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The Macintosh™ Magazine

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>
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MACWORLD

May 1986

The Macintosh™ Magazine

Getting Started

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Danny Goodman
A big plus with the new Macintosh: the Hierarchical File System blazes a trail to a civilized and flexible organization of files within folders. Take a guided tour with this introduction.

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- *Fokker Triplane Flight Simulator* Experience the thrill of a World War I dogfight as you fly the simulated skies.
- *Hard Disk Util* This handy utility lets you run programs on a hard disk without inserting master disks.
- *Housekeeper* Keep track of your possessions with an easy-to-use home inventory program.
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Infoworld (July 8, 1985): "...it is Macintosh software done right."

Icon Review (Fall 1985): "OverVUE 2.0 is our favorite database workhorse... it simply offers the best balance of power and ease-of-use available on the market today."

Nibble Mac (Oct. 1985): "OverVUE is not only easy to set up, it's the easiest for data entry. Its tools for entering repetitive data minimizes typing time."

Online Today (electronic version — Nov. 1985): OverVUE 2.0 is a heavy-duty data management tool... It does all the things a good relational database manager should."

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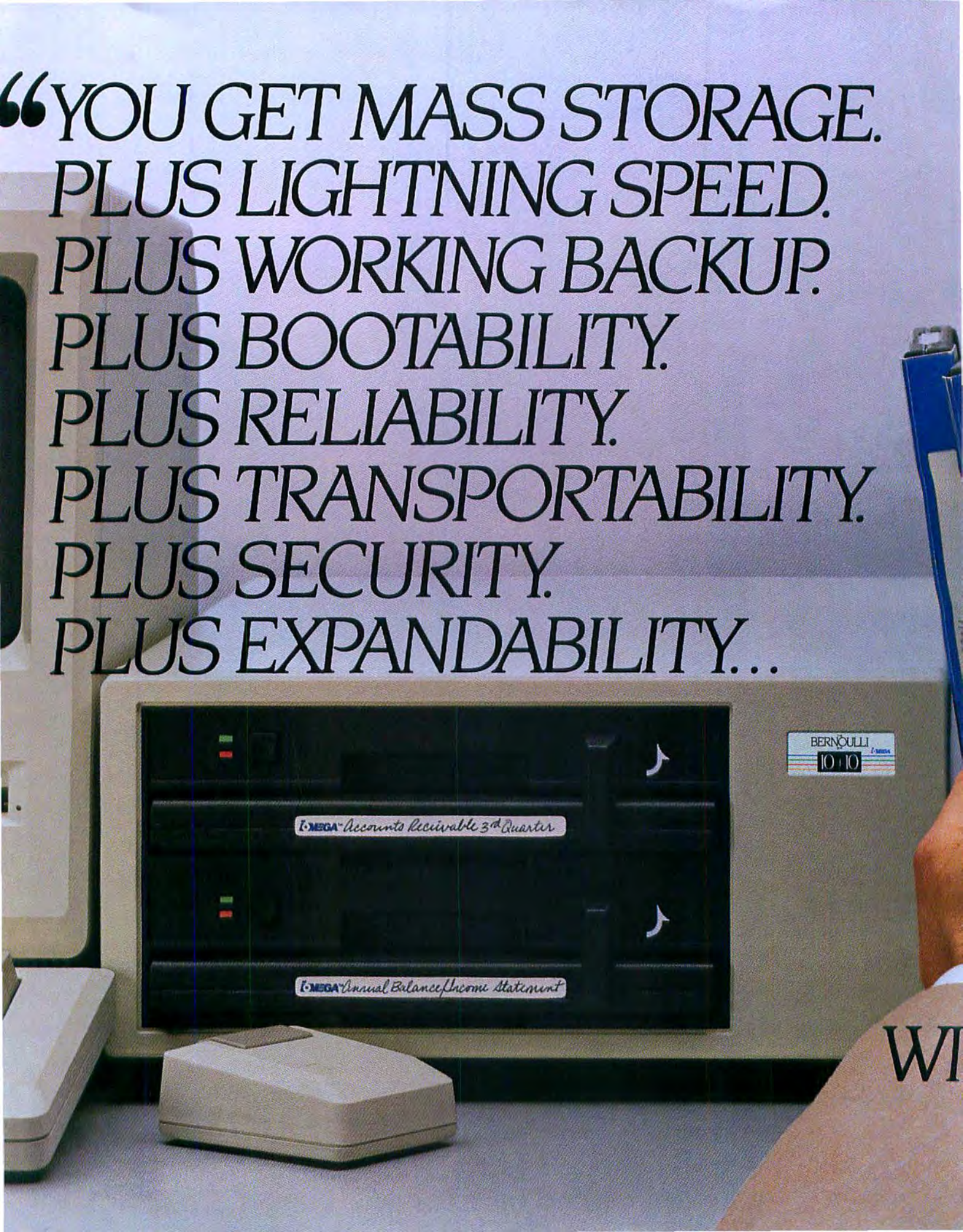
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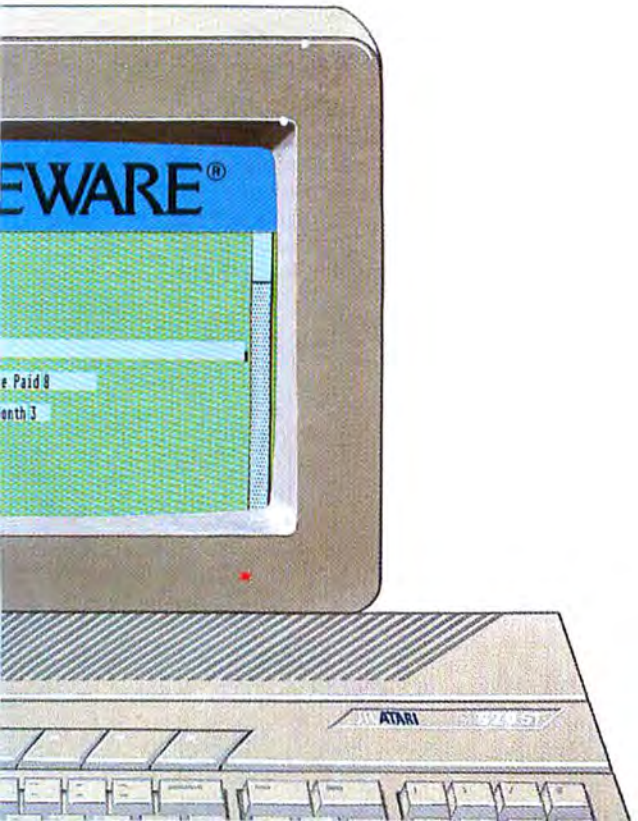

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For their needs, Activision® focused on the built-in MIDI ports for attaching synthesizers and other musical instruments. This enabled them to design the ultimate program for playing and composing music.

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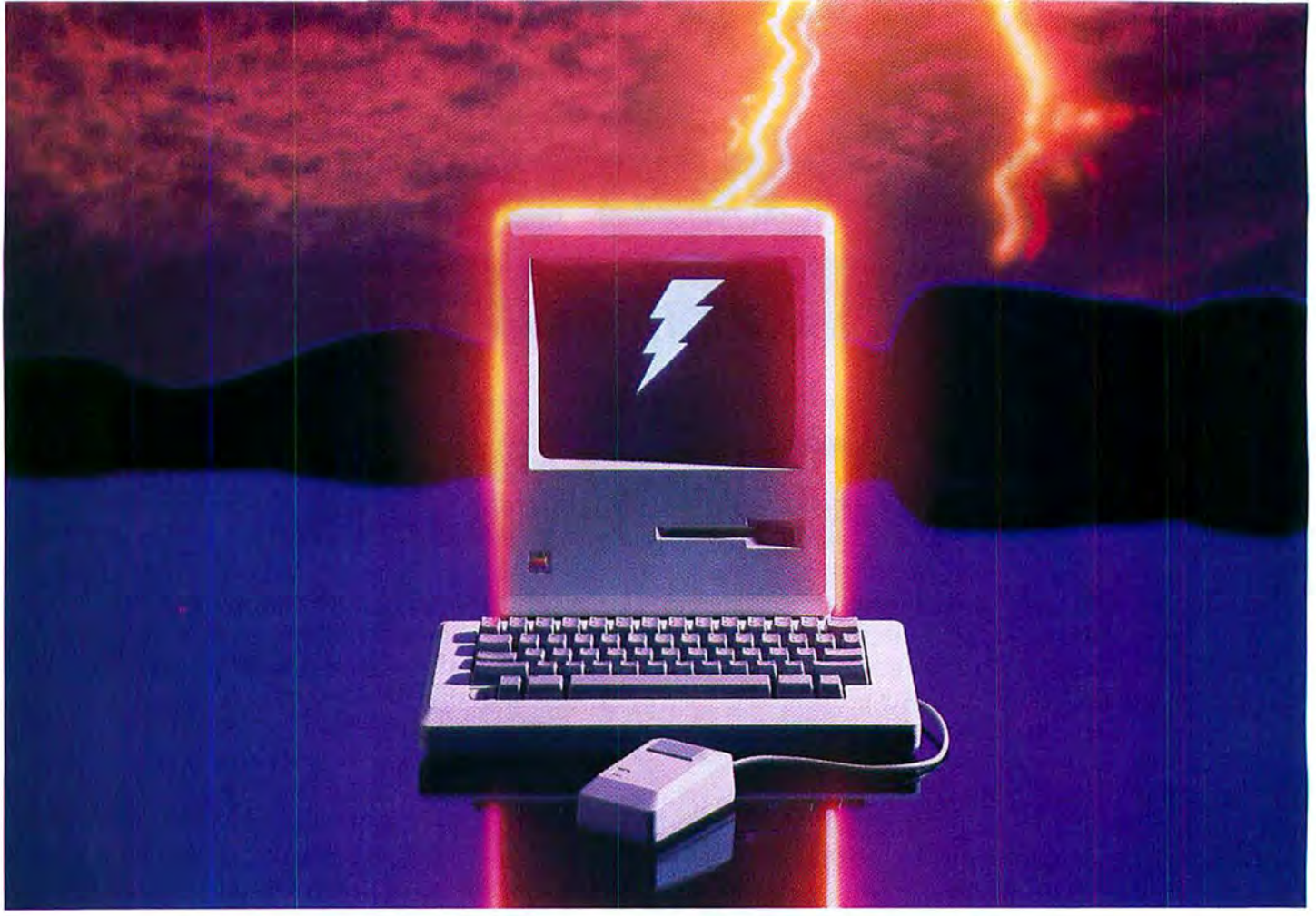

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Start with Speed. By increasing the Macintosh's 8 Mhz. processing speed to 12.5 Mhz., the Three to One Touch Board more than doubles your processing speed. This means that you will now be able to load and operate up to eight programs using Apple's Switcher™ in a fraction of the time it would otherwise take.

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David Bunnell

Personal Computer Games Come of Age

A new genre of computer play mimics the real world, exercising the mind and not just the mouse

Ultimately, computer games will change the way we think about thinking.

Conventional wisdom in the personal computer industry says that the potential of home computers will not be realized until some truly practical and desirable application comes along. Electronic shopping and control of household appliances are often cited as the breakthroughs that will someday send hordes of new customers to the computer stores.

But I believe that it will be entertainment, not utility, that makes the home computer a standard household item.

I'm not referring to multitasking, RAM-resident utilities, networking, artificial intelligence, databases, or even cursor keys that glow in the dark.

No, I'm thinking about something that happens to have many more implications for humanity's mental health: computer games.

In the final analysis, computer games will prove to be the deciding factor that puts computers in every home. Fun—not functionality—will be the key.

Ultimately, computer games will change not only the way we view the world—they will also change the way we think about thinking.

How is that possible?

First of all, I'm not referring to the goofy track 'em, eat 'em, shoot 'em up games played by the game pioneers of olden days.

We've come a long way since then.

Most early games, you may recall, grew out of video games—or, to be precise, out of the mainframe computer game called *Adventure*.

In *Adventure* you traveled along a branching path, looking left and right, and made decisions about which direction to take. You also had to pick up certain objects along the way, such as a lantern and a knife. Eventually, you crossed a stream and came to a cave.

Waiting inside the cave was a dragon you could slay only if you managed to light the lantern and grasp the knife.

Adventure was the great-granddaddy of today's interactive adventure games for personal computers. Computer games that originated from video games like *Donkey Kong, Pong,* and *Breakout* largely tested your reflexes and your hand-eye coordination.

One thing computer games didn't do was tax your brain. They were variations on a theme, and after you played them for a while, they became boring.

Because these games were so dull and repetitive, most computer magazines and computer enthusiasts wrote them off as juvenile pastimes. Games weren't seen as particularly meaningful.

Until now.

With personal computers that are more powerful and have more memory, computer games have changed dramatically. They are becoming exercises for the mind.

I heard about this notion from Trip Hawkins, president of Electronic Arts, a company that specializes in home computer games. Trip spoke at a computer conference recently about the brain's Use It or Lose It syndrome. He made the interesting observation that from the seventies on, physical exercise has been an important part of people's lives. More and more people today jog, swim, use Nautilus equipment, and engage in various other physical activities.

(continues on page 16)

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RUBICON PUBLISHING

David Bunnell

(continued from page 13)

But so far we're exercising just the body and ignoring the mind.

Trip believes that soon we'll discover it's equally important to exercise our gray matter. With practice, we'll be sharper mentally, have a better memory, and in general prolong our intellectual alertness as well as delay the mental effects of aging.

What health food is to the body, computer game software will be to the mind.

In fact, personal computer games could be the most engaging and beneficial form of mind exercise. Today, some people do the Sunday *New York Times* crossword puzzle, and some people play chess. These are mental exercises, of course. But the computer gives us the potential to enjoy a much greater variety of mental exercises with far more applications.

I've recently found two examples of games that flex the brain. There are many others, and there will be many more in the future, but both these games are excellent tools for developing awareness. They are also extremely educational.

One is Mindscape's *Balance of Power* for the Macintosh, and the other is Reality Development's *Business Simulator* for the IBM PC.

I think that the theme of *Business Simulator* reflects the fact that the IBM PC is a business-oriented machine for the corporate world, while the global quality of *Balance of Power* is more in line with the attitudes represented by Apple's Macintosh.

With *Business Simulator* you start your own company. You're in the robotics industry, you have $500,000 in seed money and access to robotics technology—and you're competing against Apple, Hewlett-Packard, Tandy, and Texas Instruments.

As you play the game, you need to make all kinds of choices—like what your prices should be, how many units you should build up in inventory, and how much you should spend on advertising. After you've made the choices, you run the program. It goes through an entire year's projections. Depending on your choices and the preprogrammed decisions of the other companies, the program determines your market share and how successful you'll be.

The game becomes more complex as you go from one level to another. For example, on a higher level you have to introduce new products into the market. There's a pet robot, then a security robot, a home robot, and other consumer products. You must decide how much money to spend on R&D. You're concerned about return on equity, about raising venture capital and building new factories. And you have to decide when to go public.

It's really like a Harvard MBA course on a disk.

Of course, the game is not real life, but you do learn many valuable concepts about doing business. As I became more involved in playing it, I began to dream at night about what kind of robots I was planning to build and what my fictional company was doing.

In fact, the game became so consuming that I spent more free time thinking about *Business Simulator* than I did about my real job at PC World Communications.

In *Balance of Power,* you find yourself playing the role of the United States or the Soviet Union. The purpose is to create a global strategy. The impact of your moves can put the whole world in jeopardy, especially since you could easily cause a nuclear conflagration.

(continues on page 18)

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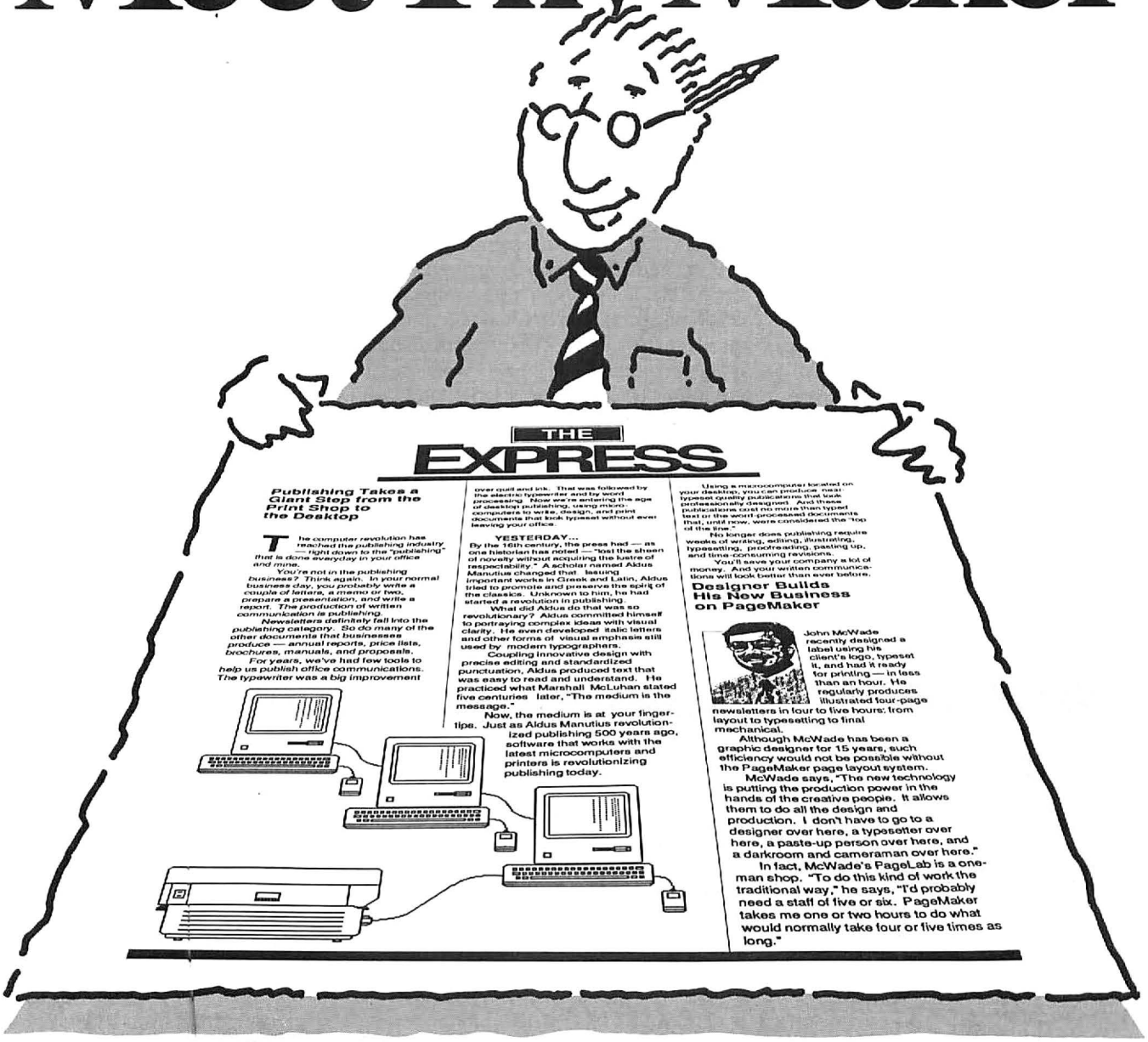
Meet Thy Maker



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(continued from page 16)

Just as with *Business Simulator,* you become completely involved, so when you accidentally blow up the world, you actually feel depressed.

As a consequence, you are determined to be more careful when you start up a new game. You come to appreciate the implications of each action, and you learn some of the complexities of international diplomacy. The game has four levels–Beginner, Intermediate, Expert, and finally, Nightmare.

As you play, you make decisions about whether you should support the use of force in a particular country or attempt a coup d'état and assume leadership. If so, how will the other superpower respond to your moves? What are the implications?

A decision that is a good strategy in one case might prove to be disastrous in another. The goal of the game is to gain more prestige than your rival without blowing up the world.

These two games are examples of how the computer game has come of age. I think that all computer users will pay more attention to games from now on.

And I predict that games will usher in a new era of fitness aimed at developing and strengthening the mind–firming up gray matter that has become flabby from lack of strategic exercise.

There could be all kinds of *Business Simulators.* In fact, just as the early computer game *Adventure* came to us from the mainframe world, today's genre of so-called reality software is also taken from mainframe computing.

For some time now, programmers have been developing business simulations on mainframes for specific companies like IBM and AT&T. So, for example, instead of playing with a robotics company, I could have a magazine publishing company. I could program my personal computer with all the characteristics of different computer magazines, and in doing so I would be creating a real-life simulation of my own business. Eventually anyone could have a custom-designed simulation.

This is where computer games are heading. As personal computers continue to gain memory and horsepower, you'll see more levels of simulation that truly relate to your life–both personally and professionally.

It's been a long time coming, but computer games are no longer going to be considered an unimportant by-product of computer technology–just something for kids to do when they want to vegetate electronically.

The games are going to be much more serious than that. Two or three years from now, computer games will be *the* thing.

When you add CD ROM technology to computer games, they're going to break through all kinds of mental barriers. That breakthrough will herald the golden age of computing, the information renaissance.

Just think about it. Radio, television, stereo–all these major advances in human communications met popular acceptance through the entertainment world.

It's always entertainment first, education second.

And with this new generation of computer games, we will see the distinction between entertainment and education disappear completely.

They will become one and the same. □

A mistake in the April column rewrote Philippe Kahn's life story; actually he never worked at Xerox.

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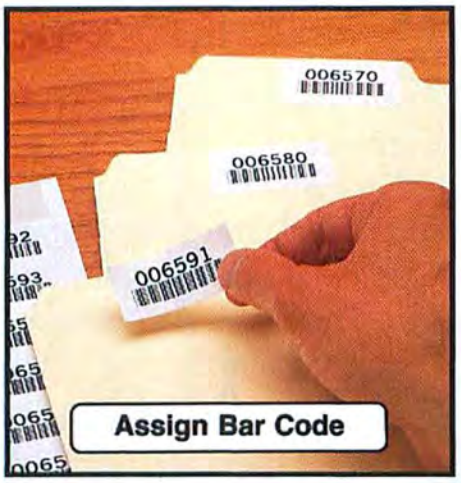

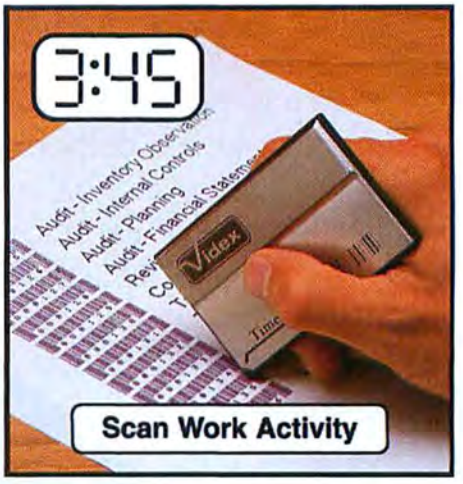

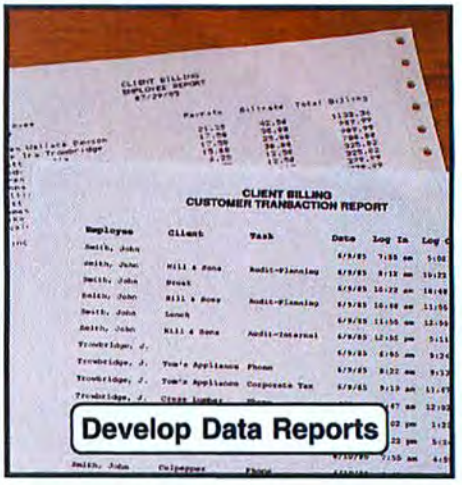

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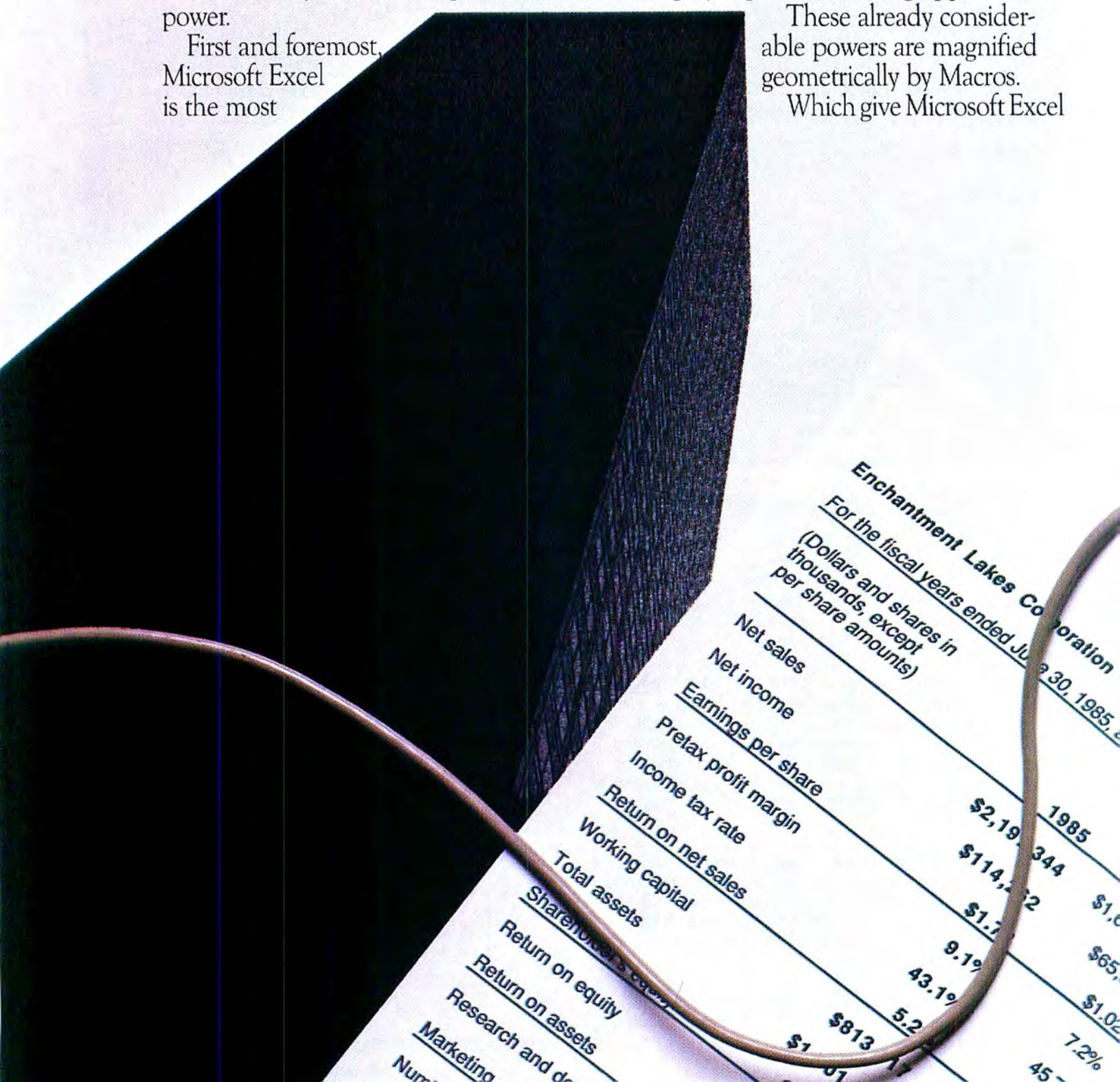

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The too bad news is that some of you think that means you're not qualified for Word.

Well, you don't need to be writing a novel to appreciate the way Word accelerates all the repetitive activities of word processing.

In fact, if you've ever needed to combine information from old files in a new one, or if you've ever had to shut down one file just to look at another—then you're ripe for Word.

Leave the windows open.

For people who've gotten used to the tedium of closing one job before they could open the next, Word's windows are a real eye-opener.

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A real time saver, even if you're only composing a memo. If, say, you needed to combine material from your three previous memos into a fourth new one.

The training wheels aren't welded on.

Some things *are* best done with mouse and menus. But once you've worked with a Macintosh for a while, you'll want the option to run commands from the keyboard as well. A faster way to order up everything from opening and closing files and starting a new file, to printing and saving, to changing font styles or page formats. It's an option only Word gives you.

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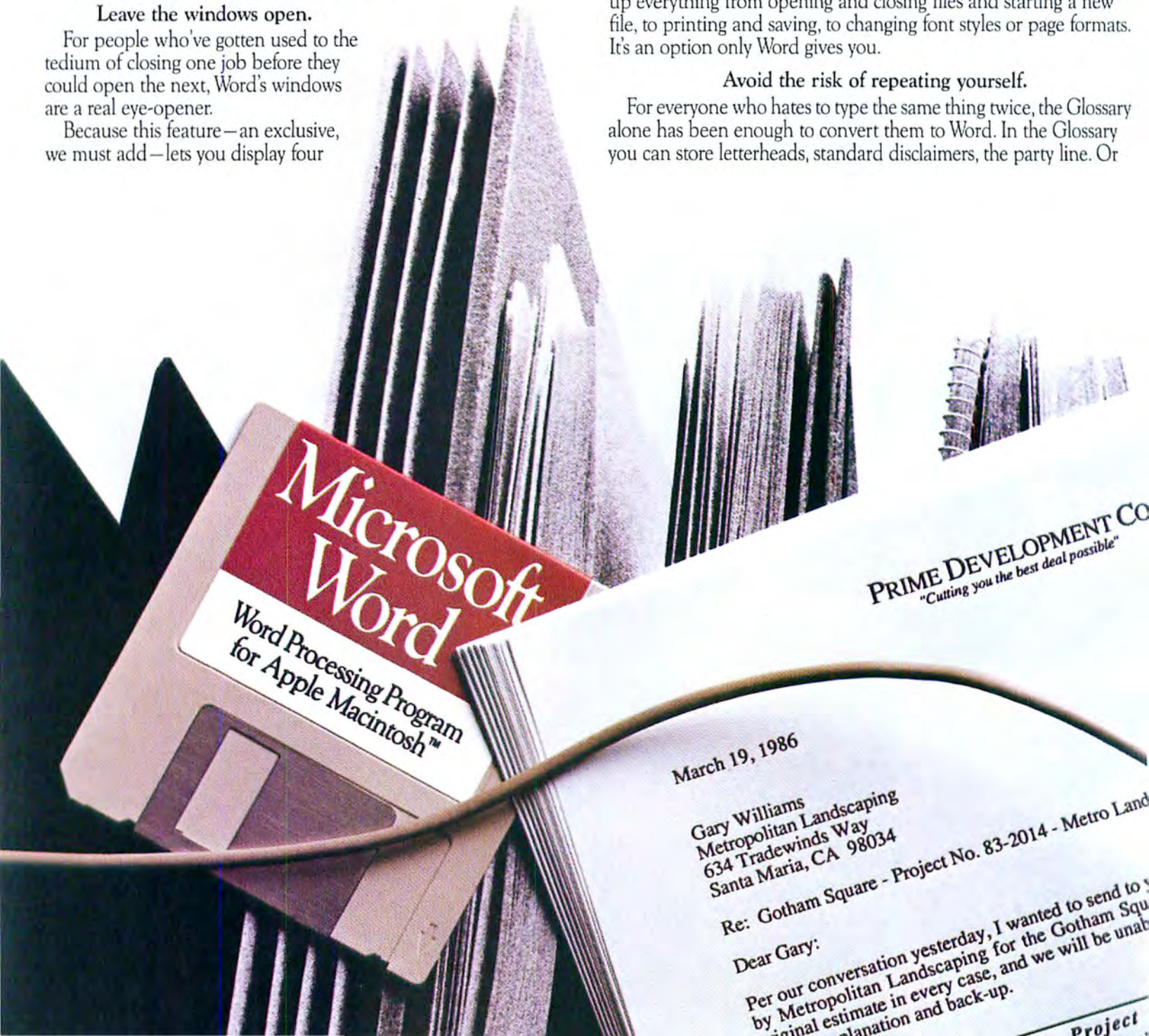

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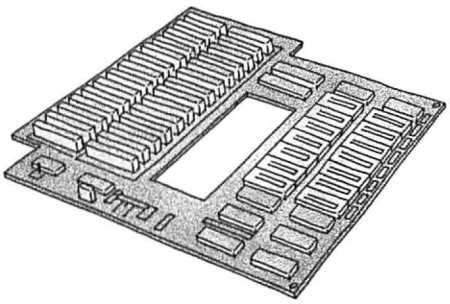

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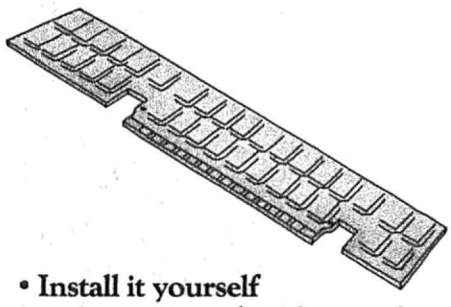

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Network Static

Until information services are as easy to use as MacPaint, the people who use them will remain a minority.

In spite of these caveats, I still recommend having a modem.

In personal computing the term *networks* refers to the various aspects of telecommunications. Networks are touted in full-spread ads in computer magazines, on modem packages, and in books and breathless articles about the emerging network nation. Networks include information services, common carriers that link personal computers to those utilities, small-scale bulletin boards, conferencing systems, videotex and teletext systems, and, of course, local area networks in the office.

None of these networks lives up to the hyperbolic promises of the last few years. The promises have come mostly from two camps: people whose business is directly related to networks and telecommunications enthusiasts who are to networks what hobbyists were to the first personal computers—brothers and sisters, under the skin, to CBers and stamp collectors. In real terms, networks are not yet ready for most people because of unfriendly user interfaces, an unfavorable cost-to-benefit ratio, the lack of hardware and software standards, and the specter of electronic junk mail.

Despite the great number of how-to books about information services, connecting a personal computer—even the otherwise easy-to-use Macintosh—to information services such as The Source or CompuServe is still time-consuming and frustrating for a beginner. Despite on-line help, tutorials, seminars, and one-to-one instruction sessions, even long-time users have their costly on-line time gobbled up by discovering through trial and error unannounced changes in a system's user interface, command set, or communications protocols. On-line services will not catch on with the general public until they are as easy to use as *MacPaint*.

Taken together, all the benefits of subscribing to an information service may justify the costs of a subscription and connect time. But most businesses and individuals do not need instant access to the whole gamut of on-line offerings, from teleshopping and airline schedules to stock market quotes and general news. The information demands of businesses and individuals are highly specific, vary with time, and can often be met more cost-effectively through alternative—and less expensive—sources, such as the public library. There will be no mass market for general information services until the cost of the services approaches the average cost of subscribing to a magazine or a newsletter.

The information services' scattershot approach negates a major advantage of microcomputer technology: the ability to narrowcast information. Although specialized services such as Newsnet and Dow Jones News/Retrieval cost more than general-information services, they are the best buys for businesses that need timely information.

No Standards and Too Much Mail

Without hardware and software standards in telecommunications, network designers are caught in a bind. Because the existing base of users includes a variety of terminals and personal computers, the search for the least common denominator (and the least cost) prevents each network from taking full advantage of the state of the art. Making telecommunications seem easy and intuitive through the still-evolving Macintosh interface takes a lot of hard work and cold cash—more than the infor-

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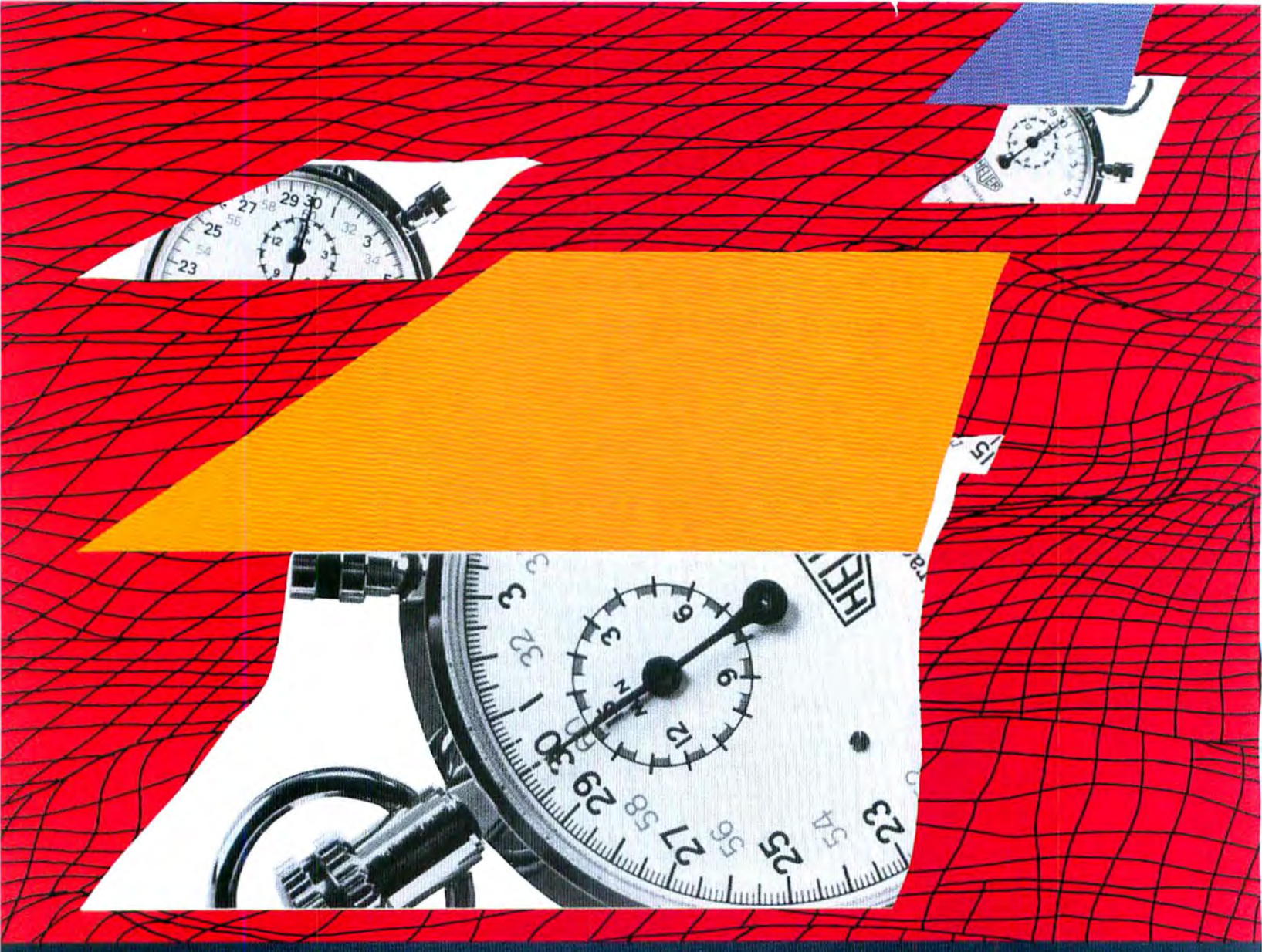

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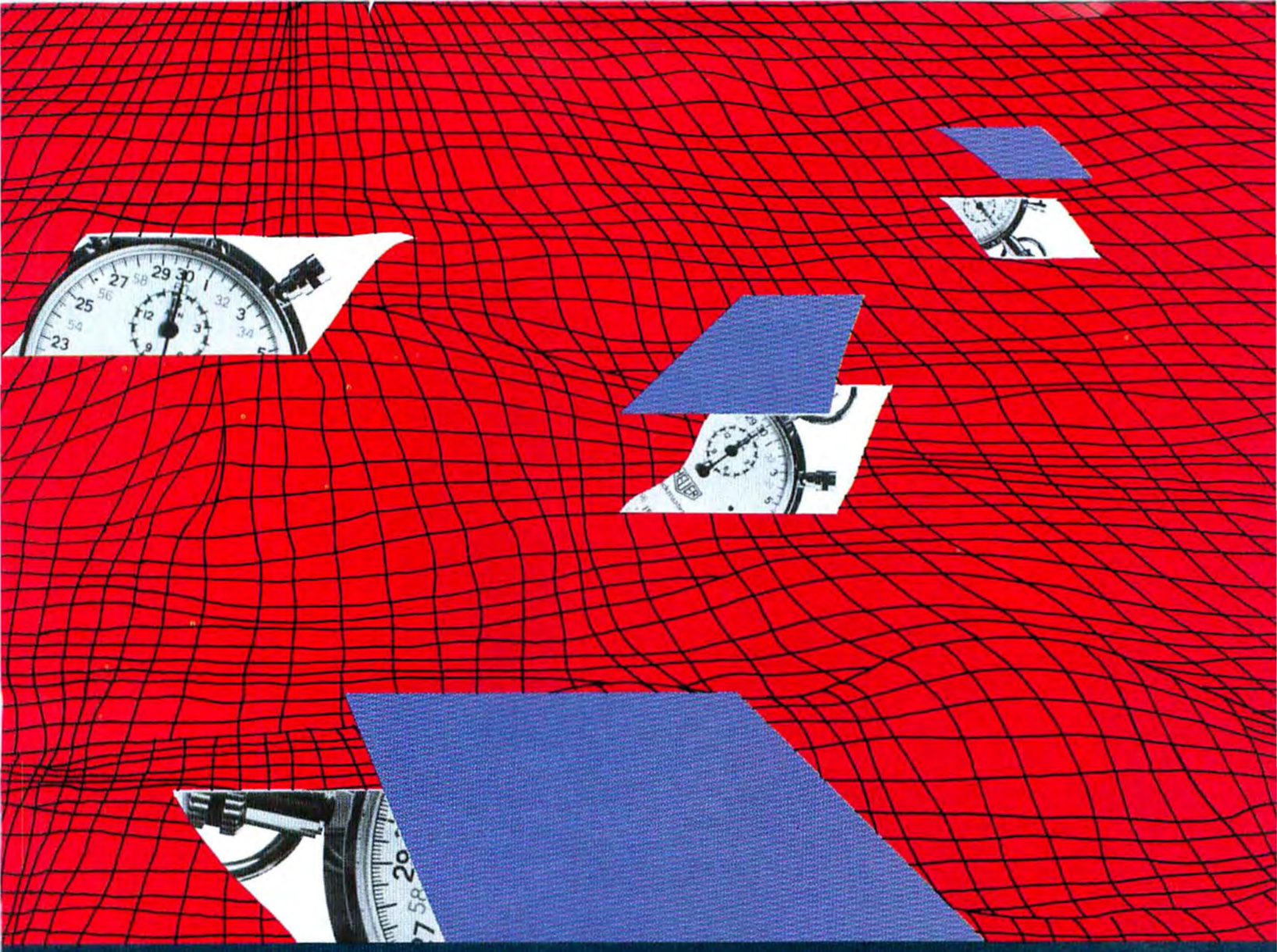

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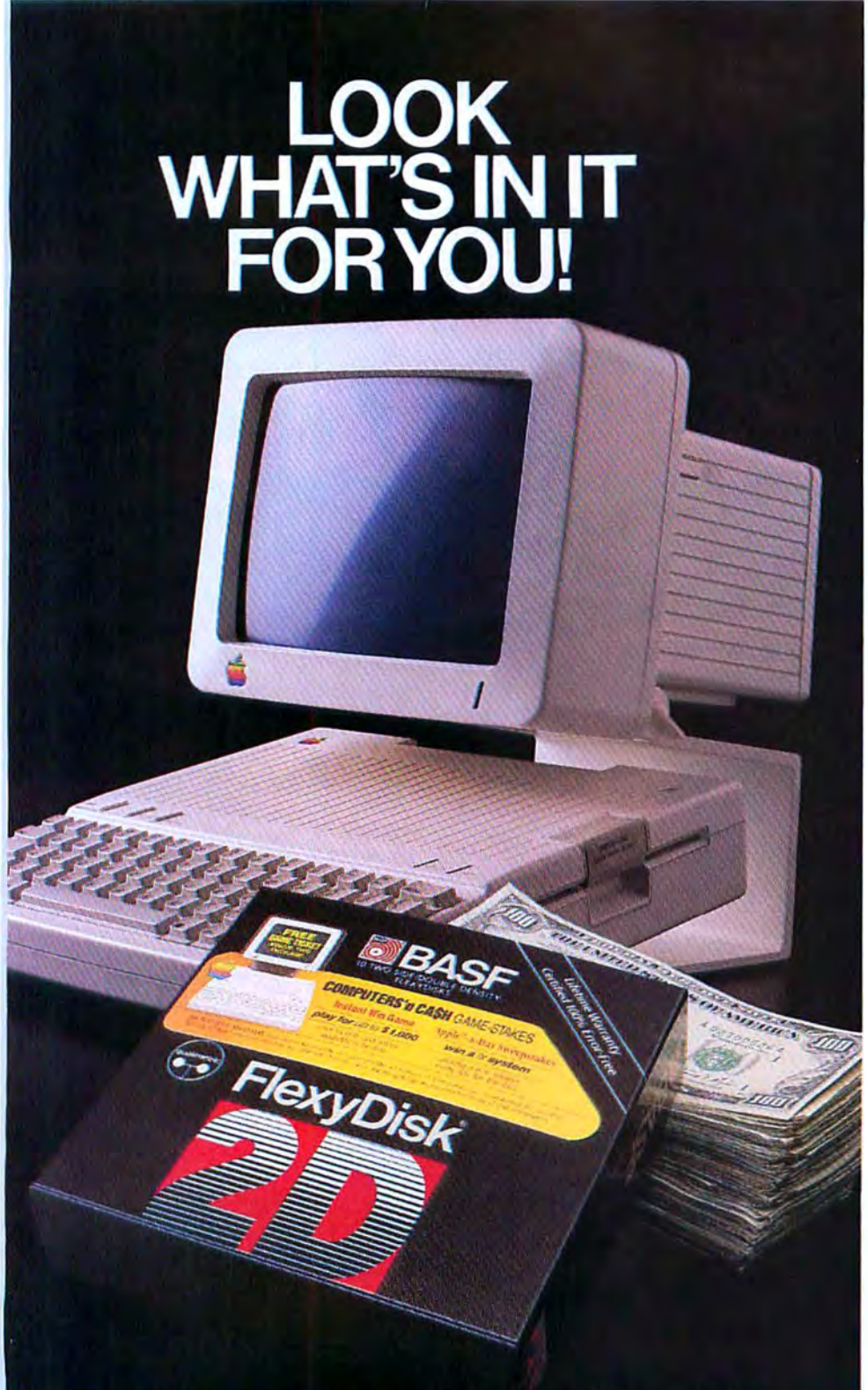

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Note Pad

(continued from page 25)

mation services can afford. Therefore, before a mass market for on-line information can emerge, telecommunications technology must reach an evolutionary plateau, which probably won't happen until early in the next century.

One of the most oversold capabilities offered by information services is electronic mail, or E-mail. E-mail can't replace all functions of regular mail. Most businesses would not finalize a contract, for example, using E-mail. They would rather depend on hard copy, face-to-face meetings, and overnight delivery services.

In my experience many more people make demands on my time through E-mail than through regular mail if I let them. Junk mail in a post office box is bad enough. Junk messages in an E-mail box are more frustrating because I have to pay for connect time to read sales pitches for information or services I am not interested in and can't afford. Besides, people who intend to communicate with one another electronically must be connected to a network, preferably the same one.

Clearly, to popularize E-mail, network designers must develop a system for validating contracts that is as easy, economical, and secure as mailing a letter.

Even with these caveats, I still recommend getting a modem. The future of telecommunications is wide open. The advent of embedded artificial intelligence features in networks will help filter out junk E-mail. Encryption-decryption systems will provide complete privacy for electronic correspondence. On the other hand, compact disk storage devices will make encyclopedic databases as cheap as paperback books and will further undercut the appeal of information services as they're currently structured. These services, in turn, will respond to the objections stated here and to the twin drives of the marketplace and technology. This response should include a few pleasant surprises for those of us who've been spoiled by the Mac and frustrated by the tangled web the networks weave.

Dean Gengle is the author of The Netweaver's Sourcebook *(Addison-Wesley, 1984) and a telecommunications consultant with the CommuniTree Group in San Francisco.* □

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- Full use of the MAC Interface
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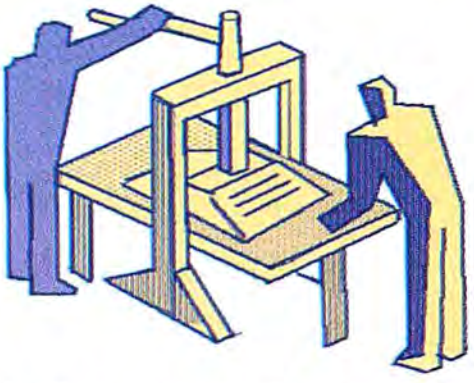
Steven Levy

Graphic Details: Notes from a Novice Publisher

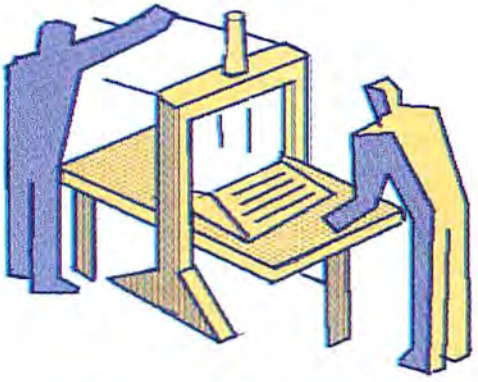
Hard copy about the desktop publishing craze

I once spent a brief internship at a small newspaper in central Pennsylvania. As it happened, that season was a cathartic time in the newspaper's long history: the production process was changing from Linotype to offset printing. This meant that the highly skilled handlers of hot type—those who operated the machines that hammered the lettering into the heated metal and who then, with the lead barely cooled, dealt the type into columns with all the deftness of Vegas blackjack dealers—were rendered obsolete. Since they had been guaranteed job security, their new job was moving around the columns of "camera-ready type"—already-printed text and



headlines—and pasting them on page forms that would be photographed for printing. It was embarrassingly less time-consuming and immeasurably less macho. After all, standing around a layout board is not exactly beer-commercial material. Yet, the men and women swallowed their pride and did it.

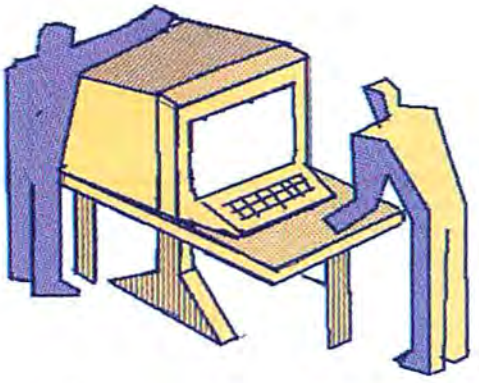
The new process greatly lowered the cost of publishing and made possible a lot of otherwise marginal ventures. If you were to look back and compare what was lost (a culture of Linotype masters whose art form was present in every well-crafted



page of type) to what was gained, you would have to conclude that the change was for the better. Indeed, it is unimaginable to consider any periodical today choosing to use the old style of production, unless it wanted to present itself as a sort of living museum.

Desktop Publishing

As significant as that change was, we are in the opening stages of something even more cataclysmic: the desktop publishing phenomenon. This is a revolution fueled by the convergence of three tools: personal computers, printers that displace typesetters (most notably Apple's LaserWriter), and page-makeup software capable of transforming computer documents into a format that looks, well . . . published. The idea is to eliminate the type shop entirely; one person equipped with less than $10,000 worth of technology can now churn out something that looks typeset.



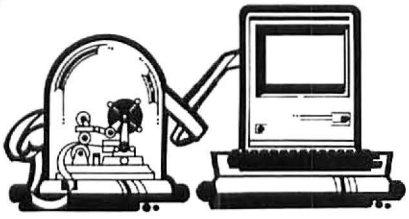
This can result in severe cognitive jolt. For when we view a document that looks "professionally" printed, our assumption is that a certain amount of production time and money went into it. We react to it differently than we do to something created in the familiar, typewriter-style manuscript form. We actually read it differently. In this Stone Age of the desktop publishing phenomenon, these are relatively subtle considerations. But as the trend continues, people will have to consider the consequences of using a technology previously available only to craftspeople.

Some of these considerations became apparent to me only when I attempted my own venture into the world of desktop publishing. As a service to an organization of computer writers I belong to, I volunteered to put together a newsletter. In previous times, standard typewritten output might have sufficed, but a collection of journalists supposedly in touch with the cutting edge of computerdom would look pretty silly with such a low-tech effort. So it was a foregone conclusion that the Computer Press Association newsletter would be not only written but also laid out on a Macintosh, and printed on a LaserWriter.

(continues on page 32)

NOW SHIPPING!

THE INVESTOR



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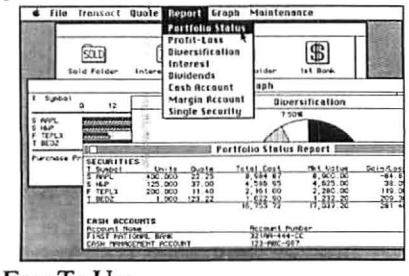

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Circle 492 on reader service card

(continued from page 31)

The Mac, of course, is the machine on which the craze is centered. It is not the only machine that works with the LaserWriter, but it does have the best software for the task.

MacPublishing

The software everyone is talking about is a $495 program called *PageMaker,* but before jumping into that, I thought it would be a good idea to try a more modestly priced package–Boston Software's $99.95 *MacPublisher.* Boston Software's $149.95 *MacPublisher II,* which has several enhancements to the original program, including the ability to open word processing or graphics files directly, a telecommunications facility, and automatic text flow, was not available at the time I created the newsletter. I might also have tried Manhattan Graphics' $125 *ReadySetGo* 2.0, which offers a range of features similar to the other programs.

MacPublisher works by putting a dummy page on the screen. The theory is that you can lay out stories, pictures, and headlines just as if you were pasting up a physical page. It's a logical tack, but in practice it can get somewhat unwieldy. The problem is that every item you lay down on the page has to be in a particular format. You need a separate file for every story, headline, picture, and "continued on page 2." These files add up; I have never messed up my Macintosh desktop quite as thoroughly as I did after an hour of using *MacPublisher.* The manual suggests you reduce clutter by storing the files in folders, but you can't avoid the problem entirely–*MacPublisher* doesn't print unless the files are open. This is like a printing company refusing to accept the finished boards unless the original typed manuscript pages are also provided.

It took me a little time to get used to the way the cursor kept changing from a little arrow to a tiny pair of scissors (which you use to move stories around and cut text to size), and I never did get the hang of using the transparent ruler, which is supposed to size stories and pictures on the page. But eventually I was able to lay out my first page. It took longer than expected, because I frequently had to shut down *MacPublisher* to create a graphic in *MacPaint,* look something up in *MacWrite,* get a file I downloaded from *MacTerminal,* or swipe a piece of clip art from a Simon & Schuster program called *The Mac Art Department.* The notorious Disk Swapper Sore Wrist syndrome began to set in.

My difficulties were more a hardware problem than a flaw in *MacPublisher,* however. Using the software would be much easier with a hard disk for storing the applications and files. In my own case, poor planning aggravated the problem: if I had created everything I wanted to go in the newsletter beforehand and used the Scrapbook, I wouldn't have had to do so much switching. But then, the whole point of desktop publishing is interactivity–the freedom to move things around on the page and, if there's a hole that needs a picture, to instantly whip up something to put in the hole.

That problem aside, *MacPublisher* proved itself capable of doing the job I set out to do and allowed me a good time while doing it. I was creating headlines, moving pictures over from *MacPaint,* and laying out articles–all without my hands getting sticky with rubber cement or hot wax.

PageMaking

Things got even better when I moved to *PageMaker,* the Cadillac of desktop publishing software. The limitations of *MacPublisher* had particularly primed me for the virtues of *PageMaker.* More intuitive commands handle text layout and picture sizing. Unlike *MacPublisher, PageMaker* lets you italicize or boldface words and even write headlines without creating new files. And once you load stories or pictures into the final document, you can get rid of the original files.

It wasn't long before I was drunk with power, switching on three-column formats, selecting documents, and–by a simple mouse click–filling in text neatly down the columns. Then I would move things around, getting the page to my liking, dropping in pictures and resizing them to fit the space. I filled up my eight pages in quick order.

(continues on page 34-35)

(continued from page 32-33)

Coming of Age

Soon I was ready for the acid test: printing the newsletter on the LaserWriter. I do not possess that pricey peripheral, but I live near a fellow named William Bates who not only owns one but has written his own typesetting software, called *JustText*. So I took my disks—just about enough to fill up a box, what with data disks and program disks and startup disks and backup disks and master disks—over to Bates. We fired up the LaserWriter, loaded the software, and told it to print.

Since the LaserWriter doesn't make much noise, it was hard to tell what was happening in there. But in less than a minute, it grudgingly ejected a piece of paper with the first page of the newsletter.

At first, I was bowled over by the quality of what I had done. It looked *real,* especially the headlines, so solid in their Times Roman font, just like the daily newspaper. It was hard to believe that I had single-handedly created that document while sitting at my desk.

I said something to that effect, and Bates looked dubious. "Do you feel that way when you see your *words* in print?" he asked. Well, no . . . but maybe I felt that way the first time I saw my words in print.

I recalled the glow of that moment. The fact that crews of art directors, pasteup people, and printers had worked on my story marked the passage of my work from private habit to public declaration. It had not been an altogether happy event, though. When the initial shock was over, I reread that first story, finally in formidable columns of justified text, arranged in the same way as the words of the writers I had admired for years. For the first time I was able to see where my writing was not quite up to standard. Norman Mailer was safe.

Standing at the LaserWriter, looking at my first foray into the field of design and production, I had similar feelings. A second glance at my newsletter revealed that my graphic skills were woefully inadequate to fully take advantage of what technology had brought within my reach. The newsletter's logo, a combination of text and a graphic, spilled over the middle column almost to the right of the page—I had thought this placement an elegant variation, but it simply looked awkward. Though I had restrained myself in the use of different type fonts, I could see how even the few alternatives in headlines and "continued on page . . . " lines I had tried clashed violently.

The rest of the eight-page newsletter, though impressive in places, was full of similar horrors. There was no consistent scheme for mixing the text with graphics and headlines, no page design to point readers to what I wanted them to read first. These flaws were not so drastic that I was tempted to trash the entire project; the wonders of the software and the laser printer make sure that anyone with a rudimentary sense of layout can create an adequate piece of work. What bothered me was that I, a graphic-design virgin, had suddenly been thrust into competition with renowned graphic designers such as Milton Glaser. I might have had a better chance in a boxing ring with Michael Spinks.

Before depression could set in, Bates began showing me his own desktop publishing software. Unlike the previous two packages, the $195 *JustText* doesn't work with the Imagewriter and doesn't have a preview mode so you can see on screen how things look. We worked on just one page; to get it right, we wound up printing over a dozen tests. But ultimately that page looked more impressive than the output from the other two programs. This was not so much because of the power of *JustText,* but because the page was laid out by Bates, who not only knows the software but knows about professional page layout as well.

And that's the key. I suspect we are going to see a lot more professional-looking documents as desktop publishing technology catches on. The more we see, though, the more we will appreciate documents created with a sensitivity to good art direction, imaginative page layout, and a solid awareness of how to manipulate graphics and text to make an effective presentation.

I can recommend any of the software packages I worked with. But none of them can replace careful craftsmanship. While the tools and techniques of publishing are now within anyone's grasp, the skills still have to be learned. It's as if the cost of airplanes were reduced by several factors of ten: we'd all have Learjets, but we wouldn't automatically know how to fly the contraptions. Most likely, more than a few of us would have some horrid moments circling the airport trying to figure out how to get the thing back on the ground. □

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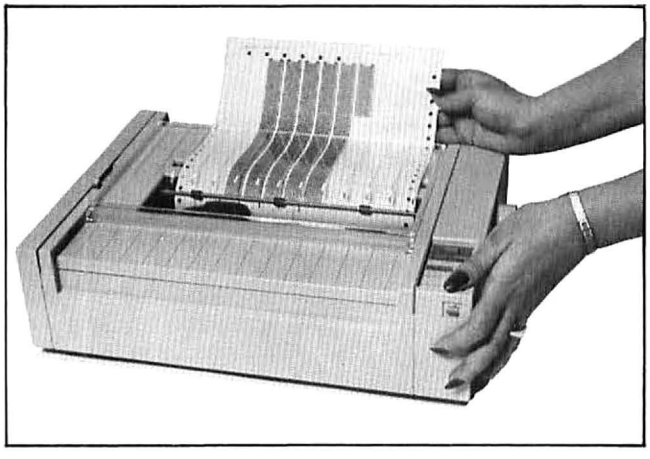
When you invest in the Softstrip System, you get the Softstrip reader, a special storage base, and a full one-year replacement warranty. Also included with your purchase is a complete Accessory kit for your Macintosh containing connector cables and communications software to link your computer to the reader.



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A MACPAINTER'S EYE VIEW

One of the most innovative uses of MacPaint is to present slide shows. Visual representations can be used to market a product, tell an organization's story or even to present an annual report at a convention.

The data strip on the near right contains a graphics utility called **VIEW PAINT** by Steve Dagley and Creative Computer Services. Using the entire screen the program displays just the upper left-hand corner of a MacPaint document. This makes viewing a number of documents a great deal easier.

The program is useful for creating a startup screen or making that important slide show. Store your MacPaint masterpieces on a data disk, and scan your visual library using **VIEW PAINT.**

After you read in the data strip, scan your files and open those MacPaint files you need. Simply Click to view another.

GET CONTROL OF YOUR DISKS

Take a look around the room. Are you slowly being overrun by floppy disks? Maybe you've placed all your valuable disks in a convenient plastic case. What's on the third data disk you come to? Is speedy retrieval of a program for you? Wouldn't it be great to have a librarian to keep track of all the files on your disks?

The three data strips on the far right contain a program called **DISK CAT,** by Craig Vaughan of Software Sorcery Inc. of Virginia, that should help you correct the problem. **DISK CAT** catalogs the contents of your disks. It provides the file name, type, creator, name of the disk it's on, and a "location" field specified by you.

Read in the data strips and RUN the program. It will ask you to enter the location for the batch of disks you want cataloged. Just pop in one disk after another and the contents are cataloged to a library text file with tabs between each field. It's easy for you to transfer the contents to a word processor or filing program for further processing.

These programs appear courtesy of the Boston Computer Society.
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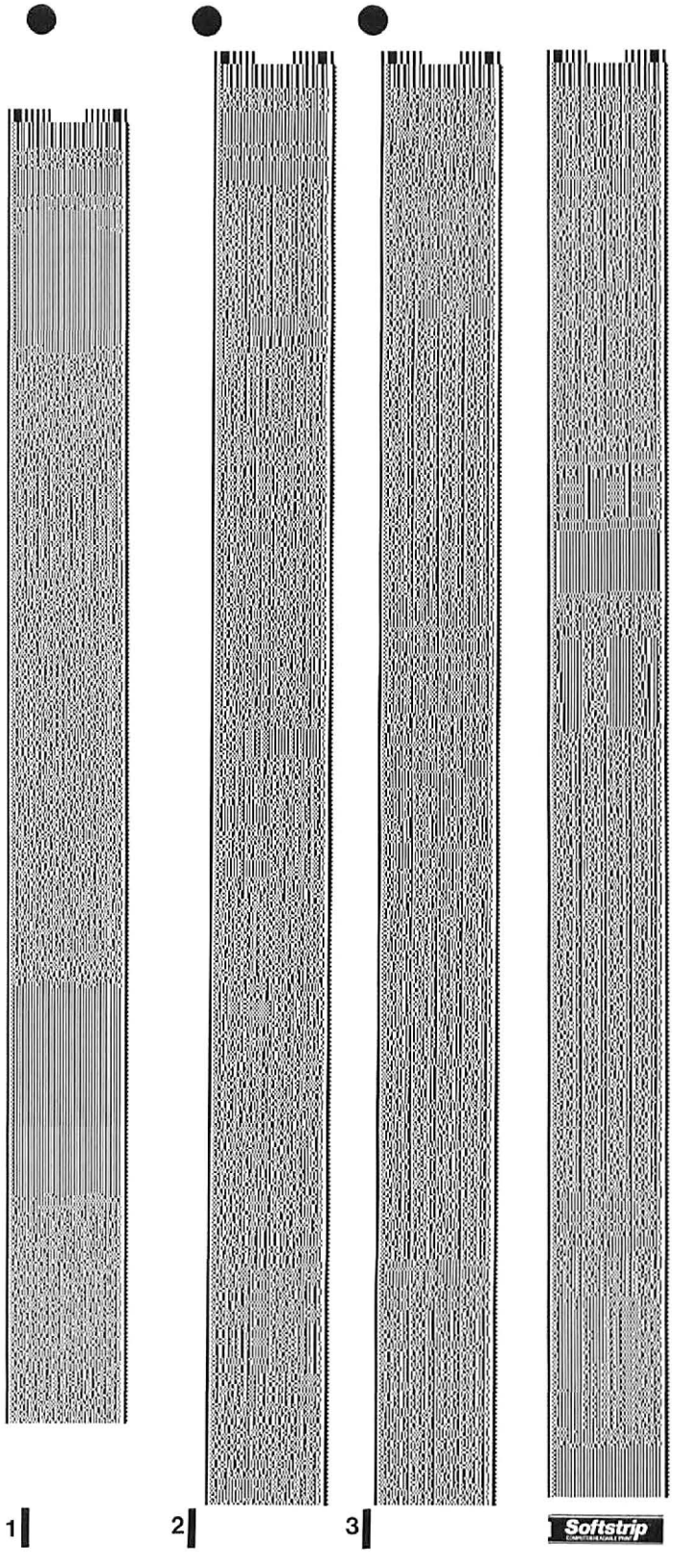
StripWare Library Nos. 204-205



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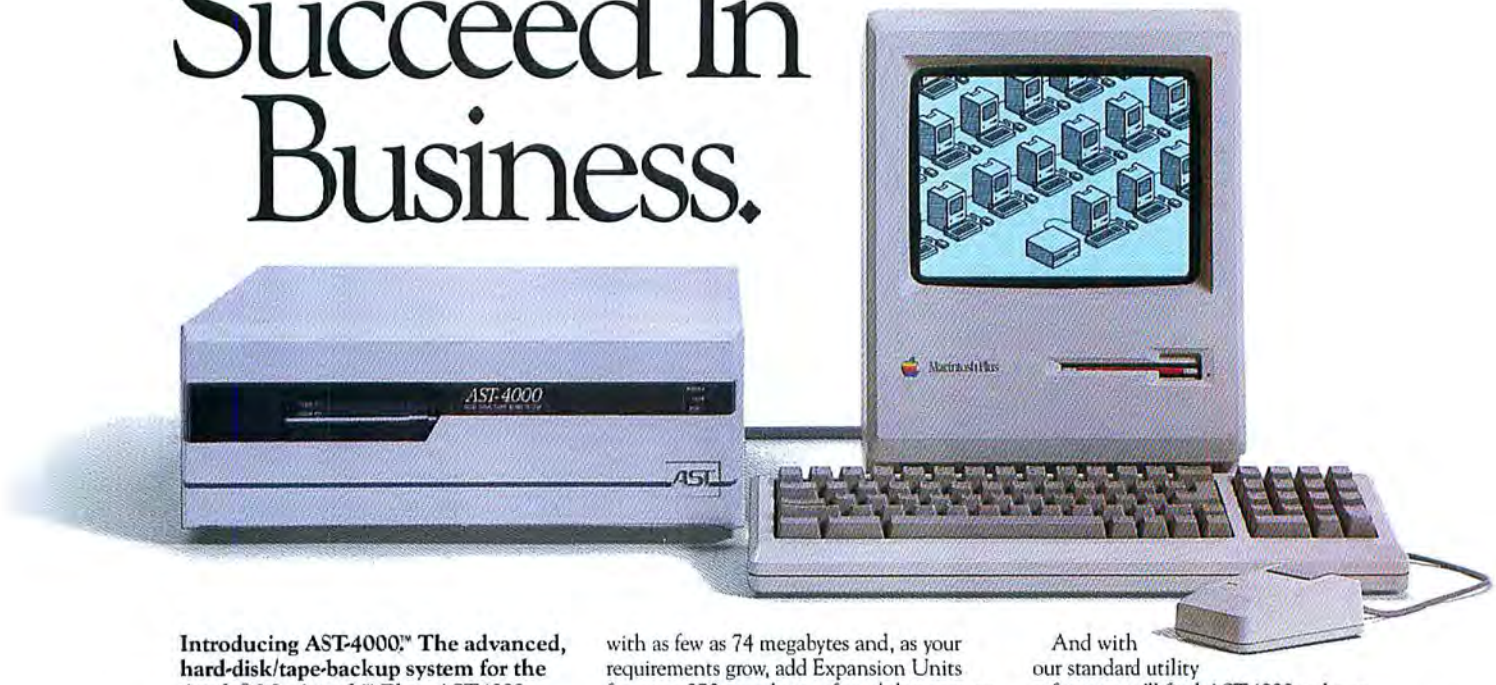

Introducing AST-4000.™ The advanced, hard-disk/tape-backup system for the Apple® Macintosh™ Plus. AST-4000 gives the Macintosh Plus all the sophisticated features required for serious business computing. Together, these two great systems offer powerful, reliable data processing and storage capabilities.

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Even with vertical software packages, such as Page Maker™ for desk-top publishing and Dental Mac™ for medical office management, you'll find AST-4000 increases office productivity through enhanced system versatility, storage and data-access speed.

AST-4000 Expands To Meet Your Future Needs. You can order your system with as few as 74 megabytes and, as your requirements grow, add Expansion Units for up to 370 megabytes of total data storage capacity. That adds up to the largest, most versatile hard-disk/tape-backup system available for the Macintosh Plus.

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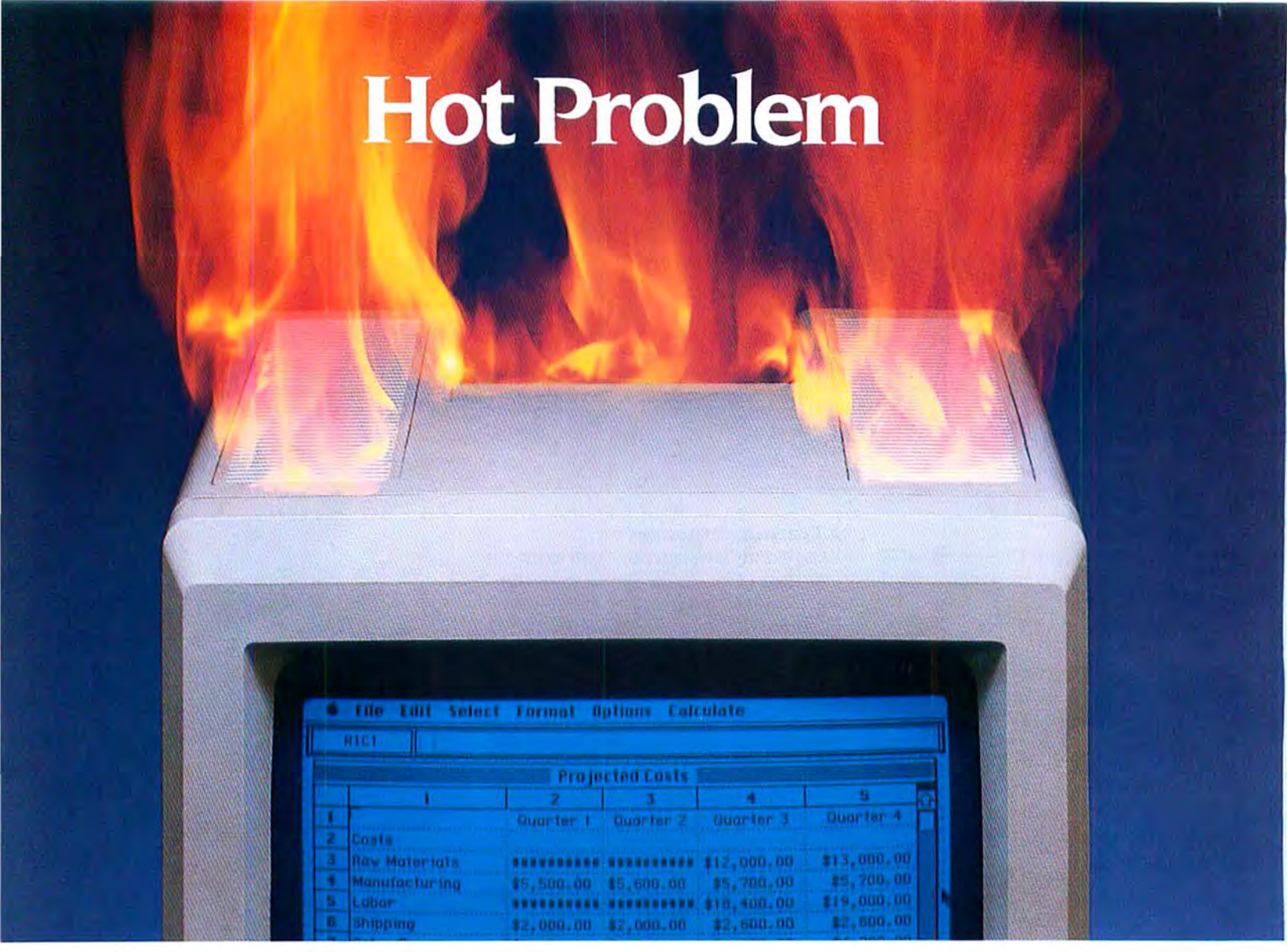

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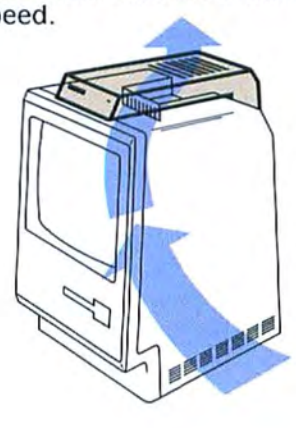
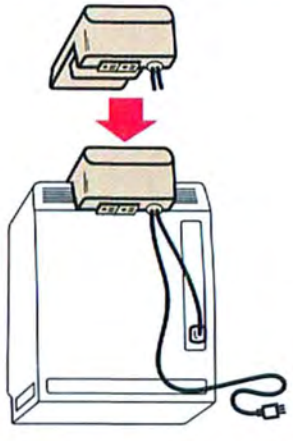


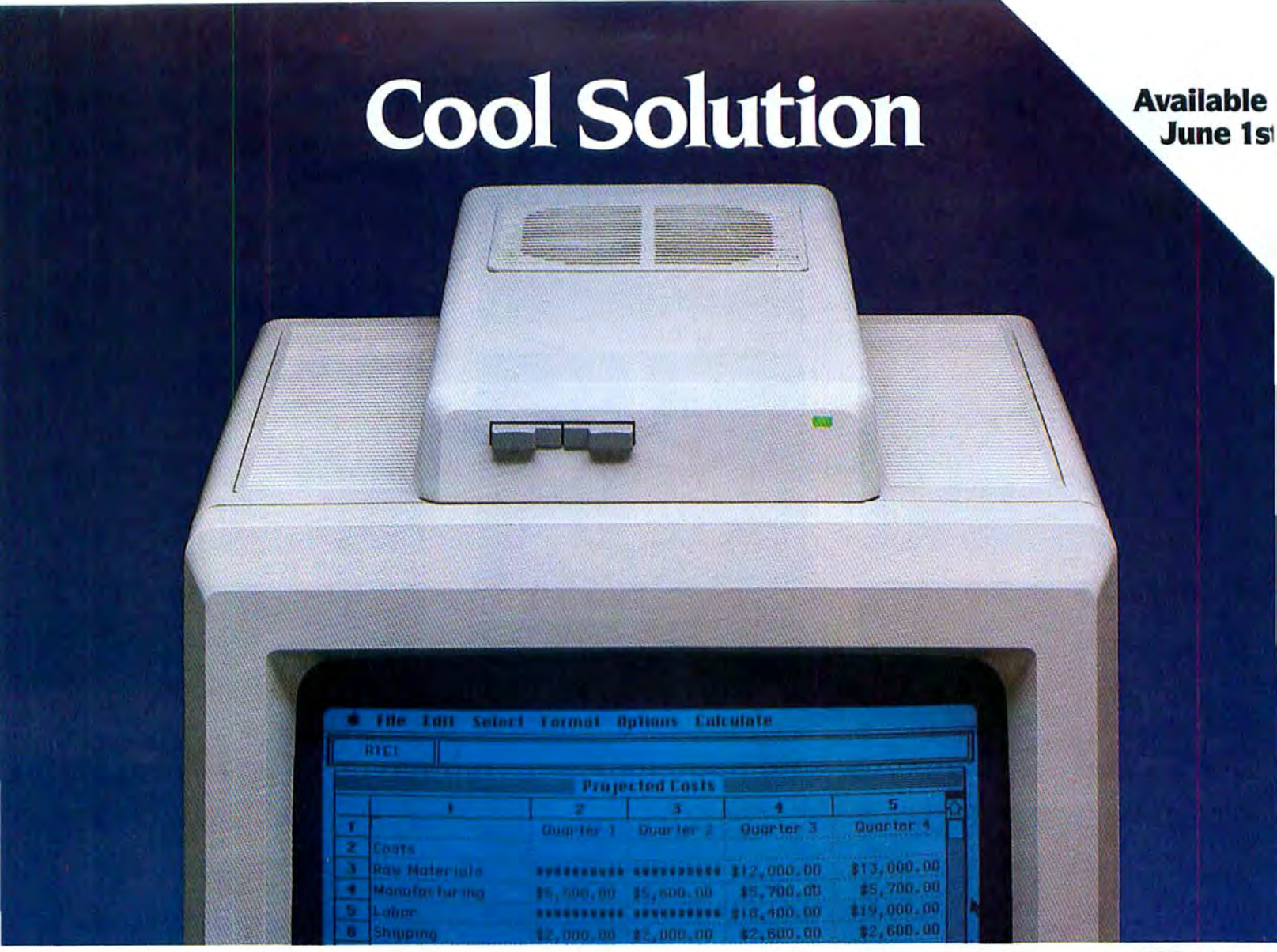
System Saver Mac stops the scramble for power.



No more reaching around to the back of your Macintosh to turn it on. No more fumbling for spare outlets. System Saver Mac organizes all your power needs. It provides outlets for two peripherals (like your printer and modem), while replacing the Mac's power cord.

Cool Solution

Available June 1st



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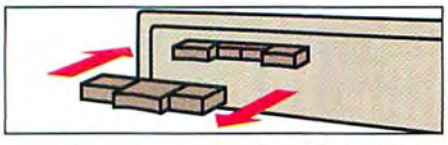
System Saver Mac has a great switch play.

System Saver Mac comes equipped with two switches—important for those of you who want to power one of your peripherals separately. For example, if you use a Hard Disk 20, you have to power up your hard disk first, before you turn on your computer. Just use one of the System Saver Mac's switches to control your hard disk and the other for the rest of your system.

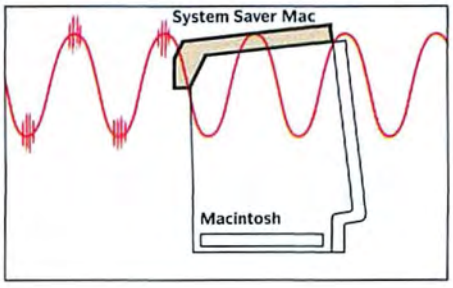


Of course, we realize that many of you would prefer the convenience of a single switch to control your entire system. That's why every System Saver Mac also comes with a special single switch cap. Just pop off the two separate switches and pop on the single one provided.

System Saver Mac provides pure power.

70-90% of all microcomputer malfunctions can be traced to impurities in the electrical current. Line noise can be interpreted as data, confusing your Macintosh and causing annoying system errors. Power surges and spikes can do costly damage to its delicate circuitry.

System Saver Mac clips surges and spikes at a safe level and filters out line noise. It provides pure power to make your Macintosh more accurate, efficient and reliable.



System Saver Mac is not a completely new idea.

Clever, yes. Versatile, convenient and useful, yes. But not completely new. After all, we've been making the original System Saver for years. It's the best selling accessory ever made for the Apple II—chosen by over 1/4 million Apple II owners. We thought you'd agree—Macintosh owners deserve the best, too.

System Saver Mac, $99.95, is available from Apple dealers everywhere. For the dealer nearest you, or to speak to a Kensington sales representative, call toll-free 800-535-4242. In NY 212-475-5200.

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Letters

Macworld readers write of upgrades, color, the competition, and more

Loyal to a Fault

Apple has done it again. The new Macintosh Plus is surely an improvement over the existing hardware.

While I applaud Apple for making sure that an upgrade path is available to the owners of existing Macintoshes, I rebel at the price. Let's take a look at the economics of upgrading a Macintosh.

The announced prices of the upgrades are $299 for an 800K drive and new ROM, $599 for a new motherboard with 1 megabyte of RAM and a SCSI interface, and $129 for a new keyboard, bringing the total upgrade price to $1027.

Assuming you paid $2500 for your 512K Mac (as I did), upgrading to the Mac Plus will bring your total expenses to $3527. A new Mac Plus costs only $2599.

Apple has seen fit to reward early loyalty by charging $928 to remain at the current Mac standard. I would feel much more loyal to Apple if they offered upgrades at their cost. The uproar over the old 128K to 512K upgrade had no effect.

Richard Scotty
Spokane, Washington

On the Other Hand

As an early (April 1984) Mac owner, I've never really understood why so many Mac owners are upset that the price has dropped. These decreases were predictable; computers were–and are–constantly improving and lowering in price. So are VCRs and audio compact disc players. I bought my Mac when I did because even at the inflated price, it was a good value for the money. Sure, I would not have minded saving a grand, but my productivity increased dramatically. The Mac paid for itself in less than a year.

Shel Horowitz
Northampton, Massachusetts

A Learning Experience

Last year my wife and I decided to investigate the purchase of a computer for the small businesses we run from our home. In addition, we felt the exposure of our two children, 9 and 11, to the uses of a computer would be beneficial. We purchased an Apple Macintosh last month and find a considerable amount of excellent business software but, alas, very little educational software. We are now wondering if we made a very expensive mistake. We find it difficult to believe that a company that produces a computer with so many positive points can overlook the educational software market. Ask yourself how many parents would spend the extra money for a better computer in the hope that their children will benefit. The market is there; why isn't someone cashing in on it?

Frank D. Mathon
Taylorville, Illinois

Radio Radio Radio

Recently I filed a petition with the Federal Communications Commission requesting that it create a new radio communication service to allow computers to exchange data in a local area network without cables or telephone connections. Before making a decision, the FCC waits to hear from the public. People who have something to say about my Proposal for the Creation of the Public Digital Radio Service can write directly to the FCC, Washington, DC 20554 (refer to RM-5241). For a copy of the petition, contact the FCC copy center at 202/857-3800 or see the copy on CompuServe ACCESS, file name FCC1.DOC.

Don Stoner
Mercer Island, Washington

User Nonchalance

Most reviews of Macintosh software include some wording like "makes full use of the Mac's graphic interface" or "thoroughly conforms to the Mac's user interface" or "extensive use of pull-down menu titles, dialog boxes, and so on . . . in typical Mac fashion." Initially there is nothing earth-shattering about these statements; anyone familiar with the Mac's operating environment would expect to find these points covered in reviews of Mac software. The profound significance begins to come out when the author expounds on these basic statements further into the review, stating, for example, "Anyone with some experience on the Mac already knows how to use 90 percent of this program; we never had to refer to the manual."

We all take this concept for granted. The statement "it moves forward when put into drive and stops when you apply the brakes" would not get much attention in an

(continues on page 45)

Control Center, $99.95

Tilt/Swivel, $34.95

Mouseway, $9.95

Circular Polarizing Filter, $49.95

Printer Stand, $29.95

Mouse Cleaning Kit with Pocket, $24.95

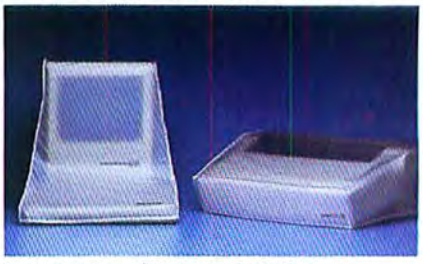
A-B Box, $99.95

Disk Drive Cleaning Kit, $29.95

Surge Suppressor, $49.95

Mouse Pocket, $9.95

Disk Case with Disk Pocket, $29.95



Dust Covers, $9.95 to $13.75

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4. No purchase necessary to win. To enter, send a 3" x 5" card with your name, address, daytime telephone number, and the words "Kensington. Complete outfitters to the PC workstation." to: Win a Free LaserWriter Sweepstakes, Kensington Microware Ltd., 251 Park Avenue South, New York, NY 10010. Only one entry per envelope.
5. Entries must be received by September 1, 1986. Any entries received after that date are invalid. The winner will be chosen September 30, 1986 and notified by October 15, 1986.

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When you buy your System Saver Mac, you'll also get a LaserWriter sweepstakes entry blank. Send that to us, along with the proof of purchase seal from the box and a copy of your sales receipt. And before long, you could be the proud owner of a LaserWriter!

Entries must be received by September 1, 1986 – so act now! The winner will be chosen September 30, 1986 and notified by October 15, 1986.

Complete sweepstakes rules on reverse.

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(continued from page 41)

automobile review. But, if by adhering to strict rules of form and function, we wind up with software that all works in the same manner—now we have something to shout about.

Can non-Mac users grasp the incredible significance of this concept, or do they, too, skip right over it because they can't imagine the real meaning behind a principle so foreign to them?

Henry Sitzman
Plantation, Florida

In Hard Disk Heaven

A committed MacFanatic for nearly two years now, I am also the proud owner of a new Apple Hard Disk 20. Forget that the HyperDrive is a little faster for the present; speed isn't everything. From anywhere in the HD 20's entire 20 megabytes you can open any document or application. I don't think you can do this with the HyperDrive without opening a particular volume. No volumes here, just straight storage. The new Hierarchical File System performs very well, allowing users to "nest" documents and applications in folders any way that suits their work habits.

Also, forget for the moment that Apple doesn't bundle a backup utility with the HD 20. It will. And if Apple doesn't, rest assured that a slew of third-party developers are laboring over such programs at this moment. Conversely, I suspect that no one but the HyperDrive manufacturer continues to improve its utilities. Nothing against General Computer Company here, or any other hardware supplier. I'm just glad I waited for Apple's unit. History has shown that the industry responds quickly to Apple products. Witness the Macintosh itself.

In short, I am pleased with the Apple unit. It's quiet enough, reliable so far, and very easy to use. And as for having innumerable applications and documents available in seconds? It's a Macintosh user's dream.

Ric Spiegel
Dallas, Texas

A Taxing Error

In "Taking Care of Taxes" in your March 1986 issue, you printed the wrong phone number for our product, *TaxWizard '85/'86.*

Linda Brandt
Santa Monica, California

The correct information is Gamma Productions, Inc., 817 Tenth St. #102, Santa Monica, CA 90403, 213/451-9507.—Ed.

We Stand Corrected

Mr. Bunnell's reverie on his trip to China ("The China Interface," *Macworld,* February 1986) certainly reveals his abilities as a high-tech prognosticator. Indeed, he may soon be writing syndicated columns, à la John C. Dvorak. However, may I suggest that the population of the People's Republic of China may be 4 or 5 times as large as that of the United States, but it is not 15 times as large.

Robert Matutat
San Francisco, California

You are so right. The 1985 edition of the World Book Encyclopedia *lists the estimated population of the United States at 238,420,000 and China at 1,047,800,000.—Ed.*

Regaled by the Tales

I just received my February issue of *Macworld* and completed reading Jeffrey S. Young's article, "Tales of the Macintosh." I was warmed by the story of Steve Jobs and his dream. I have read so many articles that discount and cheapen Apple's Macintosh story that it was refreshing to read this version that shows a bit of the bad but mostly the good of a truly wonderful entrepreneurial event. Steve Jobs and his group may have been young, idealistic, and inexperienced, but their intelligence, personal fortitude, and most importantly their imagination and enthusiasm truly set them apart.

Stacie Lyn Groff
Bellevue, Washington

Déjà Vu

As I read David Bunnell's editorial (January 1986) that maintained the Macintosh doesn't need color and won't until color on a computer screen becomes acceptable and can easily be displayed on a printer, I was saying amen and hallelujah because that's pretty much my opinion (I like the Mac's crisp black-and-white display) until I came upon this sentence about Commodore's Amiga: "Why buy a machine with an entirely new operating system and no software base?"

(continues on page 48)

IBM, VAX... Users!

Tekalike lets you use your Macintosh as a graphic terminal with mainframe applications from Issco Graphics, Molecular Design, Chemical Abstracts Service, Precision Visuals, SAS Institute... and take the IBM, VAX, etc. mainframe graphic to the Macintosh for editing and page composition.

Save documents for MacDraw, MacPaint and Pagemaker.

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Helix — the system solution
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Programming not required
You don't have to learn a query language, spreadsheet formulae, report formatting or data-base algebra. You don't have to know a programming language or battle with command codes, modes, or imposed structure.

All you need with Helix is the desire to improve your business management and administrative systems.

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Now you can develop and then customize even more new, powerful applications. To the Helix environment, Double Helix adds subforms, the fast creation of custom menus, password protection, data validation, extended data import and export capabilities, and optimized performance characteristics. Of course, anything already built with Helix version 2.0 may be automatically updated to Double Helix.

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Double Helix lets you design a complete system to run a small business, medium office, or large departmental project. Custom menus then make the whole system easy to use by clearly associating forms with functions. Password protection lets you lock it down to prevent unauthorized changes. Yet, since one of the main features of the Helix environment is its ability to change as conditions change, you or your key users can easily make modifications on an as-needed basis.

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You don't have to worry about a "file server" or other special hardware or software. MultiUser Helix turns any hard disk into the host for a whole network. Just by using the "visit" command, you can be working within a dynamically interactive network, in which all windows are updated automatically.

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With MultiUser Helix, everyone within a company or department can work from common project, inventory, customer, ordering or financial information. The direct benefits from both an operational and management perspective are dramatic.

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The birth of applications publishing
Or you can easily provide a variety of applications to others within your organization — from expense reports to sales tracking; from departmental phone lists to project coordination.

By offering an organizational site licensing program for RunTime Helix, Odesta helps you bring a new dimension to the concept of "desktop publishing" — the in-house publishing of specialized applications.

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Close the circle with Remote Helix — the way to communicate with your central Helix information base from the field, home, or satellite office — anytime.

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You can modem straight into your "central" Helix, and be immediately on-line... as if you were working directly in your main office. And, if you are running a MultiUser Helix environment, Remote Helix will log you on as a live member of the network.

System access from anywhere
Receive orders from, or transmit information to, your sales force in the field; tie sites together for communication and coordination; or have 24-hour access to the heart of your business, no matter where you are. With Remote Helix, global telecommunication becomes an information management tool for you to use, now.

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departments, small business/professional services, independent consultants, research establishments...

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Letters

(continued from page 45)

Mr. Bunnell's memory may be short, but I remember people telling me, "Don't buy a Macintosh. It's got a new operating system that's different from all the other Apple computers, and the only software for it is *MacPaint* and *MacWrite*."

Jennifer Petkus
Colorado Springs, Colorado

Color It Sold

I fully agree with the January 1986 article by Mr. Bunnell on the case against introducing a color version of the Mac too early. However, there is an important consideration that he did not cover: color, like sex, sells. Why else would all the laundry detergents be packaged in the most splendiferous, eye-catching colors possible? Even if it costs an arm and a leg, a high-end color console might just pay for itself by selling the cheaper goods. Sounds a bit mercenary, but it works.

Bob Hall
Seattle, Washington

A Shade of Blue

I was greatly disappointed by David Bunnell's column in the January issue of *Macworld,* especially some statements reminiscent of the things the IBMers said about the Mac when it first came out.

Contrary to what the column said, the color on the Amiga is far and away better than the resolution on the IBM. A demonstration of the *Masterpaint* program clearly shows this.

I could not believe that Mr. Bunnell asked, "Why buy a machine with an entirely new operating system and no software base?" Only a year ago Mr. Bunnell said, "Unfortunately, computer critics tend to predict with blinders on. They can't understand why the Macintosh sells so well, and they continue to moan about the lack of software for the machine" (*Macworld,* December 1984).

I hate to think that the Mac community has become as nearsighted and entrenched as the IBM blue suit crowd that we scoff at. Please promote the Mac based on its merits, not on the alleged faults of other computers.

Dennis Boyd
Monmouth Junction, New Jersey

(continues on page 51)

The C for the Macintosh

"Library handling is very flexible... documentation is excellent... the shell a pleasure to work in... blows away the competition for pure compile speed... an excellent effort."

COMPUTER LANGUAGES, 4/85

Why Professionals Choose Aztec C

Professionals choose Manx Aztec C development systems because they are the most powerful, portable, and professional microcomputer C development systems available. Professionals know that Manx Aztec C offers the features, dependability, and performance required for producing professional results.

Applications implemented with Aztec C development systems range from real time control of robot arms used in manufacturing, to message switching systems, to games, languages, operating systems, and business systems.

Much of the commercial software for the Apple Macintosh including top selling titles from software publishers Broderbund, Hayden Software, and Spinnaker is developed using Manx Azec C.

Value, Performance, and Flexibility

Manx Aztec C68k for the Macintosh is available as a line of three upgradable development systems: **Manx Aztec C68k-p, Manx Aztec C68-d, and Manx Aztec C68k-c.** Student, noncommercial, and small business discounts are available. Whatever your budget and requirements, there is a Manx Aztec C68k development system that offers you the best value and performance for your investment.

New Macintosh Mouse Interface

The highly acclaimed, powerful, and professional Manx Aztec SHELL development environment now includes a mouse interface. Developers unfamiliar with UNIX or MS-DOS can work entirely with the mouse interface. Those interested in learning the advanced features of the SHELL can do so at their leisure. Developer's familiar with UNIX or MS-DOS can ignore the mouse, if they so choose, and work entirely in a familiar command driven environment.

Aztec C, The Most Portable C.

Manx Aztec C Development Systems are available for the Apple Macintosh, Apple*II*, IBM PC, PC compatibles, CP/M-80 systems, Radio Shack Systems, and the Commodore 64/128. Manx Aztec C is also compatible with UNIX and UNIX ports. Manx currently is developing systems for the Amiga and other microcomputer systems. No other C Development System for the Macintosh comes close to the portability of Manx Aztec C.

Power To Spare

In benchmark after benchmark, Manx Aztec C appears in column after column as the clear winner.

The following sieve benchmark timings are reprinted with permissions of Computer Languages, 131 Townsend Sr., San Francisco, Ca 94107 from a Macintosh review that appeared in the April, 1985 issue:

compiler	compile/link	run	size
Manx Aztec	49	7	13,274
Megamax	114	7	13,816
Softworks	201	9	46,914
consulair	152	10	17,654
Hippo 2	102	13	30,648

The following sieve benchmark timings are reprinted with permission of Macworld, 555 De Harro St., San Francisco, CA 94107, from the May, 1985 issue from "Mac Wins By a Length" in the Open Window column.

Language	Run Time
Aztec C 1.06C	6.55
McFORTH 2.0	20.01
Modula-II	71.60
MBASIC 2.00	1170.00
Pascal	1270.00

Sieve timings for Manx Aztec C68k 1.06g:

with register variables 3.37 secs 5,007 bytes
without register variables 6.02 secs 5,140 bytes

Manx Aztec C68k - Professional Tools

Manx Aztec C68k is bundled with a rich abundance of tools to help produce superior results in reasonable time frames. The following is a list of features and facilities included in Aztec C68k-d, the Developer's System, and Aztec C68k-c, the Commercial system. Items that are marked -c are unique Aztec C68k-c.

Optimized C	Mouse Enhanced SHELL
UNIX-like SHELL	Creates desk Accessories
Macro Assembler	Creates Clickable Applications
Smart Overlay Linker	Phone Support
C-PASCAL Interface	PASCAL-C Interface
Resource Compiler	UNIX Library Functions
Debuggers	Terminal Emulator (Source)
Object Librarian	Easy Access to Mac Toolbox
Mouse Editor	unlimited code size
IEEE floating point	six register variables
Inline assembly	extensive sample programs
600 page manual	hard disk support
no license fees	PASCAL type strings
MacintTalk support	AppleTalk support
code optimizer	symbolic debugger (512k)-c
MacRam Disk-c	UniTools (ul, make grep, diff)-c
Library Source-c	One Year Of Updates-c

Summary

If you plan to program in C on the Macintosh or are currently doing so using a brand x C compiler, there is a Manx Aztec C68k system for you that offers the best value and the greatest degree of portability, power, and professional quality available.

Look around, evaluate, and compare. The more you look, the more you compare, the more you will see that Manx Software Systems has succeeded in its objective to provide you with the best C development system available at the best possible price. Then, give us a call, and join the 25,000 users who already know and enjoy the Manx Aztec C advantage.

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Discounts are available for professors, students, independent developers, hobbiests, and small businesses.

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30 Day Return Policy

Manx has a 30 day return policy. If you don't like your Manx Aztec C development system, return it within thirty days for a refund. Refunds do not include shipping costs, and might incur a small restocking charge.

Distribution Of Manx Aztec C:

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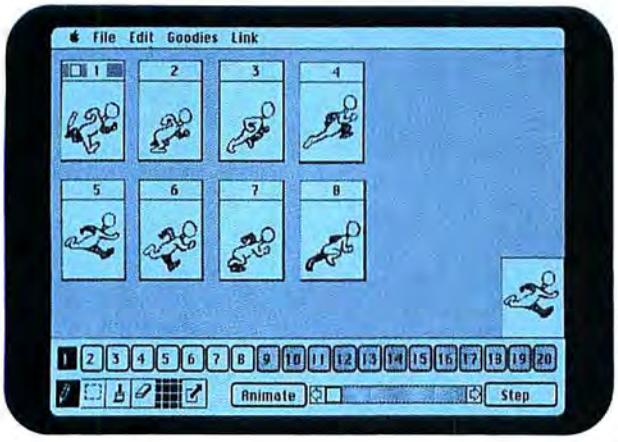
PAINTER AND ANIMATOR

for the Macintosh by Eagle Berns and Roger Lawrence



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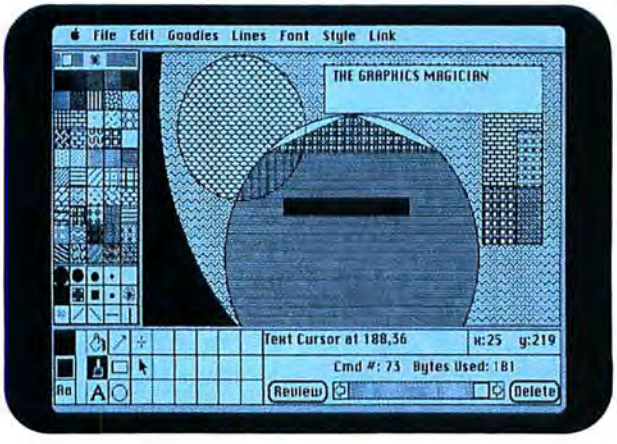

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Circle 480 on reader service card

(continued from page 48)

Beware the Red Herring

I use a Mac at work, but I recently decided to buy an Atari 520 ST after considering both the Mac and the Amiga. In all my encounters with the Amiga, I've never seen a black-and-white monitor made specifically for it; David Bunnell must have been thinking of the Atari ST when he referred to the monochrome monitor in his January column.

The way Mr. Bunnell dwelt on the Amiga, I got the impression that he considers it the major competitor to the Mac. With the Atari 520 ST's $795 price tag, the power that it represents, and the head start it has on software, it will prove to be a greater threat, I think.

Larry Kelly
Pasadena, Texas

Don't Judge This Book by Its Color

I agree with much of what David Bunnell said in his January column concerning the present state of color graphics on personal computers. Color is not the only difference between the Mac and the Amiga, however, and I think you are underestimating the Amiga.

The Amiga has three custom chips that take much of the processing load for sound, graphics, and disk I/O off the 68000. The result is that the 68000 in the Amiga can be dedicated almost exclusively to the execution of programs, instead of the housekeeping tasks that the 68000 in the Mac spends almost half its time handling. Also, the fact that Apple put a disk controller chip on the recent Mac upgrade shows that Apple is realizing the value of unfettering the 68000. The Amiga operating system is truly multitasking; even the Mac with the *Switcher* cannot claim that. The Amiga has the potential to do everything that the Mac does, and probably faster.

Stephen G. Heyl
Washington, D.C.

Competition Is the Mother of...

I believe we need the Amigas and the Ataris to spur on Apple to create a system that is an example of what Apple can really do.

Charles Pritt
Irving, Texas

(continues on page 56)

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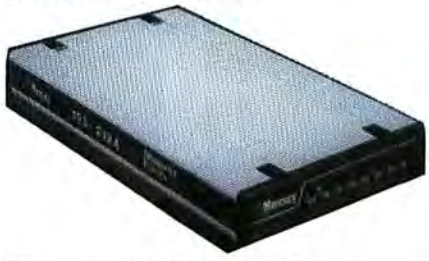

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Circle 271 on reader service card

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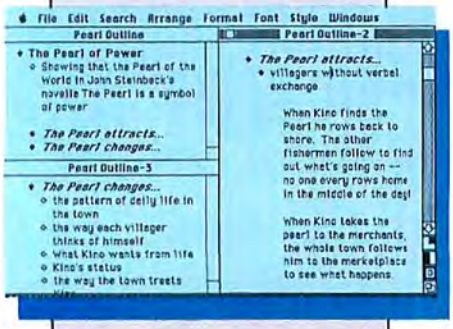
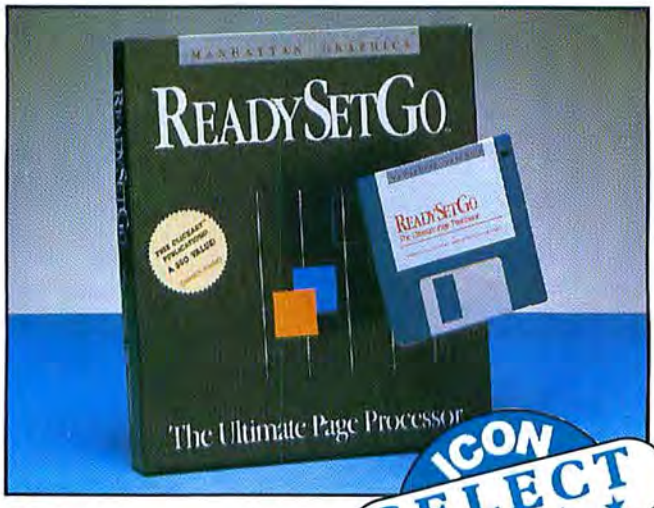


around the screen quickly by dragging them with the mouse. You can open up to twelve windows with views on the same or different documents. If you do any writing with the Macintosh you should be working with MultiWrite.



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Here at Icon Review electronic mail is vital and in our book Top Mail is, well, tops. It's the only E-mail program that installs directly into the Mac as a desk accessory, and doesn't require a hard disk. It's instantly available for

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Icon Review

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From Chang Labs

Rags to Riches brings Macintosh style to the accounting process. MACazine voted it the Best Accounting Package of 1985! Rags to Riches makes accounting procedures easier by adhering to the standard Macintosh user interface, and speeds operations by keeping them in RAM. Rags to Riches modules work smoothly together, and their innovative use of windows establishes an easy-to-understand hierarchy of information. Each module supports up to 5,000 accounts/10,000 transactions. And now a new Inventory module is available! Chang Labs provides excellent documentation and support for this time-proven, best-selling product. Automate your books with style and confidence with Rags to Riches!

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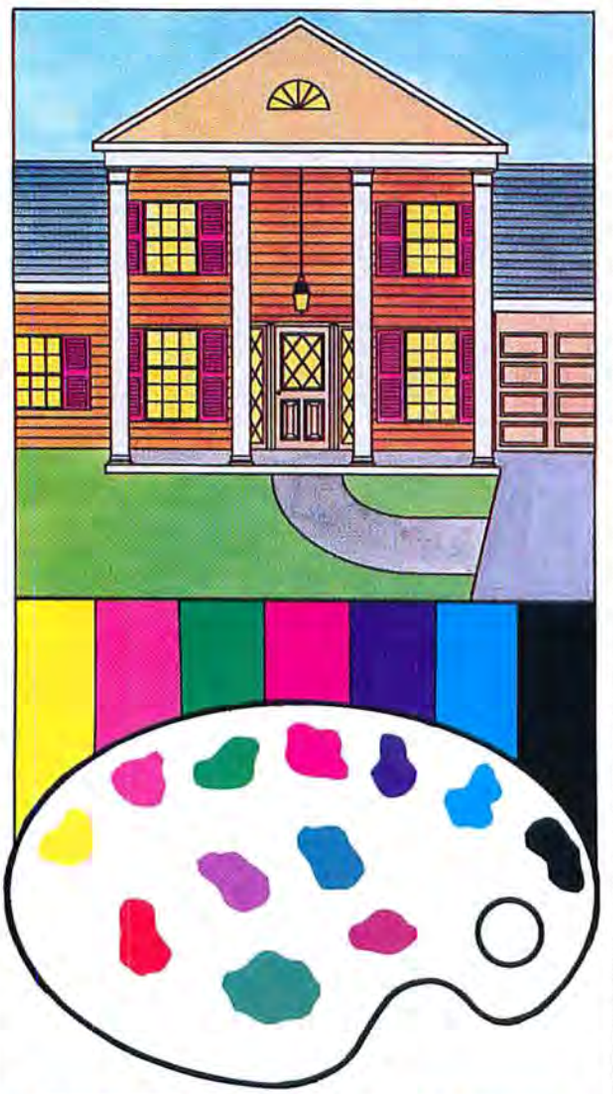

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(continued from page 51)

It's All Here in Black and White

Like some of Apple's marketing strategy, David Bunnell's January 1986 column hit the target but missed the bull's-eye.

The fact is that routine business communications produced on paper must be printed in black and white.

The reason: there's no practical way to routinely make 20 or 10 or even 3 copies of anything in color. Period.

When the end product is to be in black and white, no competitor can touch the Mac's flexibility and sophistication.

Roger Oliver
St. Louis, Missouri

While there is still nothing as fast as a Xerox machine for printing color Mac documents, the new ImageWriter and NEC's CP2 printer do generate color printouts (see "Color Commentary," Macworld, *January 1986).—Ed.*

A Yen for Accuracy

In the article "One Day in the Life of Japan," which appears in the January issue of *Macworld,* you have added one too many zeros to the yen amounts or one too few to the dollar amounts. No way are there 2250 yen to the dollar! The dollar has been strong lately, but not that strong.

I'm glad that the person who figured the currency conversions for the article doesn't work in the bank where I change my yen to dollars.

G. F. Lukos
Arlington, MA

In this case our mistake resulted from failing to follow the proofreader's maxim "Check and double-check." We transferred our Macintosh text files—which showed the correct yen values of ¥5000 for a pound of tuna or an hour in the hotel—to the IBM PC WordStar *files that our typesetter requires. However, the yen symbol (¥) that is available on the Macintosh keyboard does not translate directly, because there is no such symbol on the IBM keyboard. The IBM interpreted the code for the yen symbol as* 4, *probably by reading the first few bits of the ASCII code for the symbol. If you transfer files, keep an eye out for such unexpected results.—Ed.*

(continues on page 58)

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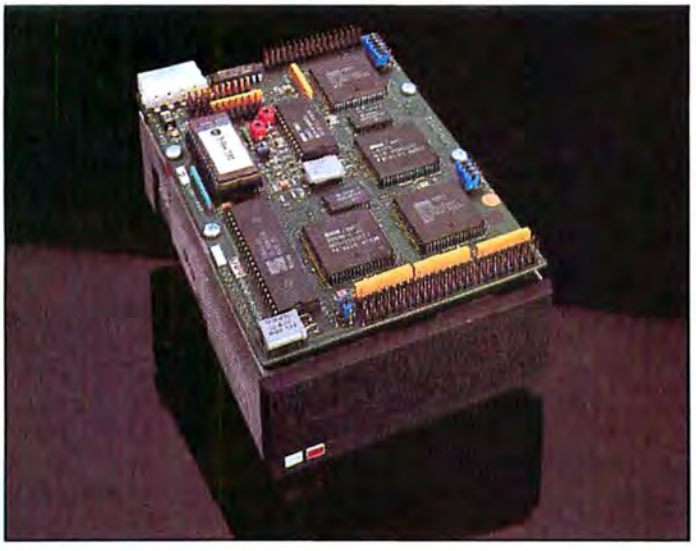

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Circle 373 on reader service card

(continued from page 56)

Omission Accomplished

After reading *Macworld*'s special winter edition, I was distressed to find that our product—MacFORTH—was not included in the "Business Software Review" list. What happened?

Christine Colburn
Rockville, Maryland

We apologize for the oversight. With more than 400 business programs to categorize, we were bound to miss a few. Readers who would like information on MacFORTH should contact Creative Solutions, 4701 Randolph Rd. #12, Rockville, MD 20852, 301/984-0262.—Ed.

Filing Fault

The recent article on *Helix* ["Files of Icons and Tiles," November 1985], the relational database system produced by Odesta Corporation, was certainly all-inclusive, but only of the program's positive attributes.

No mention was made within this six-page report of any of the disadvantages of this program, such as its significant inability to save calculated fields. Because of this drawback, it is impossible to produce three-across mailing labels, which is an amazing deficiency in such a sophisticated system. *Macworld* should feel a need to provide for its readers not only the pluses but also the minuses of featured programs.

Dave Edmiston
Sacramento, California

Perhaps you have an early version of Helix. *We reviewed version 2.0, in which you can post calculated fields. Although not as convenient as some other programs, such as* OverVUE, *which lets you choose the type of labels from a menu, you can produce three-across mailing labels within a* Helix *template icon. Simpler file management programs are generally better suited to mailing applications than a data analysis program such as* Helix.*—Ed.*

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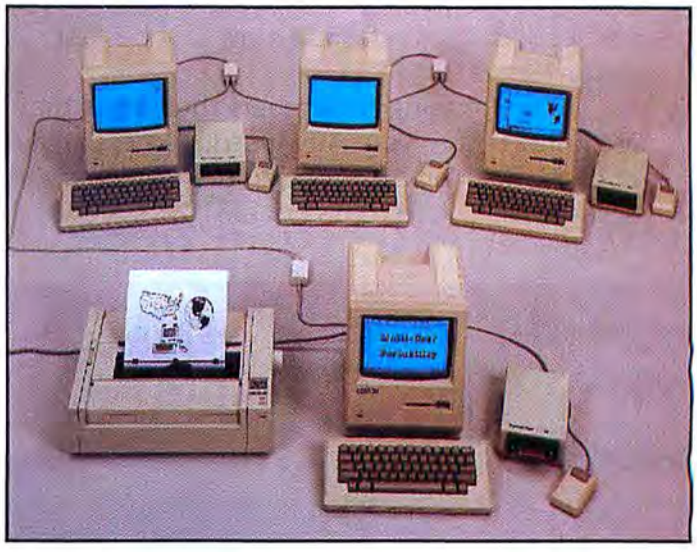

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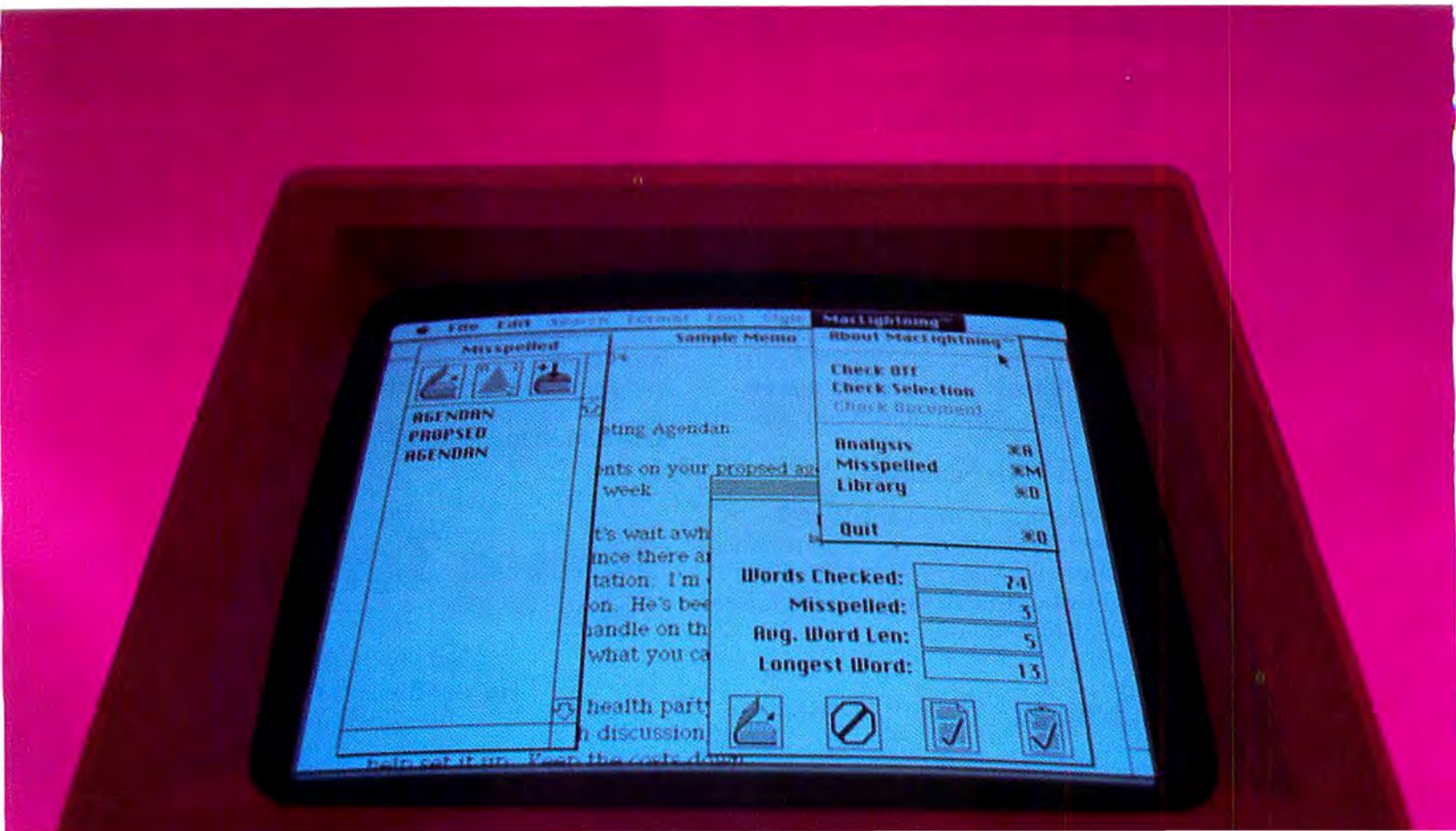

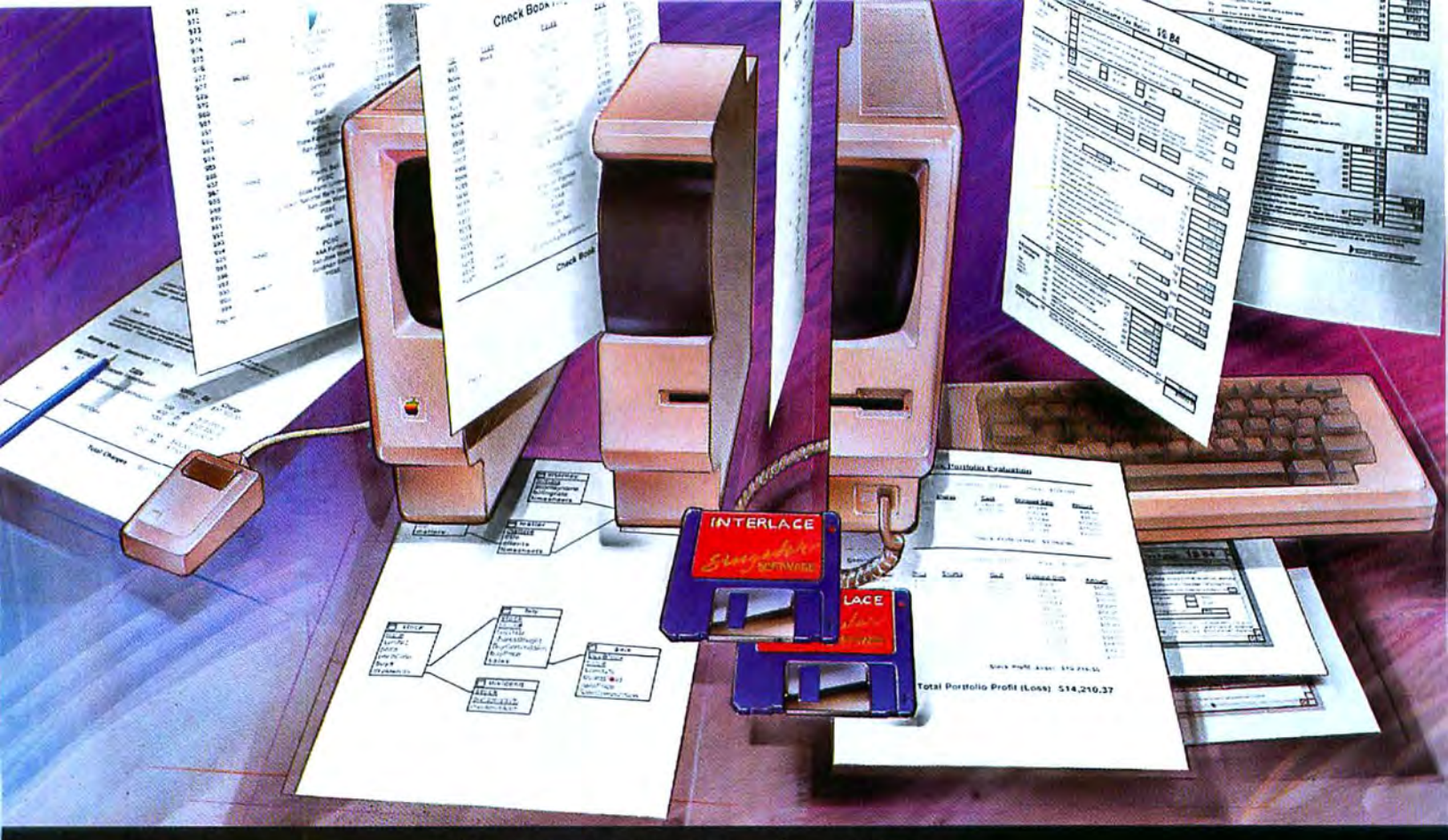

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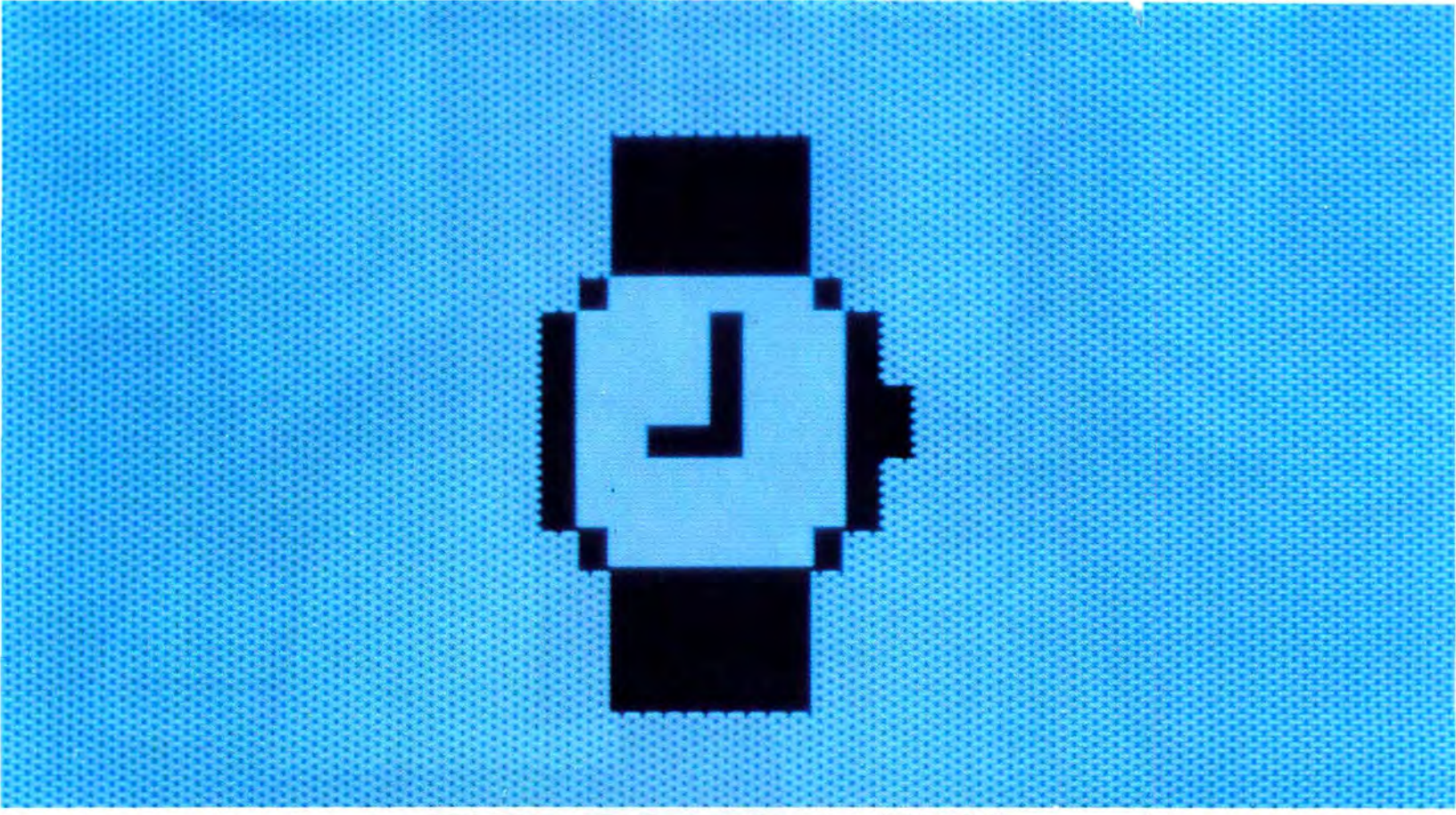

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The next demonstration will require a little imagination. Imagine a Macintosh with software that protects your data against loss by copying it onto diskettes. A print spooler that lets you go on to other jobs while your printer is occupied. And a security program that protects your files from unauthorized entry. You've just imagined a Macintosh with HyperDrive.

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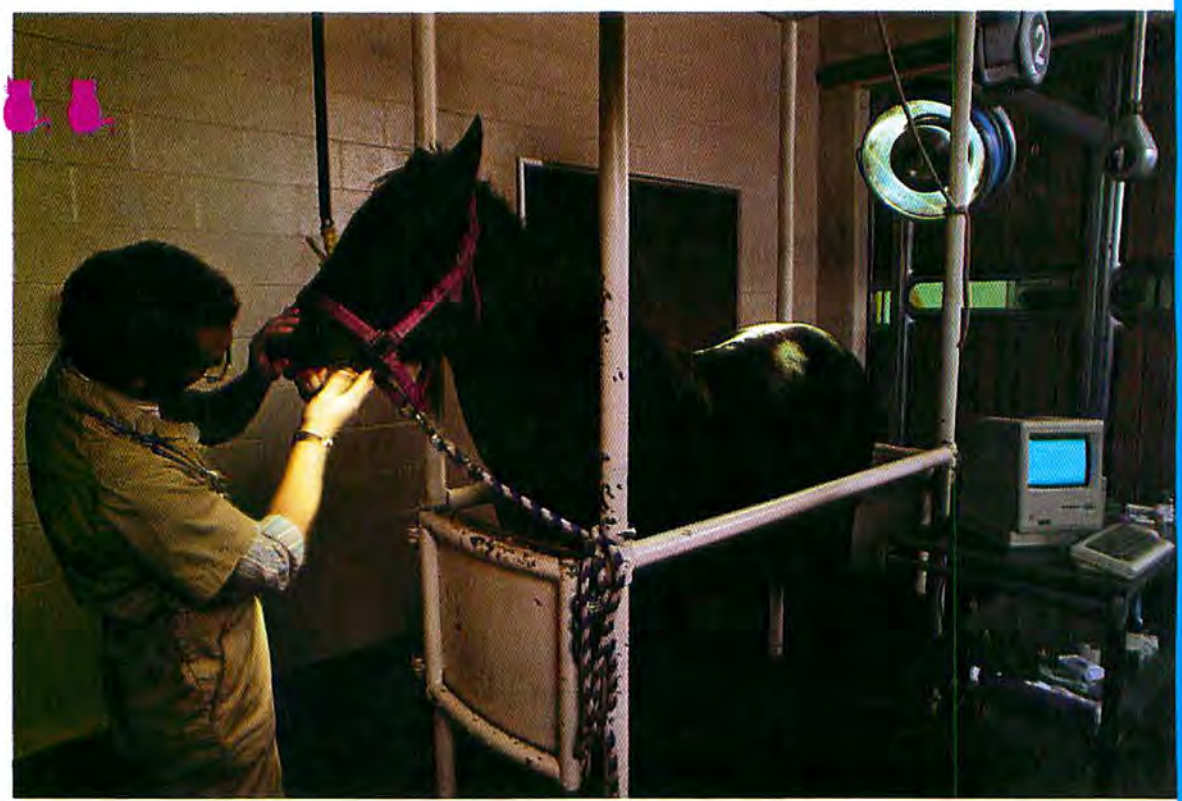
Macworld View

Software entrepreneurs join forces, the Mac ends cramming at vet school, and more

Daniel Farber

Animal Farm



A veterinary student takes symptoms straight from the horse's mouth and records them on the Mac to arrive at a diagnosis.

Out in the flatlands of east central Mississippi, far from the civilizing influence of the great river, amidst mountains of kudzu and acres of dairy farms, is Mississippi State College. You're forgiven if you don't think of Mississippi—especially Starkville, where the college is located—as a hotbed of Macintosh innovation. But think again. The Macintosh is making inroads in all corners of this country, and Mississippi is one of those corners.

Mississippi State has the first veterinary school in the country to require Macintosh computers (or, for that matter, computers of any kind) of its entering students. For the past two years, entering classes at the sleek, multimillion-dollar facility have brought Macs with them to their dissection classes. The school is developing an innovative approach to medical education that may become a model for other schools. Instead of focusing primarily on the development of courseware, Mississippi State has opted to use the computer in education for something for which it's uniquely suited—as a diagnostic database.

"This is a new college—it was founded in the late seventies—so when we set out to design the curriculum, we weren't limited by the past," explains Dr. Philip Bushby, a professor at the school and the prime architect of the computerization scheme. "We took a hard look at the curriculum expected of a veterinary student to pass the national boards. We realized that there were 216,000 facts that candidates were expected to master—that's one new item every 6 minutes, 24 hours a day, for the first three years of the four-year program. And that's just today. What about in ten more years?"

The faculty and administrators concluded that the knowledge explosion required a rethinking of the goals of education. "We realized we could no longer eliminate ignorance but should try instead to teach our students how to deal with their ignorance," say Bushby.

"And using the Macintosh as a knowledge repository, with upgraded disks of information going out to vets as an ongoing, lifelong process, is the way we're looking at the computer age."

(continues on page 65)

How To Make Your Maccing Faster, Easier, and a Lot More Fun!

Tempo macros speed your work or play on the Macintosh.

Record any series of Macintosh commands or keystrokes and Tempo will play them back, at top speed, every time you need them. With a single key code, you can execute a macro that replays an unlimited number of commands.

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Intelligent macros for the Macintosh.

Edit your macros for changes or corrections

You may edit Tempo macros the same way you create them – click to edit, click to change, click to save. Tempo has no complex programming language, simply step-by-step menu commands and dialog boxes.

What you can do with Tempo

- Reduce complex commands to a single keystroke.
- Automate moving information from one program to another.
- Have Tempo wait until the time you specify, then perform multiple tasks on your Macintosh – unattended.
- Guide new users through programs, prompting them with dialog boxes along the way.
- Distribute time-saving macros to other members of your company.
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Animal Farm (continued)

The key item in Mississippi State's scheme is a kind of expert system designed for medical purposes called the Problem Knowledge Coupler, or PKC. The program involves a querying database approach that is structured to allow doctors to answer yes or no diagnostic questions about an animal's health. After the doctor answers the questions, PKC lists possible diagnoses, along with statistical information showing how closely each possible diagnosis matches the animal's symptoms.

One important advantage of the PKC is that the diagnostic modules can include extremely rare diseases that only a specialist would catch—and put that knowledge into the hands of every generalist.

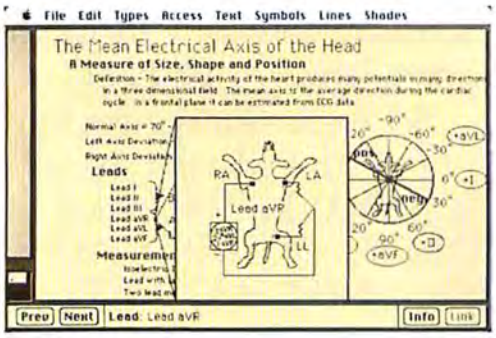
The diagnostic modules are developed one at a time and then sent out to working vets on disks. The long-range goal of the school is for all the vets in the state (and ultimately the country) to use Macs with hard disks running the PKC program. Information can be added to diagnostic modules as it is developed, and updated versions of a module can be sent out as needed.

As far as courseware goes, *Filevision* and *FactFinder* are popular with a number of the professors, and many of the anatomy classes use *Filevision* documents that have been created in the past two years. *Filevision* is ideal for storing the mix of anatomical charts and data required of a vet. Throughout the freshman and sophomore labs—big, open rooms with lockers, dissection tables, and cubicles—Macs can be found built into custom-designed stands. Students work on dissections with *Filevision* pictures nearby on their Mac screens, referring to the documents that other classes have produced and which are now part of the college's library or creating new files as class assignments. The project has been so successful that one of the professors, Dr. Nelson Westmoreland, has won several awards from Telos, the maker of *Filevision,* for his anatomical database applications.

What is especially impressive about the Mississippi State operation is that it was developed outside of the Apple University Consortium—Apple's college program. A single college with only 40 students per class and a few hundred in all, Mississippi State has nowhere near the numbers required for the consortium. But that hasn't stopped the veterinarians, and Mississippi State is now being visited by representatives of other schools from around the country. Presently discussions are taking place on how best to distribute the Knowledge Coupler modules that several schools besides Mississippi State are planning to produce.
—Jeffrey S. Young

Veterinary Courseware

At Mississippi State's veterinary school, Business Filevision *is used to provide electronic databases of anatomic and medical information.*



Television producer Bob Fraser on the set of "Benson."

Television Storyboards

Bob Fraser, producer of TV's "Benson," admits to being inspired by the *Macworld* issue devoted to the Macintosh and the movies (March 1985). But he has gone far beyond using the Macintosh for writing and scheduling. He now employs a video camera, a digitizer, and Hayden's *VideoWorks* to create animated storyboards and presentation graphics.

"Drawing storyboards used to be one of the most difficult parts of my job," says Fraser. A storyboard is a set of drawings showing individual camera setups—the first step in visualizing a script. Before the Macintosh, Fraser drew rough sketches with stick figures and then gave the sketches to an artist for another rendering. "Often the sketches went back and forth between myself and the artist several times until I got what I wanted," says Fraser. "It was a mess."

Fraser started out with one Macintosh and an Imagewriter, writing scripts with *MacWrite,* charting the status of each episode with various programs, and drawing storyboards with *MacPaint* and *MacDraw.* He soon added the digitizer and learned to use it with both a video camera and a videocassette recorder. "I freeze-frame any image I want from the VCR and use the Macvision digitizer to transfer the image to the Macintosh," explains Fraser. "That way I can create storyboards with realistic backgrounds and characters."

The producer and former actor and theater manager now owns three Macintoshes: one for home, one for the office, and another for his two grade-school daughters—"To keep them away from mine at home." Fraser has also added an Apple LaserWriter to his system. For mass storage, he's attached a 5-megabyte Bernoulli box to his home system. But the final piece in the puzzle of creating realistic animation is *VideoWorks,* from Hayden.

"That program really allows smooth animation. Now I can

(continues on page 67)

New Faster Version 2.1

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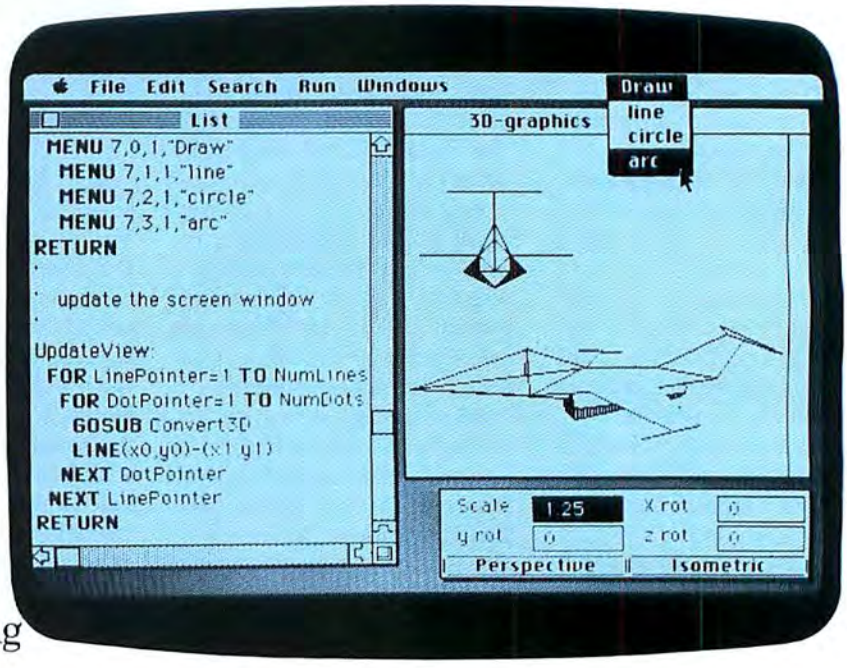

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Television Storyboards (continued)

create animated storyboards, and everyone can see the movements they have to make," says Fraser. His future plan is to use an animation program with zooms and lots of different screens to make presentations to the networks. "I'll let the Macintosh make the pitch for us. I can't really say, 'We are the brilliant writers who brought you so-and-so,' but the Macintosh can."–*John Vornholt*

Smurfs

Chris Miles is the director of the Leisure Recreation Planning and Design Division of Helman Hurley Charvat Peacock Architects in Orlando, Florida. Miles and his division have been involved with the design and construction of several major recreation centers, including the American Adventure Pavilion at the Walt Disney World EPCOT Center and the Shamu Stadium at Sea World in Orlando, Florida. The team's latest undertaking is a $200 million theme park much like Walt Disney World in France's Lorraine Valley, and the Macintosh has become an integral part of the project.

The prodigious design documents, drawings, and correspondence for the project, in both English and French, are created on the Macintosh and communicated via modem from Orlando to a French management group's office Macintoshes in the Lorraine Valley. Decorating the thousands of pages of technical documents are *MacPaint*-generated Smurfs, the peace-loving dwarfs who have become Europe's most popular cartoon characters. The Smurfs are the main characters in the theme park, dressed in space suits to illustrate the park's name, *Le nouveau monde des schtroumpfs*–The New World of the Smurfs. Scheduled to open by 1989, the theme park will combine high technology with rides, shows, and theme environments.–*K. T. Haase*

Chris Miles with his model for a Smurf (or schtroumpf *as they say in France) theme park in the Lorraine Valley.*

Software Entrepreneur's Forum

So you've finally created a great piece of software. You've spent every night and most weekends slaving away on your Macintosh to produce the little gem, and now dreams of making a living as a free-lance software developer are floating through your mind. Your mom says it's terrific, and all your friends are impressed, so what's next? How to bring that jewel to the marketplace?

Unless you've got venture capital and an experienced sales and marketing team, you're probably going to need help. And that's where a group like the Software Entrepreneur's Forum (SEF), of Palo Alto, California, can help. This three-year-old organization is dedicated to providing the independent software developer with "an educational forum for developing marketing strategies, exchanging information, and building professional relationships." What that translates to is a monthly general dinner meeting with various industry figures and special-interest groups focusing on specific topics.

And it's as good a chance to pick the brains of other free-lance developers and entrepreneurs as you'll find. Does direct mail work? Which are the best publications for placing ads? What about legal disclaimers and protection? Is public relations worth the money? How do you convince retailers or distributors to carry your product? Who is the most reliable disk copier?

At the moment the SEF is located only in Silicon Valley, and while the newsletter can be sent anywhere in the world, it's the face-to-face meetings that are of most value. Similar groups have sprung up around the country: in Seattle there's the MicroComputer Marketing Forum, while some of the larger user groups, such as the Boston Computer Society, have software developers' and business groups. The state of Minnesota has recently inaugurated a Software Education Office for Developers. Perhaps developers' groups will become a trend. The SEF is considering starting chapters in different parts of the country. If there's enough interest in your area, get in touch with them–they'll help. Software Entrepreneur, P.O. Box 61031, Palo Alto, CA 94360.–*Jeffrey S. Young*

Computer Recreations

One of the great features of the magazine *Scientific American* is A. K. Dewdney's monthly "Computer Recreations" column. I've always enjoyed his imaginative and often unusual explorations. Curious but computerless readers find much to savor, but only computer owners can experiment with the concepts and programs into which Dewdney delves. Fortunately for Macintosh owners, the subjects of many of Dewdney's columns have been turned into programs for the Mac and placed in the public domain–on CompuServe and

(continues on page 69)

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Computer Recreations (continued)

elsewhere–by generous "Computer Recreations" readers.

One of my favorite Dewdney recreations is *Core War,* which was described in the May 1984 and March 1985 columns. *Core War* is a war game simulation in which specially designed programs try to destroy one another. *Core War* for the Mac, written by Robert Martin, takes place in the Core window, an area of memory represented on the screen by an 8000-cell battlefield. The battle programs try to alter cells (memory locations) that are important to an opposing program. The last program to remain intact is the winner.

You use a special programming language called Redcode to create *Core War* battle pro-

grams. Another program, called MARS (Memory Array Redcode Simulator), runs the war by alternately executing one instruction from each battle program. The battle's progress is illustrated in the Core window.

Armchair core warriors can enter the fray with ready-made battle programs, which have names like Dwarf, Vampire, and Gemini-Cannon. More adventurous warriors program their own champions.

Wator, a water-covered, doughnut-shaped planet inhabited by fish and sharks, was the subject of the December 1984 "Computer Recreations." In the program *Wator,* also created for the Mac by Robert Martin, humans determine the initial numbers of the two major Wator species and several other ecological parameters. Once the parameters are set, the program can begin. The course of life and death is revealed in

three windows. A map of the fish and the sharks on Wator is shown in one window, and the current population of each species and the time elapsed since the start in another. The third window displays a graph of population sizes over time. Different initial parameters yield conditions of varying stability that are fascinating to watch and difficult to predict. As an ecological simulation, *Wator* ably demonstrates an old ecological adage: simple ecosystems are usually unstable.

"Computer Recreations" will surely continue to inspire unusual and thought-provoking public-domain programs like *Wator* and *Core War.* Watch for them.–*Robert C. Eckhardt*

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Macworld Best-Seller Software

This month	Business	Last month	Months on chart
1	Microsoft Excel, *Microsoft*	1	2
2	Microsoft Word, *Microsoft*	3	10
3	MacDraw, *Apple Computer*	6	7
4	Microsoft Multiplan, *Microsoft*	4	10
5	Dollars and Sense, *Monogram*	7	10
6	MacTerminal, *Apple Computer*	15	7
7	Jazz, *Lotus Development*	2	6
8	Microsoft File, *Microsoft*	5	9
9	Microsoft Chart, *Microsoft*	13	10
10	Omnis 3, *Blyth Software*	–	1
11	Back to Basics, *Peachtree*	–	1
12	pfs:file, *Software Publishing*	9	9
13	Ensemble, *Hayden Software*	–	0
14	pfs:report, *Software Publishing*	12	5
15	Front Desk, *Layered*	–	0

Source: InfoCorp survey of over 200 retail stores

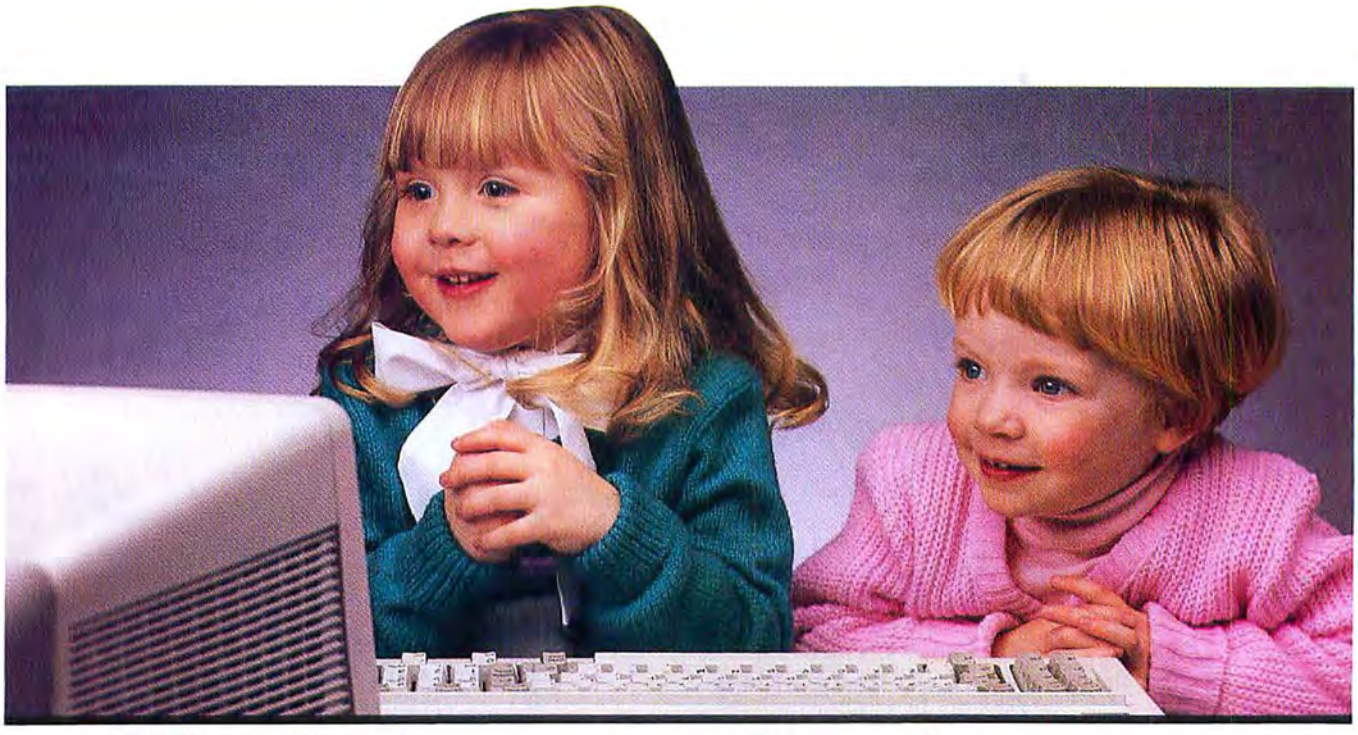
Software Watch

Editors' choice: other recent software of particular interest

Interlace, *Singular Software*
Database manager

EZ-Draft, *Bridgeport Machines*
Computer-aided design (CAD)

MacLightning, *SoftDesign*
Spelling checker



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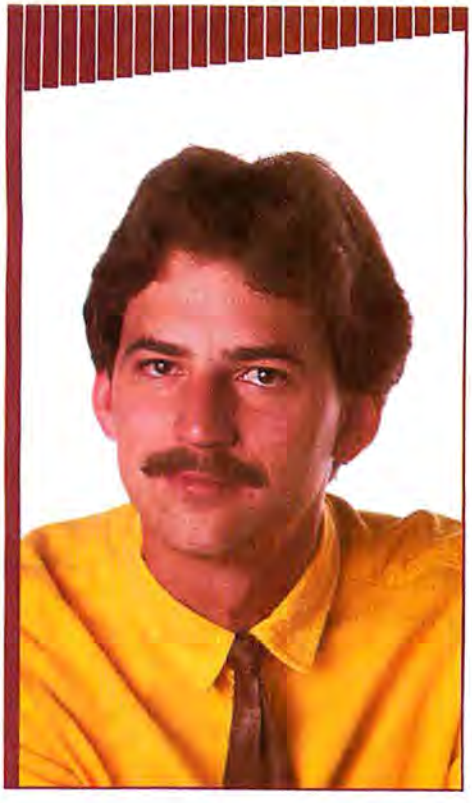
Get Info

Questions on XY plotting in Excel, word processing in columns, understanding file descriptors, and more

Lon Poole



Delete files with caution, or you may cause the application program to fail spectacularly.

If you want to create XY scatter graphs in Excel, *read about a technique that makes it possible. Also this month, information on pin-feed disk labels for neat printouts and desk accessories that let you delete files. A beep at startup and a flashing apple on the menu bar only mean that the Mac's alarm clock has gone off. There's no need to throw a pillow at it; just turn off the alarm. Some news about a word processing program that handles text in columns and an explanation of those cryptic descriptors, called* file flags, *that are assigned to every document.*

Excel Dates and XY Plots

Q. Can an *Excel* macro enter the current date and time? How can I make *XY* plots in *Excel?* The charts provide only one variable axis.

David W. Stokes
Gainesville, Florida

A. The NOW() function reports the current date and time, according to the Mac's clock, as a serial number. The following functions convert the serial number to one of its constituent parts:

DAY(serial-number)
HOUR(serial-number)
MINUTE(serial-number)
MONTH(serial-number)
WEEKDAY(serial-number)
YEAR(serial-number)

These functions, like all *Excel* functions, work in macro sheets as well as worksheets. For example, the macro formula =FORMULA("=DAY(NOW())") enters a formula into the currently selected cell to compute the current day of the month.

Regarding your second question, there are tricks to making an *XY* plot with *Excel:* enter the *X* values as labels (not values) on what *Excel* calls the category axis, enter the *Y* values on what *Excel* calls the value axis, and choose a scatter chart.

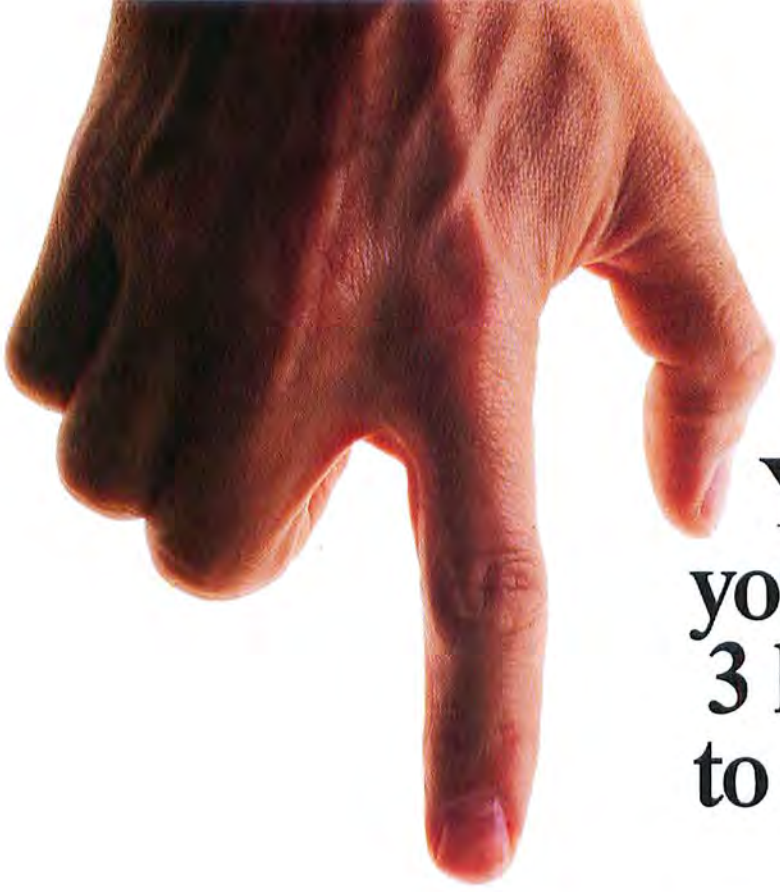
Begin by arranging your *X* and *Y* values into a table in a worksheet. The first column of values in the table enumerates the *X* values, and the second column contains the *Y* values. (You could arrange the values in rows instead of columns, in which case the *X* values go into the first row.) In *Excel* parlance, the *X* values are the categories, and the *Y* values make up a data series.

After setting up the table, select both columns (or rows) of the values, and choose Copy from the Edit menu. Next, open a new chart window and paste in the data from the worksheet, but do not use the Paste command, which treats the *X* values as a data series instead of categories.

Choose Paste Special on the Edit menu. In the dialog box that appears, select the option Categories in First Row. Click OK, and *Excel* plots the chart using its standard chart type, which is a column chart. In a column chart, each tick mark on the category axis corresponds to an *X* value from the worksheet.

Change the chart to a scatter chart by choosing Scatter on the Gallery menu. Select a chart style in the dialog box that appears. As *Excel* draws the scatter chart, it adjusts the *X* (category) axis so the tick marks measure equal increments in the *X* value, from the lowest to the highest value

(continues on page 74)



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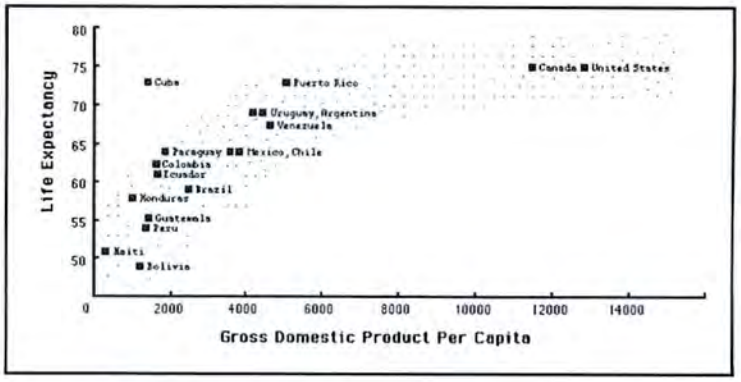
(continued from page 71)

on the worksheet's row of *X* values, and plots the data points accordingly (see "Excel XY Plot"). Label the axes and the data points by choosing Attach Text on the Chart menu.



Excel XY Plot
Scatter plots are suitable for data based on two independent variables, such as life expectancy and GNP. This chart was created in Excel *and enhanced in* MacPaint.

Delete from Desk Accessory

Q. Is there a desk accessory that allows me to delete a file?

Robert Umlas
Palisades, New York

A. I know of two desk accessories that delete files. The *Extras* desk accessory displays a scrollable list of file names in a standard file selection dialog box. The *DiskInfo* desk accessory displays a scrollable list of file names in alphabetical or chronological order.

In either desk accessory, you select one file at a time for deletion. Both desk accessories ask you to verify your selection in a separate dialog box, and they ask for verification again if the file is locked. You can turn off all verification in *Extras* if, as program author Bob Luce puts it, "you never make mistakes."

Both desk accessories work with the original Macintosh File System used on single-sided disks. The versions available in early January (*Extras* 1.5 and *DiskInfo* 1.2) did not work with the new Hierarchical File System (HFS) used on Apple's hard disk and double-sided disks. Upgrades that will work with HFS are promised.

Delete files with caution, or you may cause the application program hosting the desk accessory to fail spectacularly. Don't delete any open files or any temporary files with names like Paint1, MW0001, Print File, and Undo File. Be especially careful when using the *Switcher* that you don't delete a file from one partition that's in use in another.

Both *Extras* and *DiskInfo* are distributed as shareware, so you can get copies from most user groups. You can order *Extras* for $10 directly from Bob Luce, 324 E. Shaw, Fresno, CA 93710. *DiskInfo* is available for $10 from Maitreya Design, P.O. Box 1480, Goleta, CA 93116, 805/968-7578.

(continues on page 78)

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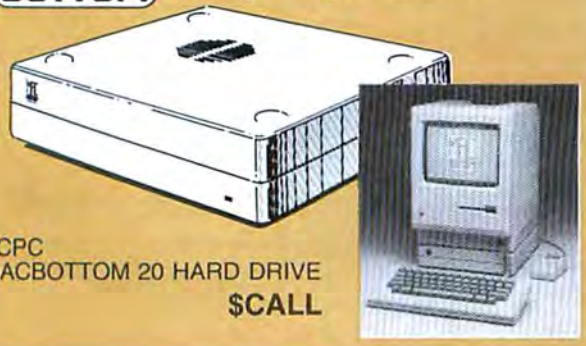

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Source Telecomputing
The Source *(subscription & manual)* 30.00
Videx Mail Center *(2 User)* 169.00
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Apple Computer MacProject 145.00
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Mac Spell Right or The Right Word 69.00
Business Essentials 65.00
The Thesaurus 25.00
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Haba Systems	
HabaDisk 800 KB DS/DD External Drive	249.00
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Bernoulli Box Personal Server 5MB	1299.00
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MT-3002 800K External Drive	199.00
MDideas, inc.	
HD-20 *(20MB Hard Disk For MacPlus)*	829.00
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MAC535-20 800KB External Drive	259.00
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Magnum 800K External Drive	275.00
MagNet 20X External 20MB Hard Drive	Call
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Super 5 Mac 400K External Drive	215.00
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Dasch External RAMdisk 500KB	395.00
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Kensington	
Portable Modem (300 Baud)	86.00
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Mac Modem 1200 *(Hayes Compatible)*	399.00
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Popcom X-100 Modem w/Straightalk	259.00
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Thinkjet, LazerJet, LazerJet Plus	Call
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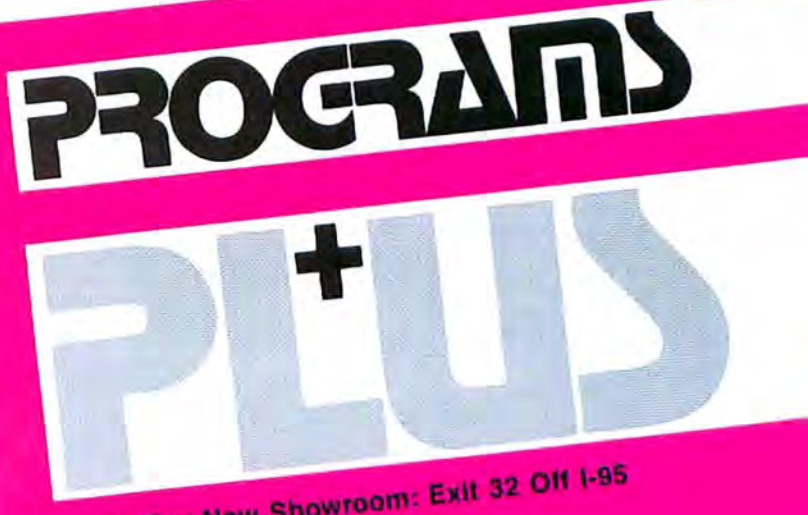

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(continued from page 74)

Printing Disk Labels

Q. When I print a disk label, the blank label slips around in the Imagewriter. Taping the blank label to a piece of paper works but is cumbersome, slow, and unreliable. Do you know a better way?

Jeffrey Hallett
Locke, New York

A. Pin-feed labels should solve your problem. You can obtain them from New Canaan Microcode (136 Beech Rd., New Canaan, CT 06840, 203/966-6969) or from Ideaform Inc. (908 E. Briggs, Fairfield, IA 52556, 515/472-7256).

Alarm

Q. My Macintosh has developed an annoying quirk. When starting up with any disk, it beeps as the menu bar appears, before the disk icon appears. And the apple in the menu flashes continuously, which is distracting. Any idea what's happening?

Michael Maiman
San Francisco, California

A. Your Mac's alarm clock has gone off. To turn off the alarm, open the Alarm Clock desk accessory. It reports the time of day, the date, if the alarm is set, and when the alarm will go off. This desk accessory also enables you to set and adjust those items. The clock is accurate to within a second or so each day. It keeps running when the Mac is switched off, thanks to a self-contained, long-life battery.

When you choose Alarm Clock from the Apple menu, you see a digital clock that reports the time of day. Clicking the small lever on the right drops the other two parts of the Alarm Clock into view. Selecting the icons at the bottom of the display lets you view or change the time of day, the date, or the alarm setting.

Check the alarm by clicking the alarm clock icon. The time at which the alarm is set to ring appears in the middle section above the icon, with an on/off button to its left. Click the button down to turn the

(continues on page 82)

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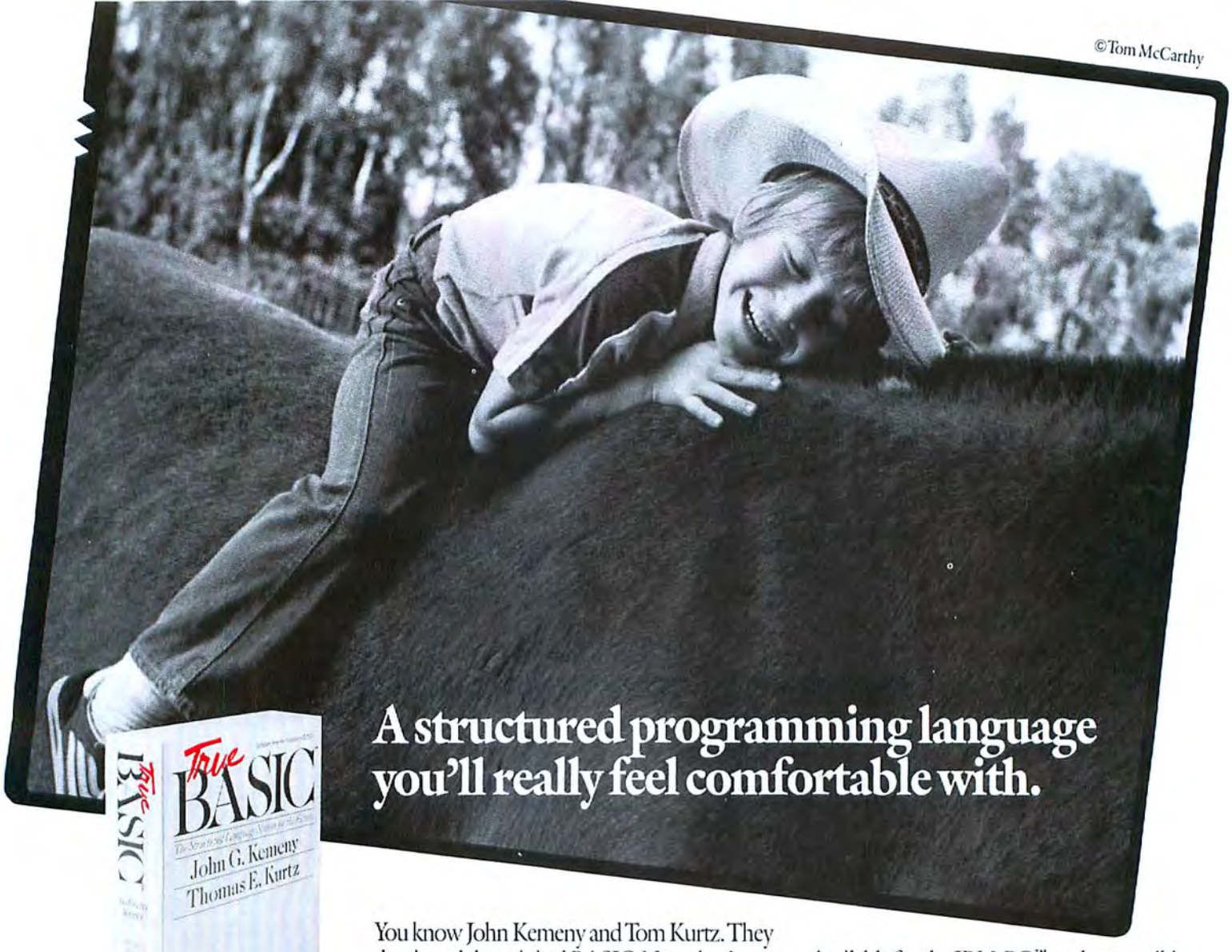

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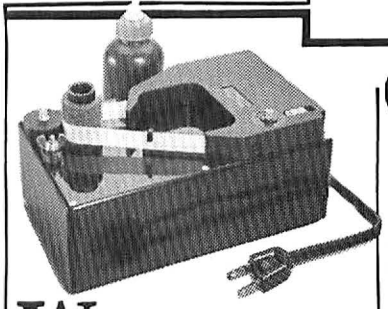

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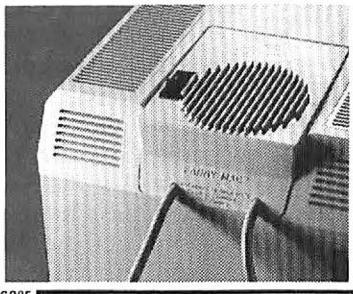
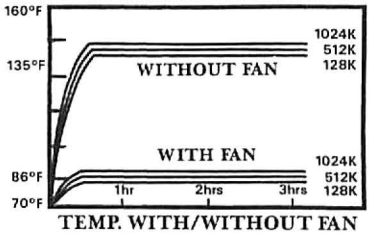


Temperature measured inside top left and right side of MAC with LM35 temperature sensor. 75° average ambient air temperature during test.



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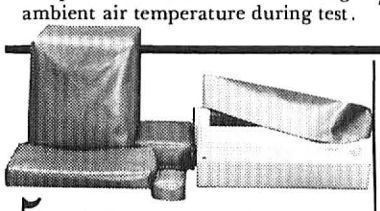

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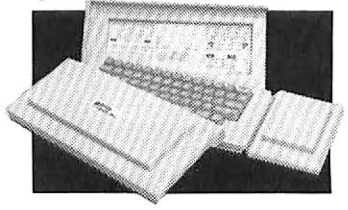

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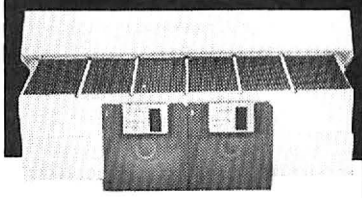

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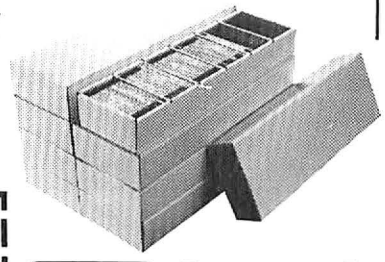

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(continued from page 78)

alarm off. When the on/off button is up, the alarm is set, and short lines radiate from the top of the alarm clock icon to suggest that the bell is ringing (see "Alarm Clock").

To change the alarm setting, click any element in the digital display next to the on/off button—hours, minutes, seconds, or AM/PM. An adjustment button with arrows pointing up and down appears that lets you adjust the selected element. Click to change the number one unit at a time; press to spin ahead rapidly. Alternatively, you may set the time by typing. You cannot change AM or PM by typing, however, so you must type the time in 24-hour format (for example, 19:15:00 for 7:15 PM). Press the Tab key to move from hours to minutes and from minutes to seconds.

Edit by Columns

Q. In *MacWrite* how can I enter and edit text in columns without having the changes in one column affect other columns? I am writing a reference book on functional analysis, and I am arranging my entries alphabetically. Since *MacWrite* treats the contents of a page as continuous text, editing by columns is impossible.

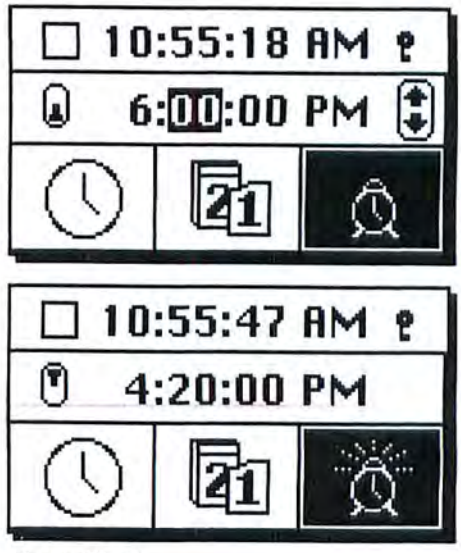
James S. Hellen
Wayne, New Jersey

A. The only Macintosh word processor I know of that permits typing, editing, and printing in columns is *Haba Word,* which was scheduled for release in March. It shows columns on screen as they will be printed and lets you resize, move, insert, and delete columns. *MacWrite* 4.5 can't work in columns, and *Microsoft Word* 1.05 only prints in columns.

Haba Word uses two column schemes. One scheme flows text to the next column on the right when you reach the end of a page, like the columns in a magazine. The other scheme maintains columns across pages like a spreadsheet.

Speaking of which, have you considered typing and editing text in the columns of a spreadsheet? Just ignore the formula calculation capabilities and use the column manipulation features. Most spreadsheet

(continues on page 87)



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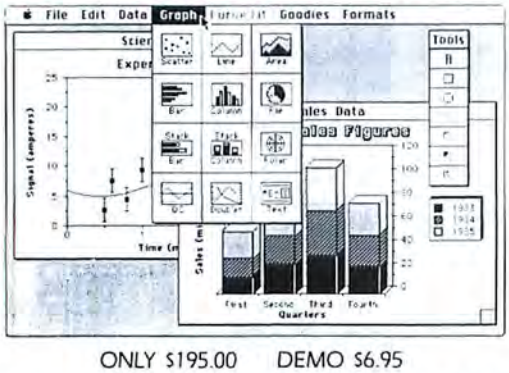

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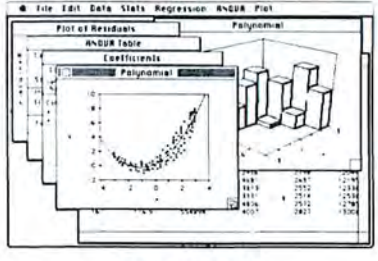

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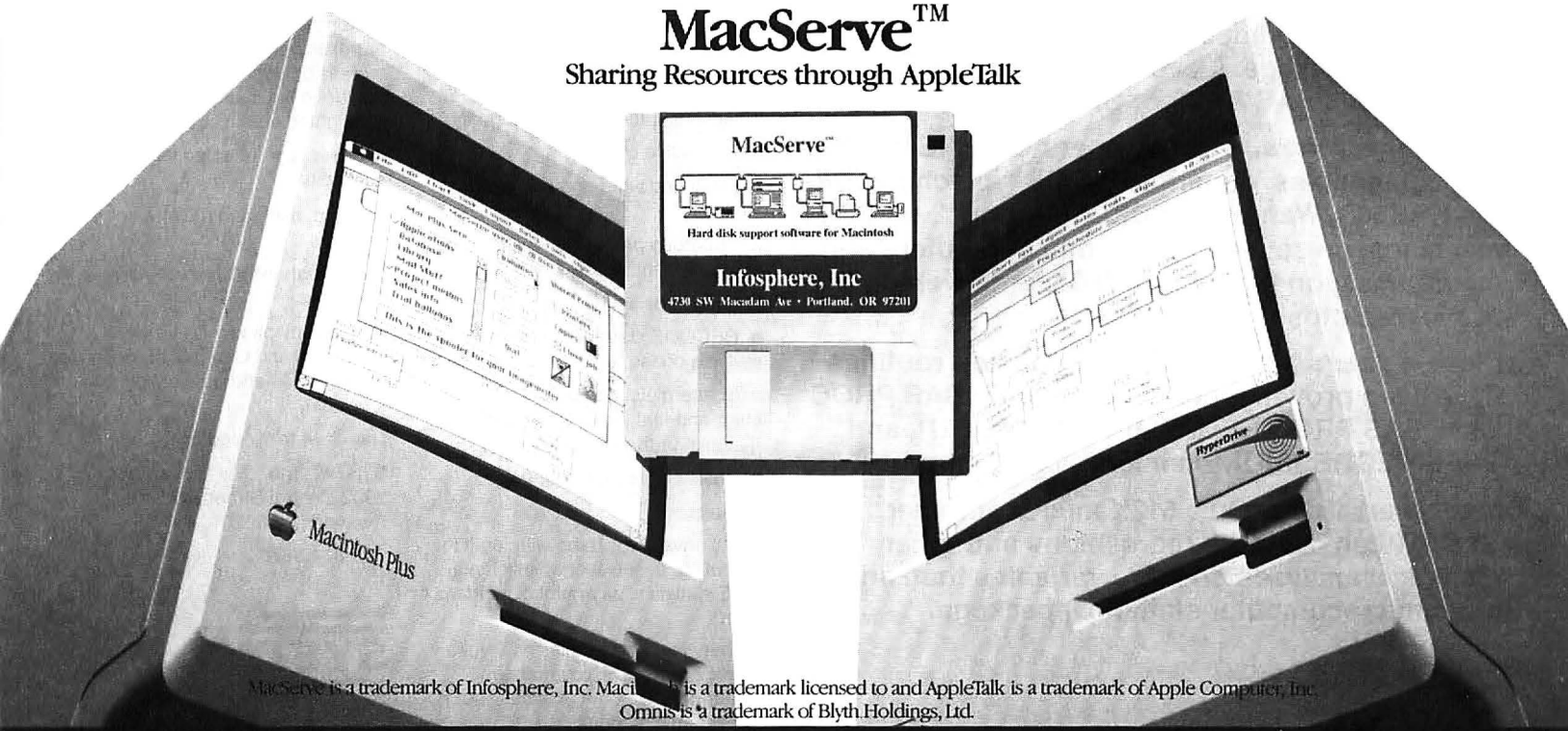

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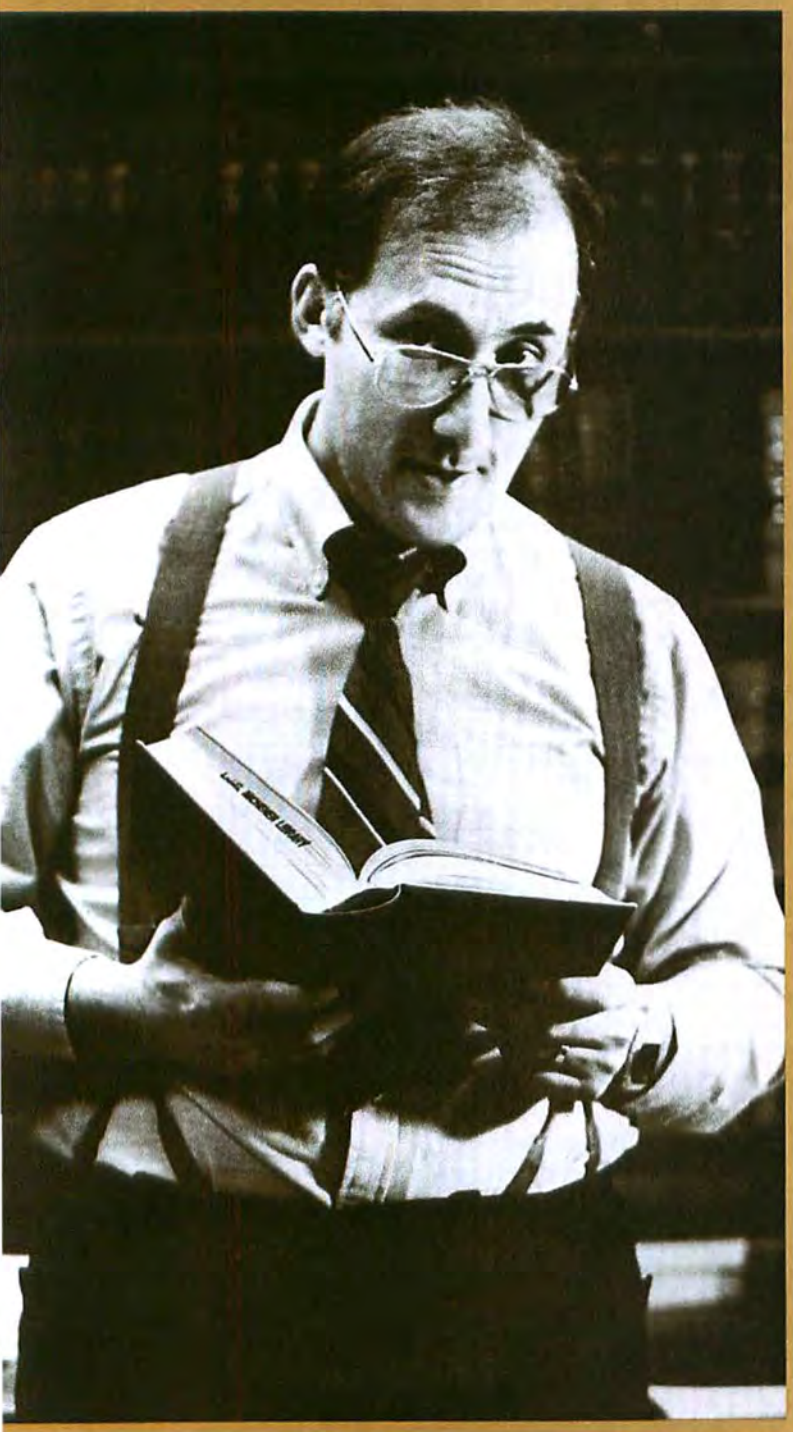

Photographed by Brian Thompson at the law library of Lang, Michener, Toronto, Ontario.

Name: Bruce Lewis.
Profession: Managing partner, major Canadian law firm.
Hobby: Crafting reproduction William and Mary furniture.
Work style: Perfectionist. Demands 100% accuracy, superior quality and appearance in every legal document.
Computer of choice: Macintosh™ with a LaserWriter. Placed 65 Macintosh computers on the desks of both lawyers and staff. Networked them to share 9 LaserWriters. Plans to buy 100 more Apple computers this year.
Favorite software: Document Modeler™, a powerful expert system toolbox for documents. It enables Bruce to "clone" his 12 years of legal experience to assist other lawyers and staff. And it saves time.
First application: Bruce constructed a model of the dozen or so letters usually required for real estate transactions. The model prompts a secretary, step-by-step, to input every relevant particular of a transaction and then automatically performs any calculations, assembles the appropriate clauses and produces impeccable letters customized to the client's individual needs, precisely as Bruce specified. Result: a 35 minute job reduced to 10 minutes.
Next application: More document models, this time for more complex documents.

Bruce Lewis. One of a new breed of "gold collar workers"* who is boosting professional and managerial productivity with advanced knowledge-management tools.

Become a gold collar worker. Contact the Model Office Company™. Phone: 1 800 268-8181, our toll free number in Canada and continental U.S. Or write: The Model Office Company, The Gooderham Flatiron Building, 49 Wellington St. East, Toronto, Ontario, Canada, M5E 1C9.

THE MODEL OFFICE COMPANY

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Circle 426 on reader service card

(continued from page 82)

programs even let you enter lines out of order; the program sorts them for you. When you have arranged the text to your satisfaction, copy it from the spreadsheet and paste it into *MacWrite,* where you can make font and style changes. When you paste spreadsheet information into a word processing document, the columns align on the tabs you have set.

File Flags

Q. I've used the *SetFile* desk accessory a number of times to retrieve a lost document by changing its type and creator. I've often wondered about the meaning of the document descriptors, such as Inited, Busy, and of course Bozo. Can you fill me in?

Tim Kraft
Canton, Ohio

A. Every disk sets aside space for a file directory, which keeps track of file descriptions and locations. The description of each file includes a standard set of file flags, including the Inited, Busy, and Bozo flags you mentioned (see "File Flags Table").

You set the flags on or off using the *SetFile* desk accessory or the *Fedit* program. Most user groups offer both *SetFile* and *Fedit* as shareware. You can order *Fedit* for $30 from John Mitchell, 939 E. El Camino Real #122, Sunnyvale, CA 94087. *SetFile* is available for $10 from Fred, Sam, and Dave Software, 1442A Walnut St. #153, Berkeley, CA 94709, 415/849-9114.

Flag	Meaning
Protected	The Finder cannot duplicate this file or move it to the trash or to another folder or disk.
Locked	The Finder cannot remove, rename, or replace this file.
Invisible	The Finder does not display this file's icon.
Bundle	This file contains an icon list, file references, and version data resources, which the Finder copies into its desktop file to display the proper icon for the file and its related documents.
System	This is a System file.
Bozo	This file is protected by a copy-protection scheme so outdated that Finder 5.0 ignores it.
Busy	The file is open.
Changed	The file has been changed since it was last saved and ought to be saved again before closing it or quitting.
Inited	This file's icon has been assigned a location on the Finder's desktop.

File Flags Table
A key to the descriptors that flag every file on disk. You can read file flags using the SetFile *desk accessory or a program like* Fedit.

Imagewriter Prints Only U's

Q. Sometimes my Imagewriter prints only *U*'s, a whole line of them, over and over. This unseemly behavior happens on and off with several programs. The Imagewriter passes its self-test and works fine with a friend's Mac. What gives?

Paula Wilkes
Charleston, South Carolina

A. The unique printing you describe occurs when you try to print a document on an Imagewriter after using a disk that was set up for the LaserWriter with AppleTalk connected. You need not have actually printed anything on a LaserWriter, but the following conditions must have occurred in the order stated.

- When you last used the Choose Printer desk accessory on the LaserWriter disk, you selected the AppleTalk Connected option.
- You started up with a LaserWriter disk when you last turned on the Mac, or you made a LaserWriter disk the startup disk since then.
- You shut down the Mac with the MiniFinder's Shut Down button or the Finder's Shut Down command, or you pressed the Reset button on the side of the Mac, and then started up with an Imagewriter disk.
- You tried to print on an Imagewriter attached to the printer port.

Once the AppleTalk Connected option has been set, it cannot be removed by changing application programs, switching disks, shutting down, or pressing the Reset button. You must use the Choose Printer desk accessory or turn the Mac off. However, Choose Printer lets you change the AppleTalk setting only on a LaserWriter disk.

It's surprising that turning off the Mac disconnects AppleTalk. It's the only documented difference I know of between pressing the Reset button and switching the power off. Further, the AppleTalk Connected/Disconnected setting is recorded in a special area of memory called parameter RAM that is kept alive by the clock battery. Theoretically, you should have to turn off the Mac and remove the battery for a minute or so to disable the setting. Remove the battery in case the printing problem persists after turning off the Mac. If you remove the battery, you must reset the clock, the calendar, and the features controlled through the Control Panel desk accessory.

Get Info *answers questions about the Macintosh and how it works. When you need advice about using the Mac, drop me a line. I cannot respond to all letters, but I will answer the most representative questions. Send your question about the Macintosh, Macintosh software, and Macintosh programming to* Get Info, Macworld, *555 De Haro St., San Francisco, CA 94107. Send electronic mail to CompuServe 70370,702 or The Source BCW440. All published submissions become the property of* Macworld.

Lon Poole is a Contributing Editor of Macworld. □

MacConnection

SOFTWARE

Addison-Wesley
Smart Eyes *(speed reading tutor)* ..... $36.
Affinity Microsystems
Tempo *(power user's macro utility)* ..... 79.
Altsys
Fontastic *(create your own fonts)* ..... 27.
Apropos
Financial Planning *(reqs. Multiplan)* .... 45.
Investment Planning *(reqs. Multiplan)* ... 45.
Tax Planner *(requires Excel)* ..... 35.
Arrays/Continental
Home Accountant *(reqs. external drive)* 52.
Assimilation
Mac·Tracks *(macro utility)* ..... 22.
Mac·Memory·Disk *(reqs. 512k)* ..... 22.
MIDI Composer *(music record/playback)* 22.
Work·N·Print *(print spooler)* ..... 22.
Business·Essentials *(correspondence)* .. 65.
Mac·Spell·Right *(40,000 word dictionary)* 69.
Right·Word *(spell checker & thesaurus)* 69.
ATI
Teach Yourself Multiplan ..... 39.
Jazz Training ..... 39.
Excel Training ..... 39.
Batteries Included
The Mac BatteryPak *(desk accessories)* 27.
Blyth Software
Omnis 3 *(requires 512k, external drive)* 259.
Borland International
Sidekick *(unprotected)* ..... 44.
Sidekick w/Phonelink ..... 59.
BrainPower
PowerMath *(requires 512k)* ..... 52.
StatView *(statistics package)* ..... 99.
CAMDE
Nutricalc *(diet & nutrition analysis)* ..... 49.
Casady Company
Fluent Fonts *(two-disk set)* ..... 29.
Central Point Software
Copy II Mac *(includes MacTools)* ..... 20.
Challenger Software
Mac3D *(3D graphics, CAD features)* .. 125.
Chang Labs
Rags to Riches Ledger ..... 99.
Rags to Riches Receivables *(reqs. 512k)* 99.
Rags to Riches Payables *(reqs. 512k)* .. 99.
Rags to Riches Three Pak ..... 249.
Creighton Development
MacSpell+ *(requires 512k)* ..... 55.
DataFood
DrawForms *(requires MacDraw)* ..... 30.
MacForms *(requires MacPaint)* ..... 42.
Datavis
MacLink *(transfer Mac/IBM files)* ..... 89.
Digital, Etc.
Maccountant ..... 99.
Dilithium Press
PC to Mac & Back *(link your PC)* ..... 99.
Dow Jones
Straight Talk ..... 59.
Spreadsheet Link ..... 62.
Market Manager PLUS ..... 125.
Dreams of the Phoenix
Day Keeper Calendar ..... 27.
Mouse Exchange BBS ..... 27.
Mouse Exchange Terminal ..... 27.
Quick & Dirty Utilities Vol. 1 ..... 27.
Quick & Dirty Utilities Vol. 2 ..... 27.
Twelve-C Financial Desk Accessory .... 27.
Electronic Arts
Financial Cookbook ..... $32.
Deluxe Music Construction Set ..... 32.
Enterset
Quickpaint *(find MacPaint files fast)* .... 29.
Quickset *(icon-driven accessory)* ..... 29.
Quickword *(word processing tool)* ..... 32.
1st Byte
Speller Bee *(spelling-learning tool)* ..... 42.
KidTalk *("talking notebook")* ..... 42.
Smoothtalker *(version 2.0)* ..... 52.
Forethought
Typing Intrigue *(typing instruction)* ..... 29.
Factfinder *(free-form entry)* ..... 84.
FileMaker ..... special
Fortnum/Southern
MacInooga Choo-Choo *(reqs. 512k)* ... 21.
MacNest *(double screen scrapbook)* ... 25.
MacChemistry ..... 89.
Great Wave Software
The Art of Fugue *(Bach)* ..... 12.
Comet Halley ..... 18.
ConcertWare+ *(music composition)* ... 39.
Greene, Johnson
Spellswell *(incl. homonym dictionary)* ... 29.
Harvard Associates
MacManager *(business simulation)* ..... 29.
Desktoppers *(new desk accessories)* .. 29.
Hayden Software
DaVinci Buildings ..... 29.
DaVinci Interiors ..... 29.
DaVinci Landscapes ..... 29.
DaVinci Building Blocks ..... 46.
DaVinci Commercial Interiors ..... 114.
Art Grabber with Body Shop ..... 29.
Turbo Turtle ..... 35.
I Know It's Here Somewhere ..... 35.
MusicWorks ..... 45.
Hayden:Speller ..... 45.
Score Improvement System for the SAT 57.
VideoWorks ..... 57.
Hippopotamus Software
Hippo Computer Almanac ..... 20.
Hippo-Lock *(file security program)* ..... 62.
Hippo-C - Level 1 ..... 78.
Hippo-C - Level 2 ..... 208.
Ideaform
MacLabeler *(print disk labels)* ..... 29.
Innovative Data Design
Paste-Ease *(requires MacPaint)* ..... 35.
MacDraft *(requires 512k)* ..... 139.
Kensington
Graphic Accents ..... 29.
Type Fonts for Text ..... 29.
Type Fonts for Headlines *(reqs. 512k)* .. 42.
Layered
Front Desk *(scheduling & organizer)* ... 77.
Legisoft/Nolo Press
WillWriter *(prepare your own will)* ..... 27.
Linguist's Software
MacCyrillic ..... 39.
SuperFrench/German/Spanish ..... 39.
Tech *(1000 different symbols)* ..... 59.
MacArabic ..... 59.
MacKana/Basic Kanji ..... 59.
MacSemitic/Coptic/Devanagari ..... 59.
MacKorean ..... 59.
SuperGreek ..... 59.
SuperHebrew ..... 59.
SuperGreek/Hebrew/Phonetics ..... 89.
Living Videotext
ThinkTank 128k ..... $52.
ThinkTank 512k *(outline processor)* ... 101.
Magnum
McPic - Volume I ..... 28.
McPic - Volume II ..... 28.
The Slide Show Magician ..... 34.
Manhattan Graphics
Ready Set Go *(requires 512k)* ..... 125.
Mark of the Unicorn
Professional Composer *(reqs. 512k)* ... 249.
Microsoft
Entrepreneur ..... 29.
Learning Multiplan and Chart ..... 37.
Chart 1.05 ..... 72.
Logo 1.0 ..... 75.
Basic 2.1 ..... 87.
Multiplan 1.1 ..... 105.
File 1.02 ..... 111.
Word 1.05 ..... 111.
Multiplan to Excel Upgrade ..... 150.
Fortran 2.1 ..... 169.
Excel 1.0 ..... 225.
Miles Computing
Mac the Knife - Volume I ..... 21.
Mac the Knife - Volume II ..... 25.
Mac the Knife - Volume III ..... 27.
Mindscape
The Perfect Score: SAT ..... 47.
Monogram
Forecast *(tax planning)* ..... 40.
Dollars & Sense ..... 81.
Nevins Microsystems
Turbocharger *(requires 512k)* ..... 55.
New Canaan MicroCode
Mac Disk Catalog II ..... 32.
Odesta
Helix *(requires 512k, external drive)* .. 219.
Organizational Development
Consultant *(idea management)* ..... 115.
Palantir
MacType *(supports Dvorak keyboard)* .. 26.
MathFlash *(math flash card drills)* ..... 26.
WordPlay *(crossword puzzles)* ..... 26.
Accounts Receivable ..... 69.
General Ledger ..... 69.
Inventory Control ..... 69.
inTouch *(communication to emulation)* .. 79.
PBI Software
Icon Switcher ..... 14.
Icon Fun & Games Library ..... 14.
Icon Business Library ..... 14.
Peachtree
Back to Basics General Ledger ..... 88.
Accounts Payable ..... 88.
Accounts Receivable ..... 88.
Polarware
Graphics Magician ..... 47.
Practial Computer Applications
MacBackup *(free upgrades)* ..... 41.
ProVUE Development
OverVUE 2.0 *(power-packed database)* 149.
QED Information Sciences
Typing Made Easy ..... 36.
Rubicon Publishing
Dinner At Eight *(recipes to wines)* ..... 35.
Satori
BulkMailer *(mailing lists)* ..... 79.
Scarborough Systems
Mastertype *(arcade typing tutorial)* ..... 25.

Gilding the lily.

Is it real, or is it Marlow? It's quiz time! Get your mice and Macs ready. It's time to find out how good a job we're doing convincing you that we're the best thing to happen to mail order since the Pony Express! Each of the following statements is either true or false.

Excel $225
World's largest spreadsheet

1. That beautiful picture of our home town, Marlow, NH (pop. 552) was completely created and digitally enhanced on a Macintosh computer. T ☐ F ☐

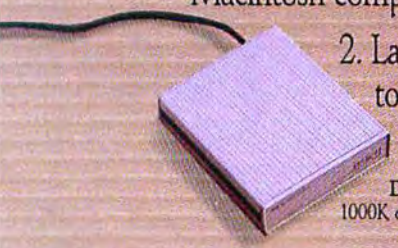
2. Last week we tore down those old useless buildings to make room for a new MacConnection parking lot. T ☐ F ☐

3. Our corporate headquarters is really in downtown Los Angeles, and this whole Marlow thing was a clever little bit thought up by our advertising people. T ☐ F ☐

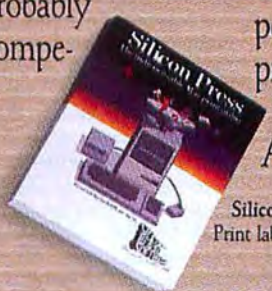
Dare to be normal.
And now for your score. If you said any one of the above is true, you are a *bona fide* skeptic. If you said two of the above are true, you probably work for the competition, and are indulging in a little wishful thinking. And if you said all three are true, then we regret to inform you that little blue men with ion generators are waiting in your kitchen to vaporize you after breakfast.

By the way, Spring *has* sprung in scenic Marlow. The local teenagers have very suspicious smiles on their faces. The grownups don't look so innocent either. And here at MacConnection, we're positively bursting. . .with prices and service beyond your wildest imagination. And that's the truth.

MacLightning $53
Instant spell checker!



Dasch $699
1000K external RAMdisk



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Order out of Chaos

Danny Goodman

With the release of 800K double-sided disk drives, the Hard Disk 20, and Finder 5.1, Apple's new Hierarchical File System lets you organize files in true file folder style. Once you know some of the system's intricacies, you'll have your disk storage firmly under control.

When you are confined to 400K, single-sided drives on the 128K and 512K Macintoshes, you rarely have difficulty organizing application and document files on a disk. On the desktop, you can group files into folders to eliminate visual clutter and help you find your way through several dozen icons. Within an application, the Standard File dialog box (the one you see when you choose Open from the File menu) lists all applicable documents on the disk in convenient alphabetical order, regardless of folder organization. Unfortunately, the more files you store on a disk, the slower the Finder works to track information.

Hard disks by themselves aren't the solution. Early models presented problems because a 10- or 20-megabyte disk could easily store more files than the Finder could track effectively, causing enormous delays in recreating the desktop when you quit an application or in opening a document from the Standard File dialog box. Moreover, an Open File dialog box could conceivably list hundreds of documents.

To counteract the Finder's sluggish performance and organizational nightmare, as well as severe file quantity limitations in Finder version 1.1g, hard disk

developers divided the hard disk into several *volumes*. The Finder was tricked into seeing each volume as if it were a separate disk, and you could hide ("unmount") unneeded volumes from the Finder with the help of a small utility program that worked only from the desktop. The more inactive files you could mask from the Finder, the faster the Finder worked. Although this was a practical stopgap measure, most people hoped that Apple would soon furnish a new Finder that would speedily handle as many files and folders as someone would likely create on a hard disk, and offer quick access to any file from the Standard File dialog box.

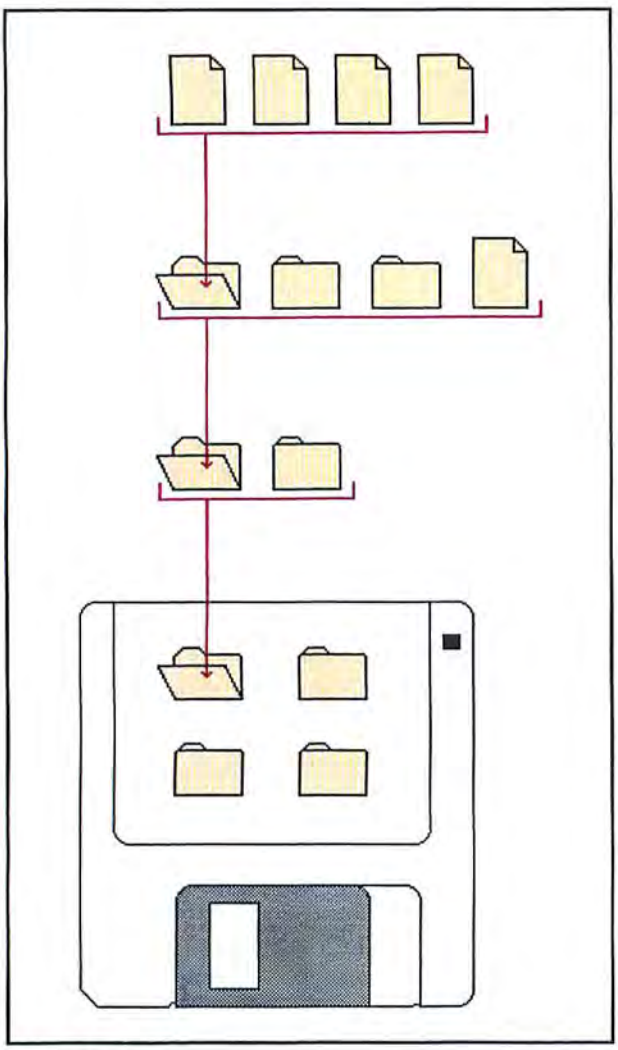

Figure 1
In a hierarchical filing system, documents and folders "nest" inside one another. Folders in Finders 4.1 and earlier were strictly desktop conveniences; in Finder 5.1, documents retain their folder identities, even from inside an application.

Apple's long-awaited solution is called the Hierarchical File System (HFS). It is built into the Mac Plus's read-only memory (ROM). The new ROM comes with the 800K disk drive upgrade for earlier Macs. The latest version of the Finder, release 5.1, recognizes both the HFS and the older, "flat" file structure (release 5.0 does also, but Apple encourages all 5.0 owners to buy the ROM and Finder 5.1 updates from their dealers to get the latest features and refinements). The HFS was designed to handle the large number of files and folders that will likely be generated on a hard disk, such as the Hard Disk 20 (HD 20), and Apple's new 800K double-sided floppy disk drives. With the new ROM, single-sided disks are treated as nonhierarchical system disks, even on 800K drives. Because the old System (2.0) and Finder (4.0) do not recognize the HFS file structure (the HFS files are invisible), make sure you use System 3.1 and Finder 5.1 on your startup disks. You update disks by moving the new System and Finder icons onto your old startup disks or by using the Installer program that comes on the Mac Plus System Tools disk.

Chain of Command

A hierarchy is any group of people or items arranged in a sorted series or in steps, as in a hierarchy of military rank. Generals give orders to their colonels, the colonels in turn pass the orders to their majors, and so on, down the ranks.

In the HFS desktop display and Standard File dialog box, the topmost rank is symbolized by a disk icon: a floppy disk for an 800K disk and a hard disk for the HD 20 or similar hardware. Ranks below the disk directory are represented as folders. Each successively lower rank of folders is "nested" in the rank above it, like slipping papers and manila folders inside progressively fatter folders in a file cabinet drawer (see Figure 1).

Thanks to early Finder versions, you probably already have a feel for file hierarchy at the desktop level if you've placed folders inside one another and then opened folder after folder to find a document icon. These folders, however, are merely cosmetic desktop aids. The Finder really sees the files as one long list, without any folder organization.

What's so important about the HFS, however, is that the Finder recognizes folder divisions and lets you open and close folders from the Standard File dialog box. In other words, whenever the Standard File dialog box is "looking" into a folder, only the names of documents and folders appearing in that folder's desktop window equivalent are listed. Even if a hard disk has 10,000 files stored on it, the Standard File dialog box lists only as many documents or folders as you would see looking at the currently opened folder. That makes finding a specific file on a crowded disk much easier and greatly reduces the amount of time-consuming work that the Finder and the disk drives must do.

Let's say you want to view a file from an extensive folder organization of your financial records (see Figure 2). The document you want to see is a *Microsoft Excel*-based travel expense report for the second week of April. When you open the main disk directory on the desktop, the Financial folder is visible (along with other disk directory folders not shown in Figure 2). To access the file labeled Week 2 from the desktop, you open a series of five folders—Financial, Taxes, Expenses, Travel, and April—to see the weekly document icons.

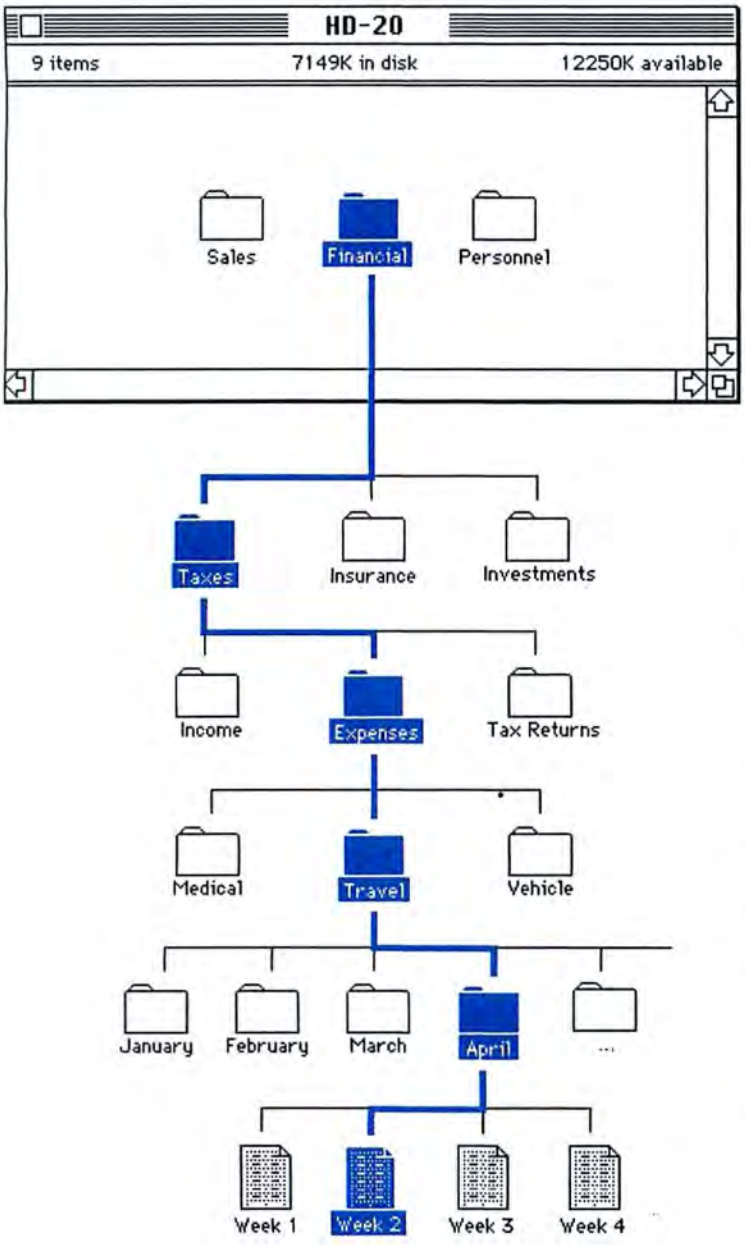

Figure 2
The Macintosh Hierarchical File System establishes nested levels of folders and documents. The Finder keeps track of the pathway through the hierarchy to your document.

You can then double-click on the Week 2 icon to start the application (*Excel*) and automatically open the Week 2 document inside the application. By doing so, you also establish a path to the April folder that the Finder will follow to save changes to the Week 2 document. Also, while the application is open, if you choose Open or Save As from the File menu, you see the HFS version of the Standard File dialog box, which lists all documents in the April folder (see Figure 3).

A major advantage of HFS over other hard disk volume arrangements is that you can make your way to other folders while you view the Standard File dialog box. Simply place the mouse pointer on the current folder name (April in Figure 3) and hold down the mouse button (see Figure 4). You now see the path that the Finder takes from the HD 20 disk directory to reach the weekly documents in the April folder.

To open a document in a folder elsewhere in the hierarchy, you select the appropriate folder name from the list. To view a document in the vehicle expenses folder, for example, you would select the Expenses folder from the list. The Standard File dialog box then displays a list of the three folders nested in the Expenses folder (notice the small folder icons to the left of the folder names): Medical, Travel, and Vehicle (see Figure 5). Double-click the Vehicle folder name to see the documents in that folder.

You can also navigate through HFS using the ⌘, Tab, Enter, and cursor keys. ⌘ with the up arrow takes you to the next level up, and ⌘ with the down arrow takes you down one level, for example.

This type of folder organization is a convenient way to keep unnecessary files out of view when you're concentrating on a particular document or task. If you set up a good organization plan for your programs and documents, you should be able to find a document more quickly by tracing logically nested folder names than by deciphering names from a list of several hundred files. HFS also reduces the burden of devising unique names for similar files (such as all Week 1 files) on a large storage disk, because two documents with the same name can be stored on an HFS disk, provided the files are stored in different folders.

It's Your Default

In planning your work patterns with the HFS, you should be aware that the Finder remembers the pathway established when you start a program or open a document and that the pathway depends on the method you use to start the application. For example, if you double-click an application icon located in the disk directory, then the next time you select Open or

Save As, the root directory is automatically selected and is therefore called the *default directory*. But if instead you start an application by double-clicking a document icon in a nested folder (as in the April travel expenses example), the document's folder becomes the default directory for the Standard File dialog box. Of course, you can change the default directory by selecting a different folder in the Standard File dialog box.

It is also important to understand how the HFS handles an application's requests for further instructions from auxiliary files, such as a help file. Very often during the operation of an application, the program reaches out to the disk for instructions, which may be stored in the program's file, a separate help file, or separate "support files," some of which may not be visible as icons on the desktop (they are the so-called hidden files). Regardless of the current default directory, when the program reaches out, it first looks to the folder (or disk directory) containing the application icon. If the desired file is not there, the program next looks into the folder containing the System and Finder icons—hence Apple's admonition that both the System and the Finder reside in the same folder. Depending on the application, you may run into problems if you are not careful in placing these auxiliary files (see "Potential Problems").

Loading Up with Applications

For most commercial programs, which have a single program file, you can place the application icon anywhere you please, even in a deeply nested folder. Moreover, most programs with single help files let you place the help file inside the folder containing the System and the Finder, so you don't have to clutter your applications' windows with help files (this works only if each help file, as delivered on the publisher's disk, has a unique name, such as Excel.Help).

You may encounter difficulties with programs that rely on hidden files, however. At first you may not even be able to run a program from the hard disk, even though you correctly copied the program's icon from the floppy disk. That's because the hidden files weren't copied. Fortunately, Finder 5.1 lets you copy the complete contents of a floppy disk onto the hard disk. To do so, drag the floppy disk icon to the hard disk icon. The Finder automatically creates a folder on the hard disk with the name of the floppy disk, and all files—visible and hidden—are transferred in one operation. If the contents of a System Folder are copied onto the new hard disk folder, be sure to trash the System, Finder, Imagewriter, Scrapbook, and Clipboard files, since these are already in your hard disk's system. As a shortcut, hold down the Option key while dragging each file into the Trash; this overrides the dialog box that asks if you're sure you want to erase a file.

You may be tempted to create multiple System Folders on the HD 20 to offer different collections of fonts and desk accessories for different applications. While many hard disks from the pre-HFS days allow

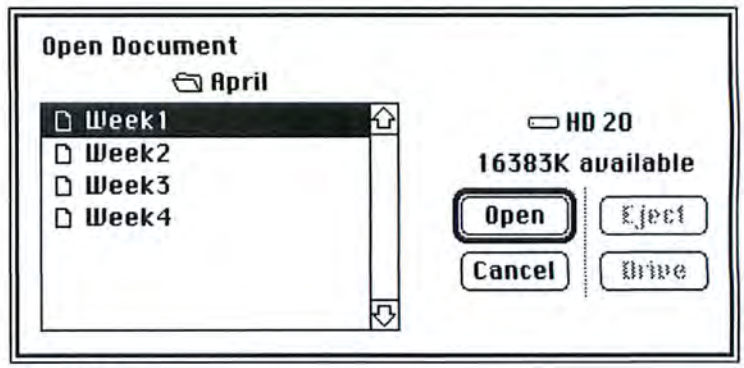

Figure 3
Standard File dialog boxes in the HFS display the contents of only the active folder; its name and small folder icon appear above the scrollable list of documents. Documents in the April folder are listed in the box.

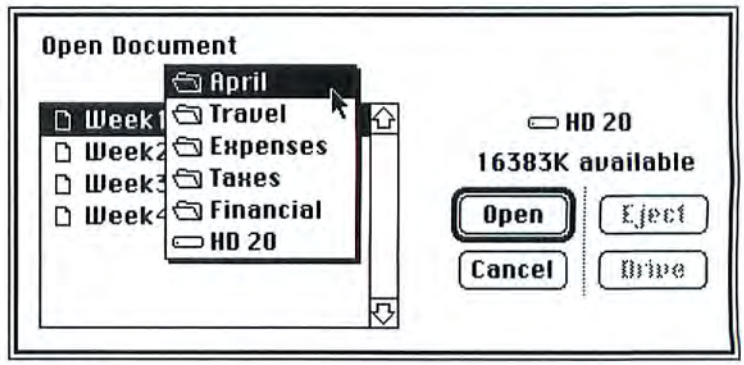

Figure 4
To reach another folder, click on the active folder name and select a folder name further up the hierarchy. Select the HD 20 directory to return to the topmost disk directory.

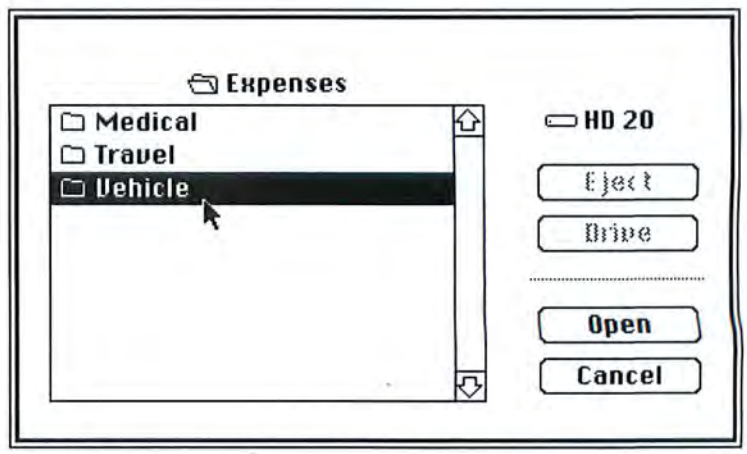

Figure 5
A folder can contain documents or, as shown here, other folders. Small icons tell you at a glance whether a name in the scrollable box refers to a folder or a document.

Potential Problems

Some versions of Mac software purchased prior to January 1986 may have difficulty running with the HFS. Until updated versions appear, be aware of potential incompatibilities and instabilities with the applications in the following list. In some cases (the Infocom games, for example) the problem is related to copy-protection schemes and requires that you use the program from a floppy disk only. Some applications such as *Dollars and Sense* and *Filevision* must be run from 400K floppy disks to read files created with HFS. In many other cases the application works provided that the application and its documents are stored in the same folder. The list is not exhaustive, but it should give you an appreciation for the kinds of problems that you may encounter. Consult with the publisher on the status of updates.

ConcertWare+. Hangs up when you change volume with the Control Panel.

Click-On Worksheet. Bombs with Mac Plus ROM.

Excel. All linked documents must be in the same folder so that references get updated automatically.

Dollars and Sense. Use the floppy disk application only.

Hayden:Speller. Bombs.

MacDraw. The font list does not scroll; it is limited to 11 fonts.

Macintosh Pascal. Cannot copy to 800K drive or hard disk due to copy protection. New key-disk-protected version expected.

MockWrite and Sidekick's Note-pad+. Cannot save files.

MusicWorks 1.0. Use the floppy disk application only.

Red Ryder 6.2. Cannot send or receive files.

Sargon III. Use the floppy disk application only.

Smartcom II. Earlier versions cannot access folders.

Switcher 4.4. Add about 20K per application. All Switcher Set applications must be in the same folder. A new, intelligent version is expected soon.

ThinkTank 1.1. Version 1.1 cannot access folders and is occasionally unstable. Version 1.2 runs correctly.

TurboCharger. Bombs, but Mac Plus ROM contains built-in cache memory.

this (with careful naming and renaming of System files to change systems), the HD 20 and HFS aren't as accommodating. Keeping two System files in different folders can cause errors, so play it safe: keep only one System file on your HD 20.

Organizing Applications

With HFS and a hard disk offering so many possibilities for organizing a number of applications, it is likely that no two Mac owners will have identical setups. But there are some general strategies that you can use as starting points in establishing your system.

If almost all your work revolves around four applications or fewer, consider keeping your Mac desktop free of clutter by dragging those applications from the disk window onto the desktop itself. Then close the hard disk window, leaving only the hard disk, Trash, and application icons showing on the gray background. In Figure 6, for example, the four applications are *Excel, MacWrite, MacDraw,* and *MacTerminal*. The icon for *MacTerminal* is actually one of the program's documents, which contains communications settings for CompuServe at 300 bps. The icon for the *MacTerminal* program is in the HD 20's disk directory, or it can be in a nested folder. To use this arrangement most effectively, it is important to resize the disk window so that the two rightmost columns of icons on the desktop are still visible when the window is open. Leave space along the right edge of the screen for floppy disk icons below the HD 20 icon.

Further supporting this desktop icon arrangement is a feature of Finder 5.1 that lets you open windows without having the windows "remembered" by the Finder. If you hold down the Option key while double-clicking disk and folder icons, the windows open—to show a document icon, for example. Then if you double-click the document icon and start the program, the windows are forgotten. When you quit the program and return to the desktop, all windows will have been closed, speeding up the return to the desktop. (With the 128K ROM, setting the cache memory in the Control Panel to 64K or 128K also speeds up your return to the desktop.) For some users, this layout of frequently used program icons is more flexible than the MiniFinder, despite the latter's speed advantage, because you also have quick access to folder windows and document icons.

Application icons can also be grouped within nested folders inside the HD 20 disk window for a more conventional layout. One alternative is to group several applications in a task-oriented folder according to your typical work flow. For example, if you frequently shift *Excel* spreadsheets and graphics into *Microsoft Word* weekly reports and then send those documents to another Macintosh via modem with *MacTerminal*, you might place all three application

Even without an HD 20, the 800K disks offer room to create task-oriented application disks.

icons in one folder labeled Weekly Reports. Other possibilities include grouping applications that you use together, such as for graphics (*MacPaint, MacDraw, MacDraft*), music (*ConcertWare+, MusicWorks*), writing (word processor, spelling checker, outliner), or programming (language compilers and utilities).

In some cases it may be convenient to have more than one copy of a program on the hard disk—for example, *MacDraw* in both a graphics folder and a presentations folder. For another methodology of grouping applications under nested MiniFinders, see "A Hierarchy and 20 Megabytes," *Macworld*, January 1986.

If your hard disk computing experience includes an MS-DOS or similar computer with a tree-structured directory system, you may try to organize your applications by placing each one in a separate folder and then nesting folders for each program's documents. You would end up with folders for *MacWrite, MacPaint, Omnis 3*, and so on. This procedure is like putting kitchen silverware into four drawers—one drawer each for knives, forks, teaspoons, and tablespoons. Bringing together the requisite pieces for a table setting becomes a cumbersome task. Although the one-program, one-directory layout makes sense in the IBM PC world, in which few applications can share data, it is largely unproductive in the HFS.

Even if you don't have an HD 20, the 800K disks offer plenty of room to create task-oriented application disks, just like the previously mentioned task-oriented application folders on the HD 20. For example, you might group *MacWrite, MacPaint, MacDraw*, and the LaserWriter System on one disk dedicated to creating text-and-graphics documents, then group *MacWrite*, a spelling checker, an outline program, and an Imagewriter System on a disk dedicated to word processing drafts.

Organizing Documents

Although applications and their support files may require special attention to placement in the HFS, documents can usually be placed anywhere (see "Potential Problems" for possible exceptions). The danger of this flexibility lies not with the HFS but with the person constructing the hierarchy of files and folders. You will probably be torn between two mutually exclusive desires: to keep folder nesting to a minimum and to keep the number of documents per folder to a minimum.

If you nest folders too deeply—the HFS can easily nest more than 50 levels deep—you spend too much time digging through the hierarchy for the folder holding a given document. This is particularly true as long as there is no global search utility program that can find a file name anywhere on the disk (third-party developers are surely working on such a creature). Five or six documents per folder plus one or two folders is currently the most comfortable number, because you can look at the entire contents of a folder inside a Standard File dialog box without scrolling the listing inside the box.

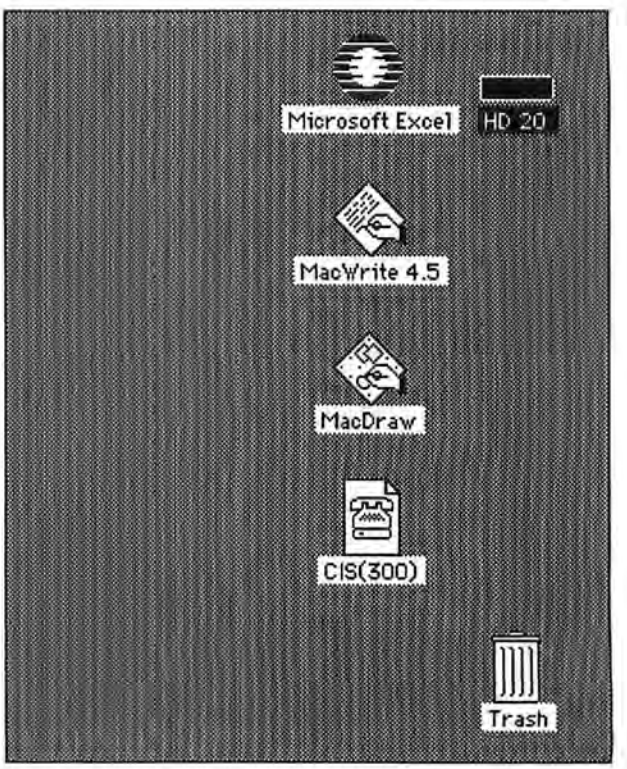

Figure 6
When all your Mac work revolves around a few heavily used applications, you can place those programs' icons on the desktop to keep the desktop clutter-free. Unlike with the MiniFinder, you can still open the disk window to access document icons directly.

To establish a document organization strategy, you have to examine carefully the way you normally work with documents. The method you choose for the HFS may be different from the flat file system you're accustomed to (Finder 4.1 and earlier).

One strategy is to create a folder in the root directory for each major project you work on. Inside that folder could be folders for components of the project. If you are producing an annual report, for example, the folder in the disk directory might be labeled Annual Report. Inside that folder would be folders labeled Scheduling, Text, Graphics, and Budget. Inside Scheduling would be a *MacProject* production schedule document and perhaps a database document for tracking photographs to be taken for the report. Inside the Text folder are two more folders: Words and Numbers, which contain the text and financial figures documents, respectively. The Graphics folder contains *MacDraw* and *MacPaint* documents, while the Budget folder contains a single *Excel* document for the project's budget.

When you finish a work session, copy the entire folder to a floppy disk (or to a second hard disk or tape drive if you are so equipped) as a backup of the day's changes. If the folder is larger than the floppy disk (either 400K or 800K, depending on your Mac's configuration), open the project folder and divide the backup operation into as many pieces as you need by copying some of the nested folders to one floppy disk. To determine the size of a folder in Finder 5.1, you select the folder icon on the desktop and choose Get Info from the File menu.

To help keep the disk directory clutter-free, place folders of completed projects inside another top-level folder labeled Archives. The disk directory then predominantly displays folders of active projects.

Another solution, for a different work pattern, is to create disk-level folders for each client, customer, or department for which you do work. A writer, for example, might keep folders in the root directory for each publication. Inside one of those folders would be a folder devoted to each project for that publication, and inside a project folder might be further folders for correspondence, text, graphics, and so on. Fortunately, each project folder can have nested folders with the same names for the sake of consistency across the entire disk.

The two methods just described mesh well with a Macintosh user's propensity to combine several applications for one project or task. If your organizational needs are more unidimensional, you can establish disk directory folders for each document type: reports, correspondence, budgets, databases, and so on. From there you can create alphabetical folders just like the tabs on hanging file folders.

If you generate tons of documents, you can literally create 26 folders inside the correspondence folder, one for each letter of the alphabet. When you're ready to file a letter, you just issue the Save As command from your word processor and use the HFS Standard File dialog box to open the desired folder from the alphabetical listing (see Figure 7). It's just like thumbing through a filing cabinet and dropping the paper into the appropriate folder.

With so many different ways to work with the Mac and with so many possibilities offered by the HFS, new methodologies and organizational systems will abound for a long time to come. Be on the lookout for tips from *Macworld* and Macintosh user groups. □

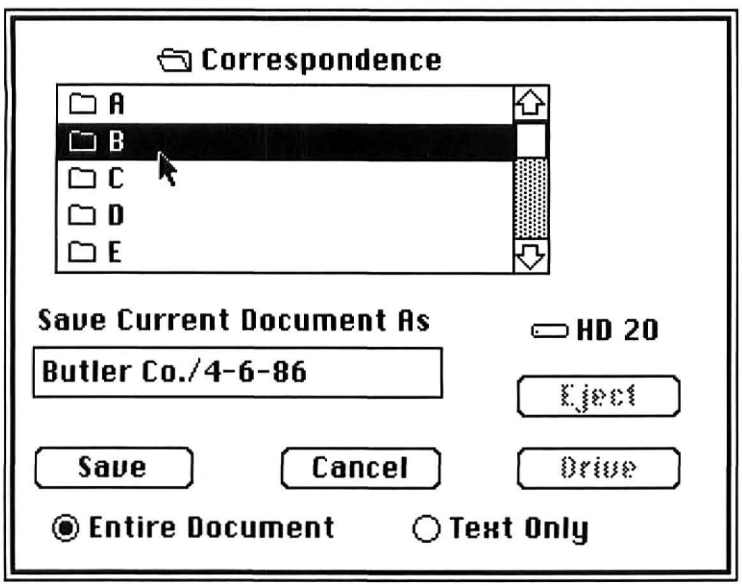

Figure 7
In an extreme case of high-volume filing, you can create storage folders for each letter of the alphabet. In this example a letter to the Butler Company is about to be saved into the B folder inside the Correspondence folder.

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Finder 5.1
Hard Disk 20
Apple Computer, Inc.
20525 Mariani Ave.
Cupertino, CA 95014
408/996-1010

New Relations

Jim Heid

Database management is one area of software with a proliferation of programs for the Macintosh. At least a dozen programs are already available, and more are in the offing. They range from simple file managers to fully relational databases. This review focuses on three new relational database managers that have some of the advanced features required by businesses.

Although any database manager can store and retrieve information, businesses require programs that can handle tasks such as client tracking and billing, inventory control, and accounting–applications that are too demanding for most file managers. What's more, businesses often need special features such as password protection to help guard sensitive data, entry checking to help uncover errors as they're made, and mail merge commands that combine text with stored data to produce "personal" form letters.

Interlace, MacBase, and *Omnis 3* are designed to meet the demanding data management needs of businesses. All three programs are relational data managers, which means they can link separate data files to create a database containing information from both. With them you can store customers' names and addresses in one file, for example, a list of their orders in another, and the prices of items ordered in a third. At billing time, a relational database manager can extract data from all three files to print an addressed invoice for each customer.

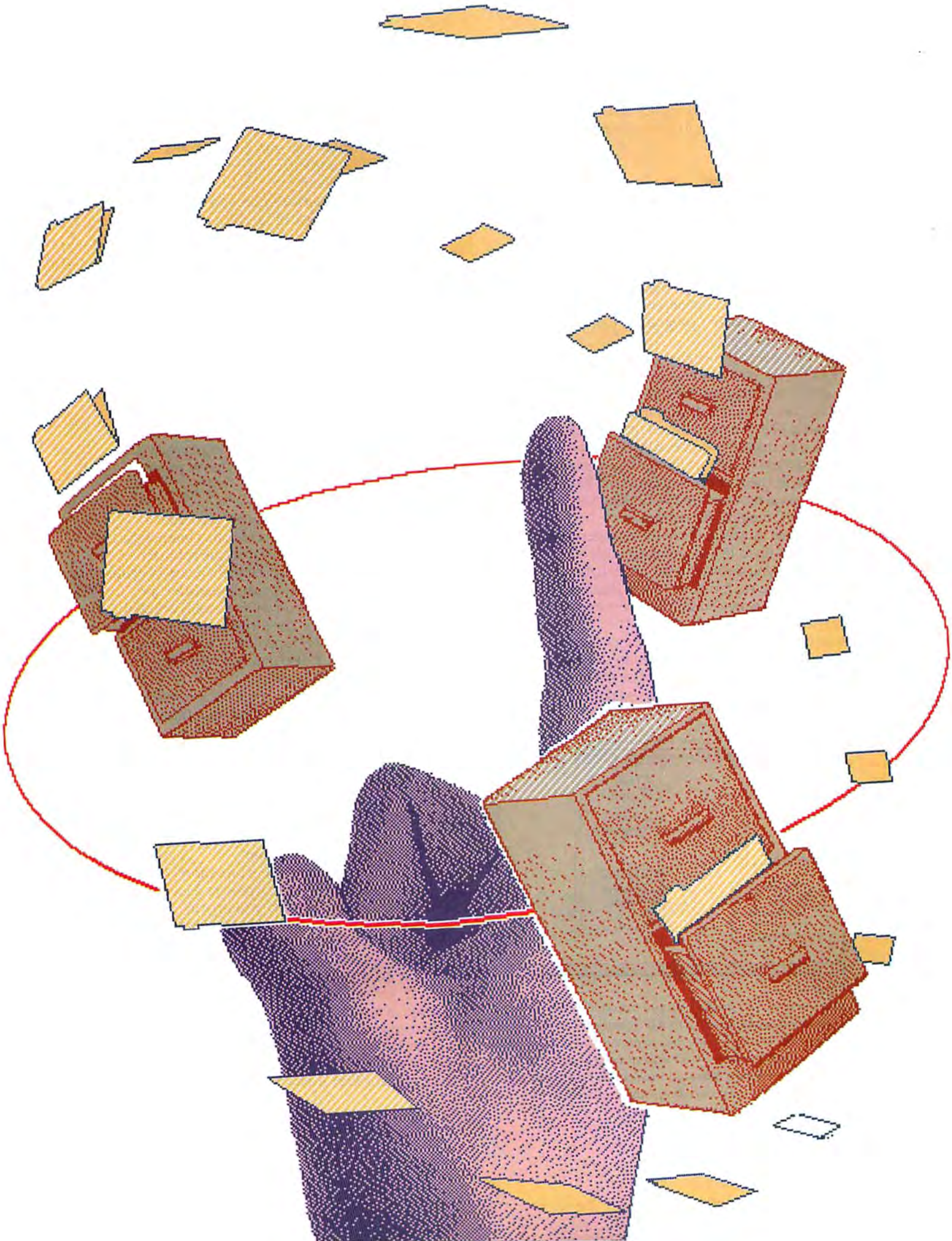
Businesses that have complex printing requirements need a program that facilitates easy report design, with full access to the Mac's fonts and the ability to work with the LaserWriter. And although it doesn't affect the product's ability to do the job, a well-designed program should let you move items by dragging them and let you produce reports without repeated trial-and-error position adjustments.

Whether you need these features depends on your work. The following reviews zero in on the applications and work styles for which each product is best suited. The vital statistics of the programs and those of a few other database management programs are shown in the table "Databases at a Glance." In addition to the three programs reviewed here, a few other database managers meet the requirements of business (see "Data That Means Business," *Macworld,* August 1985).

Interlace

One reason people use spreadsheet programs such as *Jazz* and *Microsoft Excel* for database management is that their many built-in functions let you analyze data instead of simply storing it. Financial, arithmetic, and trigonometric functions for solving business and engineering problems have traditionally been the domain of spreadsheet programs. Most database managers can perform simple math as well as calculate totals and averages in reports, but they can't calculate sines and cosines, determine net present values, or add and subtract date values.

Singular Software calls *Interlace* "a database manager with a spreadsheet on its mind." From a calculating standpoint, that billing is accurate. With 49 arithmetic, text, and statistical functions–almost as many as *Microsoft Multiplan* provides–*Interlace* can handle business and engineering calculations that would stump most data managers. If you use a spreadsheet program to manage data but find its filing and



reporting skills limited, *Interlace* presents an appealing alternative. If your reporting needs don't involve complex calculations, *Interlace* is still worth considering, although it does have some limitations that warrant scrutiny.

Getting an Overview

You create an *Interlace* database in the Overview window, which shows the structure of database files and remains on the screen while you use *Interlace*. Using the Overview window, you add new fields and specify the kind of data they hold. *Interlace* provides fields for storing text, numbers, and other types of data, but it doesn't provide a calculated field type—a curious omission for a program that purportedly has arithmetic prowess.

The Overview window also lets you specify relations between files by creating a special link field in each file and dragging the link field of one file to that of another. *Interlace* depicts links graphically by drawing lines between linked files (see Figure 1). With most data managers—especially ones for the IBM PC—linking files is a difficult hurdle that newcomers face. By making the abstract concept of file linking a concrete, visual process, *Interlace* simplifies the process of creating multiple-file databases.

Unlike most Mac database managers, *Interlace* can access up to 15 files simultaneously and provides a Window menu for switching between them. They can be files linked to form a complete database, unrelated files that you want convenient access to, or a combination of linked and separate files. The ability to open numerous files and reports, whether they're related or not, increases *Interlace*'s flexibility. It is a good choice for people who make frequent use of two or more databases in the course of their work day.

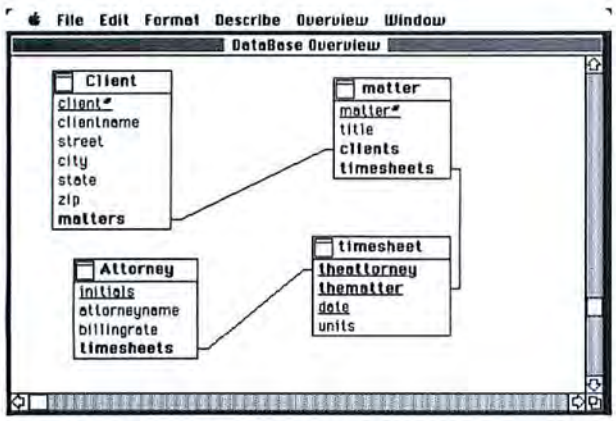


Figure 1

With Interlace, *you specify relations between files by creating a special link field in each file and dragging the link field of one file into that of another.* Interlace *depicts the links with lines between linked files. Here, the Overview window depicts an attorney's client billing database, made up of four linked files. Underlined field names are key fields.* Interlace *uses them to sort data and differentiate records.*

One Thousand Characters

You open a file for data entry by double-clicking on its title bar in the Overview window. *Interlace* automatically creates simple data entry screens—a time-saving feature that lets you start entering data immediately. You can also customize the preset data entry screen by dragging fields into position.

Unfortunately, *Interlace* stores no more than 1002 characters in each record, or less than one screen of single-spaced 12-point text. This amount is adequate for most applications because a typical field is usually less than 30 characters in length. However, if you require long text fields for tasks such as storing paragraphs of research notes or magazine article abstracts, you could easily run into *Interlace*'s space limit. Although it is somewhat inconvenient, you can use the program's relational capability to work around this limitation. First, store most of a database's brief information, such as names, addresses, prices, and amounts, in one file. Then link the file's records to another file that contains corresponding records with one or more large text fields. If you require fields longer than 1002 characters, you should consider a different program.

The Formula Approach

With many database managers, you search for specific records by filling in a screen that mimics the data entry form. But *Interlace* favors the approach of spreadsheetlike formulas. A database window contains a formula panel similar to that of a spreadsheet program. You can either type an entire formula or use the mouse to build formulas. The formula approach lets you use *Interlace*'s many functions to create powerful search specifications. It also makes spreadsheet veterans feel at home with *Interlace*.

If you aren't a spreadsheet veteran, however, becoming proficient with formulas may take time. Formulas are built by pointing and clicking, but they are not edited the same way. If you build a formula to locate all clients in a given state and then decide to further narrow the search to those in a certain city, you have to rebuild the formula from scratch or type in the additional criteria.

Putting Data on the Table

Another reason spreadsheet programs are popular as data managers is that they present data in table form. A table display works like a kind of interactive report. Seeing many records at once gives you an overall picture of a database, but you can also enter new records and edit existing ones, which is a convenience that report displays don't offer. Unlike a spreadsheet, *Interlace* can't display a database in table format. You can design a report to present data in table form, but you can't edit or add to the table displayed on screen. If you can't do without table displays, you might be better served by *OverVUE, Microsoft Excel, Microsoft File,* or perhaps *Jazz*'s database manager.

(continues on page 102)

Databases at a Glance

	Interlace	MacBase	Omnis 3	Double Helix	OverVUE 2.0	Microsoft File
Data Entry, File Management						
Maximum field length	1002	6600	60	32500	62	32767
Maximum fields per record[1]	255	unlimited	120	unlimited	64	1023
Maximum records per file	disk	disk	disk	disk	RAM	65535
Field types provided[2]	1, 2, 3, 4, 5, 7	1, 2, 3, 9	1, 2, 3, 5, 7, 8	1, 2, 3, 5, 6, 8	1, 2, 3, 4, 5, 7, 9	1, 2, 3, 6, 8
Relational	yes	yes	yes	yes	yes	no
Entry checking	yes	yes	yes	yes	yes	no
Field presets	no	yes	yes	yes	yes	no
Computed fields per record	none	unlimited	120	unlimited	64	1023
Table view of database records	no	no	no	no	yes	yes
Form design method	free with fonts	free with fonts[3]	free	free with fonts	free	free with fonts
On-screen rulers for form design	no	no	no	yes	no	yes
Custom pull-down menus	no	no	yes	yes	yes	no
Custom dialog boxes	no	no	yes	no	no	no
Password protection	no	no	yes	yes	no	no
Run-time version available	no	no	yes	yes	no	no
Multiuser version available	no	no	yes	yes	no	no
Report Generation						
Maximum sorting levels	unlimited[4]	unlimited	9	126	unlimited[4]	10
Computed fields in reports	yes	yes	yes	yes	no	no
Report destinations (screen, printer, disk file)	S, P, D	S, P	S, P, D	S, P	P	S, P
Headers	yes	yes	yes	yes	yes	yes
Footers	yes	yes	no	yes	yes	yes
Print quality (draft, standard, high)	D, S, H	D, S, H	D, S, H	D, S, H	D	D, S, H

[1] Unlimited. The database manager imposes no practical limit on the number of fields a record can contain; a record can have as many fields as will fit on a form.

[2] Field types:

1. text
2. number
3. date
4. time
5. logical (yes/no)
6. picture
7. sequence
8. calculated
9. telephone number

[3] 12-point text only

[4] Sorts on one field at a time but allows sorts on consecutive fields while it maintains the previous sort order.

Databases at a Glance

The table compares the capabilities of the database managers evaluated in this review. Three other database managers are included for comparison. Double Helix *features listed here are based on prerelease information from the developer.*

Cutting Keystrokes

Danny Goodman

The Macintosh was designed to make computers easy to use. Tempo's keystroke- and mouse-maneuver-reducing macros carry the original principle one step further.

Anything gets old with repetition. Saving your work and ejecting your work disk, for example, doesn't really take that long. But after the first few thousand times the routine of pulling down the File menu, selecting Save, waiting, selecting Quit, waiting, and finally selecting Eject and waiting once more for the song of the disk drives to cease can start to feel like your own private purgatory. Deliverance, however, is at hand. Tempo, *a new macro processor from Affinity Microsystems and the most sophisticated macro program yet available for the Mac, lets you perform routine command sequences with a single keystroke.*

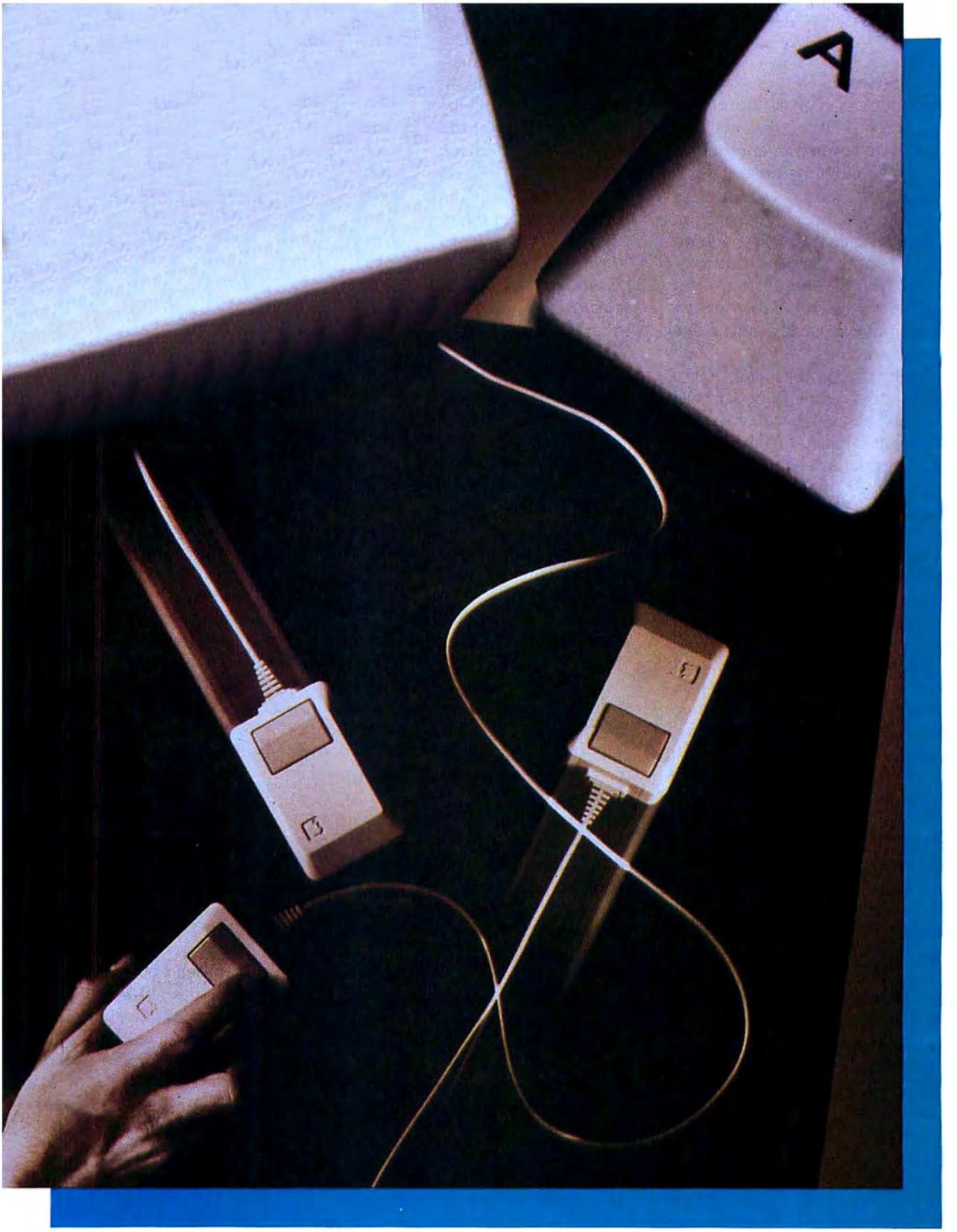
Tempo is classified as a *macro processor,* which means that it lets you combine a series of keyboard and mouse commands into a single command known as a macro (see Figure 1). Some application programs, such as *Microsoft Excel* and *SuperCrunch,* have macro programming languages that you can use to fashion lists of instructions that the computer will follow when the macro is invoked. Macro programming languages, however, work only within the program for which they were designed. *Tempo* is a generic macro processor that lets you design a macro that can be used with virtually any combination of applications.

Tempo is also easier to master than a macro programming language, because you don't have to learn a vocabulary of commands and a lot of rules about how to use them. Instead, you create *Tempo* macros simply by going through the mouse and keyboard actions for a sequence of operations. *Tempo* records those actions so they can be replayed later.

A macro is most useful when it automates a routine action that requires a number of steps. For instance, if you regularly extract a database record for inclusion in a word processing document, a *Tempo* macro can open the database program, load the data, present the search dialog box, pause while you type in the selection criteria, extract the data, copy it into the Clipboard, close the database program, open the word processing program, and paste the data into the new document. That entire process could be initiated by pressing a two-key sequence, such as ⌘-E.

If you regularly send a spreadsheet file to the home office by modem, you can design a *Tempo* macro that starts working inside your spreadsheet program to save the file, quits the spreadsheet program, starts your communications program, and waits until 11 p.m. to dial the home office computer and upload the file. Some communications software may even allow the *Tempo* macro to respond to a busy signal indication (sent to the screen by the modem) by waiting a half hour before redialing.

On a simpler level, you can program a *Tempo* macro to perform a pull-down menu operation, or a series of menu operations, with a keyboard equivalent. This ability is particularly helpful if a program that you use has no or few keyboard equivalents for often-used commands (*Mac-*


A

Write is a good example). In the past, you would have needed Apple's *Resource Editor,* a software developer's tool, to set up keyboard equivalents in programs.

Macro Smarts

Tempo does more than just record user input. A *Tempo* macro can make limited decisions and even trigger other macros if specified conditions are satisfied. The manufacturer calls *Tempo*'s advanced options "intelligent features," but that's somewhat of an overstatement. The program's branch, pause, loop, and launch options elevate it a notch above Assimilation's *Mac Tracks* macro processor, but they are not "intelligent" in the sense of artificial intelligence programming.

Branching is accomplished by comparing the contents of the Clipboard with a predetermined block of text. For example, you could create a macro that would begin by copying the contents of a Totals spreadsheet cell into the Clipboard. If the number in the Clipboard were greater than 9999, the macro could branch to a short macro routine that would reformat the entire spreadsheet to display large numbers with commas, as in 10,109. *Tempo* provides a full range of comparison operations from which to choose (see Figure 2).

Tempo's pause functions can be used in a variety of ways. Programming a pause into a macro allows you to suspend the macro's replay while you enter data, such as the name of a file to be opened or criteria for a database search (see Figure 3). Another pause option lets you add instructional dialog boxes to remind novice macro users what to do next. And you can delay macro execution until a specified time. This feature enables you to program the Mac to communicate, sort a large database, or print on a shared resource such as an office LaserWriter.

Tempo's looping capability lets you set up repetitive operations, either to be performed a specific number of times or until certain conditions are met. For example, a macro you might add to your communications program could combine branch, pause, and loop operations and could instruct your modem to keep redialing a number until it received a connect signal.

Tempo's launching facility is a big improvement over the launching method used in *Mac Tracks* (in Macintosh parlance *launching* means opening an application). *Tempo* lets you specify the name of an application to launch, while *Mac Tracks* primarily replays the precise motions you make when you record a macro. When you double-click on a program icon, for example, *Mac Tracks* simply records the screen coordinates of the pointer and the fact that you double-clicked the mouse. If you rearrange the locations of icons in that window or move the window around the desktop, *Mac Tracks* positions the pointer in the original screen position—which won't open the program and may do some inadvertent damage.

Macro Construction

Planning is important when creating *Tempo* macros. The manual rightly encourages you to break macros into many small modules. You can then use the modules to assemble larger macros, linking the modules by looping or unconditional branching (conditional branches cannot be used to link macros).

Before specifying a branch instruction, you must have already created the macro to which the first macro branches. In other words, you design and create levels of macros from the inside out. This is not necessarily a technique you'll pick up immediately, but you'll appreciate its importance after you program your first multiple-module macro (see "A MacTerminal Dialing Directory Macro").

One of *Tempo*'s most intriguing options, Real Time, enables you to create presentations similar to the Macintosh guided tours. When recording in Real Time, *Tempo* makes a literal recording of every mouse movement, including hesitations and speedups. On replay, you'd swear someone was playing with a second mouse under your desk.

Macro-intensive programs like *Excel* can also use *Tempo*. *Tempo*'s ability to cross application lines complements *Excel*'s macro language. You can also place macros into a Set Startup icon that will run those macros whenever the Mac starts with the disk—a convenient way to do daily file maintenance.

Compatibility

Virtually any program that takes control of the Mac while other applications run is destined to encounter compatibility problems on the first release. *Tempo* is no exception to this unfortunate rule. Following is a list of the incompatibilities I discovered:

AppleTalk. Tempo runs fine with a Mac-to-LaserWriter AppleTalk installation, but not when AppleTalk is configured as a local area network.

Hard Disk 20. The Apple hard disk presents no problems except when the Mac is connected to AppleTalk.

Jazz. Spurious characters appear in the menu bar when you quit *Jazz,* but they have no deleterious effect on your files. This happens in *MacDraw* and a few other common applications.

Microsoft Word. Tempo zips right over seven of *Word*'s dialog boxes before you can make your selections. When this happens, record the macro in Real Time.

OverVUE 2.0. The *OverVUE* screen does not refresh itself after the *Tempo* dialog box closes. Recalling *Tempo* from the Apple menu refreshes the screen.

ReadySetGo 2.0. Manhattan Graphics is reportedly modifying this program to accommodate *Tempo.*

ThinkTank. Risky business.

Switcher. A special case. Version 4.4 is compatible to some extent, but you'll have to allocate up to 15K of additional RAM for each application for *Tempo*'s "overhead." Even then, you won't be able to record a switch between applications (accomplished by either clicking *Switcher*'s dou-

Figure 1
When you finish recording a Tempo *macro, a Save Macro dialog box automatically appears. You assign a name to the macro and, optionally, one of 450 possible keyboard equivalents to start the macro the next time.*

ble-arrow icon or pressing the ⌘-key equivalent). Instead, you'll have to choose Switcher from the Apple menu to return to the *Switcher* screen and then click on the desired application icon. The big hangup with this switch method is that the Clipboard does not convert between applications.

Tempering Tempo

A few words of caution about using *Tempo* are appropriate. First, even though the program installs on a System file as a desk accessory (an installer program is supplied on the disk), it takes up more than 60K on a disk. Not many single-sided application disks have enough space for a 60K accessory unless you delete help files, other accessories, and fonts from the System file. A *Microsoft Word* disk, for instance, comes with 29K available. Deleting the help file, extra printer drivers, and sample document (a total of 45K) leaves scarcely enough disk space for *Tempo* and the file that contains the actual macros (macro files can easily run to 10K or more for active macro users).

If you plan to use *Tempo* macros running across more than one application, you'll have to organize your applications around a single System Folder, creating a startup disk with the System file for the internal drive and an applications disk without a System file for the external drive. You cannot change System files while recording a *Tempo* macro or when *Tempo* is active (when its ⌘-key icon appears in the menu bar).

For example, if you wanted a macro that could copy *MacPaint* graphics into the Clipboard, open *MacWrite,* and paste the graphics, you would create an application disk with only *MacPaint* (70K), *MacWrite* (70K), and the *Tempo* file with pertinent macros (2K to 20K). That would leave 240K or more of disk space free for document storage. For large applications, such as *Jazz* and *Excel,* you'll have to swap systemless application disks in the external drive (while keeping the same system disk in the internal drive) if *Tempo* macros extend across multiple applications–as when linking *MacTerminal* and *Excel* operations, for example.

A Macintosh Plus or a Mac outfitted with internal and external double-sided 800K disk drives offers plenty of space to accommodate *Tempo* and productive groupings of applications.

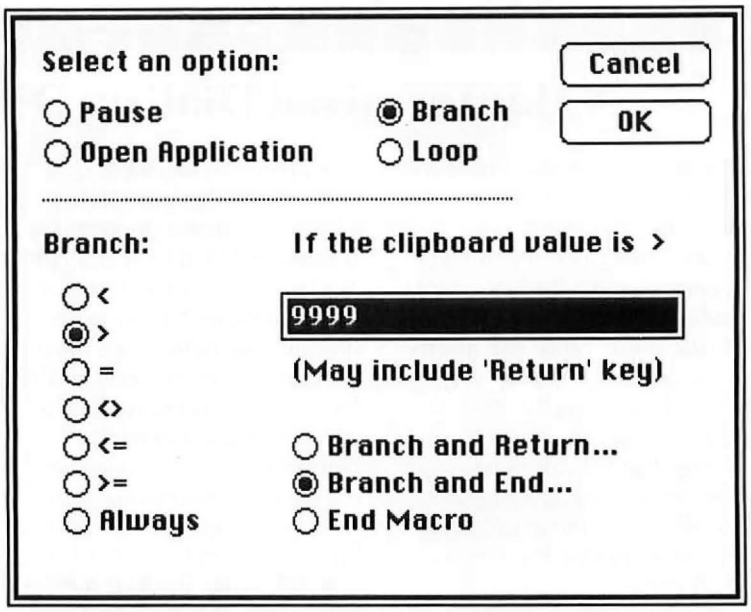


Figure 2
Your macros can test the contents of the Clipboard against predetermined criteria. Depending on the outcome of the test, the macro can branch to another macro module.

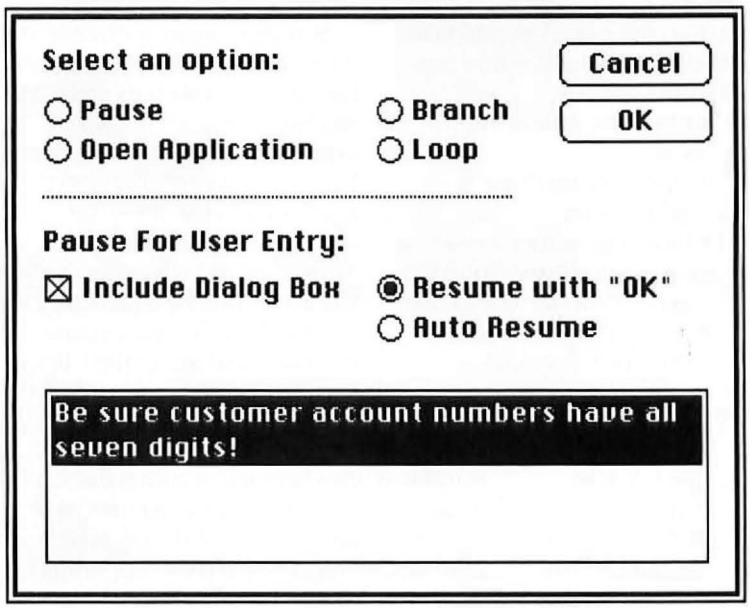


Figure 3
Instructional dialog boxes can be included in a macro. Text for the dialog is typed into Tempo's *Options dialog box while you record the macro.*

Working with Macros

No matter what kind of floppy disk drives you have, get ready to pay close attention to the location of the *Tempo* macro files. You can access only those macros in the "current *Tempo* drive," which you select from a dialog box when you start *Tempo* from the Apple menu. Generally, you would store macros for a particular application on the application's disk, and you would change the current *Tempo* drive when you change applications by quitting *Tempo* and restarting it to change the designated drive.

Although all *Tempo* macros are grouped together into one file labeled Tempo Macros, you can shift individual macros among disks by using *Tempo*'s Import and Export features. Let's say you've created a macro in one application that copies a selected area, opens the Scrapbook from the Apple menu, pastes into the Scrapbook, and then closes the Scrapbook. Because that macro is practical for many applications, you may want to export it from the current *Tempo* drive to other application disks instead of recording it each time for every disk.

If the other disks already have *Tempo* macros, Export adds the new Scrapbook macro to the existing Tempo Macros files; if not, a newly created Tempo Macros file will be added to the other application disks. In contrast, Import lets you bring individual macros into the current *Tempo* drive from other *Tempo* macro files.

A MacTerminal Dialing Directory Macro

MacTerminal doesn't have a dialing directory feature, but you could use *Tempo* to create a macro between *MacTerminal* and a desk accessory such as Macadam's *WindoWare Phone Book.* Since the macro retrieves only a dial-up service's name from the desk accessory, you can use any kind of phone directory desk accessory, as long as it displays the desired name in precisely the same spot on the screen for each entry.

The first step in designing the macro is figuring out what actions the macro should take. The following procedure outlines the actions:

- Close the *MacTerminal* window.
- Open *Phone Book* from the Apple menu.
- Pause the macro so you can page through *Phone Book* for the name of the service to dial.
- Copy the name of the service into the Clipboard.
- Close *Phone Book.*
- Test the contents of the Clipboard against the services usually dialed. If the Clipboard reads "CompuServe 300," for example, branch to a macro module that pulls down *MacTerminal*'s Open menu and selects the *MacTerminal* document (which contains the communications settings and the service's telephone number) for CompuServe at 300 bits per second.
- Pull down the *MacTerminal* Phone menu and select Dial.

You must create a macro for each service, because each one has its own branch module. Assign only a name (no ⌘-key equivalent) for each module, because you probably won't ever need to call these subroutines from the keyboard. Then start recording the major macro section by instructing it to branch to the appropriate module if the test of the Clipboard contents proves true (if Clipboard = CompuServe 300, then BRANCH to CIS 300, and load the *MacTerminal* document with that service's settings). When you finish recording the main macro, assign both a name and a ⌘-key equivalent, such as ⌘-D.

Now, whenever you're in *MacTerminal* and want to dial up another service, such as Dow Jones, press ⌘-D, flip through *Phone Book* for the service number, and watch *Tempo* do all your busywork. You've also given *MacTerminal* a feature it never had before.

WindoWare Phone Book
Macadam Publishing, Inc.
4700 S.W. Macadam Ave.
Portland, OR 97201
800/547-4000, 503/684-3000 in Oregon
List price: $79 (includes WindoWare calendar)

Running *Tempo* on a hard disk in which you have one large Tempo Macros file is the most practical way to use the program. Macros apparently "remember" the application in which they were created. Therefore, you could assign the ⌘-A keyboard equivalent to a macro that chooses Save As from the File menu in *MacPaint* and assign the same keyboard equivalent to a macro in *Word,* even though the Save As option is in a different location in both menus.

Even if you're an extremely energetic macro user, it's unlikely that you'll run out of keyboard commands. *Tempo* provides up to 450 ⌘-key equivalents that use various combinations of the ⌘, Option, Shift, and Caps Lock keys. Of course, it may be counterproductive to generate too long a list of macros that require the simultaneous pressing of enough keys to confound Vladimir Horowitz.

Editing *Tempo* macros presents a potential problem. *Tempo*'s macros are not translated anywhere into a command language you can edit. Editing requires playing back a macro (you can slow down the playback to better see what's happening), suspending playback, and then issuing menu commands to insert a new sequence or delete the last action. You'll find it easier to divide long macros into smaller modules of ten or fewer actions and then reprogram an erroneous module from scratch.

Tempo is priced $70 higher than its nearest competitor, *Mac Tracks.* In light of this discrepancy and the pricing levels of other utility software for the Macintosh and the IBM PC, *Tempo* seems overpriced. Although I recommend a macro processor to every Mac owner, I can't unconditionally recommend *Tempo* over the recently updated *Mac Tracks,* unless you insist on Tempo's branching, launching by name, or Set Startup features and don't mind paying the premium. And don't forget the program's incompatibilities, which could cause problems in certain work environments.

But because of its advanced features and (modest) intelligence, *Tempo* could still become the power user's macro processor, and it just might help you put an end to running your mouse through the same old mazes of complex operations. □

Danny Goodman is a Contributing Editor of Macworld *and the author of* Hands-On Excel, *published by Scott, Foresman & Company (1985).*

Tempo
Affinity Microsystems, Ltd.
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303/442-4840
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Circle 255 on reader service card

Tools for Thinking

Tom Maremaa and Daniel Farber

In the fifties John McCarthy, inventor of the artificial intelligence programming language LISP, conceived of a new class of software programs. He called these programs "soft robots," or "agents." McCarthy imagined that soft robots would mold themselves to the needs of users, learn their computing habits and quirks, and even act as agents for change. In maintaining a stock portfolio, for example, a soft robot would track the performance of certain stocks, search databases for key financial information, monitor current political and economic factors, and recommend or initiate courses of action. Artificial intelligence (AI) research has not yet developed any commercially available soft robots, but it has given us the next best thing: expert systems.

Expert systems are an attempt to simulate the knowledge of an expert in a particular area, such as medical diagnostics or automotive engineering (see "Experts on Disk," *Macworld,* February 1986). A few expert system development tools have recently been designed for the Macintosh, most notably Neuron Data's *Nexpert,* which is already finding a wide range of applications in the financial, aerospace, and medical fields.

Developed by a group of software engineers from Carnegie-Mellon University, *Nexpert* allows you to create an expert system for the 512K Macintosh or Macintosh Plus without learning a programming language. By AI industry standards, *Nexpert* offers the kind of power and flexibility found in expert-system development tools that cost as much as $80,000, such as Teknowledge's S.1 or Inference's ART. Companies including Hughes Aircraft, Martin-Marietta, and Boeing are currently working with the program (see "Experts on Nexpert").

Basically, *Nexpert* provides a framework in which to build a knowledge base—a set of rules that distill an expert's knowledge. Knowledge bases can have up to 500 rules and can be edited, modified, or even browsed in the form of a collection of flowcharts and block diagrams. To solve problems, *Nexpert* searches through a knowledge base by means of a special *inference engine,* which processes the data and hypotheses entered by a user and yields a set of conclusions. *Nexpert* doesn't replace human expertise, but it helps people understand and solve specific problems.

Creating a knowledge base is the most difficult part of setting up an expert system. All the rules must be written in the IF . . . THEN format, where IF is followed by a set of conditions (tests to be performed on data) and THEN is followed by a set of actions that take place when all the conditions of the IF statement are met. *Nexpert*'s hypotheses (included in the THEN part of a rule) have Boolean values, which means they can be rated as true, false, or unknown.

Nexpert has excellent tools for developing a knowledge base. The Rule Editor provides a template for creating rules and specifying the arguments, actions, and conclusions you want to include in your knowledge base. A set of operator boxes appears along the left side of the screen; from these boxes you

Nexpert's *engineers designed a program that can stand in for users' expertise—whether for medical or automotive diagnosis.*

Experts on Nexpert

Since *Nexpert* was released last October, the government, corporate, academic, and financial communities have shown a great deal of interest in the product. Neuron Data is aiming the product primarily at those Fortune 500 companies and government agencies that have staff AI experts or consultants who can evaluate and implement expert systems.

Neuron Data's Patrick Perez says that his company is also encouraging the development of run-time systems—expert systems that cannot be modified but can read any knowledge base. These programs will sell for $1000. In addition, the company plans to work with programmers to create consumer-oriented knowledge bases on such subjects as home health care or car maintenance. These programs will be compiled, so they can read only one knowledge base, and the cost will be more in line with other Macintosh software. Neuron Data provides free technical support for 90 days and one year of support and upgrades for $1000.

Nexpert in the Field

Among the first companies to purchase *Nexpert* is Hughes Aircraft. "*Nexpert*'s price-performance ratio is a plus," says John Roy, an AI specialist with Hughes. Roy is particularly impressed by *Nexpert*'s rule interaction network feature, which makes prototyping and debugging a knowledge base easier than on other systems. He uses the Apropos feature extensively and has a hard disk on which he stores *MacPaint* and text files that are linked to information in the knowledge base.

"*Nexpert*'s Rule Editor makes it possible to create knowledge bases without having to rely on an AI specialist sitting on the knowledge-domain expert's shoulder," says Roy. "An AI expert is required when you need to control the flow of a program—context and the knowledge processing strategy. But for many applications, *Nexpert*'s default strategies are adequate." Roy believes that with good documentation, people without experience in AI programming can develop small, relatively sophisticated expert systems.

As for drawbacks, Roy says that he would like to see more than one rule at a time on the screen. "The program could also have more frames and viewpoints, as in larger systems, where you can freeze a hypothetical situation into five separate conclusions." With *Nexpert* you need to rerun the program with a new set of values for the data for each conclusion.

choose which tests to perform on the IF part of the rules (see Figure 1). Hypotheses, which are entered in a column on the right side of the screen, are rendered true or false on the basis of these tests, or conditions.

Rules can trigger actions that affect the values of data in the system. For example, the Do option lets you assign values that result from computations to any object in the system, and the Show command displays text or graphics relevant to the knowledge being processed—such as a digitized illustration of a problem or solution. Rules also define operations such as calculations; such operations are similar to subroutines within a BASIC program. *Nexpert* lets you create rules that trigger other rules, and rules that link rules, or sets of rules, together through common data or hypotheses. Some rules might take into account uncertainty factors or allow the program to make assumptions about or draw inferences from unknown values.

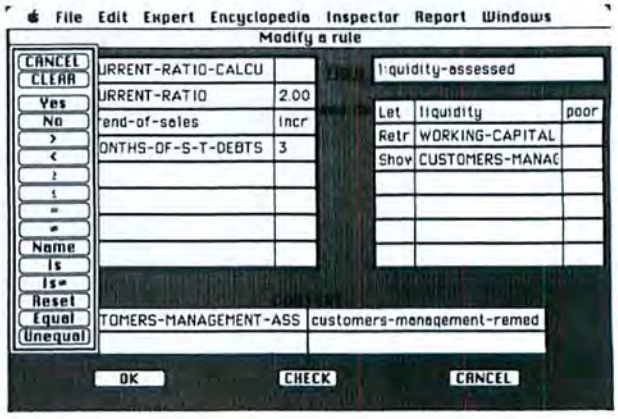


Figure 1

The structured rule editor. A rule consists of a list of conditions to be met (IF) and a hypothesis, which is a conclusion reached when the rule applies (THEN). You can also specify actions to be performed once the rule is applied and a context for rules.

The corporate accounting firm of Peat, Marwick, Mitchell & Co. is also evaluating *Nexpert*'s potential for automating its financial decision-making processes, especially in the area of loan-risk assessment. Aerospace companies such as Boeing are also interested, and so is ARCO, which wants to explore *Nexpert*'s ability to create expert systems for various oil drilling ventures. Scientists from NASA's Ames Research Center are exploring possible uses of the program for space shuttle flights and the planned space station. "If it works, we might take it up with us," NASA scientists told Perez.

Martin-Marietta is yet another interested company. Its energy systems, nuclear plants, and space station research would benefit from the increased automation that could be provided by an easy-to-learn expert system.

Albert Gouyet, Nexpert's chief engineer, and two members of Neuron Data's founding trio—Alain Rappaport, a physician with a Ph.D. in molecular pharmacy, and Patrick Perez, a strategic planner who marketed the Mac in Europe—are pleased with the warm reception corporations have given the program.

Albert Gouyet, chief engineer for *Nexpert,* says that the program will eventually have network and multiuser capabilities. "A user will be able to send values from a spreadsheet or a program that monitors a device, such as a satellite guidance system, to *Nexpert* via AppleTalk. *Nexpert* will then run its knowledge processor to diagnose the problem and send the conclusions based on the data back to the user."

At this point, Neuron Data is both delighted and surprised by all the attention *Nexpert* has drawn. Though the program is still out of the price range of the vast majority of Macintosh users, *Nexpert* has set a trend: expert systems, with all their intricacies and complexities, perform well on the Macintosh.

In its present version, *Nexpert* allows only eight conditions and actions for each rule. (To overcome this limitation, simply split the conditions into two rules and link them with an intermediate rule.)

As you create rules, the Rule Editor catalogs them alphabetically by the first letter of the hypotheses (see Figure 2). Alphabetizing the hypotheses makes it easy to find and alter the conditions of any rule. This extensive rule-editing capability effectively gives you the power to solve problems by creating a variety of "what-if" situations, much as you would in a spreadsheet.

The Knowledge Encyclopedia

Once you've entered the knowledge base, *Nexpert* automatically creates windows listing the data, hypotheses, rules, and categories you've input. These lists are essential to the system, since most requests for

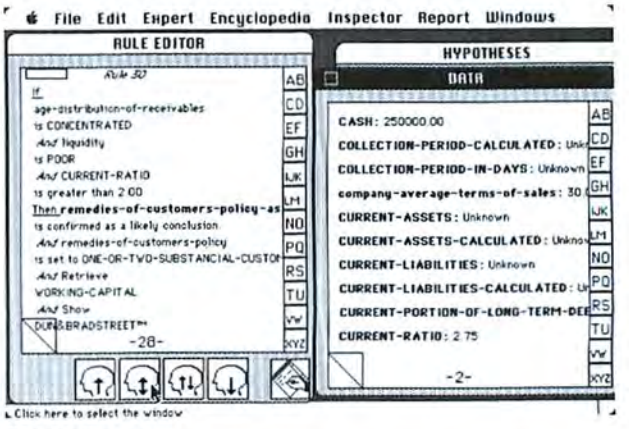


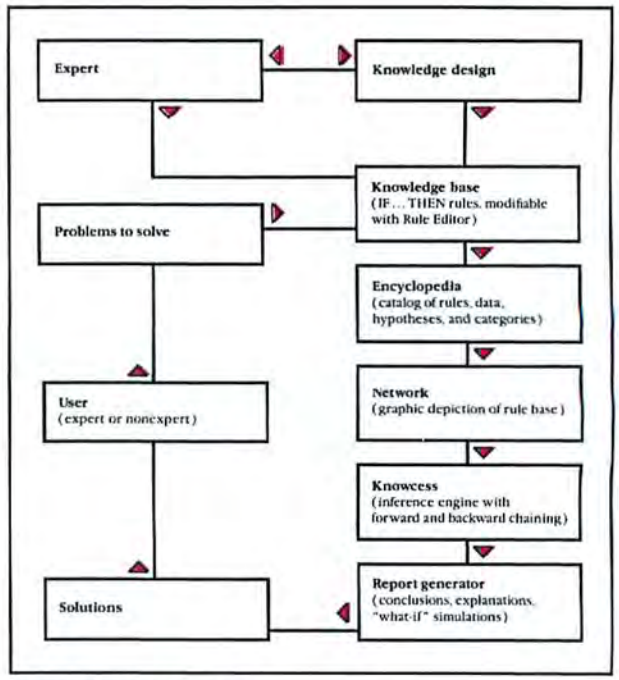
Figure 2

The Rule Editor, a window that duplicates the alphabetized Note Pad but has a series of five icons along the bottom. The first four icons let you create a new rule or modify, delete, or copy an old one. The fifth icon lets you save the knowledge base.

information or explanations involve selecting data, hypotheses, rules, or categories. You can easily browse through the lists to verify their accuracy, see the categories of information in the knowledge base, or look at the Boolean values of data.

You retrieve lists through the program's Encyclopedia menu. Each knowledge type is displayed in alphabetical order in its own Note Pad-style window. The program updates information in the windows whenever the system draws conclusions or the user adds new information to the knowledge base. You can edit the windows, type in text, or cut and paste at any time. You can also store information in the Encyclopedia windows on disk as text files.

Working with so many overlapping windows on screen can become confusing when you have several open windows and want to get at one of them. Like Lotus's *Jazz* and *Microsoft Excel, Nexpert* lists the opened windows in a separate menu, for easy tracking. *Nexpert* also displays a line at the bottom of the screen that continually prompts you with on-line help as you move from window to window and icon to icon through the program.



Expert System Design

One of the most critical steps in designing an expert system is ensuring the integrity of the knowledge base. The entire system could be corrupted by inaccurate information. The Macintosh's intuitive user interface augments Nexpert's *standard expert system components.*

Problem Presentation

After you have created a knowledge base, *Nexpert* is ready to solve problems. The first step in the problem-solving process is to provide information to the system about the problem. One method of presenting information is to input, or *volunteer,* data into the system. The data you volunteer consists of the signs, symptoms, objects, or other information that the program uses to determine whether a particular rule applies. For example, to present an automotive problem, you would select items from the data window–such as choke coil or idle speed–and input Boolean, numerical (real numbers), or descriptive (such as low, high, very high) values. If you selected Idle Speed from the Data window, the program might prompt you to enter a value. For situations in which problems can be consistently described by answering a set of questions, you can create forms to automate the volunteering process. Another way to input data is to read a file of values stored on disk into the system.

A third way to present a problem is to suggest a hypothesis for testing. When you suggest a hypothesis, the system asks you questions that test the validity of the hypothesis. A window called Active Report #1 appears as soon as you suggest a hypothesis. This dynamically updated alert box mechanism lets you follow the state of hypotheses as *Nexpert* tests them.

Problem Solving Approaches

The heart of an expert system is the inference engine, which processes the knowledge base to solve problems. *Nexpert*'s inference engine approaches problems in three ways: Forward chaining is a process whereby *Nexpert* seeks out hypotheses that match the evidence (data) and investigates them. Backward chaining is the opposite–*Nexpert* works from suggested hypotheses to find the evidence. The third method is a mixed approach in which *Nexpert* gives priority to suggested hypotheses and later focuses on any new hypotheses generated from evidence given during initial explorations. In general, *Nexpert* solves problems through the mixed approach.

Nexpert lets you override the default settings of the inference engine. This ability provides a high level of control over the system, enabling you to focus the search on a specific part of the knowledge base.

A higher-level function of *Nexpert* is the Category Editor, which lets you classify data (conditions or IF statements in the Rule Editor) by categories. The Category Editor makes the system more coherent–more like human thought. A knowledge base may hold all the knowledge pertaining to a field, but the order in which the system requests information during knowledge processing may be inappropriate. For example, an expert system in medicine that simulates a consultation might ask for laboratory data before requesting

the patient's age or other primary details. The Category Editor lets you assign priorities to each category so that the system investigates data in a meaningful order.

Final hypotheses can also be sorted in categories. If the system discovers several relevant hypotheses, it investigates them in the order of the prioritized categories.

Reaching a Conclusion

Nexpert's Knowcess command activates the inference engine. This command operates only if the system has some information about the problem at hand. The What If command in the Expert menu lets you enter the world of hypothetical alternatives. At any time during a session, or even at the end of a session, you can perform "what-if" analyses by modifying a piece of information, adding new data, or adding new hypotheses. *Nexpert* reinfers its conclusions based on new data or hypotheses.

Another important command in the Expert menu is Load Knowledge Base. If you need supplementary information while working with a knowledge base, you can get it by loading other knowledge bases into the system. In effect, each knowledge base is a module that can combine with other modules to solve a problem. Since you enter all *Nexpert* knowledge bases in a standard format, you can maintain a library of knowledge bases on disk and call up a module as required.

This method is particularly helpful in diagnosing or troubleshooting problems in fields such as the medical sciences or aerospace engineering that require different sets of knowledge to resolve. The system also accepts SYLK format files, so you can use data imported from an *Excel* spreadsheet in *Nexpert*'s calculations.

Nexpert in Action

When the inference engine begins its reasoning process, three windows appear on screen that display information about the current state of the system. These are the Transcript window, which records the entire problem-solving session; the Hypothesis window, which shows the hypothesis that the system is currently investigating; and the Conclusions window, which recaps the conclusions the system reaches.

As the program works on a problem, it occasionally asks the user questions relevant to the reasoning process. *Nexpert* automatically generates questions and formats them in a dialog box, displaying the questions and answers according to the type of value expected (see Figure 3).

A critical feature of any expert system is its ability to explain its own behavior. The Question dialog box allows you to ask why the currently requested data is important to the problem-solving mechanism. If, for example, you want to determine the major reasons why a hypothesis was confirmed, click on a Why button in the Rule, Hypothesis, or Conclusions window. An explanation supporting the system's confirmation or rejection appears. You can examine the system's solving strategy at a higher level of detail by clicking on the How or Why button in the Explanation window.

Check the Conclusions window to determine what conclusions have been reached at any point in the reasoning process. Clicking on the Why button at the bottom of the Conclusions window gives an explanation for the confirmation or rejection of a hypothesis. Clicking the Apropos button displays any fixed information linked to the selected hypothesis or data.

When you've reached a state in which no other part of the knowledge base is relevant to the current problem and no further information is needed, a window appears indicating the end of the session.

Graphics and Reports

Nexpert lets you link graphics or text to data through the Apropos option; this procedure provides additional explanation of a conclusion. Clicking on the Apropos button yields graphics, such as digitized images or *MacPaint* drawings, or text, such as explanations of computations performed on requested data. Apropos information is available through the Hypothesis, Rule, or Conclusion window. Apropos is also an option in the Encyclopedia menu.

Viewing information graphically makes understanding the complexities of an expert system easier. *Nexpert*'s Browse Network option shows you the system's reasoning path toward a given solution by drawing lines between related conclusions *Nexpert* has reached (see Figure 4). This feature enables you to see the sequence of choices leading to a particular conclusion and to determine the role of any rule or set of rules in the final decision. The Overview option charts

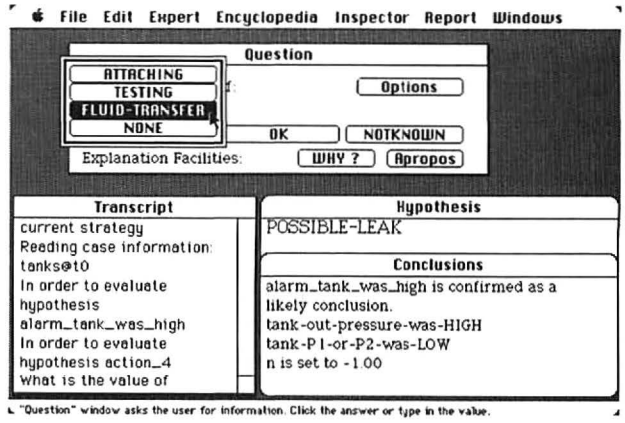


Figure 3

Nexpert *automatically asks the user relevant questions as it evaluates a hypothesis. You select Options to input data. The Why and Apropos buttons provide explanations or further information about the current investigation.*

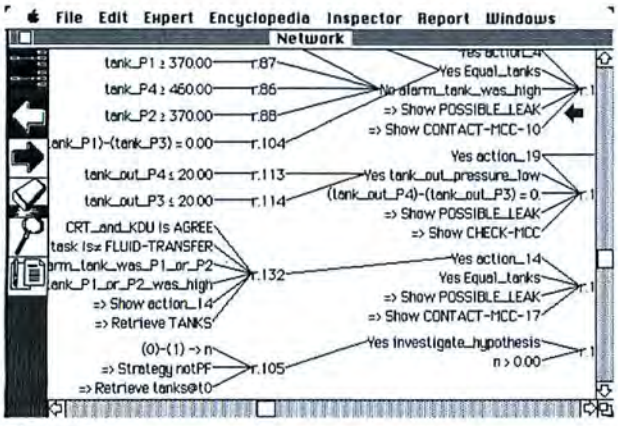


Figure 4

Nexpert *displays a graphic representation of conclusions reached by the system. The series of icons at the left lets you navigate within the network. Information is dynamically updated as new conclusions are reached.*

the entire network. The icons on the left side of the screen let you navigate within the network. You can move through this chart in two directions: from global information (hypotheses/goals) to local knowledge (conditions/data) or vice versa. In either case, this chart effectively shows the connections between various parts of the knowledge base.

Within one session, the Inspector receives the information from each inference and dynamically updates and redraws the knowledge base chart. A menu option lets you change the graphics settings so that you can tailor the knowledge chart's size, fonts, and icons. When different people investigate the same problem, printing out the entire chart reveals the processes by which they arrived at their conclusions.

Nexpert reports can be printed out or saved to disk. The Case Status command lists all the data relevant to the current problem, along with a list of confirmed and rejected hypotheses. You can print Case Status immediately or store it on disk at any time during a session with *Nexpert*. Full Report lists all the rules the system used to confirm its conclusions and provides detailed explanations.

For more selective reporting, the Explain Conclusion option gives a text description of how *Nexpert* confirmed or rejected the rules and hypotheses that led the system to a conclusion.

Overview

This article describes only some of the significant features and functions of the program. *Nexpert* gives you a great deal of control and flexibility. The program looks and feels native to the Macintosh, taking full advantage of the mouse, cut and paste capabilities, pull-down menus, and windowing environment. Without doubt, *Nexpert* is one of the most advanced software programs yet to come to market for the Macintosh or any other microcomputer; in its own field *Nexpert* is comparable to the number-crunching power of *Excel* or the seamless integration of *Jazz*.

Intended primarily for the specialist—the financial planner, engineer, medical doctor, or expert system developer—the program's ease of use opens the door to a broader range of professionals. However, a programming novice or a person with little understanding of AI principles can take advantage of only a fraction of the program's power. A knowledge base could help a stockbroker with some training make decisions regarding a client's portfolio, for example, but unless the stockbroker had some knowledge of cognitive science, computer science, or artificial intelligence, developing and using the knowledge base in a sophisticated manner would be difficult.

For the uninitiated, *Nexpert* is like a complex, abstract work of art: appreciating it requires a lot of systematic thinking—even given the program's well-designed user interface. A simplified version of *Nexpert* aimed at less technical users, more thorough documentation with tutorials and technical support, and a lower price would bring Neuron Data's expert system technology to a wider spectrum of business and education professionals. In the near future we hope to see more Macintosh expert system development tools emerge from Neuron Data and other companies—tools that would allow more of us to use our expertise to create knowledge bases that could be universally understood and applied to a host of modern-day problems. □

◆◆◆◆◆◆◆◆◆◆

Nexpert
Neuron Data Corp.
444 High St.
Palo Alto, CA 94301
415/321-4488
List price: $5000, run-time only $1000

◆◆◆◆◆◆◆◆◆◆ *Tom Maremaa is a software developer and a former senior writer for* InfoWorld *magazine. Daniel Farber is an Associate Editor of* Macworld.

For all of you who thought Dennis Brothers was crazy to give away MacTEP,™ here's MicroPhone.™ The one he's selling.

When the Macintosh first came out, the most powerful personal computer ever built didn't have the brains to make a phone call.

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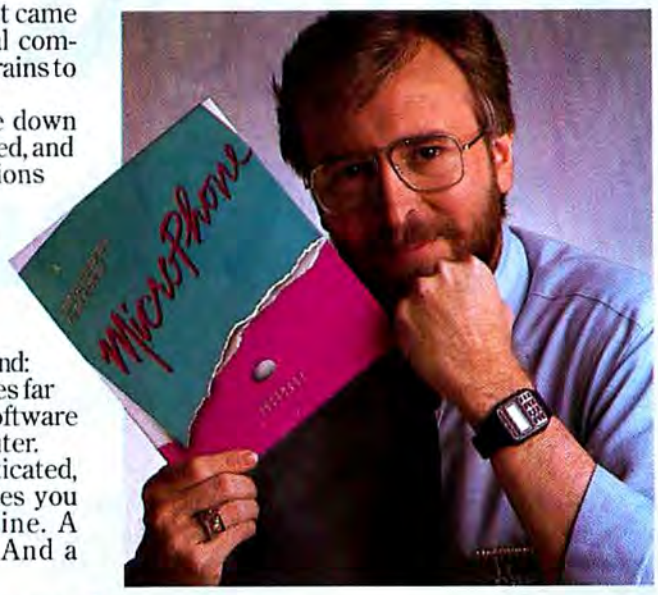
Which he proceeded to give away.

MacTEP was a classic. The first standard in Mac communications.

Now he's created the second: MicroPhone. A program that goes far beyond any communications software currently offered for any computer.

MicroPhone is so sophisticated, it cuts through the worst tangles you encounter when you go on-line. A delight to the experienced. And a saviour for the novice.



Run on automatic.

When you open MicroPhone to the desktop you'll find a comprehensive collection of icons pre-programmed to access all major information services: CompuServe,® Dow Jones News/Retrieval,® The Source,℠ Delphi,™ the works.

A few clicks and you're in. With automatic log-in and sign-on.

But that's just the beginning of its ability to automate the whole telecommunications process. For MicroPhone features the most powerful, yet simplest to set up macros ever seen on a program.

Write your own script.

Dennis gives you two ways to create these macros. The first is to set MicroPhone in the Watch Me,™ the recording mode. The program looks over your shoulder as you conduct a communications session following your keyboard and menu commands.

MicroPhone can remember not only an uninterrupted string of keyboard commands, but also wait-for-prompt conditions. In fact, virtually any series, no matter how long or complex.

The entire sequence is saved. To be invoked at any time with a single key command.

The second way to generate macros is through MicroPhone's unique "Script" window. Open it and you'll discover an extensive set of functions which can be called up and linked with a series of mouse clicks. The resulting macro is extremely powerful. The method is Mac-simple.

Using Watch Me or the Script window, or a combination of both, you can automate log-ons, file transfers and unattended operations. And navigate back into the farthest reaches of any database with a single stroke.

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Make files fly.

Sending and receiving files is faster and easier with MicroPhone, too. Using XMODEM protocols and MacBinary, MicroPhone transmits or receives anything you can create on a Macintosh. Including MacPaint documents, text, spreadsheets, charts, database tables, or programs.

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Putting VideoWorks to Work

Erfert Nielson

Most people think of VideoWorks *as entertainment software. But this animation program has a serious side as well. The next time you find yourself illustrating a business presentation using* MacPaint, MacDraw, Microsoft Chart, *or another venerable member of your software collection, consider adding the element of motion to help get your point across.* VideoWorks *can add life to charts, tables, and even memos, making a report or presentation catch the viewer's eye.*

The project described here–the creation of a memo that comes to life, followed by an animated bar chart–gives you an idea of *VideoWorks'* potential as a business presentation tool. Perhaps you'll use some of the techniques shown here in your own animations. You should be familiar with basic *VideoWorks* terms and procedures (see "A Moving Pixel Show," *Macworld,* November 1985).

A Sample Scenario

Describing an animated sequence in writing is like trying to teach someone a dance step over the phone: something is lost in the translation. The following description, however, combined with Figure 1, should give you an idea of how the animation proceeds.

A disk, labeled simply "Ticket Sales Chart," is inserted by the manager of a small movie theater. The first half of the animation is a memo with a chart showing the number of tickets sold each month from July through December. What appears to be a document created with *MacWrite* and *MacPaint* is immediately displayed on the screen. After 5 or 6 seconds, however, the movie projector logo suddenly sputters to life. The reels spin, the projector's motor whirs, and the title of the presentation appears on the movie screen.

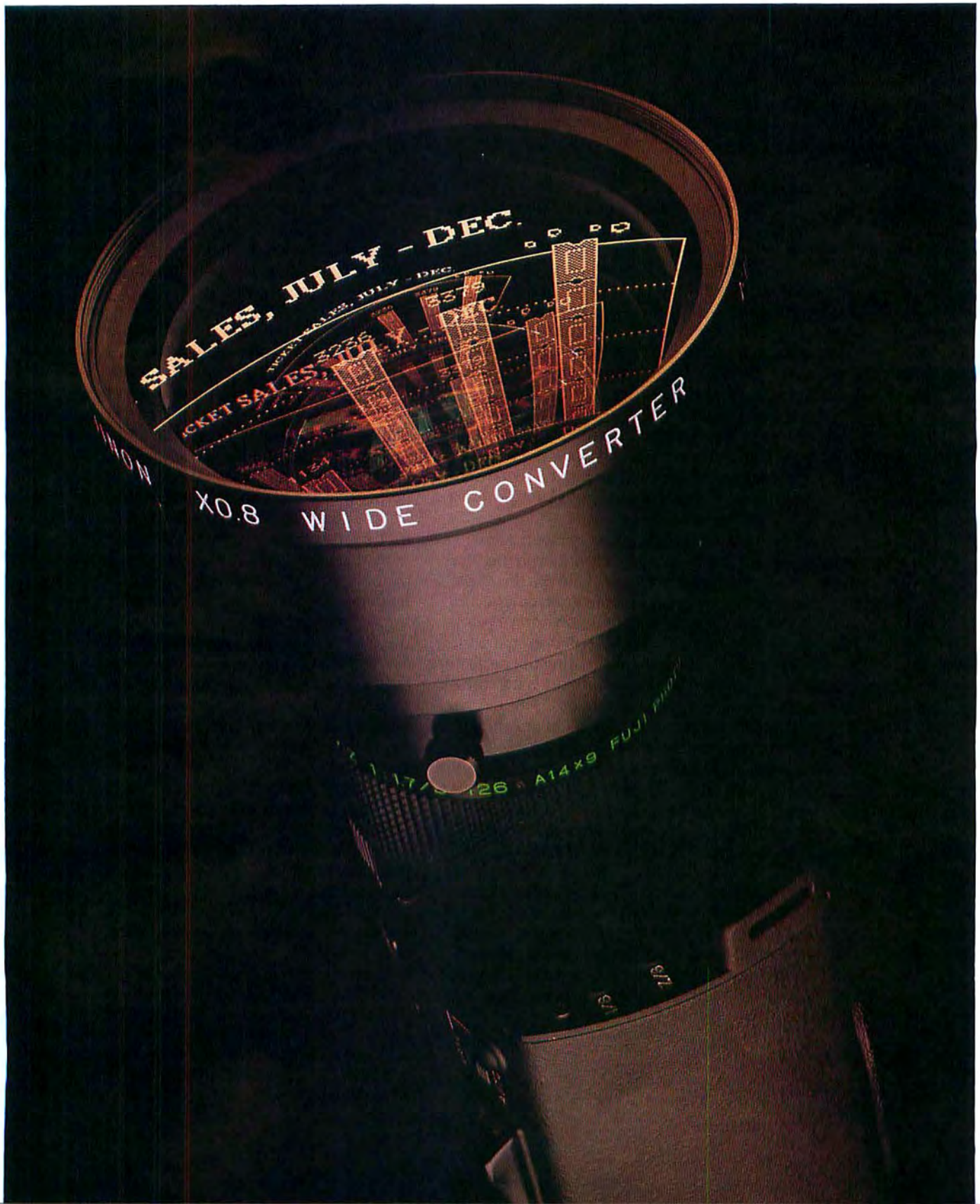
Then the ticket sales chart appears on the Mac's screen. One by one, strips of tickets rise from the bottom of the chart until the month's total is reached, at which point the number of tickets sold pops on screen. December was a record sales month for the movie theater, a fact that is dramatized by the last strip of tickets breaking through the top of the chart, complete with flying debris and the sound of an explosion.

Plan Ahead

Before you begin a *VideoWorks* production, you should have a clear idea of how you want the finished animation to look. This means mapping out, either in your head or on paper, the steps your animated elements, or *sprites,* will follow. Organizing an animation in advance keeps you from running into editing problems several hours into a project.

Be as economical as possible in the number of separate elements you animate. Animating numerous, graphically complex sprites uses up memory and slows down the animation. The two parts of the animation project described here are relatively small (8K apiece) and could be created on a 128K Mac. You may need to use a 512K Mac for more ambitious animations.

Another factor to consider is *foreground priority.* The first sprite you place in an animation is in the background. The second sprite added overlaps the first, the third overlaps the first two, and so on. Insert-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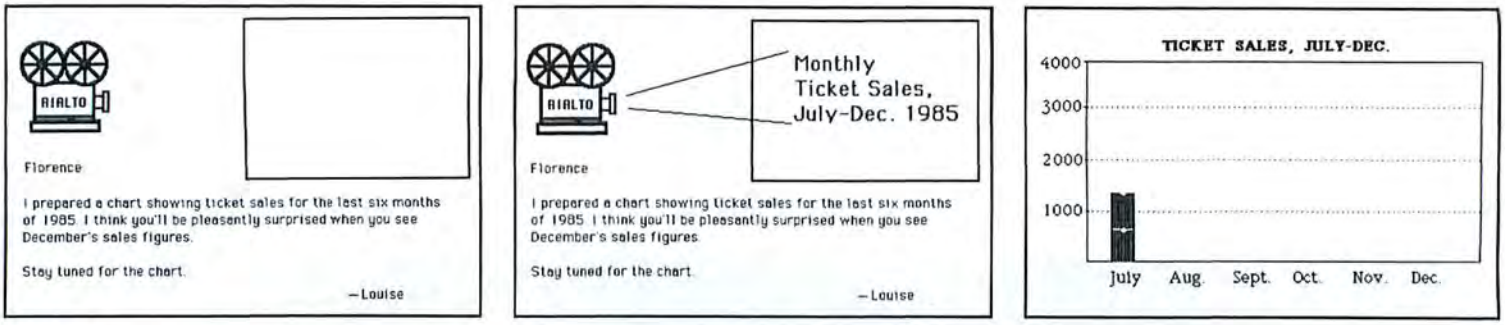

Figure 1
It's not quite poetry in motion, but this animated memo and chart is eye-catching nonetheless. The animation starts with a cover letter that looks ordinary enough until the projector in the letterhead beams the chart's title on a screen. The chart itself follows, with ticket strips climbing one after the other up the heretofore empty grid.

ing background sprites first saves you editing headaches. (Read the "Hints, Tips, and Caveats" section of the *VideoWorks* manual for more information on streamlining the animation process.)

The Moving Memo

The movie theater memo is the simpler of the two sequences. This animation has only five elements, or *castmembers*. They are, in order of appearance, the movie projector, the text of the memo, the rectangular movie screen, a slightly altered version of the projector, and the projector beam and presentation title. *VideoWorks* provides a low-rent version of *MacPaint* called CheapPaint, but I drew the projector in *MacPaint* so I could make use of T/Maker Graphics' *ClickArt Effects*, a *MacPaint* desk accessory that slants, rotates, and distorts selected objects. Draw the projector's film reels using the circle and straight line tools and then use *ClickArt Effects* to rotate the reels a few degrees. Copy the original projector and add the rotated reels to the second projector. Save the document and copy it to a data disk.

To begin building the animation, open a new *VideoWorks* file and select CheapPaint from the Windows menu. Then select Art Grabber from the Apple menu and "grab" the original projector from the *MacPaint* document. (Art Grabber lets you open *MacPaint* documents from within *VideoWorks* and paste pieces of them into CheapPaint.) Pasting the projector into a CheapPaint easel automatically adds it to the Cast window as the first castmember.

Type the text of the memo with CheapPaint's text function and then use the rectangle tool to create the movie screen. Next, use Art Grabber to place the second projector into a CheapPaint easel and into the cast. Finally, draw the projector beam and type the title that appears on the movie screen. With the five castmembers safely ensconced in the Cast window, save the file. It's a good idea to save frequently; even with careful planning you may occasionally need to use Revert to return to the last version saved if an experiment proves spectacularly unsuccessful.

Since none of the castmembers in the memo do much in the way of jumping about on screen, animating the memo is fairly easy. Click the first projector in the Cast window and drag it into position on screen. Then add that castmember to the first channel of the animation with the Step command (⌘-S). Open the Score window, highlight 80 frames of channel A (the projector sits idle for several seconds, as you'll recall), and use the InBetween command to place the projector in all 80 frames. Follow the same procedure to place the text and the movie screen in the first 80 frames of channels B and C.

To start the projector rolling, use the Switch command to replace the first projector's image on screen with the second's. With the Step command, place the second projector in frame 81 of channel A. Then use Copy and Paste to place alternating images of the first and second projector in the next hundred or so frames of the score, creating the illusion that the reels are rotating. You have to copy and paste repeatedly; begin with the initial pair of alternating images and double the number of frames in the sprite each time you copy and paste. Play back the sequence as you put it together to see what the animation looks like.

To complete the animated memo, add the projector beam and title beginning at frame 81 of channel D. Drag that castmember into position and then select Or from the Efx (special effects) menu so the beam of light appears transparent, allowing the screen to show through behind it. Make sure that the playback head—the black square that runs along the bottom of the Score window—is positioned under the proper frame before you add the projector beam and title to the score. Add the idling motor sound effect from the Sfx menu to the score and adjust the animation's speed in the Panel window to complete the first half of the animation.

Top of the Chart

Make a backup copy of the first sequence and take a break. You're now ready to proceed with the second part of the presentation. The first element to enter in the animated chart sequence is the background rectangle, complete with title, numbers along the left side, and dotted lines delineating each thousand tickets sold.

The next castmember is the strip of tickets, which you can draw with CheapPaint's filled rectangle and pencil tools. Although the strip of tickets appears six times in the animation, you insert it into the Cast window only once; for each month you drag the same castmember into position on the screen, adding it to different channels with the Step command.

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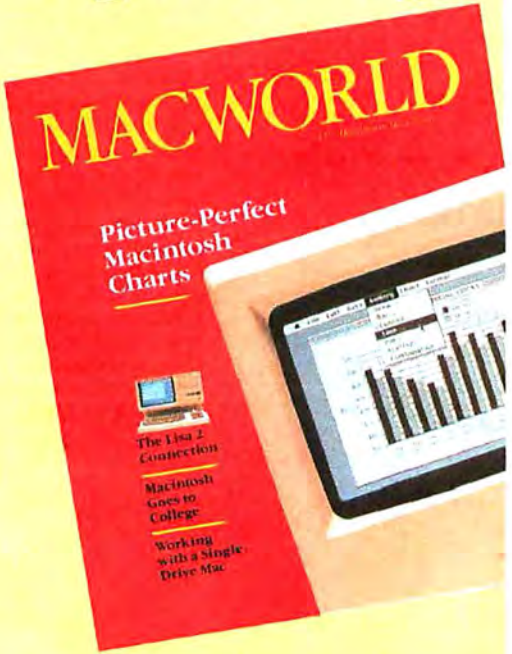

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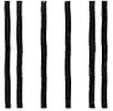

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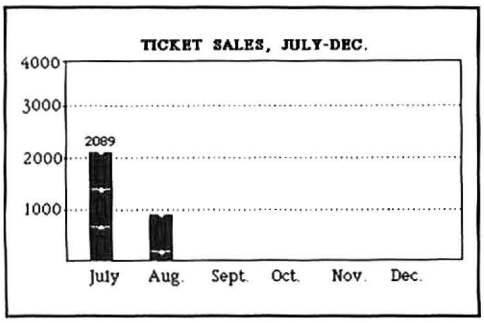

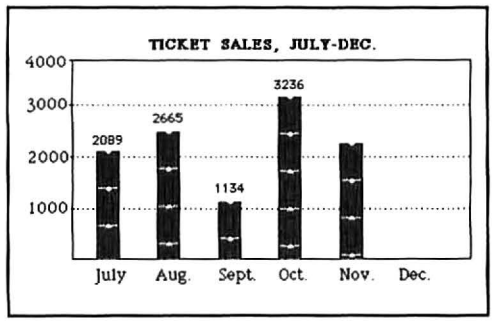

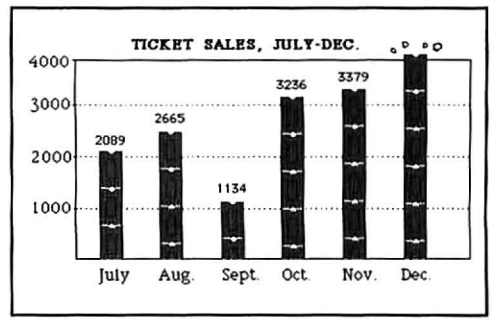

To animate the strips of tickets, which climb smoothly up the chart, place the first strip directly beneath the bottom line of the chart and then select the Tweak window, which allows you to move an object a precise number of pixels in a specified direction. In this case set Tweak to move the strip of tickets 3 pixels up and 0 pixels horizontally (see Figure 2). Clicking the Tweak window's Do It button moves the strip of tickets straight up 3 pixels. Add a frame after each tweak with the Step command, repeating this procedure until the strip reaches its proper height. Then add the number of tickets sold at the top of the strip. Each of these numbers is a separate castmember, created with CheapPaint's text function.

Because the second strip of tickets starts rising after the first strip reaches its full height, choose an insertion point in the Score window that begins animating the second strip after the first one stops moving. Repeat the procedure for each strip of tickets (see Figure 3).

The final strip of tickets bursts through the top of the chart, producing a small explosion as several chunks of the chart fly through the air. Each chunk is a separate castmember, added to the score at the point when the tickets first hit the top of the chart and animated frame by frame. To complete the chart-bursting effect, insert the medium explosion from the Sfx menu into the score so that it is in sync with the tickets breaking through.

At this point the animation is nearly complete. You are faced with a ragged array of ticket stubs hanging below the chart, however. I had to experiment a bit to cover them up. Draw a black, borderless rectangle in CheapPaint, place it over the unsightly ends of the ticket strips, and select Bic (Blank is changed) from the Efx menu. This special effect causes a black castmember to turn white if it's placed on a white background. To finish the job, add the months July through December to the bottom of the chart.

You now have two *VideoWorks* documents, which you chain together into a continuous presentation. Open a new *VideoWorks* document and choose Demo List from the File menu. A dialog box appears, asking for the list of the documents to include in the playback sequence. Type the names of the documents in the order you want them played and click OK. Then save the document as Demo List and return to the desktop.

To begin the presentation as soon as the disk is inserted, use VideoWorks Player from Hayden's *Macro-Mind Utilities Disk (M.U.D.)* collection. This 13K utility allows you to play back *VideoWorks* animations without the *VideoWorks* application itself. For an animated presentation that gets moving at startup, copy the System Folder and VW Player from the *M.U.D.* disk onto a blank disk, along with your animation documents and the Demo List document from the *VideoWorks* disk. Insert the new disk, click the VideoWorks Player icon, and select Set Startup from the Special menu. Now you have a presentation disk that automatically starts the animated memo and continues with the ticket sales chart.

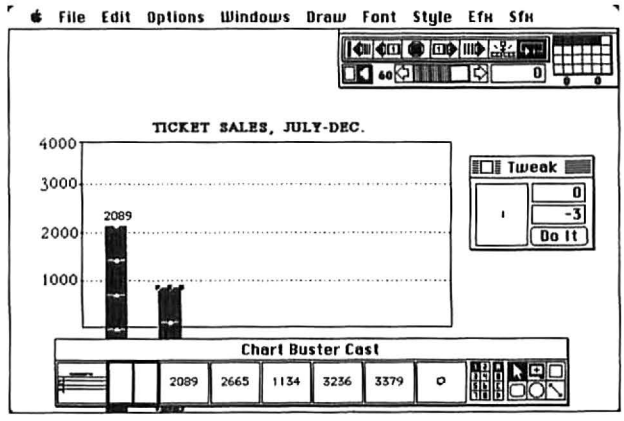

Figure 2
VideoWorks' *Tweak window allows you to move a selected castmember a specified number of pixels horizontally and vertically. Here the strip of tickets for August is set to move directly up the screen 3 pixels at a time.*

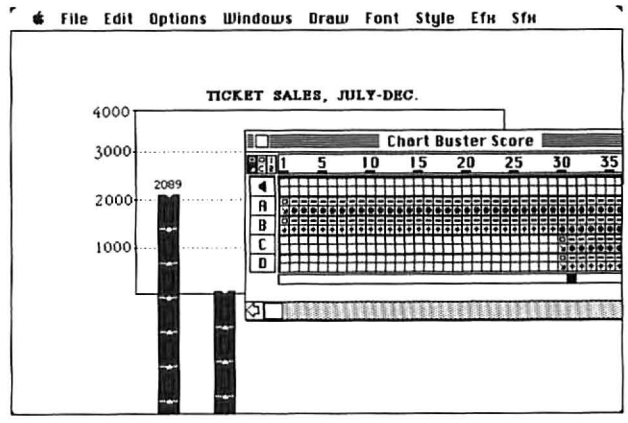

Figure 3
So that the ticket strips appear in sequence, the first frame of the next ticket strip appears in another channel of the score after the last strip stops. In this Score window the July ticket strip in channel B stops moving in frame 29, and the August ticket strip in channel D makes its appearance in frame 30 and starts climbing in frame 31.

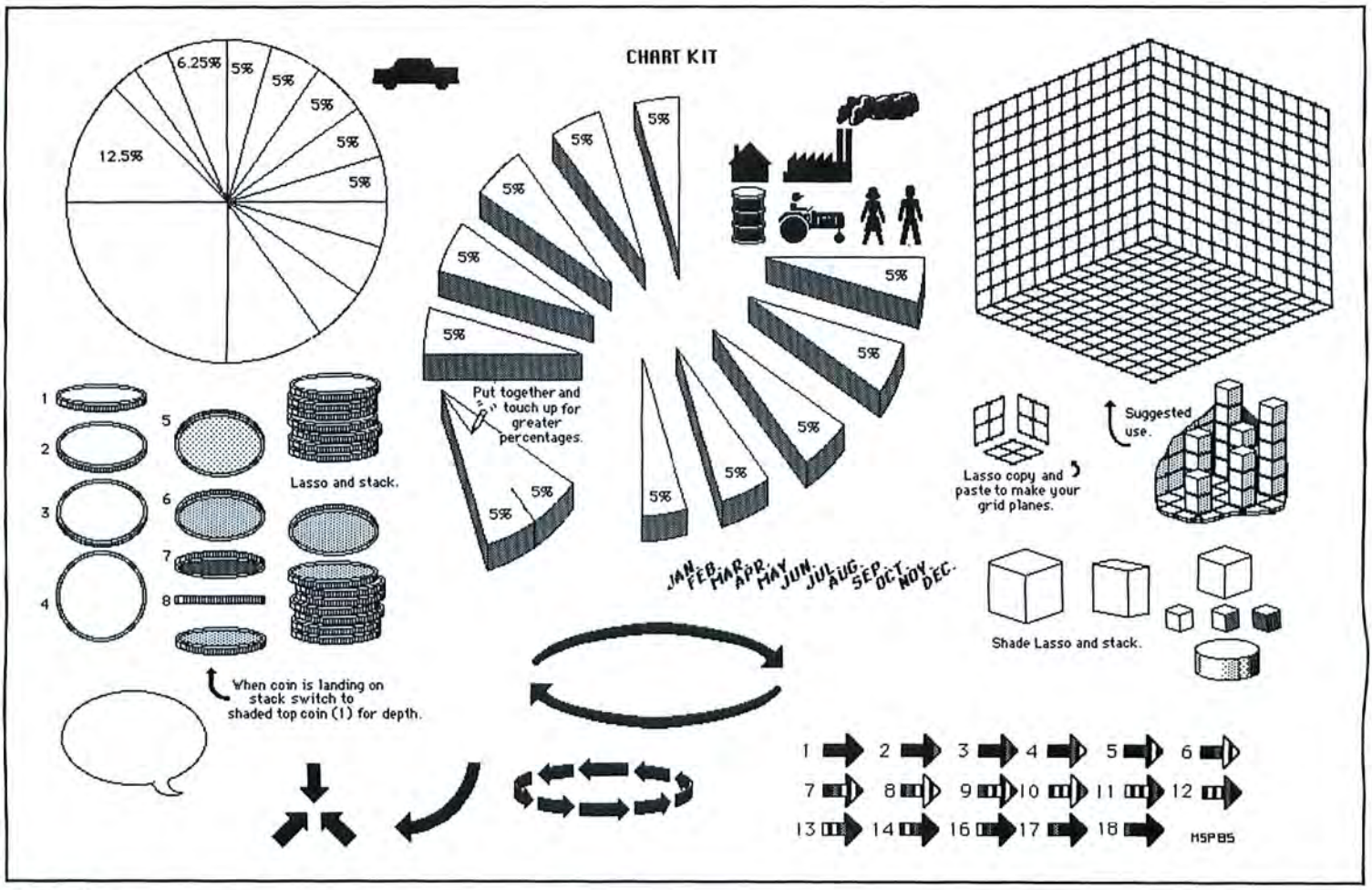

Figure 4
You don't have to start from scratch when animating charts. VideoWorks' *Art disk contains this chart kit with arrows, pie slices, a three-dimensional grid, and other handy graphic elements. Graphics pasted in from other programs, such as* Microsoft Chart, *also save you from working overtime.*

As you can see from this description, creating even a simple *VideoWorks* animation entails quite a few steps. The Chart Kit provided on the program's Art disk (see Figure 4) can save some time and effort, as can companion programs like *ClickArtEffects* and three-dimensional graphics programs such as Enabling Technologies' *Easy3D* and Challenger Software's *Mac3D.* You might want to use screen shots of *Chart, Jazz,* or *Excel* charts as the basis for an animation, saving you the trouble of drawing the initial chart or graph. Although you'll find putting together a *VideoWorks* business presentation more time-consuming than creating a graph with *Microsoft Chart* or an organizational chart with *MacDraw,* I think you'll find the results more rewarding and the presentation more effective as well. □

Erfert Nielson is an Assistant Editor of Macworld.

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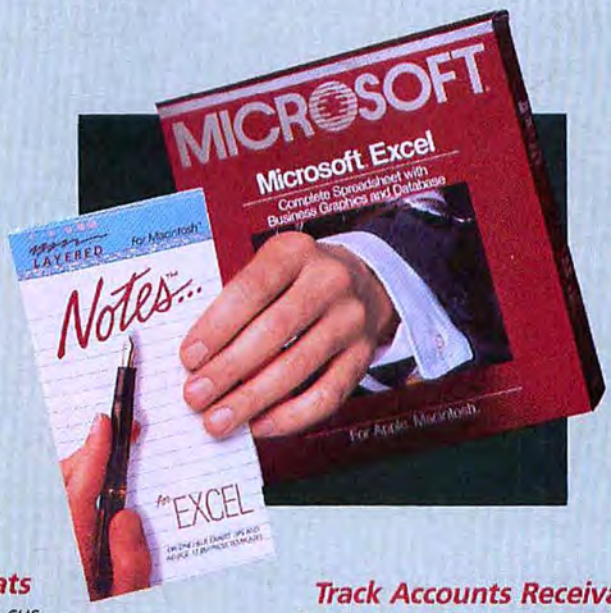

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Jim Hoyt, Apple's chief architect for its AppleLink dealer network, is now preparing an Apple II version for educators.

The Telecom Link

Tom Moran

Marie O'Connor of Future Information Systems' Manhattan branch shows how the 22-store chain keeps in touch via AppleLink.

Would you like to have direct access to Apple's technical databases? Receive answers to most of your technical questions in minutes? Send an E-mail message to a dozen remote locations in a minute or two? All without learning a complex command structure?

For years analysts have agreed that vast new telecommunications markets would open up when the thorny problem of the human interface was solved. The observers have said that until telecom services become easier to learn and use, they would only attract hackers and sophisticated business

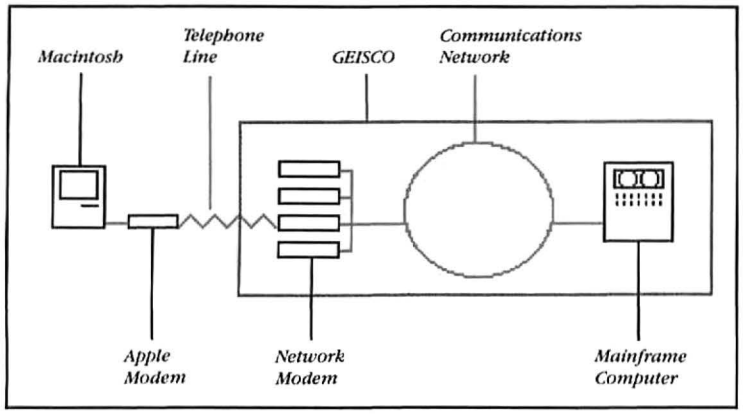

Figure 1
From Mac to mainframe: With AppleLink, GEISCO's Mark III network connects Apple dealers, developers, and user groups to Apple-related databases.

users. AppleLink, a telecommunications package that combines the powerful Macintosh human interface with GEISCO's (General Electric Information Systems Company) enormous network system, may prove to be just the revolutionary telecommunications product to do the trick—and a means of elevating Apple's products to where few Macs have gone before, Fortune 500 Heaven.

AppleLink replaces the complex commands of most telecommunications systems with the Macintosh's familiar desktop metaphor and straightforward user interface. To access the system, insert an AppleLink disk, choose Connect, and type in your password; AppleLink accesses GEISCO's Mark III network, the largest commercial distributed network in the world (see Figures 1 and 2). A distributed network stores data in more than one place, in this case in three locations in the United States. The GEISCO mainframes now contain software that allows them to understand and answer queries from Macintoshes. You can access the GEISCO mainframes from 750 cities in 31 countries.

After connection, the AppleLink desktop containing icons for different services appears. The services vary according to whether the user is a developer, a user-group representative, a dealer, or an employee of a dealer (see Figure 3). Newspaper icons appear for Apple corporate news and other news services; library icons appear for databases such as technical information, sales and support, and product and service prices. An Alert icon indicates crucial messages from Apple.

Clicking on a library icon brings up a search window where you enter key words or phrases and click on Search Library to initiate a full-text search. A full-text search is more comprehensive than a keyword search, which looks only at words and phrases previously indexed. AppleLink indicates the number of references found, and you widen or narrow the criteria to get a manageable number of folders containing the keywords. When you click Display Selections, you see the contents of the folders. The host software on GEISCO's mainframes keeps track of "no hits"—searches that get no answer. If enough queries on the same subject go unanswered, the program alerts the system administrator so an answer can be found. The program also notes if a particular user keeps missing the mark, so the system administrator can advise more effective search strategies. By navigating the technical libraries, dealers and developers get rapid answers to technical questions 24 hours a day, seven days a week without relying on Apple's technical support staff.

As powerful as the database features are, AppleLink's centerpiece is its electronic mail. On the right-hand side of the AppleLink desktop are an In Basket and an Out Basket. Large arrows in the baskets indicate the presence of messages. The electronic mail capability lets any Apple employee, dealer, developer, or user-group administrator communicate quickly and rapidly with another AppleLink user. AppleLink transfers binary files, software, graphics, spreadsheets, and so on. (Off-line composition of E-mail messages re-

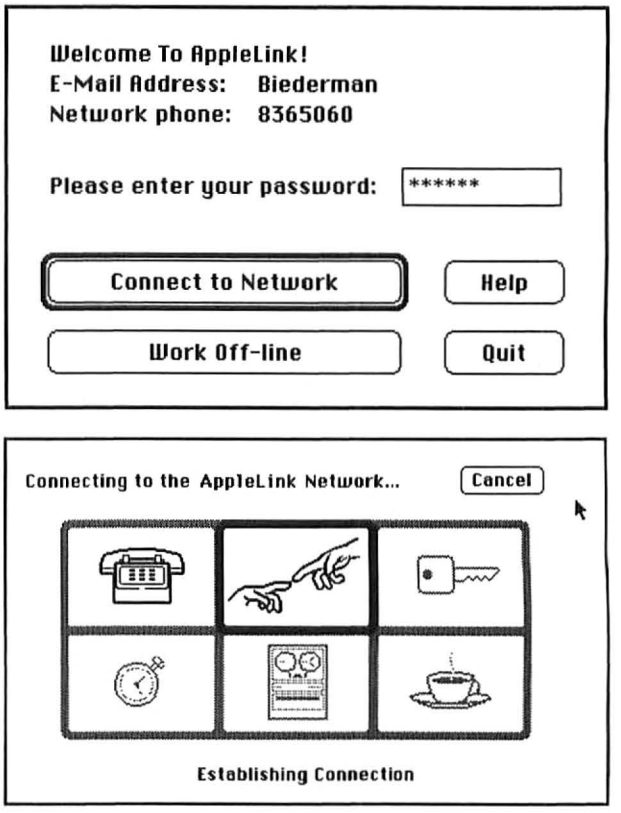

Figure 2
To connect to AppleLink, you need only enter your password. A series of symbols marks the progress of the automated log-on.

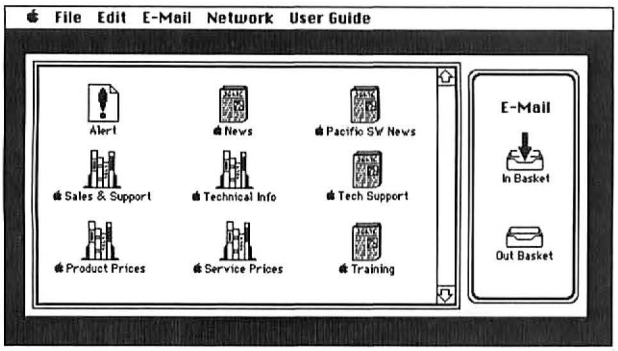

Figure 3

Once connected to the remote mainframe, desktop icons help AppleLink users navigate through Apple's database libraries and electronic mail system.

duces connection time.) You can cut and paste from E-mail, database, or bulletin board files to E-mail messages, and you can use the service to transfer graphics files from *MacPaint, MacDraw,* and *Jazz.* The system can transfer documents created with applications such as *MacWrite, MacTerminal,* Macintosh Pascal, Microsoft BASIC, and others.

AppleLink began as a technical support service for dealers. Before AppleLink, dealers could call Apple's support department only during West Coast business hours, and even then they would often get a busy signal. But since AppleLink became available to dealers last July, they have 24-hour access to a technical support database.

AppleLink gives Apple better customer support; improves communication with dealers, developers, user groups, and its own sales force; and provides huge savings in printing and mailing costs for price lists, technical updates, and other communications with dealers.

Mac Interface the Key to AppleLink

Apple's Jim Hoyt, who worked with Pete Burnight of Central Coast Software in Santa Cruz, California, to create AppleLink, says that Apple wanted to eliminate typed commands completely. "What we tried to do with AppleLink was to take all that stuff out of the way," he says. "We really tried for transparency."

Ali Saeedi, who is in charge of operations at Infomax, a chain of computer stores in Northern California, says AppleLink takes advantage of the Macintosh's simple user interface. "As a result, the AppleLink interface is very simple and intuitive." Infomax's need to communicate—among its own stores as well as with Apple—is so enormous, says Saeedi, that telephoning takes too much time.

"With AppleLink you can send a message to a lot of people in a short time. Before, we had to call Apple or send an order [for merchandise] by Federal Express; now we just type it in on AppleLink, and in 5 minutes the Apple support center has the order." Saeedi also likes AppleLink's technical support features, which have made it possible to answer many more customers' questions on the first try than before. "Our people depend on it now, which is saying a lot."

Saeedi believes that AppleLink's user-friendliness makes the system superior to IBM's dealer support system, CSS (Customer Support Service). "From IBM I get a steady stream of memos and documents that come Federal Express every day," he says. "They also send the same information through CSS, which is good, but because the user interface is not as good and not all [of IBM's] stores have CSS, all that information has to be sent by Federal Express anyway."

Peter Friedman, manager of desktop communications marketing at Apple, says that AppleLink is an excellent example of how the Mac, "with all its advantages in the communications arena, really makes information a usable resource." Friedman points out the Macintosh's ability to navigate through the information system: the Mac provides "a visual metaphor for communication so it's much more understandable. [And] you can create, manipulate, and transmit graphics." Friedman says that the development of communications solutions characterized by these Macintosh advantages is "one of our future directions."

BusinessTalk: AppleLink for Business

GEISCO, which developed the mainframe end of the AppleLink software, was so impressed with AppleLink that the company adopted Macintosh hardware and software for its BusinessTalk product. The main difference between AppleLink and BusinessTalk is that Apple set up AppleTalk for its own dealers, developers, and others, while GEISCO is marketing BusinessTalk to the Fortune 1200 as a network that can be tailored to fit. GEISCO will help companies create their own proprietary networks, all functionally equivalent to AppleLink but dedicated to the individual companies' needs. GEISCO's first product under the umbrella of BusinessTalk was DealerTalk, aimed at companies that want to offer the service to their dealers.

Alma Rodoni, manager of dealer systems marketing for GEISCO in Rockville, Maryland, says a manufacturer would use DealerTalk much as Apple uses AppleLink—for such applications as E-mail, new product announcements, price updates, and updates to technical specifications. "The real benefit of the system is that information can be communicated immediately, accurately, and simultaneously throughout the channel," she says.

AppleLink is such a powerful idea that, according to Rodoni, GEISCO is working on a version for the IBM PC. Rodoni says the company will try to introduce that new product later this year.

Long-Term Links

Although it started as a service to Apple's employees and dealers, AppleLink is already evolving into Apple products for others. Apple is adding 900 hardware and software developers to the AppleLink, according

to Ellen Nold, Apple's manager for support programs, and Apple now has a pilot program to support user groups. In the works are a version for the Apple II and, as a long-term prospect, a product purely for consumers.

In January Apple announced a joint venture with MCI and Dow Jones. Sources close to Apple say that the joint marketing agreement with MCI and Dow Jones will produce a very powerful, simple-to-use E-mail package. The first AppleLink-based service to even approach the end user is a pilot program for user groups; Apple plans to get this program on-line this spring, according to Ellen Petry Leanse, Apple's user group "evangelist." Unfortunately, only user-group bulletin board administrators will actually have access to AppleLink. They will act as go-betweens for Apple and the users, screening users' questions and relaying answers from Apple.

The pilot program will involve 40 to 60 user groups, says Leanse, but the services to the user groups have yet to be determined. To start with, "We will at least give them access to technical libraries, Apple corporate press releases and product announcements, and direct access to user-group support at Apple," Leanse says. The pilot program will also provide a read-only bulletin board, she added.

John Zeisler, manager of business marketing for Apple, speculates, "Ideally you'd be able to walk into a retail store and buy a user kit, and maybe an administrator's kit." An administrator's kit would allow you to set up bulletin boards, add and delete users, and help build a database. The user kit would give the same kind of capability that AppleLink or BusinessTalk provides. The hope, Zeisler says, is "to let a small distributor who wants to communicate with 20 key customers have the same capability that Apple has or any of GEISCO's customers has."

Zeisler points out that because Apple owns the rights to the source code of the file server software that resides in GEISCO's mainframes, the potential exists to port AppleLink to other networks. "It's hard to speculate, but it could be transported to other systems with a moderate amount of work," he says.

Ellen Nold, Apple's manager of support programs, looks forward to a network for consumers.

According to Zeisler, Apple is committed to seeing that communications products work on the Macintosh family and, "most importantly, that they work with the same user interface whether you're communicating with Dow Jones, or a private network like the AppleLink network, or a vertical market database. There are no specific product plans, but obviously we believe that this is strategically a very important market for us."

Hoyt, Apple's chief architect of AppleLink, says Apple is working on an Apple II version of AppleLink to be aimed first at the education market.

Jan Lewis, industry analyst and president of Palo Alto Research Group, says that the exciting thing about AppleLink is that it offers the best of both worlds. Lewis expects that the new combination of a graphic human interface with networking will encourage tremendous growth at the consumer level. "We already had a healthy market before we tied into the human interface, and I think this will greatly expand the user base. We could be seeing the jumping-off point in telecommunications that people have been predicting for years," Lewis says.

With GEISCO hoping to bring out an IBM PC version of BusinessTalk sometime in 1986 and Apple adding programs for developers and user groups, by year's end we could see a raft of powerful new telecommunications programs, mostly for medium-size and large businesses. But by the time that the largest and most profitable markets are established, small-business and home users will clamor for the E-mail, technical support, and news service features of these systems. □

AppleLink's easy interface opens doors for Peter Friedman and John Zeisler of Apple marketing.

Tom Moran is a San Francisco-based writer who has published numerous articles on microcomputers, peripherals, and related topics.

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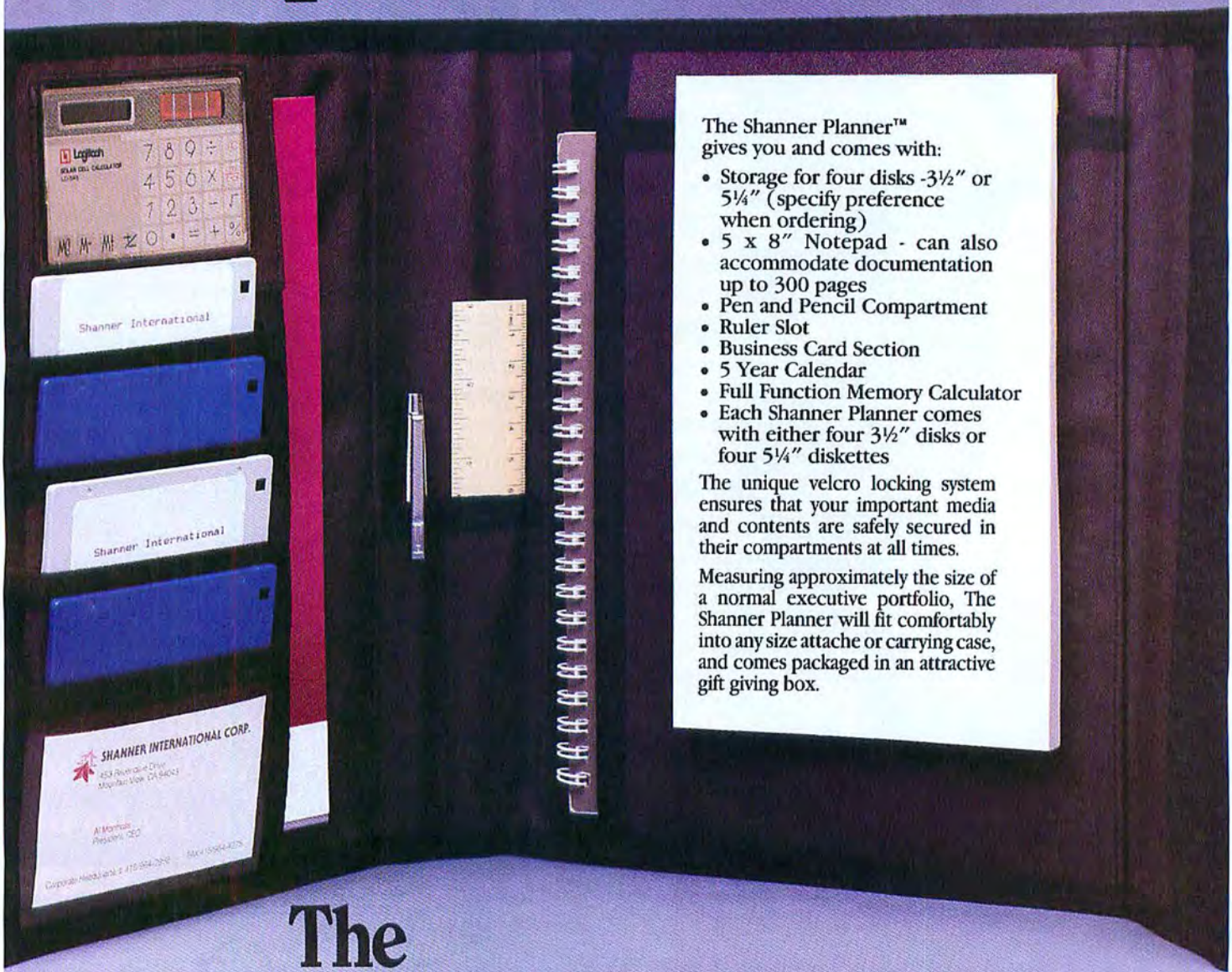

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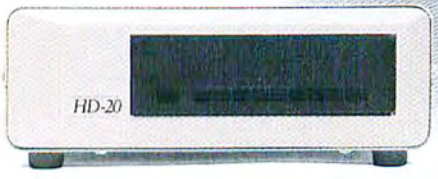

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Macware Reviews

PC MacBridge, Consultant, Fokker Triplane Flight Simulator, Hard Disk Util, The Housekeeper, Mouse Exchange BBS, and 4Paint

Edited by Erfert Nielson

Bridging the Gap

In the interest of furthering peaceful coexistence between Apple and IBM, Tangent Technologies recently released ***PC MacBridge,*** an add-on board for the IBM PC (and PC compatibles) that lets you attach the PC to the AppleTalk network and use it with Apple's LaserWriter. PC MacBridge comes with a collection of programs. LaserScript allows *WordStar, Multimate, 1-2-3,* and ASCII text files to be printed on the LaserWriter, giving PC owners access to the printer's powerful PostScript page description language. (While the IBM PC version of *Microsoft Word* already has the ability to produce PostScript output for the LaserWriter, PC MacBridge allows multiple PCs to share a LaserWriter using AppleTalk.) LaserGraph lets you create bar, pie, and line graphs on the LaserWriter. MailBox allows file transfer between the PC and other computers.

The PostScript Advantage

In addition to letting *WordStar, Multimate,* and *1-2-3* send output to the LaserWriter, the PC MacBridge software provides commands that take advantage of some of the features that make PostScript so attractive. For example, the *WordStar*-to-PostScript converter provides commands for selecting a typeface, printing super- and subscripts and strikeout type, justifying or centering lines, and printing characters other than the standard ASCII symbol set. Other commands let you select the dimensions of a page, set tabs for use with proportional fonts, change character size or line spacing, send new font-family definitions to the printer, insert graphs into text documents, and insert PostScript commands into text documents.

Placing PostScript commands in text documents enables you to easily insert graphics into a page of text. For example, using this feature you could create a small file containing the PostScript commands for printing a horizontal bar. Then, whenever you wanted to insert a bar into a document, you could simply specify the name of the file. Unfortunately, the PC-PostScript connection isn't flawless; for example, when converting *WordStar* files to PostScript, the PC MacBridge software doesn't change the location of *WordStar*'s line breaks. To justify the right margin, the conversion software adds spaces between words to make all lines the same length. This can result in text that is excessively "airy."

PC MacBridge gives you extra options for printing spreadsheets and can improve the appearance of business graphics. The PC MacBridge conversion program for *1-2-3* lets you print extrawide spreadsheets by using a small font and printing the spreadsheet in landscape (sideways) orientation. Laser printing is a real boon for *1-2-3* graphs; the LaserWriter's fonts make much more attractive graph labels than Lotus's fonts.

(continues on page 138)

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(continued from page 137)

From PostScript to Postman

As if the features already mentioned were not enough, PC MacBridge moonlights at yet another job, opening up an electronic mail link over AppleTalk from PC to PC or from PC to Macintosh. The Macs must be running Videx's *Mail Center* electronic mail program; the PC end of things is taken care of by the PC MacBridge software.

A typical E-mail application might be the creation of a newsletter. After generating articles on a PC running *WordStar,* you could send text to a Macintosh, lay it out using Aldus's *PageMaker,* and then print the newsletter on the LaserWriter. Another example would be sending *1-2-3* spreadsheets to a Macintosh, where they could then be transferred to *Excel* or *Jazz.*

PC MacBridge's one drawback is the fact that it includes an enhancement board; the board isn't necessary for printing, since a PC can be connected to a LaserWriter using a standard serial cable. If you're interested only in laser printing and don't need electronic mail, you may want to save PC expansion slots for other boards. Anticipating this need, Tangent offers LaserScript/S, a version of LaserScript that lets you connect the PC directly to the LaserWriter with a serial cable.

Will the Apple LaserWriter, assisted by PC MacBridge, succeed on Big Blue's home turf—the large corporations? My hunch is that it will. The LaserWriter opens doors to professional-quality presentation graphics, near-typeset-quality documents, desktop publishing, and a wide variety of fonts—capabilities that many companies will find too good to pass up.—*Ted Nace*

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(continues on page 142)

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(continued from page 138)

with financial planning by giving instant numerical answers to "what-if" questions. Project management software can aid in planning and managing complex tasks by finding critical paths through PERT charts. *ThinkTank* provides flexible tools for organizing ideas in hierarchies. But as good as these software tools are, they're generally of little help with work that doesn't fall neatly into their areas of specialization. And then there's ***Consultant.***

A Generic Problem Solver

Consultant is a unique program for analyzing and solving problems. Designed by a team of–what else?–consultants, the program is a software encapsulation of time-honored principles of decision making, scientific inquiry, planning, problem solving, and selling. *Consultant* doesn't do the work for you; it simply provides thinking aids and problem-solving procedures. It's up to you to provide the relevant information, ideas, and final decisions.

Consultant aims to be a general-purpose problem-solving tool, and the developers recognize the fact that different kinds of problems lend themselves to different procedures. Menus represent a variety of approaches: Begin, for getting started; Detect, for doing detective work about past events; Discover, for applying the scientific method to a situation; Create, for creatively exploring future options; Plan, for building and following steps to a concrete goal; and Sell, for convincing others that you've come up with something worthwhile. Each menu contains a sequence of steps designed to solve the problem at hand. Using *Consultant* is simply a matter of choosing a menu and answering the questions posed by each step.

Icons Whispering in Your Ears

Because *Consultant* is designed to work with all kinds of problems, some of its questions may seem vague and difficult to apply to specific situations. Whenever you're stuck, you can check with the Tutor (represented by a mortarboard icon) to find out why *Consultant* is asking a particular question, or the Coach (baseball cap icon) for specific how-to help and examples.

Not all of the questions are easy to answer, so *Consultant* provides a number of thinking aids. On the left side of the screen are icons for four idea-generation aids: Brainstormer, for spewing forth ideas; Questioner, for answering questions; Combiner, for mixing and matching ideas; and Scenario, for telling stories. On the other side of the screen are the analytic decision-making aids: Prioritizer, for ranking items; Grader, for assigning a score of 0 to 10; Rater, for grading items based on two equal criteria, such as validity and relevancy; Evaluator, for weighing options with multiple criteria; Relater, for determining interdependencies that govern which things must be done before other things can happen; and Categorizer, for grouping items. If you feel overwhelmed by icons, you can click icons at the top of the screen to see a written summary of the aids below.

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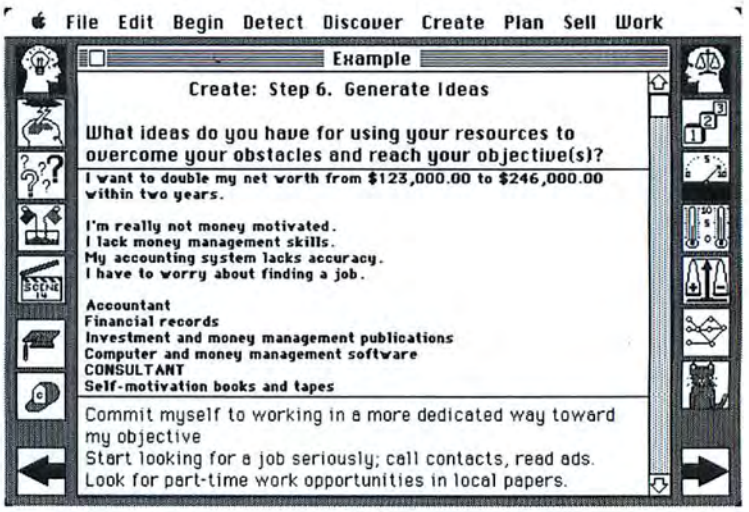
The Consultant Is In

Consultant has a wide variety of applications. I spoke with a free-lance photographer who uses it for thinking up marketing strategies, planning exhibits, and generally providing creative nudges. A financial planner uses the program to define the markets he wants to penetrate, and a CEO of a small corporation brainstorms with *Consultant* for sources of capital.

I applied *Consultant* to several problems of my own, including that classic, "Too many things to do and not enough time to do them." When the program asked me for my "mission," I found myself looking for an overall goal that could justify being so busy, which forced me to see the problem from a slightly different point of view. The program asked me to choose the appropriate procedure for my problem, and I chose Create. The procedure led me through several time-consuming steps that involved making lists: pertinent facts, objectives, obstacles, resources, and ideas for using resources to overcome obstacles (see "What's Your Problem?").



What's Your Problem?

Consultant *provides a wide range of problem-solving aids that help you define the problem at hand, establish a goal, list the resources at your disposal, establish priorities, and arrive at possible solutions.*

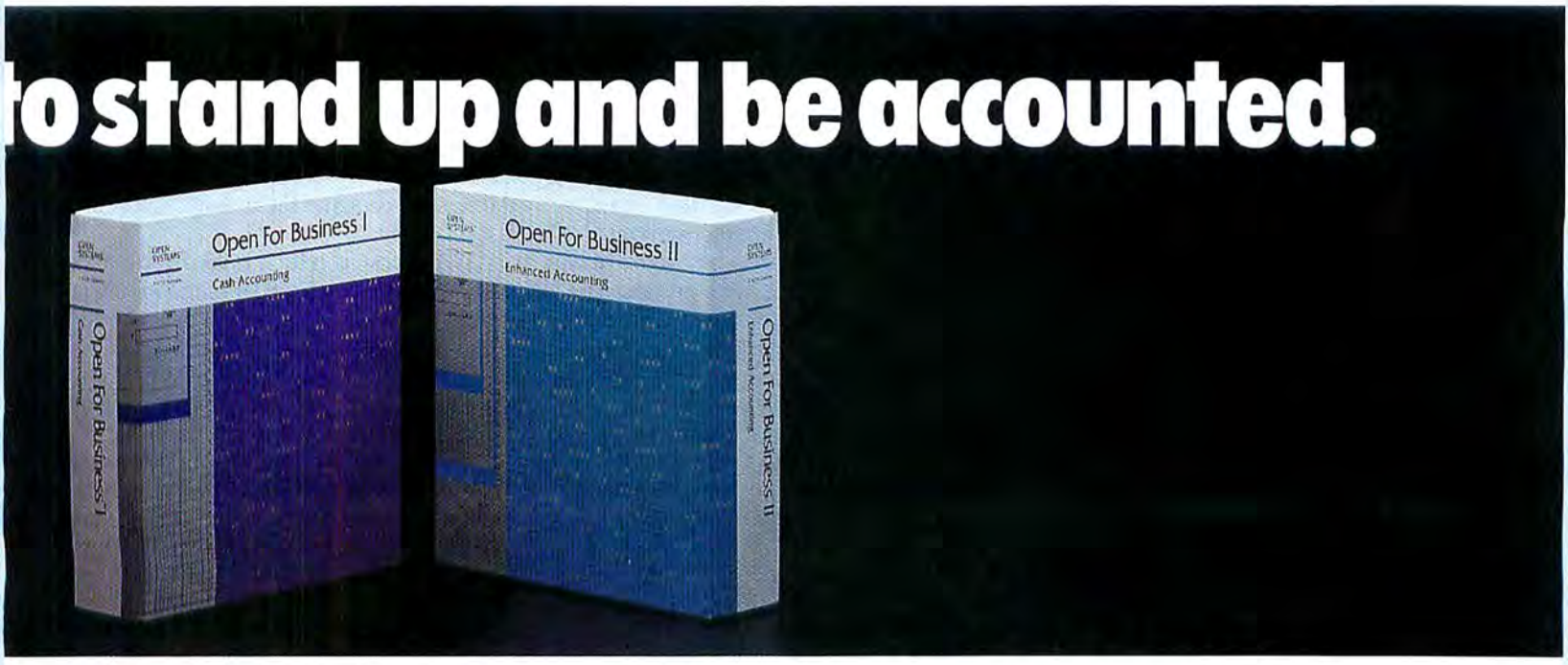
Some of the analytic tools proved helpful here—especially Prioritizer and Evaluator. These tools forced me to break difficult questions into simpler questions that almost answered themselves. When I finally reached the last step in the process, I saw that several of the "critical" items on my must-do list didn't seem important at all when considered as part of the big picture. But I wasn't surprised; I'd figured that out while working through the steps.

The Final Decision

I like *Consultant,* but I doubt that I'll use it much. After years of training and experience with problem-solving methodology, I find that the program doesn't do much that I can't do faster or more thor-

(continues on page 144)

o stand up and be accounted.



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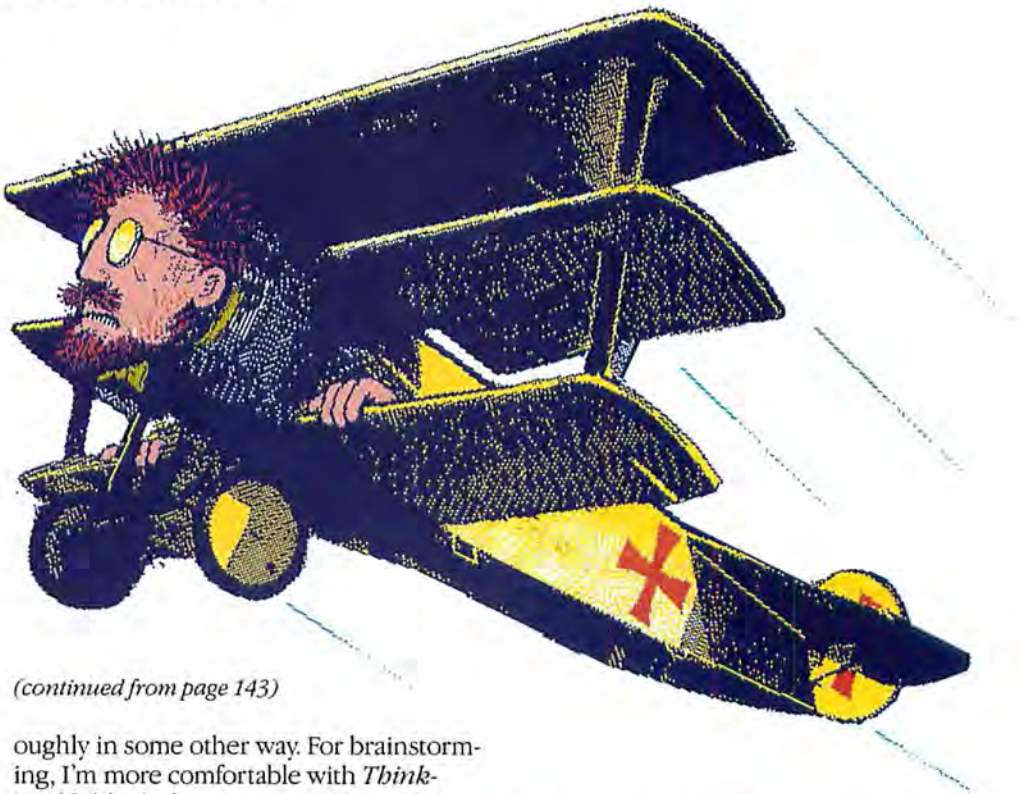


(continued from page 143)

oughly in some other way. For brainstorming, I'm more comfortable with *ThinkTank*'s blank slate approach than with *Consultant*'s incessant questioning. For quantitative decision making, I like to set up models I can see and change using *Excel*. While *Consultant*'s systematic approach did help me view certain problems in a new light, $200 is a steep price for a personal problem-solving aid.

If I managed an organization, though, I'd almost certainly spend some of my training budget on a copy of this program and encourage my employees to try it. While *Consultant* doesn't provide as much personal attention as a workshop or a human consultant, its interactive nature makes it easier to use than any of the how-to books that cover the same ground. The program could prove useful when used periodically to keep committees and other groups focused on particular goals. But like a relaxation tape or a weight-loss clinic, *Consultant* may prove most valuable when it's returned to the shelf because the skills it teaches have become second nature.—*George Beekman*

Consultant, Version 1.6
ODS, Inc.
1011 E. Touhy Ave. #535
Des Plaines, IL 60018
312/699-4156
List price: $200

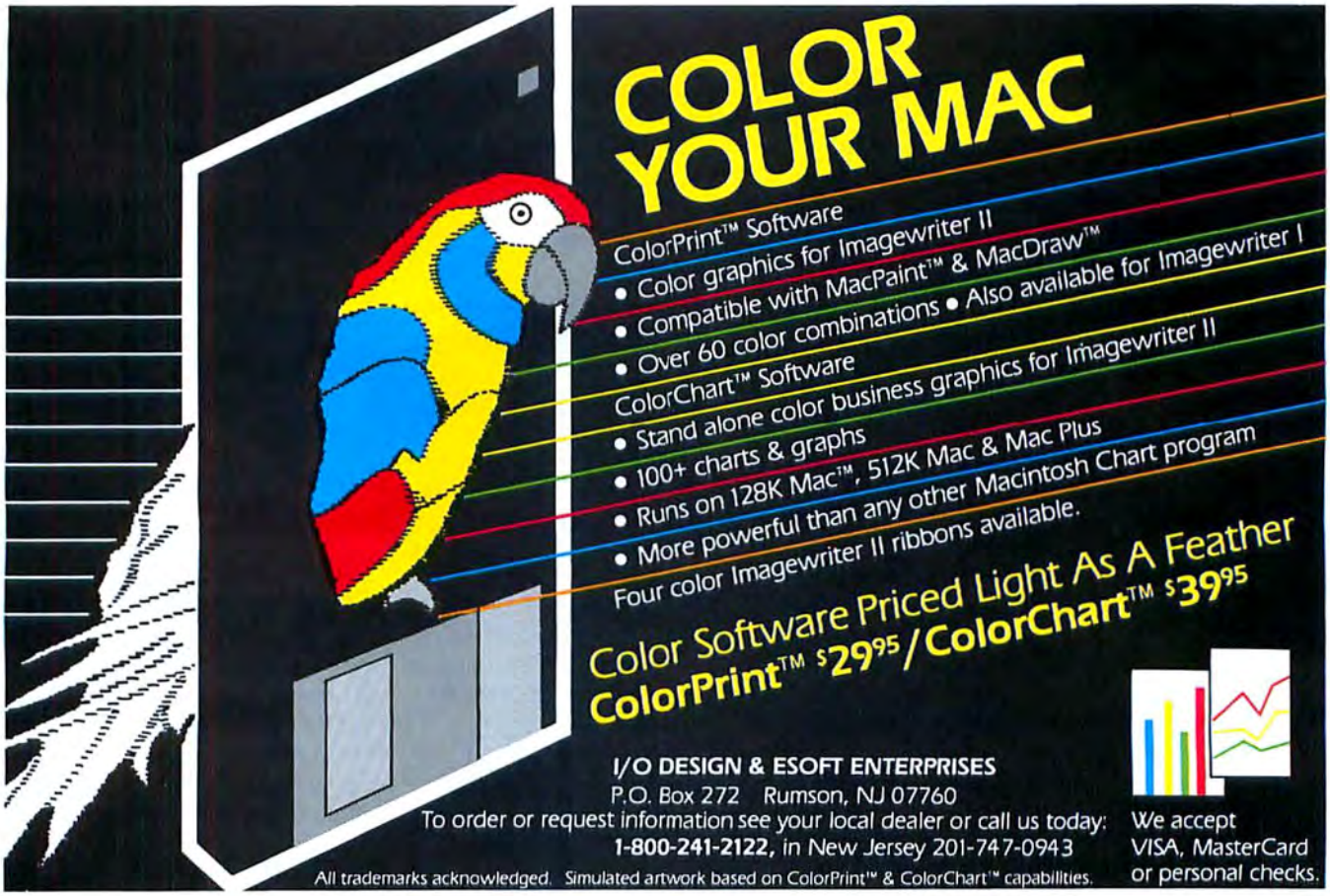
Meanwhile, in the Skies over France . . .

You're flying deep behind enemy lines and have just spotted a signal from one of your spies. You're low on fuel, but you know the signal means he's captured important documents. It's up to you to retrieve them. You throw caution to the wind—and your aircraft into a steep, diving turn, preparing to land and rendezvous. But a quick look to the rear reveals that the enemy is closing fast on your tail!

What now, von Richthofen? You can either continue with your landing, hoping to evade the enemy, engage him in a fierce aerial dogfight, or . . . hit the pause button, think it over for a while, and resume combat once your jangled nerves have settled. This is not World War I, but 1986, and you're seated at the controls of ***Fokker Triplane Flight Simulator***, a new offering from PBI Software.

By the time you find yourself in the situation just described, you will have logged a few hours in the Fokker, for the program is a flight simulator first and a challenging

(continues on page 146)



Circle 477 on reader service card

Circle 506 on reader service card

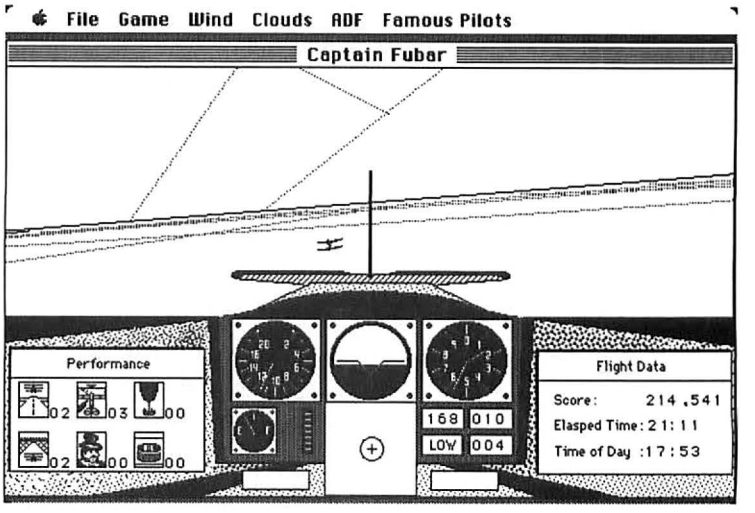
(continued from page 144)

game second. Before you start earning medals, you've got to learn to fly your crate. If you're put off by the program's 46-page manual, you can begin with Quick Flying Instructions, a short course that lets you get the craft airborne immediately. Once you tire of crashing every time you get near the ground, you'll want to proceed to Ground School and Flight School.

Fancies of Flight

As a flight simulator, *Fokker Triplane* is surprisingly realistic. As in a real airplane, engine sound varies when power is added or reduced or when the aircraft climbs or descends. To further increase the sense of reality, factors such as wind direction and cloud ceiling can be adjusted to create challenging flying conditions.

You use the mouse as the control stick to climb, descend, or turn. Throttle and rudder controls are simulated on the keyboard. You scan the horizon for enemy aircraft by pressing keys that let you look left, right, or over your shoulder (see "Enemy at Six O'clock"). Cockpit instruments are nicely detailed, highly responsive, and realistic in their operation–although the panel takes more than a little historical license (if Baron von Richthofen had had digital readouts and sophisticated radio navigation, we'd all be speaking German today). The graphics depicting the world outside the plane are less detailed but more than adequate, adjusting constantly as you slip through the skies.



Enemy at Six O'clock
Fokker Triplane*'s pilot can look to the left, right, or rear of the plane. (In a rare deviation from the program's realistic simulation, the control panel always remains in view.) Here, the enemy is in hot pursuit and immediate evasive action is required.*

Into the Breach

After a successful landing or two and a cross-country trip to one of four friendly bases, you'll lust for the taste of combat. If you think you're already an accomplished aviator, beware; danger awaits in the skies above. Choosing Armed vs. Unarmed from the Game menu gives you the advantage of ammunition while your enemy has none.

(continues on page 148)

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The DS800, our 800K external disk drive simply plugs into your 128,512 or Macintosh Plus. No software or modifications are required! Its quiet operation makes it a perfect companion for your Macintosh.

Now you can make sense out of your Macintosh office. Visit your local Apple dealer for a demonstration today, or call us directly on our toll free number.

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Dealers Circle 497 on reader service card **End users Circle 354 on reader service card**

(continued from page 146)

But the enemy is tenacious and will run into you, knocking you out of the sky despite his lack of armaments. Following a dozen or so such incidents, you'll find yourself going back to the manual to learn the daring aerobatics taught in the Military Training section.

Your missions will be many and varied. To earn your wings, you must shoot down enemy balloons, destroy fuel depots at enemy bases, fly under bridges, and retrieve documents from spies hidden deep in enemy territory. You must also keep a careful eye on fuel and ammunition levels and navigate back to a friendly base to refuel or reload when either gets low. All the while you'll be tormented by enemy aircraft, which you must either evade or fight.

Patience and Skill

The difficult task of mastering the aircraft is what I like best about *Fokker Triplane*. Although I'm an experienced pilot, it took me several flights to get the feel of the Fokker. While the manual makes it clear that this program can't teach you to fly a real airplane, *Fokker Triplane* is a realistic simulation and demands considerable flight proficiency before you can engage the enemy in anything but a foolhardy suicide mission.

A jaded pilot once defined flying as hours of sheer boredom, punctuated by moments of sheer terror. *Fokker Triplane* succeeds as a flight simulator because it approximates both of these extremes, from the monotony of a long, cross-country flight to the white-knuckled anxiety of flying in the clouds, evading another plane, or simply lining up for your first landing. *Fokker Triplane* succeeds as a game because it is realistic and exciting and because it places you in a multitude of perilous situations. If you prefer a game that allows you to start blasting the enemy out of the sky immediately—and which will bore you almost as fast—there are many available. But if you like a challenge and don't mind learning a little something along the way, I highly recommend *Fokker Triplane Flight Simulator.*—*Walter C. Burns*

Fokker Triplane Flight Simulator
PBI Software, Inc.
1111 Triton Dr. #201
Foster City, CA 94404
415/349-8765
List price: $59.95

Hard Disks Made Easy

Most Macintosh software developers have chosen copy-protection schemes that require hard disk drive owners to insert a master disk before a program can be run. This method ensures that the user has the original master disk, which contains a special key, such as an invisible file or a nonstandard sector. While it's understandable that software companies want to foil illegal copying of their products, legitimate software owners soon grow tired of irksome requests to insert master disks whenever they run copy-protected programs from hard disks or RAM disks. ***Hard Disk Util,*** from FWB Software, allows you to use copy-protected programs without first inserting a master disk.

Although sophisticated bit copiers like *Copy II Mac* and *MacBackup* also allow you to back up copy-protected disks, the copies they make are exact duplicates that retain the copy-protection scheme of the original master disk. HDUtil, *Hard Disk*

(continues on page 150)

MacBuffer™

The First Print Buffer System for the Macintosh that Really Works, Saves Time, and is Available Now.

Tired of your Mac waiting for the Imagewriter throughout the day? MacBuffer is the solution that works. MacBuffer controls the printer leaving the Mac free to use. MacBuffer's 256K, 512K, or 1 Megabyte of memory, and a super fast data transfer rate can improve your productivity up to 400%. MacBuffer comes with all cables, ready to install. Other features include:

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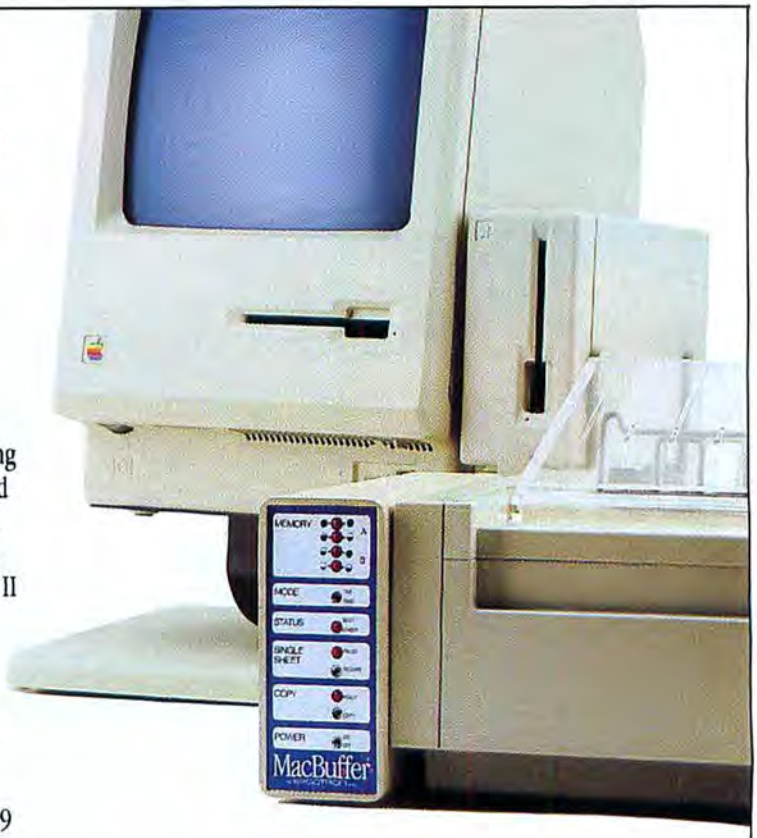

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CAT'S EYE
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CAT PRINTS
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CATALOG
Cut and paste scanned images into catalogs, newsletters, reports, correspondence, personalized cards and more. ThunderScan works great with page layout software, adding high-quality graphics to your publications.

CAT CALL
You can even send images from Mac to Mac by modem.

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(415) 254-6581

ThunderScan

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ThunderScan, as shipped, is compatible with the 128K or 512K Macintosh, ImageWriter I & II and LaserWriter. Compatibility with the wide-carriage ImageWriter and Mac Plus requires accessories. Contact us directly for answers to your compatibility questions.

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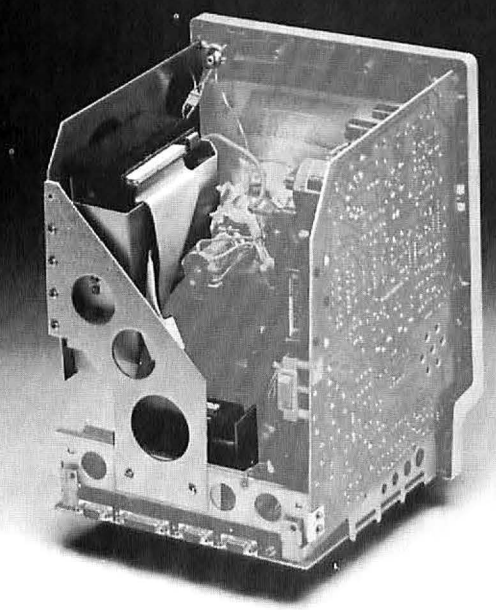

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Circle 493 on reader service card

(continued from page 148)

Util's main program, takes an entirely different approach. Instead of copying whatever file or sector oddities the various protection schemes look for, HDUtil simply alters programs so that they won't look for the copy-protection key. Programs altered, or "patched," in this manner won't ask for a master disk when they're run from a hard disk, a RAM disk, or for that matter a floppy disk. In short, once patched by HDUtil, a program can be copied from one disk to another using only the Finder.

Mastering HDUtil

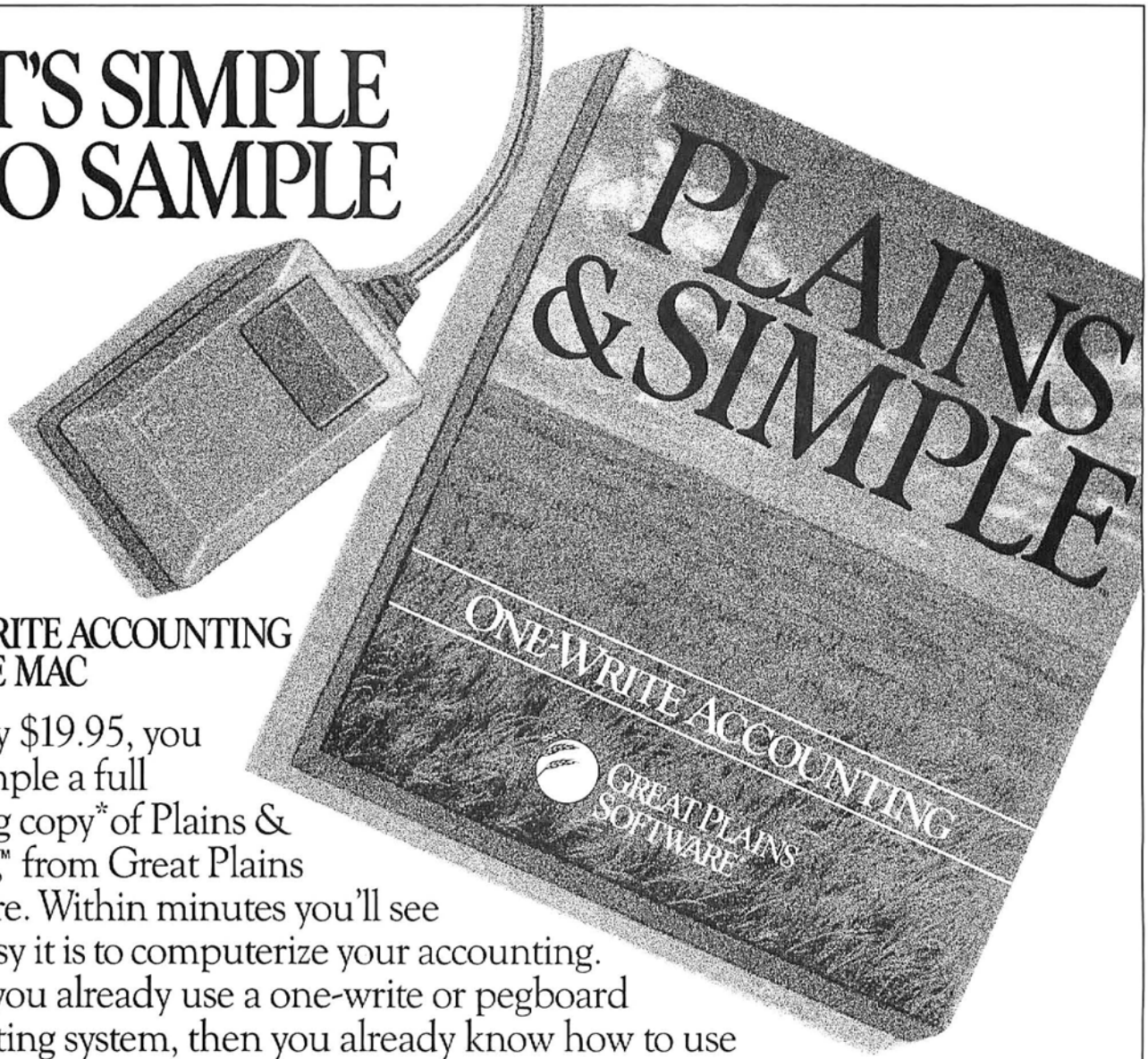
The first step in circumventing copy protection is to copy the original master disk to another floppy using the sector copier provided with *Hard Disk Util*. You begin this way for two reasons. First, it's not wise to alter the master disk. Second, the copy produced is exactly like the original except it doesn't contain nonstandard sectors or any other oddities the original disk might have had. Because the abnormalities can't be written to hard disks or RAM disks, HDUtil is then used to alter the program on the copied disk so it won't look for the abnormal sectors. Once patched, programs can be copied to either type of disk using the Finder. HDUtil also lets you copy and delete files, verify disks, and change a file's attributes.

One drawback to HDUtil's approach is that in order to install a copy-protected program onto a hard disk, the utility must both recognize the program and know exactly how to modify it. This information is stored in individual patch files that contain the identity and location of the code that must be changed. FWB Software is continually developing and updating patch files, and patches for nearly 80 programs were present on the disk I reviewed in January. Although many games are included in this list, patches for popular business programs are included too. Since programs are modified by HDUtil on a case-by-case basis, you'll need a patch file for each program you want to install. Contact FWB Software for information on specific programs.

Using a different patch file for each program to be copied may sound like the fast lane to obsolescence, but it is actually one of the more innovative aspects of *Hard Disk Util*. Because the information to remove the copy protection from new or updated programs is contained solely in

(continues on page 152.)

IT'S SIMPLE TO SAMPLE



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(continued from page 150)

tiny patch files, there's no need to continually update the HDUtil application itself, only the patches. FWB Software plans to release an additional disk with more patches every three to four months for $10 to $20. If you don't want to wait a few months for updates, the manual gives information on a bulletin board system that provides HDUtil patches.

As the *Hard Disk Util* manual states, copy protection is a controversial issue. Many software developers have chosen copy protection as a means of reducing the number of illegal copies made. Unfortunately, this scheme limits the speed and convenience of a hard disk by requiring that master disks always be at hand. It's hard to imagine how anyone who owns a hard disk drive or a large memory upgrade could resist the appeal of never again seeing another dialog box pleading "Please Insert the Master Disk."—*David Foster*

Hard Disk Util
FWB Software
2040 Polk St. #215
San Francisco, CA 94109
415/474-8055
List price: $89.95

It Does Do Windows

You may be using one of the many Macintosh desktop organizers to keep your office affairs in order, but chances are your records at home are stuffed into folders, boxes, and drawers. ***The Housekeeper,*** a home inventory system from Aegis Development, provides an easy way to keep track of personal property. *Housekeeper* is a mini-database into which you enter information about your possessions, such as the purchase date, the cost, and the serial number. You can then use the program to calculate your expenditures by category or to generate police and insurance reports should the goods be stolen or damaged. The program is so compact (17K) that it works well even on a bare-bones 128K Macintosh with one disk drive. (An Aegis representative told me that version 2.0, which works on a 512K Mac or a Mac Plus and is faster than the earlier release, is available

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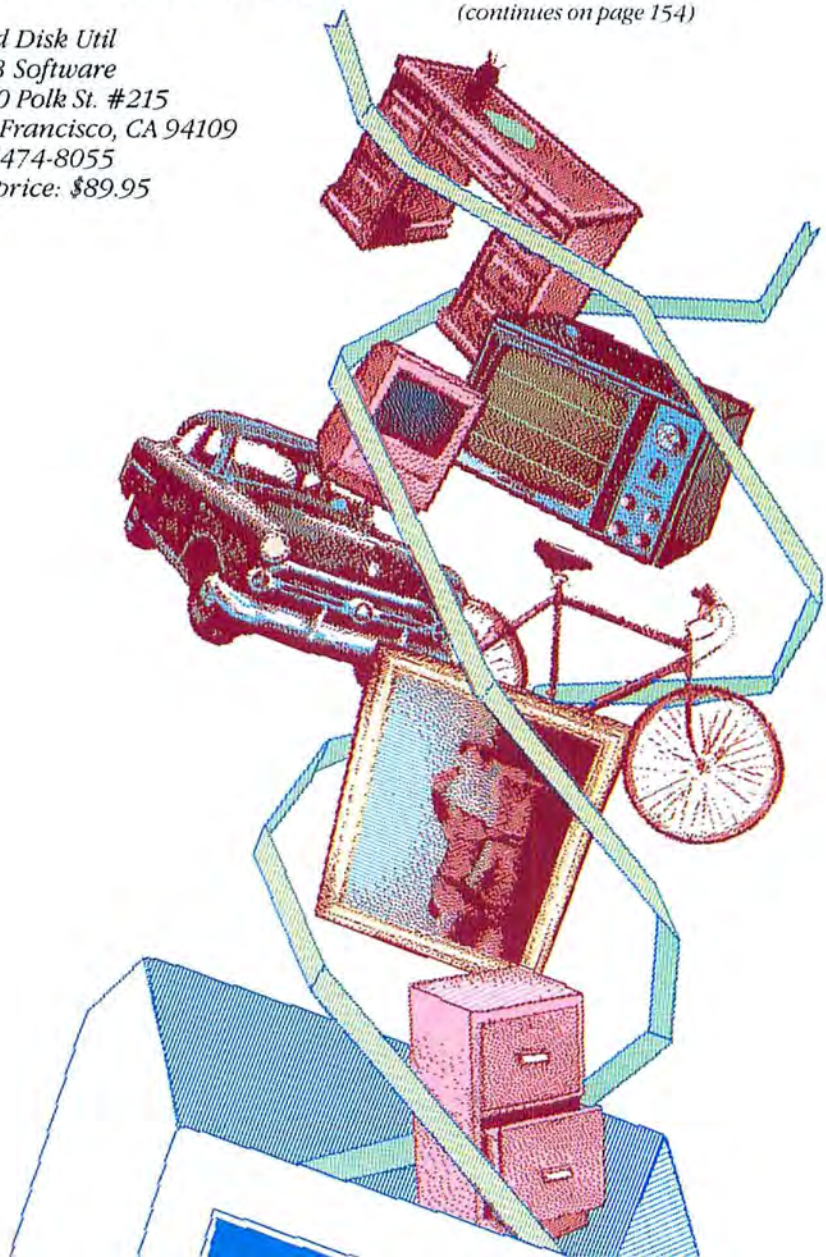

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(continued from page 152)

free of charge to registered owners.) Information on up to 500 items can be stored on the program disk. An inventory of up to 2000 items can be stored on a single document disk.

Housekeeper is easy to use, even for someone with no previous database experience. The documentation includes step-by-step instructions that walk you through all of the program's features. The manual even covers what to do if your Mac is stolen: retrieve a backup disk from your safe-deposit box and borrow a friend's Mac to generate police and insurance reports.

Name, Room, and Serial Number

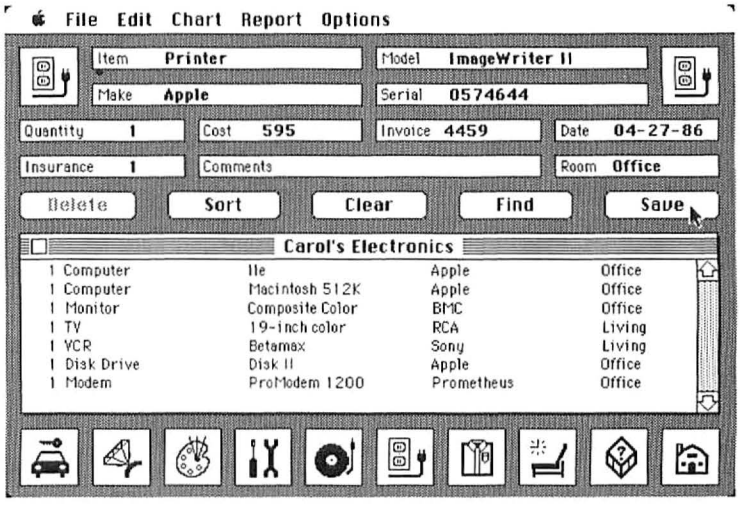
To enter an item into the inventory, first select the appropriate category from a bank of icons: Auto, Jewelry, Art, Tools, Recordings, Electrical, Clothing, Furniture, or Miscellaneous. The program's 11 data entry fields allow detailed descriptions of each possession. Fields include Item, Make, Model, Serial Number, Quantity, Cost, Invoice, Date, and Comments. You can also specify the insurance carrier and the room the item is in. When you've finished entering the information, *Housekeeper* adds the item to the household inventory and lists it in a scrollable window (see "Add Infinite Items"). To edit or change an item, click on the item in the scroll window and it reappears in the data entry section. Once everything is listed, you may want to sort the list. You can sort alphabetically by clicking the Item entry field, arrange items in chronological order by clicking Date, or sort by cost or room by clicking the appropriate field. The program also lets you sort by multiple categories, one at a time. For example, you could list all the art objects in your living room, in order from most to least expensive.

Charts and Reports

If your house should ever be burglarized, *Housekeeper* will help prepare police and insurance reports. When you print a report, information about each item is listed in the order you've specified, and the total cost of all the items on a page is listed at the bottom. The program lets you enter information for up to three insurance companies and generate forms for each company.

In addition to providing printed reports for insurance companies, you may want to use *Housekeeper* to produce charts for your personal use. Charts are a piece of cake with *Housekeeper*—or in some cases, a piece of pie. Charts come in two types: 3-D or pie. Both display the ratio of the value of your possessions in each category, and the 3-D charts provide a breakdown by insurance carrier as well. A pie chart can be a real eye-opener; I had no idea that I'd spent as much on computers and electronic gadgets as I had on my car until I saw the slices.

(continues on page 160)



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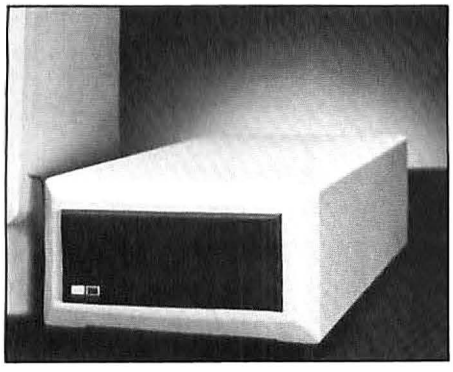

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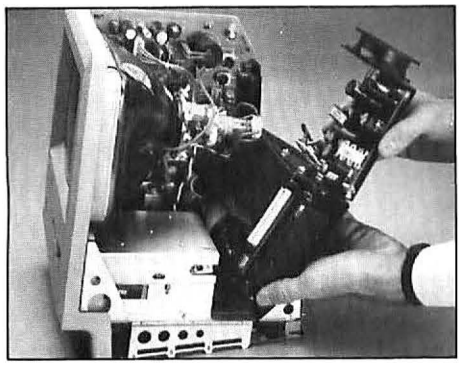

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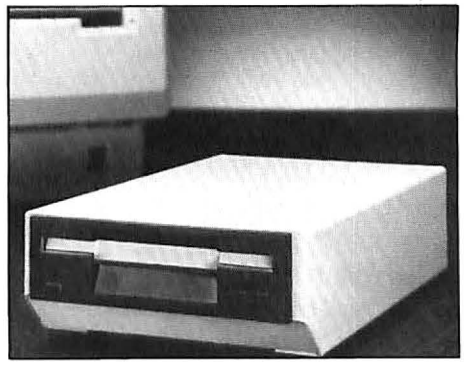

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(continued from page 154)

Does It Make the Grade?

Overall, *Housekeeper* earns a grade of B+. The program does what it sets out to do, and it does it efficiently. Because the program is a simple, single-purpose database, it is easy to use. For the same reason, it lacks flexibility. For example, you can't add to or change the data entry fields. But there are enough fields so that, with a little ingenuity, you can describe just about anything you own. A few idiosyncracies in the user interface can prove annoying. For example, to save a newly created file you must choose Save As, rather than Save, from the File menu; choosing Save wipes out your data. I also noticed some sorting problems. A list of 30 or so items sorts just fine, but when I alphabetized the 152-item sample database, three items were inexplicably out of order. This is a minor bug, however, in an otherwise competent program.—*Carol Johnson*

The Housekeeper, version 1.4
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Word of Mouse

If you're like many Macintosh owners, you occasionally attend user group meetings. There you can see programs demonstrated, ask fellow users questions, and hear the latest industry rumors. But if you have a pressing programming question or want to get hold of a public-domain desk accessory you saw at the last meeting, you may find yourself wishing that you could talk to members of the group at any time.

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(continues on page 162)

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(continued from page 160)

users who are happy to have others converse with their computer and trade information.

Dreams of the Phoenix offers a program, ***Mouse Exchange BBS,*** that allows you to set up an on-line bulletin board. *Mouse Exchange* is generally easy to use, both for the people managing the BBS and for callers. Although the program will work on a single-drive, 128K Mac for those who want to operate a BBS just as a message center, user groups operating a BBS need a hard disk to hold a substantial selection of software. For more limited applications, such as a BBS operated by a software developer to distribute the newest version of a program and to receive comments from testers, a two-drive, 512K Mac would probably be adequate.

Setting Up a BBS

Mouse Exchange comes with a 30-page manual that explains the bookkeeping files you must create to run the program. You use a text editor such as *MacWrite* to type in the information that people see when they log on. You also set up text files for keeping track of people's passwords and for listing the locations of various files. *Mouse Exchange* also allows you to specify an access level for each user; depending on the access number you assign, the caller will be granted or denied access to various parts of the board.

Mouse Exchange handles private mail messages from one BBS user to another, as well as messages posted to a public news section. The public section can be divided into as many as ten categories, so people with a specific interest won't have to read every message posted. You can make certain categories available only to people with a high enough access level, allowing, for example, communication among BBS operators about system-related topics that aren't of interest to most users.

Mouse Exchange also lets you upload and download files. The files section of the board, like news, can be categorized. As people upload files, the title of the file, the date and time uploaded, the file size, and a short description of the file are added to a file directory.

The BBS also includes a command for paging the system operator. When this command is selected, the Macintosh running the BBS beeps several times. The system operator, if present, can then select the Chat On menu option and type a message directly to the user. The system operator can select Chat On at almost any time, even if a user has not paged the operator.

Another helpful command prints a complete list of BBS users. Because *Mouse Exchange* keeps track of people by first and last names, no mail can be sent to someone whose name is misspelled. The command can be used to find the correct spelling of a name.

A Good Workhorse, but Give Us Graphics

Mouse Exchange is quite adequate for handling file transfers, mail, and information such as user group minutes and news, although the current version does not support a quick, easy type of file transfer

(continues on page 164)

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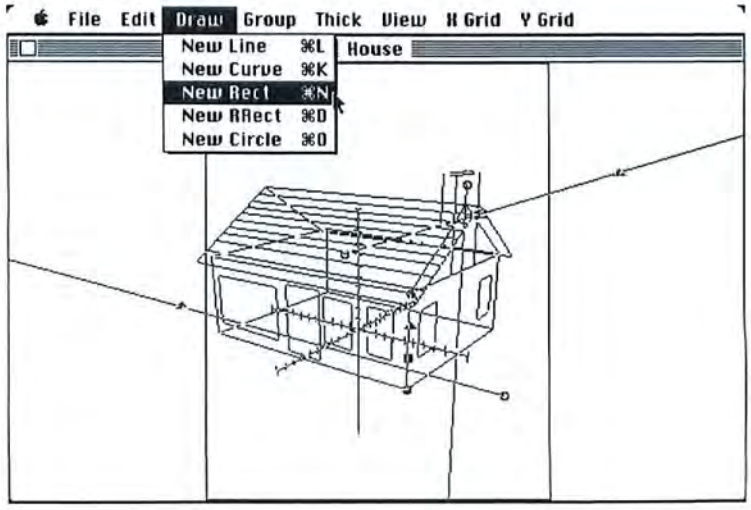

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called MacBinary. Instead, files must be stored as converted text files, to be decoded after downloading.

Novices will have little trouble understanding how to navigate around the system, since menu prompts are clear and a help screen is available. For the expert user, though, *Mouse Exchange* lacks a good full-screen editor. The editor supplied is a line editor, so it is best to prepare text using a program like *MacWrite* and then transfer the text to *Mouse Exchange* once it is completed. The program also lacks quick commands to get you from one function to another in a hurry. You have to return step by step to the main menu before changing sections.

The current version of *Mouse Exchange* does not make use of the Macintosh interface. It supports only a text display, much like bulletin boards for other computers. Apple II and IBM PC users can call a Macintosh that runs *Mouse Exchange* and feel right at home. *Mouse Exchange* doesn't allow you to use the mouse to issue commands to the bulletin board, nor can you send or receive graphics except as stored files to be opened off line.

Despite these minor drawbacks, *Mouse Exchange BBS* is well worth its price. If your user group is shopping for a bulletin board program, *Mouse Exchange* will provide an effective, inexpensive solution.—*Linda Custer*

Mouse Exchange BBS
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Quick, list four things *MacPaint* can't do. Although it's an excellent freehand drawing program, many people complain that *MacPaint* doesn't rotate objects in small increments, draw curved lines, or provide a visible, resizable grid. Perhaps the most common complaint is that the artist is restricted to drawing in *MacPaint*'s small window, and is therefore hampered when working on a full-page image. Just try drawing a circle that's larger than the *MacPaint* window, for example.

If you've voiced any of these complaints, you might find that Reas'nable Software's ***4paint,*** when used in conjunction with *MacPaint,* fills some gaps in the latter. *4paint,* an object-oriented drawing program that runs on a 128K Mac, allows you to create line drawings on a scaled-down representation of an 8½- by 11-inch page and then transfer the drawings to *MacPaint* to enhance them there (see "Full-Page Outline"). In short, *4paint* provides a full-page sketchpad in which to rough out large drawings. *4paint* has limitations of its own: it lacks an eraser, a paintbrush, patterns, and a text option. But a *4paint* drawing is intended to be a pencil sketch that can later be converted to a full-fledged drawing in *MacPaint.*

Movers and Shapers

4paint's Draw menu offers five drawing elements: a straight line, a curve, a rectangle, a rounded rectangle, and a circle. Shapes and lines can be drawn in line widths from 1 to 8 pixels, giving you more flexibility than *MacPaint*'s line-width fea-

(continues on page 166)

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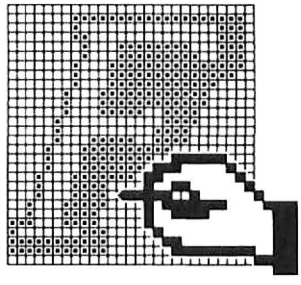

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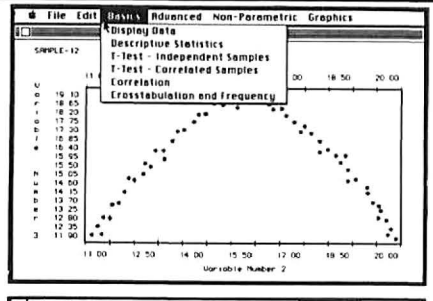

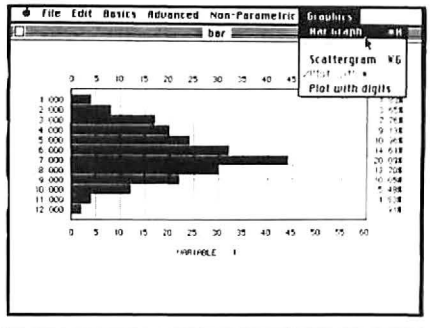

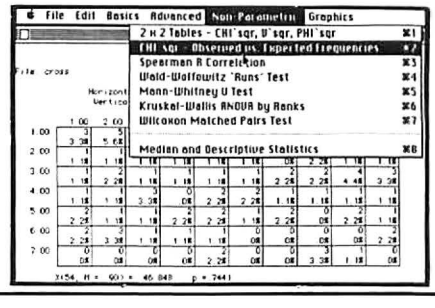

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(continued from page 164)

ture. Each element has three handles that let you move the element around on the screen, stretch or shrink it, or rotate it around a center point. Elements can be grouped, allowing you to move or rotate a conglomeration of elements as a single unit. Unlike *MacPaint,* which rotates selected objects 90 degrees at a time, *4paint* rotates single or grouped objects in increments of less than 1 degree. In addition, you can tilt an entire drawing at an angle simply by selecting a menu item and dragging the drawing.

In addition to drawing circles and ellipses, *4paint* draws curves and arcs. Selecting New Curve from the Draw menu gives you the raw material for a curved line: a U-shaped curve with four shaper handles. The shapers can be dragged in any direction to produce a variety of curves, including S-shaped curves.

Axes Mark the Spot

4paint's grid fills another of *MacPaint*'s holes. While *MacPaint* provides an invisible 8- by 8-pixel grid, *4paint* offers a multitude of grid options. You can specify increments that range from ⅛ inch to 24 inches for the *x* axis, the *y* axis, or both. The grid can be hidden or visible and can be turned on or off at any time. A Snap to Grid option causes line or shape elements to jump to the nearest grid intersection. If you scale or tilt a drawing, the grid scales or tilts accordingly.

4paint's manual is on the informal side (the Revert command, for example, is described as "a sort of super-undo for when things get really screwed up"), but it manages to adequately explain how the program's various features work. *4paint* is not as sophisticated as drafting programs like *MacDraw* or *MacDraft,* but if you need a flexible grid, curved lines, and the ability to work on a full-sized page, then $39.95 is certainly a reas'nable price to pay for enhancing *MacPaint*'s abilities.
—Gerry Kane

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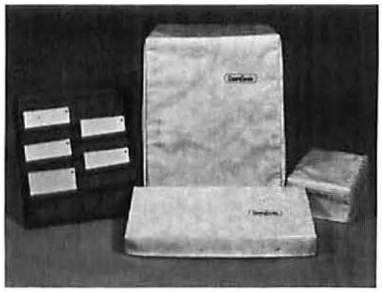

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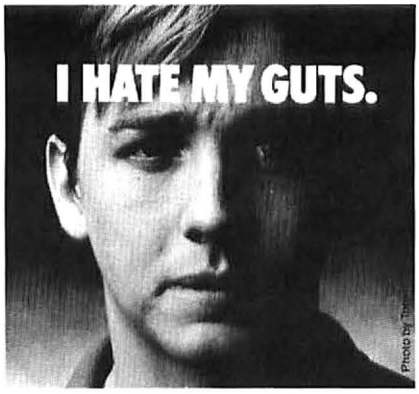

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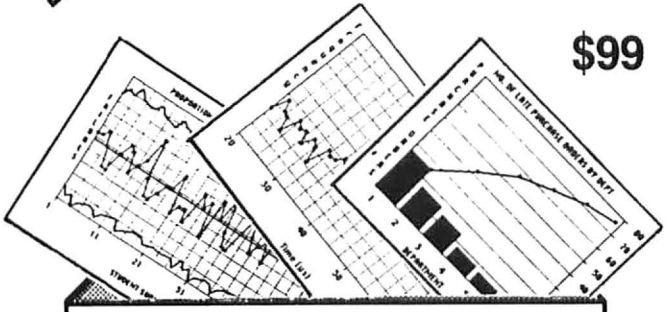

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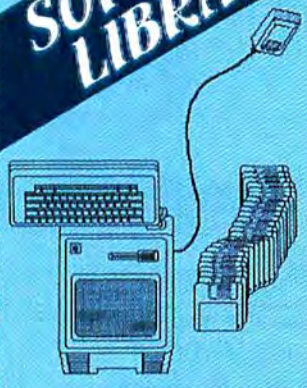

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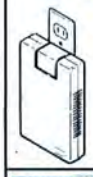

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5. For how many personal computers do you buy products? (Include both company and personal units, please.)

- ☐ (A) 1
- ☐ (B) 2-4
- ☐ (C) 5-9
- ☐ (D) 10 or more

6. How many of the above are Macintoshes?

- ☐ (1) 1
- ☐ (2) 2-4
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7. How much do you plan to spend in the next 12 months for peripherals and other add-ons for the Macintosh(es)?

- ☐ Less than $250
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Open Window

Unlocking spreadsheets, finding files through BASIC, looking at PostScript, and other tips

Edited by Jim Heid

This month: the results of a test comparing Microsoft BASIC 2.1 with Addison-Wesley's True BASIC, information on Apple's revised Imagewriter system file, a way to unlock protected Multiplan *and* Excel *worksheets using* MacTools, *and a technique for creating PostScript files for transmission to a LaserWriter. If you like to program, read about a useful subroutine that searches installed floppy disks for a specific file. For Macintosh owners who also use Radio Shack's Model 100 portable computer, a print-formatting program improves the Model 100's operation with the Imagewriter. Finally, some undocumented features of Apple's Font/DA Mover and Finder.*

Tried and True BASIC

Addison-Wesley recently released the Macintosh version of True BASIC, a version of BASIC created by John Kemeny and Thomas Kurtz, the Dartmouth professors who developed the first BASIC in 1964. I ran some benchmark programs on both True BASIC and Microsoft BASIC (MBASIC) and found that True BASIC is considerably faster.

My first test program was a prime number-generating program that measures a language's integer arithmetic and array-handling performance. True BASIC completed the program in 10.5 seconds, while both the decimal and binary versions of MBASIC 2.1 took 71 seconds. The second test was a simple FOR . . . NEXT loop that counted from 1 to 100,000. True BASIC completed the count in 20 seconds, versus MBASIC 2.1's 53 seconds.

True BASIC finished first primarily because it compiles a BASIC program into a compact intermediate code and then interprets that code when you run the program. MBASIC, by contrast, simply interprets the original code, a slower process.

Driving the Imagewriter

Many *Microsoft Word* users have expressed dissatisfaction with *Word*'s printing speed on the Imagewriter. The program seems to stop every few lines to access the disk and assemble more of the page; the program also hesitates before advancing to the bottom of a page when finished.

When Apple released Finder 4.1 along with the System Update application, I noticed that the Imagewriter driver's icon differed from the icon that appeared in *Word*'s System Folder. Substituting the new driver for the old increased *Word*'s printing speed significantly.

Michael G. Munro
Burke, Virginia

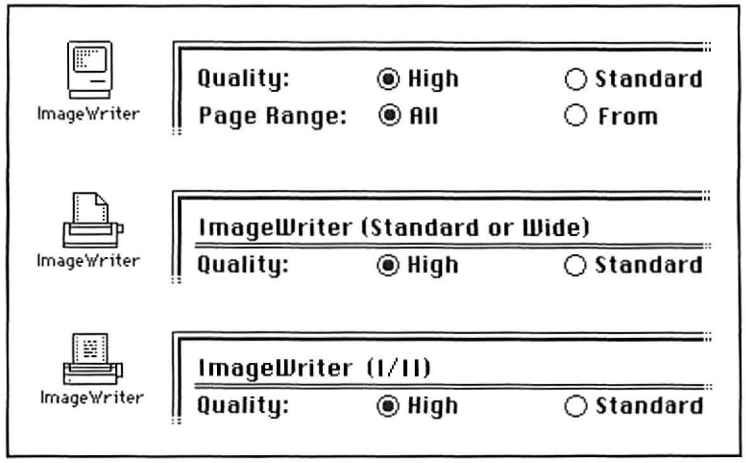
You're right. According to my stopwatch, Word *took 180 seconds to print a test page using the old Imagewriter driver, and 159 seconds using the new driver. The speed difference is greater when you print a page that's only partially full.*

The new driver is available free of charge from Apple dealers. To replace the old driver, simply copy the new driver to the Word *system disk and click OK when asked "Replace items with the same names with the selected items?" "Imagewriter Scorecard" shows how to tell one driver from another. —Ed.*

Picking the Spreadsheet's Lock

Recently, during the course of my work at an accounting firm, I encountered a situation in which a *Microsoft Multiplan* worksheet had been protected by a password, and the employee who created the file had quit without telling anyone the password.

(continues on page 184)



Imagewriter Scorecard
The early version of the Imagewriter driver uses the Mac system icon, while the version released with Finder 4.1 has its own Imagewriter icon. Version 2.0 of the latter version, which works with the ImageWriter II as well, displays an Imagewriter icon with text on the printout.

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(continued from page 179)

After some experimentation, I discovered that there is a flag in a spreadsheet file that indicates password protection. You can change this flag and remove the protection using a disk editor such as *MacTools*. The same indicator flag is present in *Microsoft Excel* files, though its location is different.

- Start *MacTools* and insert the disk containing the protected worksheet.
- Highlight the protected file and choose ViewEdit from the File menu.
- Use the horizontal scroll bar to locate the sector containing the protection flag. In *Multiplan* the flag is in block 3, part A, position 0079; in *Excel* it's in block 1, part B, position 0175 (see "Waiving the Flag"). The indicator 00 denotes no password protection, while 01 indicates protection. To remove the protection, select the 1 in the flag with the cursor and type 0.
- Check your work to make sure you altered the correct byte, then choose Write Block from the Misc menu.

Randal B. McDonald, Jr.
New York, New York

Inside PostScript

If you have a LaserWriter-equipped System file, you can see the PostScript statements that describe what you print. First, open the application and create a document or a drawing. Using the Choose Printer desk accessory, select the LaserWriter as the current printer, and then choose Print. Immediately after clicking OK in the print dialog box, hold down the ⌘ and F keys. Instead of the usual "Looking for LaserWriter" message, the line "Creating PostScript File"

(continues on page 182)

Excel File

```
Blck: 1 Part B

0100: 8F8F 7E2C C826 7E10 7E69 8F3D AD3D 7E6F   /.~,.&~.~i.=.=~o
0110: 8F16 857E 7F0D 7A6E 9000 6813 0E60 9000   ...~..zn..h..`..
0120: 0E14 850E 0D7A 6E7F 7E72 670D 7E0B 7E78   .....zn.~rg.~.~x
0130: 7964 0D00 0003 3ADC 4700 0000 128E 0008   yd....:.G.......
0140: 522A 0001 0008 0008 DD00 0004 C34E 7004   R*...........Np.
0150: 0000 0326 0D00 0064 0001 0001 0001 0000   ...&...d........
0160: 3F50 624D D2F1 A9FC 0000 0100 00FF 0000   ?PbM............
0170: 0000 0000 0001 0001 0001 0001 FFFF 0000   ................
0180: 7869 0002 0000 000E FFFF FFFF FFFF 0000   xi..............
0190: FFFF 0000 0000 0001 004B 004B 004B 006E   .........K.K.K.n
01A0: 004B 004B 004B 004B 004B 004B 004B 004B   .K.K.K.K.K.K.K.K
01B0: 004B 004B 004B 004B 004B 004B 004B 004B   .K.K.K.K.K.K.K.K
01C0: 004B 004B 004B 004B 004B 004B 004B 004B   .K.K.K.K.K.K.K.K
01D0: 004B 004B 004B 004B 004B 004B 004B 004B   .K.K.K.K.K.K.K.K
01E0: 004B 004B 004B 004B 004B 004B 004B 004B   .K.K.K.K.K.K.K.K
01F0: 004B 004B 004B 004B 004B 004B 004B 004B   .K.K.K.K.K.K.K.K
```

Multiplan File

```
Blck: 3 Part A

0000: 8004 02C0 0000 6FAA 0002 8004 3230 0000   ......o.....20..
0010: 6FBE 03CD 0000 0000 0001 FFFF 0004 0009   o...............
0020: 01B1 0000 6EC8 00FA 0000 0006 0001 0000   ....n...........
0030: 0004 0000 BBCA 0000 BBCA 0009 023F 0000   .............?..
0040: 6FDC 0000 BBDA 0001 6FF8 0000 7C44 0028   o.......o...|D.(
0050: 0002 0029 0009 02E9 0000 000B 0698 0000   ...).............
0060: 6EF0 246A 0009 0001 0138 0196 002C 8004   n.$j.....8...,..
0070: 0028 0002 0035 000D 0001 0000 0000 0001   .(...5..........
0080: 0000 0002 0001 0000 0058 0060 0648 0648   .........X.`.H.H
0090: 0648 1822 1E6A 2002 2032 0060 00E0 0107   .H.".j . 2.`....
00A0: 01F1 0000 0002 000E 0007 0018 FFA0 0D94   ................
00B0: 0060 0000 0107 00DC 0000 0000 000E 0002   .`..............
00C0: FFE4 FFA0 8800 0000 00E0 005C 01F1 0000   ...........\....
00D0: 0002 0007 0007 0018 FFF4 4400 0000 0000   ..........D.....
00E0: 005C 00DC 0000 0000 0007 0002 FFE4 FFF4   .\..............
00F0: C000 8482 0700 8042 0400 0002 0000 17E0   .......B........
```

Waiving the Flag

You can remove the protection from an Excel *or* Multiplan *worksheet with a disk editor such as* MacTools. *In* Excel *(top), the protection flag is located in block 1, part B, position 0175; in* Multiplan *(bottom), it's in block 3, part A, position 0079. To avoid damaging a worksheet by altering the wrong bytes, modify a copy of the original.*

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(continued from page 180)

is displayed. This key sequence creates a file called PostScript that you can examine with *MacWrite* or *Word.*

Jeff Koch
Maple Valley, Washington

This technique could be useful for transmitting PostScript data to a typesetter over a modem or to minimize rental charges at a LaserWriter-equipped copy shop.—Ed.

Finding Files in MBASIC

I recently wrote an MBASIC 2.1 program that accessed numerous files. Unfortunately, unless all the files were on the default drive, the program would crash with a "File not found" error. Rather than coding the volume names directly into the program (as in OPEN "MyDisk:MyFile"), I wrote a subroutine that uses the PEEK function to obtain disk names directly from memory (see "Volume Search Listing"). The subroutine searches disks in the internal and external drives for the specified file. The disk containing MBASIC must be in the internal drive.

Robert Hall
Seattle, Washington

Printing in MacPaint

I wanted to print several copies of a *MacPaint* party invitation, but I realized that the program doesn't display the usual print dialog box where you specify the number of copies. I came up with a simple solution to avoid repeating the Print command for each copy I wanted to print: save the document on a disk with plenty of free space and use the Finder's Duplicate command to make as many copies of the document as you want to print. Select all the copies and choose Print from the Finder's File menu. Each copy will be printed in turn.

Rob McDaniel
Belleville, Illinois

Model 100 and the Imagewriter

Gordon Haig's tip on making a cable to connect Radio Shack's Model 100 to the Imagewriter was a big help (see "More on the Model 100," *Open Window,* December 1985). My cable works fine, but the alignment of text on the page is terrible. There's no left margin, and the Imagewriter prints text across the perforations at the bottom of each page.

(continues on page 184)

```
REM * * * Program to search disk volumes for file.
REM * * * Written by Robert J. Hall in Microsoft Basic 2.1(b), 12/1/85
 ON ERROR GOTO ErrorFix
 VolumeName$="":'                    {Assume default drive volume
 INPUT "What file do you want to locate";FileName$
' {Set pointer to default volume memory location before each file operation
 DefPtr=&H352
REM * * Replace the line below with your OPEN or CHAIN statement
 FILES VolumeName$+FileName$:'       {Can use OPEN/CHAIN here instead
STOP:END

ErrorFix:
 IF ERR=53 THEN GOSUB Volume:'       {Type 53 File not found error
 RESUME

Volume:
 VolPtr=2^24*PEEK(DefPtr)+2^16*PEEK(DefPtr+1)
 VolPtr=VolPtr+2 ^8*PEEK(DefPtr+2)+PEEK(DefPtr+3)
' {Now have the address of volume pointer. If no volume found, show error.
 VolumeName$=""
 IF VolPtr=0 THEN ERROR 53:'         {Out of volumes: File not Found
 VNLength=PEEK(VolPtr+44):'          {Get length of volume name
 FOR I%=1 TO VNLength
  VolumeName$=VolumeName$+CHR$(PEEK(VolPtr+44+I%))
 NEXT I%
 VolumeName$=VolumeName$+":"
 DefPtr=VolPtr:'                     {Set pointer for next volume
RETURN
```

Volume Search Listing
This MBASIC subroutine uses the PEEK function to obtain disk names directly from memory, eliminating the need to code disk names directly into a program. For the subroutine to work properly, the MBASIC disk must be in the internal drive.

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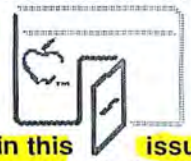

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Circle 484 on reader service card

```
10 OPEN "COM:88N1E" FOR OUTPUT AS 1
20 PRINT #1, CHR$(27); CHR$(76); "008";
30 PRINT #1, CHR$(29); CHR$(65); CHR$(64);
40 FOR T = 1 TO 50
50 PRINT #1, CHR$(64); CHR$(64);
60 NEXT T
70 PRINT #1, CHR$(67); CHR$(64);
80 FOR T = 1 TO 14
90 PRINT #1, CHR$(64); CHR$(64);
100 NEXT T
110 PRINT #1, CHR$(65); CHR$(64); CHR$(30);
120 CLOSE #1
```

Model 100 Printing
For improved formatting when printing with Radio Shack's Model 100 and the Imagewriter, type this program into the Model 100 and run it before printing. The program sets up the Imagewriter to provide an 8-character left margin and print 52 lines per page.

(continued from page 182)

The program in "Model 100 Printing" solves these problems by sending commands to the Imagewriter to control margins and pagination. Type the program into the Model 100 and save it. Follow these steps when you want to print files on the Imagewriter.

- Connect the Model 100 to the Imagewriter. Turn the Imagewriter on and advance the paper past the top rollers about ¾ inch.
- Run the BASIC program.
- Download the text files to be printed using the Model 100's Telcom program (follow the instructions in the December 1985 *Open Window*).

With my program, the Imagewriter provides an 8-character left margin and prints 52 lines of text before advancing to the next page. You can print any number of files in succession without running the program again; the Imagewriter remembers the page specifications until you turn it off.

Robert R. Callahan
Chico, California

Looking for Bugs

Finally, some program pesticide. Several readers have written to complain about bugs in Gerald Keep's Banner Maker program (*Open Window*, November 1985). The program runs properly as printed; if you're having trouble, carefully check your listing for typographical errors, and remember that Microsoft BASIC's List window must be closed for the program to operate. If you don't find any typographical errors, send us a hard copy of the listing you typed along with a detailed description of the problem. If BASIC displayed any error messages, note them along with the lines that generated them.

We've also received word of a bug in the Microsoft BASIC program Concentrate that appeared in last December's column. Line 21 of the program, which reads LI=1, should be deleted.

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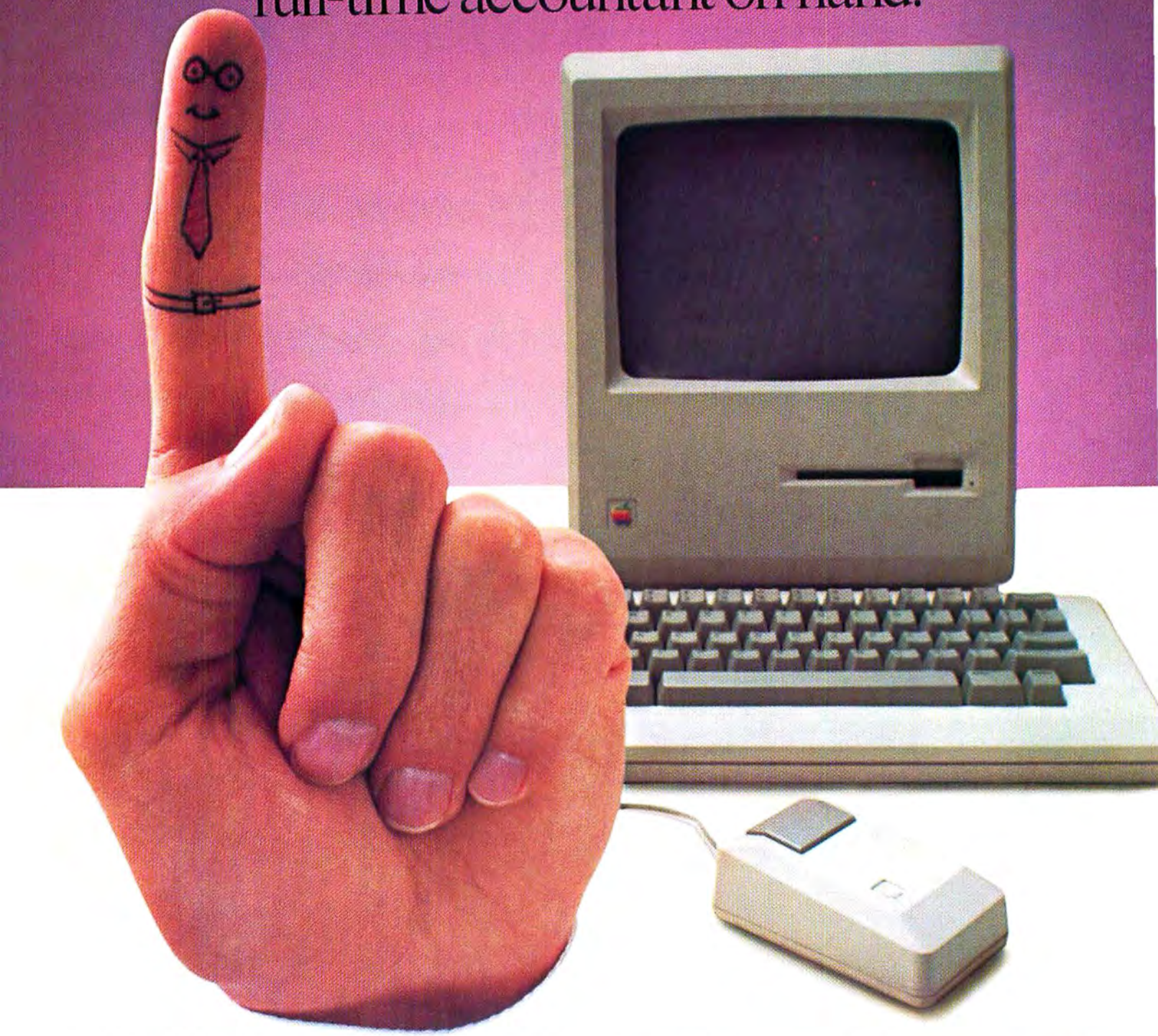

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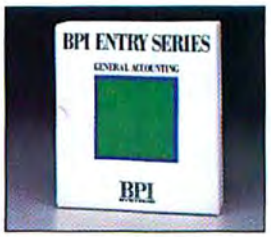

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