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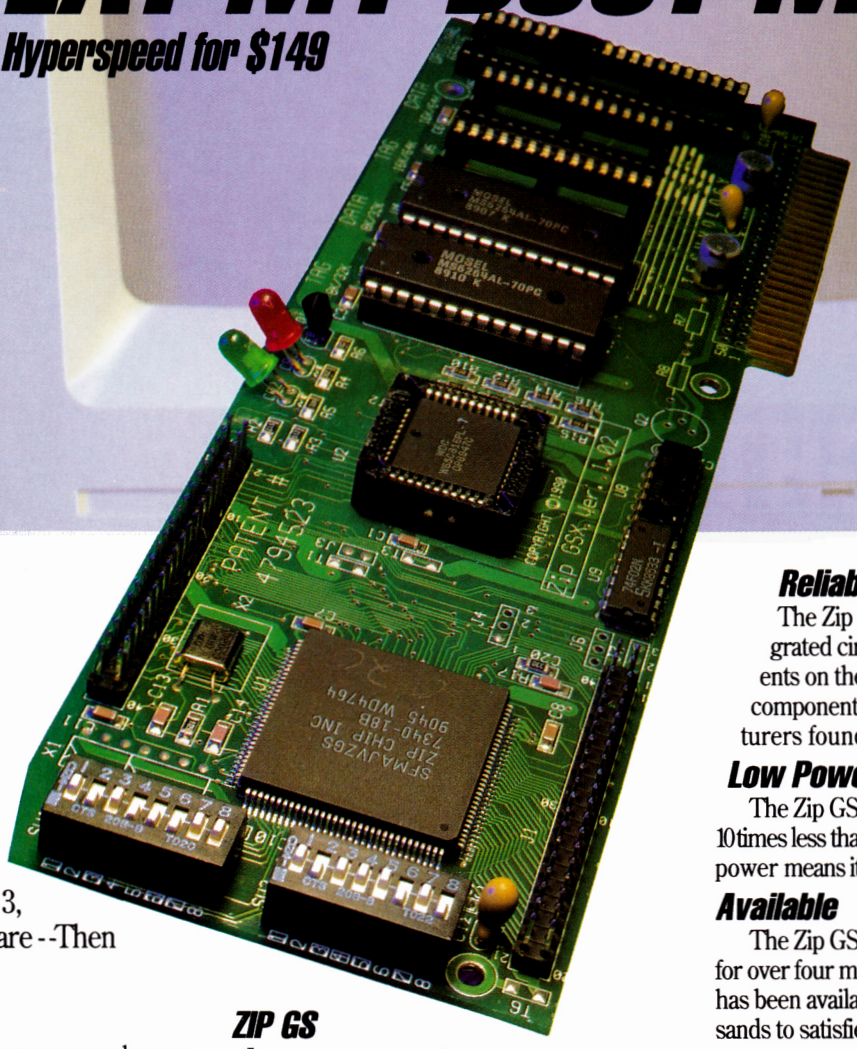

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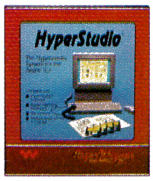

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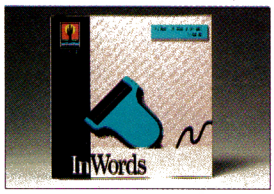

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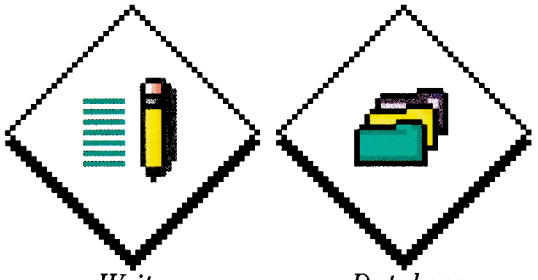

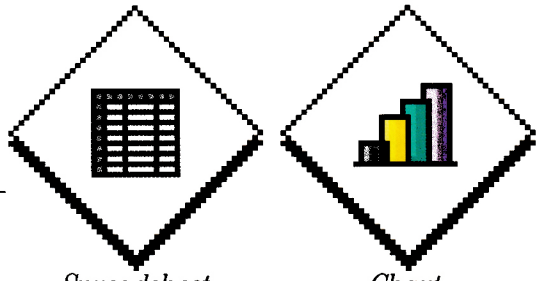

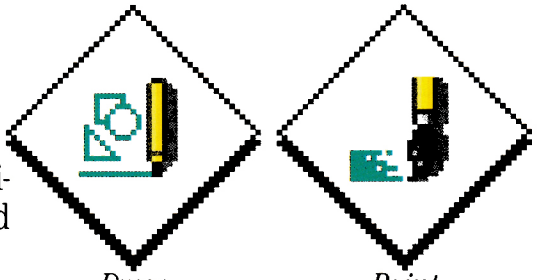

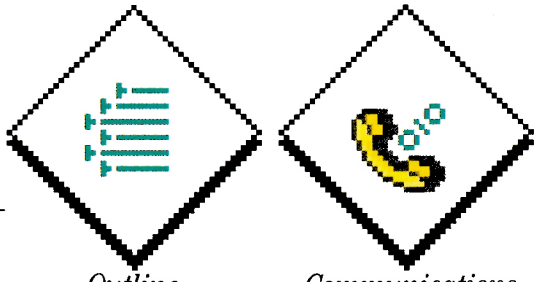

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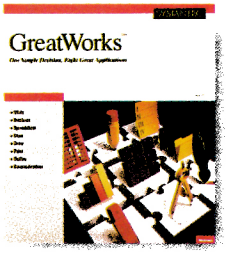

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inCider A+ Apple II/Macintosh

SEPTEMBER

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34 **The Lighter Side of Education** by Carol S. Holzberg, Ph.D.
When it's time to take a break from the books, Apple II and Mac games keep kids thinking. Whatever the subject — spatial relationships or math practice, environmental studies or American history — colorful animation and interactive play help make learning fun.

40 **In the Network Groove** by Gregg Keizer
Swing into the '90s, the decade of the network. Whether you have two computers at home, half a dozen at work, or scores of them at school, it's easy to get them talking to each other. Thanks to two innovative Apple-to-Apple communication schemes, sharing information is faster and easier than ever before.

46 **Graphics Gallery 6: Is It Art Yet?** by Deborah Greh, Ed.D.
How do we judge the value of computer art? No one can guarantee the creation of an artwork in any medium, but graphics software gives the artist new powers of manipulation — and the freedom to experiment, to play with images and let ideas grow. As a tool in the hands of an artist, the computer speaks to our deepest needs for human expression.



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Cover Illustration • Richard McNeel

REALITY CHECK

When it comes to computers, teachers are still fighting against a lack of finances and training.

Will today's computer-using educator please stand up? There's no arguing that computers have made an impact in classrooms. Reports in the general and trade press would lead you to believe that the average school has gone high-tech; as Bob Dylan says, however, "What looks large from a distance close up ain't never that big." In this case, the large success of computers in education may not be as large as it seems. Are computers now entrenched as educational tools? Or are many schools still struggling with, or avoiding, computer technology?



By DAN MUSE ✻ EDITOR IN CHIEF

While the gentle hum of Apple computers is heard in hundreds of schools, the silence in other schools is deafening. We wonder who the typical educator is: the technology-savvy teacher who spouts terms such as *CD-ROM*, *interactive multimedia*, and *peer-to-peer networking* in casual conversation much the same way he or she discusses lesson plans and grade-point averages? Or is the real computer-using educator one who maybe just got a IIe for his or her classroom and doesn't know how to use it yet? These educators — most likely through no fault of their own — don't know a RAM disk from sheep dip, or ProDOS from pro wrestling. Recently, over the course of a week, I saw both ends of the spectrum, and it left me confused and concerned.

In mid-June I attended the National Educational Computing Conference (NECC) in Phoenix. The unofficial theme was multimedia — integrating computers, audio, video, and whatever else for classroom activities. The buzzwords and the predictions were flying.

Meanwhile, discussion of computers was also taking place in other parts of the country, but on a different level. One of the great things about being located in Peterborough, New Hampshire, is that we have access to a variety of communities. Our offices are located in the middle of a rural area, but we're only an hour and a half from Boston, a high-tech mecca. It's also just a short drive to the mill towns of central Massachusetts. So we come into contact with educators from a wide range of school systems.

Shortly after returning from NECC, I talked with some local educators as well as some teachers in towns just over the Massachusetts border. One situation in particular struck me as a microcosm of computer use (or lack of it) in education. A teacher there had just gotten a new IIe, which she was taking home for the summer. She had no idea what to use the computer for, however. She had some illegal copies of five-year-old programs. She didn't know how she would use the computer in the fall. She did know the computer would be a help — she just didn't know how exactly. She wasn't — to use a term we heard at NECC — "digital groovy."

Like the teachers in Phoenix, she was committed to making education work, despite poor economic times. When it came to computers, however, she had little in common with the teachers I met at NECC, who often sounded as much like programmers and engineers as they did educators.

The level of expertise of most of today's educators probably falls somewhere between technical genius and computer ignorance. Still, a gap exists between those on the forefront of educational technology and those fighting in the trenches with limited training and money for new equipment. Reality lies somewhere between these two extremes, but, as educators or journalists who have access to the latest in high-tech items, let's remember that in many classrooms, when it comes to computers, teachers are still fighting against a lack of finances and training. It's up to all of us to continue to apply pressure on local, district, state, and federal levels.

Until buying computers and software becomes as accepted and expected as buying textbooks, classroom computing will be viewed as an adjunct to education, not as an integral part of it. We'll know the battle is over when "computer-using educator" is a redundant phrase. ❑

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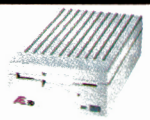

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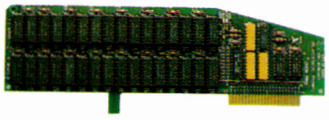

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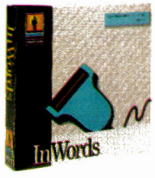

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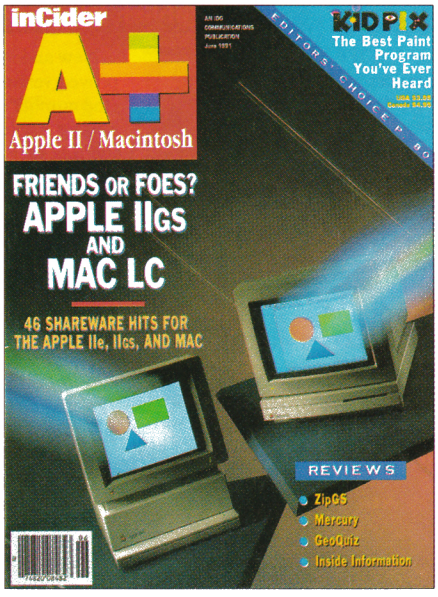

GET OUT!

CLARIS AND NAUG MISSED THE boat in "Quick Cleanup" (June 1991, p. 18). The fastest way to quit AppleWorks is to use **SuperPatch 7.0** ($34.95; Quality Computers, 20200 Nine Mile Road, St. Clair Shores, MI 48080, 800-443-6697). SuperPatch adds hundreds of enhancements to AppleWorks, including an option to let you quit regardless of the Desktop's status.

Charlie Vanderford
"CharlieV" on America Online
Brandon, FL

Claris Corporation doesn't like to recommend other companies' products; it might imply a guarantee that a product will work flawlessly with AppleWorks. For details on SuperPatch 7.0, see "Updates," February 1991, p. 14. — eds.

CALLED ON THE CARPET

I DON'T EXPECT YOU TO PRINT this. You seem to overlook letters that don't praise your magazine or staff. But as a service to others I submit these corrections.

In "Desktop Video" (May 1991, p. 12), you say to Clarence Mosely, owner of a Revision A Apple IIe that doesn't work with the Apple II Video Overlay Card, that "it's less expensive to buy an Apple IIGS than a Mac" for basic video editing and creation. Apple US still offers free upgrades from Revision A motherboards to Revision B ones. (I verified this point with Apple's Developer Technical Services.) Mr. Mosely need only see his local Apple dealer.

In "CD-ROM Comes of Age" (May 1991, p. 45), you say, "If you have more than one SCSI device attached to your computer, the SCSI I.D. number must match its place in the chain. For example, if your CD-ROM drive is last, its SCSI I.D. number must be 7." This is plainly incorrect. According to the Apple II High Speed SCSI Card owner's guide (chapter 4 and the appendix), "the computer and each SCSI device connected to a SCSI card must have a unique ID number between 0 and 7. Set I.D. numbers according to the types of devices you're connecting. Assign the highest numbers to storage devices, such as CD-ROM drives, hard disks, and so on."

In "Printer Polygamy" (May 1991, p. 70), when discussing the IIe, you fail to mention the Apple II Workstation Card, which gives AppleTalk capability to the Apple IIe. Have you never heard of it? I'm not impressed.

Stephen Brown
325 McKee Avenue
Willowdale, Ontario, Canada M2N 4E6

Unfortunately, we ran out of positive letters this month, so we had to print yours. Seriously, though, thank you for your corrections with regard to "Desktop Video" and "CD-ROM Comes of Age." Although we did answer Mr. Mosely's question in "Desktop Video," we neglected to mention the free upgrade. You're correct in pointing out in "CD-ROM Comes of Age" that a device's identification number needn't match its place in a chain, but what we said stands as good advice. For organizational purposes, a device's SCSI I.D. number should match its place in the chain.

You seem to have missed the point in "Printer Polygamy," though. Of course the Apple II Workstation Card is a viable way to connect a IIe to a laser printer, but author Gregg Keizer was simply discussing the simplest of sharing schemes — linking an Apple II or a Mac to a printer. If your laser printer comes equipped with a serial port, you can connect your IIe directly. For this simple kind of network there's no need to purchase the Workstation Card. For details on file-sharing AppleTalk networks, including the use of the Apple II Workstation Card, see "Connecting in the '90s" (December 1990, p. 66) and "In the Network Groove" in this issue (p. 40), which talks about school-based networks. — eds.

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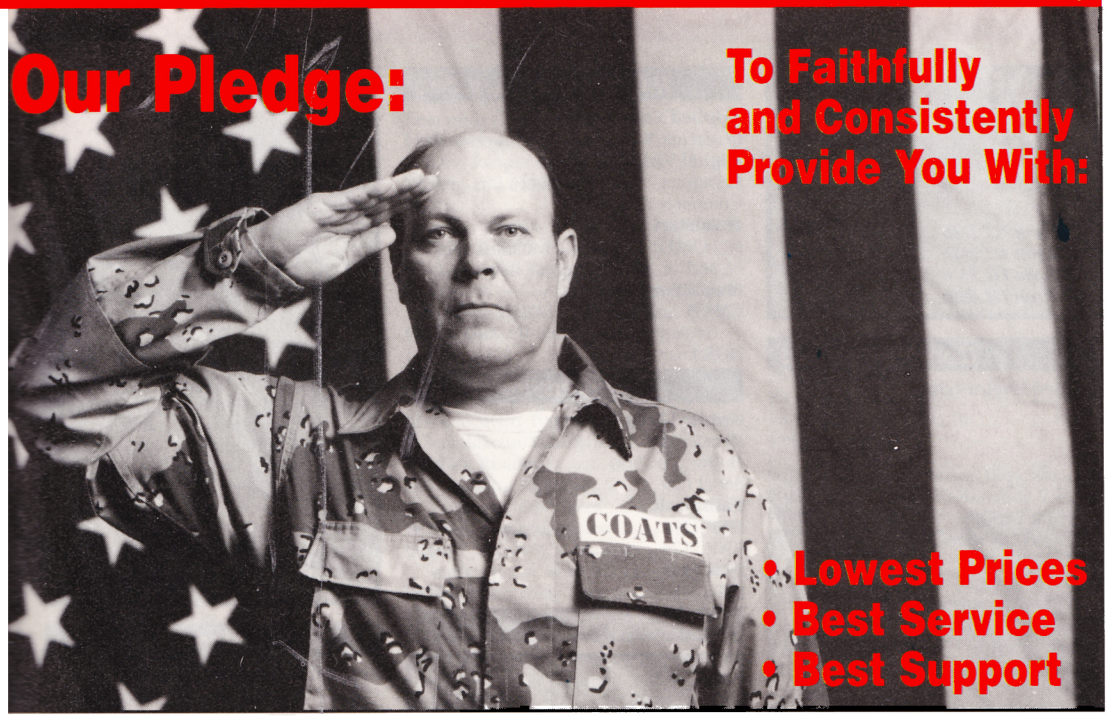

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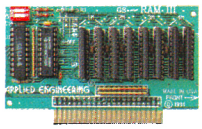

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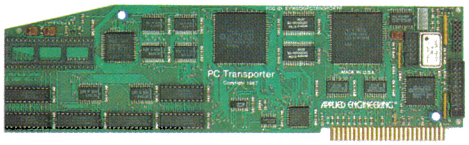

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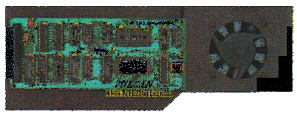

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For $79.95, you get everything you need to run a league but the other managers. (A demo disk is available for $5.) For more information, contact FantasyWorks Software at P.O. Box 57, Bedford, TX 76095-0057, or circle 351 on the Reader Service Card. — **P.S.**

TRUE COLORS

With money tight, the clamor for "a computer for every student" fades, and a call for "the one-computer classroom" is heard. While good teachers with a computer can teach as well as bad ones with a labful, they'll need something larger than a 13-inch RGB monitor to display the screen to a class.

InFocus Systems' **1600LC PC Viewer** ($2695) can use a standard overhead projector to display computer graphics in 16 true colors on any wall or screen. It works with Apple IIs, IIGses, and Macs (and MS-DOS machines) — in full glorious color.

The IIGS and IIe/c have inexpensive, large screen displays built in: Just attach the composite-video output to a large-screen TV or VCR. But the Mac is crippled by its lack of composite video out; to display Mac output on a large screen, you need an overhead-projection panel. To display the Mac LC's full color output, you used to pay the price: at least $3500 for InFocus' least expensive color projector. The key to the incredible value of the 1600LC PC Viewer is InFocus' proprietary new technology, called *SaBRE* — "subtractive birefringent effect."

"Birefringence" is double refraction: When a ray of light passes through certain crystals (liquid crystals in the case of a *liquid-crystal display*, or *LCD*) it separates into two unequally refracted, or bent, rays of light. White light can be separated into two different colors, for instance. That's a very brief description of how the least expensive type of LCD projector works: It splits a monochrome video signal into two colors. That's why what was black-and-white on screen looks yellow-and-blue on the wall. High-end overhead LCD projectors combine three separate LCDs, one for each of the primary "subtractive" colors — yellow, cyan, and magenta — in the same way a color photograph can be reproduced in this magazine by overlaying plates of those three colors (plus black). Using "smart" firmware in the projector to combine colors more cleverly, InFocus' SaBRE technology has reduced the number of LCDs required for color to two, which is the key to the comparatively low price of the 1600LC PC Viewer.

The InFocus 1600LC PC Viewer requires RGB output on the Apple II. It can create seven new frames every second — that's its "refresh" rate. Computer animations run at 14 frames per second, and look somewhat "choppy" when displayed overhead. The standard refresh rate for video — and for Apple's new QuickTime moving-picture file format — is 30 frames per second. The InFocus 1600LC PC Viewer isn't designed to display multimedia animations, but digitized still photographs look good in 16 colors. The unit's screen resolution is comparable to 640 by 480 pixels — the same as a color Mac screen. (The IIGS super-hi-res screen is 640 by 200.)

For details, contact InFocus Systems, 7770 Southwest Mohawk Street, Tualatin, OR 97062, (503) 692-4968 or (800) 327-7231, or circle 352 on the Reader Service card. — **P.S.**



Illustration • Elizabeth V. Auer

"Apple II" indicates an 8-bit product compatible with IIes, IIcs, IIc Pluses, and IIGses unless noted otherwise.

NEW SOFTWARE

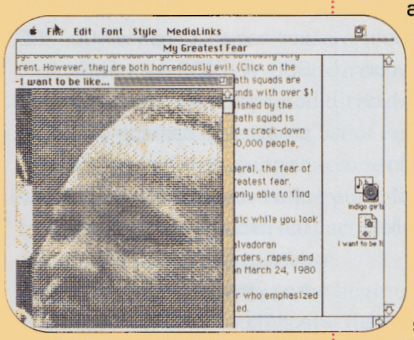
▲

MediaText

If multimedia — the weaving of words, pictures, and sounds into a seamless fabric — sounds good, but multimedia authoring tools sound expensive and difficult, **MediaText** may be just what you need.

MediaText lets anybody who can use a word processor create multimedia — it's as simple as annotating text in the margin. But in MediaText, clicking on an icon in the magic margin can display computer graphics or animation, run videodiscs or VCR tapes, play sounds on the Mac, or play music on compact discs.

Designing a MediaText document is almost as easy as playing one. Pull down a menu, select the kind of link you want to make — sound, VCR, videodisc, or CD — and use a standard interface to select the sound or image you want. Place the icon in the proper place in



the margin, and the job's done.

MediaText came out of the Highly Interactive Computer Environments group at the University of Michigan at Ann Arbor. HICE wanted to create the Brownie-box camera of multimedia: As Eastman Kodak once popularized the concept of photography with the slogan "you push the button, we do the rest," HICE set out to make multimedia composition available to the average user. The result was MediaText.

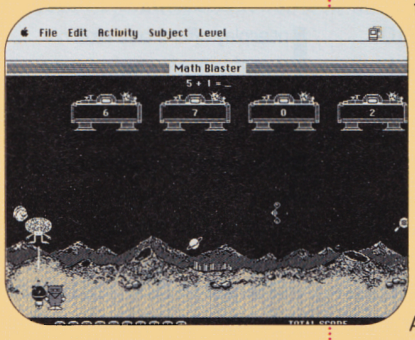
MediaText is priced at $89.95; site licenses are also available. For more information, contact Constructive Instruments, 627 South Division, Ann Arbor, MI 48104, (313) 668-8664, or circle number 353 on the Reader Service card.

▲

Math Blaster Plus

"We started a math craze with Math Blaster seven years ago," says Jan Davidson of Davidson & Associates. "Now Davidson is launching the math program of the '90s, complete with lasers, rocket ships, animation, sound, and color." And **Math Blaster Plus** is now available for Apple's computer of the '90s, the Macintosh. It's four complete programs, all of which use color or black-and-white graphics to teach both the basic skills of arithmetic and critical thinking and problem solving.

Rocket Launcher, the first program in the package, helps children learn fundamental operations as they assist the Blasternaut and his robot friend Spot in building a rocket and blasting off for outer space. In Trash Zapper, they defend the planet against trash aliens and find the missing value in an equation as they clean up space. Number Recycler is a new problem-solving game in which students manipulate chambers filled with numerals and math symbols to build a correct equation; the trick is to recycle symbols they want to use again and throw out the rest. The featured activity, the Math Blaster Game, helps students increase their speed and accuracy in arithmetic as they guide the



Blasternaut and Spot through space, solving equations while they dodge space debris.

Math Blaster Plus runs on all Macs (1 megabyte of RAM is required, 2 megabytes for color) and costs $59.95. Lab packs and teacher's editions are also available. For more information, contact Davidson & Associates, 3135 Kashiwa Street, Torrance, CA 90505, (800) 556-6141, (800) 545-7677, or (213) 534-4070, or circle number 354 on the Reader Service card.

▲

Mac Lotus 1-2-3

When Lotus Development Corporation finally released its 1-2-3 spreadsheet software for the Mac, its suggested retail price of $495 may have discouraged many educators. But Lotus also quietly announced a special academic edition of Lotus 1-2-3 priced at a competitive $99, as well as agreements with two publishers to create special textbook editions of 1-2-3.

Addison-Wesley•Benjamin Cummings (Reading, MA) has been publishing **The Student Edition of Lotus 1-2-3** for the PC since 1986; it was, in fact, the first textbook/software package designed to teach college students with commercial software, and has been used by half a million students. The company is developing products for the Mac version of 1-2-3 for the education market, including manuals and texts written by noted professors.

Course Technology (Cambridge, MA) began its partnership with Lotus in 1989, and has published 1-2-3 for Accounting and 1-2-3 for Business. These products are designed to be integrated into specific college courses, but also teach valuable problem-solving skills. **1-2-3 for Business** on Apple's Macintosh should be available this month.

For information on the academic edition of Lotus 1-2-3, contact Lotus Development, 55 Cambridge Parkway, Cambridge, MA 02142, (617) 577-8500, or circle number 355 on the Reader Service card. For information on the Addison-Wesley or Course Technology texts, contact your bookseller or local sales representative.

■

SuperConvert

SuperConvert lets you see and create all kinds of graphics images on your IIGS. You can convert Mac pictures to GS pictures, as well as Atari, Amiga, Commodore 64, and even IBM formats. But dealing with Apple II formats is the program's strength. You can work with almost any type of Apple graphics — from Print Shop graphics and double hi-res to super hi-res and Finder icons, and every kind in between.

NEW-PRODUCT FOCUS

▲ MAC ◆ APPLE II ■ APPLE IIGS

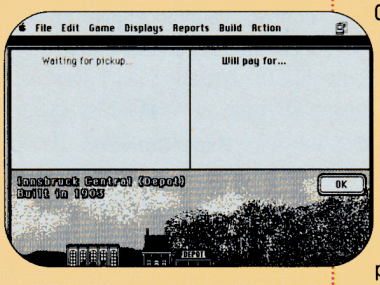
SuperConvert is a descendant of Jason Harper's shareware classic SHRConvert. If you paid your shareware fees you're eligible for a special low price on SuperConvert. For the rest of us, it's $39.95. For more information, contact Seven Hills Software, 2310 Oxford Road, Tallahassee, FL 32304-3930, (904) 575-0566, or circle number 356 on the Reader Service card.

▲

Railroad Tycoon

Struggling with our late-20th-century technology, we may forget the first visionaries who shrank the world, connected people to one another, and amassed fortunes in the process: the railroad tycoons. Sid Meier's **Railroad Tycoon** ($69.95), from MicroProse Software for the Mac, is a simulation of the days of Jay Gould and J. Pierpoint Morgan in the U.S., and of similar periods in European history.

It's a game, but also much more: Railroad Tycoon offers education in finance, engineering, and history, as well. Railroad fanatics with Macs will



have to have this program — it's an indispensable reference — but it'll also appeal to the game player who's conquered SimCity and SimEarth; it's a similarly detailed simulation.

Railroad Tycoon requires 1 megabyte of RAM (2 megabytes for color) on any Mac. A hard disk is recommended. For details, contact MicroProse at 180 Lakefront Drive, Hunt Valley, MD 21030, (301) 771-1151, or circle number 357 on the Reader Service card.

▲ ◆ ■

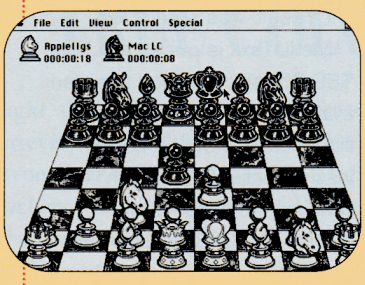
Checkmate/Battle Chess

Interplay offers two alternatives for Apple chess fiends: **Checkmate** for the old-fashioned player looking for a challenge, and **Battle Chess** for the modern gamer who wants his or her knights and rooks to see a little arcade action.

Checkmate ($54.95) has the features you'd expect in a Mac chess program: gorgeous color graphics, an intuitive interface, and the ability to see the board from any direction you choose — in two or three dimensions. But you might not expect the level of technical sophistication you'll find. If you've ever wondered how a computer plays chess, you can watch Checkmate as it asks "what if?" of hundreds of possible moves. Checkmate will also rate your playing on an internationally accepted scale. (Checkmate itself ranks at around 2000 — below the Grandmaster level, 2450, but well above the average hobby player, 1400.) Checkmate runs on any Mac with a megabyte of RAM. (Interplay claims any excess RAM will be used to increase the computer's playing strength.)

Battle Chess plays a weaker game of chess, but makes up for it in graphics and animation. Unless you've watched wrestlers in medieval garb play chess on a board 8 yards long and 8 yards wide, you've never seen chess like this. And even if you've seen "life-sized" chess, the knights probably didn't wield their swords as violently as the Battle Chess knights do.

Battle Chess is expected soon in a more intelligent, but just as bloody, CD-ROM



version for color Macs ($79.95); it's currently available for the black-and-white Mac ($49.95) and in color on the Apple IIGS ($49.95) or Apple IIe ($44.95). For more information, contact Interplay, 3710 South Susan #100, Santa Ana, CA 92704, (714) 549-5075, or circle number 358 on the Reader Service card.

NEW HARDWARE

▲ ◆ ■

Superwriter 924

Xetec's **Superwriter 924** is a parallel printer interface for the Apple IIGS, Apple IIc, Laser 128, and all Macs. That doesn't sound like much, but the Superwriter lets your Apple software, most of which thinks that Apple's ImageWriter is the only printer in the world, print on some of the inexpensive 9-pin parallel printers and good-quality 24-pin printers available.

The Superwriter interface is easy to install — just plug into an Apple serial port — and easy to use. It's perfectly transparent: You simply attach a cable to your Star, Panasonic, Epson, Okidata, or even IBM printer, and send your copy to it just as if it were an ImageWriter. You can even print color graphics if your software supports color on the ImageWriter II and your parallel printer has a color ribbon.

You do have to set some DIP switches when you install the interface, but the Superwriter has made even that simple by putting them right on top for ease of use.

Superwriter 924's suggested retail price is $119.95. For more information, contact Xetec, 2804 Arnold Road, Salina, KS 67401, (913) 827-0685, or circle number 359 on the Reader Service card.

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LightningScan Compact

Thunderware has created a portable hand-held scanner for the Mac. By connecting to the disk-drive port, **LightningScan Compact** ($359) eliminates the need for a power supply and stand-alone controller.

The LightningScan Compact interface box weighs just 5 ounces and is only slightly larger than a deck of cards; it connects to the SuperDrive port on any Mac that has one. It scans graphics and text images as wide as 4.2 inches and has settings for 100, 200, 300, and 400 dots per inch. It's compatible with all word-processing, desktop-publishing, painting, drawing, and optical-character-recognition software. The package also includes a desk accessory for quick scanning within any Mac application and ThunderWorks image-editing software, which edits and prints in gray scale even if you don't have a gray-scale monitor.

For details, contact ThunderWare, 21 Orinda Way, Orinda, CA 94563-2565, (415) 254-6581, or circle number 360 on the Reader Service card.

AppleWorks Programmers Association

NOTES

USERS AND PROGRAMMERS
Sharing the Power to Create

AW Tip: If you're an AppleWorks veteran, you're probably familiar with the program's open-apple and control-key commands. But do you know that other key-combination functions exist to enhance your productivity? Let's take a look at some of AppleWorks' less widely known key combinations.

OA-Return. Moves the cursor to the beginning of the following line in a word-processor document without generating a carriage return.

OA-Control-S. Saves the current file to the original directory; prompts you to insert the correct disk if the directory isn't on line. Saves the file to the current directory if the file is new or not loaded previously from disk. (Extension of **OA-S**: saves the current file to the current directory or folder.)

OA-Right Arrow. Marks all files in the *Add Files*, *Save Files*, or *Remove Files* lists for corresponding action.

OA-Left Arrow. Deselects all files for action.

OA-Return. From the *Save Files* or *Remove Files* option on main menu, saves, or removes from the desktop and saves, all current marked files to the original directories; prompts you to insert required disks if the directories aren't on line.

OA-Right Arrow/OA-Return. From the *Remove Files* list, clears the desktop and saves all current files to respective directories.

OA-Return. From the *Change Current Disk* menu, with the ProDOS directory item highlighted, presents an option for entering the directory name manually. It's useful when you know the desired destination path, and it saves time required to climb and descend directory trees.

OA-Return. From TimeOut UltraMacros, when *Launch a New Task* on the *Macro Options* menu is highlighted, the command displays the current path to ULTRA.SYSTEM. Press Return to launch the current default macro set. Edit displayed pathname to launch the task file from a directory other than *AppleWorks Program*. Overtype displayed directory path and type a question mark (?) to produce a menu list of task files in the directory. It's another way of launching macro sets from multiple directories.

OA-. Moves the cursor to the end of the current line in a word-processor document, the last active column in a spreadsheet, or the last category in a database.

OA-,. Moves the cursor to the beginning of the current line in a word-processor document, the first column in a spreadsheet, or the first category in a database.

OA-Delete. Deletes the character under the cursor. Also called the forward-delete or "gobble" command.

Control-B. Starts or ends the boldface print option in a word-processor document. Enter at the current cursor position.

Control-L. Starts or ends underlining in a word-processor document. Enter at the current cursor position.

Control-P. Forces a new page in a word-processor document. Enter at the current cursor position.

Control-F. Inserts the *Justify* print option in a word-processor document. Enter at the beginning of the current paragraph.

Control-N. Inserts the *Unjustify* print option in a word-processor document. Enter at the beginning of the current paragraph.

Control-R. Right-justifies text in a word-processor document. Enter at the beginning of the current paragraph.

Control-C. Centers text in a word-processor document. Enter at the beginning of the current paragraph.

AW Enhancement: The popular utility **AppleWorks Patcher**, written by Beagle Bros staff members, has been updated to version 1.6 and includes a fix for a problem with numerical sorts in the database, among other improvements. This menu-driven program takes care of several bugs in AppleWorks 3.0, including printer problems, control-key commands, tab rulers in headers and footers, deletion of more than 255 spreadsheet rows, erratic behavior of open-apple key commands in the database, and file saves over locked existing files. It's freeware, available from most Apple user-group disk libraries, your local Beagle Buddy, on-line services, or the APA.

AW Macro: Here's a macro that stores the name of your current file in the string variable $1. This routine illustrates the use of macros to obtain information held at more than one memory address. The initial location at (decimal) 3158 stores the number of characters in the filename. The characters in the filename are stored in subsequent consecutive memory locations starting at 3159. Using a counter routine, the macro gathers the filename from as many bytes as there are holding the string and stops when it obtains all characters. We used TimeOut UltraMacros version 3.1 to create this macro.

```
start
N:<all : A = 3158 :          { Var A = location of string length }:
  L = PEEK A :               { Var L = length of character string }:
  E = A + L :                { Var E = last byte or end of string }:
  $1 = "" :                  { clears string variable $1 }:
begin :              { start loop, starting point after "rpt" token }:
  A = A + 1:                 { increments location for PEEK }:
  X = peek A:                { PEEKs current location }:
  $1 = $1+ chr$ x :  { adds current character to string $1 }:
if A = E then exit :         { tests for last, if last exits loop }:
  endif : rpt :      { or goes back to beginning of loop for next }:
  msg 'filename is ' + $1>!                { stops and displays
                                           filename in message } —
```

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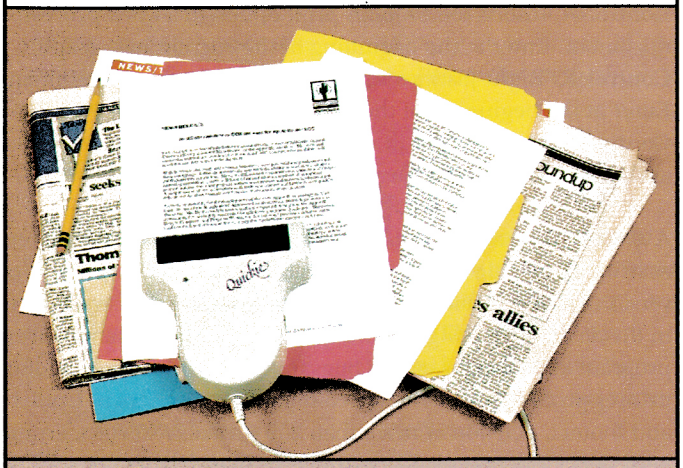

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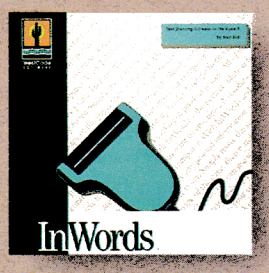

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National AppleWorks Users Group

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HYPERCARD IIGS

If you admire those who rise to a challenge, you've got to respect the representatives from America Online and GEnie who took on the task of creating a library of HyperCard IIGS freeware and shareware stacks. Armed with prerelease versions of HyperCard IIGS and HyperMover, the utility that converts Macintosh HyperCard stacks to HyperCard IIGS ones, they set to work. By the time HyperCard IIGS became available, a large number of stacks were available, too — and the number is still growing.

Let's look at some of the best of those already available. The **Quick Tutorial** stack by Sebastian Foti gives a guided tour of HyperCard IIGS, and defines and describes using its buttons, graphics and fields. **HyperTree**, by G.E. Griffin, helps you keep genealogy records. Just fill in the blanks to create your own family tree. For those who want to start keeping records on their computers, there's Tim Swihart's **Inventory** stack. It lets you keep detailed records of your possessions. If you want to keep checking-account information in HyperCard IIGS, make sure you get John K. Gibson's **HyperChecking** stack. If you'd like to keep track of all your CDs, try Hang Time's **CD Collection** database stack.

For those needing HyperCard IIGS for educational purposes, there's Joe Zobkiw's **Electronic Music Encyclopedia**, which provides definitions for nearly 200 computerized music terms, from *additive synthesis* to *waveshape*. William Josey has created a stunning stack named **Scan for Gold**, which provides resources for acquiring royalty-free clip art. Josey includes tips on achieving good results with a hand-held scanner, and describes several alignment tools. Brian Tao's shareware stack **HyperTable** is great for those studying chemistry; it presents an interactive Periodic Table of the Elements.

If you're interested in having fun with HyperCard, try Whit Crowley's HyperCard IIGS implementation of the classic **Eamon** adventure game or Jeff Rubinstein's **Horizon Philosopher**.

Finally, we come to a slew of stacks that will appeal to stack designers who need to examine and export icons, cursors, sounds, and XCMDs from one stack to another. If you want to design your own HyperCard IIGS stacks, Steve Bernacki's shareware **ResStation** and GS Bill's freeware **Free Resource** will help.

Chet Day and Hang Time's **Auto Scriptor** utility lets you program scripts with mouse clicks, and cut and paste the resulting script into your own stack. Whit Crowley's **Get Graphics** stack provides an easy way to add clip art and graphics to your stacks, and Jeff Davies' shareware **DBase to Stack** lets you import an AppleWorks database file into a HyperCard IIGS stack.

The stacks mentioned here are only the tip of the iceberg. Stay tuned, and keep on the lookout for more.

Write to Contributing Editor Joe Kohn at 166 Alpine Street, San Rafael, CA 94901. Enclose an SASE if you'd like a personal reply.

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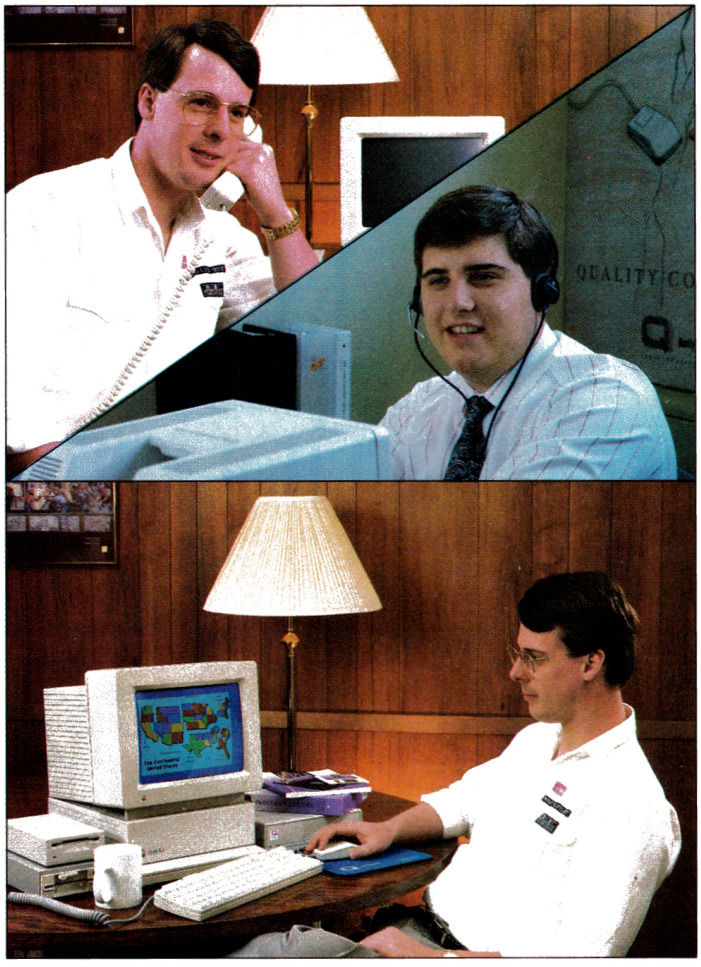

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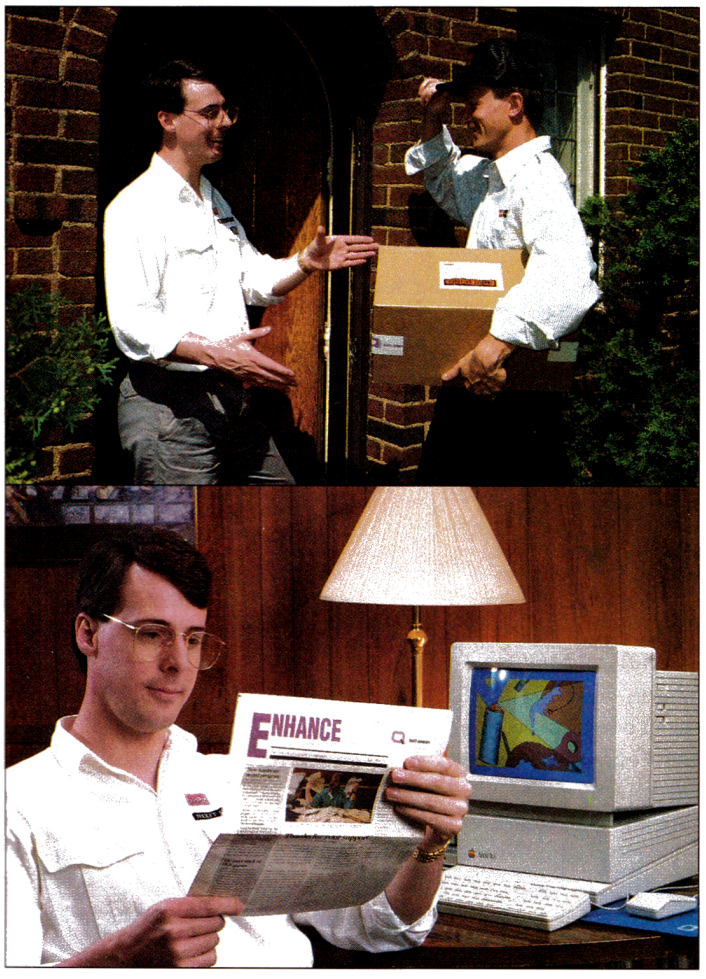

cal newsletter every other month. *Enhance* contains all the information you need to get the most out of your Apple II.

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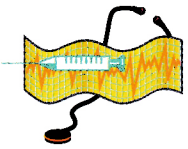

APPLE CLINIC

HEAT WAVE

When you turn on your system, it's like pouring hot water into a cold glass.

By CECIL FRETWELL

ON OR OFF?

CAN YOU SETTLE AN ARGUMENT? My friend never turns off his computer. It's on every day, all week. I claim it's better to turn off the system when you're done for an evening or a day. Who's right?

Kurt Aviary
Columbia, MO

I'd like to give you an answer chiseled in stone, but I can't. This is a much-debated subject with no clearly correct answer.

Some experts claim it's hard on the system to turn it off and on. If it's been off for quite a while, there's a surge of current when you turn it on that's mostly absorbed by the power supply. Electrical currents create heat, so when you first applypower, it's like pouring hot water into a cold glass. Some components are more susceptible to this cycling and burn out sooner than others. Any mechanical part of a computer system suffers more when you turn it off and on than it does under constant operation. A hard disk, for instance, consists of platters of metal coated with a magnetic material, and any increase in heat expands the metal, while any decrease contracts it.

After long periods of operation, though, heat is trapped under the cover and can't escape easily. There's some natural circulation of air through the computer box, and some of us use fans to reduce the increased heat. The problem with fans is that they're usually unfiltered and may drag dust and other pollutants into your machine. Your monitor also generates heat, and, unless you turn down the contrast or have software to clear the screen after a specified period of no usage, the phosphor on your screen may show permanent characters.

Take precautions you feel comfortable with. Don't put your computer in the trunk on a cold night, drive to your destination, take it out of the trunk, and turn it on immediately. Treat your system well and it will perform as expected.

CLASSROOM MONITORS

IN YOUR APPLEWORKS CLINIC response to Reese Crispen's question (February 1991, p. 30) about using a large classroom monitor to demonstrate computer programs with an Apple IIGS, you recommend a $425 amplifier. I've hooked up a large monitor to my GS by using a male RCA cable to connect the GS' *video out* to my VCR's *video in*. Set your TV to the VCR channel and turn on the VCR's power to put your computer program on screen. HyperStudio and Dazzle Draw graphics look great, but text looks fuzzy in 80-column mode. Although we use a GS, many of our IIe users also use a TV and VCR.

Judy Mulenburg
Mountain View, CA

Thanks, Judy. Feedback to Apple Clinic is greatly appreciated and helps us stay on track as we try to keep our readers informed.

BOOT IT UP

I HAVE THE LATEST OPERATING-system software for my Apple IIGS. I'd like to boot from a 3.5-inch disk and still have enough room on the disk to store other programs. What files and/or folders do I need to develop a basic boot disk with no bells and whistles?

Dana Cole
Stillwater, OK

To answer your question, I went straight to the horse's mouth — Technical Note 1 for GS/OS, *published by Apple Computer's Developer Technical Support division. From that publication I've extracted the following list of directories and files you'll need to support a basic system. You'll have to enhance it if you want to include extras such as AppleTalk, CD-ROM drivers, and so on. Here goes:*

- *for the root directory: PRODOS, BASIC.SYSTEM, and BASIC.LAUNCHER files, plus the System folder*
- *in the System folder: START.GS.OS, GS.OS, GS.OS.DEV, ERROR.MSG, TART, and P8 files, plus FSTS, DRIVERS, SYSTEM.SETUP, CDEVS, DESK.ACCS, TOOLS, and FONTS directories*
- *in the FSTS folder: PRO.FST and CHAR.FST files*
- *in the Drivers folder: APPLEDISK5.25 (if you have one), APPLEDISK3.5, UNIDISK3.5, or both, and CONSOLE.DRIVER files*
- *in the System.Setup folder: CDEV.INIT, TOOL.SETUP, TS2, TS3, RESOURCE.MGR, and SYS.RESOURCES files*
- *in the CDEVs folder: ALPHABET, GENERAL, KEYBOARD, MONITOR, MOUSE, and PRINTER files*
- *in the Desk.Accs folder : CTLPANEL.NDA file (optional: you can use Open apple-Control-Escape to get to the Control Panel)*
- *in the Fonts folder: FASTFONT file*

Thanks to Matt Deatherage at Apple Computer Developer Technical Support for his usual careful work.

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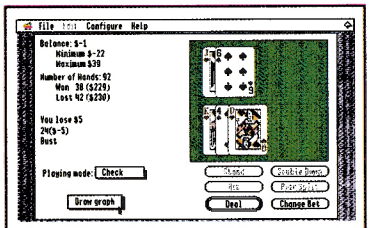

GS131 Black Jack Tutor v2.0: Learn to play BlackJack like the pros with this interactive tutorial program. The program tracks your winnings and will tell you when you make a wrong play. Also on this disk are Plasma 2, Xpurpose, FTA Plotting and Explore GS (lets you design your own adventure games.!)

IIGS Games

GS117 Star Trek Classic GS: Fire your photon torpedoes and laser, do short range scans and use your warp drives to defeat Klingon and Romulan star ships. It requires 1.5 Megs of RAM .

GS129 Games, Games, Games: Ten all new GS games including WordSearch, Cribbage, Elevators, Golden Bug, Poker and Backgammon.

GS110 Milestones 2000: You play mileage cards to advance your own auto while stalling your opponent with flat tires and accidents.

GS105 Space Clusters: This game is a clone of Galaxian. Use a joystick to shoot the invaders before they can swoop down and destroy your ship.

GS118 Memory Card Game: This disk contains a full-color GS version of the classic card game called Concentration. It's great for young children. Also included are Hearts and Wisconsin Rummy games.

GS103 & GS104 Cosmocade: On the first disk, you must Journey to Calibus in a fast-paced arcade style game. Part two is called Naxos. A joystick and 768K is required. This is a shareware game.

GS119 Columns Version 2.0: In this game which is similar to Tetris, you arrange falling blocks so that colors line up. Includes rock music background.

GS72 Cartus Primus Card Game: This disk contains card games for cribbage, pinochle, gin rummy, hearts, pitch, euchre and sheepshead.

IIGS Sound & Music

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GS94 Modulae: If you liked Nucleus, then you'll love this sound and graphic demo program which really shows off the IIGS.

HyperCard GS Stacks

All HyperCard Stacks require Apple's HyperCard GS program and 1.5 Megabytes of RAM.

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All HyperStudio Stacks require Roger Wagner's HyperStudio program version 2.1.

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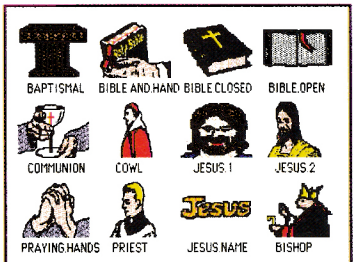

GS133 Religious Print Shop GS Graphics: An all-new collection of over eighty multicolor graphics for use with Print Shop GS. All of the graphics have a religious theme. This disk is shipped with a sheet showing all the graphics on the disk. Copyright (c) 1991 Big Red Computer. Only $3.50.

IIGS Graphics

GS07, GS08, GS29, GS35, GS77, GS78, GS100 , GS106 & GS123 Graphics, Fonts and Borders for Print Shop GS. Nine completely different disks for use with *Print Shop GS*. Each disk contains at least 72 graphics and most also have borders and fonts. Plus all of the graphics are also converted to SHR 640-mode color graphics for easy use with HyperStudio or HyperCard. A sheet showing each graphic is shipped with the disk. Each disk is only $3.50.

GS59, GS64, GS67, GS73, GS74, GS86, GS87 , GS98 & GS124 Super Hi Res Clip Art: These 9 disks contain clip art graphics that we either converted from the Mac or scanned in on the IIGS. They're great for use with *HyperStudio*.

GF01, GF02, GF03, GF04, GF05, GF06, GF07, & GF08 IIGS Type Fonts: A collection of GS-type fonts for use with most GS programs and *SuperFonts*. Great for dressing up word processing or multimedia presentations.

IIGS Utilities

GS127 Productivity PacK: This disk contains two full-fledged word processors: ElfWrite and GSXEdit. It also has El Macro, Chronos II, FindFile NDA. and several other useful programs.

GS120 Icon Mania: Everything you need to add new icons to the IIGS desktop. Two icon editors and hundreds of predrawn icons you can use.

GS47 GS/OS Goodies: Our all-time best selling disk. This disk contains over 20 brand new desk accessories including ShowPic, Screen Saver & Custom GS/OS. All work with System 5.0.4.

GS83 Customize GS/OS: Load fonts and desk accessories on the fly, plus A2.FX, Instant Icon, Finder.Patcher, and RunQ.

GS99 Twilight Screen Saver: This shareware CDev is a completely modular screen saver which operates under the Graphic Control Panel. This is a must-have program for all IIGS owners.

GS76 Productivity Disk: This disk is loaded with useful tools including Write-It!, a desk accessory which is a complete word-processing program.

GS93 IIGS Telecommunications: If you own a modem, you need this disk. It contains the GS-verison of Shrink-It plus a host of other telecomm programs.

All the disks listed above (plus hundreds more) are available from Big Red for only $3.50 a piece. Why pay more for public domain and shareware disks? And if you order ten or more disks the price drops even lower to only $3.10 per disk. All disks listed above are 3.5" disks and the price includes all shipping and handling fees (U.S. addresses only). You do not have to be a member to order. We also have a large collection of 5.25" disks for Apple IIe & IIc computers. Big Red has been in business for over nine years and is one of the largest distributors of Apple II public domain software in the world. We will be happy to provide technical support for any disk we offer. To order, write or call today. We'll ship your order within 48 hours. We accept MasterCard, Visa, school purchase orders, money orders and personal checks as payment. Please note: Some of the programs listed here are shareware. If you use these programs you're asked to make additional payment to the program's author. *Help Support Shareware!*

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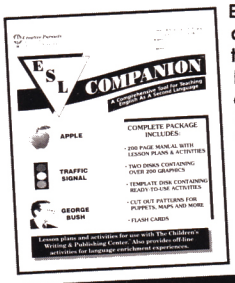

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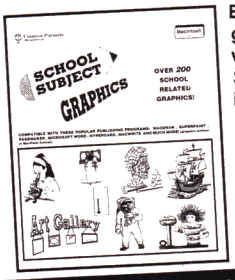

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SINGLES ONLY

I purchased a Brother printer to use with AppleWorks 3.0 on my IIe. Although all my settings are correct in AppleWorks, sometimes my printouts appear double- or triple-spaced. Can you help?

Some Brother printers interpret the return character (Control-M) at the end of the characters-per-inch code as a printer command; others don't. This makes the printer double-space text, even when you've set the Needs carriage return after each line to NO. Try this:

1. Go to Other Activities in the main menu, then select Standard Settings for AppleWorks. Proceed to Specify Information About Your Printer and Change Printer Specifications. (Be sure that the ImageWriter remains as the first printer at the #4 location and your printer is in the #5 or #6 location.)

2. After you've selected your printer, go to Interface Settings and hit Return. The interface setting in AppleWorks must correspond to your particular card. Common settings are Ctrl-I-80 for Apple cards, Ctrl-I-ON for Grappler cards.

3. Re-enter the code for 10 characters per inch without the return character. You should be able to print single-spaced output.

Here are some other fixes you can try:

1. Enter the code Escape-S in the 10-cpi and 6-cpi areas. The Escape-S command forces the printer to use the setting specified by the printer's switches for character pitch and line spacing.

2. Set the printer DIP switch that controls carriage returns and linefeeds so that no linefeed is sent at the end of each line.

ON THE RIGHT PATH

I recently updated to version 3.0 of AppleWorks from version 2.1. I'd been saving several word-processing files to a 3.5-inch floppy disk and one day received the message DIRECTORY IS FULL when I tried to save another file. I know there's plenty of room on the disk. What does this error code mean?

An AppleWorks volume can hold only 51 filenames. If you try to save a 52nd file, you'll be told the DIRECTORY IS FULL even though there are enough free blocks on the volume (disk) to save your file. The solution is to create subdirectories on your disk (volume). Subdirectories are directories of files within the main volume that aren't limited to the 51 files of the volume directory. To create a subdirectory:

1. Select Other Activities from the main menu and go to the third option (Create a Subdirectory).

2. AppleWorks asks for a pathname — a road map to get to the file. The order is /your.disk.name/your.subdirectory.name. The slashes are mandatory; a name must not exceed 15 characters in length; and spaces and symbols aren't allowed.

3. To save a file to a specific subdirectory, enter the pathname as follows: /your.disk/your.subdirectory/your.filename).

TAKING STOCK

I work for a small business and maintain our inventory database in AppleWorks 3.0. I want to generate a report to project next year's sales, including figures from the database, with a detailed explanation. Is that possible?

First, create your report from the data you have in your inventory database:

1. Press Open apple-P (OA-P) to print.

2. Choose the second option (Create a New Tables Report).

3. Choose From Scratch and type a name for the report. Call it Projections.

4. You may want to show category totals for your current sales. (You probably don't need individual order information.) Press OA-G to create a group-total definition. Press **Y** for Yes to print group totals only. You may want to create other category totals to show total dollar sales and other total revenues.

5. Press OA-P for Print.

6. Choose The Clipboard (for the Word Processor), and press Return.

7. Press the spacebar and Escape to the main menu.

8. Choose Create a New Document for the Word Processor and type your report. When you want to place your totals from the database report, press OA-O and enter **SM** for Set a Marker. Press Return. Type a **1**. (You can place any number of markers in this document by following the same procedure.)

9. Press OA-M for Move.

10. Press **F** (From Clipboard) and you'll see the database report on screen. You may want to make some formatting changes in the word-processor document.

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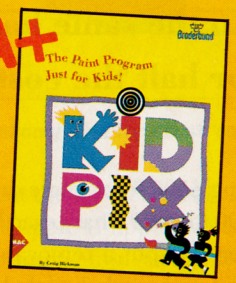

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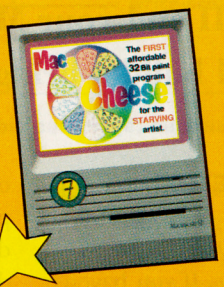

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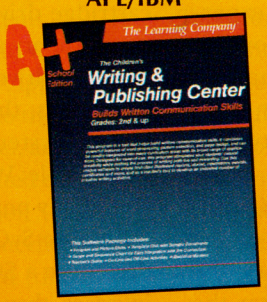

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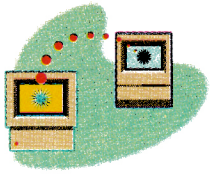


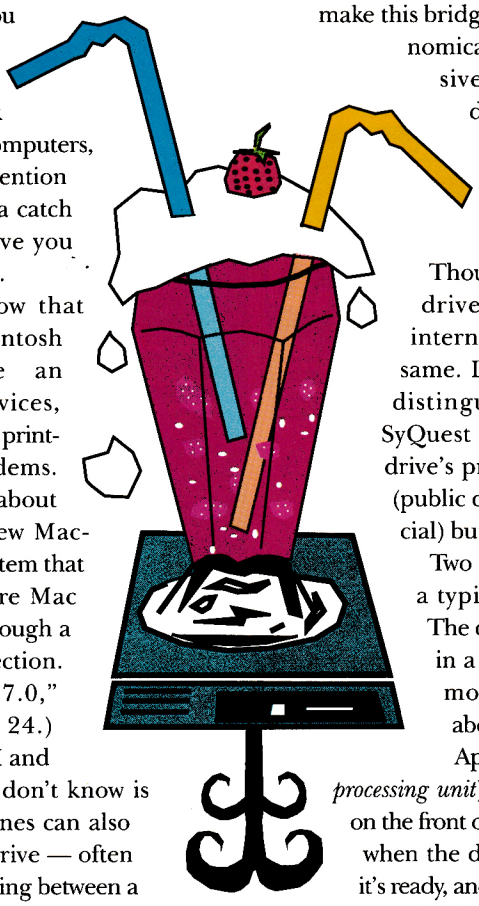
BRIDGING THE GAP

SHARE THE WEALTH

Hook up your II and your Mac to the same hard-disk drive and build a bridge for half the cost.

By GREGG KEIZER

DOUBLE DOWN, DOUBLE DUTY, double trouble, double drive. If you haven't heard that last one, don't worry. You're not out of the loop — I just made it up. But if you own Apple IIs and Macs and need a budget break as you equip your computers, you'd better pay attention to *double drive*. It's a catch phrase that can save you hundreds of dollars.



You already know that Apple II and Macintosh computers share an assortment of devices, from expensive laser printers to low-cost modems. And you've heard about System 7.0, the new Macintosh operating system that lets Apple IIs share Mac folders and files through a network-like connection. (See "Long Live 7.0," August 1991, p. 24.) What most Apple II and Macintosh owners don't know is that the two machines can also share a hard-disk drive — often the only thing standing between a bottom-line computer and top-flight productivity. That's no surprise — a hard drive is a pricey peripheral. But what if you could split the cost of a single hard-disk drive between two machines? Instead of paying $500 for a single drive, why not pay $500 for two? That's exactly what you'll do when you put a removable-cartridge disk drive on your desk, right between your Apple II and your Macintosh.

Low-cost removable-cartridge drives make this bridging feat possible economically. The least expensive and most popular drives all share a common mechanism and type of cartridge, both made by SyQuest. Though the name on the drive case may vary, the internal elements stay the same. In fact, often all that distinguishes sellers of SyQuest mechanisms are the drive's price and the software (public domain and commercial) bundled with it.

Two components make up a typical SyQuest system. The drive, usually enclosed in a metal case, looks like most hard-disk drives, about half as thick as an Apple IIGS CPU (*central-processing unit*). Two or three lights on the front of the case let you know when the drive has power, when it's ready, and when your computer is accessing it. The 5-by-5-inch plastic-shelled cartridge protects the hard platter inside — a rigid disk coated with a magnetic medium. A spring-loaded door keeps dust out when you're not using the cartridge, and slides open to let the drive's head make contact with the platter when you slip the cartridge into the drive. You can even write-protect the cartridge. (See **Figure 1.**)

SyQuest cartridges don't cost much because there's not much to them. Although the shell protects the platter, there's still a good chance that the platter will pick up more dust — something that's death to a hard disk — than a traditional fixed disk, which is sealed against contaminants. And you must handle a removable cartridge with care, much more than you would a floppy disk, for instance. Drop a cartridge on the floor and you may lose data.

Even with these caveats, a removable-cartridge drive is still a good choice as your primary storage device. Removable-cartridge drives are almost as fast as fixed hard disks, they can pull duty as quick backup systems, and they're infinitely expandable: When one cartridge fills up, you simply pop another in the drive.

Because SyQuest removable-cartridge drives use a SCSI (*small computer systems*) interface, they work equally well with both the Mac and the Apple II. A SCSI port is built into all Macintosh machines, but you'll need to install a SCSI card in Apple IIe and IIGS computers — an additional expense. Apple's own **High Speed SCSI Card** is the de facto standard, though CV Technologies' **RamFast SCSI** is significantly faster. Some drive sellers throw in a SCSI card; others sell the drive and card separately.

More than a dozen manufacturers produce SyQuest removable-cartridge drives for the Macintosh, but only a handful specialize in providing cartridges that are ready to run on Apple IIs. If you're sharing one drive between a Mac and an Apple II, stick with companies that know the II — firms such as American Micro Research, CMS Enhancements, Quality Computers, TMS Peripherals, and Tulin.

I unboxed a TMS Peripherals **ProR45** drive, plunked it down between the Macintosh LC and the Apple IIGS, and

Illustrations • Elizabeth V. Auer

had it up and running on both machines in well under an hour. The key to successful double driving is, of course, separate cartridges. Order an extra cartridge (most drives' prices include one cartridge) so that you have one for each machine. Remember, you're really sharing the drive mechanism, not the hard disk itself — that's inside the cartridge.

TMS, like most drive sellers, preformats the cartridges for you, putting the appropriate (and most recent) system software on the cartridge so it's ready to go when you stick it into the drive. As long as you specify one cartridge for your Mac, and another for your Apple IIe or IIGS, you shouldn't have trouble. Many vendors install public-domain and shareware software on the cartridge, too. Quality Computers, for instance, adds more than 15 megabytes of software to its Apple II cartridges, while TMS puts more than 19 megabytes of shareware on its Mac cartridges. You can wade through this software, tossing out what you don't want and keeping the gems.

Connect the SCSI cable to the drive, drop a SCSI board into your Apple IIe or IIGS, plug the SCSI cable into the board's port, turn on the drive's power, and you're ready to go. Grab GS-formatted cartridge and push it into the drive door. Shove the lever to the left, wait for the mechanism to spin the platter up to speed (the green *Ready* light will come on), and turn on your GS. As the computer boots from the drive, you'll hear the cartridge chatter for a moment. It may be noisy, but no more so than most fixed hard disks — you just hear it because the disk isn't sealed inside a metal box.

As far as you and your GS are concerned, the removable-cartridge drive is just another big, big disk. With GS/OS already in place, it starts up your computer in a fraction of the time it takes to boot from floppies. And you have 41.5 megabytes of space available on each cartridge, though restrictions require you to *partition*, or split, that room into sections no larger than 32 megabytes on an Apple II. When you fill one cartridge, you simply put a fresh one in the drive and run *Advanced Disk Utility*, the formatting and partitioning program that's included in the GS' system software.

Removable-cartridge drive file-access times are inherently slower than those of fixed drives, but the difference isn't significant for most Apple II applications. The TMS ProR45 running from an Apple High Speed SCSI Card, for example, turned in times only 17 to 23 percent slower than an internal Vulcan 40-megabyte drive (non-SCSI). Take a look at the accompanying **Table** for some typical time trials.

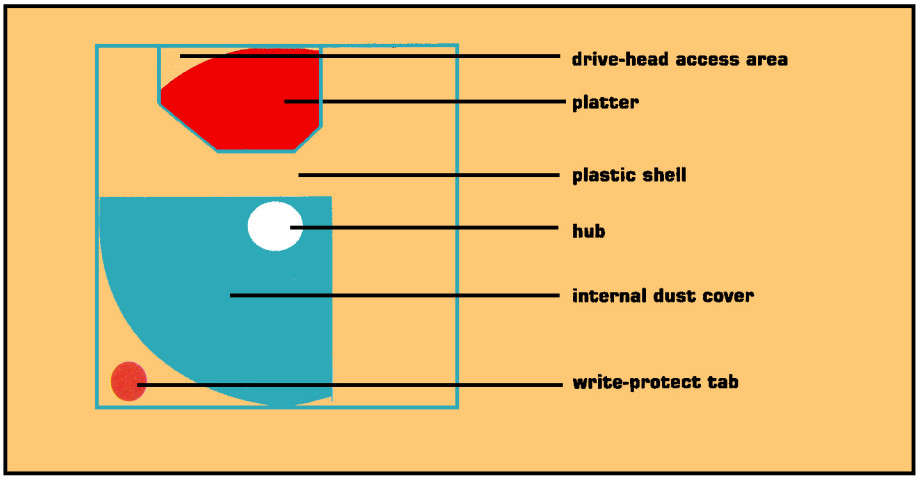


Figure 1. Anatomy of a SyQuest removable cartridge, cutaway view.

To switch the ProR45 from Apple IIGS to Mac mode, all you do is shut down the GS, turn off the drive, pull its cable from the Apple II and plug it into your Mac's SCSI port. Eject the GS cartridge, pop in one formatted with the System 7.0 operating software, and turn on the drive, then the computer. You've just done the double drive for the first time. (See **Figure 2**.)

With a new cartridge calling the shots, the Mac sees the ProR45 as a native-flavor hard-disk drive, ready with 41.5 megabytes of space. Treat it as you would any other hard disk to store your applications, games, educational software, and data. Most removable-cartridge drives come bundled with a formatting utility to prepare new cartridges, so adding disks to your Mac collection is a snap. (See **Figure 3**.)

Removable-cartridge drives offer another advantage over fixed drives: Not only can you change the drive from Mac to Apple II, but you can also turn it into a personal device. If several people use the same computer, each can work with his or her own hard disk. Everyone has his or her own cartridge, so that applications, files, fonts, and desk accessories don't get mixed up among users.

In a classroom, for instance, each student boots and works from an individualized cartridge; at home, you can keep your software separate from the kids'. Or you can segregate cartridges by application and purpose; the one you use for desktop publishing may be crammed with images and past page layouts, while the one pegged for word processing is filled with copies of every word you write. Not sure System 7.0 is right for you? Keep two cartridges handy — one holding the Mac's newest operating system, the other containing the older, more familiar software from the 6.x series. Need your Mac as an AppleShare file server only part time? Put AppleShare on one cartridge and your

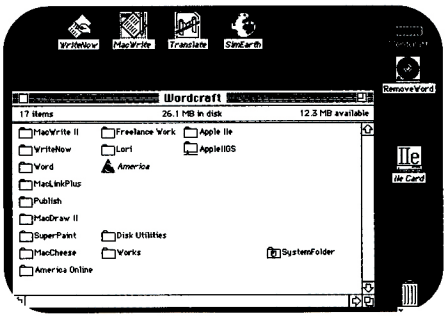


Figure 2. Switching to Mac mode.

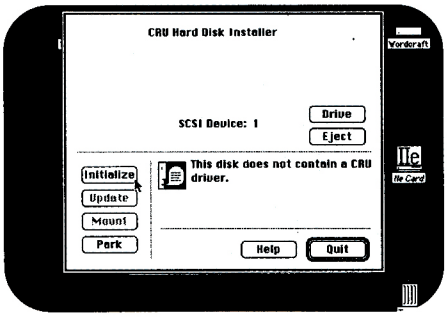


Figure 3. Mac formatting utility.

standard software suite on another. Double driving adds flexibility to your computers, neatly bridges the gap between Apple IIs and Macintoshes, and makes mass storage more affordable.

DOUBLE-BARRELED SYSTEM 7.0

If you're switching between a Mac and an Apple IIGS, you can eliminate the cable swapping and practice a different sort of double driving. System 7.0, the Mac's new network-friendly operating system, lets you share files and folders on the Macintosh with an Apple IIGS when the two computers are connected via the AppleTalk communications standard and its accompanying LocalTalk cabling. You can even copy network-ready Apple II software to the Mac's hard drive and run it from there when System 7.0's at work.

A removable-cartridge drive like the ProR45 can handle this extra workload. Because it's expandable, you don't have to worry when you move mass quantities of Apple II software to the Mac, nor when you start accumulating scads of files you're swapping between the Mac and the GS. And it's easy to customize cartridges for special needs. One cartridge can contain a few basic Mac applications, leaving the rest for Apple II-related files and programs. A second cartridge can be Mac-dominant, with room for only a sampling of Apple II data. Just call on the appropriate alternative when the situation warrants.

Files crawl over AppleTalk, so expect delays. That's especially true when you're using a removable-cartridge (in other words, slower) drive. Opening AppleWorks GS over AppleTalk under System 7.0, for instance, takes exactly twice as long as it would if you had the ProR45 drive connected directly to the GS.

You'll save the cost of a SCSI card if you share a removable hard disk with System 7.0, but you'll have to spend most or all of that money to link your computers with LocalTalk cable. Still, it does give you some of the versatility of double driving without forcing you to keep the two computers together. That might work best at home. Say the Mac is in your office and the GS is up in the kids' bedroom; the machines are hooked up with Farallon's **PhoneNet**, AppleTalk-compatible connectors that use existing phone wiring to transmit data. When you're done working on your Mac, simply slip in the cartridge that contains games, educational programs, and school applications, then tell the kids they've got the run of the Mac and the shared disk. They can't get to the family finances, because that program and its files are stored safely on another cartridge. System 7.0 file sharing always makes sense when you split time between Apple IIs and Macs. Add a removable-cartridge drive to the Mac and you've constructed an even better bridge.

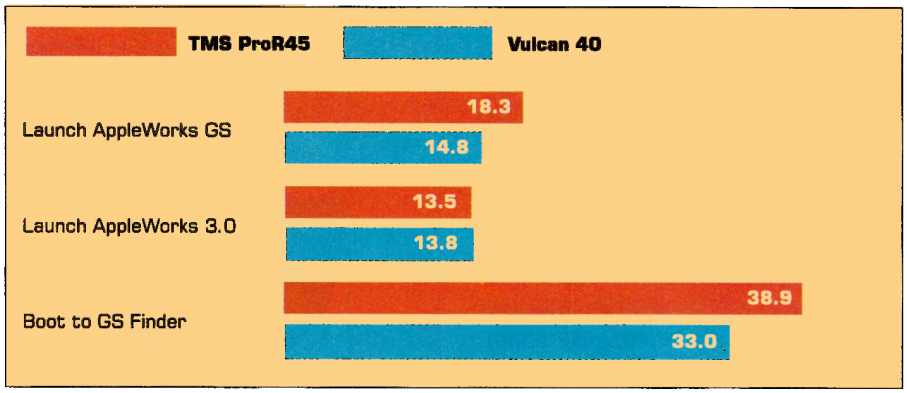


Table. Benchmarks (time in seconds).

The economics of double driving are simple: You get two drives for the price of one. If you're getting ready to add a Macintosh to your Apple IIe or IIGS and you're planning to share a drive, your current best bet is a stripped-down Classic. For less than $900, you can equip your desk with a Mac Classic, complete with a 1.44-megabyte floppy disk, 1 megabyte of RAM, and a SCSI port at the back. Another $500 gets you a TMS ProR45 removable-cartridge drive and two cartridges. Spend $130 more for an Apple High Speed SCSI Card and you're ready. The total bill comes to under $1500, for a new machine and a drive you can use with all your computers. Removable-cartridge drives work fine with the Macintosh LC, of course, but because that computer comes with a 40-megabyte hard disk of its own, double driving simply adds another storage device to the system.

Whether you're adding onto existing machines or considering a future Mac purchase, keep double driving in mind. It's one of the smartest bridges you can build. ❑

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★ ★ ★ ★ ½

If you've been fishing for a large-storage-capacity hard-disk drive for your Apple IIGS, brace yourself. Thanks to Tulin Corporation, you can reel in a big one — at less than $5 per megabyte (MB). After evaluating the company's 120MB Half Shell drive I was favorably impressed with its features and performance, as well as its overall value. Accustomed as most of us are to bulky external Apple II hard drives, you'll be pleasantly surprised to discover that the 120MB Half Shell, despite its huge memory capacity — the equivalent of about 150 3.5-inch disks — is no larger than a medium-sized paperback book. It's so small that the SCSI connection seems gargantuan by comparison; weighing a scant two and a half pounds, the Half Shell is one of the most svelte hard drives around. And not only is it petite, it's quiet. Without any scientific measurements of the unit's decibel level I'd be hard pressed to say which is quieter: the fan in the Half Shell or the one in my Kensington System Saver IIGS. (The hard-disk drive in my PC compatible out-hums them all.)

The Half Shell comes with a 25-watt AC adapter and a 6-foot-long cord, but it requires so little power that if you want to take your Half Shell on the road, you can just plug it into your vehicle's cigarette lighter, thanks to a special adapter available for $15. (A carrying case is included free with each drive.) Under ordinary circumstances, though, GS users simply need a vacant household electrical receptacle or an auxiliary outlet on a System Saver IIGS or other power-control unit.

A SCSI cable tethers the Half Shell to your Apple II High Speed SCSI Card, which is included in the price of the drive. (For an additional $89 you can substitute CV Technologies' RamFast SCSI Card.) Installing the GS SCSI card's a snap: Just insert it into the recommended slot (7) and attach the SCSI cable. Set the *Startup Slot* on the GS Control Panel to 7 and the GS/OS operating system installed on the Half Shell boots automatically — just turn on the Half Shell first, then turn on your computer. The Half Shell comes preformatted with GS/OS version 5.0.4 and Tulin includes Apple's System and Utilities disks, so it's essentially a "plug and play" peripheral for most GS users.

But users typically invest in a hard-disk drive for speed as well as convenience. During the evaluation period for this review, popular programs such as AppleWorks 3.0, Publish It! 4, AppleWorks GS, and HyperCard GS loaded from the Half Shell in one-quarter to one-third the time it took to start them from 3.5-inch disks. AppleWorks GS, for instance, took 52 seconds (and two disk swaps) to load from a 3.5-inch drive, but only 18 seconds from the Half Shell. According to Tulin, the Half Shell's access time is a fast 19 milliseconds (thousandths of a second).

Although only close scrutiny would reveal blemishes and oversights, the evaluation

Photography • Larry Dunn

unit's fit and finish was a little disappointing. The unit's power switch was unmarked, although a screw located near the "on" position was painted red. The port (a glorified hole really) through which you access the SCSI ID jumper blocks was poorly machined, leaving rough edges and an unfinished look. Unless you request otherwise when you place your order, the Half Shell is "internally terminated": You must locate it at the end of your SCSI chain. For example, we couldn't have daisychained a second hard drive — or any other SCSI device, such as a CD-ROM player — to our Half Shell evaluation unit as shipped.

While these defects perhaps won't sway you, one Half Shell feature may mystify you: The LED (light-emitting diode) that flickers during drive access is recessed within one of the dozen air vents on the right-hand side of the unit. Unless you customarily stack your disk drives to the left of the GS (as "southpaws" do) you won't be able to see the LED. Believe it or not, I had trouble finding the LED during my initial inspection and would like to see the indicator relocated to the front panel.

The unit's documentation, a meager six pages, is merely adequate. Instructions cover the basics of setting SCSI ID numbers and using Apple's Advanced Disk Utilities to re-initialize and repartition the drive should you want to do so, but the documentation fails to describe the recommended procedure for shutting down the system at the end of each work session. Nor does the documentation mention the importance of frequently backing up data stored on your drive. Because hard drives are so deceptively simple, we'd like to see "care and feeding" aspects covered more thoroughly.

Tulin Corporation doesn't have a toll-free telephone number, but technical support is free. I received courteous treatment when I called with what, in retrospect, was a dumb question. I had misread some instructions; the blooper was clearly my fault, but you'd never know it from Tulin's polite response. If a unit does require servicing, Tulin charges a $25 diagnostic fee to evaluate the problem. Though no Half Shell drive has required it so far, a typical repair might run $100 to $150 for a 120MB unit. If data can be recovered, Tulin charges $50 per hour for that service, as well.

Because you must order the Half Shell directly from Tulin Corporation, you won't encounter further mail-order discounts on the unit. At press time, mail-order advertisements for large-capacity drives from competitors couldn't match the price of the120MB Half Shell.

If you'd like to enjoy the speed and convenience that come with owning a hard drive, consider investing a few "clams" in a Half Shell. A 120MB unit virtually ensures that your programs and data — unlike shellfish — won't have to worry about outgrowing their home anytime soon.

Cynthia E. Field, Ph.D.
Wakefield, RI

MICKEY'S CROSSWORD PUZZLE MAKER

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★ ★ ★ ★ ☆

Mickey's Crossword Puzzle Maker is a versatile, fun-filled program designed to build word-power muscle and spelling clout by encouraging children aged 6 to 11 to create and solve crossword puzzles. The application is flexible, challenging, and easy to play, and even beginning readers will get a lot of enjoyment from it.

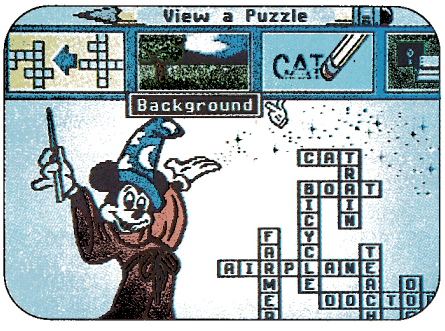
Puzzle Maker consists of several activities. Youngsters solve puzzles created by the computer, edit clues or add new words to existing puzzles, and generate new puzzles with word and picture clues. All activities strengthen reading, vocabulary, and language skills in an entertaining way.

On-screen menus, picture menu bars, and optional on-line instructions provide program directions. Puzzle hints and help messages for new users are always available. Crossword Puzzle Maker offers mouse support, but in the absence of a mouse, simple keystrokes move the cursor through menus or around a puzzle board. Popular Disney tunes, familiar Disney cartoon characters, and an animated fireworks display offer audiovisual encouragement. Children can play any of several puzzles, including one of eight Disney themes. This activity tests Disney cartoon mavens on their knowledge of classic favorites such as *Bambi*, *Cinderella*, *Dumbo*, *Peter Pan*, or *Snow White*.

The Surprise Puzzle activity offers four levels of play. The easiest, Level 1, generates puzzles of four to eight words. Children just learning to read will appreciate the large print of the puzzle words. Level 2, for kids aged 8 and 9, creates puzzles with eight to 20 words. Level 3 offers puzzles of eight to 20 words for kids aged 10 and 11 (but even adults will find Level 3 challenging). A fourth option, called "Mixed," uses words from all three levels to construct puzzles. Players can stop any game in progress, save it to disk, and resume where they left off at a later time.

Youngsters can play alone (noncompetitively), against a friend, or against one of three computer opponents — Goofy, Donald Duck, and Mickey Mouse. Goofy makes a lot of spelling errors. Donald is better than Goofy, but not as smart as Mickey. It's easy to win a game against Goofy, but difficult to match wits against Mickey.

You can print any crossword puzzle — a feature that comes in handy when several children want to play a game simultaneously or when you're preparing for a birthday party, sleepover, or long car ride. Print formats are many and varied. You can generate conventional puzzles with empty squares at the top of a page and word clues at the bottom; puzzles with blank squares, word clues, and a list of correct answers



Mickey Mouse teaches word power.

to help with proper spelling; or puzzles with letter hints — vowels, first letters, last letters, or a particular letter combination, such as *th*, *ph*, or *ai*.

Puzzle-editing options let kids or adults customize existing puzzles by adding new

words, selecting picture clues from the program's clip-art library of nearly 200 images, and modifying word clues. In addition, you can create totally new puzzles, using words from the program dictionary or a vocabulary list of your own choosing.

Mickey's Crossword Puzzle Maker is an excellent choice for parents and teachers who want to improve word mastery in elementary-school-aged children. Nevertheless, some program characteristics detract from overall user satisfaction. For example, Puzzle Maker's off-disk copy protection lets you make archival backups for safekeeping, but requires challengers to answer a question before play. Children look for the solution on a "Creative Crossword Ideas" sheet; unfortunately, the maroon color of the paper coupled with its poor print quality makes text hard to read. It's a real strain to come up with the right answer.

While the package includes both 3.5-inch and 5.25-inch floppy disks, running the program from 5.25-inch floppies will make you want to purchase a 3.5-inch drive. Constant disk swapping with 5.25-inch floppies slows down program operation and minimizes its usefulness in the classroom. Moreover, because Puzzle Maker lacks a quit command, hard-disk users must reboot to return to the program selector.

Puzzle Maker combines an amazing number of powerful features in one inexpensive package. It's a multilevel game, language-arts learning tool, and puzzle-construction set all rolled into one. You'll find 3.5-inch and 5.25-inch floppy formats, a well-written manual, a *Quick Start* card for instant reference, and a menu/icon-driven interface so intuitive you may banish all printed documentation to the bookshelf after your first workout. For rainy-day fun, as a party activity, or as an entertaining supplement to conventional classroom instruction, this product is a winner.

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★ ★ ★ ★ ☆

I never thought it would happen to me. It's a sunny Saturday afternoon in mid-June, and I'm sitting at my Macintosh playing HardBall II — indoors. I've always been a sucker for a good computer baseball game. But is HardBall II good enough to make *you* forgo summer fun to play an electronic doubleheader? If you're a baseball junkie, you can lose yourself for hours in HardBall's arcade action and team-creating, drafting, and editing features. Even if you're not a sports addict, you can boot it up and be playing a game in minutes.

For a couple of reasons, it's difficult to be too critical of HardBall II. First, among computer sports games HardBall is a

Continued on p.60

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THE LIGHTER SIDE OF EDUCATION

When it's time to take a break from the books, Apple II and Mac games keep kids thinking. Whatever the subject, colorful animation and interactive play help make learning fun.

For generations of people young and old, the word *education* conjures up that timeless image of a reluctant child being "coaxed" to the school bus by an unsympathetic parent clamoring, "School isn't *supposed* to be fun."

You'd still be hard-pressed to find a youngster who admits to preferring long hours in a classroom over playtime or "hanging out," but in the last ten years or so the Apple II and the Macintosh have added at least some element of fun to traditional education. In fact, today's software is so sophisticated that it manages to teach without students even realizing they're learning.

Make no mistake — just as the classroom isn't a place for all fun and games, your Apple is more than a tool for entertainment. The II and the Mac wear many hats: creative facilitators, promoting cooperative learning among children who work together in teams; remedial-education aides, patiently tutoring students who need to review difficult concepts; reference tools, as kids go on line to look up information in electronic encyclopedias, dictionaries, and databases.

Today, however, an increasing number of teachers also use computers as rewards, encouraging students to "play" with the machines during free time. The programs they use resemble entertaining video-arcade games more than the educational software associated with traditional classrooms.

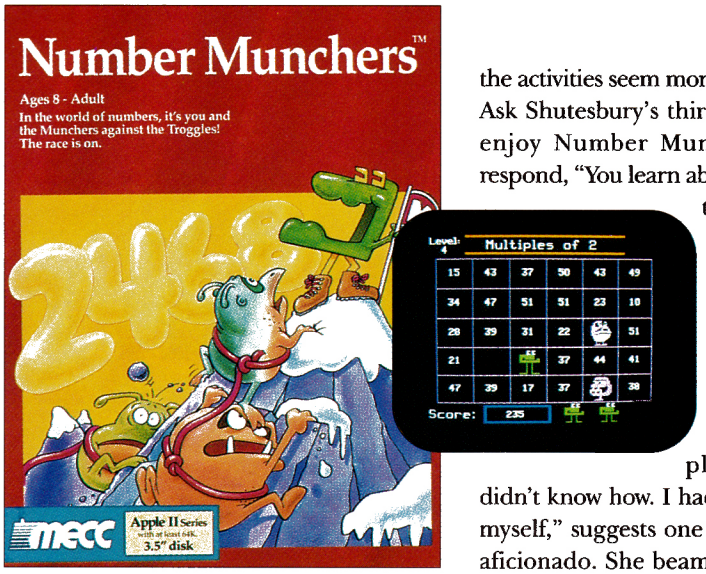
Are today's teachers getting soft? Have they given in to the MTV genera-

By CAROL S. HOLZBERG, Ph.D.



Photography ✻ Mark Alcarez


WALLIS



Math's a hit with kids of all ages, thanks to Number Muncher's graphics.

tion? Not at all. Educators have simply realized that many programs that are entertaining also offer a range of inherently educational features. Several computer games on the market, in fact, do a better job of reinforcing basic skills than software designed specifically to teach them. These learning games motivate students to solve problems in ways not possible with conventional educational software.

For example, at the Shutesbury Elementary School in Shutesbury, Massachusetts, some educators use computer games with kids who may otherwise have a tough time grasping basic math concepts. Teacher Ken Lindsay says one such third-grader was so "turned on" by MECC's venerable Number Munchers that she drew up and studied all factors from 1 to 20 so that she could achieve higher scores at the computer.

Judy Nerbonne, the school's special-education teacher, points to success with Number Munchers as an important achievement for one 10-year-old student with cerebral palsy. Normally, the child has a short attention span, says Nerbonne, but when she "plays at the computer," she can sit for longer periods of time. "It doesn't matter if she fails," Nerbonne adds. "It's just she and the game. She keeps trying because it's a challenge she can meet and succeed at in a private way. The game format is relaxing, and it's helping her develop hand/eye coordination by strengthening her fine-muscle control."

BETTER THAN RECESS?

Frequently, kids choose to stay indoors at recess to play computer "games" because the activities seem more like fun than work. Ask Shutesbury's third-graders why they enjoy Number Munchers and they'll respond, "You learn about factors and multiples and have fun at the same time." Yet, in the process of having fun, they're also "working" hard to understand how to solve problems. "The first time I played the game, I didn't know how. I had to figure it out for myself," suggests one Number Munchers aficionado. She beams with pride as she recounts her high-score achievements.

"Games instill confidence," suggests Bob Dihlmann, another Shutesbury teacher. "Children don't hesitate to step in and help each other. The software builds self-esteem because students act like teachers or parents with one another, explaining how a program works or trouble-shooting to solve problems when programs don't operate as expected."

Paul Reese, computer coordinator at the Ralph Bunche School in central Harlem, also finds that computer games help build social skills. Most children who pass through his computer labs come from disadvantaged homes and don't have the support or background experiences to help them excel at school. These kids flock to the computer rooms before school starts in the morning and after school is out in the afternoon. "Kids who are often very disruptive in class and not able to relate to peers in the kind of structure that most of our classes have," Reese explains, "will come into a room with computers and work very calmly even when there are a lot of kids around."

Many teachers use learning games to introduce and reinforce a variety of basic skills. While some programs emphasize math, others develop logical reasoning. Some are convenient educational supplements in courses dealing with history, earth science, social studies, or language arts. Not all game software is suitable for the classroom, though.

"It's important to get kids away from having to make decisions that are either right or wrong," says Paul Dye, a teacher at Sunnyside High School in Tucson, Arizona. Good software promotes higher-level thinking skills, Dye suggests. It requires kids to determine an outcome based on the degree to which an answer makes sense.

Games are also are a great way to introduce youngsters to computers and ease anxiety about the technology. "They see the computer as something they can master," Dye says. "They recognize they're in control. It puts them in charge of their own learning."

This month, *inCider/A+* examines several popular computer games that double as classroom aides. These aren't education products with some slight entertainment value added to disguise a drill-and-practice approach: Even if you weren't interested in teaching or learning anything, they'd stand up well as pure fun. While the programs — some new, some not so new — are hits in school, they also serve double duty as home-education products. Whether you're a parent or a teacher, if you want to supplement a child's learning with software that teaches while it entertains, read on. All of these selections emphasize the lighter side of education.

HISTORY COMES ALIVE

Requiring students to memorize names, places, and significant dates is a deadly pedagogical technique — guaranteed to stifle any possible appreciation for history. Challenging youngsters to match wits against the computer by playing **Revolution '76**, **The Oregon Trail**, or **Gold Rush**, though, could be just the stimulus you need to encourage exploration.

Britannica's Revolution '76 transports players to a big turning point in American history — the years 1773 to 1783. "It's a powerful educational tool," suggests Shutesbury's Ken Lindsay, "because it focuses on political, economic, and international circumstances, in addition to military battlefield strategies." Players must select generals, recruit an army, plot military maneuvers, and engage in diplomatic gambits with the French to defeat the British.

The object of the game is to win the war. Yet the simulation can end in military victory for the British if players ignore significant political, economic, and historical details. Motivation to win prompts students to read more about colonial America, the crises leading up to America's struggle for independence, and military and political events of the Revolution. A 62-page historical guide is included for reference.

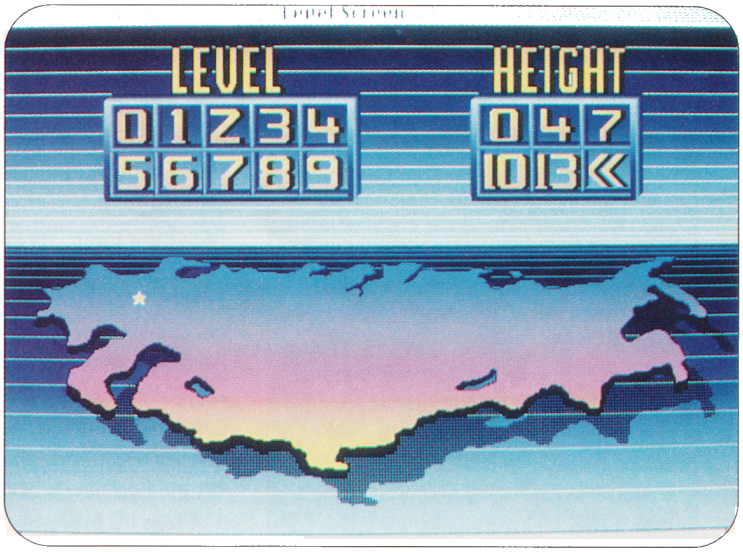
Jon Bennett, fourth-grade teacher at East Side Elementary School in Bluffton, Indiana, uses MECC's Oregon Trail to teach his students about the experiences of America's overland emigrants during the pre-Gold Rush years of 1840 to 1848. The program's focus on westward pioneering helps focus his unit on Indiana history, but the software is more than just an electronic exercise. Students must use math skills to plan the trip — making decisions about a variety of events and conditions that affect the progress of their journey. Successful "pioneers" are the ones who work cooperatively and learn from their mistakes.

In December 1990, Bennett and his students celebrated Oregon Trail Day at East Side Elementary. Everyone dressed up as pioneers, cooked an Oregon Trail stew, and decorated the cafeteria cooking cart to look like a chuck wagon. "On that day students had a chance to work together in groups to get to Oregon," says Bennett. "All groups made it. In the process, they learned a lot of good content, several vocabulary words, some first-hand history, and also problem-solving skills"

The event was so successful that Bennett expects to make Oregon Trail Day an annual event. It's a great way to develop cooperative-learning skills while giving youngsters a real sense of the perils involved in making the overland journey from Independence, Missouri, to Oregon City in the mid-19th century.

If your students like action and excitement, send them on an adventure with Sierra's Gold Rush. This software may be the best way to stimulate their interest in the years 1848 to 1853, when gold seekers from all over the world traveled by land and sea, hoping to strike it rich in California. Players take on the role of Jerrod Wilson, a mild-mannered East Coast gent who leaves his job as a reporter for a small newspaper in Brooklyn Heights, New York, to seek his fortune out West. History comes alive, as youngsters accompany Jerrod on his journey.

Gold Rush features three travel routes, each fraught with peril. Players can journey by sea from the East Coast south to Rio de Janeiro, around Cape Horn and up to San Francisco; they can proceed over land across the United States by stagecoach, steamboat, and wagon train; or they can travel by ship to the Gulf of Mexico, over land by foot through the treacherous Panama jungles, then up the coast by boat. With every expedition youngsters learn something about map reading, the history of the Gold Rush era, and the life and times of the people who lived on the American frontier. An 88-page guide to the period, called *California Gold: Story of the Rush to Riches*, provides a valuable supplemental reference.



Youngsters can work on developing hand/eye coordination and observation of spatial relationships with Tetris.

IT'S ONLY LOGICAL

What do **BlockOut** (California Dreams), **Tetris**, and **Welltris** (Spectrum Holobyte) have in common? Each is an arcade-style activity that builds hand/eye acuity while encouraging youngsters to solve visual puzzles. Many teachers find that the nonviolent challenges of these mind teasers motivate students to think quickly and develop an appreciation for spatial relationships. Kids must come up with logical strategies to win — but because these video activities are also entertaining, they combine fun and learning in one enjoyable experience.

The basic objective i the same for all three programs: Challengers must move, flip, rotate, and otherwise manipulate falling block formations to complete layers with no blank spaces. Completed layers vanish from the screen, adding points to a player's score; incomplete layers accumulate. The game ends when the screen fills to the top. BlockOut and Welltris are more difficult than Tetris because they add a three-dimensional perspective to the geometric challenge.

In **Faces** (also from Spectrum Holobyte), game pieces consist of face segments that players must stack correctly (forehead to eyes, mouth to chin, for example) to score points. The more faces a player assembles, the higher the score. Completed faces are removed from the screen, leaving more room to maneuver. The game ends when a column of incomplete faces reaches the top of the play area.

Pipe Dream, from Lucasfilm's games division, is another fast-action shape manipulation game, sharpening visual skills and improving hand/eye coordination. While it ranks as classic arcade entertainment, it doubles easily as a spatial strategy puzzle.

Players build a continuous pipeline from various shapes that appear on screen, all the while trying valiantly to stay ahead of the gunky "flooz" that oozes through the line. The game ends when the flooz flows through the last piece of pipeline. Players earn points for each piece of pipe the flooz passes through. You can't rotate game pieces, but you have to plan ahead to use up all the pipe segments. This plumber's nightmare is a great way to help kids build visual-thinking skills.

For younger children and slower learners who may not be able to work fast enough to manipulate moving shapes, several games improve visual-thinking abilities and increase powers of observation without penalizing players for taking time to think. Beginning readers, for instance, will delight in Sunburst's **Memory Building Blocks**, a simple concentration game that develops visual- and auditory-memory skills.

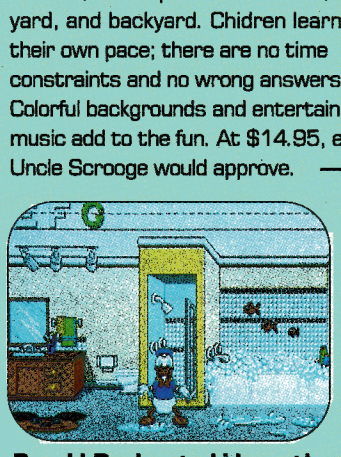
Players try to find matching pairs of pictures, words, shapes, colors, and tunes; they win by remembering what they saw and where. "It's interesting how many of our special-education and younger students in grades 7, 8, and 9 choose to play [Memory Building Blocks]," says Paul Reese. "Many of these kids [have] learning [disabilities] or problems functioning in school. They seem particularly interested in games like that, maybe because the activities are nonthreatening. [They] feel good about themselves."

DISNEY MAGIC

"Mickey" isn't short for "Michelangelo" and "Donald" doesn't trip off the tongue like "Donatello," but Walt Disney's wacky animal heroes are still the best-loved cartoon characters in town. They may be pushing 50, but they're plenty young at heart — gone high-tech, in fact, as they get ready to help your little ones build alphabet, reading, spelling, and vocabulary skills on the Apple II.

A built-in dictionary of more than 500 words and word clues plus 150 picture clues gives **Mickey's Crossword Puzzle Maker** an appealing variety for kids in kindergarten through third grade. Chidren can choose to make up their own puzzles, solve one of the puzzles they've created and saved, or try their hand at a predesigned puzzle or one featuring clues related to Disney characters. Kids can play alone or pick an opponent — a friend, the computer, or Goofy, Donald Duck, or Mickey Mouse. Kids can choose from a number of Disney graphics to create backgrounds and borders and can print puzzles in color or black-and-white. An easy-to-use picture menu bar, 20 familiar tunes, a selection of trivia puzzles, and dazzling on-screen "fireworks" grab youngsters' attention and keep the challenge interesting. Suggested retail price is $39.95.

For preschoolers just starting their ABCs, **Donald's Alphabet Chase** has everyone's favorite quacker rounding up "alphabet pets" on the loose from his nephews' toybox. The action takes place in six familiar locations around the house — living room, bathroom, kitchen, the nephews' bedroom, front yard, and backyard. Chidren learn at their own pace; there are no time constraints and no wrong answers. Colorful backgrounds and entertaining music add to the fun. At $14.95, even Uncle Scrooge would approve. **— E.T.**



Donald Duck puts kids on the trail of their ABCs.

Baudville's **Mad Match** is still another entertaining game that builds visual-perception skills. The computer presents six images on screen; players must find the matching pair. The youngster who locates the highest number of matching pairs before time runs out wins the game. At successive levels of difficulty, pictures become more complex visually and increasingly difficult to discriminate. The game can be played with or without a timer, by one or two people, and at "Beginner" or "Eagle Eye" levels of difficulty.

A step up in sophistication are **Shanghai** (Activision) and **Ishido** (Accolade), games of strategy, memory, and luck. Both build logical-thinking and visual-discrimination skills. Each can be played with or without a timer, in solitaire mode, or against a friend.

Shanghai, based on the ancient Chinese game mah-jongg, requires players to remove matching pairs of tiles from a "dragon"-shaped board with 144 pieces. Ishido challenges youngsters to place 72 stones on a 96-square game board so that adjacent pieces match either by symbol or color; to become an Ishido Master, challengers must create as many four-way matches as possible.

Shanghai and Ishido are simple to play, but difficult to win: You have to plan ahead to anticipate possible moves, or you'll be left with unplayed pieces when the game ends. Kids enjoy the chance to maneuver and make choices; even youngsters who don't have strong reading, writing, or math skills can relate to these games because they offer a number of opportunities to come up with viable solutions.

Many popular video-arcade games are simply mindless electronic shoot-'em-ups. That's not the case with the computer version of **Stratego**, however — a faithful electronic rendition (from Accolade) of the popular Milton Bradley board game. While children who play Stratego participate in familiar "boom and doom" maneuvers, they use a complex array of army pieces, bombs, spies, and flags to devise offensive and defensive strategies.

As you may remember from your days of playing the classic board game, opponents set up their 40-piece armies on opposite sides of the battlefield and advance in the direction of the enemy's camp. Higher-ranking pieces outflank and capture those of lower rank. Players lose pieces if they attack a bomb by mistake. Victory is achieved when a strategist captures the enemy flag.

Unlike chess, Stratego doesn't identify a game piece until it's attacked. Skillful players can determine the location of an opponent's flag by observing how pieces are deployed. Stratego is a game that requires careful tactical planning; it encourages youngsters to devise strategies and decipher clues. When they play against the computer, kids are challenged to match wits with a formidable military tactician.

SAVING THE WORLD

Computer simulations make it possible for children to role-play, investigate new experiences, solve problems, and participate in potential real-life situations they might never encounter otherwise. A number of these programs promote higher-level thinking skills because youngsters must access information, analyze it, synthesize it, and come up with a plausible conclusion.

"The key to good game software is that a team must work together cooperatively to solve a problem," says Gail Morris, a ninth-grade physical-science teacher at J.M. Alexander Junior High in Huntersville, North Carolina. "When my kids go out into the work force, they're not going to end up sitting in a corner by themselves. They're going to have to work with others." Computer simulations encourage students to work in teams.

Two of the most popular computer simulations in classrooms today are **Balance of the Planet** and **SimCity**. Both were sold initially as games, but teachers quickly saw their value as interactive educational tools. Balance of the Planet, written by Chris Crawford and distributed by Accolade, focuses on global environmental issues. Youngsters must grapple successfully with a variety of factors affecting the quality of life on earth — industrial development, pollution, acid rain, global warming, and nuclear accidents, among other things.

As High Commissioner of the Environment, a player has the power to tax a variety of revenue sources (industries, for instance) and grant subsidies to worthwhile causes, such as solar energy. Any move provokes a ripple effect throughout the system, though: By the time the game ends, events may not turn out as originally planned.

In SimCity, from Maxis Software and distributed by Broderbund, players design



SimCity lets students collaborate and coach each other in ways textbooks just can't accommodate.

and build a thriving metropolis, complete with roads, houses, stores, parks, and factories. The quality of city life depends on how well players juggle all variables. If life becomes too difficult for the Sims (simulated citizens) because of unemployment or high taxes, they may decide to move out; city life deteriorates even further and players eventually lose the game.

Paul Reese says SimCity is popular with his students. At first, they played the game without devising any strategy — they simply enjoyed creating their own environment and moving objects around. Eventually, however, they ran into obstacles, and the challenge lay in figuring out a workable plan.

"Kids will play SimCity several times before they realize that building all those roads or nuclear-power plants doesn't help — they have to build other things as well," Reese explains. "So they look for new strategies to get the game to do what they want." In addition, Reese says, "Students who wouldn't be caught dead opening books if they can help it will, in fact, be co-opted into using the manual and figuring out some of the basic research strategies that the game is really intended to reinforce and drill." Students work cooperatively because they're dependent on each other's knowledge.

SOFTWARE TO COUNT ON

If your students' attention span isn't long enough to learn basic math facts, MECC's Muncher series may be just the software you need to encourage mastery. **Number Munchers** teaches multiples, factors, primes, equalities, and inequalities. **Fraction Munchers** gives youngsters practice with numerators, denominators, proper and improper fractions, plus mixed and whole numbers. Both programs combine action-packed arcade graphics and sound to capture kids' attention. (**Word Munchers**, a variation of the math Muncher scenario, is a great way to spur interest in vowel sounds.)

Game play resembles Pac-Man, the classic video-arcade hit. Players move a "muncher" around a game board as they direct it to gobble up numbers or fractions that match a target expression. The more they munch, the higher their scores. If they gobble in error or bump into a troggle (a muncher-eating creature), they lose a game piece. When all munchers are lost, the game is over. Teachers can tailor the games' educational content to the needs of individual players.

NO WAY OUT

Computer games can't replace a good teacher, and won't provide an easy out for educators who are swamped with classroom responsibilities or whose teaching skills aren't up to par. "We're not going to solve that problem by plugging students into the computer and drilling and practicing them to death," says Joe Hofmeister, director of computer development at Cincinnati Country Day School. Computers won't help kids absorb basic skills by magic.

Nevertheless, today's youngsters have grown up with TV, Nintendo, and VCRs. Enlisting animated graphics and audiovisual effects to teach new things in new ways will go a long way toward equipping kids with the skills they need to survive in a competitive world. But most important, computer games are fun and teach kids that thinking and learning are pretty exciting, too. ❑

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PRODUCT INFORMATION

Balance of the Planet,
$49.95 Mac
junior high – adult
Ishido, $54.95 Mac
ages 10 – adult
Stratego, $49.95 Mac
ages 8 – adult
Accolade
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San Jose, CA 95128
(408) 985-1700

BlockOut
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Mickey's Crossword Puzzle Maker,
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Walt Disney
Computer Software
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Burbank, CA 91505
(818) 841-3326

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Tetris, $39.95
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ages 8 – adult
Welltris, $39.95 Mac
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Spectrum Holobyte
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Pipe Dream
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Shanghai II
Activision
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$29.95 Mac
ages 7 – adult

SimCity
Maxis/Broderbund
17 Paul Drive
San Rafael, CA
94903-2101
(415) 492-3200
$49.95 Mac
ages 10 – adult

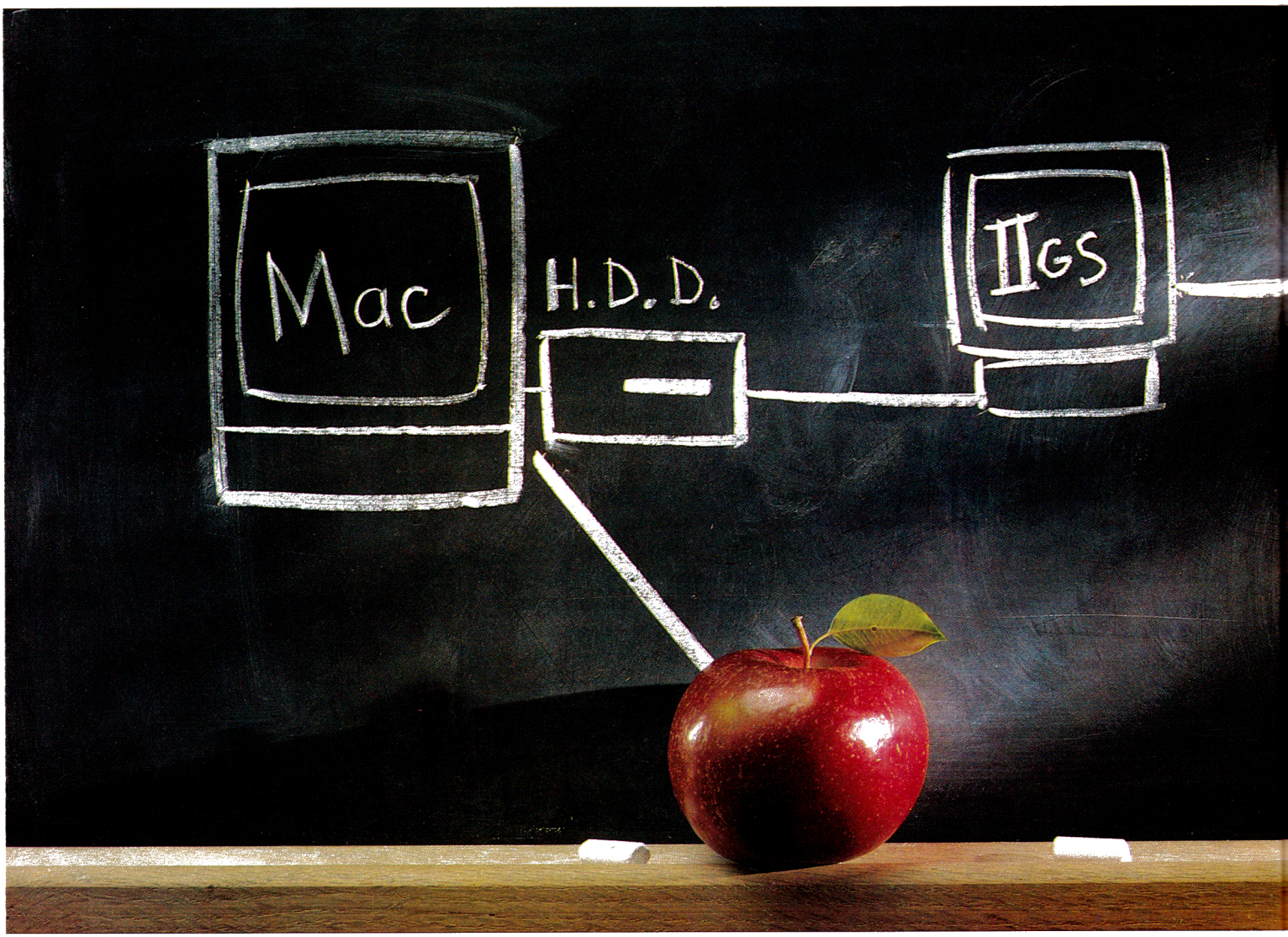
IN THE NETWORK GROOVE

By GREGG KEIZER * CONTRIBUTING EDITOR

Electrons warble down the wire, whistling some ancient tune known only to particle people. The cable curves hard to the right, and those waveforms — or are they infinitesimal fragments? — bounce off and bear right, too. They're hip-hopping to the network blues, heading for the back of your Apple IIGS, ready to make it sing.

The thought of setting up a computer network may give some people the blues, but Apple's schemes are so complete you'll want to boogie instead. When you connect Macs and Apple IIs (and even PCs) and link them with peripherals, you can transmit data, transfer files, and launch software from central storage. (See the accompanying **Table** for the results of our benchmark tests comparing launch and boot times.) Whether you have two computers at home, half a dozen at work, or scores of them at school, it's easy to get them talking to each other.

Two paths to networking make the most sense for Apple-brand computers. The more traditional, called **AppleShare**, depends on



a dedicated Macintosh file server, a hardware-and-software duo that handles heavy network traffic among Macs, Apple IIes, and Apple IIGSes. The more revolutionary alternative relies on **System 7.0**, the newest operating-system software for the Macintosh. Using a System 7.0-equipped Mac in a lightweight network, you can share files and launch software while still putting every machine to work. *You* get to choose which way the electrons dance.

WIRED FOR SOUND

No matter which network road you walk, you've got some cable laying to do. Don't get nervous — those images that spring to mind of wire snarled around computers and snaking around your feet are little more than science fiction when it comes to Apple equipment. Setting up a network isn't for the technologically feeble, but the work isn't beyond anyone who's installed a board in an Apple II or connected a printer to a Macintosh.

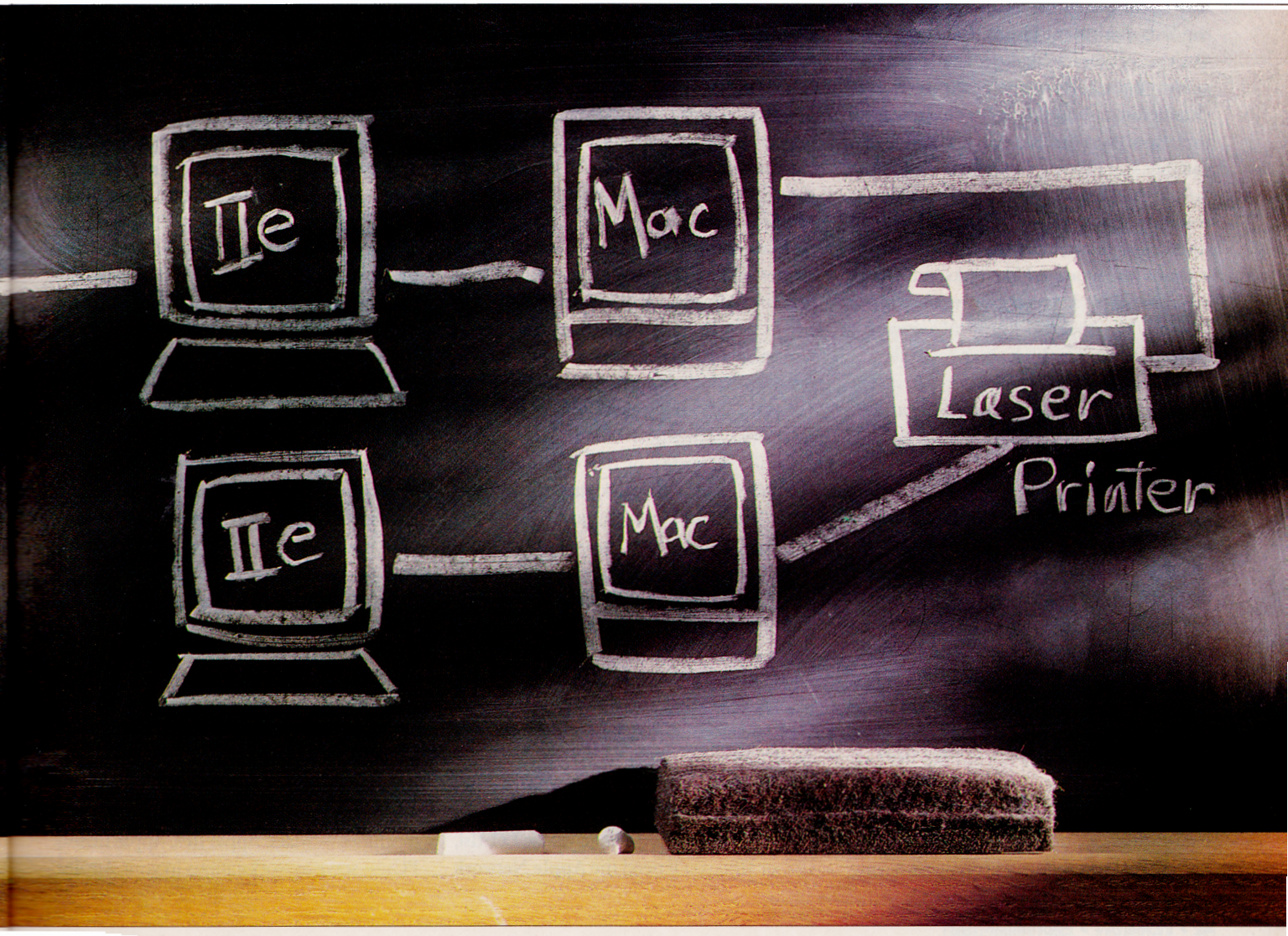
First, plan your network. Decide where the computers will go — if they aren't already in place — and measure distances between workstations roughly. Then buy enough LocalTalk-compatible cable and connector boxes to build the network. Each computer and peripheral needs a connector, and you need to stretch wire to link everything together. Apple's own **LocalTalk Connector Kit** and Farallon's **PhoneNet** both offer connector boxes and cable. Because it sends data over existing telephone wiring, PhoneNet is more versatile; you may not have to lay any cable to connect far-apart computers.

Attach cable to connector boxes, and boxes to computers. On any Mac or Apple IIGS, and on many PostScript laser printers, that's simple: Just plug the lead from the box into the AppleTalk port at the back. On an Apple IIe, though, you'll need to pop the top and install an **Apple II Workstation Card** before you can connect to the net.

Your network's terrain depends, of course,

Swing into the '90s, the decade of the network. Thanks to a pair of innovative Apple-to-Apple communication schemes, sharing information is faster and easier than ever before.

Photography * Larry Dunn



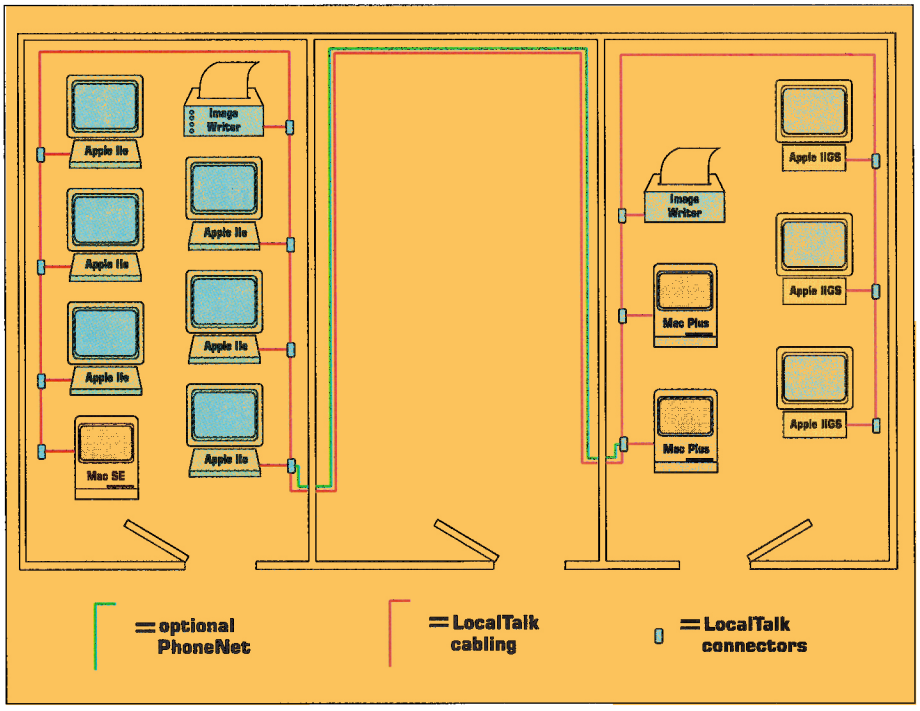


Figure 1. Basic Apple network configuration (daisychain).

on the lay of your computer land. In the house, for instance, where one computer may be in your home office and another in the kids' bedroom, PhoneNet works best. On the other hand, LocalTalk cabling seems smartest when computers are clumped in a single room, as they often are in school labs. Whatever your design, whether you're using AppleShare or System 7.0, all networks have certain traits in common: Both ends of the network remain open (not connected in a circle), workstations are arranged like links in a chain, and you can't leave a connector empty (**Figure 1**). Once the physical network's assembled, you can think about controlling it. ***Total setup time:*** *five minutes per workstation to connect to the network, with cable-laying time depending on length and complexity of the net.*

SHARE AND SHARE ALIKE

High-volume networks need a dedicated control center to provide top performance. That means using **AppleShare File Server** software and a Macintosh that does nothing but manage the network.

AppleShare is the clear choice for schools with more than a handful of computers, and for any school with Apple IIes. Because the Macintosh file server devotes all its time and processing power to running the net, it can handle as many as 50 workstations simultaneously. Because Apple IIe and GS users can start up from the file server's hard-disk drive, they can go diskless, saving money and ensuring that floppy disks aren't damaged. And Apple's **Aristotle** module, part of the AppleShare package, lets teachers and administrators create basic menus to make running programs simple for all but the youngest kids.

The downside is just as clear: cost and expertise. You must set aside a Macintosh, the more powerful the model the better, as the file server. And running AppleShare requires at least a part-time administrator to maintain the file server, assign user names and passwords, and restrict users to just the software and files they need.

It's less demanding than it sounds. Creating an AppleShare network breaks down into five convenient steps:

1. Set up your file server. You've picked a hard-disk-equipped Macintosh Classic, Plus, SE, SE/30, LC, or II as your file server, formatted the hard-disk drive, and built your network. What's next? Not much. Check the name that appears under the hard-disk-drive icon on the desktop. If Apple IIs are part of the network, that name must fit ProDOS conventions — begin with a letter; include no more than 15 letters, numbers, or periods; and not use spaces. ***Total setup time:*** *one hour to hook up the file server, format the hard-disk drive, and name it.*

2. Install AppleShare. Grab your AppleShare disks and run the **Installer** program included. (If your file server is a Mac LC, IIsi, IIci, or IIfx, you'll need the **Apple Network Products Installer** disk that came with your computer.) Select *AppleShare Server*, and if Apple IIs are part of the network, *AppleShare Apple II*. Note that if there's a mix of Apple IIe and GS machines on your network, make sure you use the GS version of the **Apple II Setup** disk that comes with GS/OS.

Name the file server (it can be the same as or different from the drive's volume name) and decide on a keyword that will let you, as network administrator, make changes to the net. You'll also need to enter your name as the administrator and assign yourself still another password so that you can log on from any workstation. (Remember, your name must follow ProDOS protocols if you want to log onto the server from an Apple II station.) When you reboot the Macintosh, you'll see the AppleShare server status window, which shows who's connected and the volume of traffic on the net. ***Total installation time:*** *one hour.*

3. Customize access. If your network users don't require privacy, you can skip this step. That's unlikely, though — most network situations, schools and offices especially, need to keep inquisitive eyes from sensitive information. The **AppleShare Administration** program lets you assign user names and passwords, and set *privileges*, or levels of access, to folders and files.

Pull down the *Server* menu and select *Administration*. Now you can create new users and set the names and passwords they'll type when they log in. You can also create groups of users — *Second Period Class* or *Accounting*, say — to collect users under one access or startup-application umbrella.

This is also where you restrict access to sections of the file server. Maybe you want a "drop" folder so that students can turn in assignments, but you don't want them to be able to see others' work. Create a folder and assign everyone the *Make Changes* privilege, but don't give anyone the *See Folders* and *See Files* privileges (**Figure 2**). Students can deposit their homework by dragging an icon or saving a file to the folder, but they can't open the folder or view any files in it; only the "owner" — you, the administrator — can do that. If there are any Apple IIs on the network, select *Server Info* under the *Server* menu, and check the box marked *Apple II Admin*. ***Total setup time:*** *two minutes per user to register and provide password, five minutes per folder to set privileges.*

4. Configure workstations. When different machines — Macs, Apple IIes, Apple IIGses, PCs — serve as workstations in your Apple-

Share network, you must ensure that each can connect to it. That usually means modifying a startup disk — floppy or hard drive — for each type of computer. AppleShare installation software makes quick work of changing Macintosh and PC startup disks; you simply run the corresponding AppleShare **Installer** program, pick the script appropriate for the machine, and click away. Your Macintosh system isn't altered, so fonts and desk accessories remain. Even Macs running System 7.0 can link up with AppleShare, which must run under pre-7.0 system software.

It's more complicated with the Apple IIe and GS. You have two options: Start up the workstations over the network, or from a disk. The first alternative means that you can forgo disk drives for individual workstations — adding up to big savings on large networks. Unfortunately, though, setting up the server to handle diskless stations can be tough. If you're going to have problems getting AppleShare up and running, this is where they'll crop up. (See the sidebar below.) Log on from an Apple IIe, then from a GS, both times as the administrator. (Each computer must be equipped with a 3.5-inch drive.) From each machine you install a clutch of software to the file server. From the GS, for instance, you select *Server Network Startup* from within the **Installer** program on your **Systems Tools** disk. Change *Startup* in the Control Panel to show *Slot 7* or *AppleTalk*,

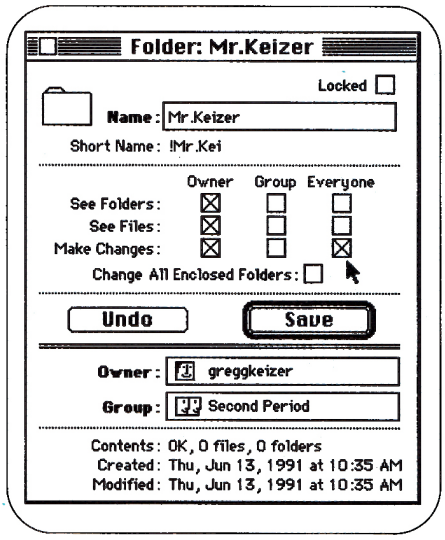


Figure 2. Creating a "drop" folder by restricting access on AppleShare network: Students can deposit assignments by saving files to the folder, but can't open it or view its files.

reboot, and the GS workstation starts over AppleShare. You can even name the startup application from the AppleShare Administration program, in effect locking in users to a single program, such as AppleWorks or AppleWorks GS. That's handy in schools, where you may want students working with only one program.

Though diskless stations save you money, the fastest way to get through to the network is by starting your Apple IIe or GS from a floppy. With the older machine, stick the AppleShare IIe Workstation disk in a 3.5-inch drive, boot your IIe, and pick *File Server Log On* from the list. Pick a file server (there may be more than one on the network), enter your name and password, choose a volume, and you're on. If you're sitting at an Apple IIGS, you'll need to boot from a floppy or hard disk that's been made AppleShare-ready. (Run the Installer program from the System Tools disk and select *AppleShare* or *AppleShare 3.5*.) Click on the AppleShare icon under the GS' Control Panel, and follow the same log-on procedure (**Figure 3**). In a moment you can call on the server's Apple II applications. ***Total configuration time:*** *two hours to configure diskless startup plus ten minutes per user to set startup application and test, ten minutes per user to create startup disk for disk-based workstations and test.*

5. Copy software. Now you need some application programs to run on the file server. Copying software to it from a Mac or a GS is a snap. Simply log onto the network and drag files and folders to the AppleShare icon from Mac or GS hard-disk drives or floppies. On the Apple IIe, you use the **System Utilities** program that came with your machine to copy software from 3.5- or 5.25-inch disks to the file server. System Utilities may look primitive, and it expects you to know the ProDOS pathnames of the files you want to copy, but it gets the job done.

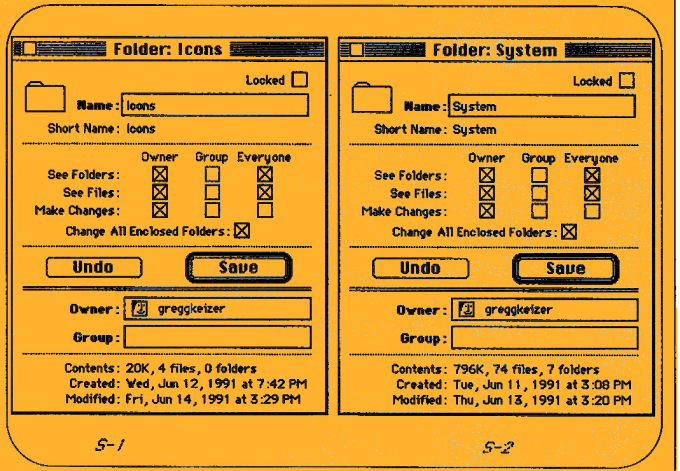
Remember, not all Apple II and Mac software is network-ready. Before installing anything, check with the publisher. And

THE DISKLESS GS

Setting up a GS as a diskless workstation is one of the trickiest parts of AppleShare installation. And it's Apple Computer's fault.

Even after installing the **Server Network Startup** program on the file server, even after specifying a startup application from **AppleShare Administration**, users may still not be able to boot their GSes over the net. The problem likely lies in how you've set two folders' privileges.

Run AppleShare Administration, pull down the Folders menu, and select File & Folder Info. Highlight System on the scrolling list, then click on Get Info. Make sure privileges are set as shown in the accompanying screen (far right). If they're not, no GS workstation can boot over the network. Now, highlight the Icons folder and click on Get Info. Set its privileges exactly as you see in the "Icons" screen shown here. Without this step, workstations can't start over the net when the GS' Finder is marked as the startup application. Although GS/OS 3.0 documentation notes this, GS/OS 5.0 instructions don't. The omission is critical, because the GS' Finder makes the machine a powerful and easy-to-use network computer. Apple has stated that the next version of GS/OS will correct the oversight. **— G.K.**



Above left, setting Icons folder privileges on a Mac file server to boot a diskless GS workstation over an AppleShare network, with the GS Finder marked as the startup application.

Above right, configuring an AppleShare file server (a Mac) to boot a diskless GS workstation entails setting Mac System folder privileges for the GS.

don't forget copyright laws. You may be able to put some network-compatible software on the server, but that doesn't necessarily give you the right to share it with dozens of users. ***Total installation time:*** *ten minutes per application (minimum), with testing time depending on the application.*

WORKING WITHIN THE SYSTEM

Not everyone needs a monster network managed by an expensive Macintosh. For less ambitious networking, turn to System 7.0, the Mac's impressive new operating system. Its networking features may be aimed squarely at sharing files and coordinating applications between Macs, but this operating system also has some intriguing uses for Apple IIGS owners. (System 7.0 doesn't currently support Apple IIe connectivity, but Apple may soon correct the problem.)

Don't expect the power and flexibility of AppleShare, though. System 7.0's file and folder sharing may work well for limited networking — in small-scale school settings, at home, or in a small office, perhaps — but it can't handle a large workload. System 7.0 is restricted to connecting with no more than ten other computers at a time; its Apple II program-launching ability is sharply curtailed; and it just won't work with the Apple IIe.

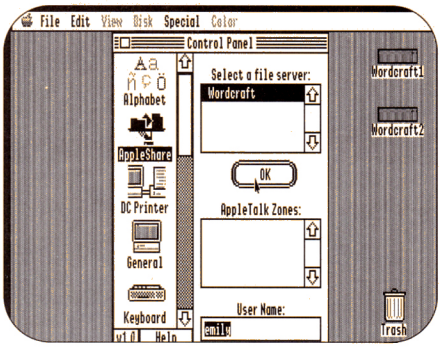


Figure 3. Logging onto an AppleShare network from a GS disk.

But because it doesn't take a Mac out of circulation and because you don't have to buy any additional networking software, System 7.0 gets you connected on the cheap. And its simple operation means that you're less likely to get network-administrator migraines. You can build a System 7.0 network in just four steps:

1. Set up System 7.0. Once you have the physical network assembled, with machines and cabling in place, you can install System 7.0 on any Mac with 2 megabytes of memory and a hard-disk drive. More memory helps, though, because System 7.0's multitasking features aren't much use with less than 4 megabytes of RAM. Buy the **System 7.0 Personal Upgrade Kit** or get a copy of System 7.0 from a local user group, Apple dealer, or on-line service. Run the **Installer** program that comes with the operating system and follow its instructions.

Once the Mac's running System 7.0, select *Control Panel* from the *Apple* menu, double-click on *Sharing Setup*, and fill in the blanks beside *Owner Name*, *Password*, and *Macintosh*. (You don't need to worry about ProDOS conventions with System 7.0, so you can use spaces in the Mac's name if you like.) Finally, click on *Start* under *File Sharing* (**Figure 4**). Back at the desktop, select a folder you want to share with others. Pull down the *File* menu, select *Sharing*, and click on *Share this item and its contents*. Don't worry about the privilege boxes for the moment. Repeat this procedure for any folder you want to share (**Figure 5**). ***Total setup time:*** *one hour per Macintosh, two minutes to share each folder.*

2. Customize access. You set network-access and folder restrictions on a System 7.0 network much as you do under AppleShare. There's no separate administration software, but you still register users and assign passwords, as well as create drop folders, private folders, and public folders. Start by double-clicking on *Users & Groups* in the Control Panel window to name the people who will connect to this Mac's shared folders. You can make new users and groups, collect users into groups, and give everyone a password so that they can access files (**Figure 6**).

To set folder privileges, head back to the desktop, select a shared folder, pull down the *File* menu, and pick *Sharing*. So that everyone can reach and read a folder's files, but not make changes to them, mark *See Folders* and *See Files*, but not *Make Changes*. You can use a bulletin-board-style folder like this to post notes and other information to every student in a class, for instance.

System 7.0's flexibility comes at a price. Unlike AppleShare, with its one-stop-shopping approach to customizing file and folder access, System 7.0 demands that every Mac owner who wants to share must create users and groups and set privileges. Where Macs proliferate, coordinating all that can be a nightmare. If all Macs are going to share with exactly the same people,

NETWORKING APPLEWORKS

If AppleShare is the answer to mass networking, AppleWorks is the answer to mass productivity. **AppleWorks/Network 3.0** is the "separated-at-birth" twin of AppleWorks Classic, with one crucial exception: It runs across a network. In fact, up to 50 users can write, file, and crunch numbers simultaneously once you've installed AppleWorks/N on an AppleShare file server. Installation takes less than 30 minutes, including copying the software to the server, setting privileges, and specifying a network-wide printer. And with AppleShare's ability to designate a startup application, you can even launch users directly into AppleWorks/N.

All the features you've come to love in AppleWorks 3.0 come with AppleWorks/N: the 90,000-word spelling checker, the improved Clipboard, multiple tab rulers, more database report formats, and the additional spreadsheet functions. Add the convenience of networking, and entire schools can justify expensive peripherals such as a laser printer, swap information with Mac users running software like Microsoft Works and Claris' MacWrite II, and share AppleWorks documents more easily. AppleShare's own features come into play, too, letting you lock the AppleWorks dictionary to make sure students don't add incorrectly spelled words, and allowing users to set and save individual AppleWorks preferences to the server.

AppleWorks/N's one failing is that it won't run over AppleTalk from a Mac with System 7.0. Incompatibilities between AppleShare and System 7.0 take the blame, says Claris' technical support. An upgrade to AppleShare later this year should fix the problem. **— G.K.**

PRODUCT INFORMATION

AppleShare File Server, $799
Apple II Workstation Card, $249
LocalTalk Connector Kit, $75
System 7.0 Personal Upgrade Kit, $99
Apple Computer
20525 Mariani Ave.
Cupertino, CA 95014
(408) 974-1010
(800) 776-2333

AppleWorks/Network 3.0
Claris Corp.
5201 Patrick Henry Drive
Santa Clara, CA
95052-8168
(408) 727-8227
$1616

PhoneNet
Farallon Computing
2000 Powell St.
Emeryville, CA 94608
(415) 596-9100
$75/connector box

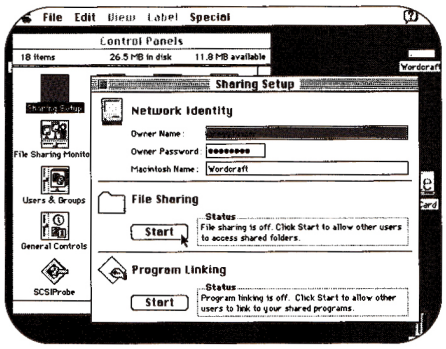


Figure 4. Setting up a Mac to share files over a network under System 7.0.

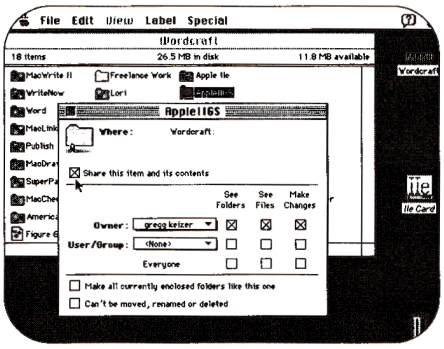


Figure 5. Selecting a folder to share over a System 7.0 network.

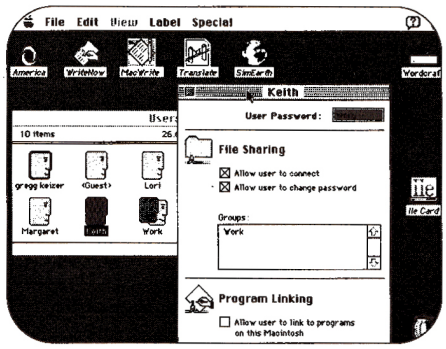


Figure 6. Assigning a password for file access on a System 7.0 network.

you can copy the *Users & Groups Data File*, found in the Mac's *Preferences* folder, to every Mac on the network. ***Total setup time:*** *two minutes per user to register and provide password, five minutes per shared folder to set privileges.*

3. Configure workstations. Because Apple IIes can't share folders, and because diskless workstations are out (Macs can't boot over the net), connecting to other computers is much simpler with System 7.0. In fact, there isn't much of a configuration process. To call on a shared folder, a workstation must be AppleShare-ready. Install AppleShare on each station's startup disk (floppy or hard drive) by running the appropriate **Installer** program, a utility that comes with the machine's operating-system software. Pick *AppleShare* and click away.

Logging onto a file-sharing Mac is almost identical from both Mac and GS stations. Once you've reached the Finder on either machine, select *Chooser* (Mac) or *Control Panel* (GS) from the *Apple* menu. Click on the AppleShare icon, select a file server (in this case, the appropriate Mac), enter a user name and password, then pick folders to access. Each folder appears as a separate AppleShare server volume, complete with icon, when it hits your desktop. Double-click on the icon to open the folder (assuming its privileges let you) and display its contents. ***Total configuration time:*** *negligible.*

4. Copy software. No sweat — just log on from a GS and drag application or file icons from a floppy or hard disk to the icon representing the shared folder. Some GS software, notably AppleWorks GS and HyperCard IIGS, will run from a shared folder. Once you've copied these applications and their supporting files to the Mac over the net, simply double-click on the appropriate icon to launch. Remember that single-user software can be in use on only one GS at a time, however. If you want multiple users to launch simultaneously, you'll have to buy multiple copies and install them in separate shared folders.

AppleShare-aware Apple II software *should* work with System 7.0, but there's no guarantee; **AppleWorks/Network 3.0**, for instance, won't run from a Mac's shared folder. (Neither will single-user AppleWorks 3.0.) Check with the software's publisher before you go to the trouble of installing it on a System 7.0-equipped Mac. ***Total installation time:*** *ten minutes per application (minimum); testing time depends on application.*

PICKING THE RIGHT NETWORK

Which network is right for you? Let's look at the deciding factors: Do you have more than a half-dozen computers? Do you have Apple IIes? Want to set up workstations without disk drives? Do you plan on running a wide variety of Apple II and IIGS software over the network? Then AppleShare it — only AppleShare can manage more than a handful of machines simultaneously, turn a IIe into a workstation, do without disk drives, or run AppleShare-aware software without a hitch.

Are you strapped for cash? Are you more interested in sharing files than running software? Connecting just a couple of computers at home? Then build your new network on System 7.0's foundation. It doesn't require a dedicated Mac, it's perfect for swapping files between your GS and your Mac, and it's the only solution simple and inexpensive enough for networking the machines in your house.

A network isn't just wire and hard-disk drives, log-ons and passwords. It's also the future of personal computing. You need to dip into networks now if you want to keep up with the relentless pace of technological change, if you want to be ready for the rest of the decade, with its promise of lightning-fast communication. Start making those electrons dance — right now. ❑

CONTRIBUTING EDITOR GREGG KEIZER IS THE AUTHOR OF *BRIDGING THE GAP*, OUR MONTHLY COLUMN ON APPLE II/MAC CONNECTIVITY. WRITE TO HIM AT 614 LINDEN STREET, SHREVEPORT, LA 71104. ENCLOSE A SELF-ADDRESSED, STAMPED ENVELOPE IF YOU'D LIKE A PERSONAL REPLY.

Launch AppleWorks GS	**with TransWarp GS**	**without TransWarp GS**
From floppy	29.1	36.0
From Vulcan hard disk	14.8	21.2
From AppleShare	42.9	46.8
From System 7.0	37.8	43.0
Launch AppleWorks 3.0	**Apple IIgs**	**Apple IIe**
From floppy	11.1*	14.6
From Vulcan hard disk	13.9*	—
From AppleShare	5.3*	5.8
*With TransWarp GS		
Boot to GS Finder		
From floppy	50.4	
From Vulcan hard disk	33.0	
From AppleShare	102.3	
File Servers	**Mac LC**	**Mac Plus**
Launch AppleWorks*	5.8	13.1
Launch AppleWorks GS**	42.9	40.3
Boot to Finder**	102.3	119.8
*From Apple IIe		
**With TransWarp GS		

Table. Benchmarks (all times in seconds).

IS IT ART YET?

As a tool in the hands of an artist, the computer speaks to our deepest needs for human expression.

By DEBORAH GREH, Ed.D.



Trying to define "art" — evaluate it — is like trying to define beauty, or quality, or truth; critics and philosophers have been at it for centuries. Personal taste — style, per se — doesn't have anything to do with quality. What appeals to me may not appeal to you; you may not like certain works, but you value them nonetheless. Take abstract paintings, for instance. You know how to judge traditionally realistic works, such as still lifes and portraits, because you have familiar visual references with which to compare them. But an image doesn't have to "look like" something to be considered art; an abstract work forces you to look beyond the content of the image.

Perhaps we can say that art is an attempt to arrive at some revelation. It does more than illustrate a word or an idea — it *is* the word or the idea, and it speaks volumes. A work may be simply an interpretation of reality, like an Impressionist landscape; it may be an analysis of truth, a restructuring of reality, like a Cubist drawing; or it may be a very personal reaction that eludes obvious interpretation, like a Surrealist painting.

Where does computer art fit in? How do we judge those works? Our problem is twofold: Can we set standards of value for art in general, and, more specifically, do any computer works live up to those standards? Is the machine producing the image (and, if so, can such an image be art), or is the computer just another artist's tool?

Of course, one common criterion of value is a piece's *timelessness* — whether it has withstood the criticism of the years, weathered passing fancies and changing tastes. Witness the works of the masters of various eras — Michelangelo, van Gogh, Monet, Picasso, Dali. They express universal truths — human realities that were true for the artists' contemporaries, that are true for us here today, and that will be true for innumerable generations to come. The newness of computer art, however, precludes the test of time — we can't stand back and look at these images, but must assess them immediately. What standards do we use?

The artist's technical skill, naturally, is important. You must be able to control the medium before you can reveal a visual image. But, fascinated with what the computer can do — precision in pattern repetition, speed of execution, the novelty of the medium — an artist may spend all his or her creative energies "showing off." In an article appearing in the magazine *Creative Computing* a few years ago, the critic Robert Mueller cautioned us to avoid being carried away by dazzling technique: "There is more to art than the fun of putting together images and being amazed at the serendipitous results displayed on a color monitor."

A related criterion, one that's equally important in traditional works and in computer art, is *composition*, or the artist's use of elements such as line, shape, space, color, and so on. How are they related? How do they influence each other, and how do they affect the viewer? Does a work show both variety and unification? Is it balanced?

Then there's *vision*. The artist should bring to his or her work a true understanding, a unique perspective — not stale mimicry, but a new insight, a fresh idea. The work must reveal a truth — a statement about society, perhaps, or a personal observation of nature. Anything less is forgery.

Just as the absolute realism of a photograph may not convey the deeper emotional reality of a subject as fully as an artist's rendition of the same scene, high technology and all the "latest and greatest" computing equipment — even the high resolution and detailed color

Right, Tiles, by Bob Haberer, inCider/A+ reader, Phoenix, Arizona. Pixel Paint on Macintosh IIcx. Inset by Tim Perdue, Apple IIgs.



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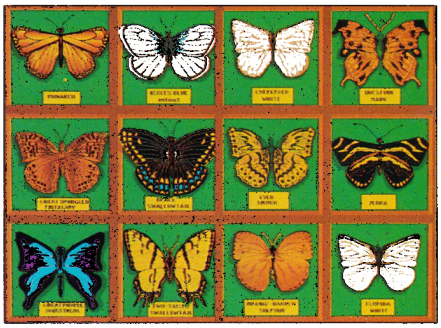

The Collection, by Bob Haberer. Pixel Paint on Macintosh IIcx.

palettes of the newest paint programs — can't guarantee great art. Art isn't about duplication — it's about giving life to the artist's ideas.

And that's probably the key. Does this image soothe you, amuse you, move you? Does it bring you face to face with reality or offer you an escape? Does this image make you think, make you remember, make you *feel*?

No one can guarantee the creation of an artwork in any medium. Put a paintbrush in one person's hand and he or she may not know what to do with it; in someone else's hand it becomes a tool of expression, an extension of the artist. What a computer *can* do is give the artist new powers of manipulation unavailable in traditional media — the freedom to rearrange shapes and forms quickly and easily, to experiment with alternatives, to play with images and integrate them in ways never before possible. It allows ideas to grow.

"Art is what artists do," says Nam June Paik ("You Call That *Art*?" November 1990, p. 56). Partly inborn, partly learned, the artist's ability to convey those ideas as he or she intends is what you'll see on the screen or on the canvas. Whatever the medium, whatever the tools, what remains is art — the resulting image, the artist's unique vision of the world. ❑

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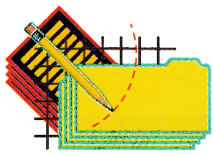


FAIR ESTIMATES 1

Get down to business with AppleWorks and you'll have no trouble determining a project's cost.

By RUTH K. WITKIN

HOW MUCH SHOULD YOU CHARGE for your product or service? Too much and you can lose sales; too little and you can lose your shirt. To stay competitive and profitable, you need to know the direct labor, indirect labor, material, and overhead costs associated with a project and allocate them properly.

Manufacturing, sales, and service firms have a different costing mix. A manufacturer, for instance, is likely to have a higher cost for materials and capital equipment than a service firm, whose major cost is payroll, or a sales organization, whose major cost is the price of products purchased for resale.

This month's example is based on a small engineering and design firm — a service business whose estimates to clients are based on project hours. **Figure 1** shows a current project spreadsheet. In this type of operation, projects are broken down into five phases of activity (cells C12 through G22).

Analysis is the period in which you determine the client's requirements, prepare feasibility studies, and decide on design approaches. **Report** is the phase in which you write recommendation reports, plan budgets, and prepare other reports as needed. **Design** is the part of the project in which you design the facility, including the preparation of drawings, technical specifications, and equipment lists. **Supervision** is the period in which you oversee the work of the contractor and review shop drawings during implementation of the project. **Checkout** is the phase in which you inspect the quality of the work on site and verify that each completed phase or project meets all specifications.

Rows 32 through 46 contain two lookup tables of engineers, designers, and drafters. Each table consists of two columns of information: *TABLE 1* (columns A and B) holds employee numbers and names; *TABLE 2* (columns E and F) contains employee numbers and amounts representing hourly pay plus salary-related benefits. From this technical pool, the project manager assigns employees to each phase of the project, thereby generating time billable to the client.

Lookup formulas retrieve the employee names and rates from the tables and calculate billable hours. Other formulas produce the overhead, marketing, administration, accounting, and clerical costs, based on hours spent by billable employees. The result is the estimated project cost.

This is a strong, sophisticated spreadsheet. In this session, you set up its overall structure and create about half of the many formulas. Next month, you enter the rest of the formulas and use *iteration*, a neat technique that produces an estimate based on the required profit margin.

A SPREADSHEET FROM SCRATCH

Create a new AppleWorks spreadsheet file named **PROJECT**. The *Review/Add/Change* screen appears with the cursor in cell A1. First, use my column-compression technique to create the long lines in columns A through M:

1. Reduce the columns: Leave the cursor on A1 and press Open apple-L (OA-L) to start the *Layout* command. Type **C** (for *Columns*), press OA-Right Arrow twice, then Left Arrow three times to highlight the columns to column M. Press Return. Type **C** (for *Column width*), press OA-Left Arrow seven times to reduce the highlighted columns to two characters each, and press Return again.

2. Enter a double line across row 2 in columns A through M: Place the cursor on A2 and type quotation marks. Hold down the equal-sign key until the sign reaches the right edge of M2, and press Return.

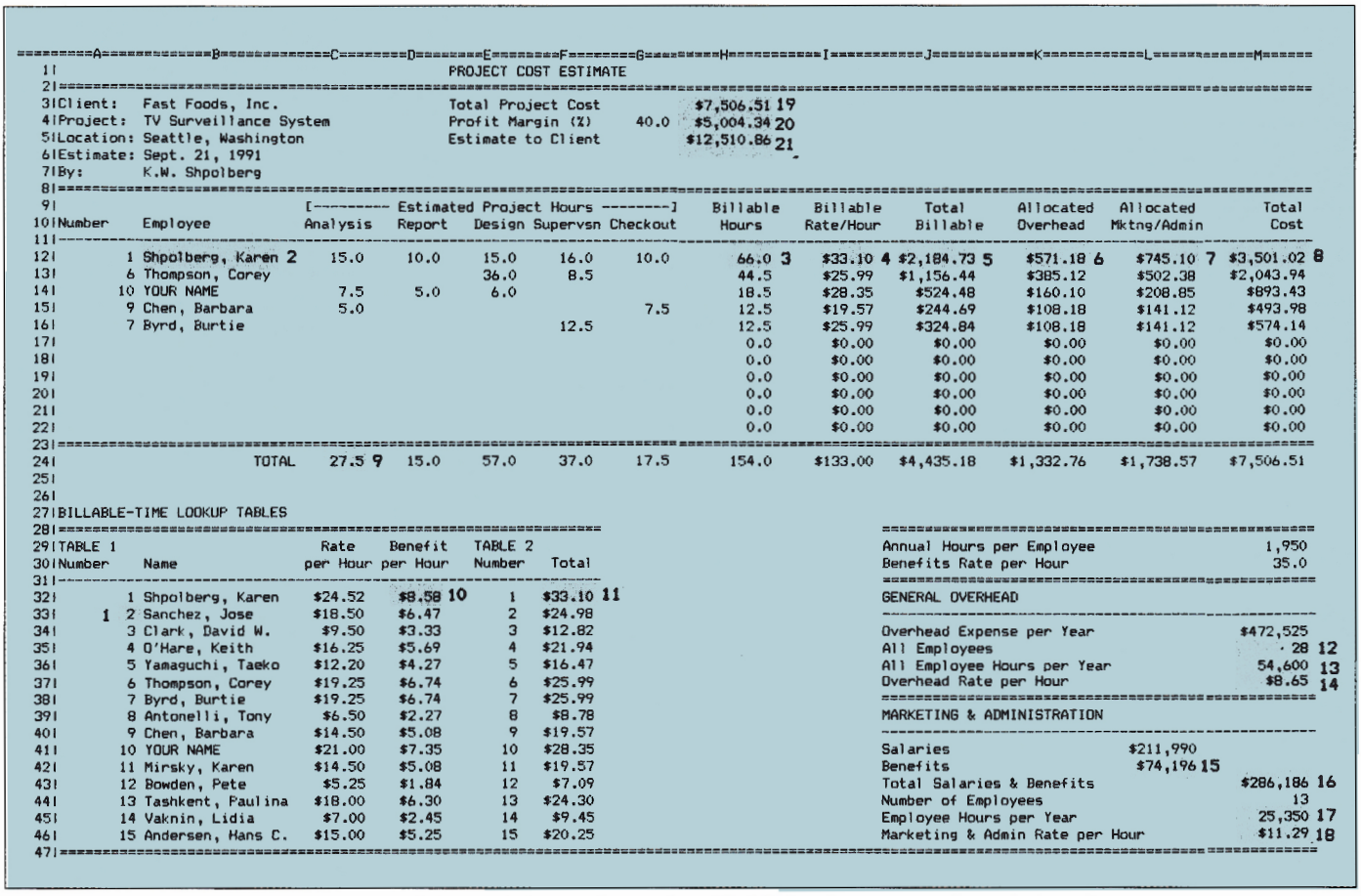
3. Copy the row containing the line to the clipboard: Leave the cursor on A2 and press OA-C. Type **T** and press Return twice. Now copy the row back into the spreadsheet: Place the cursor on row 8, press OA-C, and type **F**. The row is still on the clipboard, so copy it into rows 23 and 47 the same way.

4. Enter a single line across row 11 in columns A through M: Place the cursor on A11, type quotation marks, hold down the minus-sign key until the sign reaches the right edge of M11, and move the cursor to A28.

5. Enter the shorter lines: With the cursor on A28, type quotation marks. Hold down the equal-sign key until the sign reaches the right edge of F28, then move the cursor to A31. Again type quotation marks, but this time hold down the minus-sign key until you reach the right edge of F31. Now move the cursor to J28.

In the same way, typing quotation marks first, use equal signs to create the double line in J28 through M28, J31 through M31, and J38 through M38. Use minus signs to create the single line in J33 through M33 and J40 through M40.

6. Widen the columns: Place the cursor on A40. Press OA-L, type **C**, press Right Arrow 12 times, and press Return. Type **C**, press OA-Right Arrow seven times, and press Return again. AppleWorks "stretches" each line to fill the increased width.



PROJECT COST ESTIMATE

Client: Fast Foods, Inc.
Project: TV Surveillance System
Location: Seattle, Washington
Estimate: Sept. 21, 1991
By: K.W. Shpolberg

Total Project Cost $7,506.51 19
Profit Margin (%) 40.0 $5,004.34 20
Estimate to Client $12,510.86 21

Number	Employee	Estimated Project Hours: Analysis	Report	Design	Supervsn	Checkout	Billable Hours	Billable Rate/Hour	Total Billable	Allocated Overhead	Allocated Mktng/Admin	Total Cost
1	Shpolberg, Karen 2	15.0	10.0	15.0	16.0	10.0	66.0 3	$33.10 4	$2,184.73 5	$571.18 6	$745.10 7	$3,501.02 8
6	Thompson, Corey			36.0	8.5		44.5	$25.99	$1,156.44	$385.12	$502.38	$2,043.94
10	YOUR NAME	7.5	5.0	6.0			18.5	$28.35	$524.48	$160.10	$208.85	$893.43
9	Chen, Barbara	5.0				7.5	12.5	$19.57	$244.69	$108.18	$141.12	$493.98
7	Byrd, Burtie				12.5		12.5	$25.99	$324.84	$108.18	$141.12	$574.14
							0.0	$0.00	$0.00	$0.00	$0.00	$0.00
							0.0	$0.00	$0.00	$0.00	$0.00	$0.00
							0.0	$0.00	$0.00	$0.00	$0.00	$0.00
							0.0	$0.00	$0.00	$0.00	$0.00	$0.00
							0.0	$0.00	$0.00	$0.00	$0.00	$0.00
							0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	TOTAL	27.5 9	15.0	57.0	37.0	17.5	154.0	$133.00	$4,435.18	$1,332.76	$1,738.57	$7,506.51

BILLABLE-TIME LOOKUP TABLES

Number	Name	Rate per Hour	Benefit per Hour	TABLE 2 Number	Total
1	Shpolberg, Karen	$24.52	$8.58 10	1	$33.10 11
2	Sanchez, Jose	$18.50	$6.47	2	$24.98
3	Clark, David W.	$9.50	$3.33	3	$12.82
4	O'Hare, Keith	$16.25	$5.69	4	$21.94
5	Yamaguchi, Taeko	$12.20	$4.27	5	$16.47
6	Thompson, Corey	$19.25	$6.74	6	$25.99
7	Byrd, Burtie	$19.25	$6.74	7	$25.99
8	Antonelli, Tony	$6.50	$2.27	8	$8.78
9	Chen, Barbara	$14.50	$5.08	9	$19.57
10	YOUR NAME	$21.00	$7.35	10	$28.35
11	Mirsky, Karen	$14.50	$5.08	11	$19.57
12	Bowden, Pete	$5.25	$1.84	12	$7.09
13	Tashkent, Paulina	$18.00	$6.30	13	$24.30
14	Vaknin, Lidia	$7.00	$2.45	14	$9.45
15	Andersen, Hans C.	$15.00	$5.25	15	$20.25

Annual Hours per Employee		1,950
Benefits Rate per Hour		35.0
GENERAL OVERHEAD		
Overhead Expense per Year		$472,525
All Employees		28 12
All Employee Hours per Year		54,600 13
Overhead Rate per Hour		$8.65 14
MARKETING & ADMINISTRATION		
Salaries	$211,990	
Benefits	$74,196 15	
Total Salaries & Benefits		$286,186 16
Number of Employees		13
Employee Hours per Year		25,350 17
Marketing & Admin Rate per Hour		$11.29 18

Figure 1. Project-cost-estimate spreadsheet with sample entries. Highlighted areas are formula locations.

Use the following summary to set up the rest of the spreadsheet. (There's lots of fine-tuning in this spreadsheet, so bear with me.)

Column width. Each column is now nine characters wide. Use OA-L, *Columns*, and *Column width* to increase the column widths as follows: Increase column A by one character; column B by nine characters; columns H through J by three characters; and columns K through M by four characters.

Recalculation. To speed up the entry process in the next step, turn off automatic calculation: Press OA-V and type **RFM** (for *Recalculate Frequency Manual*). Press OA-S to store all your work on disk.

Labels and numbers. **Figure 2** shows the sample entries, but read these instructions before you begin typing.

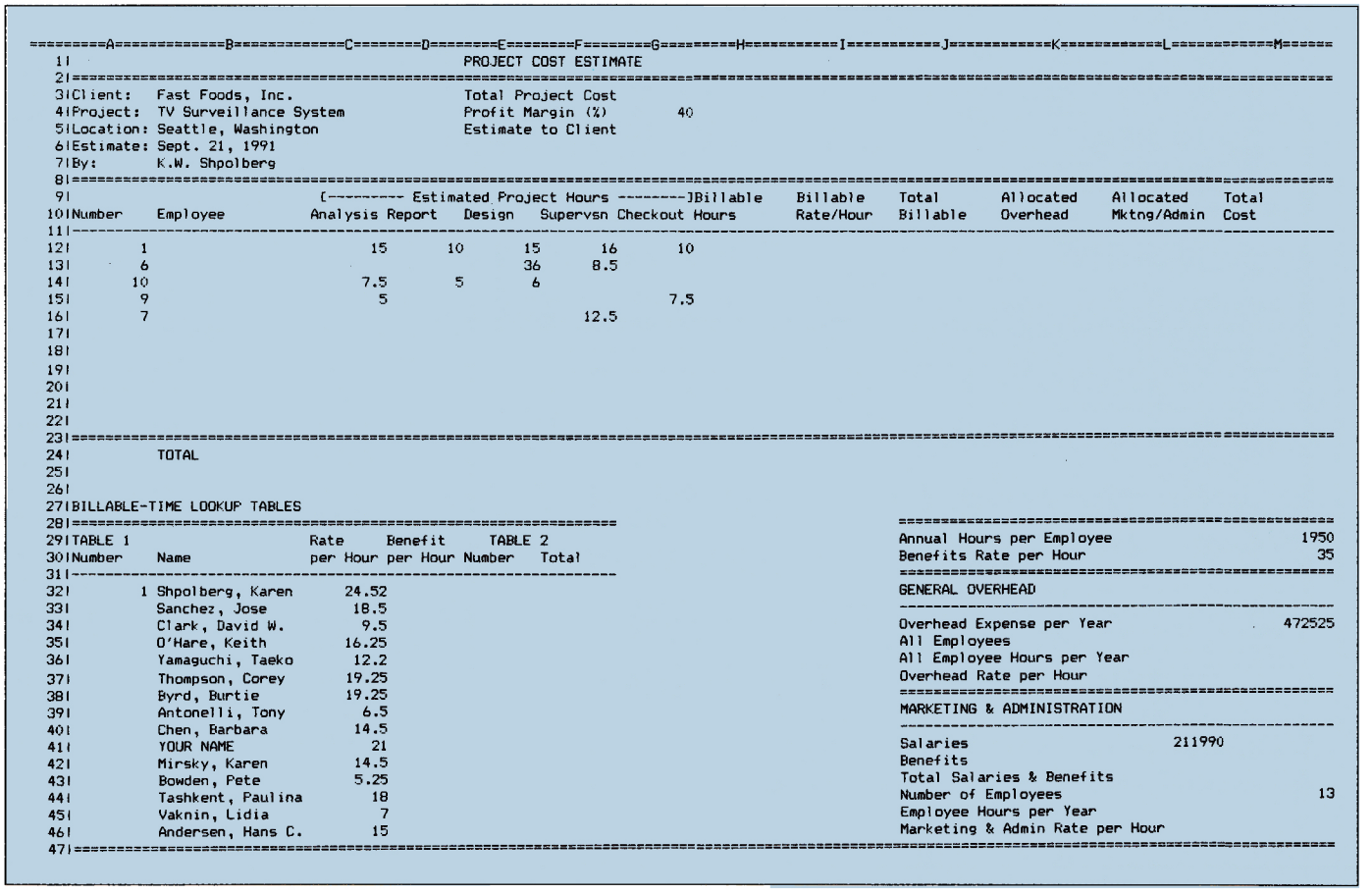
- In C9, type quotation marks, then create the long heading by pressing the spacebar, the left-bracket key, nine minus signs, and the spacebar. Then type **Estimated Project Hours** and hit the spacebar, eight minus signs, and the right-bracket key.
- In B41, just for fun, type your name.
- Press the spacebar once immediately after you type each of the labels in the following cells (before you move the cursor to the next cell): L9, M9, K10, M10, and F30. Press the spacebar twice after typing the labels in these cells: J9, H10, and C29. When you right-justify these labels in the formatting step discussed below, the spaces will align the labels with the numbers in the cells below.
- In E29, type quotation marks and press the spacebar three times before typing **TABLE 2**.

Now, referring to **Figure 2**, enter the labels and numbers. After typing each entry, move the cursor to the next cell needing an entry. This step serves the same purpose as pressing Return and saves one keystroke every time. When you're finished, press Return.

Formats. During each of the format steps, you can compare your results with **Figure 1**. First, use the *Value* command (OA-V) to set a standard *Value format* of *Commas* with one decimal place. Next, use the Layout command (OA-L), either *Entry* (for single cells) or *Block* (for contiguous cells), and *Value format* to reformat the following cells to show *Commas* with no decimal places: A12 through A22; A32 through A33 (yes, A33 — you enter a formula in A33 and copy it down the column, reproducing the format in the process); M29; M35 through M36; and M44 through M45.

Now reformat the following cells to show *Dollars* with two decimal places: H3 through H5; I12 through M12 (copying formulas down these columns reproduces the format, too); C32 through C46; D32; F32; M37; and M46. (When you copy formulas down some of the these columns, you copy the format, too.)

Reformat these cells for *Dollars* with no decimal places: M43; L41 through L42; and M34. And finally, use OA-L and *Label format* to right-justify these labels: H9 through M10; C10 through G10; B24; C29 through D29; and C30



```
=========A============B============C========D========E========F========G=========H===========I===========J============K============L============M======
  1|                                                PROJECT COST ESTIMATE
  2|=====================================================================================================================================
  3|Client:   Fast Foods, Inc.                      Total Project Cost
  4|Project:  TV Surveillance System                Profit Margin (%)        40
  5|Location: Seattle, Washington                   Estimate to Client
  6|Estimate: Sept. 21, 1991
  7|By:       K.W. Shpolberg
  8|=====================================================================================================================================
  9|                          [--------- Estimated Project Hours --------]Billable    Billable    Total       Allocated    Allocated    Total
 10|Number    Employee        Analysis Report   Design   Supervsn Checkout Hours      Rate/Hour   Billable    Overhead     Mktng/Admin  Cost
 11|-------------------------------------------------------------------------------------------------------------------------------------
 12|       1                        15       10       15       16       10
 13|       6                                          36      8.5
 14|      10                       7.5        5        6
 15|       9                         5                                7.5
 16|       7                                                12.5
 17|
 18|
 19|
 20|
 21|
 22|
 23|=====================================================================================================================================
 24|          TOTAL
 25|
 26|
 27|BILLABLE-TIME LOOKUP TABLES
 28|=============================================================                                  ==============================================
 29|TABLE 1                    Rate     Benefit     TABLE 2                                         Annual Hours per Employee                    1950
 30|Number    Name             per Hour per Hour Number   Total                                      Benefits Rate per Hour                         35
 31|-------------------------------------------------------------                                  ==============================================
 32|       1 Shpolberg, Karen      24.52                                                            GENERAL OVERHEAD
 33|         Sanchez, Jose          18.5                                                            ----------------------------------------------
 34|         Clark, David W.         9.5                                                            Overhead Expense per Year                  472525
 35|         O'Hare, Keith         16.25                                                            All Employees
 36|         Yamaguchi, Taeko       12.2                                                            All Employee Hours per Year
 37|         Thompson, Corey       19.25                                                            Overhead Rate per Hour
 38|         Byrd, Burtie          19.25                                                            ==============================================
 39|         Antonelli, Tony         6.5                                                            MARKETING & ADMINISTRATION
 40|         Chen, Barbara          14.5                                                            ----------------------------------------------
 41|         YOUR NAME                21                                                            Salaries                       211990
 42|         Mirsky, Karen          14.5                                                            Benefits
 43|         Bowden, Pete           5.25                                                            Total Salaries & Benefits
 44|         Tashkent, Paulina        18                                                            Number of Employees                            13
 45|         Vaknin, Lidia             7                                                            Employee Hours per Year
 46|         Andersen, Hans C.        15                                                            Marketing & Admin Rate per Hour
 47|=====================================================================================================================================
```

Figure 2. Project-cost-estimate labels and numbers to type into cost-estimate spreadsheet.

through F30. Press OA-S to store all your work on disk.

ENTERING THE FORMULAS

Now enter the formulas that perform your calculations. The highlighted areas in **Figure 1** show their locations. First read how the formula works, then place the cursor on the cell receiving it. Move the cursor to the cell location shown with the formula and type everything else.

When the formula is complete, compare each character on your screen with the way it appears here. If everything agrees, press Return. If something's amiss, press Escape and start again.

FORMULA 1: Employee Numbers

Cell location: A33

Formula: 1+A32

Formula 1 adds 1 to the number in the cell above (A32) to start a series of sequential numbers in *TABLE 1* of the billable-time lookup table. Copy Formula 1 down the column: With the cursor on A33, press OA-C and hit Return twice. Move the cursor to A34, type a period, move the cursor to A46, and press Return again. AppleWorks pauses with a highlight on A32 in the entry line near the bottom of the screen and asks if A32 is a *No change* (absolute) or *Relative* reference. It's relative, so type **R**. Press OA-K to show the numbers.

Now copy the entire group of formulas to column E: Place the cursor on the number in A32, press OA-C, and hit Return. Move the cursor to A46, press Return again, move the cursor to E32, and press Return once more. Press OA-R to identify all cell references as relative.

FORMULA 2: Employee Name

Cell location: B12

Formula: @IF(A12>0,@LOOKUP (A12,A32.A46),"")

Formula 2 enters the name of employees assigned to the project, saving you the task of typing them, and letting you make rapid changes in project assignments just by typing a different number. The formula uses the *IF* function, which has three elements: *Test*, *Then*, and *Else* statements.

The *Test* statement looks at A12. If A12 contains a number greater than zero, the *Then* statement uses the lookup function

Formula 3	G12 and C12	Type **R** each time
Formula 4	H12 and A12	Type **R** each time
	E32 and E46	Press Return each time
Formula 5	I12 and H12	Type **R** each time
Formula 6	M37	Press Return
	H12	Type **R**
Formula 7	M46	Press Return
	H12	Type **R**
Formula 8	L12 and J12	Press OA-R for both

Table. Follow these directions for highlighted cells.

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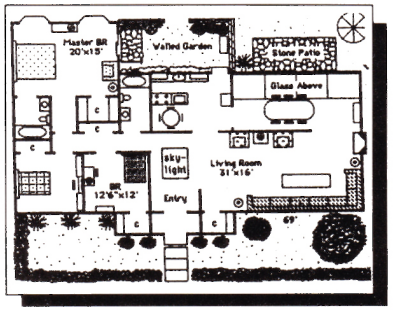

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to find the number in A32 to A46 (*TABLE 1*). It then retrieves the corresponding name from column B and enters it in B12. If B12 is empty, the *Else* statement ("") makes B12 appear empty.

A12 contains a *1*, so Formula 2 searches *TABLE 1*, finds the *1* in A32, plucks the corresponding name, *Karen Shpolberg*, from B32, and enters it in B12.

Copy Formula 2 into the cells below: Leave the cursor on B12 and press OA-C. Press Return twice, press Down Arrow, type a period, move the cursor to B22, and press Return again. AppleWorks asks you to identify the *absolute* and *relative* references. To tell AppleWorks the first two references are relative and the second two are absolute, type **R** twice, then press OA-Return. Press OA-K to have the formula do its thing. Formula 2 does exactly what you tell it to do: enters a name in B13 through B16 and does a disappearing act in B17 through B22.

FORMULA 3: Billable Hours

Cell location: H12

Formula: @SUM(G12.C12)

Formula 3 sums the project hours in G12 through C12 and enters the total billable hours for this employee in H12. You copy this formula along with others after you enter Formula 8.

FORMULA 4: Billable Rate per Hour

Cell location: I12

Formula: @IF(H12>0,@LOOKUP (A12,E32.E46),0)

Formula 4 calculates the employee's billable rate per hour. The *Test* statement looks at the number of hours in H12. If this number is greater than zero, the *Then* statement looks up the employee number in E32 to E46 (*TABLE 2*), retrieves the corresponding total (employee rate plus benefits) from column F, and enters this amount in I12. If H12 contains a zero, the *Else* statement enters a zero in I12.

TABLE 2 doesn't yet contain amounts in column F that Formula 4 needs, so I12 shows *$0.00*.

FORMULA 5: Total Billable

Cell location: J12

Formula: +I12*H12

Formula 5 multiplies the employee's billable hours (H12) by the billable rate per hour (I12) and enters in J12 the total billable amount for an employee assigned to this project. The formula cell shows zeros.

FORMULA 6: Allocated Overhead

Cell location: K12

Formula: +M37*H12

Formula 6 multiplies the employee's billable hours (H12) by the overhead rate per hour (M37) and enters in K12 the overhead allocated to the time this employee spends on the project. Again, zeros appear in the formula cell.

FORMULA 7: Allocated Marketing & Administration

Cell location: L12

Formula: +M46*H12

Formula 7 multiplies the employee's billable hours (H12) by the marketing and administration rate per hour (M46) and enters in L12 the dollar amount of support services allocated to the time the employee spends on this project — zeros again.

FORMULA 8: Total Cost

Cell location: M12

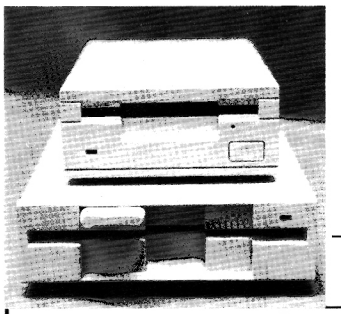
Formula: @SUM(L12.J12)

Formula 8 adds total billable cost (J12), allocated overhead cost (K12), and allocated marketing and administration cost (L12) and enters in M12 the total cost for an employee assigned to this project. Because it has no amounts to work with, M12 shows zeros.

Now copy Formulas 3 through 8 down their respective columns: Place the cursor on H12 and press OA-C. Press Return, move the cursor to M12, and press Return again. Press Down Arrow to move the cursor to H13, type a period, press Down Arrow nine times to move the cursor to H22, and press Return again. As AppleWorks highlights cell references in these formulas, respond according to the accompanying **Table**. Press OA-K, then OA-S to store everything on disk.

Next month you pick up from here, seeing the spreadsheet formulas come alive with spectacular calculations. ❑

CONTRIBUTING EDITOR RUTH K. WITKIN IS THE CREATOR OF THE *SUCCESS WITH APPLEWORKS* TEMPLATE/HANDBOOK SERIES (*INCIDER/A+*, IDG COMMUNICATIONS/PETERBOROUGH) AND *RUTH WITKIN'S BEST NEW APPLEWORKS TEMPLATES* (QUALITY COMPUTERS). SHE'S ALSO THE AUTHOR OF *THE BEST BOOK OF APPLEWORKS* (MACMILLAN PUBLISHING COMPANY) AND *PERSONAL MONEY MANAGEMENT WITH APPLEWORKS* (JOHN WILEY & SONS). WRITE TO HER AT 5 PATRICIA STREET, PLAINVIEW, NY 11803. ENCLOSE A STAMPED, SELF-ADDRESSED ENVELOPE IF YOU'D LIKE A REPLY.



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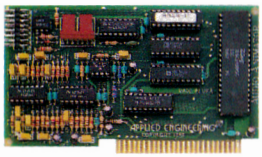

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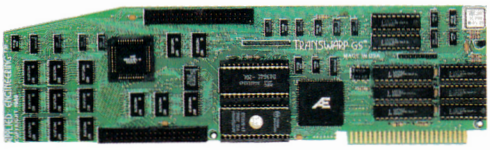

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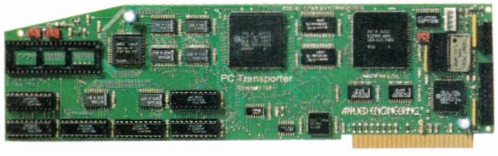

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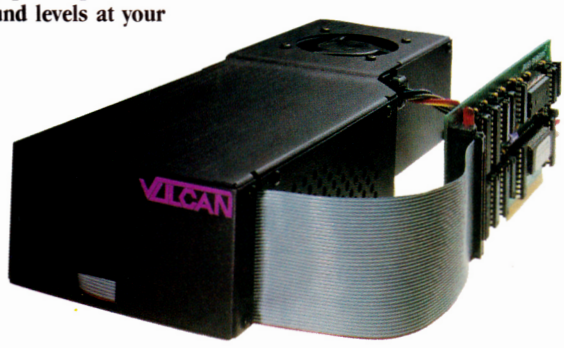

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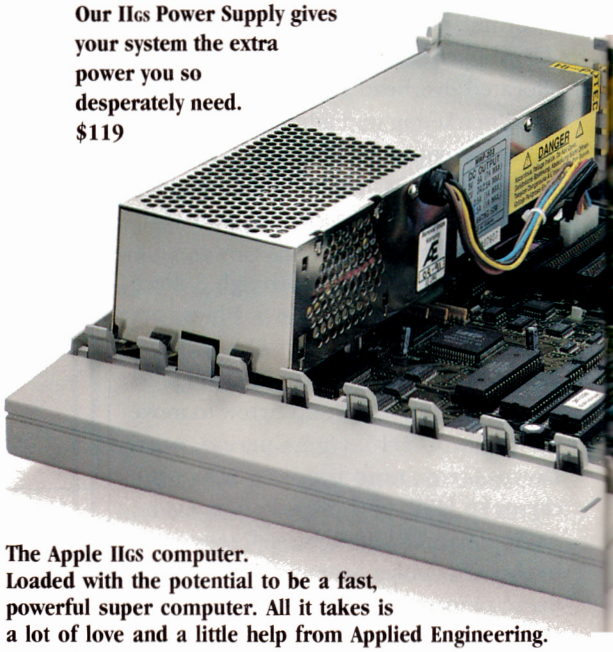

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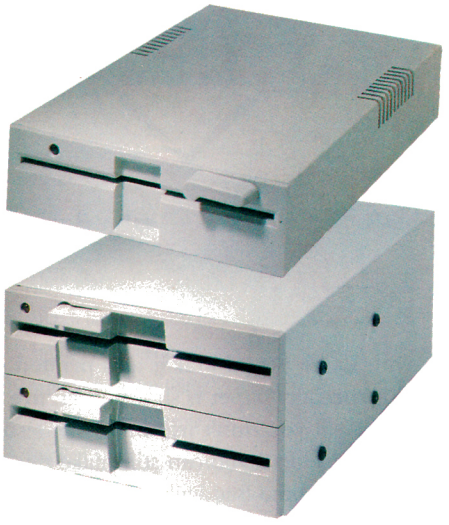

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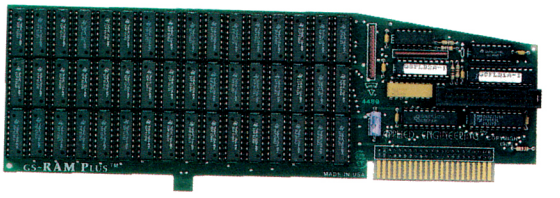

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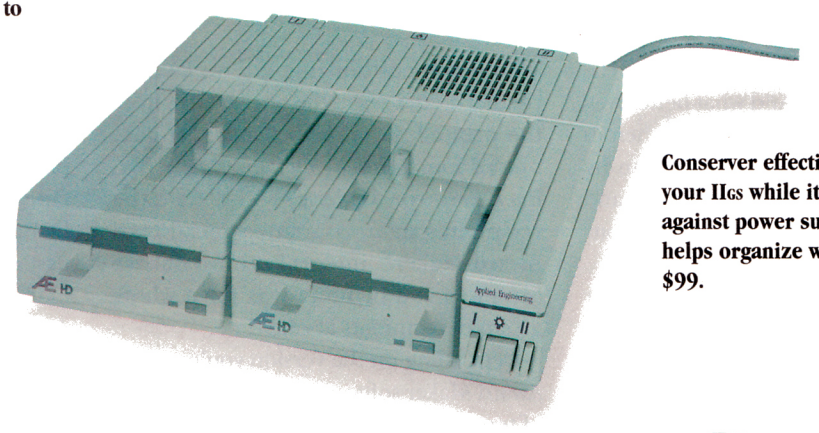

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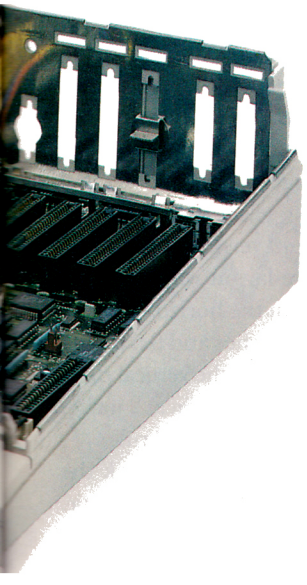



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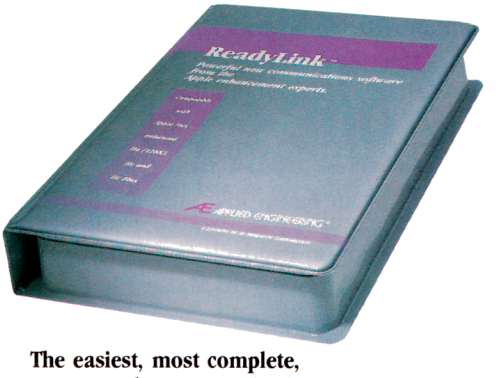

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PRESS ROOM

LAVISH PRAISE

Give the gift of approval with awards you create with specialty software or your favorite DTP program.

By CYNTHIA E. FIELD, Ph.D.

EVERYONE NEEDS A PAT ON THE back once in a while. And what better way to show appreciation to the unsung heroes in your school, club, or family than by handing out custom-designed awards and certificates that you've created with your Apple computer?

Whether you're designing awards for informal celebrations such as retirement parties or for formal ceremonies such as graduations, you can use programs that offer ready-made award templates — or design awards from scratch with your favorite desktop-publishing (DTP) program. We'll try both methods this month.

INSTANT GRATIFICATION

If we were giving an award for "Best Personal Recognition Software," we'd bestow the honor on Baudville Computer Products, publisher of **Award Maker Plus** for the Apple II family and **Laser Award Maker** for the Mac. (If your Apple's equipped with an Applied Engineering **PC Transporter**, you might want to take a look at the IBM PC version of Laser Award Maker.)

Award Maker Plus works with many popular dot-matrix printers. Laser Award Maker for the Mac requires a laser printer, such as the Apple LaserWriter or the Hewlett-Packard DeskWriter.

Each Baudville program offers dozens of ready-to-customize award and certificate templates. Some are serious, some silly, but all are designed exquisitely with attractive text and handsome layouts. Some of these templates feature graphics illustrations, as well.

To begin customizing a template, all you need do is select the one you like from the printed *Award Style Catalog*, choose one of four fonts — *Old English*, *Script*, *Book Serif*, or *Modern* — and type the recipient's name and any special text. Award Maker's integral mini-database even lets you print awards for a whole group of recipients at one time.

Depending on the version you're using, Award Maker software lets you choose one of ten or 20 striking border designs. With Award Maker Plus on your Apple II, you can also incorporate hi-res graphics images into selected layouts and transform Print Shop graphics images into borders.

Award Maker Plus lets you print borders in any of 14 colors on an ImageWriter II equipped with a multicolor ribbon. **Figure 1** is a black-and-white version of an award created with Award Maker Plus on an Apple IIGS with an ImageWriter II printer. Designing awards like this one takes less than ten minutes.

As an alternative to printing borders, you can choose the program's "no border" option and print awards on Baudville's continuous-form preprinted border paper. This high-quality stock for dot-matrix printers has a royal-blue border that lends a high-brow look to creations.

If you're using Laser Award Maker, experiment with Baudville's single-sheet preprinted border stock. The borders come in an assortment of colors: green, pewter, plum, and royal blue. An award created with Laser Award Maker and printed on this specialty paper is shown in **Figure 2**.

Even if you don't use Baudville's software products, you can still make people feel special the Baudville way: Just use the company's preprinted border stock, gold-foil award forms, and other award-making accoutrements, such as frames and presentation folders. But before adding those finishing touches, you need to start up your favorite DTP program and try out your design ideas. If you don't quite know where to start, don't sweat it — just follow our lead. We'll show you how to use both **AppleWorks GS** and **Publish It! 3** to produce custom awards that fit Baudville's fancy paper stock. To design an award to fit Baudville's preprinted border paper, first we'll use **AppleWorks GS**.

To replicate our template, fire up the AppleWorks GS page-layout module. Pull down the *File* menu, select *Page Setup*, and click on the *Condensed* vertical-sizing radio button. In the page-layout window, drag two ruler guides from the horizontal ruler and place them at 2 inches and 9.5 inches on the vertical ruler. From the vertical ruler, drag two guides and place them at 2 inches and 6.5 inches on the horizontal ruler.

Pull down the *Options* menu, lock the guides in place, and make them magnetic. With the text tool, *rubber-band* an object (hold down the mouse button and drag) within the territory fenced off by the four ruler guides. The results should look something like **Figure 3**.

Position the I-beam inside the upper-left corner of the text object and type the award's text. Experiment with various typefaces, sizes, styles, and justification options. You'll probably want to press Open apple-W (OA-W) and switch back and forth from *Actual Size* to *Fit in Window* mode to observe your design's evolution. Be sure that nothing strays outside the boundaries of the text object.

Make a few photocopies of the specialty paper with which to practice, so that you

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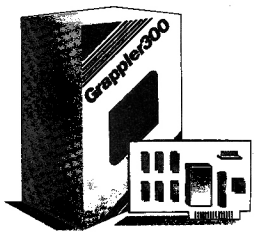

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won't waste any good paper during trial runs. When you're happy with the award's design, save it with a meaningful name on a formatted data disk. You might even want to keep a separate, labeled floppy just for awards and certificates you create.

When you're ready to print the final version of the award, insert a single sheet of colored-border stock into the printer. On the ImageWriter II, line up the left edge of the paper with the single-sheet icon on the back cover. Insert the paper so that it barely meets resistance from the platen. Then press the form-feed button once to advance the paper to the top-of-page position. Print the award in AppleWorks GS' *Better Text* mode.

The hypothetical award we created with AppleWorks GS is shown in **Figure 4**. We used the public-domain typeface called *New Century Schoolbook* and the *Geneva* typeface included in the original AppleWorks GS System Disk. Among other special effects, we chose the shadow type style for *Employee of the Month* and placed the recipient's name in italics.

Note that we switched to a smaller type size for the date and the name of the person signing the award. We also shifted these items right to reserve room for the adhesive-backed gold seal we added. These stickers are available from Baudville and at least one other supplier. (See the "Product Information" box.)

8-BIT ADULATION

We created our second hypothetical award with Publish It! 3 — again in less than a half hour. Start up the program and switch to *Size to Fit* mode (OA-4). With the text tool, *rubber-band* a text frame that conforms to these specifications (in inches): *Left Start, 1.000*; *Top Start, 4.250*; *Width, 6.250*; *Height, 5.500*. Select the frame and press OA-M to view and edit the specifications dialog box.

Switch to *Show Full Size* mode (OA-1), type the award's text, then customize it as you want. In our design, we didn't include graphics elements such as clip art, but there's no reason you can't. Just make sure all objects are restricted to the area allocated by the text frame you draw. **Figure 5** shows the screen appearance of our award.

Insert the paper as you did for the AppleWorks GS project described above. As suggested before, use photocopies of the actual stock for practice. When your design's perfected, save it with a meaningful name on a formatted data disk.

Because Baudville's gold-foil award stock is a real heavyweight, you'll need to adjust the paper-thickness lever on your printer before running off the final award. On the ImageWriter II, we pushed the lever all the way down and, even then, had to be careful to avoid paper jams.

If you encounter problems with your printer, you can edit the page-layout template. Change the text frame's *Top Start* to *0.000* inches (don't change other specs, though), and advance the gold-foil award stock manually so the printhead sits about one-quarter inch below the word *AWARD*.

The finished document is shown in **Figure 6**. For this sample, we used various sizes of the *Wilmette* typeface. We added two streamers made of blue silk ribbon and secured them with an embossed gold seal, both of which we purchased from Baudville Computer Products.

COMPUTER KUDOS

Baudville offers a complete range of products, but check the "Product Information" box for additional sources of specialty papers, gold seals, certificate frames, and presentation folders. Because of subtle differences in the layout of various preprinted forms, the need for a precise fit may require you to adjust the ruler guides (AppleWorks GS) or text frame (Publish It! 3) of your templates.

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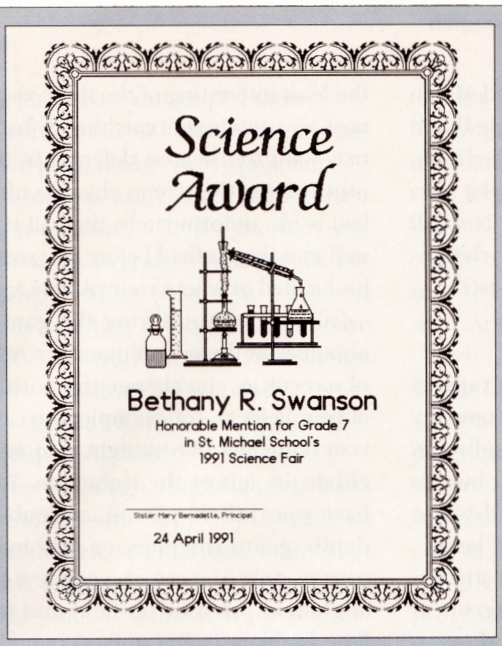


Figure 1 (above). **Team up Award Maker Plus, a IIgs, and an ImageWriter II to create this award.**



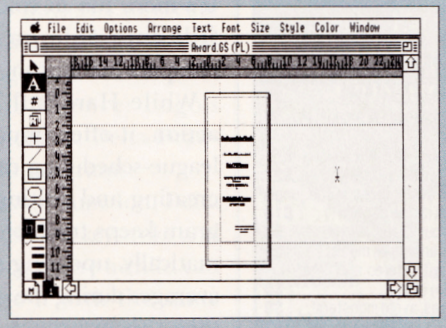


Figure 2 (top). **Laser Award Maker design on specialty paper.**

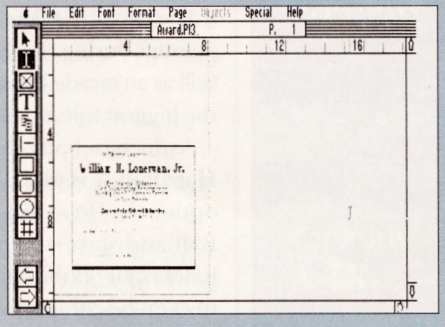
Figure 3 (bottom). **Screen dump from custom template.**

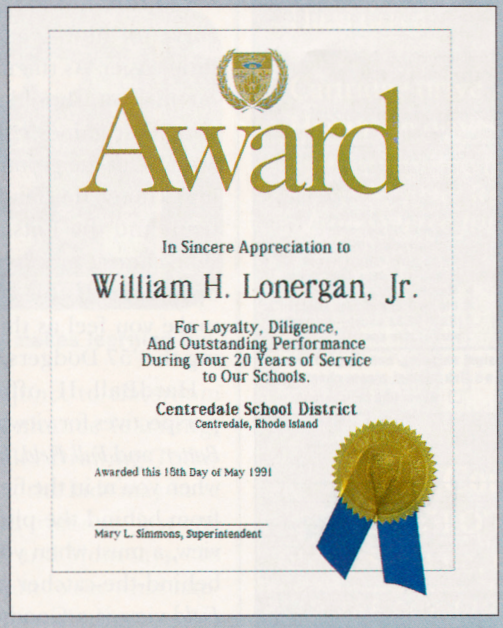


Figure 4 (above). **Use AppleWorks GS to design an award like this one.**

Figure 5 (top right). **Screen dump of the Publish It! 3 award in progress.**

Figure 6 (bottom right). **Award created with Publish It! 3 and printed on specialty paper.**





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Continued from p. 32

legend. (See April 1987, p. 95, and March 1988, p. 48, for reviews of the Apple II and IIGS versions.) Second, there's a lack of high-quality entertainment software for the Mac. HardBall II is by far the best Mac baseball game available, which leads to the rhetorical question "What's the second best?"

BATTER UP

HardBall II offers the vivid graphics you'd expect from Accolade, the company that set the standard for sports software. It's more fun in color, of course, but it's still enjoyable on a black-and-white compact Macintosh, such as the Classic.

While HardBall II excels at arcade action, it offers much more in terms of league-scheduling capabilities and team-creating and editing features. The program keeps track of team statistics automatically, updating stats such as batting averages during the game. Accolade could take this approach a step further and include stats for current teams instead of the fictitious teams that come with the game.

HardBall II takes player statistics into account during the game, but it's still your skill as an arcade hitter and fielder that plays the biggest role in whether you win or lose.

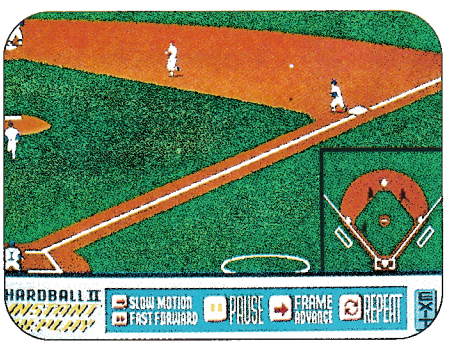
As in baseball, the key to winning at HardBall II is practice. (Wind sprints are optional.) Don't expect to boot up HardBall and start scoring runs and stealing bases right off the bat. In fact, don't expect to even be competitive.

You can, however, make the learning curve for hitting and playing defense a little easier. As the manual wisely recommends, you should select the teams for your first games carefully. If you really want to hit the ground running (and scoring), choose the Sandlot Swingers for your team and the Lotsa Losers — a cast of slow, clumsy, hitless ballplayers — as your opponent. If this combination doesn't make you feel as though you're managing the '57 Dodgers, nothing will.

HardBall II offers three different perspectives for viewing the action: *Pitcher*, *Batter*, and *Full Field*. In *Pitcher* view, best for when you're in the field, you see the action from behind the pitcher's mound. *Batter* view, a must when you're at the plate, is a behind-the-catcher perspective, and *Full Field* view is a Goodyear-blimp-type shot that lets you see the whole field at once. It's the least interesting of the three views, but until you get used to catching fly balls, you may want to use it on defense. In the two other views, the screen changes after the ball is hit; unfortunately, the ball is pretty well into the outfield before you see where it's headed or where your players are.

In addition to playing the game, you also take on the role of manager. A variety of screens let you change the positioning of your fielders. For example, you can have your outfielder play straight away or shade either the left or the right side. You can have your infield play in, at double-play depth, guard the lines, or play in at the corners only. You can also create a custom alignment for your outfield and infield. One problem is that unless you're in *Full Field* viewing mode, you won't see your players' positions on the field. For example, more than once I changed my outfield to adjust to a left-handed hitter and then forgot to change it back when a righty came to the plate. After you get burned a couple of times, you start to remember where your fielders are.

After you tire of playing with HardBall's



HardBall II: The big leagues.

fictitious teams, you can personalize the game by creating your own with the software's team editor. You can make a team's skills resemble those of your favorite baseball team, or you can create a dream team. I had a great time building a HardBall team based on the tendencies of my softball team, the Fish Heads. I tried to be realistic, but there's nothing — except your conscience — to stop you from building a nearly indestructible super team.

NOT QUITE A PERFECT GAME

HardBall II has only a couple drawbacks. As noted above, the game would be more interesting if it used real teams' statistics,

for one thing. For example, I'd rather have the stats for the 1990 Red Sox than stats for the hypothetical Boston Minutemen.

Then too, Accolade could have gone a step or two further to add a greater sense of authenticity overall to HardBall II. For example, you can choose from seven stadiums based on real ballparks, but the game doesn't identify Fenway Park, Yankee Stadium, Candlestick Park, and so on as such — instead it lists the city in which the stadium is located.

In general, though, HardBall's drawbacks are minor. If you want to play serious defense, though, you may want to invest in a joystick. To most Mac users, the thought of a joystick plugged into the Apple Desktop Bus (ADB) is foreign, but games like HardBall may change that. In this case, a joystick is more of a necessity that a luxury. You can enjoy HardBall without a joystick, but using the keyboard makes the game a little too challenging — and playing it with the mouse is nearly impossible.

If you love baseball and the Macintosh, HardBall II is a must. It can't replace the feeling of standing on second base after a line shot in the gap or the excitement of box seats at Fenway — but when you're not outside playing or watching the real thing, step up to your Mac and take a few cuts with HardBall II.

Dan Muse
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Question: When is a drawing program not just a drawing program? Answer: When it's a learning tool, too. Power Industries' Delta Drawing Today not only presents young users with a graphics program that's fun and easy to use, but also with a specialized language — a key that can open the door to exploration, discovery, and logical thinking. Through the act of drawing on screen, children as young as 3 can manipulate patterns, become familiar with letters and numbers, and develop some beginning computer skills. Older children can use logic and math concepts intuitively while they learn to program their Apples — painlessly.

Delta Drawing Today inevitably invites comparison with Logo, the familiar computer language for children. Both programs use on-screen drawing; both use reiteration of simple patterns to create complex designs; both use a delta-shaped cursor, known in Logo as a "turtle." Yet there's one major difference: Logo's programs result in pictures; Delta Drawing's pictures result in programs.

Using a powerful macro function, Delta Drawing Today records each keystroke and saves it in live memory, where a child can replay it or combine it with the same keystroke or with other saved functions to create complex pictures, kaleidoscopes, and simple animation. This macro function makes the program, in effect, a simpler Logo, one that even very young children can use effectively.

Does this mean that Delta Drawing is designed as a first step — a stop on the way to learning Logo? To some educators it will be — those dedicated to the philosophy of learning that Logo epitomizes. Others will find Delta Drawing an end in itself — a curriculum-integration tool and an adjunct to classroom projects that can enhance learning. Parents will find Delta Drawing Today just plain fun. In fact, the kids may have to stand by while Dad tries out "just one more kaleidoscope," and Mom says, "In a minute, honey. I want to see what happens if I combine this with that . . . ."

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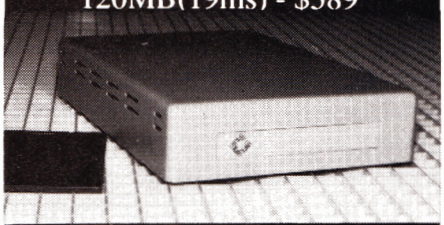

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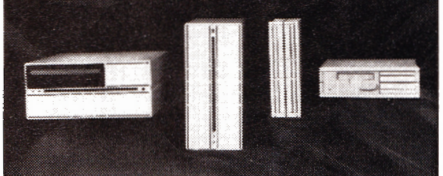

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and running in just a few minutes, thanks to an excellent manual that combines a teacher's guide, a user's guide, and a series of flash cards in one handsome package. The documentation suggests that first-timers use just five basic commands: *(D)raw*, which draws a line one unit long in the direction of the cursor arrow each time you press the key; *(M)ove*, which moves the cursor one unit without drawing; *(R)ight*; *(L)eft*; and *(E)rase*. Adults and kids alike will want to use *(C)olor*, though, as well. Apples with 64K of RAM are limited to five colors; 128K machines can use 15. Using color in a picture is easy even for children too young to read: Colors cycle with each press of the *C* key, and the choice is shown on a line at the bottom of the screen. You can draw shapes in black and fill them with color for interesting fade effects.

Easy as it is to use, Delta Drawing is by no means a rudimentary program. Version 4 contains a number of sophisticated commands to enhance your drawings, including one for mirror-image drawing and another for creating kaleidoscopic effects. You can enlarge a drawing, shrink it, squeeze it, or stretch it, or scroll the entire picture. If the line increment doesn't suit your needs, you can halve it. You can vary your drawing speed from slow motion to normal. *(H)iding* the cursor cranks the drawing speed to overdrive, while a special *Quiet* command allows a pause in the program that you can vary from one twentieth of a second to as long as you like. The program's text mode lets you try out special effects with letters and allows labeling of graphics.

As with Logo, Delta Drawing Today's real strength comes from its reiterative functions. For example *(D)raw, (D)raw, (L)eft, (S)ave* creates an arc saved in memory as F1. Pressing *12*, then *F1*, then *(S)ave* tells the program to draw the arc 12 times, resulting in a circle with that function saved in memory as F2. Interspersing *(M)ove, (C)olor, (K)aleidoscope*, and direction commands with the newly created F2 creates endless designs on screen, to the delight of children and parents alike. Up to nine functions can exist in memory at one time, and you can save functions and drawings to disk. You can print in black-and-white or color, for signs, posters, and story illustrations. The program supports a number of printers.

THE OTHER SIDE

Nitpicks? The program's copy-protection scheme doesn't permit hard-disk installation unless you spring for the pricey AppleTalk network version. Also, while the program concept is great, the graphics images can be less than stunning, especially when compared with those produced with some of the slick packages available today. Overall, though, it might be a tough fight to lure kids away from arcade machines, but Delta Drawing ought to make the top of anyone's "best buy" list. Consider it an investment in your child's future. ❑

Sharon Webb
Blairsville, GA

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CALL TO ARMS

By DAVID D. THORNBURG, Ph.D.

During his speech presenting "America 2000," a new strategy for educational reform in our nation, President Bush made a statement that struck a responsive chord: "To those who want to see real improvement in American education, I say there will be no renaissance without revolution." This statement is a call to arms for all who are working to restructure education so that it honors a child's innate capacity to learn. Phillip Schlechty, in his book *Schools for the 21st Century: Leadership Imperatives for Educational Reform* (Jossey-Bass, $20.95), says that the ideology surrounding schools has changed several times in our country's history, and we're ripe for another transformation. Colonial society established schools to meet the moral and literacy needs of the early landholders. During the 1800s, a school's purpose was to meet the needs of workers in industry. More recently, we've shifted our schools to a "hospital" model, in which teachers test students for learning disabilities and create special programs to enable these children to move along their own tracks.



Schlechty argues that the time for change has come again. We need to start viewing schools as places where "knowledge work" occurs — environments in which students receive basic information, then work to make sense of it, constructing knowledge in the process. A lecture-based approach to teaching provides only the starting point; the real work begins after the lecture.

If we accept this premise, we need to reexamine the teacher's role. If the teacher is just a content expert and deliverer of information, students never get the chance to work with him or her to achieve an understanding and appreciation of the topic. But if kids receive the core information through other means, the teacher can be the facilitator of the meaningful part of education — the use, expansion, and interconnection of information in the student's life.

But to give teachers this opportunity we must also reexamine technology's role. If we compare the technology in today's classrooms to that in our homes, we see that our homes are becoming better resourses for information than our classrooms. Can we take advantage of this fact to restructure education?

If information from TV stations such as the the Public Broadcasting System, as well as CD-ROM discs and multimedia presentations, becomes an integral part of students' learning experiences, teachers will be able to focus on helping students develop and use that information. I can't imagine many science teachers presenting information on sharks, for example, with the effectiveness of the Discovery Channel video on this topic — nor should they try. If these channels were to create programs geared to the curricular needs of school systems, students could receive lecture-based instruction at home, and work on their "homework" in class with the assistance and support of a teacher.

Despite the obvious advantages of utilizing home-based technology and freeing teachers to help kids shape their knowledge, it's still a radical concept and may not be the solution we're looking for. But if the gap between technology at home and in class doesn't narrow, schools will have to radically change their role or they'll cease to exist.

It's true that this revolutionary concept will demand a degree of commitment (both financial and emotional) on the part of each child's family, and that the question of unequal distribution of costly technological equipment among the poorer members of our society won't be solved easily. Where will our national leadership take us? The current national focus on education gives us a golden opportunity to redesign education so that it honors the needs of our students and helps them prepare for their future. The challenge has begun. ❑

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HINTS

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By THE STAFF OF INCIDER/A+

SYSTEM EXTENSIONS

In the beginning, there was system software. And lo, it encompassed many functions. Primarily, it allowed access to storage devices, but there was more: The "desktop metaphor" was a work environment that extended beyond SAVEing and LOADing, yea into the very heart of applications. Witness the ever-present menu bar and Apple's *Human Interface Guidelines*. And the people rejoiced. But then the people cried out, "We're not satisfied! We're unruly, argumentative, and demanding! We want to modify our work environment to suit our own petty and fickle needs!" And Apple said, "I'm way ahead of you."

The fundamental Mac and GS/OS system extension is the *initialization program*, or *INIT*. INITs load when you boot your system and insert themselves into the system software. They may improve on standard functions or add new ones. To install an INIT, place it in your System folder (where your machine will call it a *Startup* document), and restart. If you watch the lower left corner of your screen while your machine is booting, you'll see an icon appear, indicating that your INIT has loaded successfully. There are many INITs available, especially from shareware sources, including screen-capture and virus-protection programs.

Control Panel devices, or *CDEVs*, are similar to INITs in that you just drop them into your System folder and restart; they load and mesh directly with the system software. One difference, though, is that they include user-adjustable parameters you can access through the Control Panel under the *Apple* menu. Screen blanking programs such as Fifth Generation's **Pyro!** are usually CDEVs; another popular program is the shareware CDEV **SoundMaster**, which lets you assign sounds to Finder actions such as "open," "close," or "copy." Similar CDEVs are also available for the IIGS: Drag the file into the CDEV folder within the System folder. Reboot, and press Control-Open apple-Escape to access the Control Panel.

Desk accessories (*DAs*), or *new desk accessories* (*NDAs*) for GS/OS users, are mini-programs your system software keeps in a special file and displays under the *Apple* menu. Under System 6.x for the Mac, you have to use the utility Font/DA Mover to install DAs. If you have System 7, or a IIGS, all you have to do to install any system extension is drop it into the proper folder and reboot. Apple ships several desk accessories with its Mac system software, including a calculator, an alarm clock, the Control Panel, and the Chooser, which lets you select your printer. GS owners also have *CDAs*, or *classic desk accessories*, found in the IIGS Control Panel. You can add CDAs to your system, but not many developers write them. One good source, though, is **A2-Central**'s monthly software disks (P.O. Box 11250, Overland Park, KS 66207, 913-469-6502). **— C.C.**

AUTO-INDENTER

Macros are supposed to make your work easier so that you can follow that creative thought without pausing to think about software commands and sequences. Here's one that does just that.

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Copy the macro at left to your default list. Then use *Macro Compiler* from the TimeOut menu to recompile the macro file, and *Macro Options* to resave it as your default set. Put the cursor on the line where you want the indentation to begin, then in the column to which you want to indent. Press **<ba-I>** and AppleWorks will indent the following paragraphs automatically. **— Will Nelkin**

```
start
=================================================
<ba-I>:<awp><          { AUTO-INDENT MACRO, only in a WP file  }
posn x, y :            { records cursor position in variables  }
                       { x = horizontal position on screen     }
                       { y = vertical position on screen       }
first :                { sends cursor to the left margin       }
posn z, y :            { records new horizontal position       }
x = x - z :            { redefines x as the difference . . .   }
                       { . . . between the horizontal positions }
                       { this accounts for varied left margins }
oa-O>IN<rtn :          { call the Printer Options menu . . .   }
                       { . . . and select the Indent command   }
print x : rtn :        { enter x as the number of characters   }
esc>!                  { escape the menu, return to your file  }
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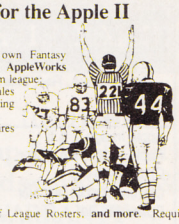

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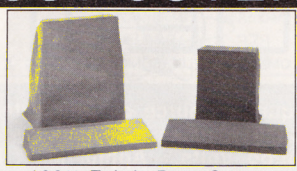

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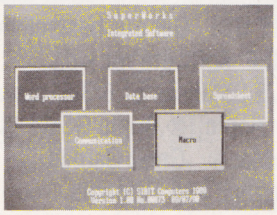

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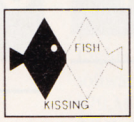



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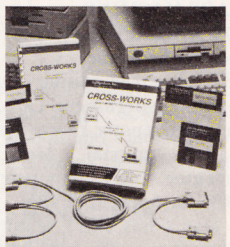

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HYPERBOLE

Is multimedia the wave of the future of literature?

A *hyperbole*, if you study literature, is an exaggeration, or an extravagant statement used as a figure of speech to make a point: *I'm so hungy I could eat a horse. That movie lasted forever.* **HyperBole**, from Resource-Central, is a magazine on disk. Its articles are created with Roger Wagner's HyperStudio on an Apple IIGS, and include words — in the form of poems and narratives — along with photographs, paintings, and original music.

It's multimedia. *HyperBole is revolutionary. It will change forever the way people communicate. Its uses are infinite.* (Irony is also a figure of speech.)

So what exactly is HyperBole? We can start by saying what it's not. It's not a collection of the latest and greatest HyperStudio stacks, for one thing. That's *Stack-Central*, also a product of Resource-Central, and now better than ever under the watchful eye of Dean Esmay, who's been the editor of *A2-Central: The Disk* for as long as anyone can remember. It's also not for everybody. HyperBole demands considerable attention from its readers.

HyperBole calls itself "an eclectic literary journal," and that it is. It contains stories, poems, and frantic foaming rages passing for essays. But eclectic literary journals sprout up like mushrooms around any campus, and none of them becomes Editors' Choice. Stories, poems, and essays won't do the trick. What sets HyperBole apart is that it's the first literary journal *in hypermedia*.

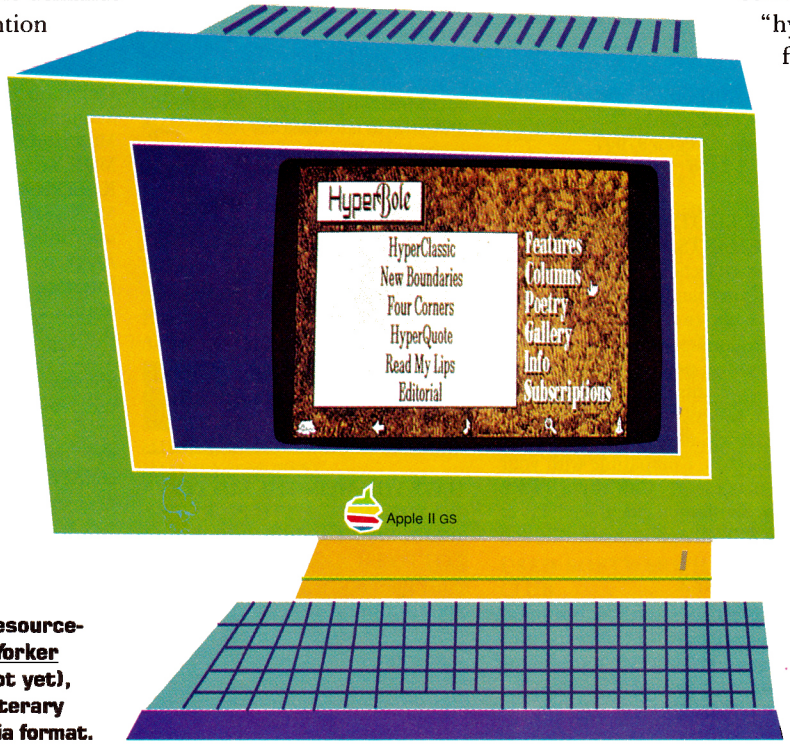
Greg Roach, the man behind HyperBole, worries about the names of things: what to call the person who designs a HyperStudio creation, what to call that creation, how to tell the authors of HyperBole that he wants their pieces to be more "hyper" — more fitted to his peculiar medium.

Roach is a playwright, actor, and director from Houston. He bought an Apple IIc six years ago; because he likes words, he tried to play text adventure games. "They should have been a portal to a different world," he says, but they weren't. Computer games lacked imagination, Roach thought. Later he bought an Apple IIGS, and still later HyperStudio. "Here was the answer I'd been looking for," he recalls.

Roach says that the Apple IIGS is the finest multimedia computer available, and he should know: He's working on a Mac HyperCard version of HyperBole (which will also be available from Resource-Central), but finds that he misses the GS' color graphics and musical abilities. On the other hand, he likes the ease with which he can program a HyperCard stack.

Hypermedia, by definition, does many things — but one of the tasks assigned it by a number of its makers and hangers-on is the destruction of the book. Roach says he's not comfortable with the glib assertion that "hypermedia is the literature of the future," but that he has to admit that hypermedia's only going to become more important: "Its potential as a means of communication is enormous."

A subscription to HyperBole (three issues a year, two disks per issue, HyperStudio not required) sells for $20 from Resource-Central, P.O. Box 11250, Overland Park, KS 66207, (913) 469-6502. A sampler pack is $3. Submissions of hypermedia literature for possible publication in HyperBole should go to King's Gambit, 2402 Yoakum #2, Houston, TX 77006, (713) 522-0383.



HyperBole, from Resource-Central: The New Yorker it's not (at least not yet), but it is the first literary journal in hypermedia format.

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