

inCider

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PUBLICATION
November 1990

RamFast SCSI

Editors' Choice, p. 96



Apple II / Macintosh

Exploring Hypermedia

6 Options Compared

**In Search of
Early-Learning
Software**
5 Programs
For the Preschool Set

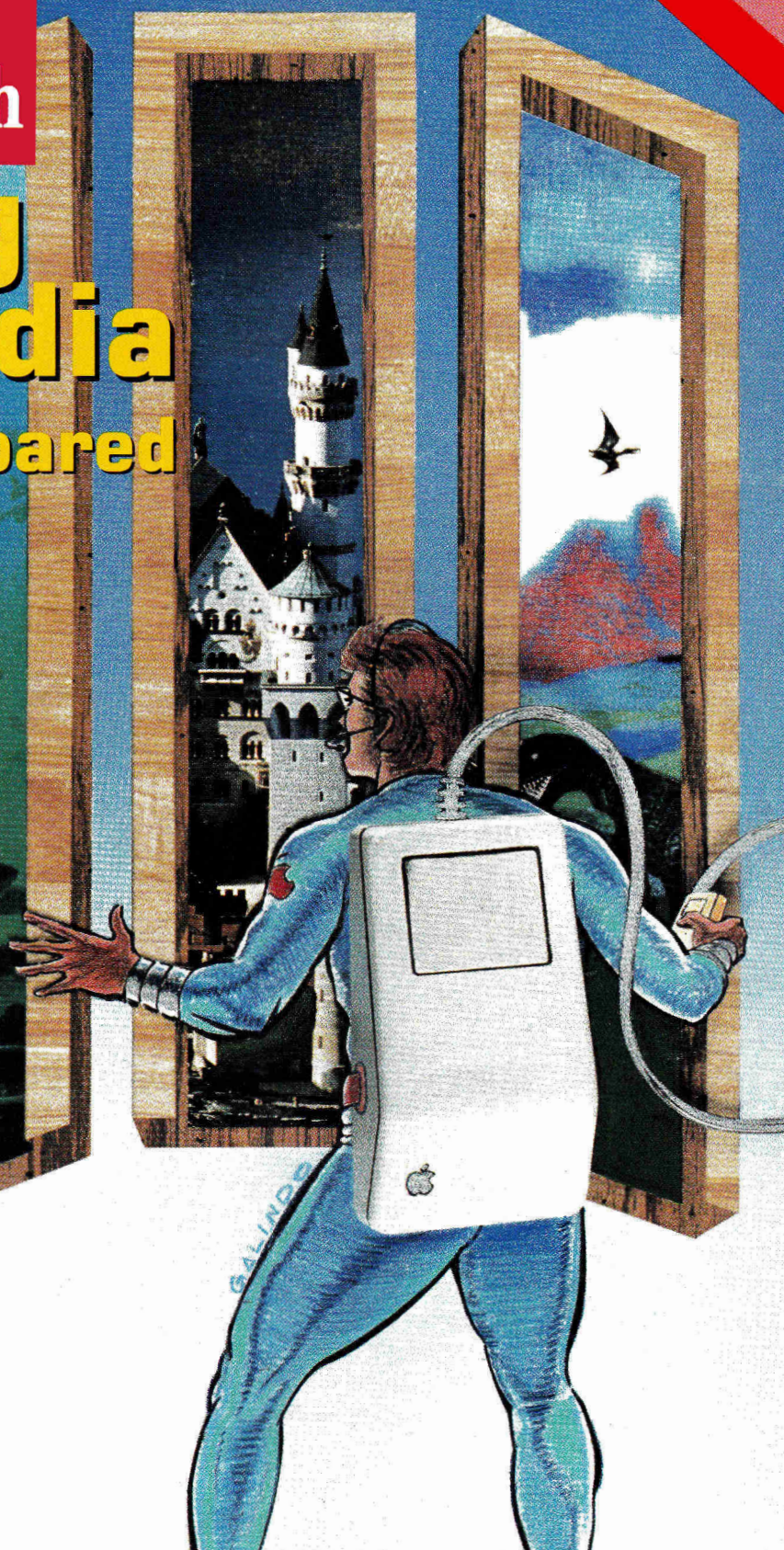
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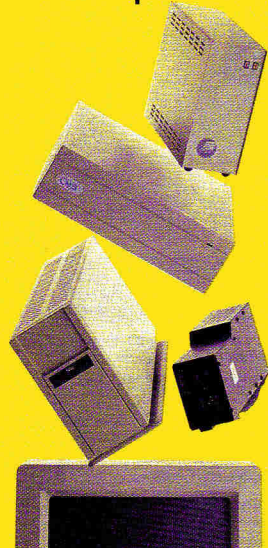
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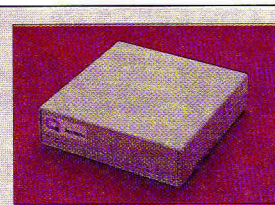
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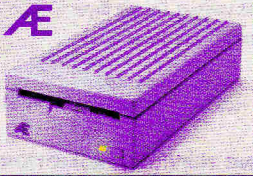
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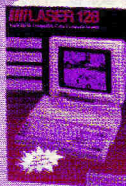
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inCider (ISSN #0740-0101) is published monthly by IDG Communications/Peterborough, Inc., 80 Elm Street, Peterborough, NH 03458. Phone: (603) 924-9471. Second-class postage paid at Peterborough, NH, and additional mailing offices. (Canadian second class mail registration number 9590.) Subscription rates in U.S. are \$27.97 for one year, \$43.00 for two years and \$59.00 for three years. In Canada, \$34.97, U.S. funds, one year only. In Mexico, \$32.97—one year only, U.S. funds drawn on a U.S. bank. Nationally distributed by International Circulation Distributors. Foreign subscriptions (surface mail), \$47.97—one year only, U.S. funds drawn on a U.S. bank. Foreign subscriptions (air mail), \$82.97 prepaid, U.S. funds drawn on U.S. bank, one year only. **Postmaster:** Send address changes to *inCider*, Subscription Services, P.O. Box 58618, Boulder, CO 80322-8618. (Send Canadian changes of address to: *inCider*, P.O. Box 1051, Fort Erie, Ontario L2A 5N8.)

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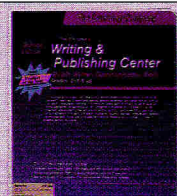
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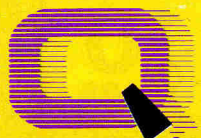
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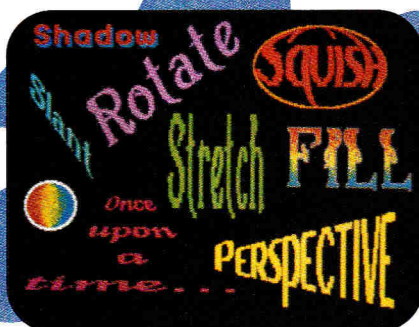
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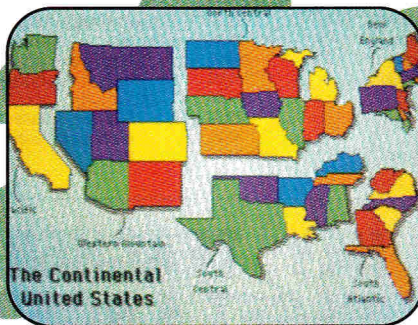
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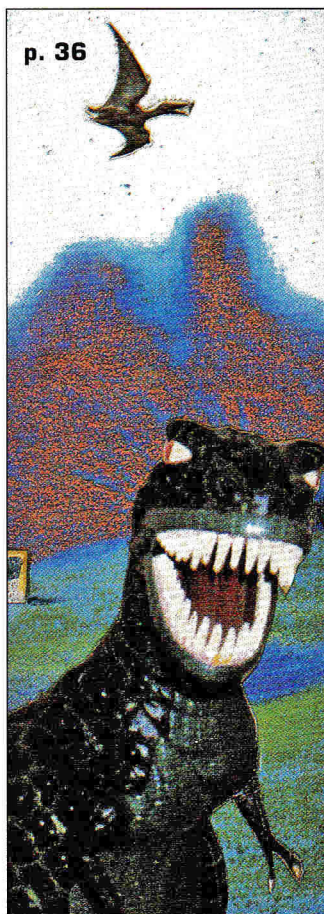
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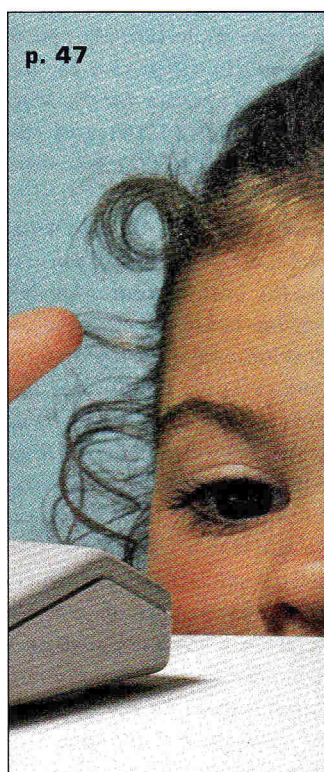
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47 Days of Discovery

The best software lets kids explore electronic worlds just as they explore their physical world — at their own speed and for their own reasons. *inCider* takes a look at five such programs for preschoolers and evaluates their potential for fun and learning.

54 Graphics Gallery: You Call That Art?

When art meets technology, the computer screen's your canvas. In this first installment in a six-part series exploring the dimensions of Apple II graphics, computer artist and teacher Debbie Greh looks at the 40-year history of this steadily evolving medium — where we've been and where we're headed.



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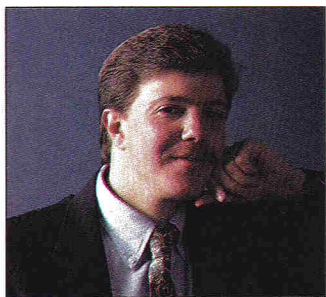
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INCIDER'S
VIEW

ALL IN THE FAMILY

By DAN MUSE * EDITOR IN CHIEF

It's time for
Apple II users to
see the Macintosh
as an ally,
not the enemy.

YOU PROBABLY DON'T READ MANY computer trade newspapers. We do — it goes with the territory. While a lot of what we read doesn't affect us directly, a few stories have an impact on the Apple II. For nearly a year, computer industry newsweeklies, such as *InfoWorld* and *MacWeek*, have been reporting heavily on new Macintoshes, which are anticipated this fall.

The implications are clear: Apple has been trying to sell Macs to schools for the last couple of years. At least one of the new Macs reported by *MacWeek* and *InfoWorld* will be designed to appeal to the education market and other markets that have historically been Apple II fare. When the rumored low-end Macs appear — computers that John Sculley has already pre-announced — expect to see big changes in the Apple world. That's not to say the II will shrivel up and go away, but things won't be the same. It's time for Apple II users to see the Macintosh as an ally, not the enemy.

Last month, in his letter to *inCider* readers, Sculley said, "We are currently working on a variety of 'bridges' between the Apple II and Macintosh families to make that synergy even better. During 1990 and 1991, Apple will introduce several new entry-level Macintosh computers, and at least one will have Apple II emulation capabilities"

One difference between New England and California is that East Coast types don't often use words like *synergy* — at least not with a straight face. In discussing the way the II and the Mac work together, however, *synergy* is appropriate.

Maybe *inCider* editors aren't typical Apple II users in every way, but we do use IIs eight hours a day. For the last year or so, however, Macs have been springing up at slow but steady pace. Does that mean we're getting rid of our Apple IIs? Hardly. Apple IIs still rule the office.

Some products we need to produce the magazine, however, simply don't exist for the Apple II. Quark Xpress, Adobe Illustrator, and so on are necessities in the magazine biz. We find

ourselves converting text and graphics from IIs to Macs with Apple File Exchange, SHR.Convert, and other products. On the other hand, it's true that the II is better suited for some things, such as affordable multimedia solutions. Also, the GS' inherent sound capabilities far exceed the Mac's.

On my desk I have an Apple IIGS and a Mac SE/30. The walls haven't started to bleed; the sky didn't turn black; I didn't develop a sudden and acute hatred of the Apple II. The II (the GS especially) and the Mac are more like kissing cousins than they are sibling rivals.

On the software side, the Mac and the GS bear a striking family resemblance. If you're familiar with one, using the other comes naturally. On the hardware side, the similarities are even greater. Apple SCSI (small-computer-systems interface) devices work with either the Mac or the II with a SCSI card. So you can, for example, use one removable-cartridge hard-disk drive with both machines: Just format one cartridge for the II and another for the Mac. The Apple Desktop Bus (ADB) and the AppleTalk network let the II and the Mac share more data and devices.

Apple, however, needs to convince hardware and software developers that it makes sense to market products for both systems. Apple's system-software group has done a great job of providing new development tools that make it easier to create better Apple II software. The cross-development tools are also available to let programmers design GS software on the Mac.

I don't believe that Apple intends to develop the Apple II line further. I *do* believe that Apple wants the II and the Mac to work well together. Apple wants to sell the similarities and connectivity of the two computers as a benefit to Apple customers in general. Okay, that's not great news for Apple II owners. But it's important to face facts: The Macintosh is good for the Apple II; they're part of the same family. Let's hope it's a family that sticks together for a long time. □



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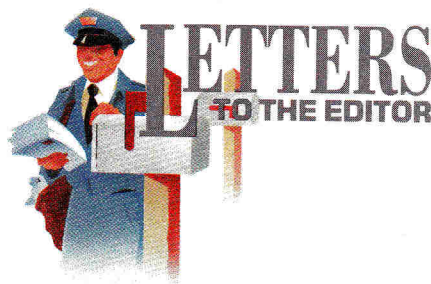
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Economics 101

IN THE JUNE 1990 STATUS Report, Paul Statt tells us to save the Apple II by buying "all the hardware you can afford." (See "Supply and Demand," p. 20.) Rubbish! I think Paul has been to too many three-martini lunches with Apple executives. If Apple would sell more IIs to new users, there'd be no problem. Apple should offer a decent warranty, customer support, and competitive prices. Every Apple II user I know loves the machine, but hates the company. We'll get our revenge — Laser will clone the GS at a fair price, the Mac will be eaten in the marketplace by Big Blue, and the legend will become history.

John Gilkey
Route 4, Box 299
Lynchburg, Virginia 24503

TWO RECENT EDITORIALS, "Supply and Demand" (Status Report, June 1990, p. 20) and "Creating a Market" (*inCider's View*, August 1990, p. 8), speak the truth about the declining Apple II market.

Mr. Muse's mention of Vitesse's Quickie scanner points out an important fact: Short of developing the product independently, there's no way to express demand for a product that doesn't exist. (Although I wrote to express my desire for a IIe version of the scanner, I doubt my one letter had any measurable affect.)

Mr. Statt's argument for buying all the Apple II hardware and software we can afford, however, is flawed. Running out and buying unwanted and unneeded items is absurd — especially if a product's quality is poor or its use is limited. If there's any real interaction between supply and demand, demanding mediocre products

should increase only the supply of mediocre goods.

Although third-party hardware has kept the Apple II running, there are remarkably few useful programs available for the machine. AppleWorks, Publish It!, HyperStudio and a handful of other programs represent a tiny fraction of the much-touted body of Apple II software. Only a continued supply of quality software will keep the Apple alive.

If you must spend every available dollar on Apple II items, buy what you find useful. It's better to buy ten copies of AppleWorks, WordPerfect, Dazzle Draw, or whatever fills your need than to buy inferior products that cost the same.

Leonard Lanigan
P.O. Box 358
Browns Valley, CA 95918

CAVEATS

IPURCHASED QUALITY Computers' RepairWorks thinking it would run on the same machine as my AppleWorks version 2.1. It doesn't — RepairWorks runs only on an enhanced IIe. I wrote to Quality Computers to suggest it should have marketed the product with a warning, but the company didn't offer to refund my money. Did *inCider's* Editors' Choice point out this quirk?

Wayne I. Pribble
112 North West Drive
New Haven, IN 46774-1160

When we reviewed this product in October 1989, we weren't aware of the problem. (See "Salvaging Sunken Files," p. 124.) Quality Computers has made no plans to introduce a patch or another version of RepairWorks.

— eds.

Do It Yourself

IN RESPONSE TO THE SEPTEMBER 1990 Apple Clinic item, "RAM Additions" (p. 34), we at VMC Marketing Technologies would like to offer some further insight into Dr. Kennedy's advice.

First, we want to commend Dr. Kennedy on his explanation of installing memory chips on expansion cards. We've also helped countless numbers of customers through this process. Adding RAM seems to be a common obstacle and we're quite pleased you addressed it.

We're somewhat concerned, however, with Dr. Kennedy's comments on cheap parts. It's been our experience that bare boards are indeed cost effective. Our market research has shown a savings of 50 percent or more by adding memory chips rather than purchasing fully populated boards.

We believe Dr. Kennedy's reservations about using bare boards are unwarranted. The potential for error is present in all of life's challenges, but we've never had a customer void a warranty. In fact, we've had only one problem: Upon adding more RAM, one customer snapped a pin. (Our policy is to replace these chips at no additional cost to our customers.) With the expert advice in Dr. Kennedy's column, our customers may not make this kind of mistake again.

Michael Van Matre
VMC Marketing Technologies
1031 East Battlefield, Suite 221 B
Springfield, MO 65807

ICAN'T AGREE WITH WILLIAM P. Kennedy's advice in the September Apple Clinic column. (See "RAM Additions," p. 34.) I'm the owner of a company that sells large quantities of RAM chips

both preinstalled in our Laser computers, and to customers who install the chips themselves. Most of these people are novices, and in all cases they've installed the chips without difficulty. Dr. Kennedy's opinion that adding RAM is a difficult task you should leave to a dealer increases the mystery surrounding computers. Apple and Laser computers are made to be opened — users just need to read and follow the directions. Dr. Kennedy's advice probably scared off people who could have added the RAM themselves.

Also, Dr. Kennedy's endorsement of a single dealer as being more reputable than others is untrue and unfair. Dealers buy chips from distributors, who in turn buy from a pool of manufacturers.

My company receives different brands with each purchase — all of which work fine. All that matters to the customer is the chip type, such as 256K by 1, 120ns, and CAS/RAS, the instructions and technical support the dealer provides, and, of course, the price.

I hope your readers support all dealers and continue to install RAM chips as a powerful and inexpensive upgrade to their computers.

Andrew Kramer
Perfect Solutions Software
3701 Savoy Lane, Suite 106-D
West Palm Beach, FL 33417

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I NEED YOUR HELP RECEIVING A \$406.50 credit to my account from Zimco International, Inc. (85-39 213th Street, Queens Village, NY 11427).

On April 17, 1990, I ordered merchandise from Zimco by phone. In that conversation, the sales representative stated that the company would ship the goods in "15 to 25 business days." Although Zimco charged my VISA account for the order that same day, when I paid the bill on June 6 I still hadn't received the merchandise.

On June 14 I called Zimco to ask about the delay and was told that the order would "take an additional 15 or more business days to ship." I decided to cancel the order and asked for a prompt credit to my VISA account. As of June 29, 1990, I've received no such credit.

I think this company routinely charges for goods well before shipping them, and fails to inform the customer of this practice. Also, it's clear that Zimco delays issuing credit well beyond three to five business days.

Dale W. Lerch
416 15th Street
Modesto, CA 95354

This letter represents several complaints we've received regarding Zimco International, Inc.


In all of the cases, the company billed the customer for the product, even though it was back-ordered. When customers cancel their orders, there's a significant delay in crediting their accounts. Although Zimco International is working to correct these problems, progress is slow.
 — eds.

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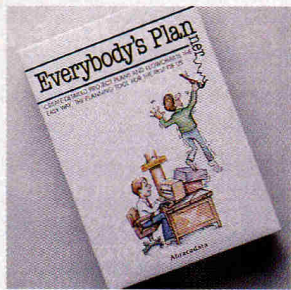
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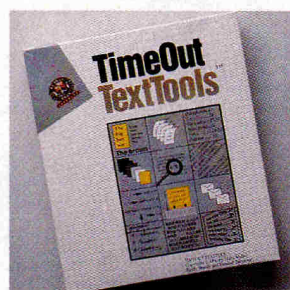
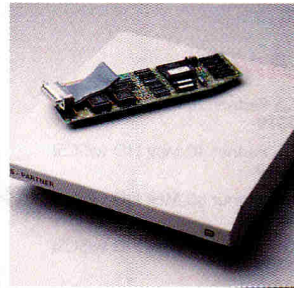
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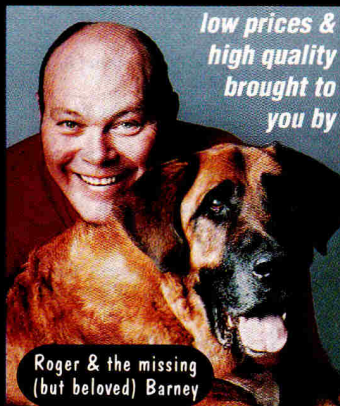
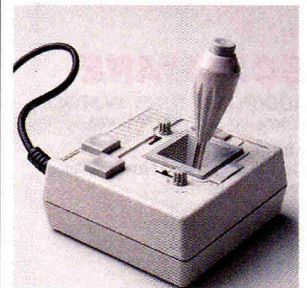
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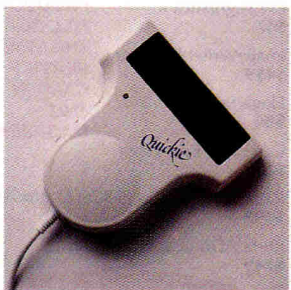
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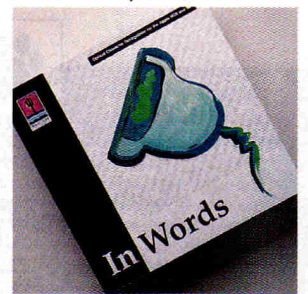
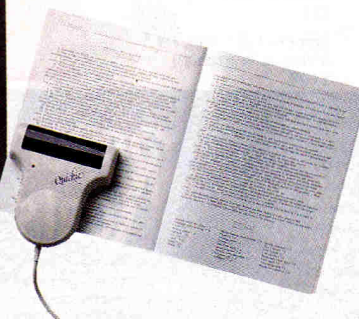


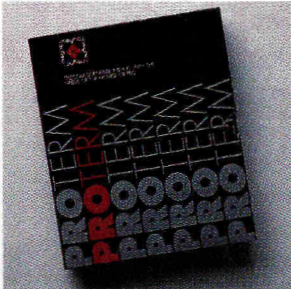
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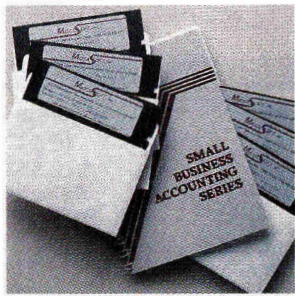


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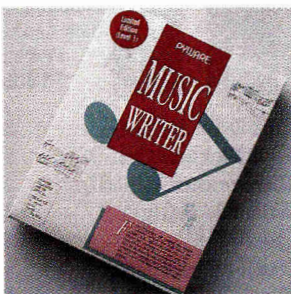
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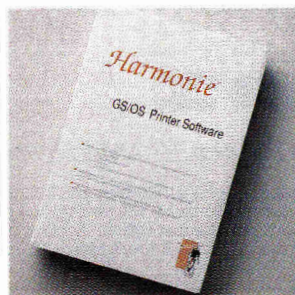
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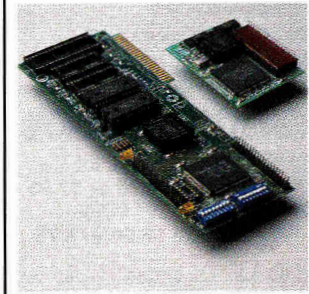
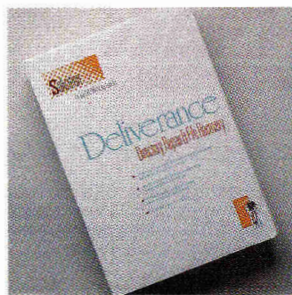
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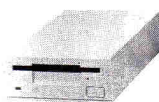
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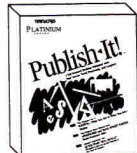
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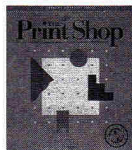
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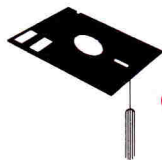
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PAINT

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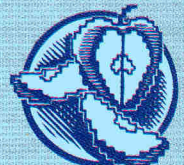


SOFTWARE

My Paint was created for kids. Everything about it — from the color of the disk to the easy interface — was designed with kids in mind. In fact, young

users who don't know how to read can let the colorful animated icons do the work. **My Paint** includes a Coloring Book with 28 fascinating pictures in which kids can draw and paint; you can add digitally sampled sounds. Additional coloring books are available. **My Paint** has been tested by educators in the classroom and has been successful in its Amiga and MS-DOS versions, according to the publisher, Saddleback Graphics. For more information, contact Saddleback at 3621 West MacArthur Blvd., Suite 119, Santa Ana, CA 92704, (714) 540-4062, or circle number 350 on the Reader Service card. —P.S.

• Laser Computers (Lake Zurich, IL) has completed a **portable Apple clone**, but the company is looking for a "joint venture" partner to build it. Also, Laser would like to build an Apple II clone similar to its PC 4 MS-DOS clone; as an alternative to a laptop, this hand-held personal organizer has built-in software and a computer interface.



APPLE BITS

• Apple's **animation toolkit** for the GS simulates full-screen animation and character/bit-map animation. Contact the Apple Programmers and Developers Association for details.

• Mike Westerfield from **ByteWorks** (Albuquerque, NM) amazed a few attendees at the A2-Central Apple II Developers' Conference in July with his **Integer BASIC** compiler for the GS. "I actually started it just to prove it could be done," says Westerfield, "but now I kind of like it." It sure is fast.

• Apple's **scanners**, built with the Macintosh in mind, run perfectly under GS/OS on the GS or under ProDOS on the IIe — they're full SCSI devices. Trouble is that Apple won't release scanner software, and expects third parties to do so.

• Apple insiders promise that a ProDOS text-based version of **AppleLink** will be available "sometime within your lifetime."

• Randy Brandt at JEM Software (P.O. Box 1500Q, Arvada, CO 80001) hopes to include Mark Munz's **AmperEngine** in **UltraMacros 3.2** — it adds more programming power.

TECH NOTES

AND A GOOD HARD-DISK MANUAL IS GOOD TO ... HARD TO ... OH NEVER MIND Do the words "hard-drive partitioning" and "SCSI interface" make you cringe and weep? Fear not! The National Apple Users Group has released "The Apple II Hard Disk Primer." Gary Morrison leads the faint-of-heart and weak-of-knee gently through the trauma of selection, configuration, installation, organization, and salvation for all II models. "The Apple II Hard Disk Primer" is available for \$16.95 plus \$3 shipping from NAUG, Box 87453, Canton, MI 48187.

WHAT IF WE THREW A PARTY AND NOBODY CAME? Apple Computer has released improved GS sound tools that'll let music programmers access MIDI devices easily as well as edit digitized samples. Your GS could save MIDI input (as from a synthesizer), alter it, replay it, and translate it into sheet music. Sound-software developers, including Broderbund, Diversified, Electronic Arts, and Passport, are being conspicuous in their silence about new product design. What's their excuse now that Apple has provided GS support?

SKELETONS OUT OF THE CLOSET

A.P.P.L.E.'s "Skeleton Desktop Application" by Sandy Mossberg is now available in disk form for the APW and ORCA/M assemblers and for the APW C and ORCA/C compilers. It contains the entire series of articles in AppleWorks format, including the fourth and fifth installments, not yet published at the time Call-A.P.P.L.E. went out of print. The disk is available for \$20 from Cecil Fretwell, 2605 Highview Avenue, Waterloo, IA 48187.

ON THE HORIZON? Date-line Scotland: Cirtech is being decidedly close-mouthed about Duet, which is scheduled for release in December 1990. It's a coprocessor card for the GS with a 16MHz 68020 microprocessor on board and 1 to 8 MB of RAM. Add some special "linking" software, and D-u-e-t spells "Macintosh emulator." The GS 65816 processor should handle nearly all I/O functions, leaving the 68020 to run Mac software faster than a IIcx can say "Brigadoon." Price? Well... — **Cameron Crotty**



AppleWorks Notes

**From the AppleWorks Programmers Association:
Users and Programmers Sharing the Power to Create**

A W tip: When you use @AVG or @COUNT in the AppleWorks spreadsheet, problems often arise from the program's mishandling of zeros. In the example below, assume that Adam and Carol were present at school and took a test. Because Bruce was absent on the day of the test, his score was a zero. When AppleWorks averages the class scores in column

1 Student	Test	Absent
2 Name	Grade	Adjust
3 _____		(formulas in column H)
4 Adam	90	90 @IF(G4=0,(H1),G4)
5 Bruce	0	absent @IF(G5=0,(H1),G5)
6 Carol	80	80 @IF(G6=0,(H1),G6)
7 =====		(formulas for average)
8 AVERAGE	56.7	85 @AVG(G3..G7) & @AVG(H3..H7)

G, it includes the zero and gives an incorrect result as shown in G8. Instead, use the new text-pointing feature in AppleWorks 3.0 and change the value "0" to "absent." Then your program will produce the correct average in cell H8.

A W enhancement: TimeOut Glossary is a time-saving boilerplate tool for users who insert repetitive words, names, addresses, phrases, even paragraphs into various word-processing documents. To keep the information straight, create your own glossary and include up to 127 separate text entries — each entry will have a label that appears on a TimeOut pop-up menu. (Glossary entries may include carriage returns and specified embedded printer commands, too.) To search for your entries, simply type the first letter of the label or scroll through the menu with the arrow keys. Selecting an item with the return key (or mouse for UltraMacros users) inserts the entry immediately into the word-processing file at the current cursor position. Because you can access the files from a TimeOut Menu, you can make and keep track of multiple glossaries.

To create these glossaries quickly and easily, use AppleWorks' mail-merge function to access existing database files. TimeOut Glossary is included on the TimeOut TextTools disk from Beagle Bros, Inc. Other TextTools enhancements for the word processor include QuickStyles, QuickTabs, MarkMerge, MultiPrint, CopyBlock, SuperFind, Analyst, Indexer, Table of Contents Generator, and Carriage Return Stripper.

A W personality: For more than 12 years, A.P.A. member Stephen Reiss has called Aspen, Colorado, home. High in the Rocky Mountains, Aspen is ideal for outdoor people like Steve who enjoy skiing in the winter and "four-wheeling" in the summer. As a noted oenophile, he also travels the world to wineries and tasting events. His expanded Apple IIc has been integral in publishing a wine-accessories catalogue and managing the affairs of his company, Buyers & Cellars Wine Consultants.

On the computer front, Steve has written a number of AppleWorks templates, macros, and TimeOut help screens, which he shares with other Apple users. Steve's father was involved with the early Univac, leading Steve to develop an early interest in computing. All computer fans can identify with a story Steve tells of being chastised severely in grade school for writing a "I will not run in the halls" punishment paper on a TTY paper loop. Steve is a regular participant on popular on-line services and is always ready to lend a hand or upload a useful file.

A W macros: To accomplish a given task a specified number of times, you often need counters in your macros; the example below may help you understand how counters work. A counter macro must include certain elements (not necessarily in the form we use here); we've indicated these elements with brackets in this example. This simple counter macro types "Ring" ten times, then types "Hangup" once and stops. You can expand the action command to accomplish various tasks tailored to your needs.

```
T:<<all S=0 {start value}: E=10 {end value} :
begin {start point}:
>Ring<<rtn {action command} : S=S + 1 {increment}:
ifnot S=E : {test for end} : then : rpt : {repeat command}:
else>Hangup<<rtn>! {exit command}
```

A P.A. news: Members can obtain valuable discounts when they purchase products directly from the growing number of participating publishers and vendors. (A.P.A. is not a reseller.) With AppleWorks, Don Aquilino (Woodland Hills, CA) is making exciting breakthroughs in automated double-entry accounting, trial balances, and other advanced business-accounting activities. Anthony Vasek (Grand Rapids MI) has done some innovative work with map coordinates to make "Meals on Wheels" community projects more efficient. Pro-APA (our BBS) continues to expand networking facilities, adding new and important news feeds. Be sure to call us at (213) 463-9289. (Pro-APA is PC pursuitable.)

Members contributing to this month's notes include Don Aquilino, Dave Gair, Mark Munz, Steve Reiss, and Anthony Vasek. For details on membership and other information, contact the AppleWorks Programmers Association at 6531 Lexington Avenue, Los Angeles, CA 90038-1451, modem (apa@pro-apa.cts.com) (213) 463-9289, voice (213) 469-9916. The A.P.A. is an Apple User Group registered with the Apple User Group Connection.

EDUCATION *NOTES*

*According to a recent press release, **Apple Computer** has announced it will form a partnership with the **National Education Association (NEA)**, the country's largest organization of teachers, "to enable the nation's classroom teachers to purchase a personal computer system package for their personal professional use at home." IBM formed a similar partnership enabling teachers to buy special IBM PS/1 computers. Apple didn't specify the hardware it will make available.

***Scholastic Software** (New York, NY) has followed up its **Success-with-Writing** program for the Apple II with a Mac version. The comprehensive writing course, which covers everything from prewriting to revising, costs \$99.95. Scholastic has also released **HyperScreen 2.0**, a substantially enhanced version of its Apple II hypermedia tool. Upgrade is free to registered users. Call (800) 541-4413 for details.

*To launch its **Great Reading/Great Writing** series, **Sunburst Communications** (Pleasantville, NY) has selected three classic books of the read-aloud genre — Margery Williams' *The Velveteen Rabbit*, Roald Dahl's *Charlie and the Chocolate Factory*, and Richard Adams' *Watership Down* — to use with the Magic Slate II word processor in the classroom. To stimulate reading, writing, and thinking skills simultaneously, each package includes a copy

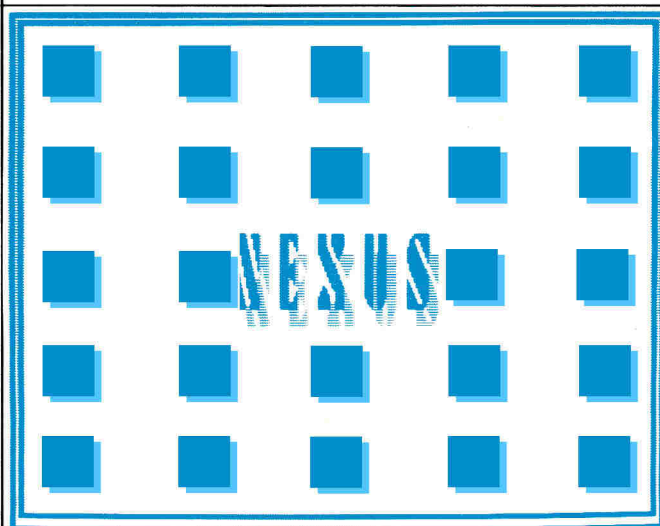
of the book, detailed lessons, and a student data disk. Each package costs \$59.95. Teachers can obtain a free 30-day preview by calling (900) 628-8897 or (914) 747-3310 collect.

***William K. Bradford** (Acton, MA) has released the first of its multicultural **Explore-a-Folk-tale** series. "Ananse the Spider," a West African tale related by a storyteller around a campfire, has been animated with colorful pop-up text and graphics. The Explore-a-Folk-tale series includes the same features as Bradford's popular Explore-a-Story series. The standard package costs \$75. For a free preview, call (800) 421-2009.

*For qualified schools, **Broderbund Software** (San Rafael, CA) is now offering site licenses for GS versions of **The New Print Shop**, IIe/IIc and GS versions of three titles in the **Carmen Sandiego** series, as well as Apple II and Macintosh versions of **Type!**. Contact Broderbund Software at P.O. Box 12947, San Rafael, CA 94913-2947, (800) 521-6263.

***The New Math Blaster Plus** from Davidson and Associates (Torrance, CA) brings to the 512K Mac all the fun of the original program, released seven years ago. Covering elementary arithmetic from addition to word problems, this new version sports color graphics and is priced at \$59.95. For volume and teacher's prices call Davidson at (800) 556-6141.

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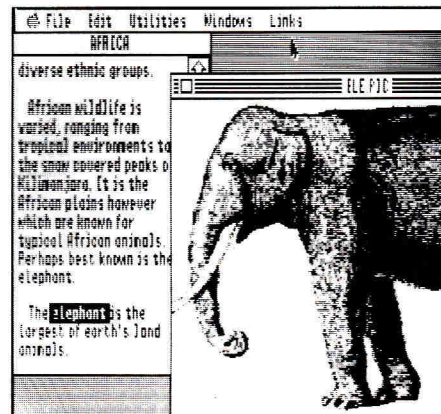


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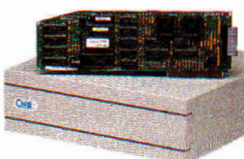
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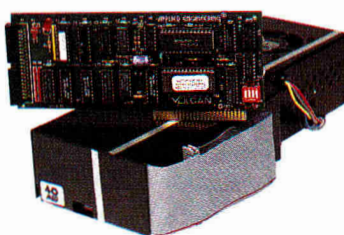
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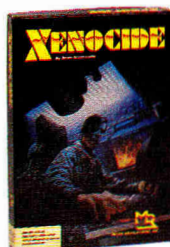


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FILE IT AWAY

**The ProFile represents old technology —
when you consider the cost and performance
of the new SCSI hard drives, you may want to replace
your ProFile rather than repair it.**

**By CECIL FRETWELL
and PAUL STATT**

PROFILE DISK PROBLEMS

I RECENTLY PURCHASED A USED 5-megabyte Apple ProFile hard-disk drive (model #A9M0005). I'm new to computing and have "hung up" the drive. It was working fine until I erased a file with my GS System Disk, which caused the window to freeze on screen. I hadn't read all the documentation, so I guessed, "When in doubt, reboot." Now I can't erase or format the hard drive. I tried to "zero" the disk and obtained an error.

I used the Block Warden program (from Glen Bredon's ProSEL) to erase enough blocks to load GS/OS onto the drive. But now I get the error message MLI 27 when I try to run GS/OS. What does MLI stand for?

I'm sure I've really fouled up the structure of the hard drive's directory. According to the ProSEL utilities, my ProFile contains 9727 blocks. I can't locate any bad blocks using ProSEL utilities, but when I try to use the utility to repair a volume, it stops at 6144 blocks. If I can get past the magic 6144 blocks, will I be okay?

**Jerome Peplinski
Omro, WI**

It sounds like your ProFile may need a low-level, or hard, format — in other words, your hard disk needs to be worked back into a condition so that you can put files on it. The process also "repairs" any blocks that have gone bad by replacing them with good blocks the hard drive has kept in reserve. A high-level, or soft, format, by contrast, only writes a new directory on the disk. ProSEL, as good as it is, can't do a hard format. Neither can Copy II Plus, the Apple IIGS Finder, or the Apple II System Utilities. In fact, Apple designed the ProFile (back in the early '80s) in such a way that you can't hard-format it in the field.

Apple's ProFile can be formatted only in a carefully controlled environment. The process involves temporarily switching a chip and moving a couple of jumpers inside the ProFile. Evidently this can be done only on an old Apple III. Only a few companies will format an Apple ProFile, and Apple Computer isn't one of them. Sun Remarketing (Logan, UT, 800-821-3221), Lisa Shop (Woodland, CA, 916-668-5637), and ON THREE (Chicago, IL, 312-338-2202) can do the hard format for \$50 to \$100. My thanks to Bob Consorti from ON THREE for helping me answer your question.

You may want to consider two other facts. To work on the Apple IIGS, the ProFile's interface card requires a new ROM chip. Apple's part number is 341-0299, Revision B.

If that's not the number on the chip on your ProFile's interface card, ask an authorized Apple dealer for a free upgrade.

The ProFile is old technology, and has long since passed its normal life expectancy. Yours may not be repairable at a reasonable cost. Given that and the cost and performance of the new SCSI hard drives, you may want to replace your ProFile rather than repair it.

MLI, by the way, stands for machine-language interface. It's the workhorse for all disk operations on the Apple II. And 27 is an error code for I/O ERROR, meaning something's wrong with the input or output, which you might have guessed.

DISK-DRIVE CLICKS

WHY DOES MY APPLE 5.25-INCH drive click and light up every time I use the Finder on my Apple IIGs, even if there's no disk in the drive?

**Josh Ash
Madison, WI**

That clicking happens when the Finder checks to see if a new disk has been removed or inserted into the drive: It starts, then stops, the drive quickly. If you really want to stop the Finder from checking your 5.25-inch drive, you could remove the file called APPLIEDISK5.25 from the . . . SYSTEM/DRIVERS folder in GS/OS. You wouldn't be able to use the drive at all, but it would remain silent.

SCSI DuoDisk?

I'VE BEEN TOLD THAT THE APPLE DuoDisk Controller card is, in reality, an Apple small-computer-systems interface (SCSI) card. I also hear that you can connect any SCSI-compatible Apple II or

Macintosh hard-disk drive to that card.

Are the Apple DuoDisk and Apple SCSI cards compatible? If so, would using a SCSI drive require any oddball (not easily remedied) modifications to my hardware or software? I'm thinking of adding a hard drive to my Apple IIe system.

D.S. Cronk
Lewisville, TX

This interesting rumor has prompted quite a few letters to inCider. I proposed your question to several experts in the computer-hardware industry and without exception they answered that the Apple DuoDisk and its controller card aren't SCSI compatible. Sorry.

As a point of interest to Apple IIgs owners, the DuoDisk does work just fine on the IIgs. Just put the interface card in slot 6 and set slot 6 on

the Control Panel to Your Card. Don't try to run the DuoDisk from the SmartPort in slot 5.

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APPLEWORKS CLINIC

This month *inCider* introduces a new Q & A column called *AppleWorks Clinic*. If any version of AppleWorks — Classic, 3.0, or GS — has you stymied, confused, or just plain frustrated, this column and our panel of experts from Claris Corporation will provide helpful answers to your questions.

By William Marriott

CODE WORDS

With special AppleWorks codes I set up my ImageWriter II printer to use a color ribbon, then I used different codes to make it print in a foreign language. When I went back to use the driver for color output, I discovered that my special codes for color had been replaced with the special codes for foreign language. Does that mean I'm limited to one set of special codes?

You're not limited to one set of codes, but you are limited to one set of labels.

The developers of AppleWorks intended you to use the special-code section to format three different printers. If you want your ImageWriter, Apple DMP, and Epson to print in boldface, for example, the program lets you write just one code. By labeling this command "bold," AppleWorks translates it for your three printers.

This time-saving feature becomes a drawback when you use one printer: Although you need two different codes, you can use only one label.

If you use code labels that remind you of the code's multiple personality, such as BlueSpanish or RedFrench, AppleWorks will do the rest.

CHECK THE TAB

In my original copy of AppleWorks, Open apple-Tab (OA-Tab) moves the cursor to the previous tab stop, but in AppleWorks 3.0 it moves the cursor to the next tab stop. Even the quick-reference card states that OA-Tab moves the cursor to the previous tab stop. Which is correct?

The quick-reference card isn't correct. In AppleWorks 3.0, the tab key moves both the cursor and the text to the next tab stop, and OA-Tab moves only the cursor to that tab stop.

If you want to move the cursor backwards, press OA-Left Arrow.

In AppleWorks Classic (pre-3.0), pressing the tab key makes the cursor jump over the text and move to the next tab stop.

If you prefer this older tab format, Beagle Bros' AppleWorks 3.0 Companion offers a patch that changes 3.0 tabs to AppleWorks Classic format (\$39.95, 6215 Ferris Square, Suite 100, San Diego, CA 92121, 619-452-5500).

LOCKED OUT

I have a large database that I created in AppleWorks 2.1 on two 5.25-inch disks. When I try to open this file in AppleWorks 3.0, I get an error message and I'm unable to open the file. Why?

If you have extra memory in your computer, it's possible to create files too large to fit on standard 5.25-inch disks.

Try saving the file either to a larger disk, such as a 3.5-inch disk, which holds 800K, or a hard disk, which holds at least 5 megabytes (about 5120K).

For earlier versions of AppleWorks you can buy a utility (such as AppleWorks 3 Expander, \$29 from Applied Engineering, P.O. Box 5100, Carrollton, TX 75011, 214-241-6060) from most memory-board manufacturers to cut your large files into segments, then save them to two or more disks.

Although segmenting your files takes advantage of your computer's memory, you can't use these files with AppleWorks 3.0 unless you check out one of the following procedures:

- Check with the memory-card manufacturer to find out if there's a utility to "unsegment" your AppleWorks Classic files.
- Purchase a 3.5-inch disk drive or hard disk. To open large files with AppleWorks 3.0 from either the 3.5-inch disk drive or

a hard disk, first open the files with AppleWorks 2.1, then copy the files to a 3.5-inch disk drive or hard disk.

• Separate the file into parts that fit on one disk, then combine the files in memory: Use AppleWorks 2.1 to open the large file and segment it manually across two or more disks. Open the file with AppleWorks 3.0 and combine the files in memory.

A final note: Because of its additional features, AppleWorks 3.0 uses 16K more memory than older versions. If you had files that were near the limit of the Desktop, you may not be able to open them in AppleWorks 3.0. Either make the files smaller or purchase additional memory.

NO TIME

I can use my No-Slot clock with AppleWorks 2.1, but I can't with 3.0. Does this version support clocks?

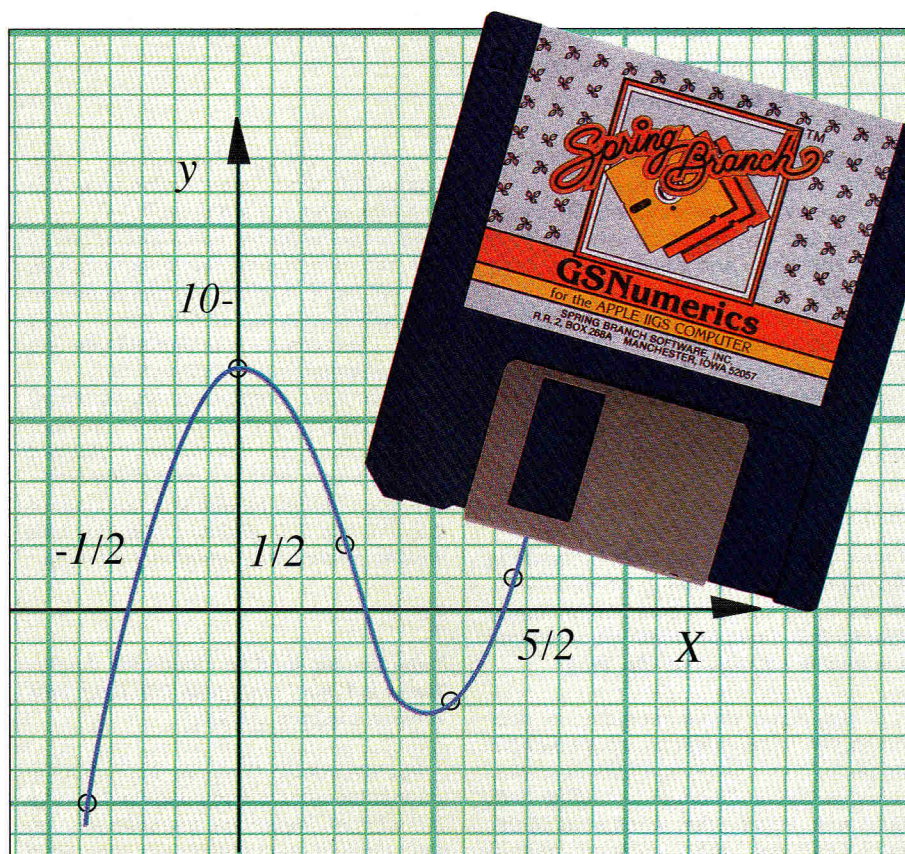
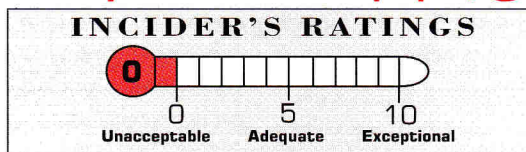
AppleWorks 3.0 supports ProDOS-compatible clocks. If you use AppleWorks 3.0 with an Apple IIgs, for example, you don't need to enter the date or time when you start AppleWorks. The program even stamps your files when you modify them.

Although the No-Slot clock isn't ProDOS compatible, you can modify it with any number of special patches available on line or from your local user group. If you have an older (patched) version of ProDOS, you can copy it from your AppleWorks 2.1 disk to the ProDOS disk supplied with AppleWorks 3.0. Then your clock should work properly.

[Note: SMT Technologies' No-Slot clock is no longer available. —eds.]

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REVIEWS



GSNUMERICS

SPRING BRANCH SOFTWARE
P.O. Box 342, MANCHESTER, IA 52057, (319) 927-6537
 Mathematics-education program;
 1-megabyte Apple IIgs, GS/OS 5.0.2; no copy protection; \$139.95

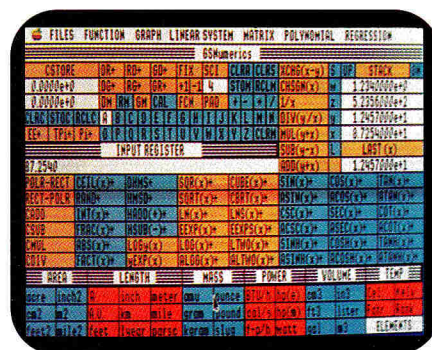


Mathematics seems to be all the rage with personal computers these days. People are fascinated by mathematically based games such as Life and by fractal programs, as they show off the marriage of powerful mathematics and beautiful imagery.

Beyond such imagery, however, there's a more compelling issue — that of mathematical literacy. Recognizing this problem, Spring Branch Software has developed a sophisticated educational program called GSNumerics. It's a scientific calculator, graphing tool, and equation tamer rolled

into one — which should make it the darling of the math class. It's a complex program, however, so it may be tough to learn, and its printing capabilities aren't quite as flexible as they could be. GSNumerics covers nearly anything you could expect to encounter in an average high-school math curriculum or during the first couple of years of college, with an emphasis on algebra and trigonometry. The program lets you enter mathematic functions just as you'd write them down, and then solve problems analytically or graphically.

Printing isn't quite as flexible. You can print a screen after you've plotted a graph, but it would be nice if you could print your graph as a finished product complete with a headline, explanatory text, labeling, and a longhand representation of the equation you've just graphed. It would also be nice to be able to print the graph as a rudimen-



Solving the math-literacy problem.

tary text file for inclusion in a word processor document or as a high-quality picture for a desktop-published document.

My impression of the program's general presentation — the things that together account for your overall comfort when using a piece of software — improved as I grew more familiar with the program. Nearly 100 buttons with obscure abbrev-

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rations on them, combined with a set of interlocking pull-down menus, is an intimidating sight. After I learned what and where everything was, however, I came to appreciate having it all in one place; your work does go faster.

GSNumerics computes the value of an expression differently from the familiar hand-held calculator. To add 16 and 4 on a calculator, for example, you'd enter 16, +, 4, and =. To evaluate the same expression in GSNumerics, on the other hand, you first enter all the numbers, then the operator. That's called *post-fix notation*, and it simplifies long calculations. You also need it to work with *complex numbers*, which always have two parts, a real number and an imaginary one. Thanks to post-fix notation, GSNumerics can operate on a complex number such as $16 + 4i$ as a single entity. A hand-held calculator can't.

GSNumerics accommodates polynomials up to the tenth order. You can solve for x compute area and slope, find real and complex roots, do multiplication and division by binomials, and integrate or differentiate polynomials. X-y data-analysis features let you analyze up to 300 points, along with linear regression, log regression, exponential regression, power regression, and coefficient correlation. GSNumerics also lets you solve systems of linear equations. The program supports all standard matrix math operations. You can have as many as three matrices of up to 10×10 numbers. Memory operations are available for two 10×10 matrices at once.

The program's graphing capabilities are extensive — standard polynomials and nonpolynomial functions, x-y data, regressions and curves, and regression predictions — and you can extract real roots of functions and overlay various graphs on the same screen.

You can customize GSNumerics by defining your own functions and saving them in logically related files — one for each class or job, for instance. You can also save sessions in progress, polynomials, x-y data, matrices, and systems of linear equations.

GSNumerics uses the built-in Standard Apple Numerics Environment (SANE) to provide extended precision for mathematical operations. Extended precision, however, often means extensive time needed to complete a calculation. While an accelerator such as TransWarp GS can certainly help, the real answer here is the Floating

Point Engine from Innovative Systems (reviewed in December 1989, p. 119). The FPE provides more than twice the acceleration than the TransWarp for most mathematical operations.

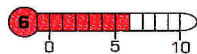
I recommend GSNumerics. It may have a couple of rough points, but there's nothing else like it, and its power is undeniable.

Joe Abernathy
Houston, TX

TALKING SCHOOL BUS

ORANGE CHERRY SOFTWARE
Box 390 WESTCHESTER AVENUE, POUND RIDGE,
NY 10576, (800) 672-6002,
(914) 764-4104

Basic skill-building program;
512K Apple IIgs; no copy protection; \$49
(\$59 for Educator version with backup disks
and Teacher's Guide)



The Talking Schoolhouse series from Orange Cherry Software reconfirms that the Apple IIgs is a computer built for graphics and sound. These programs combine beautifully drawn super-hires graphics with clear and realistic digitized speech for a wonderland of audiovisual stimulation. Talking School Bus is no exception. It provides four



Graphics and sound teach basic skills.

graphically rich speech-enhanced activities to teach young children counting, identification, and map skills.

Like other programs in the series, Talking School Bus is easy to use, with a picture menu, full mouse support, on-screen instructions, pull-down menus, and dialog boxes. Even preschoolers should be able to choose activities and complete tasks with minimal adult supervision.

Prereaders can begin an activity by clicking on a picture icon that interests them. Children who already have some reading skills can select activities from a written table of contents. As the activity loads into

memory, a yellow school bus at the bottom of the screen drives down the road to the appropriate destination.

When children reach the Aquarium — the first activity — a digitized voice instructs them to count the animals swimming in the tank and select the correct answer (up to 10) from those displayed at the bottom of the screen.

After answering a set number of problems, the program automatically moves to the second half of this two-part activity. Here aquarium visitors must add the number of animals in the first group to the number in a second group and again select an answer at the bottom of the screen. Talking School Bus simplifies the task of addition by dividing the animals into two distinct groups, and keeping the answers somewhere between zero and ten.

With the spoken instructions, kids can play At the Aquarium with minimal adult supervision. An ever-present menu bar at the top of the screen gives children access to written instructions and volume-adjustment controls. There's also an option to repeat the spoken instructions. When the activity is over, a beautiful full-screen drawing congratulates the child on a job well done.

On the Farm lets kids visit a country farm. It shows a nonanimated screen of nine realistically drawn barnyard animals — including a horse, a donkey, a sheep, and a turkey. Children click on the animal that matches the sound they hear. When the answer is correct, the written form of that sound (such as *neigh*, *honk*, or *bleat*) appears on screen next to the appropriate animal and the sound repeats. Children may click on *Repeat* at the menu bar to instruct the program to replay the animal sound. After identifying all nine animals, the activity ends and youngsters receive a visual reward.

The third activity is called Bus Route, which builds map skills as children direct a bus through a maze of city streets to pick up children for school. There are always four students on the route and their names never change, but the program varies the order in which the students get picked up. Once all four kids are on board, bus drivers must navigate the vehicle to school — steering by clicking on compass icons at the bottom of the screen. For example, clicking on *west* moves the bus to the left, while clicking on *south* moves the bus downward. As youngsters play the game

REVIEWS

several times, they begin to understand compass directions and build a solid foundation for reading more complex maps.

Farmer's Market, the final activity, presents kids with eight food bins, each containing a bunch of colorless fruits or vegetables. The bottom of the screen shows five paint cans with different hues. The program will instruct the child to color the carrots orange or the bananas yellow.

Children respond by clicking first on the picture of the specified fruit or vegetable, and then on the correct color paint can. The carrots will then turn orange, for example, and the word *carrots* will appear beneath the carrot bin. If children correctly identify and color all eight fruits and vegetables, they receive a visual reward.

Three of the activities in the package — On the Farm, Bus Route, and Farmer's Market — also reinforce early reading skills by using words on screen. These activities encourage youngsters to figure out the spelling of animal sounds, kids' names, and the names of fruits and vegetables. All Talking School Bus activities offer audio reinforcement for correct answers.

The program doesn't provide the answer when a child responds incorrectly. Instead, a digitized voice requests that the child try again. The activities don't advance to the next problem until the child answers correctly. Kids may become frustrated if they have continued difficulty with a problem, because there's a never-ending loop of wrong answer/try again/wrong answer. Orange Cherry should consider including a help option in the menu bar to provide players with problem-solving hints.

When all activities are complete, youngsters can direct the program to print a reward by select this option from the written table of contents on the main menu. Type in a child's name and click on *print* at the menu bar, and the program generates a personalized *Award of Excellence* (suitable for coloring).

Orange Cherry targets Talking School Bus at children aged 4 to 8 (as indicated by the packaging) or 3 to 7 (as in the manual). Actually, the product may be more appropriate for children aged 2 to 6. Children can select the activities in any order, as they're nonsequential. The program doesn't incorporate multiple levels of difficulty to engage children with more chal-

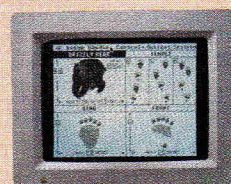
Continued on p. 7B

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Sample screens



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GAME ROOM



HALLS OF MONTEZUMA

STRATEGIC STUDIES GROUP
1747 ORLEANS COURT, WALNUT CREEK, CA 94548, (415) 932-3019

Military-strategy game;

1-megabyte Apple IIgs, GS/OS 5.02; two drives recommended; no copy protection; \$44.95



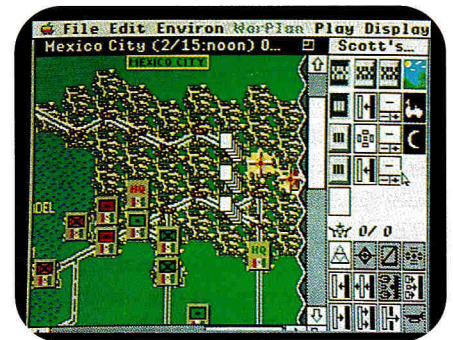
A good computer war game is everything a “good war” isn’t — fun, educational, and safe for children and other living things. You might even argue the case that the better people understand war, the less likely they’ll be to want to call in the Marines.

Playing just a few rounds of Strategic Studies’ Halls of Montezuma will indis-

putably show you just how much sacrifice is involved when that call does go out. Seven scenarios let you simulate pivotal battles in Marine Corps history: Mexico City in 1847, Belleau Wood in World War I, the World War II battles of Iwo Jima and Okinawa, Pusan and Inchon during the Korean conflict, and Hue in Vietnam.

Halls of Montezuma brings SSG’s

“Battleplan” gaming system to the GS and takes full advantage of the machine’s desktop interface — mouse control, menus, and icons. This unique simulation system has two aspects: During part of the game you play the role of a general in a war room; during the rest, you’re a popcorn-munching theatergoer.



History of the Corps, battle by battle.

Consider, for example, how General Buckner must have prepared for the invasion of Okinawa: He didn’t get on the phone and call all those thousands of servicemen who were to storm the beach; he didn’t even communicate directly with his company commanders in the field. In real life, one man simply couldn’t handle all that, so Halls of Montezuma simulates the way a general would issue orders and set mission priorities for divisional and regimental commanders. That’s the first phase of each turn. Then you sit back and watch as the icons on your screen move and clash, and combat results are tallied. Did your plan work or fail?

SSG’s Battleplan system scores big points for ease of use. On screen you’ll see map and command windows. Icons indicate your divisions (up to three per scenario). Click on a division and icons representing the regiments within it (up to four each) appear. Select a regiment and the icons

representing its component battalions flash in unison. To assign orders, click on a division first, then a regiment, and then on one of the order icons.

Battalion icons flash, light up, and dim to show states of readiness and wear-and-tear — you can analyze your situation at a glance. Reshape your forces on the fly in response to the outcome of a battle by assigning various battalion-level assets from regiment to regiment or division to division — all thanks to the game's icon-based interface.

How do you know how well a regiment will carry out its orders? A large part of it depends on the condition of the battalions within the regiment. Click on a battalion icon to see its type and degree of strength. Click on individual units and pull down the appropriate menu to get a divisional report covering leadership, supply administration, and losses.

The game includes SSG's "Warpaint" module — a program that lets you modify existing scenarios with what-if possibilities. You can even re-create actual battles — if you're willing to do the library work as you search out orders and terrain maps. The computer part's easy — with Warpaint it's simple to add units to a scenario or alter a map. Completely mouse and icon driven, it's intuitive and fun, and just as challenging as you want to make it.

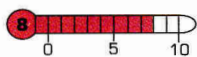
Halls of Montezuma is something of an experiment for SSG, as the company makes a foray into conversion of 8-bit Apple II games to this superior GS format. Pick up Halls of Montezuma, and the next time you hear the phrase *Semper Fidelis*, it'll mean a whole lot more to you.

Neil Shapiro
Bethpage, NY

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the California Highway Patrol? Well then, it's time to head for Europe.

European Challenge, the latest scenery disk for Test Drive II: The Duel, takes you over the twisting roads of Italy, France, Germany, Spain, Switzerland, and the Netherlands. Sure, you're still driving the same car you're used to, but now you can watch the beauty of Europe flash by your windshield.

In Italy, you'll drive past the ruins of ancient Rome. The roads in France will take you along the Riviera. The Netherlands shows you gardens and windmills. (The roads are pretty narrow and winding, though, so don't spend too much time admiring the view.)

If all-out speed's your game, be sure to head for the Autobahn in Germany. With no speed limit and four lanes to play with, you'll be able to see just how fast your car can really go.

Installing the European Challenge



Hit the road, Continental-style.

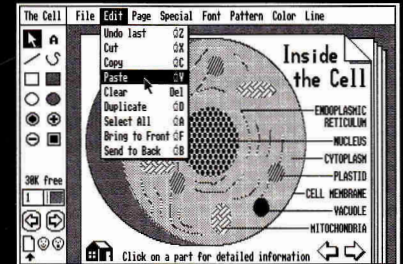
scenery disk (or any of the other add-on disks for Test Drive II) is still the only backfire in your otherwise smooth and silky ride. Although the manual includes a clear explanation, the procedure's still tedious. You have to create and enter names for play disks, and enter the pathname of any scenery or car disk you're using. Why can't you just switch disks when prompted, as in Accolade's Jack Nicklaus add-on golf-course series?

When you've grown accustomed to the same old scenery whizzing by the windows of your Porsche 959 or Ferrari F-40, it's time for a change. Try speeding through Europe — after all, you're probably driving an automobile of European origin, so go all the way.

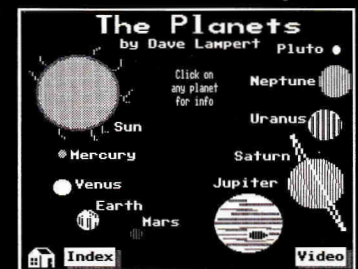
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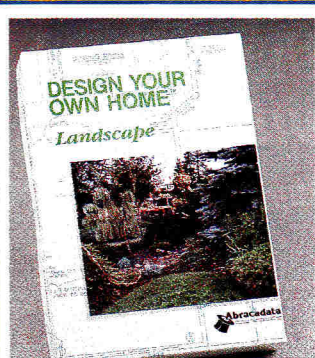
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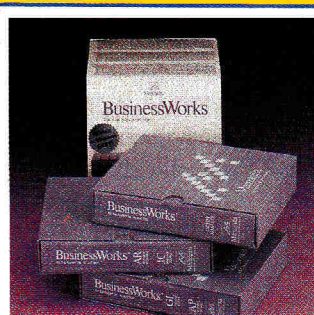
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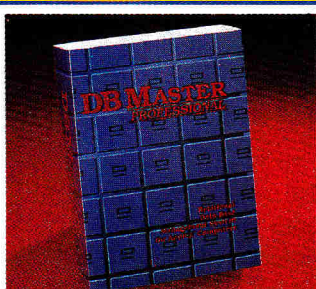
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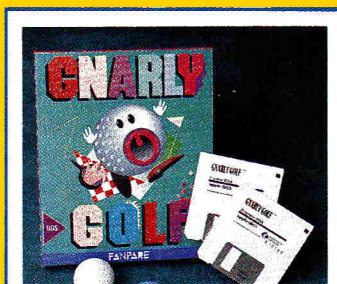
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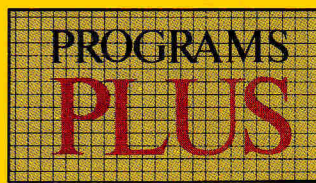
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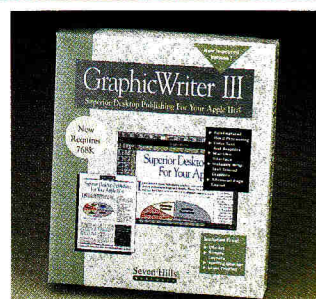
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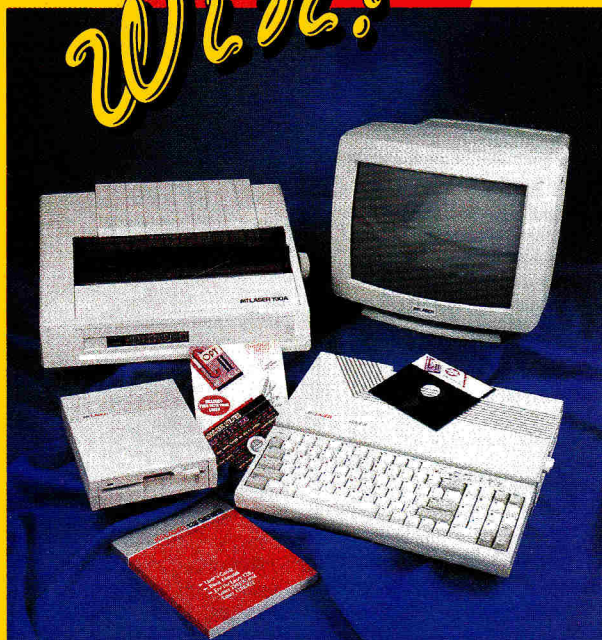
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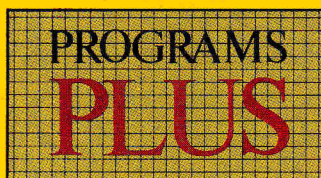
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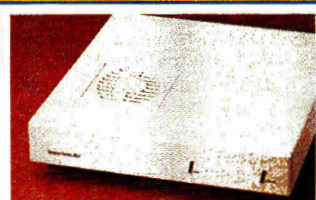
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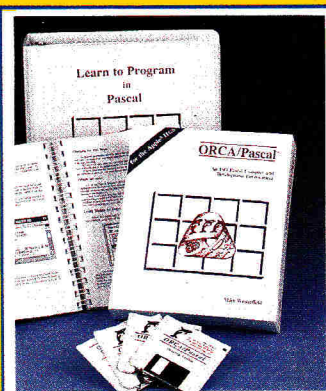
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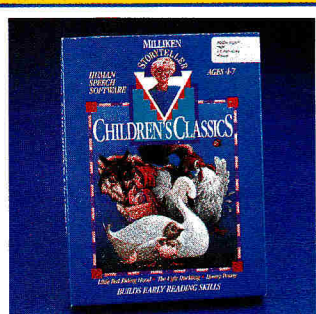
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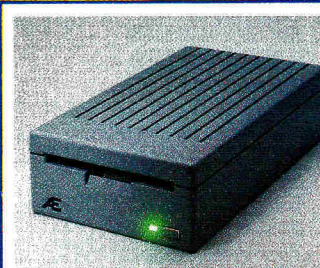
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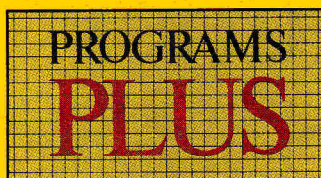
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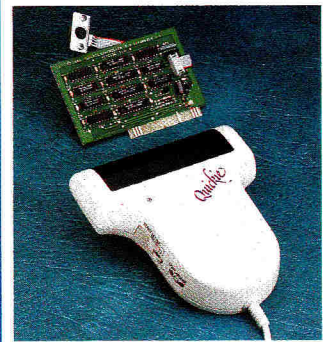


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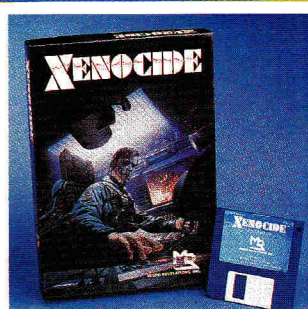
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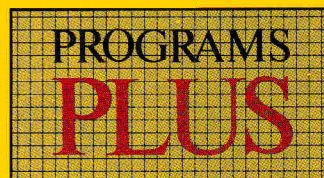
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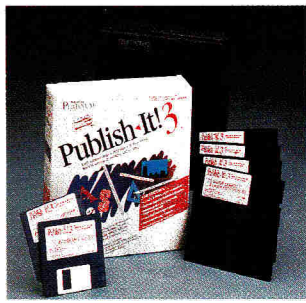
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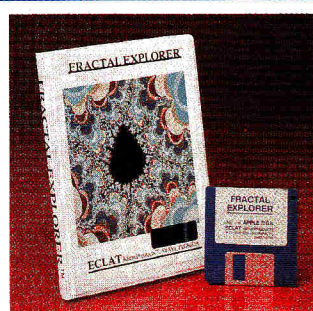
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EXPLORING HYPERMEDIA

Lessons, stories, and presentations come alive when you combine text, graphics, sound, and video in an interactive environment. Compare the six leading packages: Here's one media event you can program yourself, as you dazzle your audience with the power of your Apple II.

By CYNTHIA E. FIELD, Ph.D. * CONTRIBUTING EDITOR

IF YOU THINK YOU'VE HAD FUN GETTING CREATIVE with desktop publishing, just wait 'til you try your hand at *interactive multimedia*. The very term sounds pretty highfalutin — yet an investment of about \$50 to \$200 is all that's required to begin authoring your own courseware, visual databases, or Twistaplot-style stories.

Interactive multimedia isn't restricted to "techies" or experts, either. In fact, the average computer user should be able to design his or her first creation — complete with sound effects and graphics embellishments — within a couple of hours. Best of all, absolutely no programming experience is required.

PAINLESS PROGRAMMING

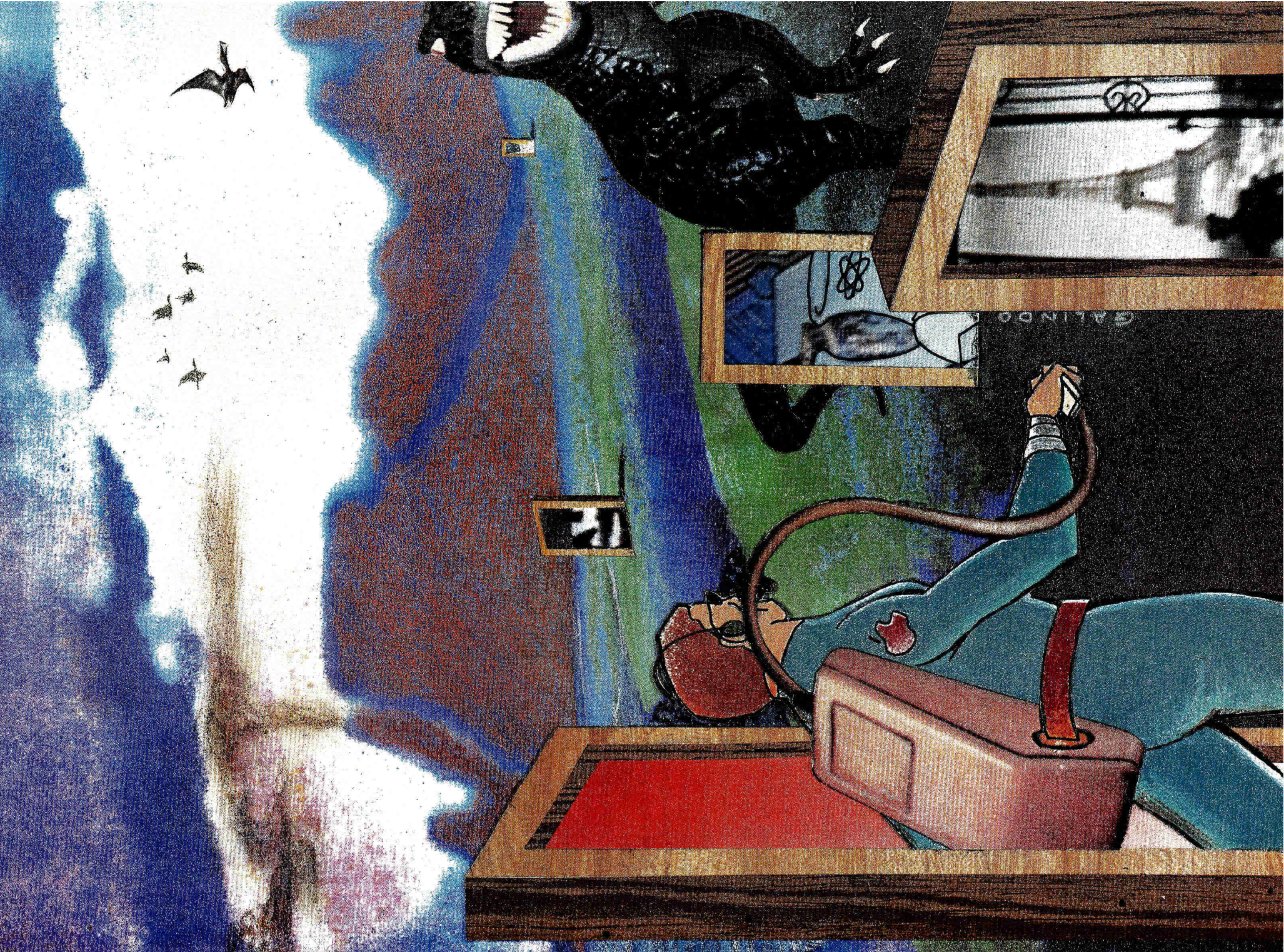
In preparing this article, we took a close look at the half-dozen hypermedia authoring systems now available for the Apple II: HyperStudio, Nexus, Tutor-Tech, HyperScreen, Super Story Tree, and StoryWorks. (For details about each product and available add-ons, see the accompanying "Product Information" box.)

Each of these Apple II products shares at least two attributes with the popular Macintosh product HyperCard. For one thing,

authoring systems let the creator (that's you) write — in hours or days — software that would otherwise take weeks or months to prepare. Second, hypermedia software lets the reader (a student, business associate, or customer) browse interactively through the free-form database you design.

What does a hypermedia application look like? You can probably find one right in your local grocery store: Any number of supermarkets these days have computer-based information kiosks. Want to know where the pickles are? Press *P* on the kiosk's touch screen. Browse through the listings until you find the word *pickles*. Press the screen again, and a display pops up showing the aisle location for pickles and a "you are here" indicator. If pickles are on special today, the kiosk might even generate a cents-off coupon. Imagine being able to design similar systems with an Apple II — of course, you probably don't sell pickles, but maybe you're trying to sell your students on the value of classical music, say. Your interactive database would feature Beethoven and Mozart instead of Heinz and Vlasic.

As the author of this cultural-enrichment lesson, you'd type selected text about classical music on an introductory (or "home")



screen. From that screen, a student could choose to go to other screens to learn more about any of the composers featured in the introduction to your lesson. Moving from screen to screen often takes no more than a click of the mouse or joystick button, or a tap on the spacebar or **TouchWindow**.

Depending on the hypermedia package and the computer accessories you used to create your program, the student can veer off to see illustrations of musical instruments that were popular in Mozart's day, to listen to a sound clip from each of those instruments, to view a portrait painting or digitized image of the child genius, or to watch a video sequence of an orchestral rendition of one of Mozart's works.

With hypermedia you can intersperse true/false, multiple-choice, or even fill-in questions throughout the lesson and have your database respond appropriately to students' answers. Some hypermedia authoring systems can keep score and perform more advanced grading functions, as well.

Talk about self-paced learning! With hypermedia the reader can proceed or branch off to new information, or revert to review material that's already been displayed. And, like the best examples of commercial educational programs, your computer-assisted tutorials are infinitely patient, motivating, and reinforcing.

Another benefit is that most Apple II authoring systems have adaptive features that can help special-education students use teacher-scripted lessons, too.

That's not to say that interactive multimedia is just for kids — or schools, for that matter. Not long ago we interviewed a horticulturist in the Midwest who was planning his first visual database. (See "Taking Care of Business," October 1990, p. 44.) His retail customers, like most customers in his industry, always want to know how plants will look when they flower, how high they'll grow, or how big a certain tomato fruit will be. Just like teachers, retailers tend to share the same information over and over again.

But hypermedia can do a lot more than just liven up a broken record. Creative writers, including young ones, relish the ability of most authoring systems to take readers on interactive adventures. You can build a series of choices into your story that in effect let your reader determine the story's path and its outcome.

As a bonus, most authoring systems let you create self-running disks. This novel communications medium, to which one developer has jokingly referred as "disktop publishing," lets you share your databases and stories with others who use compatible Apple II computers. (For a no-frills, low-cost approach to this technique, see the accompanying sidebar, "Getting Back to BASiCs.")

Surprisingly, hypermedia has few prerequisites. You don't need to master a traditional programming language — but you do need to get a handle on some new jargon. For one thing, authoring systems refer to each program you create as a *file*, a *story*, a *set*, or, more commonly, a *stack*. Each screen within a stack is usually called a *card*, although some programs refer to them as *pages* or *segments*; the starting point in a stack is the *home card*. Links

between cards are usually called *buttons*; some move the reader forward, some link back to a previous card, some ask questions and keep score, some play music, and some elicit a video sequence. At least a couple of the hypermedia programs reviewed here let you use invisible buttons, which you can cover up with colorful, readily identifiable icons. Click on the house icon to return to the home card, for instance; click on the stop sign to end the lesson; click on the right-facing

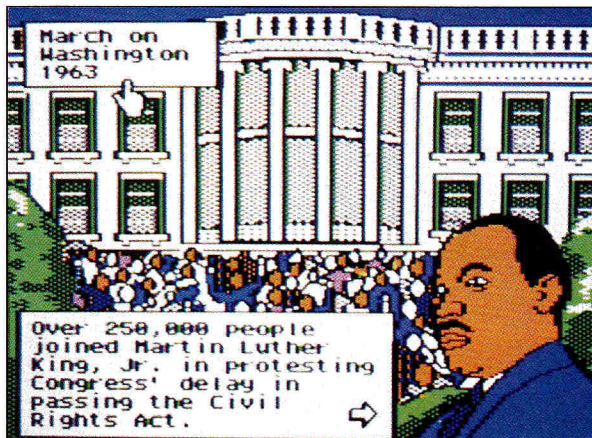
arrow symbol to proceed to the next card in the application.

Besides buttons, authoring systems give you lots of other tools with which to work. Use a program's text editor or graphics text tool to type directly on a card in a variety of fonts and colors. Create original artwork with a program's paint and drawing tools. Some hypermedia packages offer multiple brush shapes and assorted line widths in addition to flood-fill and spray-paint tools. Shape tools, such as hollow and filled rectangles and ovals, are standard fare.

If the number and variety of built-in text and graphics tools in a particular authoring package seem insufficient, consider this: Most hypermedia programs can also import text files from other software either in ASCII format or as **AppleWorks** Classic word-processor files. Depending on the graphics capabilities native to the Apple II system for which they were designed, hypermedia authoring programs may also import high-resolution, double-hi-res, or super-hi-res clip art as well as original illustrations and digitized images. And, to get you started, the majority of programs we tested come with free clip art, full-screen backgrounds, borders, and sound effects.

In general, hypermedia products support the **Apple II Video Overlay Card**. This circuit board lets you display images from a VCR or a videodisc player on the computer screen instead of requiring you to set up a second monitor at your workstation. You commonly incorporate brief codes on designated buttons within your stack to start and stop the player after it displays a given frame or sequence. The manuals accompanying programs that support laserdisc players teach you how to write these "scripts."

True to their nature, most multimedia authoring systems can incorporate sound effects, musical selections, or spoken language into your stacks. HyperStudio, a GS authoring



HyperScreen: a low-cost alternative for 8-bit Apple IIs.

system, comes with its own sound-digitization card that lets you record "live" music or spoken words. Another superstar Tutor-Tech, imports speech from dictionaries created with software accompanying the **Echo** family of synthesizers.

Most hypermedia products we reviewed are breathtakingly easy to use. The majority feature Apple Human Interface niceties such as pull-down menus, mouse input, and sensible dialog boxes. Virtually all offer on-line help, interactive tutorials, and sample stacks.

Most programs provide automatic scripting: You don't have to type programming codes to design the cards in a stack. Want to place a button somewhere? Depending on the authoring system, all you have to do is pull down a menu and choose the "add a button" feature, click on the button icon in the program's toolbox, or draw a button with the mouse. Want to review a button's attributes? Click on the button and read the dialog box that appears. You can design (and redesign) each card until you're happy with the results.

Whether it's stapled, spiral bound, or inserted into a three-ring binder, hypermedia program documentation is generally of good, but not outstanding, quality. Many offer a plethora of stack ideas for teachers, school administrators, business owners, and hobbyists. Take advantage of resources, too, including the **HyperStudio Forum** newsletter and **Stack Central**, a magazine on disk, to supplement and expand your hypermedia authoring expertise.

NO HYPERBOLE

No ifs, ands, or buttons about it: If you use a GS, you need **HyperStudio** (1.25 megabytes required). Thanks to excellent

design and a strict adherence to Apple Human Interface standards, this cream-of-the-crop authoring system is superbly easy to learn and simple to use.

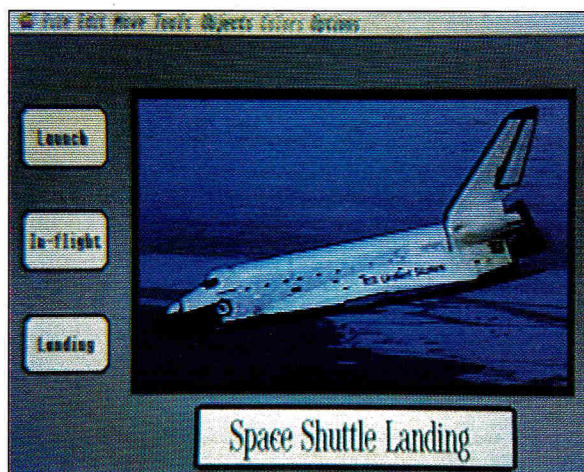
Among its many laudable features, HyperStudio offers a full-featured toolkit for creating original artwork — even a "magnifying glass" for zooming in on pixel-sized details. And with a program called **The Graphics Exchange** (sold separately), you can incorporate virtually any Apple II artwork into your HyperStudio stacks.

HyperStudio even lets you create scrolling text windows so that you can incorporate more information onto a card than might otherwise be possible. True to the Roger Wagner tradition, the program also supports extended commands, written in standard Apple II programming languages such as assembly and Pascal, that add advanced features.

In addition to its authoring software, the HyperStudio package includes some hardware, as well: a sound digitization card and a microphone. The "no-slot" card attaches via a metal bracket to the inside of the GS' chassis; it doesn't usurp any precious peripheral space.

To record live, designate a button to play a sound. Hold the microphone close to your mouth if you're going to speak — or near a musical instrument or a stereo speaker if you're going to record music. The Sound Shop, a free utility program that comes with HyperStudio, lets you digitize, edit, and save sound files for later use in your stacks. A small amplified speaker that supplants the GS' own internal unit is available at nominal cost.

With HyperStudio and other "desktop publishing" systems, everything you display on a card — text, background, clip-



HyperStudio: the premier GS authoring system.

Getting Back to BASICs

Need an inexpensive way to launch your "desktop-published" newsletter or catalogue? Take a look at Floppy Book 1, the first in a series of disk-based communications written by Phil Shapiro, a Washington, D.C. -area educator and computerphile.

"The floppy-book concept derives from the fact that nothing is cheaper to reproduce and distribute than magnetic media," Shapiro says. "For the wholesale dissemination of ideas, magnetic media works out to be at least one-tenth the cost of equivalent hardcopy distribution of the same ideas. I see this Floppy Book disk as a sort of poor man's

hypermedia. Ideas can be quickly accessed from either of two menus. Comments can be added or deleted from the text. And the whole shebang can be reproduced for 25 cents, the price of a blank 5.25-inch floppy [disk]."

Creating your own "floppy book" requires implementing Karl Bunker's public-domain Dogpaw programming routine, as well as customizing the two menus to which Shapiro refers. Some knowledge of Applesoft BASIC is helpful, but don't be daunted: The "B" in BASIC stands for "Beginner's."

"Karl Bunker has effectively donated a printing press to any Apple II user who

owns a disk drive," Shapiro concludes. "Those of us who use Apple IIs for work and play have shown a great willingness to continue the vivacious spirit of the early days of microcomputers. We are all just far-flung members of the Homebrew Computer Club, creating and sharing new products, new tools, new ideas with wide-eyed amazement. I am hoping that the floppy-book concept will play a small part in keeping the Homebrew ethos alive in our hearts."

For more information on Floppy Book 1, write to Phil Shapiro at 5201 Chevy Chase Parkway NW, Washington, DC 20015-1747.

— C.F.

art, and button icons — looks outstanding, in sharp contrast to many desktop-published communications in which the message is often blurred by a dot-matrix medium.

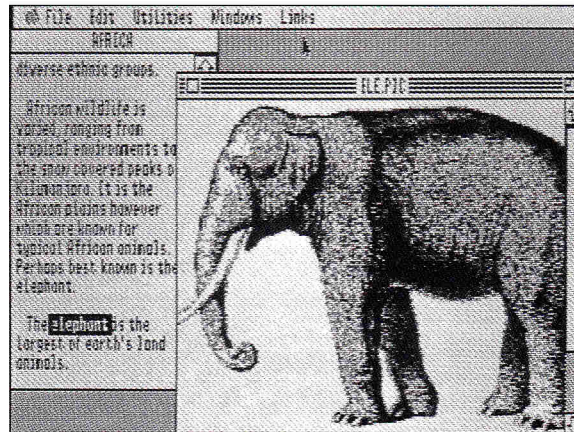
LINKS IN THE CHAIN

Another exclusively GS program, **Nexus** (1.25 megabytes and GS/OS 5.0.2 required) pales in comparison to HyperStudio. In fairness, however, Nexus takes a totally different approach to hypermedia. You can't write a multiple-choice question or draw a polygon within Nexus itself; instead you use it as a utility to link files previously created with word-processing, painting, or sound-digitization programs. (At press time, a version of Nexus supporting Pioneer laser-disc players was in development.)

In Nexus each free-form database isn't a stack; it's a *set* consisting of linked files. Forging links couldn't be easier. For example, open a document written with the AppleWorks Classic word processor (version 3.0 files are imported without formatting); now pick a linking word. Press Open apple-A (or pull down the Link menu) to add the connection. Drag and

double-click on the hollow rectangle on the target word. Finally, choose the file to which you'd like to link; you can link as many as 1000 such files in a chain.

You can also place one or more links in graphics documents and sound files. In theory, clicking on a picture of a flute could open up a sound file and coax your Apple IIGs to play a selection from Mozart's *Flute Quartets*. Besides providing these powerful linking options, Nexus also offers the ability to create your own self-running disks, although you may have to alter the pathnames of accompanying files, depending on your particular hardware setup.



Nexus: free-form database linking text, graphics, and sound files.

TOOLS GALORE

A veteran 8-bit hypermedia authoring system, **Tutor-Tech** is the program of choice if audiences for your interactive tutorials and business presentations are likely to use the Apple IIe, IIC, IIC Plus, or their Laser 128 counterparts. A Tutor-Tech-based hypermedia system is an affordable choice for the average classroom, computer lab, or retail store.

Tutor-Tech, which requires only 128K of random-access memory, probably offers more tools and options than other

PRODUCT INFORMATION

Apple II Video Overlay Card

Apple Computer Inc.
20525 Mariani Ave.
Cupertino, CA 95014
(408) 996-1010
\$549

AppleWorks 3.0

Claris Corp.
5201 Patrick Henry Drive
Santa Clara, CA 95052-8168
(408) 727-8227
\$249

BCD-450 Interface

BCD Associates
7510 North Broadway Extension
Suite 205
Oklahoma City, OK 73116
(405) 843-4574
\$595

Dazzle Draw, \$59.95

The New Print Shop, \$49.95

Broderbund Software
17 Paul Drive
San Rafael, CA 94903-2101
(415) 492-3200
(800) 521-6263

Echo II, \$129.95

Echo IIC, \$149.95

Echo Headphones, \$19.95

Street Electronics Corp.
6420 Via Real
Carpinteria, CA 93013
(805) 684-4593

Graphics & Sound Booster Packs:

Holidays and Special Events

People and Places: U.S. History

Science and Technology

Science Fiction

Mystery

Adventure

Everyday People, \$29.95 each

HyperScreen, \$99.95

Super Story Tree, \$79.95

Scholastic Inc.
730 Broadway
New York, NY 10003
(212) 505-3000

HyperStudio Forum

HyperStudio Network
Box 103
Blawenburg, NJ 08504
(609) 466-3196
\$29/year (quarterly,
includes network membership)

HyperStudio 2.1, \$149.95

Amplified External Speaker,

\$9.95 plus \$3 shipping

Demonstration Set, \$10

Clip Art Volume 1, \$24.95

Clip Sounds Volume 1, \$24.95

XCommands Library Disk

Volume 1, \$49.95

The Graphics Exchange, \$49.95

Roger Wagner Publishing
1050 Pioneer Way
Suite P
El Cajon, CA 92020
(619) 442-0522
(800) 421-6526

Laser 128, \$479.95

Laser 128 Color System, \$699

Laser 128EX, \$549.95

Laser Computer Inc.
800 North Church St.
Lake Zurich, IL 60047
(708) 540-8911

H Y P E R M E D I A

hypermedia products for the Apple II family. In addition, the program's features are neatly organized around eight easy-to-use pull-down menus: File, Edit, Page, Special, Font, Pattern, Color, and Line.

Among other things, Techware's "Hypermedia Toolkit" comes complete with an impressive collection of ready-to-use artwork and an adequate supply of graphics tools for creating custom illustrations.

Tutor-Tech can import both single- and double-hi-res graphics, so you needn't worry about incompatibility with your growing collection of **Print Shop**, **Newsroom**, and **Dazzle Draw** images.

Not only does Tutor-Tech support more than a dozen models of **Pioneer** brand videodisc players, the program can interact with videocassette players by means of a BCD Associates' **BCD-450** interface. At press time, we knew of no other Apple II hypermedia product that could "talk" to VCRs, though Roger Wagner Publishing was said to be working on the necessary drivers for an upcoming version of HyperStudio.

How does Tutor-Tech work on your 16-bit GS? Well,

despite the many alluring features of Tutor-Tech stacks, if you're creating them on a GS, you need to make one minor adjustment. Note that because the program's double-hi-res colors tend to bleed on the GS' RGB monitor screen, you may want to switch to monochrome mode via the Control

Panel first to get the clearest images possible.

Tutor-Tech is a standout when it comes to supporting a wide variety of peripheral devices, including the **Tutor-Tech Tape Cassette Controller**; Echo speech synthesizers; various joysticks, trackballs, and graphics tablets; the **TouchWindow**; and the **Muppet Learning Keys**. You can use the regular keyboard to present stacks, a feature that may be an important consideration for some hardware-hungry schools.

Prospective software authors will be up and running in no time thanks to the Tutor-Tech tutorial; it's one of the best we've ever seen. Moreover, creating a new stack is as easy as pulling down menus and making choices with the mouse.

According to the company, some 250 stacks are available through various public-domain libraries and resources such



Tutor-Tech: a complete range of tools and options in 128K.

Laser-Disc Players

Pioneer Communications
3545 Long Beach Blvd.
Suite 400
Long Beach, CA 90807
(213) 492-9935
(800) LASER-ON
\$895 - \$2285

Muppet Learning Keys

Sunburst Communications
101 Castleton St.
Pleasantville, NY 10570
(914) 769-5030
(800) 431-1934
(800) 247-6756 Canada
\$129

The Newsroom

Spinnaker Software
201 Broadway
Cambridge, MA 02139
(617) 494-1200
(800) 823-8088
\$34.95

Nexus

Golem Computers
1111 Rancho Conejo Blvd. #407
Newbury Park, CA 91320
(805) 499-0197
(800) 248-0363
\$79.95

Stack Central

A2-Central
P.O. Box 11250
Overland Park, KS 66207
(913) 469-6502
\$42/year (6 2-disk issues)

StoryWorks

Teachers Idea & Information Exchange
P.O. Box 6229
Lincoln, NE 68506
(402) 483-6987
\$49.95

TouchWindow

Edmark Corp.
P.O. Box 3903
Bellevue, WA 98009
(800) 426-0586
\$275

Tutor-Talk

Tape Cassette Controller

OMMEGA Corp.
15476 NW 75th Court
Suite 122
Miami Lakes, FL 33016
(305) 558-0097
\$195

Tutor-Tech 2.6

Hypermedia Toolkit, \$195

Gradebook, \$95

Demo Disk, free

Video Overlay Card

Demo Disk, free

The Stack Exchange,

free to registered users

Techware Corp.
P.O. Box 151085
Altamonte Springs, FL 32715-1085
(407) 695-9000
(800) 34-REACH

as *The Stack Exchange* newsletter, a publication produced by Techware and sent free to registered Tutor-Tech users.

ON YOUR SMALL SCREEN

HyperScreen, an authoring program from Scholastic Software, finishes third among HyperCard-like interactive-hypermedia programs for the Apple II family (128K required). Although it's well-designed and easy to use, the program lacks the appeal of either HyperStudio or Tutor-Tech. For one thing, HyperScreen limits you to single-hi-res graphics in your stacks. We recognize the fact that for some prospective software authors, that's no limitation at all, because thousands of single-hi-res Print Shop images are available in the public domain. Moreover, Scholastic Software sells add-on "booster" disks with additional graphics and sound files.

To its credit, HyperScreen offers you a choice of 15 opening transitions, 32 paintbrushes, 80 colors, and various fonts. Moreover, the program supports videodisc players and the Apple II Video Overlay Card. Like other programs reviewed so far, HyperScreen sports pull-down menus and mouse support, two features that make the program easy to learn. Sample stacks, including "The Human Body" and "Movie History," provide glimpses of the program's capabilities.

HyperScreen has one distinct advantage over Tutor-Tech, its only real competitor, and that's price — it's about \$95 cheaper. If you're a teacher who plans to use an Apple IIe, IIC, or IIC Plus to create stacks and you're undecided about the program that's right for you, take advantage of both Techware's and Scholastic Software's 30-day preview policies.

MULTIMEDIA STORYTELLING

Super Story Tree is similar to HyperScreen. They were designed by the same person and share certain features,

including compatibility with Scholastic's **Graphics and Sound Booster Packs**. Both programs offer a similar array of paintbrushes, line widths, and dithered colors.

A number of differences are immediately apparent, however. True to its name, Super Story Tree (128K required) is geared almost exclusively to writing and illustrating stories. In place of HyperScreen's File menu, for example, Super Story Tree sports Story and Page menus.

At each twist and turn, a story writer can give a reader one of three options: *continue*, *choice*, or *chance*. Continue buttons let the reader proceed to the next screen; choice buttons provide options about where the story should go; chance buttons create opportunities for random exploration. The author doesn't have to draw physical buttons on screen; the program supplies them automatically.

Super Story Tree's many appealing features would make it an exceptional addition to your elementary-school classroom or computer lab, particularly if your students like to collaborate on illustrated stories complete with sound effects.

APPLEWORKS BRANCHES OUT

While it may not be inherently as intuitive as the other interactive products reviewed so far, **StoryWorks** has at least three compelling attractions: First, authors use the AppleWorks Classic word processor (versions 1.0 through 3.0) to create stacks. Second, the program requires only 64K. Third, StoryWorks costs less than \$50, a price that most schools can readily afford.

Start up AppleWorks, add the StoryStarter word-processing template to the desktop, and press Open apple-Z. The template consists of 51 segments demarcated by predefined markers that were set by the template's creator through the word processor's Printer Options (Open Apple-O).

Map your story (the manual includes sample flowcharts for ↗

FURTHER READING

Super Story Tree.

Reviews, October 1990, p. 75

"Videodiscs and Apple IIs: A Star Is Reborn,"

September 1990, p. 58

HyperScreen.

Reviews, September 1990, p. 38

"I Want My GTV,"

Status Report, September 1990, p. 30

"GTV: Back to the Future,"

September 1990, p. 100

"Get Hyped,"

What's New, August 1990, p. 22

"Link Up: Nexus,"

Editors' Choice, August 1990, p. 100

"Hypertext,"

June 1990, p. 16

"On the Button: Scholastic HyperScreen,"

Editors' Choice, May 1990, p. 96

"Where Were We?"

What's New, May 1990, p. 16

"Desktop Video: Making Movies with Your Apple II,"

April and May 1990, pp. 44 and 45

StoryWorks.

Reviews, April 1990, p. 32

"More Hypertext,"

What's New, April 1990, p. 20

"Exploring HyperStudio,"

March 1990, p. 56

"In the Cards,"

Speaking of Graphics, October 1989, p. 94

"Does HyperStudio Stack Up?"

September 1989, p. 44

"Curing the 8-Bit Blues,"

September 1989, p. 48

"HyperStudio: Hypertext for Your GS,"

Editors' Choice, August 1989, p. 108

Only AE accelerators are compatible with this...



A blank sheet of engineering paper. For some time now, we've done all of our design work using CAD (computer aided design), but the blank sheet of paper shown above represents future AE peripherals and accessories for the Apple II line.

Because accelerator cards push technology close to the limit, designing new peripheral cards to be fully compatible with a given accelerator requires a special insight. That's why whenever one of our engineering teams designs an Apple II peripheral, they have to take into account the way in which TransWarp and TransWarp GS will interact with that particular peripheral device.

Both TransWarp and TransWarp GS were designed with future upgrades in mind (note the 40 pin high speed buss connector on TransWarp GS). That's why Apple owners who expand and enhance their computers with Applied Engineering products have far fewer compatibility and performance problems than those who try to "mix and match." But should you ever have a question,

one call to our technical support department puts you on line with someone that knows your Apple and all the peripherals in it, making a solution to your configuration much easier.

You've probably already read the great reviews the TransWarps have received: *"I wasn't able to find a single piece of software incompatible with it, nor could I attribute any system problems to the card's presence."* — A+ (IIGS)

"TransWarp is great. I have replaced all my other accelerators with it!" — Steve Wozniak, co-founder of Apple computer

"Wait 'til you see it perform. Folders and icons open from the finder like lightning; text wraps instantly around graphics in your favorite desktop publishing program; documents scroll at a reasonable rate in any graphics-based word processor. TransWarp makes the GS as good as the Mac, because it's fast and it's still in color." — inCider (IIGS)

"Your engineering department should take a bow. As a developer and consultant, I work with the Mac II and Mac SE as well as the IIGS. I have conducted some recent tests which indicate that the 'little' IIGS outperforms the Mac SE." — George Dombrowski, Jr. (IIGS)

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stories and a multiple-choice test) and write its text between appropriate sets of markers. Change the filename to the title of your story in progress.

After each Set Marker sandwich, type in a short script that directs StoryWorks to respond to buttons (selected Apple II keyboard keys), which the student presses. Besides branching off to appropriate parts of a story, these "transfer directives" can instruct StoryWorks to play a sound (the program comes with 26 sound effects), revert to a previous story segment, keep score, or display a grade.

Typing transfer directives isn't as easy or as fast as creating stacks with object-oriented authoring systems, but StoryWorks' syntax makes sense. If at a certain juncture you want the program to respond to a press of the *L* key, for instance, you include *L,l* in the transfer directive. If you want to play the fourth sound effect in the sound file, type a *d* at the appropriate location in the transfer-directive sentence. If you want the story to proceed to the eighth segment, type *>8*.

When your stack is finished, save it. Then boot up StoryWorks and test your masterpiece. You can read the story in 80-column text, but the program's default 30-column graphics text is much more appealing and much easier on the eyes.

Unfortunately, we know of no way to incorporate standard graphics into a StoryWorks story, though a sample seating-chart template provided in the StoryWorks package includes

an impressive drawing created solely with text characters.

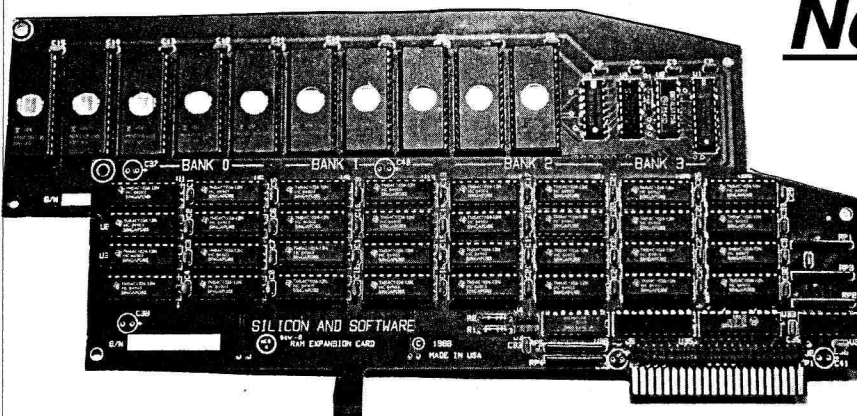
If you're an AppleWorks-using educator, you owe it to yourself to test-drive StoryWorks either as a teaching tool or as the basis for creative-writing activities in your classroom. You'll be in excellent company, too: StoryWorks is published and supported by the Teachers' Idea & Information Exchange, a professionally run network of software-sharing educators.

HOW DOES IT STACK UP?

If one genre of software deserves to be hyped, it's hypermedia. With the ultimate in programming tools for the non-programmer, virtually every Apple II user can design stacks and stories that used to be impossible for the average person to create.

Thanks to HyperStudio, Tutor-Tech, and the other purveyors of personal-computing power we've talked about here, you'll be astounded by the sheer number and variety of enrichment opportunities you'll discover for your home, classroom, or business. □

CONTRIBUTING EDITOR CYNTHIA E. FIELD IS A FREE-LANCE JOURNALIST SPECIALIZING IN COMPUTER-RELATED TOPICS. SHE'S THE AUTHOR OF PRESS ROOM, *inCider*'S MONTHLY COLUMN ON DESKTOP PUBLISHING. WRITE TO HER AT 60 BORDER DRIVE, WAKEFIELD, RI 02879. ENCLOSE A SELF-ADDRESSED, STAMPED ENVELOPE IF YOU'D LIKE A PERSONAL REPLY.



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Woodstock, IL 60098
Inquiries / Tech Support / Information: (815) 338-4227

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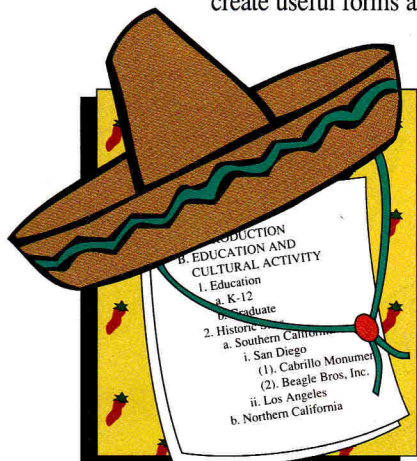
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Outliner for AppleWorks 3.0 requires a 128K Apple IIe, IIc, IIc+ or IIgs with at least one 3.5" or 5.25" disk drive and AppleWorks 3.0.

Outliner™ for AppleWorks 3.0

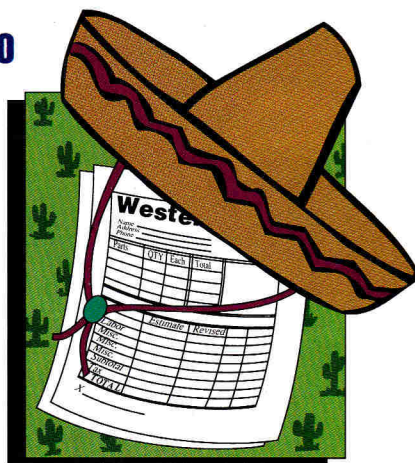
Design Forms Like a Pro

SuperForms, a utility that works with TimeOut SuperFonts, lets you create custom forms right inside AppleWorks. Now you can graphically create professional looking invoices, calendars, inventory forms, grade sheets and more. Plus, once you've created your form, FormFiller will allow you to fill it with information transferred from a data base, spreadsheet or word processor file.

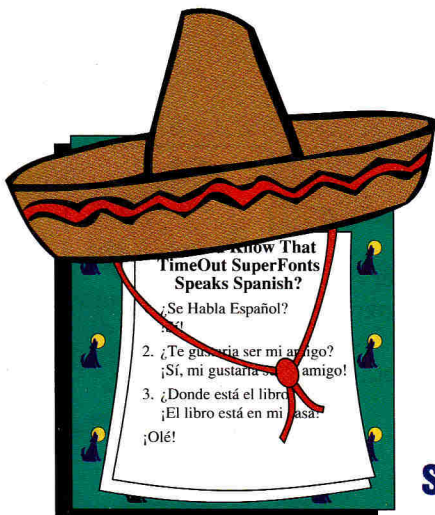
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TimeOut SuperFonts and SuperFonts Activity Guide. **\$99.95.**

SuperFonts Activity Guide requires AppleWorks 2.0, 2.1 or 3.0 with TimeOut SuperFonts.

SuperFonts Activity Guide™



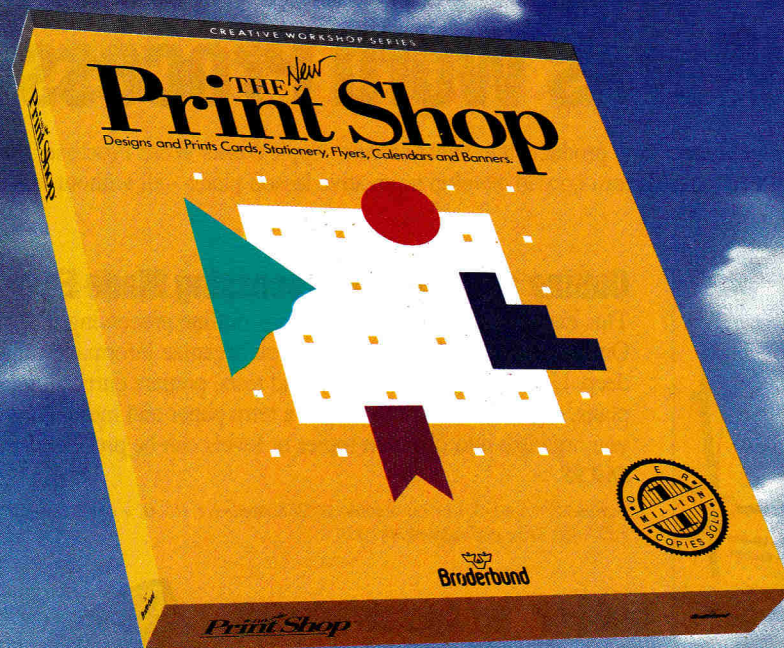
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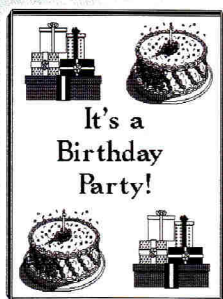
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841NR



The best software lets kids explore electronic worlds just as they explore their physical world — at their own speed and for their own reasons. inCider takes a look at five such programs for preschoolers and evaluates their potential for fun and learning.

DAYS OF DISCOVERY

By GREGG KEIZER

ALIEN MINDS LIVE AMONG US.

No, that's not a headline from your favorite supermarket tabloid. It's a fact. Spend a few moments with a preschooler and you'll realize that young children simply *think* differently from the rest of us. They just don't live by the same rules as everyone else.

Everything is fair game to a preschooler. Any question can be asked, any saunter through the kitchen turned into an adventure, any law of physics repealed. Curiosity is their byword; learning is their job. That preschooler in your house is on a five-year

mission of exploration, trying to gather as much information as possible. The discoverers of the New World had it easy compared to kids — after all, at least they knew their colors.

THE COMPUTER'S ROLE

To help such pint-sized Magellans, parents have always called upon special tools to quicken their children's progress — anything to give them an edge. Alexander the Great had a private tutor — Aristotle. We had Play-Doh and Etch-a-Sketch. Today's kids have



computers like the Apple IIe and the GS. But is the personal computer the right tool for preschoolers? Should a three-year-old sit at a computer desk, hands on the keyboard, eyes on the screen?

Some people say no. Surprisingly, at least one is a software developer. Tom Snyder, once a classroom teacher and now head of the software publishing company that bears his name, believes that computers can't compare with low-tech or no-tech learning. "A computer doesn't compete particularly well with other [learning] activities — the stuff is intriguing for only a couple of minutes," he says. "Let me put it this way: I've got two preschoolers at home and we don't own a computer. But we do have a ton of books. They're slightly more interactive than a computer."

What computers can do, suggests Snyder, is foster interactivity among children, perhaps by serving as a smart storyteller, by "introducing a new fictional problem for kids to deal with" — the computer as referee and coach.

Not everyone sees it the way Snyder does. Warren Buckleitner works for High/Scope, a nonprofit foundation that tracks and evaluates preschool software; as he edits an annual collection of preschool-software reviews, he watches kids use more than 400 programs every year. "Computers won't replace traditional preschool activities, like blocks," he says, "but they're a great activity for kids. Kids love computers." The key, he explains, is the software. "The best software puts the child in control," he notes, whether in an

open-ended or a drill-and-practice-style program. "Sure, kids should use computers. They're a good option. All the teachers I talk to feel good about what they see kids doing with computers," he adds. "But I could still raise a happy child without one."

Most parents would agree. You want to put your Apple II to good use, and put your preschooler in front of good software. You've seen the way your Apple II has changed your life, and you want to see whether it can change your children's lives, too. We all want to give our kids the very best

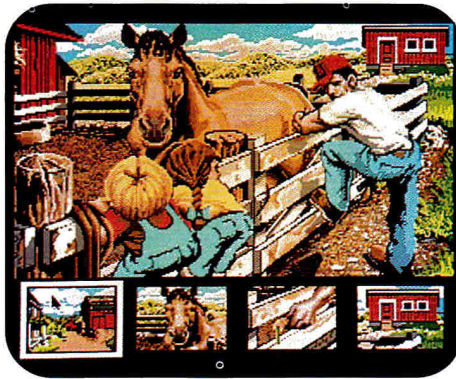
we can — and that goes for the computer time they keep just as much as for the food they eat and the books they read.

November's the start of the Christmas promotion season for many stores and manufacturers — a perfect excuse to kick your quest for high-quality preschool programs into gear. To get you started, here are five packages I recommend strongly to anyone with an Apple II and a tot in the house. I've put my four-year-old play tester

through the preschool-software mill to come up with this list. Pick up any (or all) of these five programs and your child will learn something, have loads of fun, and probably teach you a thing or two along the way.

FROLIC ON THE FARM

Your preschooler won't find a better program of discovery than **Katie's Farm**, the sequel to **McGee**, Lawrence Productions' debut into no-word software (Editors' Choice, January



Go exploring around Katie's Farm.

CHECK IT OUT

It's hardly surprising that good software for preschoolers is at a premium — it's simply harder to create quality preschool programs than educational software for older kids. A developer can assume that a school-aged child knows how to start a program or skim a manual, but take that for granted with a preschooler and the disk may never leave the box.

To help you find the best preschool programs, use this simple yes/no checklist. Answer three or four questions with a yes and you've spotted a good piece of software.

1. Can kids use the program without much help? Top-notch preschool software starts automatically, demands no disk swaps, and works with just a few easily recognized or remembered commands.

2. Is the program self-paced or open-ended? Good preschool software lets kids explore, lets them discover new ideas, shapes, words, and more without forcing them along some sort of locked-in path.

3. Does the program use graphics and sound for a purpose, not just as window dressing? To a young learner, pictures and sound take the place of written words. Good graphics and sound, especially spoken words, keep preschoolers' short attention spans focused on the program.

4. Is the program fun? Entertainment and education aren't contradictory terms, no matter what you remember from your school days. Preschool software must be fun to use, or children will recognize it as work and refuse to play along.

Other criteria can affect your evaluation of preschool software, of course. Does the program depend on perfect typing skills? Bad news.

Is it useful only for two-and-a-half-year-olds who can spell three-letter words? Worse news — software that accepts broad ranges of abilities and ages will get used more often, and longer, too.

To root out the best programs, talk to friends with computers and preschoolers, pump a local kindergarten teacher for recommendations, or visit a software store and ask to see programs demonstrated. Take your child with you on those trips to the software store, though. For confidence in what you're buying, nothing beats having your own preschool play tester give a package a thumbs-up. — G.K.

1990, p. 132). Like its predecessor, *Katie's Farm* puts preschoolers in complete control and lets them explore a fascinating world with their Apple IIGses.

High on graphics and packed with digitized sound and voices, *Katie's Farm* stars McGee and his older cousin Katie. Your preschooler decides what the computer kids do by moving the mouse and highlighting one of four smaller scenes at the bottom of the screen. A click of the mouse button sends them to the garden, the lake, the barn, the corral, the chicken coop, even the big oak tree in the yard.

Head into the barn, for instance, and watch Katie's mom milk the cow, or jump into a pile of soft hay, or feed the barn cats fresh milk. The sound effects are realistic enough to bring back memories of early mornings on the farm; the animation is smooth.

There are no numbers, letters, or shapes in *Katie's Farm*, so at first glance you may think its educational abilities suspect. But the key to the program's success is the control your child has over Katie, McGee, and their little world — a real luxury in most preschoolers' lives. Almost as important are the conversations you'll have after a stroll through *Katie's Farm*. Ask why McGee took the berries, then listen for a hilarious answer — or get ready to answer questions about anything from how to milk a cow to why horses like carrots. Don't underestimate the educational power of conversation — McGee and Katie don't.

A MESSY ROOM WITH LOTS TO DO

A bit more traditional is **The Playroom** (Reviews, October 1990, p. 34), an intriguing collection of preschool learning games for the Apple II from Broderbund Software.

The opening scene is a crowded playroom with lots of objects to choose from. Using the keyboard, the mouse, or a joystick, kids select the clock, the alphabet book, the spinner toy, the computer, the mousehole, or the mixed-up toy. After a disk swap, another screen appears. It's an easy-to-use interface perfect for young learners.

One of the best activities is *The ABC Book*, three different scenes your child fills with objects that appear when he or she presses a letter key. Though some of the objects are obscure (how many kids know what a zither is?), *The ABC Book* is a wonderful way for young children to practice initial letter skills. They can even peel objects off the background and reposition them — a nice touch.

Another Playroom activity is *The Mousehole*, a one- or two-player counting game in which kids shake on-screen dice

and move pieces around a board. At its simplest level, it's a good introduction to numbers. Children learn to plan ahead, though: They have their choice of three dice and figure out quickly that some rolls mean a trip backwards, others a great leap forward.

Four more Playroom games focus on telling time, counting, spelling, and matching. The mix ensures that every preschooler will find something interesting. Think of *The Playroom* as the AppleWorks of preschool software — a bit of everything packed together — and you'll understand its attraction for young children.



Lots of games to choose from in *The Playroom*.

READ ME A STORY

Tom Snyder, educator and software developer, coined the word *lapware* for his kind of preschool programs. The idea, in a nutshell, is that a computer isn't something preschoolers should face alone, but instead should share while perched on a parent's lap.

Snyder turned his lapware idea into reality with the introduction of his Reading Magic series. Two titles

— **Jack and the Beanstalk** and **Flodd, the Bad Guy** (Reviews, September 1989, p. 38) — make up the line's Apple II offerings. They're more than two years old now, but they're still among the best preschool programs around.

Our favorite is *Jack and the Beanstalk*, a slightly warped version of the classic. Set in a future in which cows are robotic, the story follows the traditional line for the most part. Jack sells his cow for magic beans, climbs the beanstalk, and rescues a goose-like creature from the nasty giant. There are no digitized or synthesized voices here, just

relatively simple pictures and words to read from the screen. Your child is in control, and operating the program couldn't be easier — press the spacebar to "turn" the page.

What turns a computerized fairy tale into a top preschool program is the way the software forces you to interact with your child. At various times along the way, a fork in the plot trail appears and you've got to decide what to do. Go down the stairs or up? Leave the beanstalk or head for the top? What to do, what



Reading is magic when it's *Jack and the Beanstalk*.

to do? That's the point of the Reading Magic concept, for the story is secondary to the time spent together reading, talking, planning, enjoying.

A TALKING BEAR

If you're looking for software fit for the younger preschooler, a two- or three-year-old perhaps, you can't go wrong by booting any program in the Stickybear series. This wide-ranging line is most impressive, though, in its

Apple IIGS format, for the veteran Stickybear talks to your child.

Our AFB (All-time Favorite Bear) is **New Talking Stickybear ABCs** (Reviews, September 1989, p. 82), a perfect program for young learners just starting to associate letters and their initial sounds. This GS program's graphics and sound are outstanding, head and shoulders above the competition.

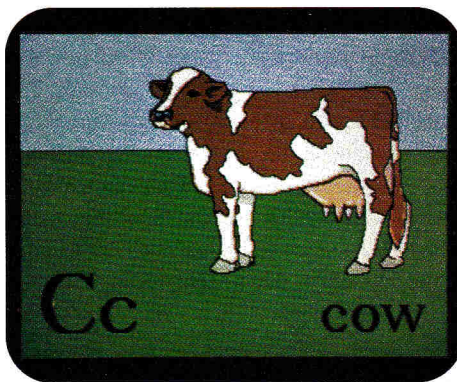
Your preschooler chooses one of three related activities. The most fun and the best learning tool is

Alphabet, a simple press-the-key-and-see-a-picture experience. The voice-over speaks the displayed letter and its associated word while animation takes over the screen. What sets Stickybear apart from other programs with similar ambitions is its illustration-quality graphics and its impeccable speech. Your child won't have any trouble understanding Bedford Stickybear and his cohorts.

We've also enjoyed other bear software, and especially recommend the GS talking versions of **Stickybear Shapes** and **Stickybear Opposites** (Reviews, February 1990, p. 32). Shapes seems a bit more advanced, but Opposites is another perfect choice for young preschoolers ready for the concepts of up/down, in/out, and above/below. Stickybear may teach only one thing at a time, but he teaches it well.

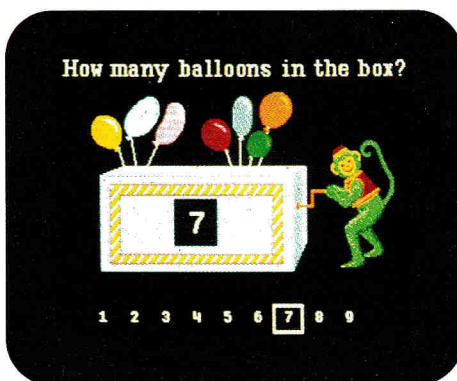
MONKEY MATH

More ambitious than the single-minded Stickybear, Davidson's **Math and Me** tosses a dozen math games into preschoolers' hands (Reviews, May 1990, p. 62). This drill-and-practice program directs children from simpler math concepts to more complex. It's not easy



Stickybear offers outstanding animation and sound.

time limits). Math and Me's pattern activities, in which kids fill in a gap in a sequence of objects or numbers, are fun; the puzzle problems seem to strike preschoolers as particularly challenging. Correct answers are greeted with musical and graphics rewards. If you have a GS, your child will delight in the high-quality digitized voices that gently request "Try again" and read numbers as they're summed.



Math and Me: solid drill-and-practice games.

to wander in Math and Me, and though the package is genuinely fun, it's more like work than any of the other programs on our recommended list.

From a main menu, youngsters can choose one of four subjects — *Shapes, Numbers, Patterns, or Addition* — each offering three different games. Traditional computer-style learning activities for the most part, they range from the very simple (identifying a shape) to the demanding (adding numbers under

time limits). Math and Me's pattern activities, in which kids fill in a gap in a sequence of objects or numbers, are fun; the puzzle problems seem to strike preschoolers as particularly challenging. Correct answers are greeted with musical and graphics rewards. If you have a GS, your child will delight in the high-quality digitized voices that gently request "Try again" and read numbers as they're summed.

This program is best suited for reinforcement of things already learned. My tester balked at the addition problems because the software did little more than display numbers. Once we'd spent time on the floor with piles of real things, adding Lego blocks by counting them out one at a time, she got more out of Math and Me's drill-and-practice. There's a lot in Math and Me — the dozen activities cover a lot of ground — but it wouldn't be my first choice for a preschool package. Second or third, yes, definitely.

DREAMING OF TOMORROW

The Apple already in your house becomes a terrific tool for preschoolers when it's running terrific software. Top

Learning Without the Computer

Time spent exploring with the computer is time well spent, but learning can take place away from the monitor, too. One of the great things about preschool software is that it usually sparks creativity in parents as well as in their kids.

To really make learning happen, take a look at the preschool software your child uses and come up with a few off-screen activities.

It's not that hard. Take Katie's Farm, for instance. The program offers several things to do or to investigate in

each scene. You can help foster your child's sense of sequencing, for instance — an important part of understanding such things as numbers and repetitive patterns — by sketching each activity on a separate index card. Even the crudest drawings will do fine. (It's not art you're teaching here, remember.)

Then after your child has played with the program, ask him or her to group the cards into the appropriate scenes. "What can Katie and McGee do at the pond?" is a good way to phrase it.

Some of the best preschool software puts ideas not just in your head, but on paper, too. Broderbund's Playroom is an excellent example, for its manual includes several pages of off-screen learning ideas that mesh with the software.

No matter what software you're using, keep thinking of new ways to use its power with your child. The software's designers may know kids, but they don't know your kid. You're the only one who can really individualize computer learning.

— G.K.

preschool software mimics the way preschoolers learn — by playing, guessing, leaping from activity to activity — just as top simulation software mimics the way planes fly and cars drive.

But buy a computer just to launch your kids into education orbit? That's probably overkill. Even the best software pales in a preschooler's world when compared to crayons and coloring books, action figures and dolls, backyard trees and playground swings. Computers and software can push the exploration envelope into some new areas, but that's about it for now.

When technology catches up with our dreams and offers a home center that takes advantage of multimedia techniques, huge amounts of information and data, and open-

ended exploration, then computers can truly become first-line teachers. Imagine an answer machine, your kids asking tough questions such as "Where does electricity come from?" and getting treated to audiovisual answers on electromagnetic fields, generators, and wires full of electrons — real learning, real stuff not available on the playground or even in the library.

Until that day, we'll have to use what we've got. The five Apple programs covered here are among the best today. Tomorrow? Who knows? □

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First Letter & Words First Shapes

FirstByte Software
3100 South Harbor
Suite 150
Santa Ana, CA 92704
(714) 432-1740
512K GS
\$49.95 each
Multiple activities in each package, some of which aren't closely linked with the subject matter. The synthesized speech may be difficult for preschoolers to understand.

Flodd, the Bad Guy Jack and the Beanstalk

Tom Snyder Productions
90 Sherman St.
Cambridge, MA 02140
(617) 876-4433
(800) 342-0236 (orders)
64K Ile/Ilc/Ilc Plus,
512K GS
\$34.95 each,
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\$44.95 each,
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Katie's Farm McGee

Lawrence Productions
1800 South 35th St.
Galesburg, MI 49053
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(800) 421-4157
1-megabyte GS
\$39.95 each

Kidstime II

Great Wave Software
5353 Scotts Valley Drive
Scotts Valley, CA 95066
(408) 438-1990
512K GS
\$39.95
Letter recognition and computerized dot-to-dot games appropriate for young preschoolers; music composition and playback for older kids.

Math and Me Reading and Me

Davidson & Associates
3135 Kashiwa St.
Torrance, CA 90505
(213) 534-4070
512K GS,
\$49.95 each (talking)
128K Ile/Ilc/Ilc Plus,
\$49.95 each

Muppets on Stage

Sunburst Communications
101 Castleton St.
Pleasantville, NY 10570
(914) 769-5030
(800) 628-8897
128K Ile/Ilc/Ilc Plus, GS
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\$129 with Muppet Learning Keys
Letters and numbers discovery package rarely seen outside the classroom. Good preschool program when used with Muppet Learning Keys alternative keyboard.

The Playroom

Broderbund Software
17 Paul Drive
San Rafael, CA
94903-2101
(415) 492-3200
(800) 521-6263
128K Ile/Ilc/Ilc Plus, GS
\$39.95

Reader Rabbit

Learning Company
6493 Kaiser Drive
Fremont, CA 94555
(415) 792-2101
(800) 852-2255
256K GS, \$59.95 (talking)
64K Ile/Ilc/Ilc Plus, \$39.95
Excellent learning tool with great digitized sound, but too difficult for most preschoolers. Better left for early-elementary-aged kids.

Stickybear ABCs,

512K GS, \$49.95 (talking)
48K Ile/Ilc/Ilc Plus, \$39.95

Stickybear Opposites,

512K GS, \$39.95 (talking)
64K Ile/Ilc/Ilc Plus, \$39.95

Stickybear Shapes,

512K GS, \$39.95 (talking)
64K Ile/Ilc/Ilc Plus, \$39.95
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10 Station Place
Norfolk, CT 06058
(203) 542-5553

Talking Animals Activity Set

Orange Cherry Software
Box 390
Westchester Ave.
Pound Ridge, NY 10576
(914) 764-4104
(800) 672-6002
512K GS
\$49

Best part of this package is the free-form animal creator, in which kids build bizarre animals and paint them with an electronic brush. Other programs in the series are Talking Numbers and Talking School Bus.

The Ugly Duckling

The Byte Works
4700 Irving Blvd. NW
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Albuquerque, NM 87114
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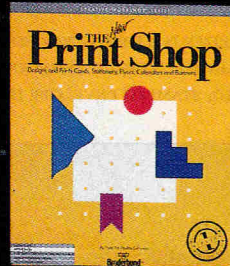
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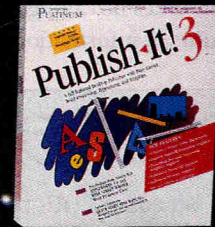
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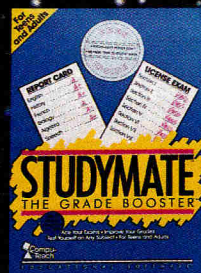
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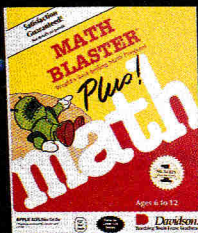
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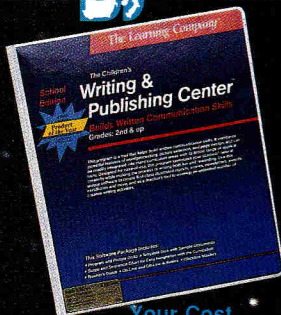
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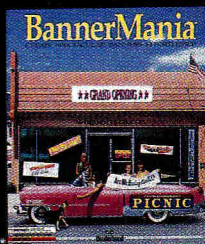
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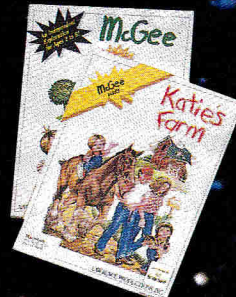
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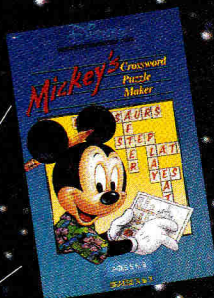
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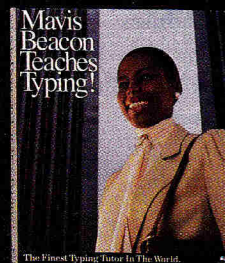
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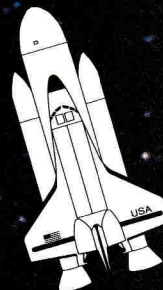
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When art meets technology, the computer screen's your canvas. In the first installment in a six-part series exploring the dimensions of Apple II graphics, computer artist and teacher Debbie Greh looks at the 40-year history of this steadily evolving medium — where we've been and where we're headed.

By DEBORAH GREH, Ed.D.

DRAWING AND PAINTING, LIKE music and language, can express both our deepest emotions and the most basic factual information. But can these uniquely human and varied forms of communication be transferred from traditional paints and brushes and pencils to the chips and pixels of today's personal computers?

The answer: They already have been. Apple II programs such as Paintworks Gold, DeluxePaint II, Dazzle Draw, and Blazing Paddles allow established and would-be artists to convey their message through an electronic medium. But although the II certainly boasts a proud graphics heritage, the roots of computer art run even deeper — back four decades.

notebooks and in the sketches of his anatomical studies. Five hundred years later, the mathematicians, scientists, and engineers of the 1950s were using main-

to see in those images the beauty of the ordered, structured world around them. At least one mathematician has observed that “a good mathematical problem produces

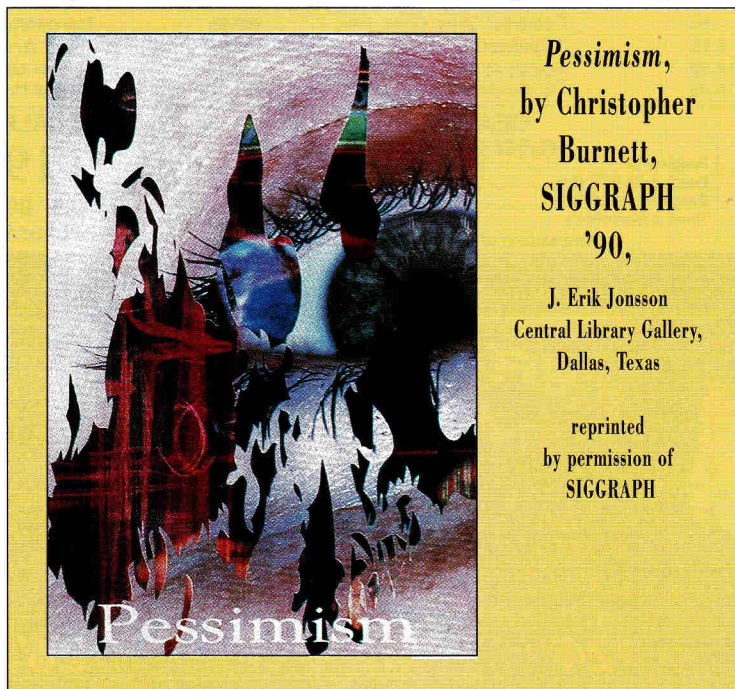
a beautiful graphic image.”

To quote Galileo, “Mathematics is the language with which God has written the Universe.” (See *inCider's* Learning Curve column in September 1989, p. 110; February 1990, p. 84; June 1990, p. 82; and this issue, p. 86, for more on the relationship between graphics and mathematical functions.)

It wasn't long before artists became intrigued with computers' potential as a new graphics tool. Those early images were limited by monochrome monitors and low resolution, however; in addition, plotters were the only output devices available, printing only line drawings

that were often used as preliminary designs for work that would be executed in other media, such as paint, film, or textiles.

Each individual graphics image had to



Pessimism,
by Christopher
Burnett,
SIGGRAPH
'90,

J. Erik Jonsson
Central Library Gallery,
Dallas, Texas

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BIT BY BIT

Technology and art seem to have always enjoyed an interesting kinship — think of Leonardo's genius on canvas and on fresh plaster, in the pages of his architectural

frame and minicomputers to visualize missile trajectories, aerodynamic design, and early robotics problems. As they plotted their equations and functions, they began

be programmed by hand, so most artists working with computers came from the world of industry or higher education, where access to technical expertise and state-of-the-art equipment was available. The cost of an IBM or Digital Equipment Corporation computer was prohibitively expensive for individuals — and so artists needed to work closely with programmers, or to become programmers themselves.

In the late '60s, for example, artists Lillian Schwartz and Ken Knowlton worked out of Bell Laboratories in Murray Hill, New Jersey; Charles Csurí, a painting instructor, traded in his brushes for a box of key-punched cards at Ohio State University. Working with programs and systems that today are obsolete, these artists and others pioneered the field of computer art. In 1968 the first major exhibition of works created on computers, *Cybernetic Serendipity*, was held at the Institute of Contemporary Arts in London. Since then, computer artwork has been shown regularly at mainstream galleries and museums around the world, as well as in special exhibits, such as annual juried shows of members' works sponsored by SIGGRAPH and the National Computer Graphics Association. (See the accompanying sidebar for details.)

While the increasing accessibility of all types of technology tempted many artists to look beyond traditional media, nothing had as great an effect as television. Television offered color screens for output and the ability to create overlays, special effects, and transitions (wipes, dissolves, and so on) through the use of a switcher, a device that controls two or more input sources, such as cameras, videotape, and computer graphics. Many artists — Nam June Paik, for instance — turned to video as a tool of expression, with computer-designed images providing additional inspiration. Today's genlock technology for personal computers, as found in the Apple II Video Overlay Card, for example, lets even amateur artists and home-movie enthusiasts combine video and graphics images (and text) for personalized multimedia presentations. (See "Roll Video," May 1989, p. 42; "Reel-World Images," July 1989, p. 40; and "Desktop Video," April 1990, p. 44, for more information.)

A CUMBERSOME BRUSH

By the mid-1970s, advances in silicon-chip circuitry led to reductions in

the cost and size of computers. You could "build your own" (Heath/Zenith, for one, offered computers kits) for \$395; meanwhile, Steve Jobs and Steve Wozniak were developing the desktop-sized Apple II in a garage in Palo Alto, California. Home and office "hackers" started experimenting with "art typing" programs — code that would print a fairly simple image (such as Snoopy or a Christmas tree) composed of nothing but alphanumeric characters.

But it was another phenomenon altogether that really brought computer graphics home: a video game called Pong. In 1972, Atari invented this coin-operated entertainment program, and its success led to development of a microcomputer version. Pong's graphics images were limited to a "blip" moving across the screen, but

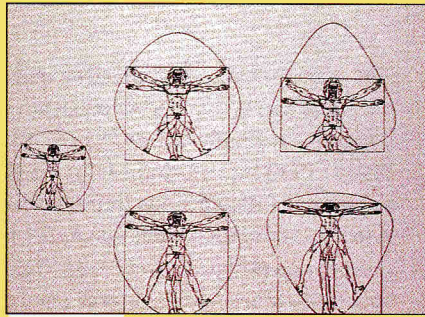
from those humble origins came further graphics-programming experimentation and the development of Space Invaders, Asteroids, and PacMan.

As Apple IIs began to appear in schools and homes in the early '80s, refinements in the computer language BASIC made it possible to create exciting graphics images, with little programming skill required. Drawing and painting programs appeared in a number of magazines, such as *BYTE*, *Kilobaud*, *Creative Computing*, and *inCider*; if you could type in some code, you had yourself a rudimentary graphics package — and you didn't have to write a whole new routine for each image you were designing.

Despite the convenience of today's commercially available painting and drawing

Computer drawing by Charles Csurí, Ohio State University

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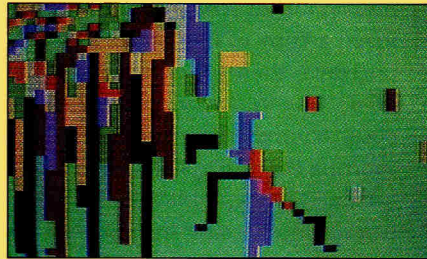
Urbana Vita, by Milton Montenegro, SIGGRAPH '90

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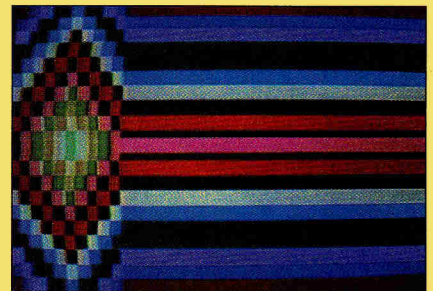
KoalaPainter design by Julie Shanahan

Union Catholic Regional High School,
Scotch Plains, New Jersey



Lo-res Applesoft BASIC design by Kathy Neasley

Union Catholic Regional High School,
Scotch Plains, New Jersey



software, typing in and running a simple BASIC graphics program can still open up whole new worlds of experimentation and exploration. As *inCider's* Learning Curve columnist David D. Thornburg notes, "Without the computer these pictures would be hard to create — it's unlikely that anyone would have the patience to do the calculations by hand. But with an Apple II at your fingertips, you can free the human mind to do what it does best — to wonder and to ask, 'What if . . . ?'" (See "An Ordered World," September 1989, p. 110; "The Art of Mathematics," February 1990, p. 84; "Glued to the Set," June 1990, p. 82; and "The Beauty of Chaos," this issue, p. 86, for programs and sample output.)

A BITE OUT OF GRAPHICS

The mid-1980s saw two major advances in personal-computer technology, completing the migration of graphics from the domain of expert programmer/artists out into the world of computer users with less expertise but plenty of curiosity: the development of commercial painting and drawing software and the invention and/or the promotion of the joystick, mouse, light pen, and graphics tablet. These input devices, which more closely resembled traditional artists' tools, provided an alternative to the keyboard.

Memory and speed also increased — from the Timex Sinclair 1000's 2K to the "megs" of RAM now commonly available, capable of defining vastly more complex images — and color was enhanced, from early Apple IIs' four hues (green, violet, orange, and blue) to the GS' 4000-plus, and from a resolution of 280 by 190 pixels to the gs' 640 by 200.

The KoalaPad touch tablet came packaged with KoalaPainter software (now MicroIllustrator); Blazing Paddles, Dazzle Draw, and The Print Shop with its disk libraries of clip art and other images put graphics into the hands of everyone who wanted it, from professional artists to gifted amateurs to students. Today, painting and drawing programs take full advantage of the GS' spectacular palette to produce designs of stunning power and detail.

When you look at the complex graphics designed for today's computer games — software such as the King's Quest series, Carmen Sandiego, The Ancient Art of War,

and so on — it's hard to imagine that only ten years ago artists had to program each image individually. HLINE, VLINE, PLOT, PLOT, PLOT . . . Sounds more like a sequence of dance steps than a string of BASIC commands, doesn't it? As for more serious pursuits, a new relationship between science and art is now emerging. Perhaps taking a cue from Leonardo, a new organization called the "Renaissance Team," based at the National Center for Supercomputing Applications in Chicago, is working with scientists, engineers, and mathematicians to develop more precise graphics renditions of digital information.

Computer graphics can even help illuminate some of the mysteries of art history; Lillian Schwartz, for instance, digitized a copy of one of Leonardo's self-portraits, then superimposed it on the *Mona Lisa* and made the astonishing observation that that famous face may be sporting the artist's features in disguise.

Whatever the application — visualization of the innermost structure of a human gene, corporate profit-and-loss spreadsheet data turned into readable charts and diagrams, multimedia geography lessons combining text and graphics, sound and video — computer graphics is advancing into the 21st century right along with the rest of the information revolution.

Regardless of the technological advances, however, many people still look at computer-generated or computer-enriched images and ask "Is it art?" The responses have been mixed. Some critics still call computer graphics an expensive form of "paint by number" and shun the machine as too technical a tool, too "cold" a medium. Still, computer-based works are in fact exploding into the mainstream.

But is it art? We'll tackle that question in depth in upcoming issues — but in the meantime, the best answer yet comes from Nam June Paik: "Art is what artists do." □

DEBORAH GREH TEACHES COMPUTER GRAPHICS AT ST. JOHN'S UNIVERSITY IN JAMAICA, NEW YORK. INTERESTED READERS MAY SEND SLIDES, PHOTOS, OR PRINTOUTS (NO DISKS) OF THEIR COMPUTER ART TO HER FOR POSSIBLE PUBLICATION AND CRITIQUE IN UPCOMING ISSUES OF *inCIDER*. ADDRESS YOUR CORRESPONDENCE TO 516 FARLEY AVENUE, SCOTCH PLAINS, NJ 07076. ENCLOSE RETURN POSTAGE OR A SELF-ADDRESSED, STAMPED ENVELOPE IF YOU'D LIKE A REPLY.

FOR MORE INFORMATION

Organizations

SIGGRAPH

Association for Computing Machinery
11 West 42nd St.
New York, NY 10036

In 1966, the Special Interest Group on Computer Graphics of the Association of Computing Machinery (ACM) was founded. It's an organization of graphic artists and fine artists who meet to share ideas and insights they've gained while using computers to create visual images. SIGGRAPH sponsors an annual summer technical conference, including an art show of juried works by members.

NCGA

2722 Merrilee Drive
Suite 200
Fairfax, VA 22031

The National Computer Graphics Association focuses on artists working in business and industry. The group sponsors a Video Gala at its conference each year, featuring the winners of the organization's annual animation competition.

Books and Articles

Bernstein, Saul & Leo McGarry
Making Art on Your Computer
Watson Guptill Publications,
New York, 1986

Deken, Joseph
Computer Images: State of the Art
Stewart, Tabori & Chang, New York, 1983

Knowlton, Ken
"Why It Isn't Art Yet"
Computer Graphics, January 1987, p. 11

Leavitt, Ruth
Artist and Computer
Harmony Books, New York, 1976

Machover, Carl
"A Brief Personal History of Computer Graphics"
Computer, November 1978, p. 21

Prueitt, Melvi.
Art and the Computer
McGraw-Hill, New York, 1984

Truckenbrod, Joan
Computer Graphics Opens Artistic Options: Interview with Joan Truckenbrod
Computer Graphics Today, August 1986, p. 4

Magazines and Journals

Art in America

Art Forum

Art News

Audiovisual Communication

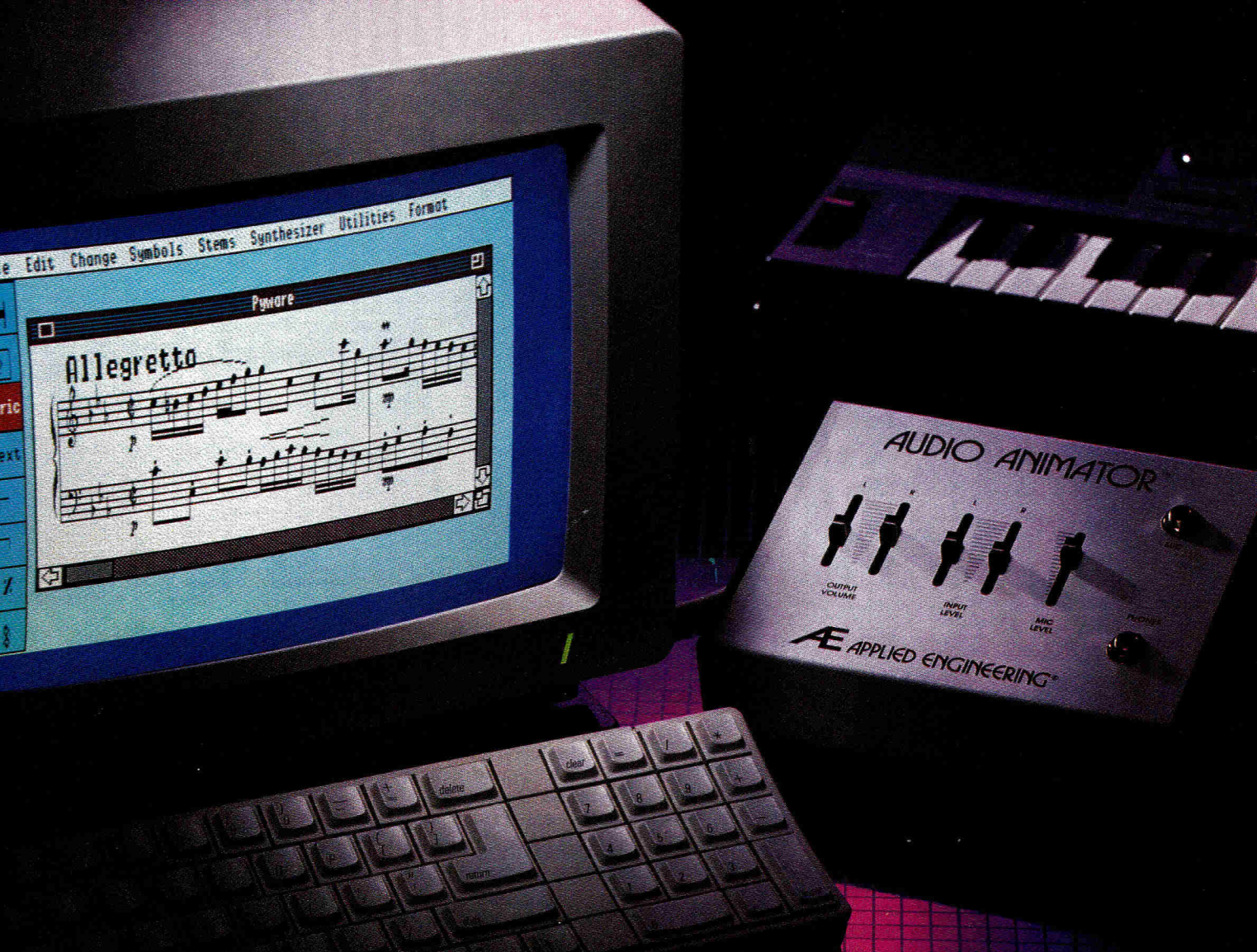
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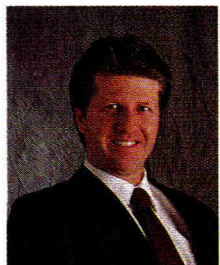
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IN THE BALANCE 2

Secure your assets, plan your budget, and assess your liabilities — with this spreadsheet you won't need an accountant after all.

By RUTH K. WITKIN

ALTHOUGH YOU MAY NOT CONSIDER yourself part of the "corporate culture," all aspiring businesspeople must play the game of "number crunching" to keep their company's finances running smoothly. If evaluating your company's business affairs usually yields nothing but wasted time and troublesome arithmetic errors, let our spreadsheet do the work for you. Last month we created a *balance sheet* and *income statement*, to help you summarize your company's business activities. (See "In the Balance," p. 58.) This month we'll help you set up *financial ratios* to assess the managerial performance of your business.

For example, this spreadsheet divides your current assets by your current liabilities to produce the *current ratio*, a barometer of your company's ability to pay bills when due. This program also divides gross profit by sales to produce the *gross profit margin*, your company's profitability in relation to sales and costs. If you need to convince a bank to give you a loan, a trade creditor to extend you credit, or an investor to put his money into your company, let these financial ratios do the talking.

Now load the AppleWorks program and display the spreadsheet named **BALIN-CRAT**. And here's the *Review/Add/Change* screen. Last month you entered the labels,

lines, formats, and formulas for the balance sheet and income statement. Let's pick up from there and enter the financial-ratio labels, formats, and formulas.

Refer to the **Figure** and enter the ratio labels in column G. Here are a few instructions to guide you.

- In G32 type quotation marks to tell AppleWorks the asterisk is part of a label, and not a mathematical operator.
- In I32 and K32 type quotation marks before you enter the year to tell AppleWorks that the numbers are labels. (If you don't, the program will insert a comma because the standard numbers format is set at *Commas, no decimal places*.)
- Type a space after the column entries, so that they'll be aligned correctly.
- When you finish typing, press Open apple-S (OA-S) to store the spreadsheet.

Now use OA-L and *Value format* to override the standard format in these cells.

- Format I34 through I36 and I38 through I41 for *commas* with two decimal places.
- Format I43 through I45 for *commas* with one decimal place.
- Format I46 through I49 for *percent* with one decimal place.
- Format I50 for *dollars* with two decimal places.
- Use OA-L and *Label format* to right-justify the labels in I32 and K32.

The unshaded cells in the **Figure**

contain the ratio formulas. Read how the formula works, then place the cursor on the cell receiving the formula. Move the cursor to the cells shown in the formula description and type everything else. After you finish the formula, compare each character on your screen with the following description. If everything agrees, press Return. If something's amiss, press Escape and start again. Even with automatic recalculation turned off, AppleWorks produces the result for each formula.

Protect each formula immediately after you create it, so that you can copy the protection along with the formula: With the cursor on the formula cell, press OA-L and hit Return to confirm *Entry*. Type **PN** to select *Protection Nothing*.

Now take a look at the financial ratios and formulas you'll include in the spreadsheet. We divided the financial ratios into four groups: liquidity, debt, funds management, and profitability.

LIQUIDITY RATIOS

Liquidity refers to a company's cash or near-cash position — or its ability to convert assets quickly to cash. Liquidity ratios measure a company's cash solvency and its ability to remain solvent under adverse conditions.

FORMULA 13: CURRENT RATIO

The *Current Ratio* indicates a company's ability to meet its short-term obligations — in other words, pay bills when they're due. The spreadsheet calculates the current ratio by dividing *Total current assets* (C13) by *Total current liabilities* (I12). In general, you want a current ratio of at least two to one. You should have at least \$2 available in current assets for each \$1 of current liabilities.

Cell location: I34

Formula: +C13/I12

FORMULA 14: QUICK ASSETS OR ACID-TEST RATIO

The *Quick Assets or Acid-Test Ratio* measures a company's ability to meet its current obligations with assets it can convert quickly if sales revenue ceases. The spreadsheet calculates this ratio by dividing *Total current assets* (C13), less *Inventories* (C10) and *Prepaid expenses* (C11), by *Total current liabilities* (I12). We've excluded your inventory for two reasons — it's subject to a decline in market value, and it takes time to convert to cash. In general, you want a quick assets ratio of at least one to one.

Cell location: I35

Formula: $(C13 - C10 - C11) / I12$

FORMULA 15: CASH RATIO

The *Cash ratio* measures the company's ability to service its short-term obligations from cash and marketable securities — the two most liquid assets. Your spreadsheet calculates this ratio by dividing *Cash* (C7) plus *Marketable securities* (C8) by *Current liabilities* (I12).

Cell location: I36

Formula: $+C7 + C8 / I12$

FORMULA 16: NET WORKING CAPITAL (IN THOUSANDS)

Net Working Capital is a dollar amount (not a ratio) that results from subtracting *Total current liabilities* (I12) from *Total current assets* (C13). Use it to evaluate the resources you have available to meet current liabilities. This indicator is significant particularly for small companies that have limited access to long-term capital markets, and must rely on trade credit and short-term bank loans — both of which affect net working capital by increasing current liabilities. The spreadsheet shortens this value by dividing it by 1000.

Cell location: I37

Formula: $(C13 - I12) / 1000$

DEBT RATIOS

Debt is the amount of financing supplied by creditors. Debt ratios measure the relative proportion of funds supplied by the owners of the company compared with the funds supplied by creditors, and the company's ability to meet its long-term obligations to nonequity suppliers of funds.

FORMULA 17: DEBT-TO-ASSETS RATIO

The *Debt-to-Assets Ratio* indicates the percentage of total assets financed by cred-

itors. In general, the lower the ratio the greater the buffer against creditors' losses in case of liquidation. This ratio is calculated by dividing *Total liabilities* (I17) by *Total assets* (C27).

Cell location: I38

Formula: $+I17 / C27$

FORMULA 18: DEBT-TO-EQUITY RATIO

The *Debt-to-Equity Ratio* indicates the relationship of money you borrow to money you invest — a measure of a company's ability to meet its total obligations from equity. In general, the lower the ratio the higher the proportion of equity relative to debt, and the better the firm's credit standing. The higher the ratio the lower the proportion of invested money relative to borrowed money, and the less solvent the business. As this ratio approaches 100, creditors' interests in the business approach that of a stockholder. The spreadsheet calculates this ratio by dividing *Total liabilities* (I17) by *Total stockholders' equity* (I25).

Cell location: I39

Formula: $+I17 / I25$

FORMULA 19: LONG-TERM DEBT-TO-EQUITY RATIO

The *Long-Term Debt-to-Equity Ratio* indicates the relative importance of long-term debt in the company's capital structure. The spreadsheet determines this ratio by dividing *Long-term liabilities* (I15) by *Total stockholders' equity* (I25).

Cell location: I40

Formula: $+I15 / I25$

FORMULA 20: TIMES INTEREST EARNED RATIO

The *Times Interest Earned Ratio* measures a company's ability to pay annual interest obligations out of its earnings. Inability to meet annual interest costs can result in legal action by creditors. The closer the ratio to industry norms, the better the rating. To calculate this ratio the spreadsheet divides *Operating income before taxes* (C47) plus *Interest expense* (C43) by *Interest expense* (C43).

Cell location: I41

Formula: $(C47 + C43) / C43$

FUNDS-MANAGEMENT RATIOS

Funds-management ratios measure how well (or how poorly) a company uses its resources. The value of certain assets, such

as receivables and inventories, can fluctuate widely during the year. In calculating the ratios for a company, analysts often use the average dollar value of the asset for the year (obtained from company records) instead of the dollar value from the balance sheet. For demonstration purposes, use the number from the balance sheet.

FORMULA 21: AVERAGE COLLECTION PERIOD

The *AVG Collection Period* is the average number of days from the date of a sale on credit until the company collects its cash. A longer-than-normal period may mean uncollectible bills. In general, the average collection period shouldn't exceed the net maturity of the selling terms by more than 10 or 15 days. Therefore, if the company offers 60 days to pay, the average collection period should be no longer than 70 to 75 days. Slow collections without adequate finance charges hurt a company's profits and tie up working capital.

The spreadsheet calculates the average collection period by dividing *Average accounts receivable* (C9) by *Credit sales* (C34) divided by 365 days. For this example, assume that all of this company's sales are on credit.

Cell location: I42

Formula: $+C9 / (C34 / 365)$

FORMULA 22: RECEIVABLES-TURNOVER RATIO

The *Receivables-Turnover Ratio* indicates the number of days in which the receivables are paid off — a measure of a company's efficiency in using the funds it invests in receivables. Money tied up in receivables may make a company short of cash and unable to take advantage of cash discounts. The spreadsheet calculates the receivables-turnover ratio by dividing *Credit sales* (C34) by *Average receivables* (C9).

Cell location: I43

Formula: $+C34 / C9$

FORMULA 23: INVENTORY-TURNOVER RATIO

The *Inventory-Turnover Ratio* indicates the number of times inventory turns over (is replaced). Each time inventory turns over, it generates more profit. In general, if the ratio is high the company manages its inventory efficiently. A downward trend may be a warning sign of obsolete or slow-moving inventory. The spreadsheet calculates the ratio by dividing the *Cost of*

COMPARATIVE BALANCE SHEET					
	June 30, 1990	June 30, 1989		June 30, 1990	June 30, 1989
ASSETS			LIABILITIES AND STOCKHOLDERS' EQUITY		
1 Current assets:			Current liabilities:		
71 Cash	\$ 185,890	\$ 182,506	Notes payable (current portion)	\$ 447,500	\$ 355,670
81 Marketable securities	36,503	30,090	Accounts receivable	152,897	140,800
91 Accounts receivable	771,080	807,289	Accrued taxes	41,234	110,560
101 Inventories	1,234,567	1,115,876	Other accrued liabilities	185,670	159,323
111 Prepaid expenses	19,880	16,540	Total current liabilities	\$ 827,301	\$ 766,353
121 Total current assets	\$ 2,247,920	\$ 2,152,301	Long-term liabilities:		
131 Fixed assets:			Notes payable (long-term)	626,017	829,371
161 Plant, property, and equipment	1,579,150	1,494,235	Total liabilities	\$ 1,453,318	\$ 1,595,724
171 Less: Accumulated depreciation	876,820	766,031	Stockholders' equity:		
181 Total fixed assets	\$ 702,330	\$ 728,204	Common stock (\$10 par value, 40,000 shares outstanding)	400,000	400,000
191 Other assets:			Paid-in capital	344,550	344,550
211 Investments	63,589	0	Retained earnings	1,015,971	740,231
231 Goodwill	200,000	200,000	Total stockholders' equity	\$ 1,760,521	\$ 1,484,781
241 Total other assets	\$ 263,589	\$ 200,000	Total liabilities and stockholders' equity	\$ 3,213,839	\$ 3,080,505
251 Total assets	\$ 3,213,839	\$ 3,080,505			
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Figure. The powerful BALINCRAT spreadsheet, combining balance sheet, income statement, and financial ratios.

goods sold (C35) by Average inventory (C10) during the period studied.

Cell location: I44

Formula: +C35/C10

FORMULA 24: ASSETS TURNOVER

The *Assets-Turnover Ratio* indicates the number of times fixed assets turn over — a measure of a company's efficient use of its assets to generate sales. In general, a higher-than-normal ratio (normal based on a broad economic analysis) indicates that the company generates sales from its assets faster and better than similar companies or industry averages. The program calculates this ratio by dividing Sales (C34) by average Total assets (C27).

Cell location: I45

Formula: +C34/C27

PROFITABILITY RATIOS

Profitability ratios measure management's effectiveness in using the resources invest-

ed in the business to generate a dollar return. These ratios show return on investment in relation to sales, assets, and equity.

FORMULA 25: GROSS PROFIT MARGIN

Gross Profit Margin indicates profitability in relation to sales after deducting the cost of producing the goods. It provides a measurement of the company's pricing, purchasing, and production policies. The spreadsheet calculates this ratio by dividing Gross profit (C37) by Sales (C34).

Cell location: I46

Formula: +C37/C34

FORMULA 26: NET PROFIT MARGIN

Net Profit Margin indicates the profit per dollar of sales — a measure of the relative efficiency of the combined operations of the company after you deduct expenses and income taxes. A higher-than-normal

ratio indicates that sales are good, that expenses are low, or both. The spreadsheet calculates the ratio by dividing Net income (C50) with Sales (C34).

Cell location: I47

Formula: +C50/C34

FORMULA 27: RETURN ON ASSETS

Return on Assets is another indicator of profitability in relation to investment. It measures the efficiency with which the company generates a return on the use of its assets. The spreadsheet calculates the ratio by dividing Net income (C50) by average Total assets (C27).

Cell location: I48

Formula: +C50/C27

FORMULA 28: RETURN ON STOCKHOLDERS' EQUITY

Return on Stockholders' Equity indicates earnings generated by capital and invested by all owners of the business. It lets management measure the effects of its policies on the firm's profitability in comparison with other types of investments. It's the single most important measure of a firm's financial position — a kind of bottom line for the bottom line. The spreadsheet calculates the ratio by dividing Net income (C50) by average Stockholders' equity (I25).

Cell location: I49

Formula: +C50/I25

FORMULA 29: EARNINGS PER SHARE

Earnings per Share (EPS) is the net income available to common stockholders. This represents the current yearly earnings that the corporation can attribute to each share of common stock. The denominator of the EPS ratio is usually a weighted average of the amount of stock outstanding during the year. For purposes of this example, the spreadsheet calculates Earnings per Share by dividing Net income (C50) by average Common shares outstanding (I21). The formula divides the dollar value of the shares by ten (*par value*) to get the number of shares.

Cell location: I50

Formula: +C50/(I21/10)

THE HOME STRETCH

Now copy the ratio formulas from the 1990 column to the 1989 column: Place

the cursor on I34. Press OA-C and hit Return. Press OA-9 to reach I53, and hit Return again. Now press Right Arrow twice and hit Return once more.

Every cell reference in every formula is *relative*, so press OA-R. Press OA-K to calculate the 1989 results. Press OA-S to store the spreadsheet on disk.

ROLL THE PRESSES

The print settings you made last month are fine, so all you need do is turn on your printer.

Now press OA-P to start the *Print* command. Confirm *All*, select the printer, enter the date (or type an @ — the *at* sign — if your computer has a clock), and confirm one copy.

The all-in-one BALINCRAT spreadsheet rolls off the printer, showing every section in all its glory.

Although ratio analysis provides valuable insights into the strengths and weaknesses of a company, be aware that it has limitations. Because the information we used to derive these ratios is based on accounting rules and personal judgment, don't consider them the final word. Ratios are meaningful tools only if you consider them in light of the company's past performance, trends over time, and industry norms.

HINTS

If you prepare balance sheets and income statements regularly, it's a good idea to keep BALINCRAT as a master template with formats, formulas, labels, and lines intact — but without the numbers. Simply give BALINCRAT another name (OA-N) before you enter the new data. This eliminates the chore of blanking out old entries over and over.

Practice with your templates and get your finances in order, because the holidays are almost upon us. Next month you'll design some snappy invitations to get the season off to a grand start. □

RUTH K. WITKIN IS THE AUTHOR OF THE TEMPLATE/HANDBOOK SERIES *SUCCESS WITH APPLEWORKS* (IN CIDER, IDG COMMUNICATIONS/PETERBOROUGH), *THE BEST BOOK OF APPLEWORKS* (HOWARD W. SAMS & CO.), AND *PERSONAL MONEY MANAGEMENT WITH APPLEWORKS* (JOHN WILEY & SONS). WRITE TO HER AT 3 PATRICIA ST., PLAINVIEW, NY 11803. ENCLOSE A STAMPED, SELF-ADDRESSED ENVELOPE IF YOU'D LIKE A REPLY.

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By CYNTHIA E. FIELD, Ph.D.

WITH THE EXCEPTION OF GREETING cards, perhaps no desktop-publishing (DTP) endeavor has more widespread appeal than printing mailing labels. Although you can find specialized software such as **Labels, Labels, Labels, Publish It! 3**, the most popular Apple II DTP program, provides more design choices for label makers than ever before, thanks to newly enhanced graphics importing and color-printing capabilities.

This month we'll describe Edward C. Hinckley's template so that you can produce personal or business return-address labels in bulk. As with most of our Press Room projects, you can adapt the layout of our mailing-label template to other DTP programs. Although you may use different commands, or recognize features by different names, most DTP programs are essentially similar.

GEAR UP

Start up Publish It! (any version is compatible with this project) and work in *Size to Fit* mode. Press Open apple-4 (OA-4) or select the *Size to Fit* viewing option from the *Special* menu.

Ed Hinckley's original template consisted of eight labels on an 8-by-11-inch Publish It! page. Continuous-form mailing labels

usually come 12 to a sheet, so we opted for a 14-inch long Publish It! page to accommodate a dozen labels at a time. We also found that for small "publications" such as labels, using the centimeter as our unit of measure gave us a more precise fit.

To implement these adjustments, pull down the *Page* menu and select *Set Page Size*, then select the legal 8-by-14-inch page size. Next, pull down the *Special* menu, click on *Select Unit Measure*, and choose *centimeters*. Note that screen rulers reflect these alterations immediately.

Now choose the text tool from the tool box that appears on the left-hand side of the screen. On the drawing board, rubber-band a 9-by-2.5-centimeter text frame. When you *rubber-band* an object, you move the cursor to a location on screen, then hold the mouse button as you drag the mouse across the page (about 9 centimeters in this case) and down the page (about 2.5 centimeters). Because an elastic, rectangular text frame expands (or contracts) as you move the mouse, the technique is called *rubber-banding*. When the text frame looks about right — use the screen rulers as rough guides — let go of the mouse button to drop the text frame into position.

If you're a loyal Press Room reader, you know we rave about Publish It!'s unique *Show Specifications* feature. Instead of

fussing about drawing an object precisely, we can draw the object by eyeballing the screen rulers, then fine-tune the object's dimensions and placement by entering values in a special dialog box.

To set the specifications for the text frame you just drew, select the frame with the pointer. (This action places *handles* at the object's four corners.) Now press OA-M (or choose *Show Specifications* from the *Objects* menu) and type the values for label #1 in the window that pops up on screen. (See the values in the accompanying **Table**.) Press the return key when you're finished.

When you create the remaining 11 labels on the template, use this shortcut: Make sure label #1 is selected, then press OA-C to copy the object into the computer's memory. Press OA-V to paste a duplicate on the page. Now press OA-M and enter the specifications for label #2 from the values in the **Table**. Continue this procedure (OA-V followed by OA-M) to create and place label #3, label #4, and so on, until your template has a dozen labels in all. Save the template as MAIL.LABELS — it should look similar to the screen-dump diagram in **Figure 1**.

BEYOND THE BASICS

Each text frame you created is the same size as a standard mailing label. Continuous-form one-across labels of this size come in boxes of 5000 customarily. Although buying smaller quantities at an office-supply store may seem more economical, that's probably not the case. An excellent source of inexpensive, good-quality labels is MEI/Micro Center, 1100 Steelwood Road, Columbus, OH 43212, (800) 634-3478 — a box of 5000 was \$10.95 at press time.

Five thousand labels may seem gargantuan as you embark upon your first label-creation adventure, but you'll be amazed at

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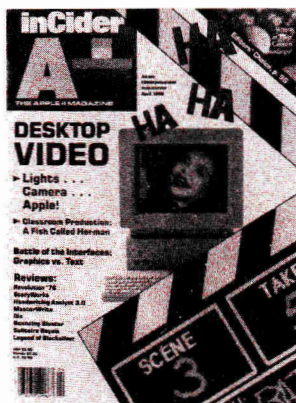
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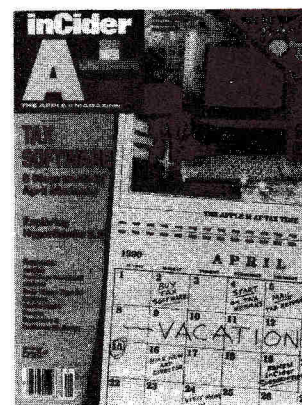


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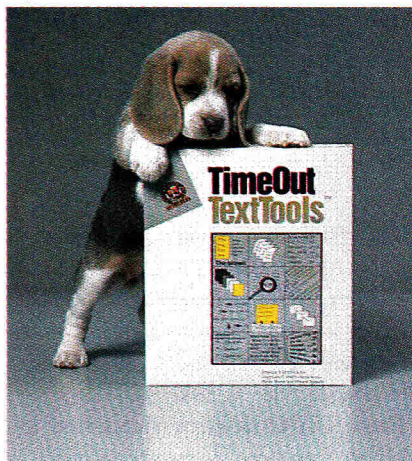
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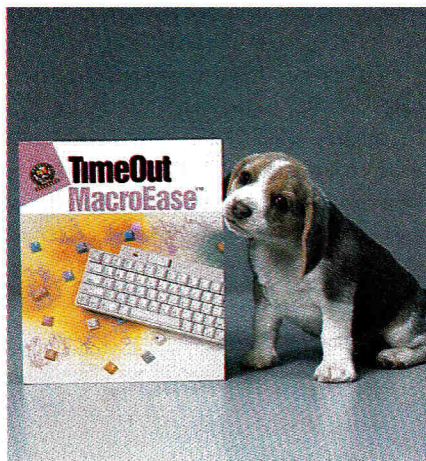
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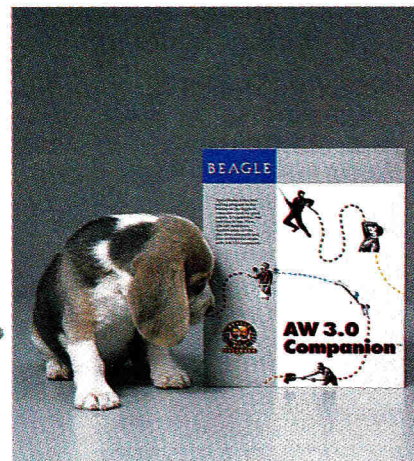
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how quickly the pile shrinks — create custom floppy-disk labels, "Fragile" or "Perishable" mail labels, and holiday-gift tags.

A page-layout program such as Publish It! opens all kinds of possibilities for designing custom labels. We fooled around with just a few of those possibilities when we created the labels shown in **Figure 2**.

Generating a batch of return-address labels similar to ours is a snap. Insert the I-beam into label #1's text frame, and select the font you want to use: Press OA-W, scroll through the font directory that appears, and press the return key when the font you want is highlighted. Now type your name

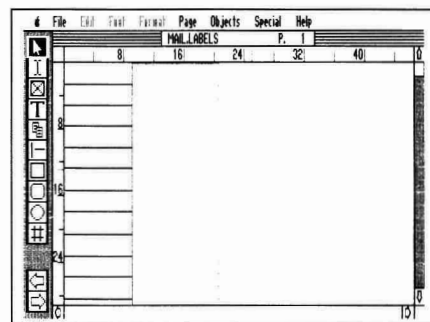


Figure 1. Screen dump showing MAIL.LABELS template layout.

and address into label #1, then select the text in one of three ways: Place the I-beam at the beginning of the text and press OA-E, drag the I-beam across and down the entire text, or pull down the *Edit* menu and choose *Select to End*.

Press OA-C to copy the name and address into your computer's memory. Now place the I-beam in label #2 and press OA-V. The name and address should flow into the second label. Place the I-beam in label #3 and press OA-V. It's that simple. Now continue pasting copies of your name and address onto all 12 labels.

In our sample batch of labels we restricted ourselves to the fonts that came with the Publish It! program, but there are hundreds more we could have used. (For more information about using fonts with Publish It!, see our October 1990 Press Room column, "All the News That Fits," p. 62.)

We also tried a few formatting options and incorporated clip art from the Artwork disk that comes with Publish It! 3. Remember that this version of the program supports **Print Shop** graphics, double-high-resolution graphics, and even super-high-resolution graphics.

Figure 3 shows just a few of Ed Hinckley's designs, which include rules, boxes, and transparent text. You can make each label unique, or make them all the same. To copy a graphics element (clip art, rules, and shapes) from one label to the next,

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Figure 2. Sample output created with MAIL.LABELS template.

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select the object with the pointer, copy it (OA-C), and paste it (OA-V). When a page of labels is complete, save it under a special name such as *Mail.Labels.XXX* (substitute your initials for XXX).

STICK WITH IT

When it's time to print your labels, insert the continuous-form label stock into your printer. On the ImageWriter II, line up the left edge of the label itself (not the backer paper) with the vertical red line on the metal paper-bail bar. Line up the label's top edge with the top edge of the hole in the plastic paper guide. On other printers you must experiment to find appropriate alignment settings.

Print a "page" of 12 labels at a time. You can use Publish It!'s double-strike printing mode for optimum results, but first try regular printing mode — it's adequate for most situations. Before generating another

	Left Start	Top Start	Width	Height
TEXT FRAMES				
Label # 1	0.000	0.000	9.000	2.500
Label # 2	0.000	2.700	9.000	2.500
Label # 3	0.000	5.200	9.000	2.500
Label # 4	0.000	7.700	9.000	2.500
Label # 5	0.000	10.300	9.000	2.500
Label # 6	0.000	12.800	9.000	2.500
Label # 7	0.000	15.400	9.000	2.500
Label # 8	0.000	17.900	9.000	2.500
Label # 9	0.000	20.450	9.000	2.500
Label #10	0.000	23.000	9.000	2.500
Label #11	0.000	25.500	9.000	2.500
Label #12	0.000	28.100	9.000	2.500

Table. Specifications (all dimensions in centimeters). All labels are text frames.

batch of labels, check to see if the label stock in your printer needs adjusting.

Be careful not to roll labels backwards in your printer — labels tend to loosen and stick to the printer's innards. If you need to realign label stock, always advance the stock by turning the platen knob or pressing the line-feed button manually. Wasting a label or two beats paying a big repair bill.

Besides, who wants to suffer printer deprivation when you're about to enjoy the final results of a new DTP project? □

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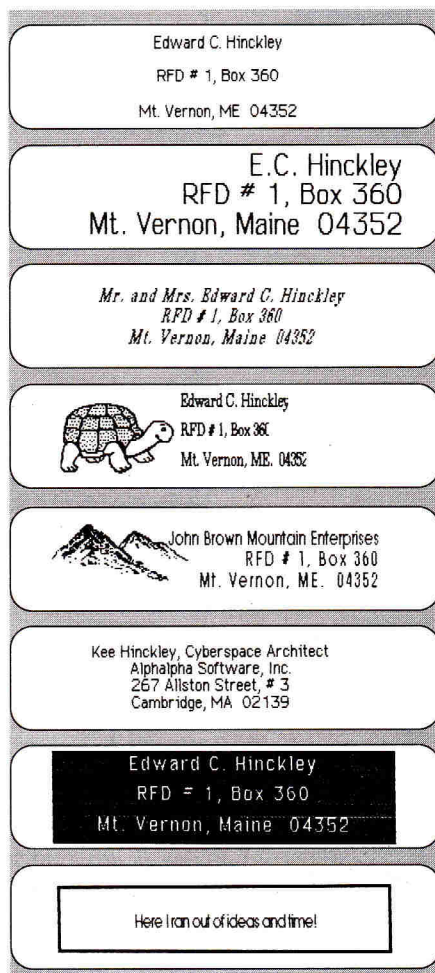


Figure 3. Note the wide variety in Edward C. Hinckley's labels.

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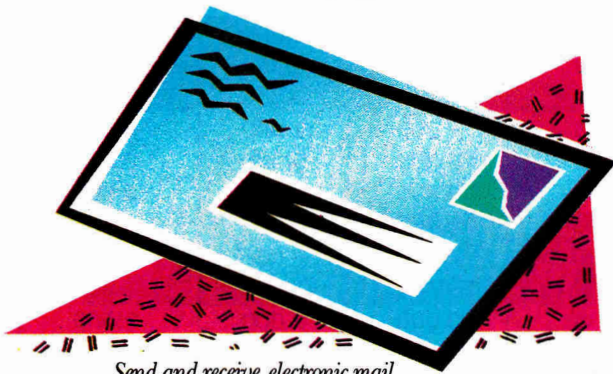
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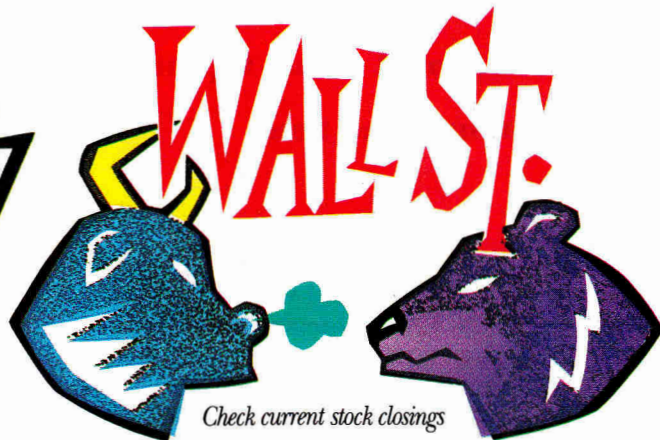
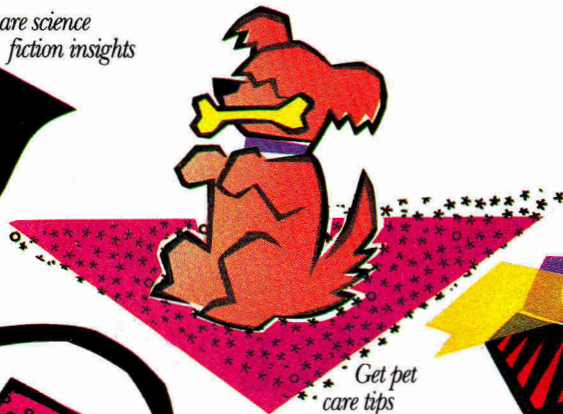
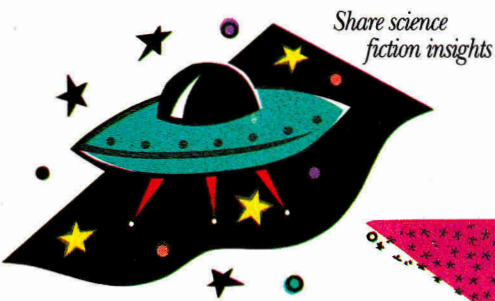
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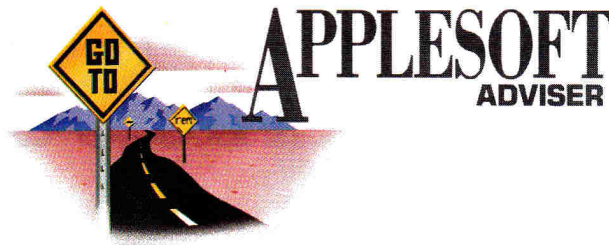
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By **DAN BISHOP**

DREAMING UP ANIMATIONS ALL ON your own is one of the most enjoyable ways to use BASIC programming. After all, where else can you create a world in which characters run through thin air, remain suspended from the ceiling, or crash to the ground only to stand up and walk away?

In our last column, "The Big Screen," (September 1990, p. 72) we discussed using Applesoft BASIC's HPLOT command to create simple high-resolution graphics and animation. Although our program produced some interesting results, we had to keep our images small — BASIC renders images so slowly that larger images yield animations that seem "clunky." This month we'll delve into an Applesoft BASIC technique called *shape-table animation*, so that you can create complex figures and designs that move smoothly on screen.

Although programming an animation in machine language is quicker than in BASIC, most people aren't assembly-language wizards. Instead, if you use the techniques we describe in this column you can define and store shapes in your computer's memory, then use BASIC's DRAW and XDRAW commands to draw or erase these shapes at any screen location. And if you define your shape carefully, you can use the SCALE

command to double or triple its size, and the ROTATE command to draw the shape on screen at different angles.

Let's cover some fundamentals first. A *shape table* is a group of geometric figures you define for use with the Applesoft DRAW and XDRAW commands. Think of DRAW and XDRAW as pens, and a shape as a series of instructions you give to the pens. You can tell the pens to move up, down, left, or right, and whether or not to plot a point. Constructing a shape is as simple as deciding how you want the pen to move, and translating those instructions into the numerical language your computer understands.

The letters and numbers used with the DRAW and XDRAW commands define the starting point of each shape. To continue drawing the shape, your computer uses the numbers you see in the program's DATA statements. These are your shape tables, and they contain information about the relative locations of the other pixels defining your shape. The numbers in the DATA statements aren't pixel coordinates themselves; instead they describe locations of pixels relative to your starting pixel.

SHAPE UP

Let's start by using shape tables to define our stick figure, whom we've named Waldo Wall Walker. We used two simple shapes to create this figure: One is a standing stick

figure, and the other is a shot of Waldo midstride. (See the accompanying **Figures** and **Program listings**.) Although getting the hang of shape definition is difficult, once you've mastered it we'll move on to something more fun. With four Applesoft commands we'll show you an animation technique that will put Waldo into motion.

To determine the numbers that define a shape, start with a sheet of graph paper and sketch Waldo by filling the squares. (See **Figures 1** and **2**.) Keep in mind the color/column problem we discussed in September. If you don't fill your squares with double horizontal dots, and you use colors other than 3 and 7, a vertical line in your shape may disappear. (For details see "The Big Screen," p. 75.)

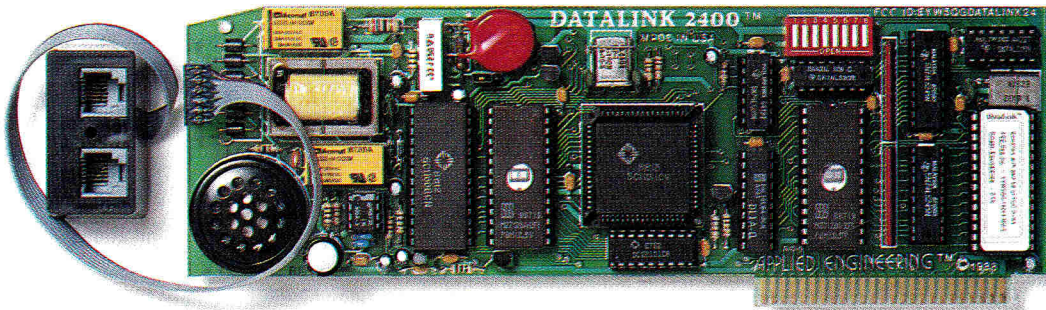
Once you sketch the figure, decide on XX, YY, which will be both the starting pixel of your shape definition and the point about which the figure will rotate. You can select a filled or empty square in the center, on the edge, or outside the figure.

Starting with this square, draw an arrow to the center of an adjacent square. Your arrow must point up, down, left, or right, and in the direction of either a shaded or a blank square. *No* arrow can point diagonally. Now draw another arrow from this new square to an adjacent square other than the first square. You may draw arrows to blank squares or to filled squares as long as they form a continuous string.

These first two arrows constitute your first pair of shape vectors — a pair of lines that have direction. Continue drawing pairs of arrows to connect adjacent squares until all the filled squares connect with arrows and the last arrow exits the figure (ends in a blank square). The second arrow of each pair, however, can't move up from an empty space.

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squares in your figure, use the accompanying **Table** to substitute the appropriate decimal value for each pair of arrows, starting with the first arrow at the figure's reference point. If an arrow begins in an empty square it's called a *move up*, a *move down*, a *move right*, or a *move left*, depending on the direction in which it travels. If the arrow begins in a filled square it's called a *plot & move up*, a *plot & move down*, a *plot & move right*, or a *plot & move left*. Match the descriptions for each pair of arrows with those in the accompanying **Table** to determine the code value for each pair.

For example, **Figure 2** has a code value of 42 because it's a *move down*, then *plot & move right* — an arrow starts in a blank square and points down, then is followed by a second arrow that starts in a filled square and points right. A *plot & move up*, then *plot & move left* has a code value of 60 and describes an arrow that starts in a filled square and points up, then is followed by a second arrow that starts in a filled square and points left. Continue following your maze of arrows, two at a time, and make a list of the code values for each pair. End the list with a 0 (zero).

In your program, this list of code values appears as numbers in one or more DATA statement(s) and defines the shape of the object. The 0 (zero) at the end of the list tells Applesoft that it's reached the end of a particular shape definition. If your program has one or more shapes, repeat the process of following arrows and recording values for each shape. Be sure to end each shape definition with 0 (zero). In **Listing 1**, lines 1005 and 1010 contain the code lists for the two shapes shown in **Figures 1** and **2**.

FIND THE ADDRESS

In order for your Apple to find the shapes when you issue a DRAW or XDRAW command, you must protect high RAM with the HIMEM command and use two POKE commands to tell your computer where to store the shapes in memory. If you plan to use hi-res page 1 for your graphics, or if you have only 20K of RAM, you should set HIMEM to 8192. If you have the necessary memory, and you want to save room for more program code, you can set HIMEM to 16384 and use only hi-res page 2. (The

Listing 1. Waldo Wall Walker demonstrates the use of shape tables in Applesoft BASIC to create realistic animations.

```

1 REM WALDO WALL-WALKER [3609]
2 REM BY DAN BISHOP [2746]
3 REM APPLESOFT ADVISOR [3476]
4 REM INCIDER, NOV. 1990 [3717]
5 REM ***** [3588]
6 REM [186]
10 HIMEM: 8192 [808]
15 HGR [173]
20 HCOLOR= 7 [331]
24 REM READ SHAPE DATA [3173]
25 GOSUB 900 [642]
29 REM DRAW BACKGROUND [2901]
30 GOSUB 700 [679]
35 SCALE= 1 [360]
40 ROT= 1: GOSUB 100 [669]
45 ROT= 48: GOSUB 200 [773]
50 ROT= 32: GOSUB 300 [792]
55 TEXT "HOME" [396]
60 END [248]
94 REM [330]
95 REM ***** [4692]
96 REM HORIZONTAL WALK [3163]
97 REM ***** [4908]
98 REM [306]
100 FOR I = 3 TO 130 STEP 2 [1561]
105 DRAW 1 AT I,85: GOSUB 800 [1899]
110 XDRAW 1 AT I,85 [939]
115 DRAW 2 AT I + 1,85: GOSUB 800 [1721]
120 XDRAW 2 AT I + 1,85 [1477]
125 NEXT I [562]
130 RETURN [181]
194 REM [306]
195 REM ***** [2348]
196 REM VERTICAL WALK [1172]
197 REM ***** [2436]
198 REM [314]
200 FOR I = 85 TO 14 STEP - 2 [1314]
205 DRAW 1 AT 130,I: GOSUB 800 [2058]
210 XDRAW 1 AT 130,I [1415]
215 DRAW 2 AT 130,I + 1: GOSUB 800 [2154]
220 XDRAW 2 AT 130,I + 1 [1519]
225 HCOLOR= 0: HPLLOT 138,I: HCOLOR= 7 [2068]
230 NEXT I [375]
235 RETURN [325]
```

```

294 REM [188]
295 REM ***** [3494]
296 REM UPSIDE DOWN WALK [3029]
297 REM ***** [3494]
298 REM [196]
300 FOR I = 136 TO 3 STEP - 2 [1506]
305 DRAW 1 AT I,22: GOSUB 800 [1240]
310 XDRAW 1 AT I,22 [584]
315 DRAW 2 AT I - 1,22: GOSUB 800 [2196]
320 XDRAW 2 AT I - 1,22 [1477]
325 NEXT I [407]
330 RETURN [325]
695 REM [196]
696 REM ***** [614]
697 REM DRAW BACKGROUND [1195]
698 REM ***** [702]
699 REM [204]
700 HPLLOT 0,97 TO 142,97 TO 142,10 TO 0,10 [3350]
705 RETURN [309]
795 REM [202]
796 REM ***** [3284]
797 REM PAUSE ROUTINE [2739]
798 REM ***** [3500]
799 REM [178]
800 FOR J = 1 TO 100: NEXT J: RETURN [1841]
894 REM [180]
895 REM ***** [918]
896 REM READ SHAPE DATA [1174]
897 REM ***** [1006]
898 REM [188]
900 FOR I = 0 TO 38 [858]
905 READ A% [336]
910 POKE 24576 + I,A% [1359]
915 NEXT I [263]
920 POKE 232,0 [331]
925 POKE 233,96 [372]
930 RETURN [185]
994 REM [316]
995 REM ***** [2414]
996 REM SHAPE DATA [932]
997 REM ***** [2342]
998 REM [324]
1000 DATA 2,0,6,0,17,0 [1486]
1005 DATA 53,55,46,62,46,62,54,54,46,4,0 [3280]
1010 DATA 53,55,46,62,63,42, 41,45,30,59,55 [3487]
1020 DATA 41,62,54,63,46, 9,41,28,36,63,0 [3247]
```

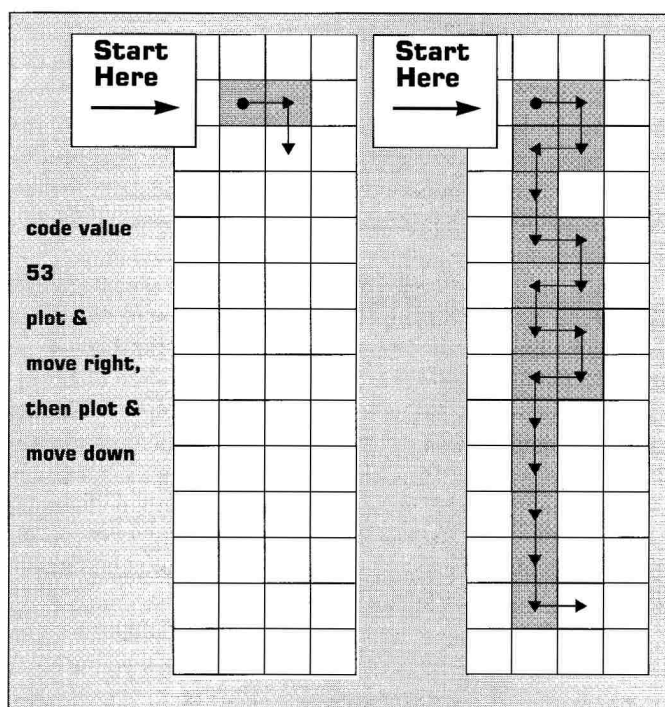



Figure 1. Waldo in a standing position. The code values for this figure are in line 1005 of Listing 1.

HIMEM:8192 or HIMEM:16384 command must be the first command line in your program. See line 10 in **Listing 1**.)

The POKE commands give the Apple the shape table's starting address. If you want to store this data just beyond hi-res page 2, use POKE 232,0 and POKE 233,96. This places the shape definitions in page 96, which corresponds to $96 \times 256 = 24576$, starting at byte zero. (One page in memory is 256 bytes.) On the other hand, if you set HIMEM to 8192, and plan to use only hi-res page 1, you can employ POKE 232,0 and POKE 233,64. This stores the shape's starting position at byte zero of page 64 and at RAM address 16384 — the beginning of hi-res page 2.

Lastly, you must write one more DATA statement, so that your Apple will locate the first byte for each shape. This DATA statement must immediately precede the first shape definition's DATA line. (See line 1000 in **Listing 1**.) The first value in this DATA statement is the *shape count* — the number of shapes you're defining — and the second value is 0. The third and fourth values are the number of DATA values the Apple must skip over to get to the first shape. The fifth and sixth values are the number of DATA values the Apple must skip to reach the second shape's code value.

To set up the DATA statement easily, insert a DATA line just before your first shape definition's DATA line, and use the shape count-value and 0 as the two first numbers in the line. Follow this pair with one pair of hyphens (separated by commas) for each shape in your table. For example, line 1000 in **Listing 1** is 1000 DATA 2, 0, -, -, - because we're defining only two shapes. (The Apple must skip over these values because each shape you define in your table has a pair of values in the DATA line.)

Now count the number of bytes (DATA values) that the Apple must skip to reach the first value in each shape. If the number you come up with is less than 256, enter that value in place of the first

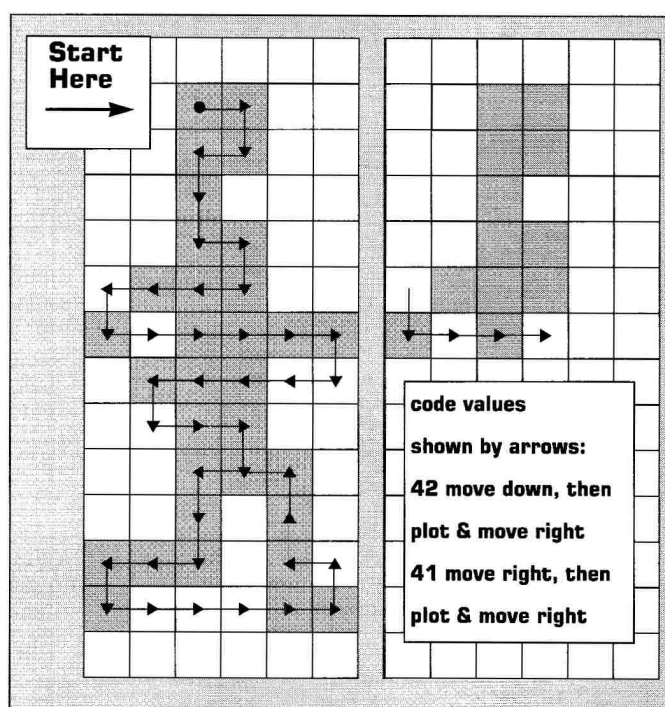


Figure 2. Waldo in a walking position. The code values for this figure are in line 1010 of Listing 1.

hyphen, and enter 0 in place of the second hyphen. Because the Apple must skip the six values (including hyphens) to get to the first code value for the first shape, we rewrote line 1000 as 1000 DATA 2, 0, 6, 0, -, -. Count again from the shape-count value to the first code value for the second shape. In **Listing 1** this comes to 17; we rewrote line 1000 again as 1000 DATA 2,0,6,0,17,0.

If you have several shapes or complex definitions, your byte count may be greater than 256. When this happens, divide your count by 256. The integer part of the number you obtain should replace the second hyphen representing that shape. Then take the decimal part of this number, multiply it by 256, and round it to an integer. Replace the first hyphen in the pair with your result. If the count comes to 493, for example, the two values you'd use to replace the two hyphens would be 237 and 1 ($493/256 = 1.92578125$).

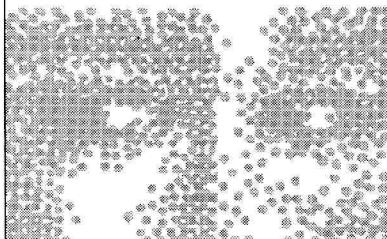
Listing 2. With this generic subroutine you can define shapes by reading values from DATA lines and storing them in RAM.

```

10 HIMEM: 24576 [991]
15 HGR [173]
20 POKE 232,0 [990]
25 POKE 233,96 [1140]
28 REM SC IS THE NUMBER [3259]
29 REM OF SHAPES BEING DEFINED [4607]
30 DATA SC, 0, -, -, -, -, -, .... [5052]
35 DATA X1, X2, X3, X4, X5, .... [4934]
40 DATA Y1, Y2, Y3, Y4, Y5, .... [4974]
45 DATA Z1, Z2, Z3, Z4, Z5, .... [4946]
48 REM DC IS THE NUMBER OF [3812]
49 REM DATA VALUES TO BE READ [4191]
50 FOR I = 0 TO DC - 1 [1202]
55 READ A% [684]
60 POKE 24576 + I, A% [1425]
65 NEXT I [398]

```


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1.92578, and $0.92578 \times 256 = 236.999$).

You can use this calculation to find corresponding page and byte values for any decimal memory address. If you decide not to begin the shape definition at address 16384 or 24576 (by POKEing values into 232 and 233 as 0,64, and 0,96, respectively), you can select any address and calculate its byte and page number. POKE the byte number into address 232 and the page number into address 233.

At this point you've finished the real work. All you need do is write the FOR/NEXT loop that READs the data into memory, then count the DATA values in your shape table, starting with the shape-count value. In **Listing 1** there are 39 DATA values, so write your loop to cycle 39 times. Inside that loop READ a value, then POKE that value into successively higher memory locations. In Applesoft BASIC, you can define an integer variable by adding a percent sign (%) after the variable name. To illustrate this technique, **Listing 1's** lines 900-915 use the starting address of 24576 for the shape-definition table. If you start your definition at 16384 or some other address, use the number in line 910.

Listing 2 is a generic format you can use to write the codes necessary for shape tables. This format assumes you want to protect both pages of hi-res graphics (HIMEM :8192), and start your shape table just above hi-res page 2. In **Listing 2**, SC is the shape count, or the number of shapes you're defining. The number of hyphens you use to finish the line should be twice the number of shapes you're defining. X1, X2, X3, and so on correspond to the code values for the pairs of vectors that define the first shape. Y1, Y2, Y3, and so on are the code values for the pairs of vectors that define the second shape. DC is the Data Count, the total number of DATA values the program reads into memory.

TAKE COMMAND

Now let's try to put some life into Waldo. Four Applesoft BASIC commands — DRAW, XDRAW, ROTATE, and SCALE — manipulate the shapes you've defined in memory. As you manipulate these shapes, the still pictures flash so fast that your brain blends them together in the illusion of movement. Your Apple numbers each shape sequentially as you define it, and you access a shape by using its specific reference number. Therefore, to draw a defined shape on screen, simply use the command DRAW ## AT XX,YY where ## is the shape's reference number and XX and YY are the object's on-screen reference points. (An object's reference point is the first vector you list when you define its shape.) Because the full hi-res screen measures 280 columns across and 192 rows down, XX may be a value between 0 through 279, and YY may be a value of 0 through 191.

To keep Waldo marching along the walkway you must erase him, then draw him again at another location. To erase a defined shape, replace the DRAW with the XDRAW command and repeat the values. XDRAW ## AT XX, YY erases shape ## by drawing it in the background color. Unlike using the HPLOT command, you don't need to use the HCOLOR command to change the color — the XDRAW command draws the shape in the background color automatically. If you want to enlarge the image, change the scale factor before you use the DRAW command. Use the format SCALE = #, where # is a value between 1 and 255. A



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before the
move:

Move up, then plot & move up	32
Move up, then move right	8
Move up, then plot & move right	40
Move up, then plot & move down	48
Move up, then move left	24
Move up, then plot & move left	56
Move down, then plot & move up	34
Move down, then move right	10
Move down, then plot & move right	42
Move down, then move down	18
Move down, then plot & move down	50
Move down, then move left	26
Move down, then plot & move left	58
Move right	1
Move right, then plot & move up	33
Move right, then move right	9
Move right, then plot & move right	41
Move right, then move down	17
Move right, then plot & move down	49
Move right, then plot & move left	57
Move left	3
Move left, then plot & move up	35
Move left, then plot & move right	43
Move left, then move down	19
Move left, then plot & move down	51
Move left, then move left	27
Move left, then plot & move left	59

First vector
plots before
the move:

Plot & move up	4
Plot & move up, then plot & move up	36
Plot & move up, then move right	12
Plot & move up, then plot & move right	44
Plot & move up, then plot & move down	52
Plot & move up, then move left	28
Plot & move up, then plot & move left	60
Plot & move down, then plot & move up	38
Plot & move down, then move right	14
Plot & move down, then plot & move right	46
Plot & move down, then move down	22
Plot & move down, then plot & move down	54
Plot & move down, then move left	30
Plot & move down, then plot & move left	62
Plot & move right	5
Plot & move right, then plot & move up	37
Plot & move right, then move right	13
Plot & move right, then plot & move right	45
Plot & move right, then move down	21
Plot & move right, then plot & move down	53
Plot & move right, then plot & move left	61
Plot & move left	7
Plot & move left, then plot & move up	27
Plot & move left, then plot & move right	47
Plot & move left, then move down	23
Plot & move left, then plot & move down	55
Plot & move left, then move left	31
Plot & move left, then plot & move left	63

Note: Make sure your second vector isn't a simple move up. If your vector ends in an upward movement, you must plot it first; this table includes a code value for plot & move up, but not for move up.

Table. Vector-pair codes you can use with shape-table definitions. You must represent each pair of arrows in your drawing with one code value.

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scale factor of 1 produces the image in the original size, while 2 doubles the size, 3 triples the size, and so on.

With Applesoft BASIC you can also control your shape's rotation. The command ROT = # followed by DRAW commands rotates the shape around its reference point. Although the value for # must be between 0 and 255, the angle of rotation depends on the scale factor. With a scale factor of 1 the object can rotate in 45-degree increments. Add eight to the rotation value in the ROT command for each additional 45-degree angle. For example, to turn an object upside down, which is four 45-degree rotations, use the command ROT = 32.

To illustrate these commands, Waldo Wall Walker marches along a horizontal path toward a well. (See Listing 1.) Subroutine 100 uses a FOR/NEXT loop to move Waldo across the walkway. The loop counter, I, along with DRAW and XDRAW, specifies Waldo's horizontal (XX) position; the pause routine at line 800 slows his movement. With a series of commands — DRAW shape 1 at I, pause, XDRAW shape 1, DRAW shape 2 at I+1, pause and XDRAW shape 2 — we completed one phase of the animation, then incremented I by two and did it again.

Now if you change line 800 to read 800 FOR J = 1 TO 1000: NEXT J : RETURN, Waldo will march to a different drummer — a very slow one. With such a long pause, you can determine the two shapes we used for this demonstration. To make Waldo run along the path, remove the GOSUB 800 command entirely.

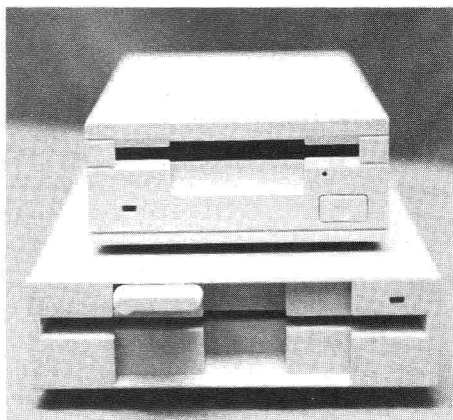
Waldo has a few other surprises up his sleeve: When he reaches the wall he rotates clockwise 270 degrees and marches up it. Line 45 rotates Waldo with the ROT = 48 command (270 degrees is six 45-degree increments, and 6 x 8 = 48), then calls subroutine 200 with GOSUB 200. Subroutine 200 also uses a sequence of DRAW and XDRAW commands within a loop, but this time the loop counter, I, decreases the vertical position of our traveling acrobat (decreasing values of YY), so that the program draws the image closer and closer to the top of the screen. Although at this value of rotation XDRAW doesn't erase the image completely, the last command in the loop uses HPLLOT and HCOLOR = 0 to erase the remaining pixels.

When Waldo reaches the top of the wall, he rotates once more upside down and marches back along the ceiling. At line 50 the ROT = 32 command turns him upside down, then GOSUB 300 calls subroutine 300, which is merely the reverse of subroutine 100. The loop counter, which decreases by two each cycle, along with the DRAW and XDRAW commands, specifies Waldo's horizontal position as he heads to the left.

When you animate a design use your creativity — don't let those shape tables constrain your imagination. Start with a simple figure and go wild with animation. Draw a ball, an arrow, or a rocket, then animate it by DRAWing and XDRAWing it at different positions along the screen. Or, practice with the animation in Listing 1. After all, it's simply two figures we set into motion with the DRAW and XDRAW commands. Once you get the hang of using shape tables, you'll create animations that'll astonish any assembly-language programmer. □

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lenging tasks as their skills develop.

My daughter, who is almost 7, quickly tired of the activities. The only game she wanted to repeat was Bus Route. She seemed to get more enjoyment from adjusting the sound volume and clicking on the repeat command than from solving the Aquarium math problems or painting the fruit and vegetables at the Farmer's Market. She wanted to know why she couldn't paint the apples green and why she always had to paint the carrots orange. Overall, she found the program too restrictive. Younger children, who still have to learn how to count or identify colors, will find Talking School Bus more stimulating. They may not tire of it as quickly.

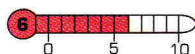
Still, \$49 is quite an expense for a program with little growth potential. Even with all its natural-sounding speech and painstakingly drawn hi-res, 16-color graphics, Talking School Bus is limited because there's no way to tailor the activities to the needs of individual children.

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

EXPLORING TIDEPOLS

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Simulation of tidepool ecosystem;
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What may seem like a scattering of temporary puddles peppering the rocky California coastline is actually an ecosystem rich in plant and animal life. You and your students can find out more about this saltwater environment and its inhabitants with Exploring Tidepools. The program is directed at students in grades 4 through 9. It lets youngsters examine high-, medium-, and low-level tidepool ecosystems over a 24-hour cycle.

High-level tidepools are the first to be exposed when the tide goes out and the last to be covered when the tide comes in, remaining uncovered for the longest period of time. Low-level tidepools are the last to be exposed when the tide goes out and the first to be covered then the tide comes

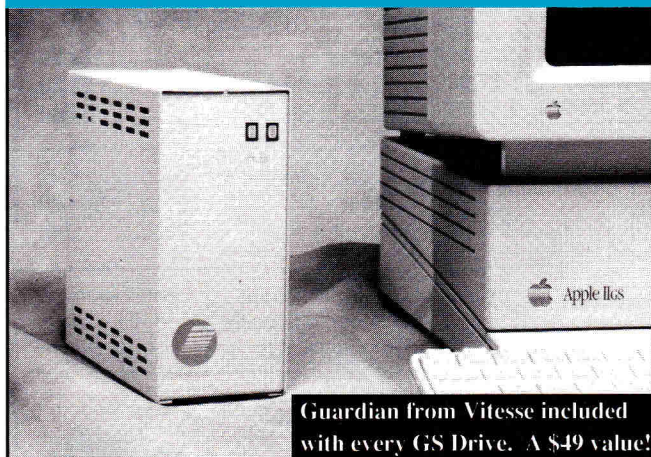
in, forming shallow aquatic habitats for the shortest duration.

The plant and animal types found in a particular tidepool depend largely on the length of time the habitat is uncovered. As the tide recedes, tidepool flora and fauna become more susceptible to the sun's rays and to land predators. The salt content of the water increases, the temperature climbs, and the oxygen level decreases.

Kids can examine tidepools at eye level (the macroscopic view) and observe plant and animal interactions. They can also switch to a microscopic view to investigate life forms not visible to the naked eye. At both levels, the richly illustrated graphics sport bright colors and realistic animation. You can almost taste salt in the air.

Kids don't have to memorize complex keyboard commands to operate this program — budding naturalists will enjoy the easy-to-use, point-and-click graphics interface. For example, selecting the text-page icon calls up descriptive information about the current scene; choosing the notebook icon presents specific data. Youngsters can

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inCider Magazine, July 1990

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navigate with minimal adult supervision.

The program works best with a mouse or trackball: The pull-down menus, icons, dialog boxes, and other objects are easy to control by pointing, dragging, and clicking. The keyboard seems awkward by comparison, yet youngsters shouldn't have too much difficulty using the program on a mouseless Apple II.

Kids explore all three ecosystems at the macroscopic and microscopic levels, while studying interesting information about various aquatic inhabitants at both stages of the tidal cycle. They'll learn the names of plants and animals, characteristics and behavior of microscopic plankton, and the nature of predator/prey relationships.

By pressing the escape key, students can call up an icon menu bar with the cast of animated characters and stationary objects. They can add these animals and objects to the tidepool screens, or modify any tidepool scene by changing the background.

Youngsters can enter brief descriptive titles and identification labels, or type a

short paragraph anywhere on screen. Editing text on the screen is a breeze. Kids can save their modified scenes to disk and print them (in color on a suitably ribboned ImageWriter II).

The program ships on two double-sided 5.25-inch disks. One side serves as the



An ecosystem revealed in rich detail.

boot disk, which features configuration utilities to customize the program for your particular hardware.

You can set up the application for use with one or two drives, and it works with a variety of printers; students will have to

contend with frequent disk swapping, though. Copy protection on the boot disk (you may copy the other three sides) prevents you from installing Exploring Tidepools on a hard disk. Disk swapping could be eliminated entirely if the program were available on a 3.5-inch floppy.

TIDEPOOL ACTIVITIES

After students familiarize themselves with tidepool conditions, they can move on to the five related activities on the flip side of the program disk. These exercises are nonsequential, so kids may do them in any order. Each serves as a supplementary resource, providing useful information about tidepool life cycles.

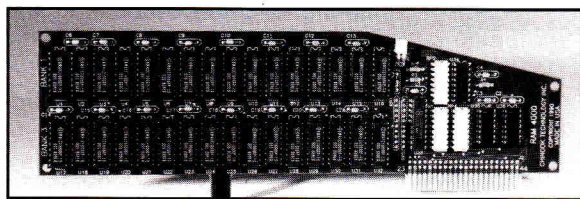
In Tidal Cycles, students learn that gravitational pull of the moon is the major cause of tides. Tidal heights shift as the orbiting moon goes through its phases, and the gravitational affects of the sun and moon creates different kinds of tides.

Plankton Life Cycles offers information on the animals that form the foundation of tidepool food chains. Students learn to

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REVIEWS

diagram plankton life cycles, match adult tidepool animals with plankton larvae, and classify different types of plankton.

In *Who Eats Whom*, youngsters can diagram the complexities of food relationships in a low-tidepool life cycle. They'll learn about differences between food chains and food webs, and that all food chains begin with plants converting the sun's energy to a form animals can eat.

East/West Tidepools challenges young scientists to build their own low-level West

Coast tidepool. They decide which plants and animals to import into the environment. If they choose incorrectly, the animal turns black and disappears. East/West Tidepools also provides an opportunity to study an East Coast (New England) tidepool. Kids are encouraged to note the similarities and differences between the two ecosystems.

In the final activity, Reports/Graphs, youngsters write a brief report by entering their observations on a blank report page.

They can also generate either a line graph or a bar chart to illustrate tidepool diversity or plants and animals observed. All the tools needed for designing graphs are in the inanimate objects category in the icon menu. Kids may save and print their reports and graphs.

DOWN BY THE SEA

The documentation for Exploring Tidepools is richly detailed; it includes operating instructions, teaching objectives, activity sheets, and suggestions for all sorts of followup exercises. One caveat for GS users: The teacher's manual suggests changing your machine's system speed to normal. The program's animation runs more smoothly when you set the speed to fast, however.

Exploring Tidepools is educational software at its very best. It's more than just a suitable alternative to class field trips. Kids can examine an entire tidepool life cycle without getting their feet wet or getting bogged down in real-time observations. Students even can compare tidepools on different coasts from the comfort of their desktop.

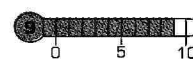
When it's impossible to trek to the seashore, Exploring Tidepools is the next best thing to being there. Even though the program has no sound, the simulations are true-to-life. The animation is vivid and life-like. With a bit of imagination, it's easy to hear waves crashing against the rocky shore and the cries of seagulls as they soar overhead.

Carol S. Holzberg, Ph.D.
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Continued on p. 82



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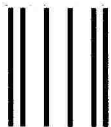
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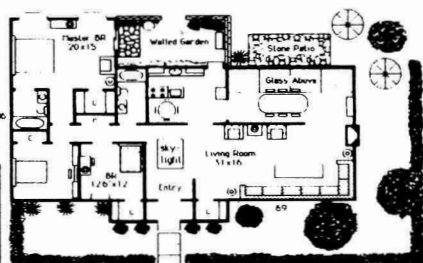
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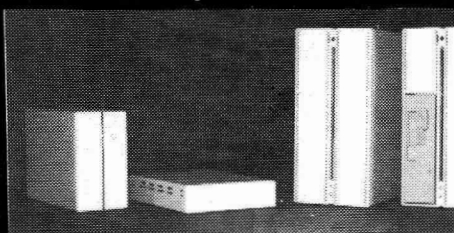
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geography needs improvement, check out Geographic Jigsaw — it may be just what they need to sharpen their expertise.

Geographic Jigsaw consists of four activities — Jigsaw, Map Quiz, Map Facts, and Statistical Maps — that reinforce basic geographic skills. Jigsaw and Map Quiz are game-like challenges enhanced with colorful graphics and sound effects. (If the sound is too much, however, you can turn it off.) Kids can compete at three difficulty levels, each one building on facts and fig-

ures learned in previous activities. As they play each game they learn geographic, historical, and cultural tidbits about the 50 states Americans call home.

Both the IIe/IIc and the GS versions are menu driven, with point-and-click activity selection, on-screen instructions, and on-line help. Using the program is so intuitive that kids can work through the activities without even consulting the documentation. Although the GS edition requires a mouse, the IIe/IIc version lets youngsters

input information with either keystrokes or a mouse. (They'll probably find that its easier to use the mouse.) While both versions of Geographic Jigsaw have virtually identical contents, the GS edition features super-hi-res graphics and a finer resolution for map images.

Jigsaw is the program's flagship activity. It presents youngsters with a jumbled map of the United States and challenges them to solve the puzzle by repositioning the states. At the easiest level, kids simply have to match the mystery state with its outline on a blank map; it's suitable for children as young as six. Then when they place a state in its correct position, the program tells them its name and its capital.

At a more difficult level, kids must flip the puzzle pieces before they try to position them on the map, then name the state and its capital. At the highest level, youngsters have to position the puzzle pieces within a blank outline of the United States.

When youngsters reach the higher levels, Jigsaw provides some hints. For example, if a child starts to type a wrong state name, the computer beeps and highlights the first three spelling errors. If a youngster can't decide whether a state is Iowa or Missouri, for instance, they can type either *I* or *M* and know the answer immediately.

Although the hints help children learn geography, Jigsaw has some drawbacks: Kids must hit Return to receive any audiovisual reinforcement, there's no hint button, and incorrectly spelled state names and capitals count as wrong answers.

Map Quiz, Jigsaw's second activity, builds on what young geographers learned in Jigsaw. At the easiest level, it challenges kids to answer questions about states or capitals. At higher levels, it tests their knowledge of cities, native flowers, capitals, nicknames, and other tidbits. Youngsters respond to questions by placing the cursor over a state's outline and clicking (or pressing Return). When children choose the correct answer, they receive positive audiovisual reinforcement. If their answer is wrong, the correct state flashes briefly.

Map Quiz keeps track of the correct and incorrect answers, and places the top ten scores in a special Hall of Fame. The program saves new names to the list automatically when you quit the program from the main menu.

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When kids play Jigsaw, the first activity, they must select a level of difficulty before they begin. If they exit to the option menu and switch levels during play, they must begin the game from scratch. Map Quiz, however, doesn't penalize kids for changing levels during play. When they exit to the option menu and change the level of difficulty, they can return to the game and continue where they left off.

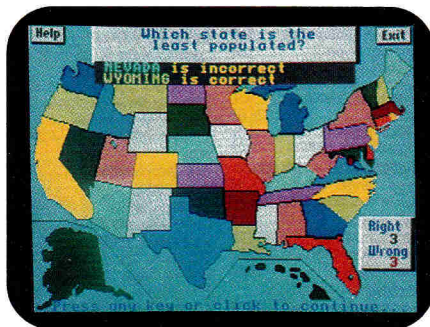
Map Facts is Geographic Jigsaw's third activity, and it contains a wealth of information about each state. To call up a particular state, youngsters simply place the cursor on its outline and click: A screen with 16 categories of information, such as state capital, largest city, state bird, highest elevation, and population, appears.

Unfortunately, Map Facts has no printing option for either individual screens or the entire file. Moreover, you can't access Map Facts information from within Map Quiz — you can't use the file as a desktop reference. Map Facts is essentially an electronic textbook. Although the file consists of 50 individual "pages" (every state fills a page), and each page includes a roster of data categories, kids can't call up information by state name, nor can they research particular states by categories.

In the final activity, young geographers can look at seven statistical maps, each showing either population, elevation, summer temperatures, winter temperatures, precipitation, waste dumps, or the years in

which individual states joined the union. Each of these theme maps appears on screen with only the outlines of state borders — state names aren't filled in.

Because this activity doesn't include the states' names, these maps mean little to those youngsters who haven't learned to identify the states. If children examine the color-coded map of *Environmentally Hazardous Waste Sites*, for example, they see



Can puzzle games teach geography?

that some states have 60 or more waste sites, but may not be able to list them. On the other hand, if youngsters study the state's locations, you can use these theme maps to test their knowledge. When older kids examine the map, you can ask them to identify states with a large number of sites — if they answer *New York*, *Pennsylvania*, and *New Jersey*, they know their states.

Geographic Jigsaw is an interesting, entertaining way to learn the subject, but the program has some irritating features:

The map in the manual shows Hawaii as a group of islands off the east coast of Texas, and it locates Alaska below California and Arizona — no lines drawn in to indicate that these states are located elsewhere. The electronic map, however, does show Alaska and Hawaii as geographic insets.

Another of the program's drawbacks is that once kids place a state in the Jigsaw activity, they can't move it. If they click on a state again, instead of the program responding with the state's name and capital, it merely informs them that the state is already in place. Because Jigsaw has no provision for reviewing a state's name, it's difficult for children to identify a state in relation to its neighboring states. Also, Geographic Jigsaw has no save-game options: If kids quit in the midst of play, they can't pick up where they left off.

Geographic Jigsaw's user-friendly interface is its best feature: Kids don't have to memorize any complex commands to operate the program, and fitting the states into a map of the country is a good way to teach youngsters the states' locations. When I determine the success of an educational program, however, I examine more than the ease with which I operate it. Geographic Jigsaw would be a better program if it sported print capabilities and a save-game option, and if Eclat were to revise the Map Facts activity. □

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

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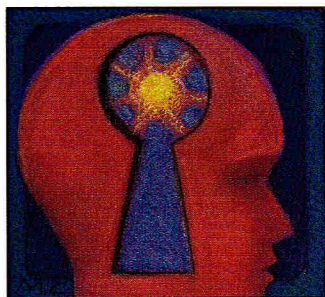
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LEARNING
CURVE

THE BEAUTY OF CHAOS

By **DAVID D. THORNBURG, Ph.D.**

Much like Michelangelo, who used his hammer to set statues free from the bondage of stone, you can use mathematics to find complex graphics patterns within a simple design.

OVER THE YEARS, THE COLUMNS I'VE written about *chaos* — a branch of mathematics that produces exquisitely complex graphics patterns — have generated more mail than all of my other writings combined. Whether the letters are from students, teachers, or those who use computers at home, all discuss projects and share discoveries.

Because of your continuing interest in exploring this topic, I've decided to spend the next two columns continuing our quest in this infinitely rich domain. Each of you who tinkers with these math programs is a conceptual space explorer — your space ship is your trusty Apple II. Now sit back, fasten your seat belt, and prepare to go where no thoughts have gone before.

SUBTRACTION AS ART

I once read that Michelangelo would look at a piece of stone and see his finished statue — he'd chip away the stone to get to the statue. This subtractive approach to creating sculptures is evident in some of his unfinished pieces — the characters look as if they're straining to free themselves. Much like Michelangelo, who used his hammer to set statues free from the bondage of stone, you can use mathematics to find complex graphics patterns within a simple design.

To start your journey, imagine an equilateral triangle. (See **Figure 1**.) Next, imagine shrinking the triangle toward each corner by a factor of one half to produce three smaller triangles within the original space. (See **Figure 2**.) Now imagine repeating this process with each of these three triangles, the next three triangles, and so on, until the new triangles

shrink to an infinitesimal size. This design is a *Seirpinski gasket*. (See **Figure 3**.)

Although a simple set of rules builds this design, the shape is complex. After all, any region of the gasket contains an infinite network of triangular holes of various sizes. If you follow the method we explore, you can create magnificent pictures of shapes ranging from geometric figures to the diaphanous forms of living organisms such as ferns. By applying randomly selected rules to a single point, you can form

order out of chaos — something you almost have to see to believe.

THE PROGRAM

Now type in the GASKET program in **Listing 1**. This program lets you explore the triangular gasket at any level of detail. The first part of the program asks for the desired number of points (start with 50,000), the magnification (80 gives a nicely sized picture), the coordinates for the center of the display screen (1, 0.5), and the coordinates for the first point. (We'll talk about this pair of numbers later.)

Note the subroutine starting at line 1000, which selects a random number less than one. Based on this number's value, the program chooses one of three sets of numbers, or *rules*, to determine the next plotted point: The new point

is moved either halfway from its present location to the origin (determined by the values of R and S); halfway to the origin, then translated to the right by one unit (H and K are the translation values); or halfway to the origin, then translated up and to the right. Although you won't know which rule the program will choose,

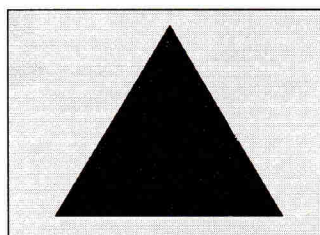


Figure 1. An equilateral triangle.

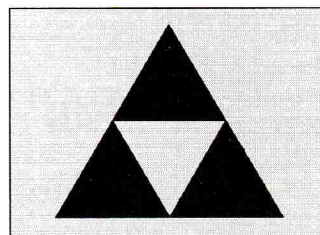
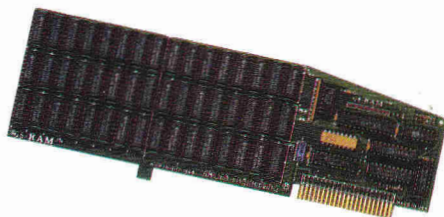


Figure 2. Three triangles in one.

Three ways to grow a IIGS.

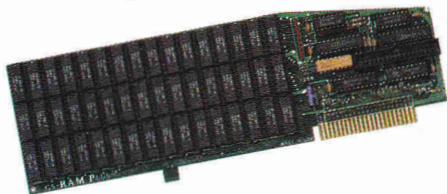
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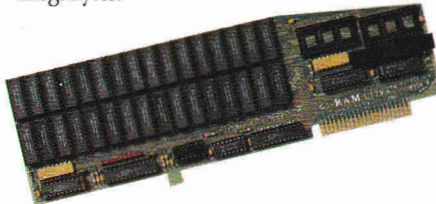
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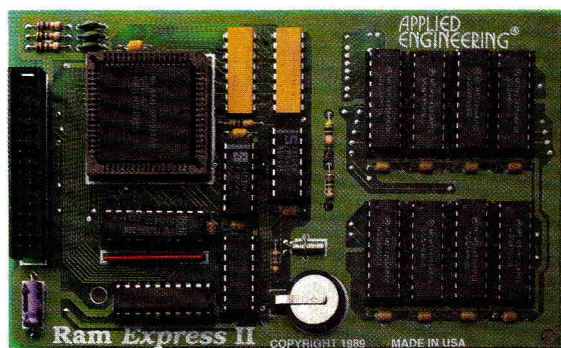
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each moves the point in the direction of one of the three corners.

ROLLING THE DICE

If this pattern isn't strange enough, let's see the effect our original starting point has on the result. Run **Listing 1** and choose the coordinates 0,0 as the starting value. You should get a picture like **Figure 3**.

If you think the program produces this design only with

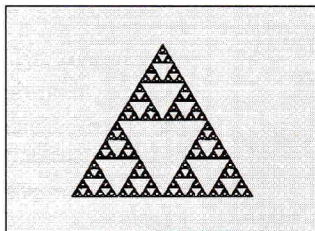


Figure 3. A Sierpinski gasket.

these values, guess again. Almost any pair of starting values will yield virtually the same final picture. Try starting with the values 12, 0.1 — or choose values of your own. Except for a few scattered points in the beginning, you'll find that the pattern settles down quickly to produce the same picture each time. This result is so counter-intuitive, it still amazes me. After all, you pick a random starting point, select each successive point by the random application of rules, and achieve the same figure each time.

To see this process working at any level of detail, try the program again with a larger mag-

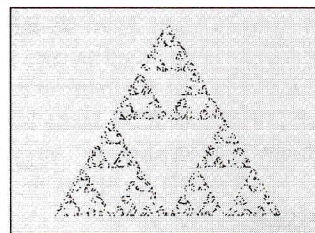


Figure 4. A portion of Figure 3 blown up 800 times.

nification. **Figure 4** shows the gasket centered at 0.1, 0.1 and blown up 800 times. Any small region of the gasket contains an infinite number of copies of the

original pattern — a compelling example of creating order out of chaos.

MORE SHAPES

To see another pattern this program can create, enter the set of five rules in **Listing 2**. These rules contain translations to the four corners of a square and to a point at the center of the square. Prior to translation, the coordinates of the point are shrunk by one third instead of one half. (Experiment with different values to see what happens.) Because there are five rules from which to choose, the random-number range for each rule is adjusted accordingly.

Before running the program, see if you can guess the shape of the pattern. **Figure 5** displays the actual shape with a magnification of 80 centered at 1, 0.5. As with the triangular gasket, this shape isn't sensitive to the starting coordinates

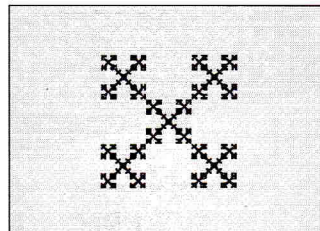


Figure 5. A pattern created with five rules.

(except for the first few points), and settles down to produce a highly symmetrical figure that also replicates itself on magnification.

WHAT'S GOING ON

The orbit of points that's produced by the random application of rules is infinitely complex, yet highly constrained. This oxymoronic behavior has a name — such orbits are *strange attractors*. An attractor is a description of the steady-state behavior of an orbit. For example, a simple pendulum (with friction) will slow and stop at its attractor — the lowest point in its movement. A metronome

Listing 1. The GASKET program.

```
0 REM GASKET program
10 HGR : HOME : VTAB (21) : HCOLOR= 3
20 INPUT "Number of points "; N
30 INPUT "Magnification = "; M
40 INPUT "Center coordinates = ";XC,YC
60 INPUT "Start at ";X,Y
70 FOR J = 1 TO N
80 U = 140 - M * XC + M * X
90 V = 90 + M * YC - M * Y
100 IF U < 0 or U > 279 THEN GOTO 130
110 IF V < 0 or V > 180 THEN GOTO 130
120 HPLLOT U,V
130 GOSUB 10000
140 XN = R * X + H
150 YN = S * Y + K
160 X = XN : Y = YN
170 NEXT J
180 END
1000 Z = RND (1)
1010 R = .5 : S = .5 : H = 0 : K = 0
1020 IF Z < .667 THEN R = .5 : S = .5 : H = 1 : K = 0
1030 IF Z < .333 THEN R = .5 : S = .5 : H = .5 : K = .866
1050 RETURN
```

has an orbit of two fixed points as it oscillates back and forth. These are two examples of well-behaved systems.

What makes our program a strange attractor is that the resulting dots never reach a steady state. Although the coarse resolution of the display screen hides the individual points, each point in the orbit is unique.

Once the program plots a point, it won't choose that

from different numbers of rules to see if you can reproduce a seashell pattern. Or explore changing the shrinkage values (R and S in the **Program listings**). Change the values for all rules, then change the values so that each rule has a different value. See what happens when S has a different value from R. With our five-rule example, you could even move the point outside the square. As you can see,

Listing 2. A new set of rules.

```
1000 Z = RND (1)
1010 R = .33333 : S = .33333 : H = 0 : K = 0
1020 IF Z < .8 THEN R = .33333 : S = .33333 : H = 1 : K = 0
1030 IF Z < .6 THEN R = .33333 : S = .33333 : H = 1 : K = 1
1040 IF Z < .4 THEN R = .33333 : S = .33333 : H = 0 : K = 1
1050 IF Z < .2 THEN R = .33333 : S = .33333 : H = .5 : K = .5
1060 RETURN
```

coordinate again. Even so, the result is far from random.

ON YOUR OWN

Next month we'll extend this program and teach you how to create complex pictures, such as ferns, with a few simple rules. In the meantime, continue to experiment on your own. Many seashells have patterns that look remarkably like triangular Sierpinski gaskets. Experiment with gaskets made

from different numbers of rules to see if you can reproduce a seashell pattern. Or explore changing the shrinkage values (R and S in the **Program listings**). Change the values for all rules, then change the values so that each rule has a different value. See what happens when S has a different value from R. With our five-rule example, you could even move the point outside the square. As you can see,

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COOKIN' UP A BATCH

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.

SHORTCUTS TO SUCCESS

By Susan W. Rollinson

DO YOUR FRIENDS AND associates with MS-DOS computers ridicule your Apple IIe "toy"? Are you green with envy over their AUTO EXEC.BAT files? Well, cheer up. With Applesoft BASIC your Apple IIe can give you a powerful "batch" language — and Applesoft is just as easy to learn.

If you use an Apple IIe with an attached hard-disk drive, for instance, you're probably tired of typing PREFIX /HARD2/APPLEWORKS -APLWORKS.SYSTEM every time you want to start AppleWorks. Instead of typing long commands, consolidate them into an EXEC file and save your keystrokes. Simply use AppleWorks (or another word-processing program) and

save the two lines to the main directory of your startup partition as a text or ASCII file named WORKS.BAT. (My main directory was /HARD1.) Press Open apple-P (OA-P) and choose *A text (ASCII) file on disk*. Next time you start your Apple IIe, type EXEC WORKS.BAT, and the two lines in the WORKS file will execute as if you typed them from the keyboard.

Repeat this procedure for other programs you use regularly. In fact, the MS-DOS batch facility has only one advantage over the Apple EXEC command: When you reboot a program, MS-DOS batch files pick up where they left off.

Many MS-DOS systems utilize batch files to set up a program-selection menu. This process is even easier (and more versatile) in Applesoft. The accompanying **Program listing** is a sample menu program. If you name it STARTUP, ProDOS will execute it

automatically when you start your computer — it's similar to the AUTOEXEC.BAT file on an MS-DOS system. You'll need to modify the **Program listing**, however, to suit your system.

If you have an Applesoft STARTUP program, save the **Program listing** as MENU. Find the line with the END statement in your current STARTUP program, then add the text PRINT CHR\$(4)"RUN MENU": between the line number and END.

If your STARTUP program isn't an Applesoft program, save the **Program listing** as MENU, then type RUN MENU when your STARTUP program ends. If you'd rather have the menu program run automatically, change the name of your current STARTUP program to something else, such as STARTUP.OLD, before you save the **Program listing** as STARTUP. And next time you hear someone put down the Apple IIe because it can't write batch files, set the record straight. □

Write to Susan W. Rollinson at 849 Lou Avenue, Clifton Forge, VA 24422.

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Program listing. Set up a menu-selection program with batch files.

```
90 REM COPYRIGHT INCIDER, DEC. 90
100 REM SAMPLE MENU SYSTEM FOR APPLE IIE
110 REM NAME THIS FILE STARTUP FOR AUTOMATIC EXECUTION
120 D$ = CHR$(4):BEEP$ = CHR$(7)
130 TEXT : HOME
200 VTAB 5: PRINT "<1> APPLEWORKS"
210 VTAB 7: PRINT "<2> LOGO"
220 VTAB 9: PRINT "<3> SIDEWAYS"
230 VTAB 11: PRINT "<4> EXIT TO BASIC"
```

```
240 REM LOTS OF ROOM HERE FOR EXPANSION
300 VTAB 22: INPUT "ENTER SELECTION: ";A$
310 IF A$ = "" THEN PRINT BEEP$: GOTO 300
320 A = VAL (A$)
330 IF (A < 1) OR (A > 4) THEN PRINT BEEP$: GOTO 300
340 ON A GOTO 410,420,430,440
400 REM SELECTIONS ROUTED HERE
410 PRINT D$;"EXEC WORKS.BAT"
420 PRINT D$;"EXEC LOGO.BAT"
430 PRINT D$;"EXEC SIDEWAYS.BAT"
```


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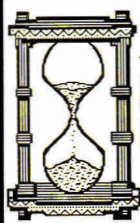
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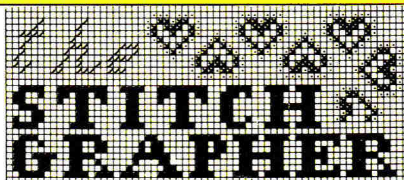
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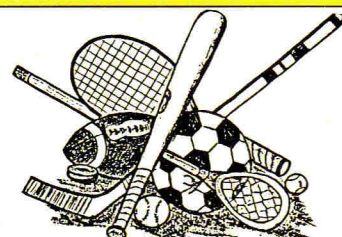


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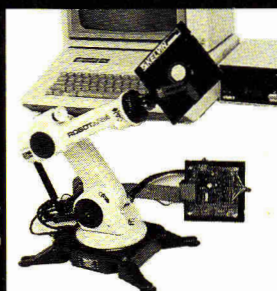
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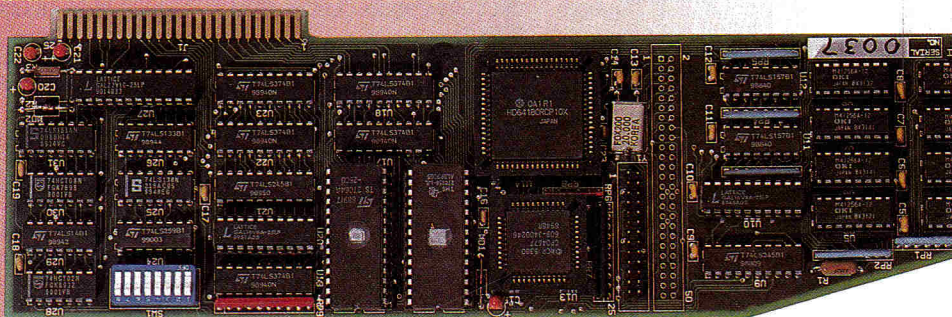
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Speed and storage have always been important issues for computer users. As if it weren't hard enough to figure out whether you need a hard drive, what type of hard drive you need, and what size you need, you also have to make some choices when it comes to your hard-drive controller. Now CV Technologies makes that a little easier — thanks to its new **RamFast SCSI** card, a speedy alternative.

As its name implies, the new card combines the speed of SCSI (small-computer-systems interface) with the speed of RAM (random-access memory). You know how fast RAM is if your computer has more than 128K of it and you run AppleWorks: New screens appear instantly. SCSI is the most up-to-date way to attach a hard-disk or CD-ROM drive to your computer: Not only is SCSI fast, but because millions of Macs also use SCSI drives, the prices of those drives have been coming down.

RamFast SCSI uses a couple of different methods of accelerating data retrieval. First, a 10-megahertz on-board processor means that the card operates on a true 1:1 interleave (reading one entire drive track per revolution). It also uses DMA (direct memory access) to relieve your computer's processor of the time-consuming drudgery of disk reads: It keeps up to 256K of the disk data you use most often in a bit of RAM called a *cache*, a scheme perfected by Ohio Kache Systems. That extra 256K means, for instance, that you can keep the entire GS operating system (the Finder) in RAM even if you have only 1 megabyte. If you use a IIe with AppleWorks, all three of the program's modules, even the printer information and spell-checker dictionaries, will stay in RAM (if you use those portions frequently).

In addition to the 256K of dedicated memory on board, other notable features include compatibility with the Apple IIe or IIGs, compatibility with older SASI drives (Shugart Associates standard interface, SCSI's precursor), simultaneous support for up to eight drives or partitions, and a data-transfer rate of up to 1 megabyte per second.

Installation is straightforward. Once you've properly set the card's DIP switches (clearly explained in the manual), just plug it into an available slot, run the cable through an opening in the back, and connect your hard drive. Fire up your system and the startup utility program (stored in ROM) appears. Your choices include configuring your system, adding or deleting partitions, and formatting drives.

The RamFast manual includes a list of popular memory and accelerator boards and indicates DMA compatibility for each. There's also a handy troubleshooting list, outlining possible problems with probable causes and solutions, and a tech-support phone number. If all your equipment is compatible, though, you shouldn't run into trouble — RamFast is pretty much plug-and-play.

What's the best way to speed up your computer — a RAM card or a hard disk? Get RamFast SCSI and a hard disk and get the benefits of both. It's priced at \$289, from CV Technologies, 9431 Saddlebrook Lane, Suite #2C, Miamisburg, OH 45342, (513) 453-5743. Keep an eye on *inCider's* Reviews section for a more detailed look at the ins and outs of RamFast SCSI in an upcoming issue. □

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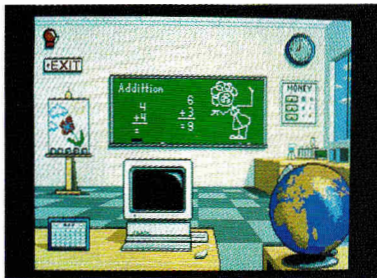
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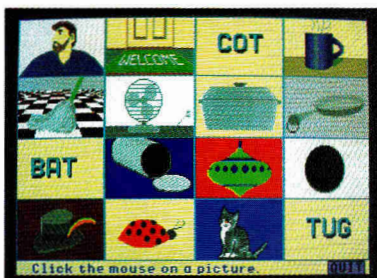
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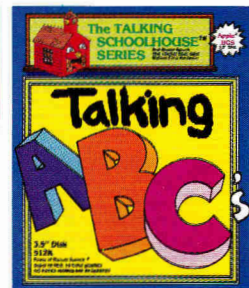
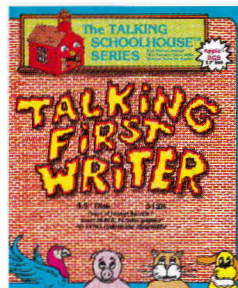
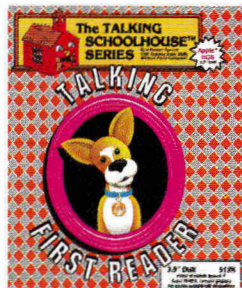
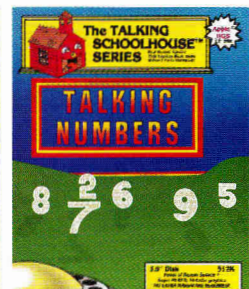
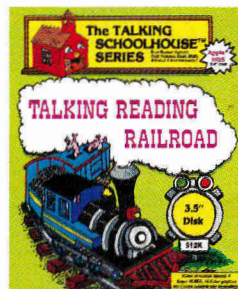
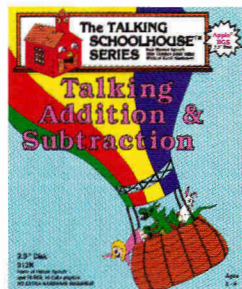
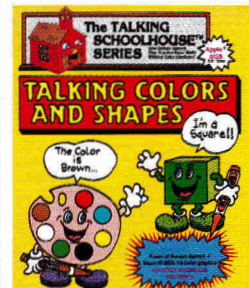
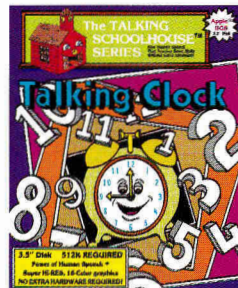
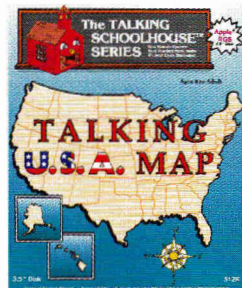
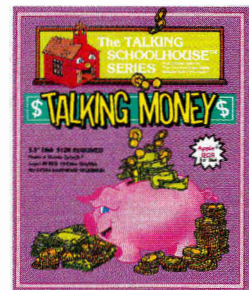
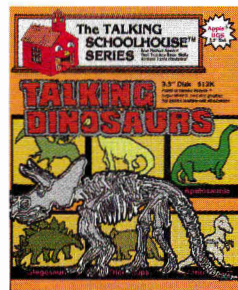
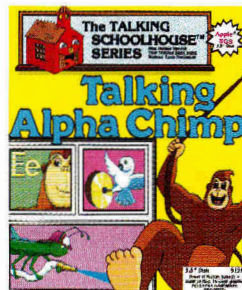
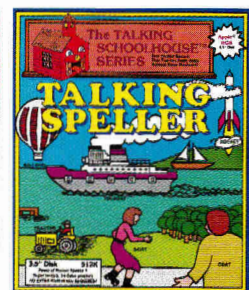
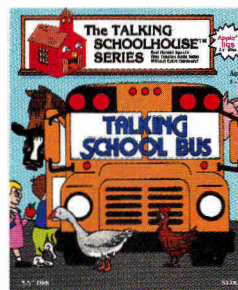
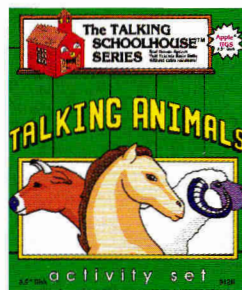
Talking First Words uses voice and animation to introduce children to nouns and verbs.



Talking Multiplication & Division provides a human voice to help kids with basic math skills.

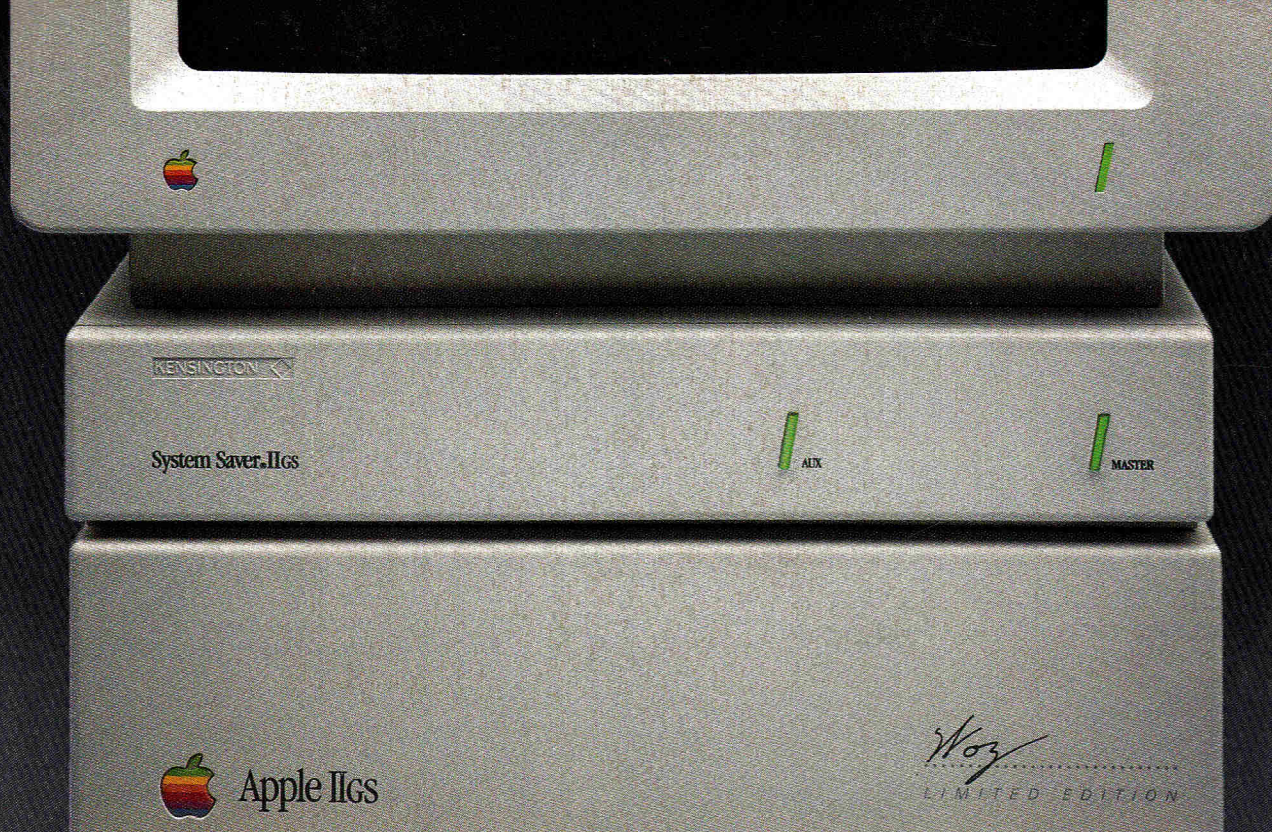
These new programs join the 15 others listed here to form the Talking Schoolhouse Series, which educators and parents across the country are hailing as the most outstanding software available for the IIGS. IBM PS/2 and TANDY 1000 versions will be ready for shipment shortly.

The suggested retail price for each program is \$49, or \$59 for the School Edition (with backups). To order or obtain information contact your dealer or call (800) 672-6002.



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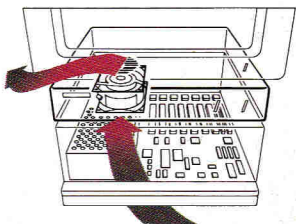


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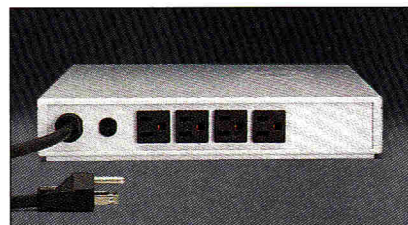


Keeps your IIGS calm.

Its UL Listed surge suppression circuitry protects your valuable equipment and data from dangerous power surges and spikes. And its noise filter smooths out disruptive EMI and RFI. It makes your whole IIGS system more reliable and longer lasting.

Keeps your IIGS collected.

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