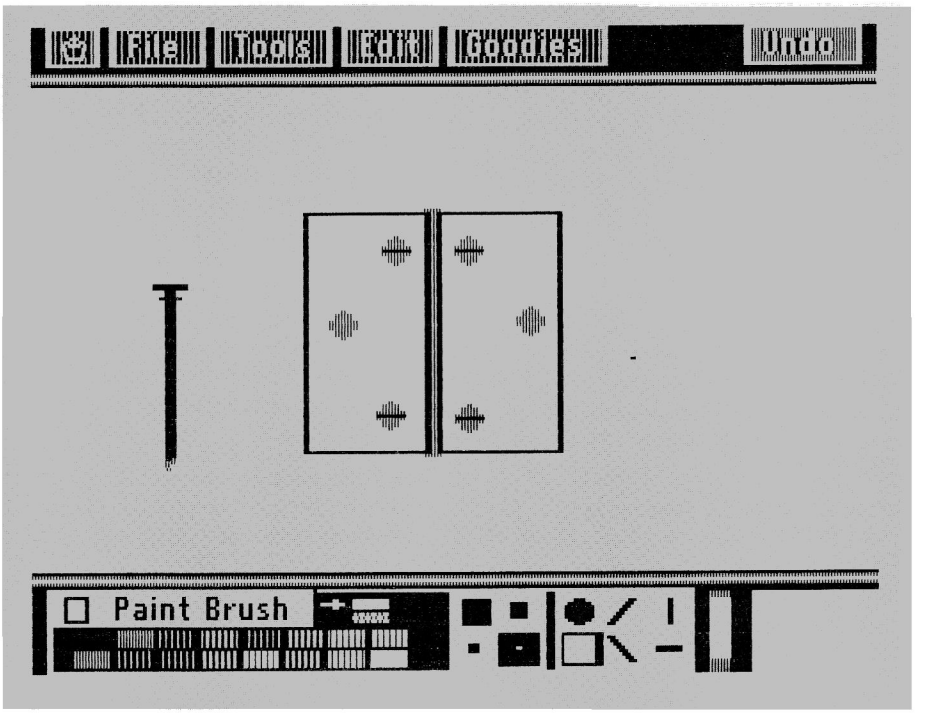

Figure 3. Hinge and nail.

DAZZLE DRAW

A graph may be worth a thousand data, but illustrated diagrams also add to a publication's visual impact. Until now, you may have resorted to clipping predrawn art from public-domain or commercial-art portfolio disks. If you're beginning to find these resources too limited, consider adding Broderbund's **Dazzle Draw** to your desktop-publishing toolkit.

This double-high-resolution drawing program has pull-down menus that bypass any need to memorize commands. Point the mouse (or an alternative input device like the joystick) and click on selections.

With programs such as Dazzle Draw, even amateur artists can create special effects. Dennis Krill, an *inCider* reader from Pennsylvania, uses his paint program's fonts to type headlines. He saves each string of text as a picture, then imports it into a graphics area in Publish It! 2. Krill stretches or squeezes the headline to create effects that are, he observes, either "eye appealing or mindbending."

In our crime-prevention newsletter, we plan to include step-by-step instructions to prevent a would-be intruder from lifting a door off its hinges. Let's use Dazzle Draw to design a simple illustration to accompany that text.

Start up Dazzle Draw, pull down the Tools menu and select *Paint Brush*. Notice the paint palette that appears at the base of the screen. The white color should be selected, as indicated by the Active box in the lower right-

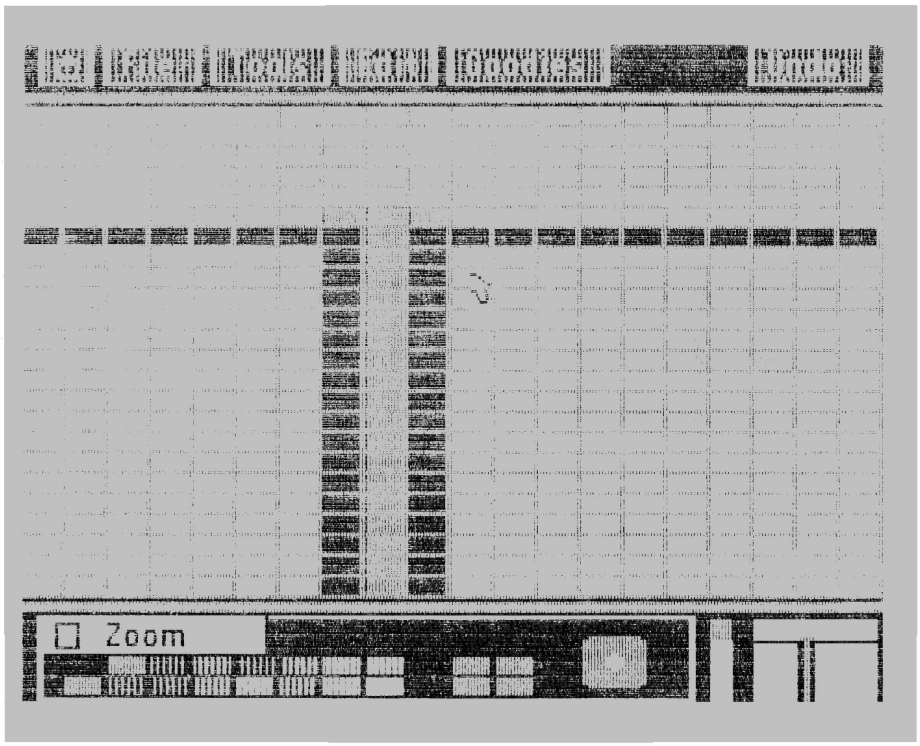

Figure 4. Zoom mode, top of hinge pin.

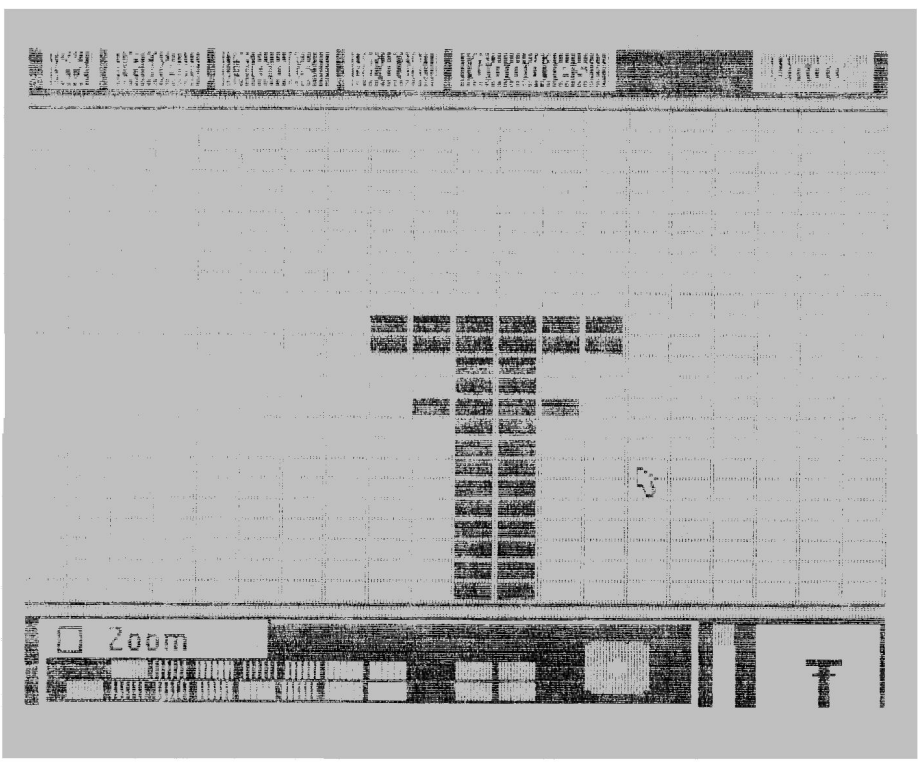

Figure 5. Zoom mode, two-headed nail.

hand corner of the screen. To select a color, click on its "paint chip" in the paint palette to the left.

Click on *Flood Fill* on the Tools menu. Click on the black-screen background, and paint your "canvas" white. Push up the scroll bar to the left of the Active box. The top part of the drawing area displayed is still black. Flood-fill it with white by clicking on it. Pull down on the scroll bar to display the very bottom of the drawing area. Flood-fill this area with white.

Click on the black paint chip in the paint palette. Select *Shapes* from the Tools menu. From the shape palette, choose the outlined rectangle, and rubber-band a rectangle on screen: Hold down the mouse button and drag the mouse down and to the right.

From the Edit menu, select *Capture* and rubber-band a Marker box outside—but in close proximity—to the rectangle's perimeter. From the Edit menu select *Copy*; pull down the menu again and click on *Paste*. Holding the mouse button down, drag the copy of the rectangle next to the original. Leave a gap of one pixel (a screen dot) between the rectangles. These rectangles are the two halves of a door hinge; the gap will hold the hinge pin. See **Figure 3** for a preview of the completed Dazzle Draw picture.

From the Tools menu select *Paint Brush* and click on the dark-grey color in the paint palette. From Tools, select *Zoom*. Move the Zoom box to the top of the hinge-pin area. In this bird's-eye viewing mode, color the hinge pin by clicking on each pixel individually or by dragging down a series of pixels. Draw the top of the pin by adding one pixel to either side as shown in **Figure 4**. Click on the Zoom exit box in the upper left-hand corner of the Zoom tool window. Zoom in again to complete your drawing of the hinge pin and make its bottom match its top.

From the Tools menu, select *Shapes*. Choose the filled circle from the palette, and rubber-band the top "screw hole" on the left-hand half of the door hinge. If your circle is too large or too small, click on the Undo box to the right of the menu bar and try rubber-banding another circle.

NAIL IT DOWN

When the screw hole looks good, *Capture* and *Copy* it, then *Paste* five identical screw holes: two more on the left-hand half and three on the right-hand half of the door hinge. In our anti-burglary project, the two top and two bottom holes will contain screws. To simulate screw slots, draw black lines across the filled circles. Use the Paint Brush palette, the pencil-point brush size, and Zoom mode to click these pixels into place.

Now let's illustrate the two-headed nail required for this anti-theft project. Zoom in and plot a vertical black line two pixels wide for ▶

the nail's shaft. Zoom in for a close-up view of the top of the nail, as shown in **Figure 5**. Draw the first "head" one pixel high and four pixels wide. Lengthen the shaft above this head by two pixels. Draw the top nail head two pixels high and six pixels wide. At the other end of the nail, simulate a point by adding two dark-grey pixels on the left and one dark-grey pixel on the right at the tip. Finish off the left side of the tip with a single light-grey pixel.

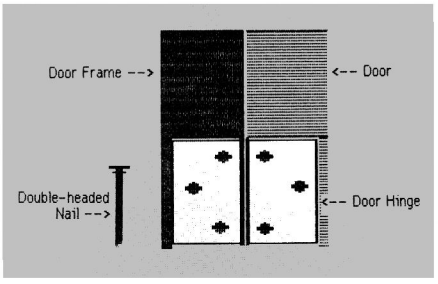

Figure 6. Publish It! 2 diagram.

Graphics Objects	Left Start	Top Start	Width	Height
Top of Door Frame	2.700	1.013	0.775	1.016
Side of Door Frame	2.700	1.976	0.090	1.100
Top of Door	3.500	1.015	0.779	1.018
Side of Door	4.180	1.975	0.100	1.100
Hinge Nail Picture (from Dazzle Draw)	1.908	1.997	2.361	1.130
Text Objects (Labels)				
Door Frame	1.638	1.333	1.037	0.166
Double-Headed Nail	1.111	2.572	0.879	0.358
Door	4.325	1.333	0.602	0.184
Door Hinge	4.215	2.572	1.036	0.186

Table. Specifications for Figure 6 (dimensions in inches).

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Dazzle Draw
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San Rafael, CA 94903-2101
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(800) 521-6263
$59.95 home edition
$69.95 school edition

Graph It!, $69.95
Publish It! 2, $129.95
Timeworks
444 Lake Cook Road
Deerfield, IL 60015
(312) 948-9200

Select *Print Picture* from the Goodies menu. Fine-tune the drawing as necessary, and save the final version on a ProDOS data disk as DD.HINGE.NAIL.

Publish It! 2 and Dazzle Draw make a great team in more ways than one. Though some people bemoan the lack of graphics tools in Publish It! 2, you can perform surprising tricks with the tools that *are* available.

Start up the program and rubber-band a graphics area on screen. Pull down the File menu and select *Import Picture*. Load the door-hinge illustration (DD.HINGE.NAIL) you just created with Dazzle Draw.

Use four pattern-filled rectangles to add a partial door frame and door to the picture. Add text areas, type labels into them, and drag them into place to complete the diagram. It should look something like **Figure 6**. (Specifications for all objects in the diagram are included in the **Table**.) Print the diagram, fine-tune its features, and save it as PI.FIGURE.2.

Like crafting a fine piece of furniture, creating custom artwork is often a matter of knowing what tools to use. Your new skills may not replace professional artists, but you'll enjoy the satisfaction that comes from being a desktop do-it-yourselfer. □

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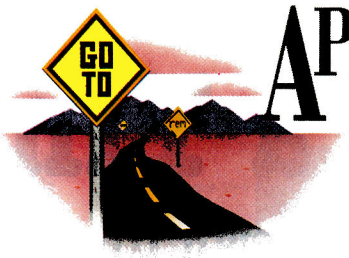

OVER AND OVER

Some things bear repeating—BASIC loops let you handle objects consistently without writing a lot of cumbersome program code.

By DAN BISHOP

WHAT GOES AROUND, COMES AROUND. A CASE IN POINT: the loop. This key programming feature lets any computer language perform one general task repeatedly. Although the object on which you're working may change each time through the loop, the procedures handling that object remain the same. With loops, you can use a relatively short segment of program code to deal with many objects.

A billing program, for example, may have to manage data on hundreds or thousands of customers, yet the software must handle each account the same way. The program might begin by taking the first name from the customer list, then entering a loop that accesses this customer's account record. The program determines what the customer owes, prints a bill if there's an outstanding balance, and updates the account record. Finally, it changes the name to the next customer on the list and begins again with the new account record. The process continues until there are no more customer names on the list.

'ROUND AND 'ROUND

This brief example contains all the necessary elements of any program loop. First, you must usually initialize (set to starting values) some data before entering the loop. In our example, that means the name of the first customer. You then start the loop and carry out all essential processing instructions on one set of data (the customer's account record). When you've finished with this set, you change the initialization data to those belonging to the next set of data to be processed.

The program is now at the bottom of the loop, so you direct your Apple to return to the top, or beginning, of the loop. The computer now executes the same set of instructions that it used on the first data set. This continues until some situation arises (such as reaching the end of the customer list) that signals your Apple that the looping process is complete. At this point, the computer jumps out of the loop and begins executing any program instructions that follow.

When you begin writing the code for a loop, you must mark the instruction that will be its first command. That's the top of the loop. In BASIC, the line number provides a built-in tag to mark this instruction. At the end, or bottom, of the loop, the last instruction can be a GOTO command with this tag number. The number tells the computer to go back to the top of the loop and go through it once more. The following simple program contains such a loop:

```
510 PRINT "SIMPLE LOOP PROGRAM"
520 PRINT "ENTER A NAME..."
530 INPUT NM$
540 PRINT "HELLO,";NM$;
550 PRINT ", HOW ARE YOU?"
560 PRINT
570 GOTO 520
580 PRINT "GOOD-BYE!"
590 END
```

This example has one drawback—it will never end! It contains an infinite loop; to stop it, you must press Reset. Not a very elegant way to end your first loop.

The missing feature is some way to signal your Apple that the looping process should end. In the example, because an INPUT statement is part of the loop, you can enter a special symbol to end the loop. Then if your computer detects that symbol, you can instruct it to jump out of the loop and go to line 580. You need to add only two new lines to accomplish this:

```
525 PRINT "OR ENTER 99 TO END..."
535 IF NM$ = "99" THEN GOTO 580
```

With these added lines, the computer checks each name as you enter it. If you enter the special symbol "99" instead of a name, the computer jumps to line 580, which is outside the loop. Congratulations—you've solved the infinite-loop problem.

All loops in Applesoft BASIC must have a conditional GOTO command that lets your Apple determine whether or not to execute the loop yet again. Here the conditional test (line 535) appears in the middle of the loop. The command may appear instead as the loop's first instruction.

In this case, a condition may exist that makes the computer jump over the loop and never execute its instructions. For example, say a program is to print only on Saturday the daily receipts for the week. If the daily income is in an array containing seven elements, AM(1) through AM(7), and if the names of the weekdays are in another array

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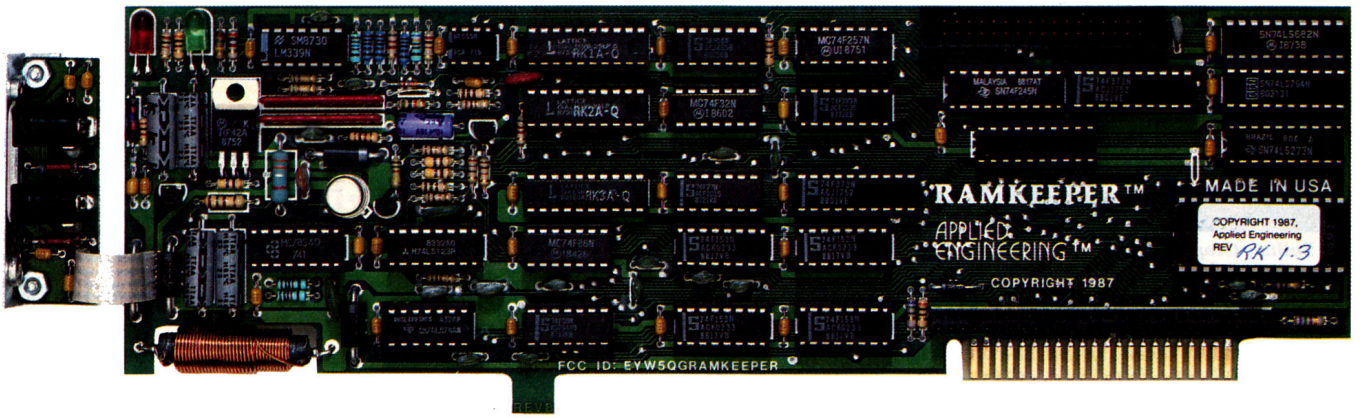

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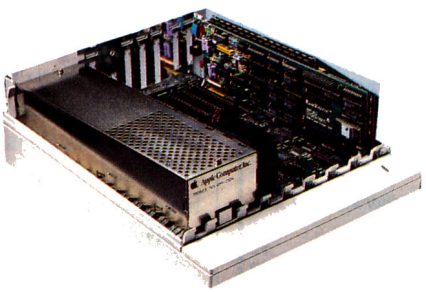

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of seven elements, WK$(1) through WK$(7), the following commands might make up part of the program:

```
120 PRINT "ENTER TODAY'S DAY"
130 INPUT DY$
.....
6990 I = 0
7000 IF DY$ <> "SATURDAY" THEN GO TO 7060
7010 I = I + 1
7020 PRINT "DAILY RECEIPTS:"
7030 PRINT " ";WK$(I);": $ ";AM(I)
7040 IF WK$(I) = "SAT." THEN DY$ = ""
7050 GO TO 7000
7060 .....
```

In this example, the computer executes the loop instructions only when DY$="SATURDAY." Once the loop has started, it continues until WK$(I) has the value "SAT." The computer then changes the value of DY$ to a blank string. Now when the computer executes line 7000, it sees that DY$ is no longer "SATURDAY" and the looping process stops.

The example above illustrates another common loop feature: the loop counter, represented by I. You must initialize loop counters before entering the loop (line 6990) and increment them (increase their value) inside the loop (line 7010).

You may use them within the loop as subscripts for arrays (lines 7030 and 7040) or in mathematical operations and PRINT statements. Combining arrays and loop counters lets your Apple deal with different objects each time through the loop.

You may also place the conditional test (telling your Apple whether or not to continue looping) at the end of the loop. Suppose the preceding program is to display the total of the week's receipts every day. You could use the following additional code:

```
7060 SM = 0.0
7070 I = 0
7080 I = I + 1
7090 SM = SM + AM(I)
7100 IF I <> 7 THEN GOTO 7080
7110 PRINT "TOTAL OF WEEK'S RECEIPTS: $ ";SM
```

This code assumes that you've cleared the daily amounts, AM(I), to zeros at the beginning of the week and that you've entered them one at a time as each day passes.

The loop consists of lines 7080–7100. You must initialize both SM and I before the start of the loop. Then you need to increment I, the loop counter, inside the loop (line 7080). I is used as a subscript for the array AM within the loop (line 7090), and in the conditional test at the end of the loop (7100).

Using loop counters occurs so frequently in programming that almost all languages have a special instruction to deal with this case. In BASIC, it's the FOR/NEXT loop, named after the two BASIC keywords required for its construction. The previous example would look like this with a FOR/NEXT loop:

```
7060 SM = 0.0
7070 FOR I = 1 TO 7
7080 SM = SM + AM(I)
7090 NEXT I
7100 PRINT "TOTAL OF WEEK'S RECEIPTS: $ ";SM
```

The loop counter, I, appears in the first line of the loop, line 7070, right after the keyword FOR. Here it's initialized to its starting value

(I=1). That line, using the keyword TO followed by the counter's final value (7), also tells your Apple when to stop the loop. Following line 7070 are the lines to be repeated within the loop; then the last line in the loop,containing the keyword NEXT and the name of the loop counter.

Besides marking the end of the loop, NEXT also increments the loop automatically. Because I is incremented each time through the loop, programmers often refer to it as an *iterative* loop. The second time through the loop, when the program cycles back to line 7070, I has a value of 2.

Each time the computer executes line 7070, it compares the current value for I against the loop's ending value. As long as I is less than or equal to this value, the computer executes the loop instructions again. As soon as I equals 8, the computer realizes it has finished the looping process, and the program jumps to that instruction immediately following the NEXT statement.

Applesoft BASIC increments the loop counter by 1 automatically each time it encounters the NEXT statement. You can make your Apple use a different increment, however, with the STEP command. STEP comes at the end of the same line as the FOR keyword. The increment value you want to use in place of 1 then follows it. For example:

```
250 FOR J = 2 TO 50 STEP 2
....
300 NEXT J
```

Here, J is initialized to 2 and the loop begins. Each time your Apple reaches line 300 at the end of the loop, it increments J by 2 and jumps back to line 250 where it compares the current value of J to 50. As long as J is less than or equal to 50, the program executes the loop again.

Can you use the FOR/NEXT construction in those rare cases in which the loop counter counts down to a minimum number? By all means yes. To do this, you must initialize the counter to a value that's larger than the ending value. Because you're counting down, you must use a negative STEP value. For example:

```
880 FOR CT = 99 TO 1 STEP -1
890 PRINT CT;" BOTTLES OF BEER ON THE WALL"
892 PRINT CT;" BOTTLES OF BEER"
894 PRINT "TAKE ONE DOWN AND PASS IT AROUND"
896 PRINT CT-1;" BOTTLES OF BEER ON THE WALL"
898 PRINT
900 NEXT CT
```

Your Apple will perform this loop 99 times. The first time through, CT equals 99; the second time, CT equals 98. For loops that count downward, the computer compares the loop counter's values to the ending (1 in this example), and repeats the loop as long as the loop counter is greater than or equal to the ending value. When CT becomes 1, the computer executes line 880 and enters the loop one last time. Line 900 then changes CT to 0, and line 880 halts the looping process.

Programmers follow two simple rules when using FOR/NEXT loops:

1. *Never* jump into a FOR/NEXT loop.
2. *Never* jump out of a FOR/NEXT loop.

The first rule is easy to observe, because violating it usually results in a program crash with a NEXT WITHOUT FOR error. To see why this happens, imagine that the previous program example contains the following line:

```
50 GOTO 892
```

When the computer reaches line 50, it jumps obediently to line 892 and continues executing instructions until it reaches line 900. There it

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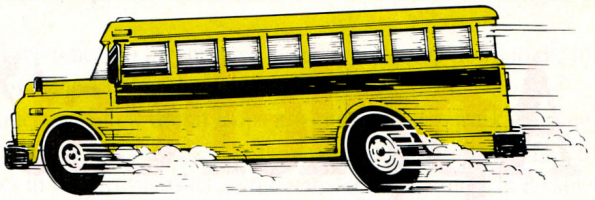

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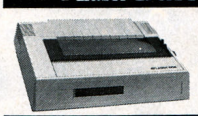

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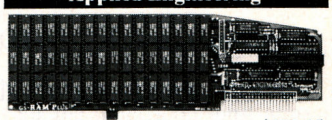

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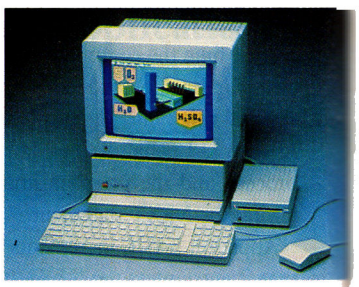

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runs into NEXT CT. What do you mean? There never was a FIRST CT! Your confused Apple comes to a halt and prints its error message.

Violating the second rule doesn't cause such obvious problems. If you jump out of a loop before it has run its natural course, your Apple thinks it must hang onto the current value of CT and its specified ending value forever. This takes up space in memory. If you continue to violate rule 2, the computer eventually runs out of "stack" memory. The program then crashes with an OUT OF MEMORY error.

Occasions do arise when you might need to end a FOR/NEXT loop prematurely. There's a simple, yet safe, way to do it. You need to add two statements on the same line as the IF statement that tests whether the program should halt the loop.

Let's say you're writing a program with a FOR/NEXT loop and you want to halt the loop if some variable, B, becomes negative:

```
1100 FOR J = 1 TO 100
...
1210 IF B < 0 THEN J = 100: GOTO 1300
...
1300 NEXT J
```

Here line 1210 appears inside a FOR/NEXT loop in which J is the loop counter and line 1300 contains the NEXT J command. The GOTO command doesn't make the computer jump out of the loop. Instead, it forces a jump to the bottom of the loop, where J is incremented. Line 1210, however, resets J to 100 "manually." When line 1300 now increments it, J becomes 101. The computer cycles back to line 1100 and finds that J is greater than 100, ending the looping process. It can now erase all references to J from stack memory and jump down to the line that follows line 1300 in the program.

To understand how useful loops are and how they work, you must play with them for a while. Create some simple programs like the examples in this article. Change the initial, ending, and STEP values. Add other processing instructions within the loop. Then add a conditional statement within the loop that forces it to end prematurely by setting the loop counter to its ending value (for example, I = 1000) and jumping to the NEXT command as described above.

Finally, experiment with "nested loops"—loops contained within other loops. There are only two additional rules you need to remember:

1. Always choose different names for your loop counters.
2. The NEXT command for a nested loop must come before the NEXT command of the outer loop.

Both FOR and NEXT statements for the inner loop must appear between the FOR and NEXT statements that control the outer loop:

```
10 FOR I = 1 TO 10
20 FOR J = 5 TO 0 STEP -1
30 PRINT I;"-";J;"=";I-J
40 NEXT J
50 NEXT I
```

Play with these concepts for a while, and you'll be surprised at the amazing variety of functions you can achieve with BASIC loops. □

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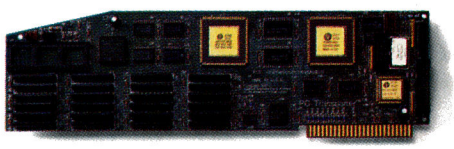

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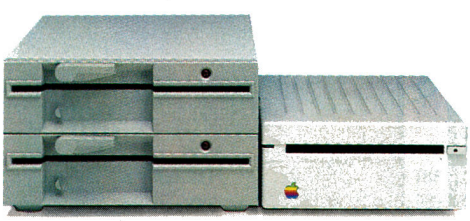

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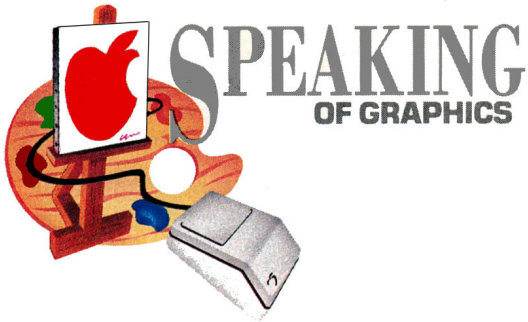


SPEAKING OF GRAPHICS

Now You See It

Two specialized commands—stenciling and masking—turn a tedious procedure into artistic elegance.

By ROBERTA SCHWARTZ and MICHAEL CALLERY

"THIS POWERFUL PAINT PROGRAM IS feature laden," raves the reviewer. "It offers custom brushes, color cycling, symmetry, xoring, masking...." Sounds good. I'll buy it. Does anyone know what I should xor?

Starting this month, and continuing occasionally in future columns, we'll look at some of those specialized commands offered in Apple II paint programs, and show you how to use them. For September, we'll cover stencils and masks.

Think back to school days when we wanted to make "fancy" covers for our book reports. We bought stencils, usually those with old-English lettering, and placed those stiff cardboard sheets on a piece of paper. Then, using a pencil, we'd simply trace along the edges of the appropriate cut-out characters. Beautiful lettering!

Artists and craftspeople still use stencils—available with alphabets, numbers, pictures, and symbols—for decorative as well as functional purposes. Place a stencil of early-American flowers, for instance, on any surface (a wall, a box, and so on), and using a wide, soft brush or an airbrush, dab or spray-paint through the openings.

While stencils provide open areas that let the paint cover the surface, masks create the opposite effect. They block areas so that you can't paint on them.

Artists frequently apply a liquid mask, also called *frisket*, to any area where they don't want paint to appear. Watercolorists, for example, will often mask out those areas of the paper they want to remain white (the color of the paper), such as clouds. Instead of painting painstakingly around these areas, they can "wash" the paint across the paper, and the masking fluid will reject it. Then they simply rub off the masking fluid, which dries to a gummy consistency (much like rubber cement).

Stenciling and masking are powerful tools whose electronic equivalents would be welcome in any paint program. As far as we know, only three Apple IIGS paint programs—**DeluxePaint II, Paintworks Gold**, and **Cheap Paint**—provide these features. DeluxePaint II (which uses the term *stencil*, but actually provides masking) lets you lock specified colors; Cheap Paint lets you make a stencil of selected areas; and Paintworks Gold lets you chose between masking colors or making selections for stenciling. ►

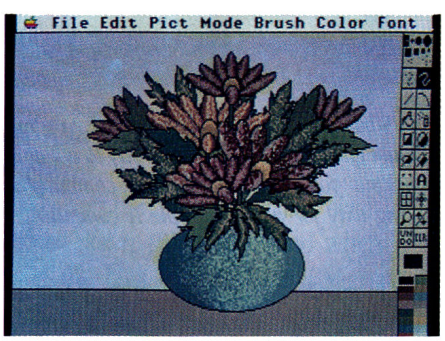


Figure 1. Original floral arrangement.

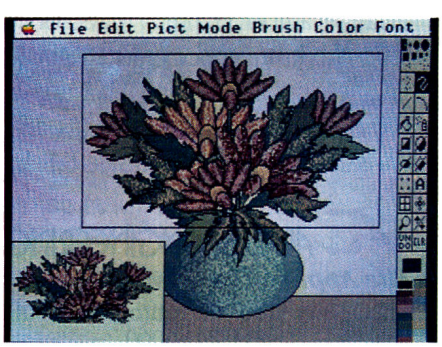


Figure 2. Halve-brush command.

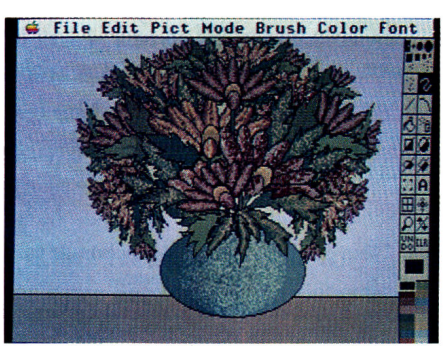
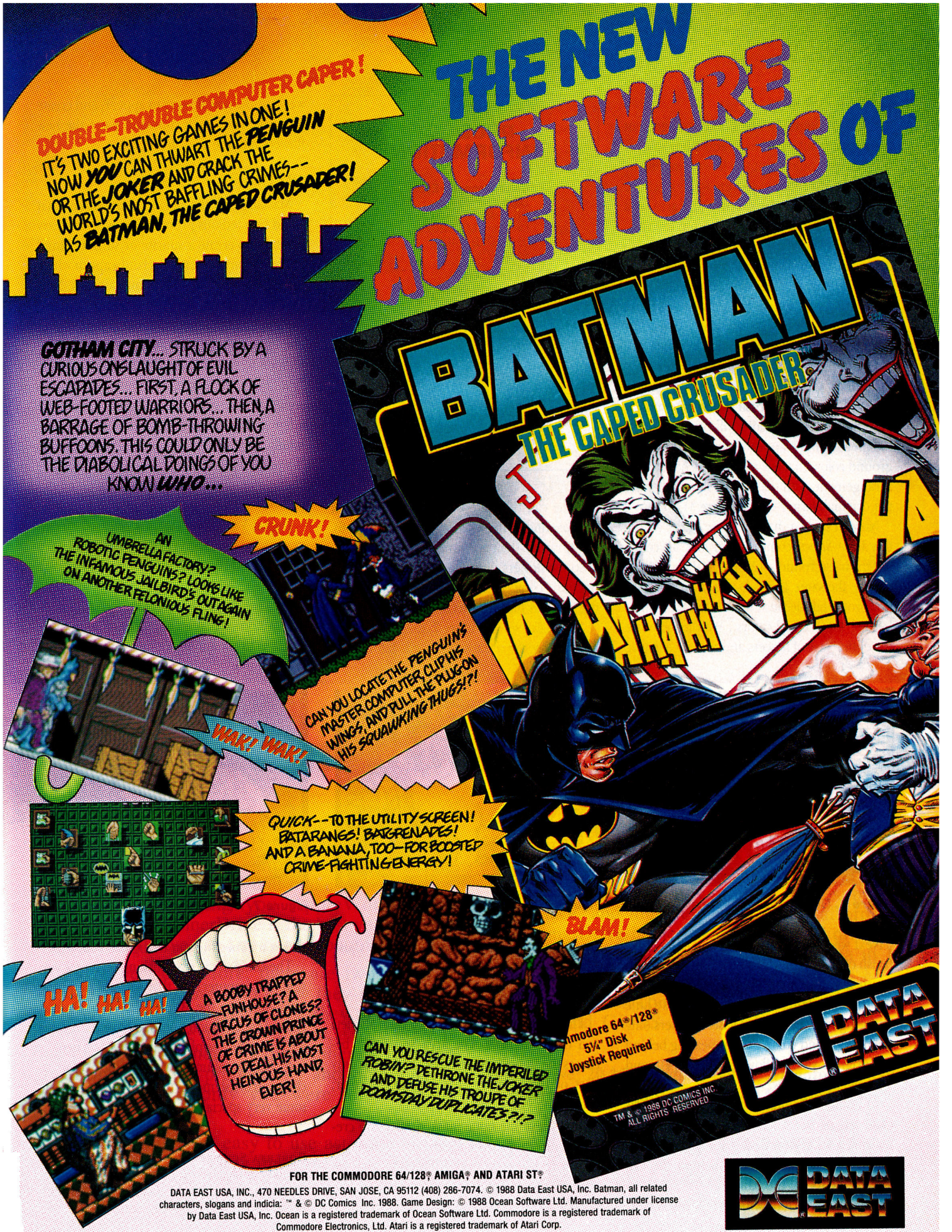


Figure 3. Smaller flowers appear.

Figure 4. Background shadow.



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FLOWER POWER

Look at **Figure 1**. The floral arrangement is complete, but we want to add a few smaller flowers. We could paint the flowers in, one by one, but there's an easier way. Because DeluxePaint II lets us capture any area as a brush, we can capture the flowers in the vase, making them a brush. Using the halve-brush command, we'll then reduce the brush to half its size (**Figure 2**). Now let's add the new flowers so that they appear to be in the vase, but behind the other flowers. In other words, they should cover the background color only.

Using the *Make Stencil* command under the Pict menu, we "lock" all but the background's colors. As we use the brush to place the smaller flowers, the locked colors will reject them, so the new flowers appear only on the background color. In a few minutes we have a new arrangement, with the smaller flowers behind the original, larger ones (**Figure 3**).

Now let's add a shadow. Once again, we use the *Make Stencil* command to lock all colors but the background's. (Although the new flowers are the same colors as the others, they're not protected, because we created them after locking the original colors.) We then capture the entire vase of flowers and make it a brush.

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and the cat, then choose the command *mask selection* under the Colors menu (**Figure 6**). Next, rather than draw new flowers, we can lasso the flowers in the lower right-hand corner and "copy" them. We "paste" them above the cat, and flip the selection horizontally.

As you can see in **Figure 7**, the new flowers, rejected by the area we masked, fall behind the cat and the other flowers—and that's just as we'd originally planned.

we want the new flowers to appear, and create a stencil. Then we'll copy and paste the new flowers into the stenciled area.

TRY IT!

Masking and stenciling let you simplify what could be a tedious process. Discover how easy it can be to create a sunrise or sunset behind the mountains. Or create a landscape in which the snow covers only the mountaintops. Now you can put clouds in the sky behind the trees without getting a drop of white on the leaves—even if you don't have a steady hand.

Need a crowd? Draw one person and copy him. Mask the original person and paste a second person behind him. Repeat the process a few times and you've painted a crowd instantly. Is your mind beginning to whirl with the possibilities? Good.

UPGRADES AND UPDATES

Digital Vision has recently released an upgrade to its GS version of ComputerEyes. (See "Reel-World Images," July 1989, p. 40.) Color ComputerEyes runs under GS/OS and features a full Apple desktop interface with multiple windows. It also offers a timer (something like the timer on your 35mm camera) that makes it easier for you to digitize yourself.

The company is also working on a new version of ComputerEyes that will add digitizing capabilities to the Apple II Video Overlay Card. Digital Vision hopes to have it available by September AppleFest in San Francisco.

In future columns, we'll explore color cycling and brush modes that will help you create some very special effects. □

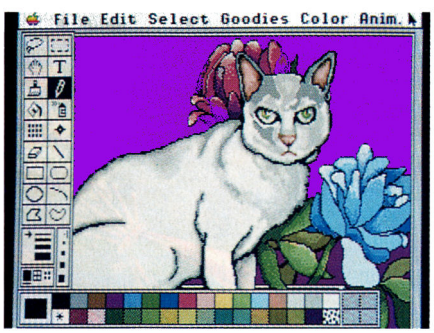


Figure 5. Original painting of cat.

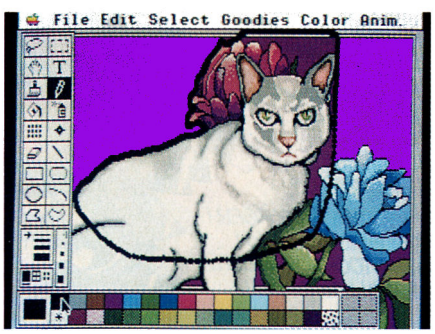


Figure 6. Choosing mask selection.

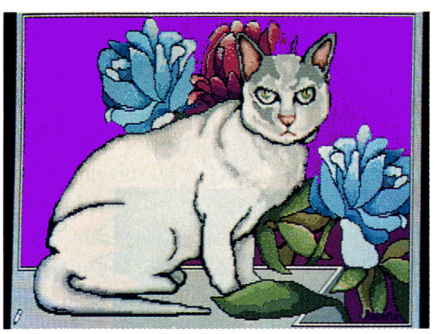


Figure 7. New flowers appear behind cat.

Next we select a dark shade and choose the brush option *color*, which turns our multihued brush into a solid. Finally, we use the brush to place the solid-colored vase of flowers a little to the right of the original vase. It covers only the background color, thus appearing behind the original vase of flowers (**Figure 4**)—and it's a perfect shadow.

In addition to masking colors, Paintworks Gold lets us select any area of our painting and mask it. **Figure 5** shows a painting of a cat. Let's add some flowers behind the cat, toward the top of the painting.

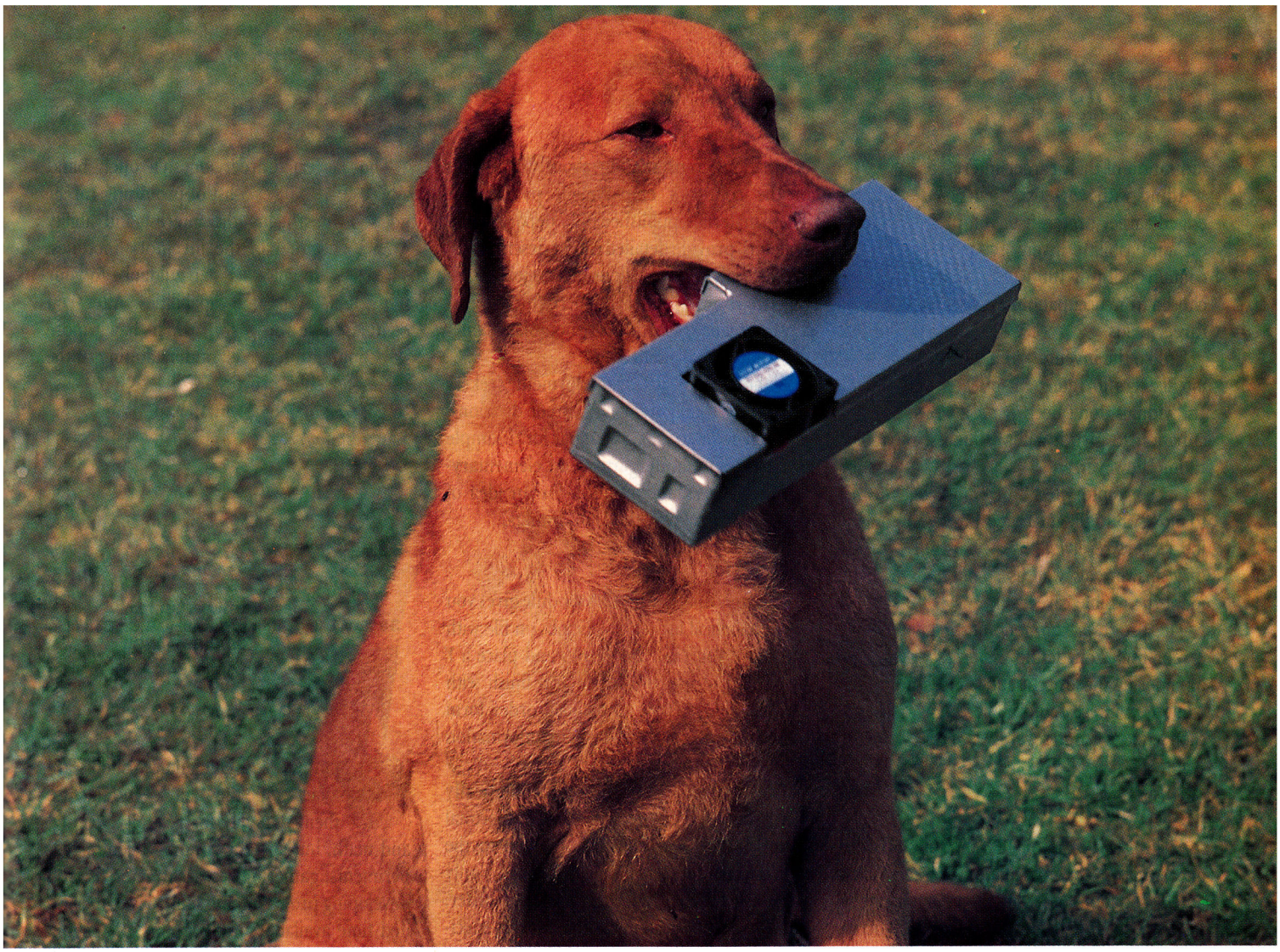
Using the lasso tool, we select the top flowers

CHEAP IN NAME ONLY

The shareware progam Cheap Paint also lets you create stencils. The area you select becomes the stencil's cutout area. This is the only part of the painting that will accept color; everything else is masked.

To achieve the same masked effect we created with Paintworks Gold, we'll select the option *Create stencil* and outline the area we want to cover. In this case, we'll select the purple-background area above the cat, where

ROBERTA SCHWARTZ AND MICHAEL CALLERY CREATE GRAPHICS FOR COMMERCIAL SOFTWARE. WRITE TO THEM C/O *INCIDER*, 80 ELM STREET, PETERBOROUGH, NH 03458.



Man's Best Friend

Yes, InnerDrive has surpassed the dog as "man's best Friend". While InnerDrive may not bring you your newspaper or your slippers, it offers some "dog-gone" good features that make your life a lot easier... like bringing you AppleWorksGS at lightning speed. InnerDrive is the best value of any Apple II hard drive, and no bones about it!

As we've said before, there are two kinds of Apple II users - those who know they need a hard drive and those who don't know they need a hard drive, yet. What we mean by that is, a hard drive is one of those misunderstood peripherals that can greatly increase the productivity and simplicity of your computer, if only you were to realize its potential.

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Continued from p. 41

indication of their career interests.

Adults with work experience and acknowledged career preferences complete the interest and ability inventory module. It too contains a list of 180 work-oriented activities chosen from occupations in the same 12 major career fields.

Unlike the inventory module, this one asks job seekers to rate both interest and ability. Individuals don't need experience in any occupation to give it a high interest or ability rating, however.

Once inventory testing is complete, it's time to move on to the interpretation report. Here job seekers receive an analysis of their inventory answers, as well as suggestions to help identify possible career options.

The program can generate eight types of career lists. You define the selection criteria by choosing those occupations with the highest combined interest and ability levels. You can then choose from several report options to print.

POUNDING THE PAVEMENT

The three remaining TPC modules provide additional career information. Career Fields and Occupations describes the 12 major career fields in detail and lists more than 600 occupations categorized by field.

For example, individuals who select the scientific field learn that occupations in this group usually revolve around problem solving based on research. TPC lists almost 60 occupations for reference.

Those who favor influence and leadership will discover that these jobs require well-developed verbal and math skills. Job seekers then get to choose from more than 75 career possibilities in administration, management, finance, law, regulation enforcement, communications, higher education, and so on.

Individuals should review the field-specific occupational lists to see if they find any interesting jobs listed there. The entries are referenced by title and classified by GOE (*Guide for Occupational Exploration*) and DOT (*Dictionary of Occupational Titles*) numbers. The GOE sourcebook contains data on more than 12,000 occupations arranged by career field. DOE provides job definitions for most occupations cited by The Perfect Career or the *GOE*. You can learn more from TPC's Additional Resources module.

The U.S. Department of Labor (DOL) currently keeps information for more than 225 occupations, representing about 80 percent of the country's employment possibilities. These materials, published in 17 departmental bulletins, provide detailed career descriptions. They specify considerations such as job duties, salaries, hours, educational requirements, advancement opportunities, nonsalary benefits, and work conditions.

Without such data, employment seekers can't make totally informed career decisions. You can refer to TPC's manual for a sample job profile on kindergarten and elementary-school teachers, for instance, for an idea of what to expect from the DOL listings.

INFO FILES

TPC's occupation-profiles module gives you an alphabetical list of the 225 jobs on file with the DOL. You read the entries and place a *Y* by all jobs of interest. When you finish with the list, TPC prepares a detailed order form to request specific employment information from the DOL.

The program determines automatically which bulletins to order, calculates the total cost, and prints a hardcopy to mail to the superintendent of documents. You need only write the check, attach the purchase order, and forward both items to the address specified on the form.

EXTRA HELP

Additional Resources—the final TPC module—presents supplemental materials designed to facilitate a final career decision. You can view the module contents on screen or print them.

There are bibliographic references for job planning (occupational directories, handbooks, and vocational encyclopedias), as well as further materials for career guidance (such as computer software).

Refer to Additional Resources to find out more about job-counseling services and the role of employment offices.

THE FIRST STEP

Working through The Perfect Career is merely the first step in making employment decisions. The software is set up to help you identify careers of interest, offer employment suggestions, and develop a plan for reaching your career goal. In conjunction with the supplemental career-guidance exercises in the manual, you'll be able to conduct an informed career search.

The Perfect Career doesn't offer blind advice. It produces a list of promising career goals by measuring the interest and ability ratings obtained in the inventory modules. The software tailors career guidance to your individual tastes and capabilities. After you complete the program, you'll have more direction and a deeper understanding of the career-selection process.

Carol S. Holzberg, Ph.D.
Shutesbury, MA

ALL THE RIGHT TYPE

DIDATECH SOFTWARE LIMITED,
3812 William Street, Burnaby, B.C., Canada
V5C 3H9, (604) 299-4435

Typing-instruction program; 64K Apple IIe, IIc, IIGS, $49.95

Rating: ❖ ❖ ❖

Computers in elementary schools are a fact of life these days. Students use them not only for reading, writing, and math, but also for running scientific experiments, gathering research materials, and developing programming skills. Given the limited time available for classroom instruction, good typing skills are essential. Kids shouldn't waste precious moments struggling at the keyboard when they could be developing ideas or working on an assignment.

THE RIGHT KEYS

Children can use computers more effectively when they're "keyboard savvy." All the Right Type is an interactive program designed to help youngsters learn how to type. It uses a four-step approach—introducing new keys; emphasizing accuracy and speed; building typing skills with words, sentences, and paragraphs; and testing students' performance. When kids finish the lessons, skill builders, and tests, they can use the mini word processor to reinforce their new keyboarding skills.

The lessons in All the Right Type are sequential—each one builds on previously learned skills. Students don't have to complete the exercises in the given sequence, however. The number of completed assignments will appear on the lesson menu, so it's immediately obvious which sessions they haven't done yet.

Youngsters should begin with Introduction to Keyboarding. Here they'll learn the importance of proper typing posture for agility and ►

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accuracy at the keyboard. They'll also learn correct finger positioning on the home-row keys (ASDFJKL;). Simple graphics provide visual reinforcement throughout the introductory section.

The first lesson set includes 18 topics, each containing 20 lines of practice type. These introduce students to the keyboard while building typing prowess. Students learn the location of new keys in relation to the home row.

All the Right Type incorporates both upper- and lowercase letters in the lessons. Entering an uppercase letter gives students practice with the shift key. The initial practice lines in Teach New Keys use individual letters rather than real words for the typing drills. The bulk of the lesson, however, requires students to type words, phrases, and sentences.

Lesson 12, for example, focuses on the letter *x*. Students begin by typing the home-row letter *s*. Next they're instructed to reach from *s* to *x*. A graphics representation of the keyboard appears on screen with a flashing letter *x*, so typing neophytes don't have to hunt for the key on their own.

Error analysis in Teach New Keys heeds the standard marking rules for typing. Students enter a line of type following the letter or word prompts set by the program's source line. Improperly typed letters or spaces result in a negative-sounding beep from the computer plus a message to correct the error. The target letter flashes to show its location.

SLOW AND STEADY

The section on speed and accuracy follows the same format. Students choose one of 18 lesson topics. Then they select a speed goal—slow speed is 15 words per minute (wpm); average is 20 wpm; and fast is 30 wpm. They can also choose their own speed. Typists can't advance to a new line if they make a typing error or don't meet their goal.

Each lesson contains 20 lines of practice type. After students complete a line, they'll receive a progress report showing the number of the line just typed, the speed achieved, and the error count. Missing spaces, letters, or words in the typed line show up as highlighted mistakes in the source line. Incorrectly typed spaces and letters appear as errors on the typed line. Typists then decide whether to try again, skip the line, or reset the speed.

The Skill Builders section presents 18 lessons following the same categories set out in Teach New Keys and Speed/Accuracy. Each Skill Builder, however, requires students to type multiple rather than single lines of isolated words, sentences, or paragraphs. When a section is complete, the program displays the speed and error count. Students may opt to repeat the section or move on to the next typing passage.

The Tests offer a choice of 14 quizzes. Kids can choose whether or not to activate the clock. If they choose a timed paragraph, they must also select a speed goal. To succeed at the stated speed, a student must reach a highlighted letter in the passage before the time expires. After the test, students receive a progress report showing speed and number of errors. Typists may then repeat a test or move on to the next challenge.

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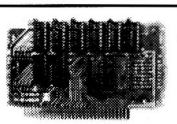

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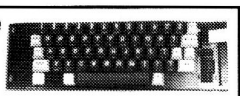

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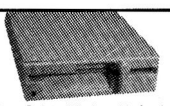

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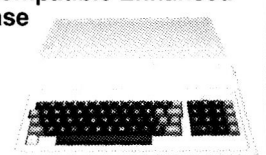

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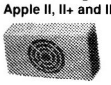

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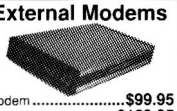

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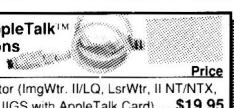

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customizing options, recordkeeping capabilities, and authoring potential. To get to the customization menu, press Control-C right after loading the program, then tailor such options as the number of penalty points from zero to ten, disallowing the delete key or word wraparound, configuring the printer slot, and toggling the mini word processor from 40 to 80 columns.

The delete key and word-wraparound options are very important. These features enable instructors to configure the program as a typewriter or a word processor. Typewriters traditionally make no provision for using a delete key. In addition, typists must press Return after every line of type. On the other hand, word processors incorporate word wraparound and let you edit errors, making the computer an attractive typing alternative.

The cursor will move to the beginning of the next line automatically if word wrap is active. Even if you're in the middle of a word when you reach the right margin, you still won't have to press Return, because the entire word will shift to the next line. When word wrap is activated, students don't have to press Return during the Skill Builders and Tests.

The Authoring System (which you get to by pressing Control-A at startup) enables instructors to customize as many as 30 lessons, 30 skill builders, and 14 tests, which are all stored on a specially prepared data disk. You can initialize data disks within the program. The Authoring System's simple word processor lets you edit existing materials, delete them from disk, or print them.

The recordkeeping options store Skill Builder and Test information about typing speed and error count for up to 30 students. To customize the recordkeeping feature, type Control-R and follow the menu prompts to set up a new system, work with an existing system, or merge files from multiple disks. Once the recordkeeping system is active, a list of student names appears at startup. Students sign in by typing the appropriate number next to their names. They may still practice keyboarding if the name isn't on the list, but the program won't keep any of their records.

All the Right Type provides solid typing instruction guaranteed to increase a student's prowess at the keyboard. Youngsters can repeat each lesson or test as necessary to improve speed and accuracy. Immediate and specific feedback keeps both teachers and typists informed. The manual contains detailed instructions, lesson plans, and masters for reproduction or use as overhead transparencies.

THE LAST WORD

While All the Right Type has no serious flaws, it lacks certain features offered by other keyboarding applications. First, it doesn't adjust automatically to your abilities. Also, it doesn't provide additional practice on those keys that need special attention.

Finally, the program presents lessons in a monotonous, repetitive fashion. There are no action-packed, motivating, skill-building typing games. All things considered, All the Right Type can best be described as an electronic textbook—heavy on content but low on instructional pizzazz.□

Carol S. Holzberg, Ph.D.
Shutesbury, MA

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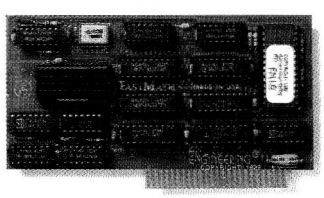

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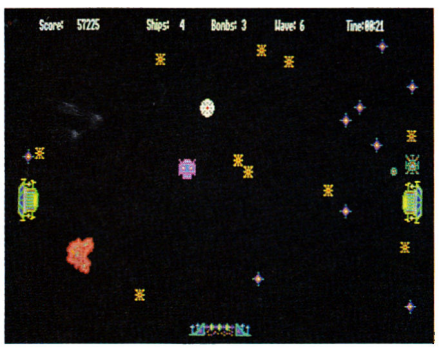
Crystal Quest, Casady & Greene, P.O. Box 223779, Carmel, CA 93922, (408) 624-8716; 512K Apple IIGS; $49.95
Rating: ◆ ◆ ◆

JUST WHAT I NEED—ANOTHER furiously addicting arcade game to occupy my days. Crystal Quest has deliriously fast action, entertaining (although relatively simple) graphics, and amazing digitized sounds. You control a star-shaped orb with your mouse; you have to move it around to capture all the glowing crystals on screen, then escape through a portal that opens at the bottom of the screen after you have all the crystals. Sounds abysmally simple, doesn't it?

Not quite—as soon as you start moving around, all sorts of bizarre critters start popping out of the side doors. Some of these mean and nasty buggers just float around getting in your way, while others are bent on your destruction.

You'll see floating blobs, things that shoot at you slowly, things that shoot fast, things that fire lasers across the screen, things that lay mines, things you can't get rid of by shooting



them (they only hibernate for a while), things that hurl shrapnel in every direction when you hit them, and things that let go with bouncing bombs.

You can, of course, fire a couple of rounds at any creature that gets in your way by clicking your mouse. (You fire in the direction you're traveling.) If you really find yourself in a jam, though, you can use a bomb, which clears everything on screen except the mines that were there in the first place. There's only one way to clear out those mines, but it costs you a life.

Then there are those items on screen that you *want* to bump into—extra bombs, bonus points, floating crystals that give you bonus points when you catch them, and, of course, all the other crystals. Once you've cleared a level (or *wave* as it's called in Crystal Quest), getting out is no piece of cake. Bumping into the side of the escape portal is every bit as hazardous to your health as the roving critters you were just worrying about. And if that isn't enough, at higher levels the escape hatch moves from side to side.

Crystal Quest is a blast—no doubt about it. You always figure you can do just a little bit better on the next game, so you try again. I guess that's what they mean by "addictive."

and plays . . .

Deja Vu II: Lost in Las Vegas, Mindscape, 3444 Dundee Road, Northbrook, IL 60062, (312) 480-7667; 768K Apple IIGS, ROM version 01 or higher, system-disk version 3.2 or higher; $49.95
Rating: ◆ ◆

YOU'RE REALLY IN DEEP this time. You've awakened in a dingy bathroom in a Las Vegas hotel; you've got a screaming headache and a price ►

SHORT TAKES

TRIANGO

California Dreams, 780 Montague Expressway, #403, San Jose, CA 95131, (408) 435-1445, $39.95

It's Chinese checkers in the 23rd century—and the graphics screens are superb. The object is to capture your opponent's playing pieces within a triangle; match wits against the computer or up to three other players. Hints are included at the novice level. It's fun and unpredictable. (See Games Editors Play, August 1989, p. 91.)

Rating: ◆ ◆ ◆ ◆ ◆

SPACE QUEST II GS

Sierra On-Line, P.O. Box 485, Coarsegold, CA 93614, (209) 683-6858, $49.95

That slimeball Sludge Vohaul is at it again. He's out to launch a massive invasion of genetically mutant insurancemen who won't take no for an answer. It's up to you, Roger Wilco, hapless adventurer and janitor of the universe, to stop him. There's some pretty funky scenery, and an infinite variety of ways to get into trouble. It's weird, wild, and lots of fun. (See Games Editors Play, August 1989, p. 91.)

Rating: ◆ ◆ ◆ ◆

WAR IN MIDDLE EARTH

Melbourne House, 711 West 17th Street, Costa Mesa, CA 92627, (714) 631-1001, $49.99

The familiar characters of J.R.R. Tolkien's *Lord of the Rings* trilogy—Frodo, Sam, Pippin, and the rest—are brought to life on a beautifully detailed map of Middle Earth. You're out to destroy the magic ring in the fires of Mount Doom. It's just as interesting to scout about as it is to carry out your quest. Graphics and animation are smooth and artistic. (See Games Editors Play, July 1989, p. 85.)

Rating: ◆ ◆ ◆

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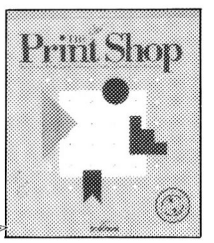

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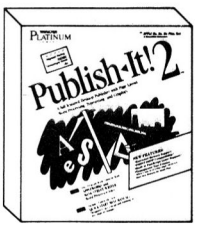

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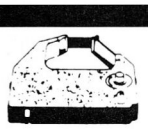

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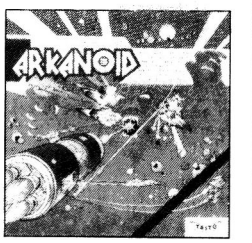

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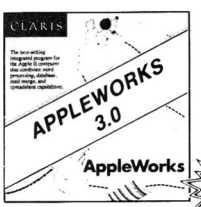

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on your head. You owe the gangster Tony Malone $100,000 and you have a week to pay it back in cash, or Tony will find some other way to get it out of you.

This time you really *have* been here before. The setting and premise are similar to those of the first Déjà Vu, and you start off equally dazed and clueless. But finding those clues should be no problem—after all, you're supposed to be a private detective.

Now how are you going to gather up 100 grand in just a week? You could start off at the blackjack tables in the casino downstairs at your hotel, but unless you're incredibly lucky, you'll eventually have to look elsewhere. You'll certainly need some cash as you scout around Las Vegas, though, so that's a good place to start.

One hint here—to amass enough spending

money to make it through the week, play some blackjack and save your game after every winning hand. It's cumbersome, but it beats the odds.

As in other adventure games, this one demands your insatiable curiosity. Examine everything and pick up any item that isn't nailed down. You never know when it might come in handy—especially with Malone's thugs lurking at every turn.

The world of Déjà Vu II looks and sounds about as realistic as you can expect. There are plenty of places to explore and there's plenty of trouble to get into.

The desert scenes are beautiful, but if you see too many of them, chances are you've traveled way off track and had better turn around.

To get anywhere you're going to have to spend a good amount of time (and money) wandering about. Watch out—nothing is obvious, and, as in the real city that serves as the setting for Déjà Vu II, everyone wants your money.

JOE ABERNATHY PLAYS . . .

Impossible Mission II, Epyx, P.O. Box 8020, 600 Galveston Drive, Redwood City, CA 94063, (415) 366-0606; 512K Apple IIGS; $19.95
Rating: ◆ ◆ ◆

THIS IS THE SEQUEL TO A GAME that never was—the Apple IIGS version of Impossible Mission. But it stands quite well on its own, intertwining arcade action, exploration, and strategy with a race against the clock.

Impossible Mission II has nice stereo sound and animation, and its balance of play appeals both to those with reflexes still intact and to . . . others of us.

The action takes place in a nine-tower, 25th-century Los Angeles office complex designed by the sick, twisted mind of Professor Elvin Atombender.

The Professor is bent upon world destruction and yours, because of an unfortunate childhood as a computer nerd. (The manual is lively and well written, and weaves an amusing tale around this idea.)

Your task is to find a stealthy path through Atombender's legions of security robots, discover codes to pass from tower to tower, and collect fragments of a song for use in the final confrontation.

You can use the complex's computer network to befuddle the robots, but only if you can snatch pass keys from under the robots themselves. (Watch out—they're deadly, whereas your only weapons are your fast feet and quick wits.)

The Professor's plot will be set in motion if you exhaust your lives—which are plentiful, but not endless—if you use too much time, or if you succeed at all the tasks, but in the wrong order.

You have to solve each tower completely before moving on to another, although the game's designers built in a margin of error to make play a bit more forgiving.

When you're ready to tackle the central tower, you'll come up against Atombender's raw, evil genius.

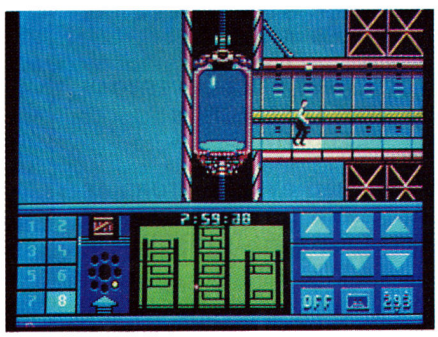
But first you must use an on-screen "tape recorder" to arrange the music fragments you've collected from each tower into a coherent song. Beware: If a fragment's missing, you lose.

Using your completed song as a key to the control center, you can attempt to reprogram Atombender's computers to abort his attack on the world. (This is a good place to use the save-game feature—you can easily be killed.)

The game's programmers make skillful use of the capabilities of the GS. Impossible Mission II has sharply detailed, scrolling scenery, fine animation, and good stereo sound.

And one thing you'll love is that these qualities don't come at the price of painfully slow performance, as is often the case with native GS software.

Attention to detail is evident also in the quality of game play: Although you may never succeed in finishing all nine towers in the time allotted—I haven't—you'll still be able to enjoy every part of the game except the final encounter. It isn't like a 20-level dungeon you



have to explore sequentially.

And in similar fashion, the game's puzzles offer a mental challenge that doesn't resort to the often unsolvable trickery of Infocom-style adventures.

What's your pleasure? Some of you may dislike games whose implied moral is that you can succeed by smashing your way to victory. Others may simply be tired of the unoriginal amusement offered by smash-'em-ups.

But both groups of people may like this game, for it achieves attention-grabbing action without relying on the fire button (although you may need to press it to somersault out of harm's way).

Impossible Mission II is worthwhile entertainment—patient enough for idle amusement, challenging to the accomplished gamer.

My only disappointment was that the disk has an unusual, hidden copy-protection scheme that not only prevents backups and hard-drive use, but renders even the factory disk useless in conjunction with the OKS Multi-Kache disk accelerator.□

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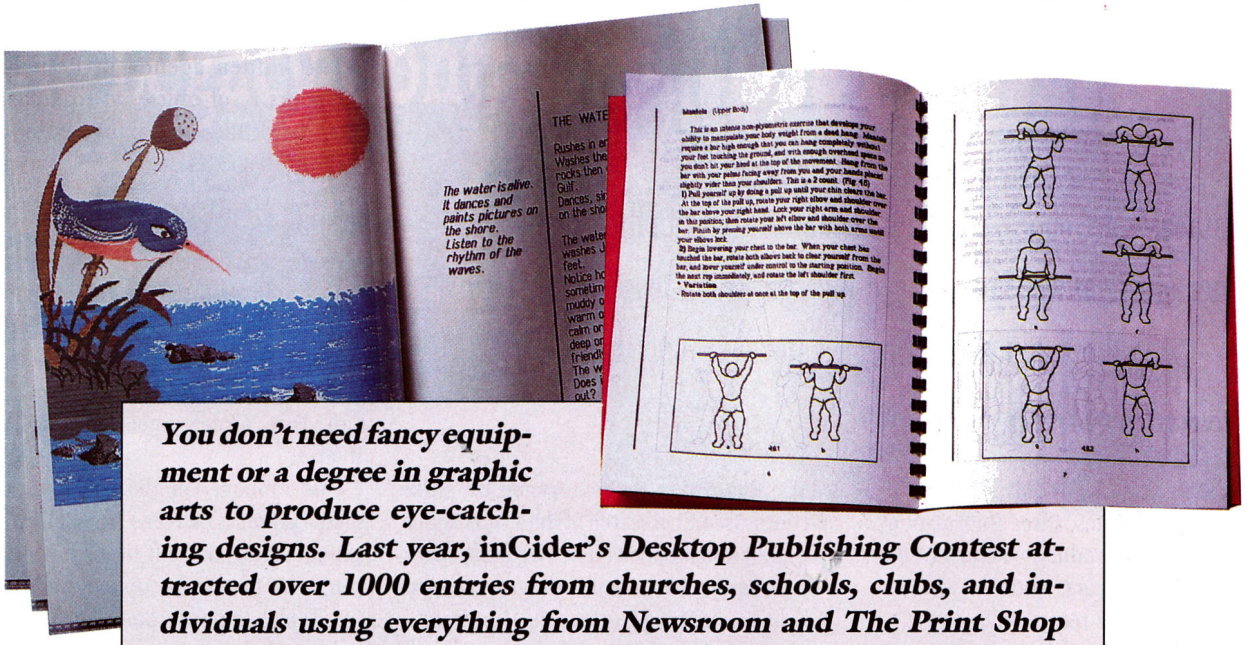

You don't need fancy equipment or a degree in graphic arts to produce eye-catching designs. Last year, inCider's Desktop Publishing Contest attracted over 1000 entries from churches, schools, clubs, and individuals using everything from Newsroom and The Print Shop to Publish It! and Springboard Publisher to DeluxePaint II and PaintWorks Gold.

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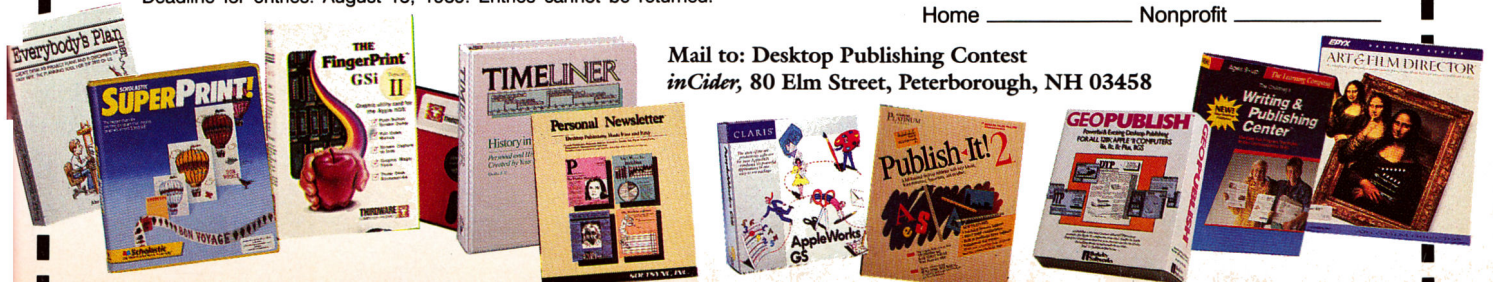

DATABASES IN DISGUISE

Databases are chock-full of information—but can they keep kids entertained, as well? Four easy-to-use programs teach youngsters to think creatively about the world around them.

By CYNTHIA E. FIELD, Ph.D.

IF "DATABASE ENTERTAINMENT" SEEMS a contradiction in terms, three information-filled yet *imaginative* products—Return of the Dinosaurs, Grizzly Bears, and World Geo-Graph—should set the record straight.

While we're at it, let's take a look at a fourth "data-based" program, College Explorer—a post-high-school stress-syndrome preventative.

BACK TO THE FUTURE—APPLE-STYLE

No question about it: Dinosaurs are making a comeback. They populate books, toys, even pajamas. Among the latest products are AEC Software's **Return of the Dinosaurs**, the first "dataventure."

AEC might just as well have named this program "Where in the World Is Carmen Allosaurus?"—because Return of the Dinosaurs plays much like Broderbund Software's popular geographic sleuthing series.

The scenario: Like the wacky scientist in the movie *Back to the Future*, Professor T. Rex in Return of the Dinosaurs has invented a Time Transporter.

Alas, a faulty circuit has created an electrical overload, causing a "crack in time" through which dinosaurs can squeeze. One by one, they invade the town. These dinos aren't violent, but they sure do give folks nightmares!

Your mission (should you choose to accept it) is to travel through four colorful graphics scenes (Main Street, the countryside, the park, and the museum) in search of clues. Talk about graphics onomatopoeia! The hardware store is shaped like a claw hammer, the grocery store looks like a shopping bag, and the laundromat is a veritable front-loading washing machine. The hot-dog emporium? You guessed it—bun and all.

GET ORGANIZED

On level 1 (of four), the program helps you locate clues. Sergeant Prime Evol at the Police Station probably has some information. Maybe you should hop on the bus ($3 please) and ride to another scene.

Funds are limited, though. So's your time: The program takes breaks automatically for eating and sleeping. You can earn extra money by answering questions in the newspaper's Dino Column or by chancing upon other opportunities for moonlighting.

Organize your clues by typing key words into the electronic Notebook at the bottom of the screen. When you think you know the identity of the dinosaur at large, fire up the Time Transporter and return the dino to its original habitat on the program's pre-continental-drift world map. If you succeed, the critter rewards you with a full-screen self-portrait and a word of thanks for "your kindness."

The hidden agenda in Return of the Dinosaurs is, of course, to coax children to learn the identities and appreciate the lifestyles of some 70 species.

DINO DATA

As they participate in each game, children branch off at will to access the Dinofile database, a storehouse of facts including Name, Pronunciation, Geologic Period, Place, English Name, Size, Weight, Measurement, Locomotion, Diet, Order, Suborder, and Notes of Interest.

One caution: On the GS' RGB monitor, some graphics screens in Return of the Dinosaurs are difficult to discern even when you've set the Display option on the GS Control Panel to monochrome. We don't think the lack of resolution will interfere unduly with most people's enjoyment of the program, though.

BEAR FACTS

More interested in contemporary critters, you say? Embark on a journey into the American wilderness, courtesy of the Audubon Society and Advanced Ideas.

Grizzly Bears, first in a series of "Wildlife Adventures" from this team of collaborators (coming soon: **Whales**, **Sharks**, and **Poacher Patrol**), wins a gold star from this armchair naturalist. (See our review, May 1989, p. 38.)

Separate versions are available for the Apple IIe/IIc and the GS. While the GS edition has superior graphics, the IIe/IIc version is also top-notch.

Grizzly Bears offers four interactive (and refreshingly nonsexist, nonracist) stories. In the first, "On the Spot with Dr. Potts," you're a research assistant to Dr. Martha Potts; in "Bear Encounters," you're a field investigator working under Martin Esposito; in "Grizzly Bear Mystery," you help Officer Val Jenkins (an African American) bring a criminal to

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justice; in "Oil Explorer," Nick Wong, a seismic engineer, helps you strike black gold.

And just wait 'til you meet Dana Dinmont, the Forest Service's grizzly-bear expert! The program keeps track of your progress, and scenarios change each time you start a new game.

PARTICIPATORY LEARNING

Participating in a Grizzly Bears story is a particularly enjoyable way to spend an autumn afternoon. Here's one objective endorsement: Skipper, my black Labrador retriever, routinely cocks his head and noses around the GS when he hears the program's "insect" and "bird" sound effects.

On a more academic note, Grizzly Bears' scientifically accurate information is organized in three ways: the Bear Country Handbook, Grizzly Food Data Cards, and Grizzly Habitat Model. During the various stories, you'll use one or more of these resources to learn grizzly-bear habits and techniques for prudent environmental management.

The program's printed manual, *Grizzly Guidebook*, includes a note to parents as well as enticing enrichment activities. How about a grizzly version of *Win, Lose, or Draw*? Or Tic-Tac-Paw?

Projects like "Preserving Wildflowers" are terrific summer or fall activities in which the whole family—even the beary youngest—can participate.

AROUND THE WORLD IN 80 WAYS

World-class explorers more interested in people than grizzlies will love **World GeoGraph** from MECC. This product's the first substantial Apple II educational offering we've seen (apologies to AppleWorks Classic users). But World GeoGraph isn't for everyone: This revolutionary product runs only on the GS and requires 768K of memory. Two 3½-inch drives are recommended, and the mouse is required.

Lest you think this "geography discovery-learning tool" is just a high-priced ($139) database, be aware that MECC calls World GeoGraph a "living" map.

And with ample reason. With its GS good looks, its Apple Human Interface panache, its highly detailed maps, and its interactive database (according to the manual a printout of the complete database would take 1½ hours and create a stack of paper 3 inches thick), World GeoGraph could almost be considered the poor man's CD-ROM. Relatively speaking, of course.

Apple-click (press the Open-apple key and the mouse button simultaneously) on the World Map to zoom in for a closeup view of a continent. Zoom in yet another level to take a closer look at one of the 21 regional maps included in this world atlas of 177 nations. View a keyed theme map to study climate zones, elevation, energy consumption, or population density. Show national boundaries or hide them.

DYNAMIC DATABASE

Each map is linked dynamically to the World GeoGraph database with 55 categories of information, including "Death Rate," "Exports," "Newspapers in Circulation," "Per Capita Income," and "Population Age 60 and Over." Much like conventional database programs, World GeoGraph lets you find information according to plain-English rules you set up in dialogs.

Glide the "category" scroll bar to select the feature you want to investigate; click on the appropriate "rules" radio button: equals, contains, is less than, begins with, ends with, does not equal, does not contain, is greater than, does not begin with, does not end with. Single out a nation, or discover new relationships among seemingly disparate countries.

Information is displayed in "data cards" (vertical listings of information), tables (horizontal compilations of data), or bar graphs. Use the mouse, the Display pull-down, or keyboard-equivalent commands to select the data format you like best. Invoke the program's World Quartiles feature to evaluate a country's world standing in selected categories such as literacy rate or number of motor vehicles.

EXTRAS

You can add as many as three new information fields to the database. In addition, MECC says it plans to provide timely upgrades of the complete database disk.

A hefty user's manual describes the program in detail, and on-line help assists you in learning to recognize abbreviations, mouse-click productively, and construct search rules.

In addition, a ***Classroom Guide*** for teachers offers an abundance of lesson suggestions and reproducibles.

Thanks to World GeoGraph, children (and adults) both at home and at school can quickly discover among the countries of the world relationships that might otherwise require a three-foot stack of library books and days of work. In more ways than one, this program really clicks.

ONLY 2800 COLLEGES?

College Board's **College Explorer** may not be fun and games, but this self-directed "guidance office on disk" can help high-schoolers (or adults returning to school after a working or parenting "sabbatical") find the two- or four-year college that best suits their aspirations and their wallets.

College Explorer centers around a database of detailed information on some 3000 institutions of higher learning. Data are organized into six major categories: Basic (Type of Institution, Sex of Students, Enrollment Size, College Setting), Map (geographic location), Admission (Requirements, Financial Aid), Majors (Architecture to Zoology!), Student Life (Dorms, Sports, Special Services), and AP Information (acceptable Advanced Placement scores).

As specific features are presented on screen, check off those you consider "necessary," "preferred," or "unwanted." The program sorts

Fielding Questions

In a recent column we addressed the issue of running 8-bit software on the GS ("Welcome to the Real World," March 1989, p. 85).

Hilary Cowan of the Kanawha County Schools in Charleston, West Virginia, adds this reminder: When running 8-bit programs, don't forget first to set the system speed to "normal" via the GS Control Panel.

She further cautions that while most Apple II (non-GS-specific) programs run correctly, you may not be able to access printing features if the GS port isn't listed among supported interfaces.

Cowan's solution? Let's encourage companies to "either update their older software or specify on the outside of the package that the software is not compatible with the IIGS. . . . Consumers deserve to have that information before they [make a] purchase." □ **—C.F.**

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In fairness, she adds, these consultants do more than any single program can. (College Board is expected to offer a "college cost" program with information about loans and grants by the end of this year, according to Priven.)

Still, if you're searching on your own, College Explorer, priced at only $50, lends powerful assistance for a task that may otherwise seem overwhelming.□

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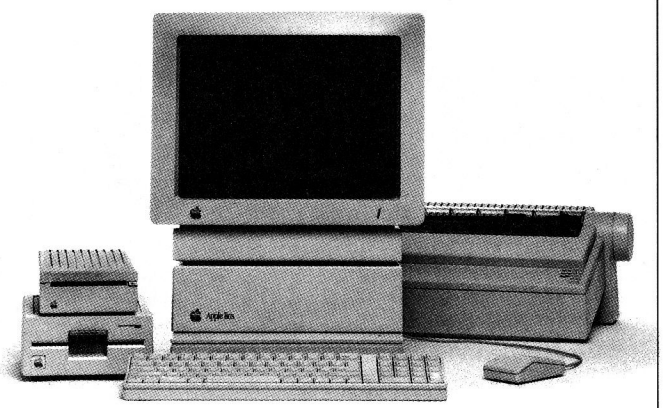

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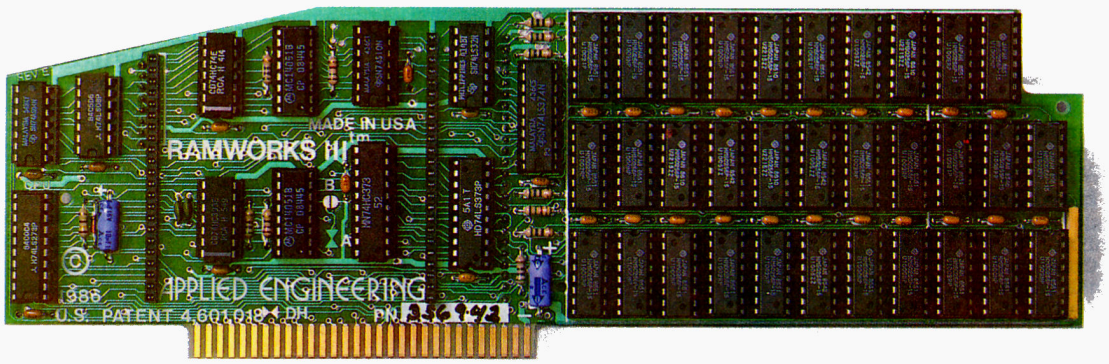

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While RamWorks III is recognized by all memory intensive programs, NO other expansion card comes close to offering the multitude of enhancements to AppleWorks that RamWorks III does. Naturally, you'd expect RamWorks III to expand the available desktop, after all Applied Engineering was a year ahead of everyone else *including Apple* in offering more than 55K and we still provide the largest AppleWorks desktops available. But a larger desktop is just part of the story. Look at all the AppleWorks enhancements that even Apple's own card does not provide and *only* RamWorks III does. With a 265K or larger RamWorks III, *all* of AppleWorks (including printer routines) will automatically load itself into RAM dramatically increasing speed by eliminating the time required to access the program disk drive. Switch from word processing to spreadsheet to database at the speed of light with no wear on disk drives.

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RamWorks, nothing comes close to enhancing AppleWorks so much.

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Using RamWorks III couldn't be easier because it's compatible with more off-the-shelf software than any other RAM card. Popular programs like AppleWorks, Pinpoint, TimeOut series, HowardSoft, FlashCalc, ProFILER, Managing Your Money, SuperCalc 3a and VIP Professional to name a few (and most hardware add on's like ProFile and Sider hard disks). RamWorks is even compatible with software written for Apple cards. But unlike other cards, RamWorks plugs into the IIe auxiliary slot providing our super sharp 80 column text (U.S. Patent #4601018) in a completely integrated system while leaving expansion slots 1 through 7 available for other peripheral cards.

RamWorks III is compatible with all Apple IIe's, enhanced, unenhanced, American or European versions.

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Applied Engineering has always offered the largest memory for the IIe and RamWorks III continues that tradition by expanding to 1 full MEG on the main card using standard RAMs, more than most will ever need (1 MEG is about 500 pages of text)...but if you do ever need more than 1 MEG, RamWorks III has the widest selection of expander cards available. Additional 512K, 1 MEG, or 2 MEG cards just snap directly onto RamWorks III by plugging into the industry's only low profile (no slot 1 interference) fully decoded memory expansion connector.

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If you've got some other RAM card that's not being recognized by your programs, and you want RamWorks III, you're in luck. Because all you have to do is plug the memory chips from your current card into the expansion sockets on RamWorks to recapture most of your investment!

The Ultimate in RGB Color.

RGB color is an option on RamWorks and with good reason. Some others combine RGB color output with their memory cards, but that's unfair for those who don't need RGB *and* for those that do. Because if you don't need RGB Applied Engineering doesn't make you buy it, but if you want RGB output you're in for a nice surprise because the RamWorks RGB option offers better color graphics plus a more readable 80 column text (that blows away any

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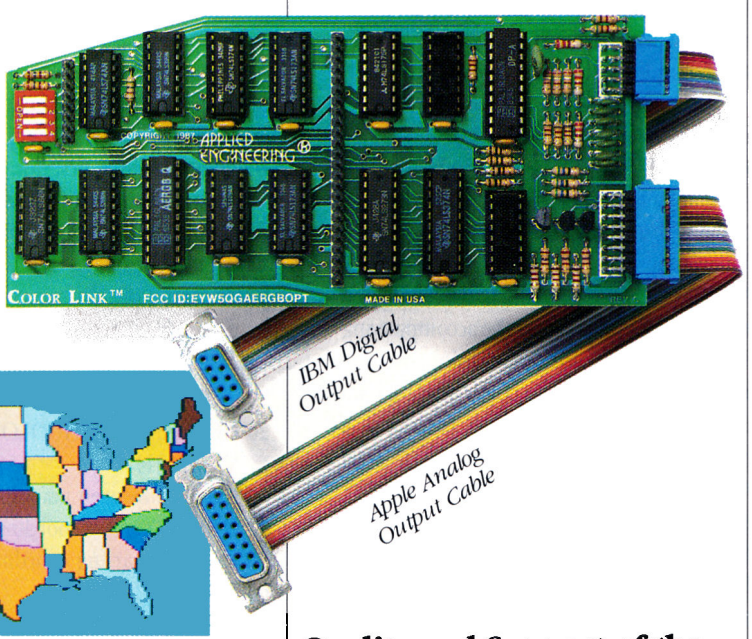
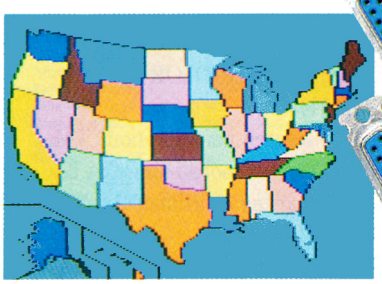
composite color monitor). For only $129 it can be added to RamWorks giving you a razor sharp, vivid brilliance that most claim is the best they have ever seen. You'll also appreciate the multiple text colors (others only have green) that come standard. But the RamWorks RGB option is more than just the ultimate in color output because unlike others, it's fully compatible with all the Apple standards for RGB output control, making it more compatible with off-the-shelf software. With its FCC certified design, you can use almost any RGB monitor because only the new RamWorks RGB option provides both the new Apple standard analog and the IBM standard digital RGB outputs (cables included). The RGB option plugs into the back of RamWorks with no slot 1 interference and remember you can order the RGB option with your RamWorks or add it on at a later date.

ColorLink™ RGB Option





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A+ magazine said "Applied Engineering's RamWorks is a boon to those who must use large files with AppleWorks...I like the product so much that I am buying one for my own system." inCider magazine said "RamWorks is the most powerful auxiliary slot memory card available for your IIe, and I rate it four stars...For my money, Applied Engineering's RamWorks is king of the hill."

"I wanted a memory card for my Apple that was fast, easy to use, and very compatible; so I bought RamWorks."

Steve Wozniak, the creator of Apple Computer

Apple experts everywhere are impressed by RamWorks' expandability, versatility, ease of use, and the sheer power and speed that it adds to any IIe.

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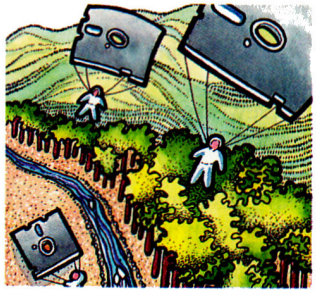

LEARNING CURVE

AN ORDERED WORLD

By DAVID D. THORNBURG, Ph.D.

Run, run, as fast as you can; you can't catch me, I'm the gingerbread man!

OF ALL THE WAYS YOU CAN USE COMPUTERS in education, the easiest and possibly most powerful application—microworld creation—is the least popular. Ever since I was introduced to software like the programming language Logo, I've been convinced that the personal computer is a special tool—a sophisticated instrument that encourages free-form exploration of conceptual domains (such as mathematics) with the ease that a microscope, say, allows exploration of the universe contained in a drop of pond water.

The domains open to you and your computer are unbounded. This month we'll examine *chaos*, a branch of mathematics that deals with order and disorder and whose impact spans the sciences. (See "Something Strange," Stattus Report, August 1989, p. 20.) All the software you'll need to delve into one part of this world is contained in the accompanying 16-line Applesoft BASIC **Program listing**.

A word of caution: Once you begin investigating this microworld you may find hours passing in a flash. I've invested more than 50 hours of my time searching this domain and have been left with more exciting questions than the ones I started with!

Our microworld consists of a graph—a set of dots painted on the display screen. You'll choose the location of the first dot and the program applies the microworld's rules to that location to generate the positions of the other dots. This is similar to a physics problem in which the starting position and velocity of a particle might be described, and then all future positions are governed by the laws of gravity and motion.

The position of each dot is indicated by X- and Y-coordinates, expressed as a pair of numbers separated by a comma. For example, 0,0 might be the center of the screen, 50,50 might be the upper right corner, and so on. Following are the rules for the microworld we'll create this month.

Pick a starting location, X,Y. The next dot is located at Xnew,Ynew where Xnew = 1 − Y + Abs(X) and Ynew = X. Abs(X) is the *absolute value* of X—its value without its sign. These rules are applied over and over again for each new dot in the sequence to generate a picture on screen.

What questions might we ask? First, does the resulting picture reach a stable point with a finite number of dots on screen? Is there a pattern to the dots? Does this pattern depend on the starting coordinates? Do integer starting points result in different results from those generated with non-integer values? The accompanying **Program listing** can help us answer such warmup questions.

Enter the program into your computer and save it to disk. The first few lines set up the magnification of the screen, the coordinates of the screen center, and the location of the first dot. Lines 60–150 plot points you can see on screen (based on your chosen magnification and screen-center coordinates) and calculate the coordinates for the next dot. Your computer carries out this process 5000 times (line 60). You'll want to increase this number when working at high magnifications.

Program listing. Rules of a microworld.

```
 10 REM Gingerbread Man
 20 HOME : HGR : HCOLOR = 3:
    VTAB (21)
 30 INPUT "Desired magnification? ";M
 40 INPUT "Center coordinates? ";A,B
 50 INPUT "Starting coordinates? ";X,Y
 60 FOR I = 1 TO 5000
 70 U = 140 - M * A + M * X
 80 V = 95 + M * B - M * Y
 90 IF U < 0 OR U > 279 THEN 120
100 IF V < 0 OR V > 191 THEN 120
110 HPLOT U,V
120 XN = 1 - Y + ABS (X)
130 Y = X
140 X = XN
150 NEXT I
160 END
```

Let's get started by running the program with the following values: magnification = 15; center coordinates = 1,1; starting coordinates = 0,0. You should see six dots on screen like those in **Figure 1**. ►

Illustration • Debra Howard

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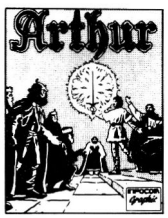

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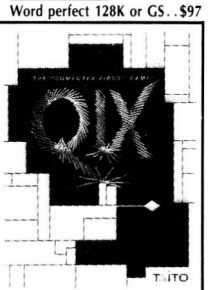

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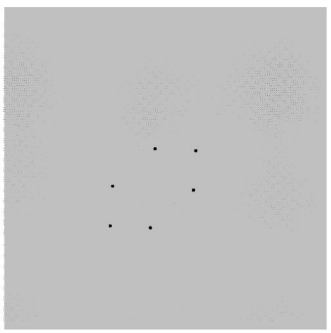

Figure 1. Starting at origin.

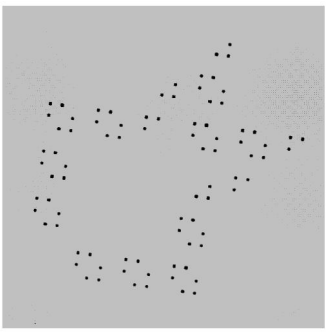

Figure 2. Integer starting location.

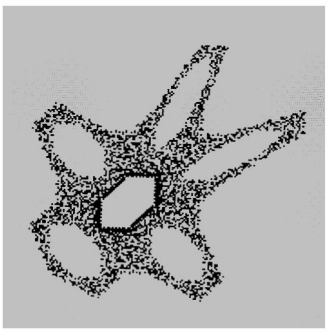

Figure 3. Starting at −.03,0; mag = 15.

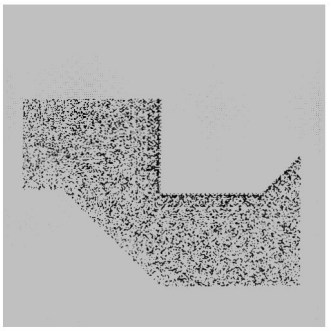

Figure 4. 100x ; centered at 0,0; starting at −.03,0.

You can convince yourself easily that the cycle repeats itself after six points by carrying out the calculations by hand.

Next try repeating the process with other integer starting points. Use the same magnification and center coordinates and create pictures from these starting values: 1,0; 2,0; 3,0; and so on. Reduce the magnification for large values of the starting coordinates. Now what starting values can you find to produce the picture in **Figure 2**?

Thus far it seems that for integer starting points at least, the resulting picture is made from a fixed number of points whose cycle repeats indefinitely. Test this idea with other integer starting values to see what you find.

Now, we started this article with a line from a children's story about the gingerbread man who escaped from the kitchen and was chased through town by everyone who saw him. The program you're working with can create a gingerbread man—and no matter how fast the computer runs, it can never catch all of him on screen!

To see for yourself, run the program with these values: magnification = 15; center = 1,1; starting point = −.03,0. After 5000 points you should see a picture like **Figure 3** on screen. What happened? Had we started with the coordinates 0,0, we would have seen only six dots on screen. By shifting our starting point ever so slightly to the left we've created a whole new picture—a gingerbread man partway through a somersault.

Is there a pattern to the seemingly random array of dots that make up the gingerbread man's body? **Figure 4** is a blowup of the region around the origin. To create this figure change the number in line 60 to 100,000; use a magnification of 100 centered at 0,0; repeat the starting value −.03,0.

From this picture we might conclude that our gingerbread man is filled with a random assortment of dots, yet the boundaries of this area are very tightly defined. In fact, the dots aren't random at all—they're determined by the simple rules we discussed at the beginning of this article.

As you continue to experiment with the program on your own, keep some questions in mind. Do all noninteger starting points produce gingerbread men? Are there any tiny gingerbread men lurking about in the chaotic array of dots?

This simple program can provide hours of fruitful exploration in any math class, and can even form the basis for an in-depth research project on chaos. If we can create exciting educational microworlds this easily, why aren't we using more of them?□

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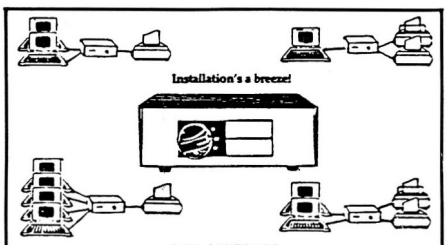

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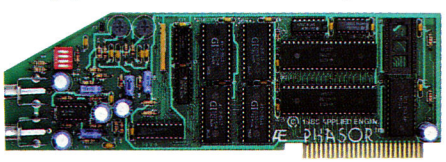

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Apple users know there's always an easier way to get the job done. A shortcut here, an elegant twist there—that's what Hints & Techniques is all about. It's an information swap for readers who want to share their programming pointers, hardware secrets, AppleWorks applications, and all kinds of other insights.

UNIVERSAL DOUBLE-HI-RES PICTURE LOADER

By Barclay R. Clemesha

NEED A DAZZLE DRAW OR BEAgle Graphics picture loader? Michael Ko's "Dazzle Draw Picture Loader" (Hints & Techniques, August 1988, p. 91) works fine for Dazzle Draw, but it won't load Beagle pictures.

The program's also slow and involves three separate file operations. That extra complexity creates wear and tear on you and your drives. Is there a way to streamline Picture Loader?

Graph.Load (see the **Program listing**) not only eliminates the two extra file operations, but loads both Dazzle Draw and Beagle Graphics files automatically.

Graph.Load's also faster, because it uses the II's ROM-based subroutines MOVE and AUXMOVE; you don't have to shuffle data back and forth between your computer's memory and the disk drive.

Type in, SAVE, and RUN Graph.Load to display either Dazzle Draw or Beagle Graphics pictures from drive 1 or 2.

Press Return (don't specify a filename) to display the current double-hi-res image. Watch out—you'll see garbage if you haven't loaded a file!

Write to Barclay R. Clemesha at I.N.P.E., C.P. 515, 12201 S. J. dos Campos, Sao Paulo, Brazil.

Program listing. Graph.Load.

```
5  REM  Graph.Load Double Hires Loader  [5889]
6  REM  by Barclay Clemesha  [3834]
7  REM  Copyright 1989, inCider  [4820]
10  LOMEM: 24577: POKE  - 16383,0:D$ =  CHR$ (4):M$ =
    CHR$ (13)  [5972]
20  POKE 768,56: POKE 769,76: POKE 770,17: POKE 771,1
    95: REM  AUXMOVE caller  [5902]
30  POKE 16386,144: POKE 16387,80: REM  Check bytes  [4424]
40  PRINT D$"PR#3": INPUT "File Name ? ";F$  [3547]
50  IF F$ = "" THEN 200  [1690]
60  PRINT "DRIVE ? 1/2 ? ": GET DRIVE$: IF DR$ = M$ THEN
    DR$ = "1": REM  Default drive 1  [9161]
70 DR$ = ",D" + DR$  [1318]
80  PRINT D$"BLOAD "F$ + DR$",A$2000": REM  Load file
     [5306]
90 MLOW = 32:MHIGH = 64: REM  DD start/end addr's for
    auxmem  [7972]
100  IF  PEEK (16386) <  > 144 OR  PEEK (16387) <  >
    80 THEN TYPE = 1: GOTO 130: REM  TYPE=1 if DD  [4534]
110  PRINT D$"BLOAD "F$".AUX" + DR$ + ",A$4000": REM
    BG since check bytes unchanged  [7952]
120 MLOW = 64:MHIGH = 96:TYPE = 2: REM  BG start/end
    addrs  [4419]
130  GOSUB 220  [232]
140  POKE 60,0: POKE 61,MLOW: POKE 62,0: POKE 63,MHIG
    H: POKE 66,0: POKE 67,32  [5832]
150  CALL 768: REM  Move data to auxmem  [4108]
155  IF TYPE = 2 THEN 210  [1113]
160  POKE 60,0: POKE 61,64: POKE 62,0: POKE 63,96: POKE
    66,0: POKE 67,32  [3904]
180  POKE 770,44: POKE 771,254  [1715]
190  CALL 768: REM  Data to HGR pg1  [3374]
200  GOSUB 220  [586]
210  GET K$: TEXT : GOTO 20  [818]
220  POKE 49232,0: POKE 49234,0: POKE 49239,0: POKE  -
    16290,0: POKE  - 16384,0: RETURN : REM  Enable do
    uble-hires  [7226]
```

SHARED SUPER SERIAL

By Worth Lovett

WANT TO GET MORE OUT OF your Apple Super Serial Card (SSC)? Here's a simple project that'll let you connect up to three serial devices—printers, modems, or both—to a single SSC and free up a slot or two inside your Apple II.

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I decided to create my own serial expansion box after spending considerable time swapping cables for my ImageWriter and LaserJet printers. I also wanted to use a modem, although my Apple IIe's expansion slots were full.

If this is a familiar scenario, head out to a local Radio Shack, as I did, and purchase a 4-by-2⅛-by-1⅝-inch experimenter's box, three female and one male D-sub 25-pin panel-mount connectors, and a 25-pin flat-ribbon extension cable (male-to-female connectors) for about $20.

You'll also need a pencil-type soldering iron, solder, a couple feet of 24-gauge hookup wire of various colors, and mounting hardware for the connectors. Finally, you'll want an inexpensive multimeter to test your connections when you've completed the project.

To start, carefully draw the connector outlines on the experimenter's box. For easy soldering access, put the male connector on the side and the three female connectors on the top of the box.

Then drill 7/16-inch holes, 1 9/16 inch long, for the connector bodies, and carve out the spaces until the connectors fit snugly. Drill ⅛-inch mounting holes, and mount the three top connectors.

Cut ten 6-inch and 20 3-inch wires of various colors and strip ⅛ inch from the ends of each. Soldering each wire to the connectors will be easier if you also tin (pre-solder) the wire ends.

Solder one of the 6-inch wires into both pins 19 and 20 on the male connector. Then insert the wire through the side connector hole, and solder its end along with one of the 3-inch wires to pin 20 on one of the outermost female connectors.

Solder the other end of that 3-inch jumper with another 3-inch wire to the middle connector, and finish the connections by soldering the free end of the last 3-inch wire to the last female connector. Follow these same procedures for pins 1–8 on the male-to-female connectors.

Now test your connections. Set the multimeter for measuring resistance and test pins 1–8 and pin 20 for continuity from the male to each of the mounted female connectors.

At the same time check each pin against the others for shorts. If all the connections are correct, side-mount the last connector onto the box and you're now ready to test the results.

Plug one end of the extension cable into the SSC's connector and the other end into the side-mounted connector on the box.

Plug up to three of your serial devices (printers, modems, and so on) into the top connectors.

Make sure each device's settings are the same; you don't want to have to change the baud rate, for example, on the SSC each time you use a different printer—that would defeat the purpose of the expansion box.

Also, leave the power off on all but the one serial device you're using, because the expansion box doesn't use a switch to select a particular connector.□

Write to Worth Lovett at North Middle School, Forrest and Gorgas Avenue, Fort Campbell, KY 42223.

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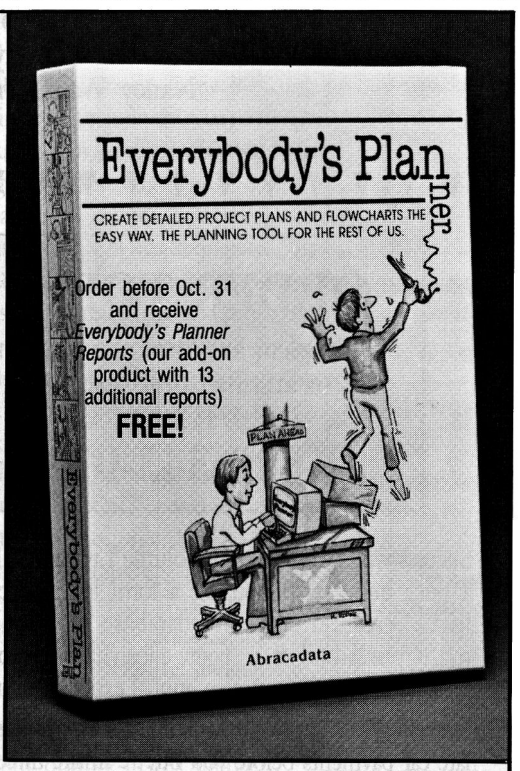

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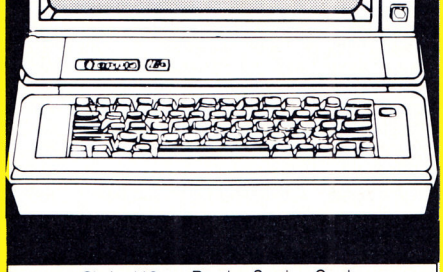

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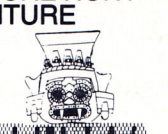

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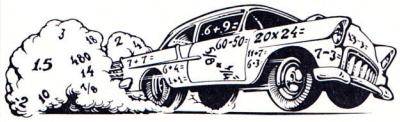

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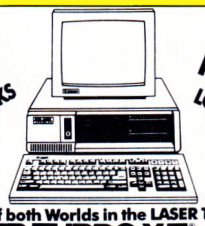

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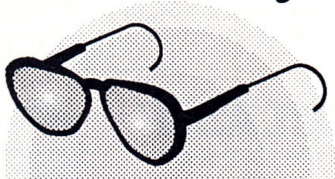

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EDITORS' CHOICE

IN QUEST OF A SOLUTION

WHO DUNNIT? WHO'S PUT THE FUN into math equations? Who's made word problems as engaging as they are educational? No, the butler didn't do it. Davidson did with its latest release, **Math Blaster Mystery**.

What's the MO? The program starts off with the standard "Davidson interface"—center screen, a picture of the package surrounded by icons representing the game's four activities. Kids can pursue Follow the Steps, Weigh the Evidence, Decipher the Code, and Search for Clues. As the titles indicate, each fits into Math Blaster Mystery's detective theme.

This math game's not so elementary, my dear reader. (The packaging states it's appropriate for ages 10 and up.) Math Blaster Mystery calls on some advanced arithmetic and problem-solving skills. The lower levels use simple whole numbers, but as you advance you're faced with combinations of decimals, percentages, negative numbers, and fractions.

The first activity, Follow the Steps, is essentially word-problem solving. Rather than reading a passage that begins with the usual premise—such as "If a train left Albuquerque traveling at...."—and arriving at a single answer, you solve a problem in four stages. You first define it by stating the information you'll need to solve it; you then determine the value a certain number indicates within the problem; and finally you come up with the numerical answer.

After seeing a target number in Weigh the Evidence, you then have to move four weights about on three scales to arrive at that number. You can't stack higher values on top of lower values. Once you've figured out the right combination, a trenchcoat-clad detective comes out to congratulate you.

Decipher the Code can be the toughest of the four activities. At the lower levels, it gives you an equation with missing numbers you have to fill in. At higher levels, you're working without the operators (the +, −, /, and × signs) and must create entire equations on your own.

Search for Clues is *inCider*'s favorite part. In this mystery-game portion, you see a picture of a room in a mansion. Occupying these quarters are characters resembling the stars of the board game *Clue*—Professor Plum, Colonel Mustard, and Miss Scarlet. Just click on any charcter or item—the lamp or the globe, for instance—and you'll get a clue to the mystery number, such as "N > 12." Keep going until you have enough clues to deduce the number.

At any time on any level, you can bring up a calculator to help with your figuring. Although it's handy, teachers may not want to make this crutch available. To disable the calculator, simply press C as the program loads.

"I always liked the game *Clue*," says Review Editor Lafe Low, "but I never liked math. Had Math Blaster Mystery been around when I was being forced into learning math, perhaps it wouldn't have been such a painful experience."

"As a former math teacher, I appreciate the context that Math Blaster Mystery uses to present fractions, decimals, and percentages," adds Senior Editor Paul Statt. "In Weigh the Evidence, kids will have to convert the numbers on each weight to the appropriate form before moving the blocks around to match the target number."

Come, readers, the game's afoot. Unravel the mysteries of math for $49.95 (3½- or 5¼-inch disk), from Davidson & Associates, Inc., 3135 Kashiwa Street, Torrance, CA 90505, (213) 534-4070.□

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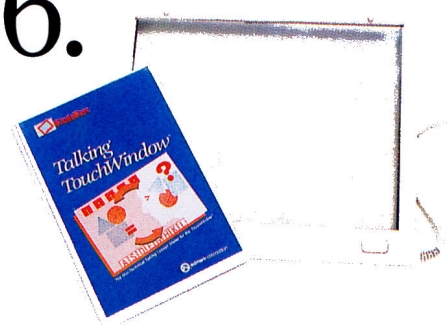

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While there are a few programs that use the Apple IIGS® built-in voice capability, for most of the Apple II family "talking software" it is still necessary to use an Echo Speech Processor.

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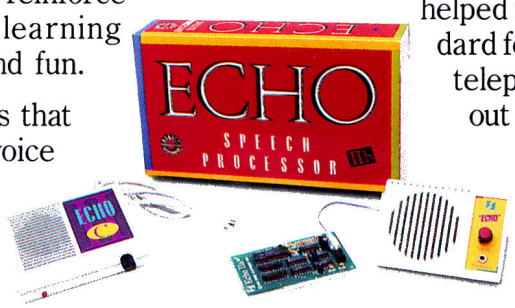

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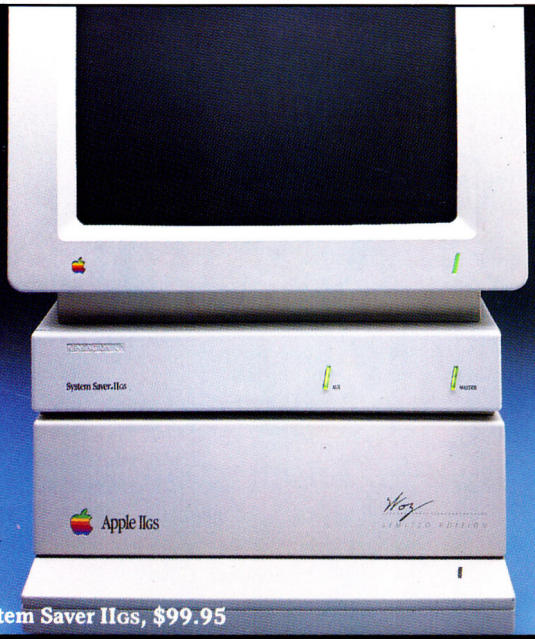

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Editors' Choice
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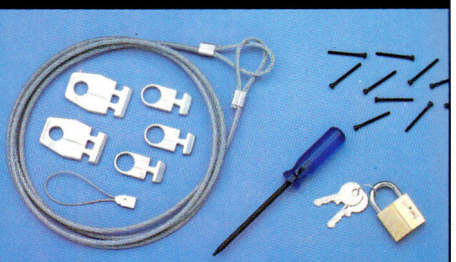

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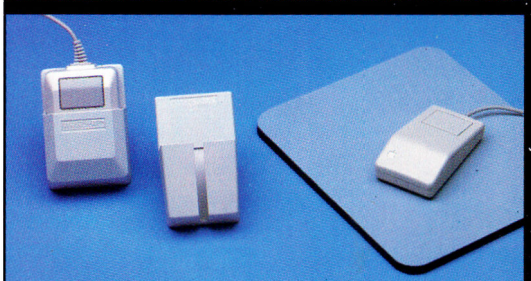

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