Fifth Anniversary Issue • Over 60 New Products—Page 277

MACWORLD

The Macintosh® Magazine

February 1989 $3.95

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Illustrator vs. FreeHand

The Winner Is . . .

Writing Tools: Spelling Checkers, Thesauruses, Dictionaries, Outliners, and More

Guide to Color Separations on the Mac

19 Personal Finance Programs Compared

The Mac's Fifth Anniversary: Back to the Future with the Mac Development Team

Spend seven years inside Apple and you learn a thing or two.

In 1981, Apple approached several major software developers with a radical vision of personal computing.

A vision, it turned out, too radical for most to even accept.

But one did.

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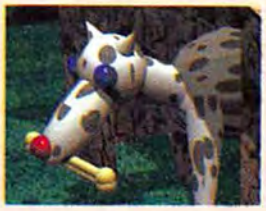
- *VideoWorks CD ROM* A razzle-dazzle display of the Mac's potential as a multimedia playback device with CD ROM.
- *Desktop Planetarium* Voyager software excites astronomers, both lay and professional.
- *Hackers in Paradise* Computer jockeys convene at Hackers 4.0.

Plus, HyperCard book roundup, how Macs guide shoppers through Bloomingdale's, object-oriented programming news, and more.



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Need some animation ideas? You'll find a dazzling display of them on the Video-Works CD ROM—over 200MB of animation, clip art, sounds, and more (p. 145).

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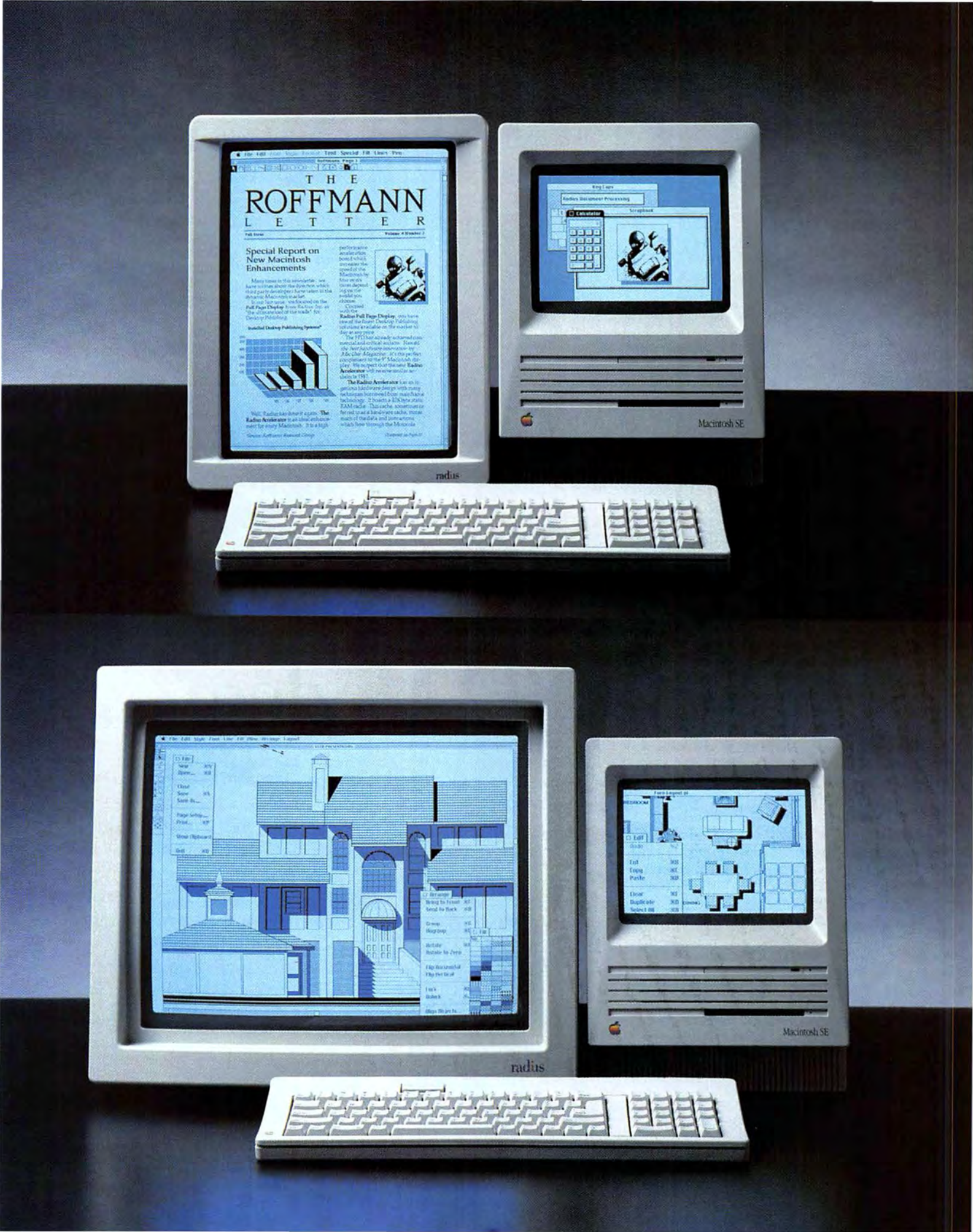
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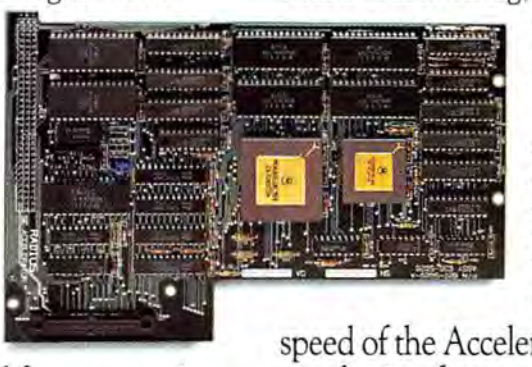

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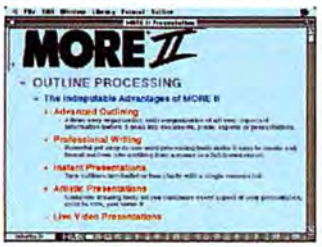

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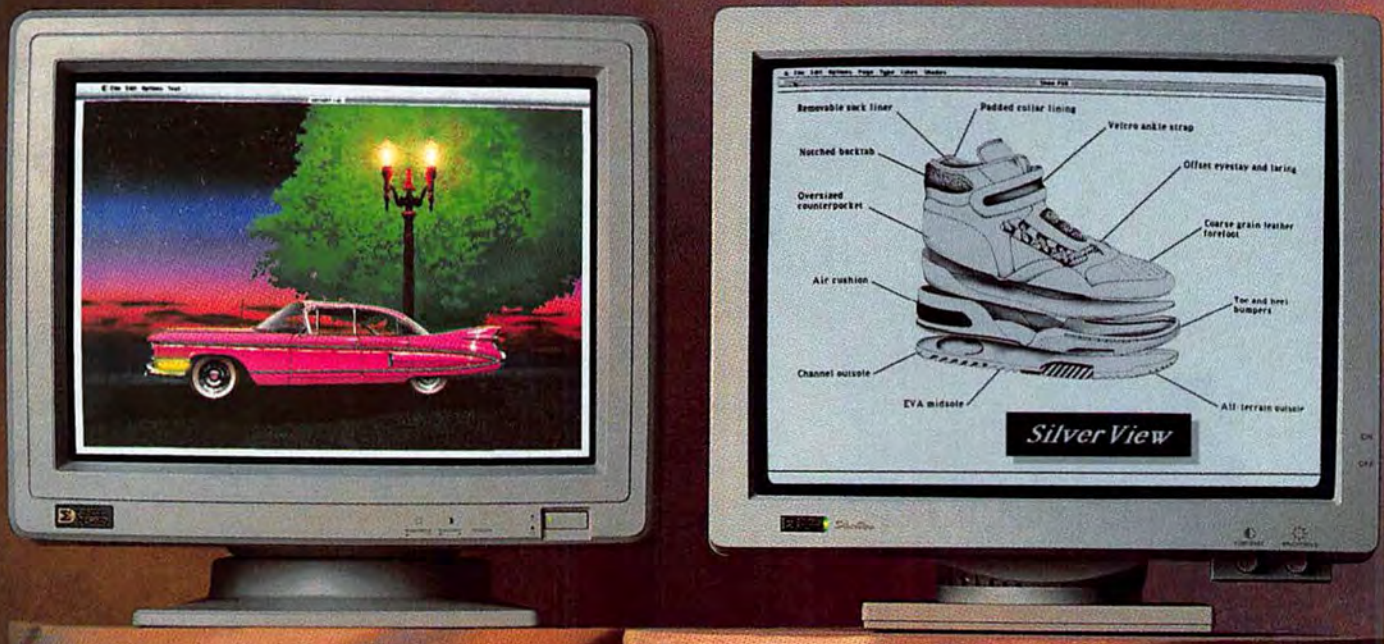

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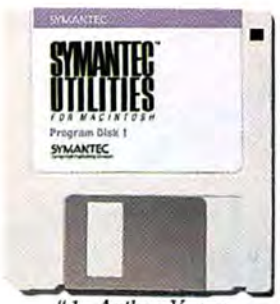

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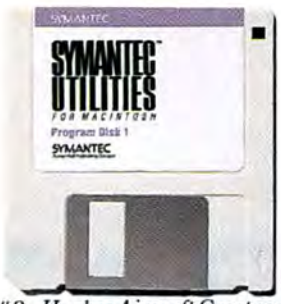

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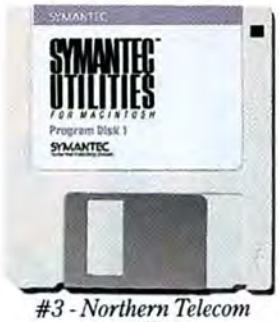

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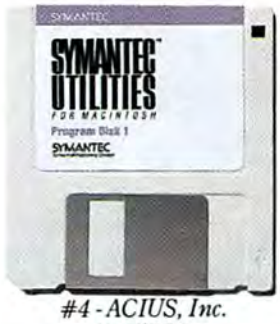

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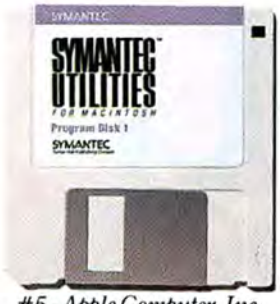

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#6 - American President's Co. uses SUM

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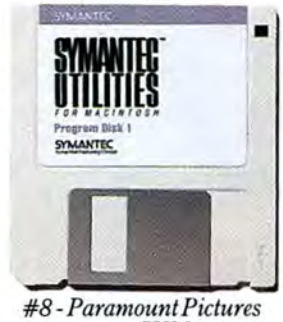
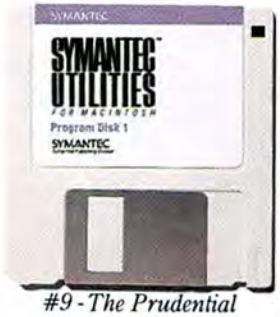
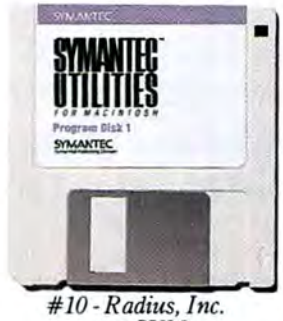


#8 - Paramount Pictures uses SUM



#9 - The Prudential uses SUM



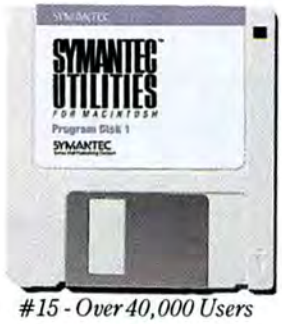
#10 - Radius, Inc. uses SUM

#11 -100's of Positive Reviews

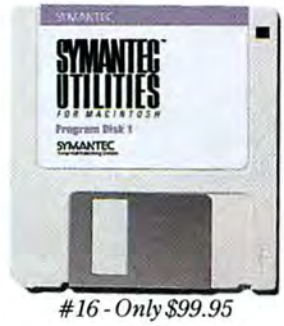
#12 - 7 Powerful Utilities

#13 - 3 Minute Data Recovery

#14 - #1 Selling Macintosh Utility



#15 - Over 40,000 Users



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Mac Bulletin

Jukebox on Mars

Micro Dynamics' MARS (Multiuser Archival and Retrieval System), a network-based turnkey data-storage-and-access system for use with the Macintosh, now supports the largest storage device ever to be connected to a Mac—the 160GB "jukebox" optical disk automatic changer from Sony. To get an idea of how big 160GB is, imagine two thousand 80MB hard disks—enough to store about 80 million pages of text. Micro Dynamics installed its first jukebox-equipped MARS system in October 1989.

The jukebox—also known as Writable Disk Autochanger model WDA-3000-10—has two optical disk drives and 50 optical disks, which are changed by a robot arm. In addition to the jukebox, MARS works with WORM optical disks; other components of the system include high-speed scanners, OCR text-recognition devices, local area networks, and laser printers. For more information, call Micro Dynamics at 301/589-6300.

FoxBase+/Mac Multi-User

FoxBase+/Mac, the fastest database-management software available for the Mac, is now available in a multiuser version. FoxBase+/Mac Multi-User provides full record- and file-locking on AppleShare and compatible LANs, including 3Com's 3+ and the soon-to-be-released Novell Netware version 2.15. Multi-User is completely compatible with Apple standards and with the methods and language syntax used in the PC multiuser versions of FoxBase+. Users on mixed PC and Macintosh networks can share the same data, index, format, and program files.

FoxBase+/Mac Multi-User lists for $595. For further information, contact Fox Software at 419/874-8678.

Macs to Minis to Macs

Ideassociates has introduced its Ideacomm Mac, the first communications board designed to link a Macintosh SE to an IBM System 36/38 or AS/400 midrange system. The new board, which Apple expects will help the Mac further penetrate organizations that use the IBM machines, supports bidirectional file transfer between the Mac and IBM systems.

The Ideacomm Mac board plugs into the SE's expansion slot and connects to the IBM System 36, System 38, or AS/400 via twinax or twisted-pair cabling. Mac SEs, IBM PCs, and PS/2 systems can all attach to the midrange system on the same line.

Users can cut and paste data from the minicomputer into Mac applications. Ideacomm Mac supports HyperCard XCMDs, allowing users to tailor applications to their needs. You can run, and view, up to four host sessions simultaneously.

Ideacomm Mac allows printers such as the ImageWriter Plus and the LaserWriter to emulate IBM system printers. For remote communications, the board connects to an IBM 5294 or 5251 Model 12 cluster controller.

Slated to ship in January, the Ideassociates board retails for $995 including software. For more information, call Ideassociates at 508/663-6878.

Larger SE Screens for Less

Mobius Technologies believes it has a solution for SE users who long for larger screens but can't afford them. Mobius's MultiScreen, a video board with software, lets you attach a wide range of inexpensive high-resolution monitors to the SE.

MultiScreen can display multiple resolutions on the same screen—640 by 480, 720 by 540, or 800 by 560 pixels, all selectable from software—and redraw the display on an external monitor up to 30 percent faster than the SE alone.

MultiScreen should allow users to see almost a full page lengthwise for half the cost of a typical full-page display.

MultiScreen is priced at $495. For more information, contact Mobius Technologies at 415/654-0556.

New Accelerators

A line of accelerator boards from Irwin Magnetics, the XL, XL 20, and XL 25 Excelerators, boosts the processing speed of the Mac SE by up to eight times. The XL doubles the SE's speed by replacing its 8-MHz 68000 microprocessor with a 16-MHz 68000. The XL 20 and XL 25 accelerate the SE to more than three times faster than a Mac II, by replacing the 68000 with a 20-MHz or 25-MHz 68020, respectively. Prices for the boards are $499 for the XL, $999 for the XL 20, and $1600 for the XL 25. For more information, call Irwin at 313/930-9000.

New Monitors

A host of high-resolution monitors have been introduced recently, and one thing they all share is ergonomic design and a tilt-and-swivel base.

Three of the new monitors support the Mac II equipped with the standard Mac II Video Card at its 640 by 480 resolution. All three are priced well below the AppleColor High-Resolution RGB Monitor: NEC's MacSync monitor lists for $895, Magnavox's 9CM080 for $699, and Relisys's RE1475 monitor for $645.

Another NEC monitor, the MultiSync 3D, supports the Mac II Video Card as well as a wide range of display modes such as IBM's 8514 standard, VGA, PGA, EGA, CGA, MDA, and super VGA (800 by 600). NEC hopes that the MultiSync's flexibility will make it a common choice for corporations seeking to stan-

(continues)

dardize; it supports IBM AT, IBM PS/2, and Mac II computers. The list price is $1049.

Relisys is also competing for corporate customers who use both Macs and PCs. The RE1520 monitor is compatible with the IBM 8514 display graphics standard and displays an unlimited number of colors with a resolution of 1024 by 768 pixels. The list price is $995.

Moniterm Corporation has introduced its Viking 2 19-inch monitors for the SE and the II, which will eventually replace the Viking 1. Improvements include easily accessible controls and indicators on the front panel. List price is $1995 for monochrome display on the SE and the II, $3045 for gray-scale display on the II.

Personal Computer Peripherals Corporation is marketing the Shadowgraph gray-scale monitor, which works with the CGC/2 graphics board. The Shadowgraph provides a screen resolution of 1024 by 768 in both 1-bit or 8-bit mode, and it is also A/UX compatible. The list price is $3045.

For further information, contact NEC Home Electronics at 312/860-9500; Magnavox at 612/521-4499; Relisys at 408/945-1062; Personal Computer Peripherals Corporation at 813/884-3092; or Moniterm Corporation at 612/935-4151.

High-Capacity Hard Disks

Crate Technology has introduced the InnerCrate 600, a 600MB internal hard disk for the Mac II. Features include automatic head parking and a utility for remapping defective areas of the hard disk. The list price is $3845.

On the external hard disk front, NCL America Computer Products has introduced a line for the Mac II, SE, Plus, and 512KE. Capacities of these hard disks range from 30MB to 675MB, and they are available as the ExpressDrive Series, which fit under the Mac, or as the portable ExcelDrive Series. Both kinds have two SCSI ports so that you can daisy-chain multiple hard disks for even higher storage capacities.

List prices for the ExpressDrive series are $875 for 30MB, $1075 for 50MB, $1775 for 80MB; for the ExcelDrive series, $895 for 30MB, $1095 for 50MB, $1795 for 80MB, $2295 for 150MB, $4395 for 360MB, and $5195 for 675MB.

For more information, contact Crate Technology at 800/543-5808 (nationwide), or 800/323-9994 (in California), or NCL America Computer Products at 408/734-1006.

1280 by 1024 Resolution

Matrox Electronic Systems has developed the first graphics board for the Mac II that can display graphics and text at a resolution of 1280 by 1024 with a choice of 256 colors from a palette of 16.7 million. The NG-1281 board runs under Apple's 32-bit QuickDraw interface, and Matrox is now modifying the interface to take advantage of the NG-1281's on-board intelligence and graphics capabilities.

The board was designed to turn the Mac II into a cost-effective entry-level engineering workstation that can run CAD packages at top speeds. For further information, call Matrox at 514/685-2630.

New LAN Options

CBIX, producer of the LAN operating system Network-OS, has announced a Mac-to-PC LAN interface and a CD-ROM Delivery System that can be accessed by multiple users through CBIX's Network-OS LAN operating system.

Network-OS Mac-PC Connection lets Macintosh users run PC applications and share PC network resources, such as printers and storage devices.

The Network-OS CD-ROM Delivery System enables multiple users to access databases stored on CD ROM disks. For further information, contact CBIX at 404/446-1332.

Software Piracy Protection

Rainbow Technologies is shipping a Mac version of its Eve copy-protection system, which defends developers' software while letting users make unlimited backup copies. Eve consists of a hardware key and development software. Developers use the Eve software to set up a security system of "locks" inside their applications.

When an application is shipped, the hardware key is included. The end user plugs the key into the Apple Desktop Bus, where the key can open the locks embedded in the application. The hardware sends a "challenge" to the lock, which must reply or the application halts.

The backup copies also contain the software locks, so the backups work only when the key is installed, which prevents piracy. A user can transfer the key and software to any single Mac SE or Mac II.

Users who buy Eve-protected software from several developers can install hardware keys provided separately by each developer. Keys will not interfere with each other, the company says. The Eve system sells to developers for $45 each in lots of 500, or $55 in lots of 100. For more information contact Rainbow Technologies at 714/261-0228.

SBT Announces Mac Accounting Programs

Major dBase application developer SBT Corporation says it's shipping its first Macintosh programs, part of the new Series Six Plus/Mac portion of the SBT Database Accounting Library. Created in FoxBase+/Mac and fully compatible with Database Accounting Library software running on IBM PCs and UNIX/XENIX systems, the first four Mac programs are dLedger, dInvoice, dStatements, and dPayables. Single-user versions (scheduled for release before the end of 1988) cost $395, $295, $100, and $395, respectively. Multiuser versions, called MultiNet by SBT, will ship soon after the multiuser version of FoxBase.

A total of 15 programs, all FoxBase versions of existing SBT accounting products, are planned for Series Six Plus/Mac; all will have multiuser versions and will offer compatibility with the other major operating systems running SBT accounting software. For more information, call SBT Corporation at 415/331-9900. □

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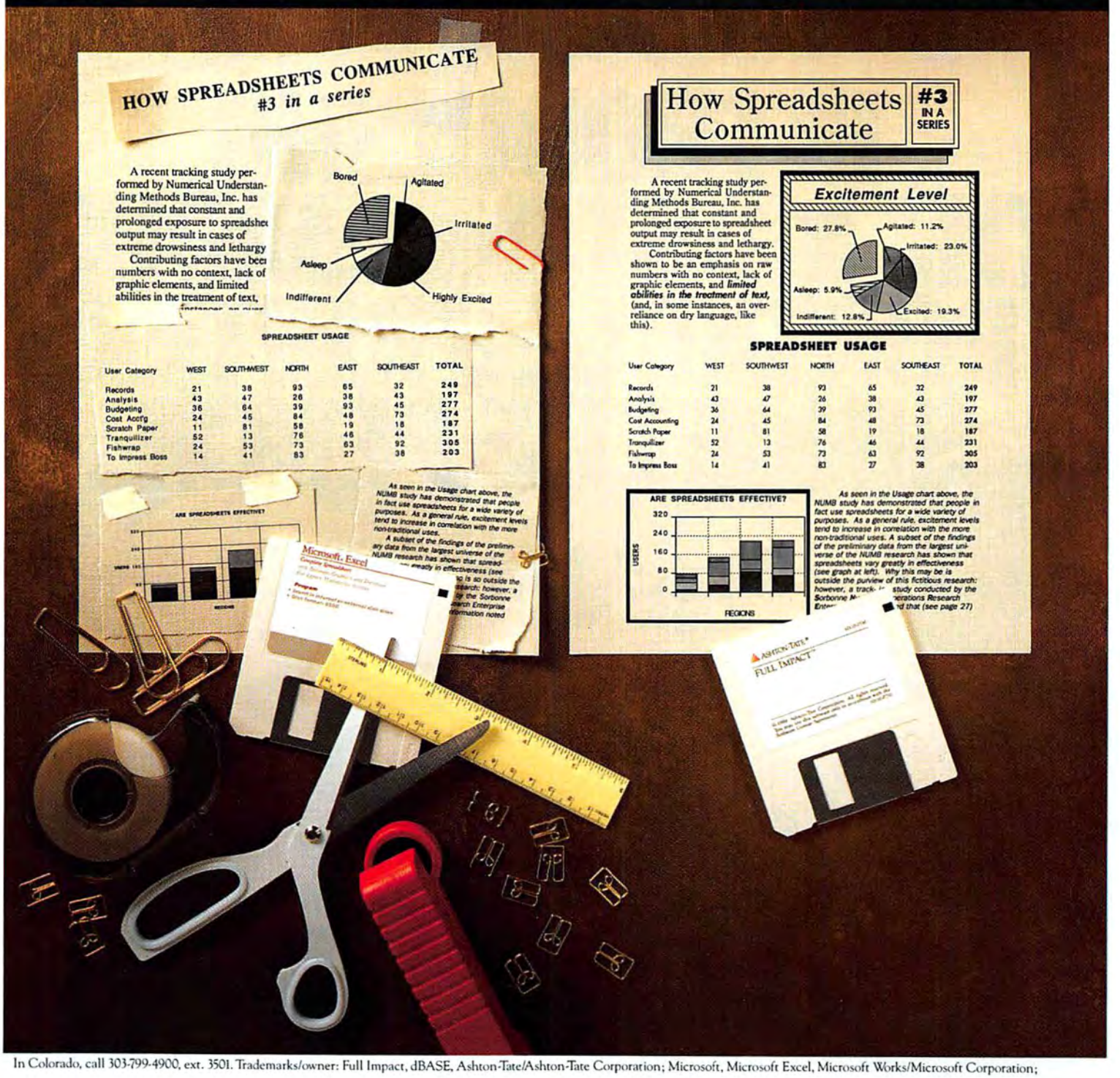

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Outside Looking In

The fifth anniversary of the Macintosh

The Macintosh is five years old and, late last year, it became the central product line of the company. There is no need to ask any longer if Apple Computer will make it into the twenty-first century; the question now is what the company will look like. So rather than make this a paean to the Macintosh, I'm taking one more opportunity to conjecture on Apple itself. Because of the frequency with which the company is reorganized, that's difficult—but perhaps change is the crux of the matter. Surely no other company in the Fortune 200 is in such a constant state of flux.

There is a joke at Apple that the company's organization charts are kept in MacDraw because of the frequent changes. Recently the company's reorgs reached the nadir when a new organization chart for marketing, labeled Step One, was produced with the admonition that it only represented areas of responsibility and did not constitute a true organization chart (or words to that effect). It's getting mighty thick in Cupertino. Time for hip boots?

Many people have begun to ask whether the repeated reorganizations are a sign of the company's ability to adapt in response to rapid growth, or the manifestation of a company subject to weak leadership, power plays, rapid staff turnover, and lack of overall direction. John Sculley sees the reorgs as the former: planned, directed, well-defined events that pave the company's road toward the twenty-first century.

Third-party developers, many of whom understand the need for growing companies to change, have taken to throwing their hands up. They spend months establishing contacts within Apple, only to find that these valued sources of information or direction change overnight. Similarly, some Apple managers find themselves in new jobs overnight through executive fiat. But that may be preferable to the status of those who keep their old jobs—one manager told me he had seven bosses in two years. An asset to the company who has seen too much change, he is by turns either enthusiastic or burned out and cynical after five years at Apple.

Such rapid change raises several questions: not only whether Apple's managers have the institutional memory to deal adequately with the company's developers and customers (no, say many), but also whether the philosophy of change itself has become institutionalized at the company.

A Company of Opposites

Indeed, Apple is a company of opposites. For every superlative one can direct toward Apple, there is a negative counterpart. Those who work for the company find it a mecca of high salaries, good benefits, profit sharing, stock options, fast growth, stability (at least compared to a small developer), high energy. It offers young people tremendous opportunity. So it attracts them—and some of them realize their dreams. For others it is a sweet-scented trap. Once lured in, they are caught by the pay and benefits and the lifestyles those benefits engender, but they feel unable to bring their skills to bear in ways that can help the company or allow them to realize their potential. Many bright and capable people believe the system is set up to ensure failure.

Apple is run by consensus. Decisions are made at the top, to be certain. But the implementation is left to midlevel managers. Ambitious managers at Apple find their days given over to incessant meetings, forcing them to set aside their evenings for getting real work done. Meeting fever leads to wasted time, and to decisions that cater to the lowest common denominator. Witness the debate over who really controls the future of favorite projects such as multimedia. This project has nearly a dozen groups within the company, each with some claim to implementing it.

Consensus-building can lead to realistic goals, broadly understood and supported by groups within the company. But managers often find themselves at odds with their peers who have alternative ways to achieve the goals. A group works laboriously toward a consensus, only to have its decision second-guessed by others who couldn't make the meeting. Or a dissident member effects a pocket veto by avoiding a crucial meeting and then announcing that the arrived-at decision cannot be implemented without consideration of other agendas.

Nor do these traits lead to a company that makes decisions well—for two years Apple did not formally recognize that the Macintosh sold into the home. The official explanation that Apple did not want the Mac to be seen as a home computer came at a time when 85 percent of our readers had Macintoshes at home. This monolithic approach, that "We'll tell people what we want to be the truth because it matches our goals," is out of place at a company supposedly in touch with its market. It was a sad irony juxtaposed with the lemming campaign. Even today, the company seems all too capable of marching to its dogma rather than to reality. At a time when many have begun to recognize that the future of the office is in the home, Apple promotes the idea that the Mac is a success in the business market. To its credit, the company once had a manager for the home-office market.

The ability of Apple to believe in itself, and its own perception of the truth, is legendary. Little wonder, then, that even its most acute critics seem to have a soft spot for the company. An Apple manager once said to me, "It's amazing what you guys in the press let us get away with. We've made some really bad blunders, and no one calls

(continues)

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us on it." If that is a widely held perception within Apple, it's no wonder that executives feel they can say what they want.

On the other hand, Apple will go to great lengths to please some groups—such as financial analysts. Last fall's price hike, for example, is said to have been based on the need to keep Apple's traditionally high profit margins of over 50 percent. Despite the price hike, and another increase in quarterly revenues, the price of the stock dropped to a year low. Was it worth it?

A Nimble Company?

Nor does Apple exhibit the suppleness of a young, ambitious company, if a $200 million dollar CPU backlog is any indicator. Lethargic might be a more appropriate term. Apple seems to be quietly waiting for IBM, which is preparing an onslaught against the desktop computer, engineering workstation, and personal computer markets. Not with OS/2, but with a machine based on Next's model of unified printing and imaging (PostScript), AIX (IBM's version of UNIX), and Next's software architecture (NextStep). The great news for these markets is that UNIX will be friendly. Apple's HFX utility is a strong, incremental step. But IBM will have the equivalent of a finder-level implementation of AIX on its machine.

Many remember the origins of Apple's struggles with UNIX. Chris Espinosa (Apple employee number 9), a brilliant young contributor to the company, was given the task of heading product management for A/UX. Simultaneously he was the manager for HyperCard. This is an example of the company setting up some of its best to fail. Espinosa's contribution to the company is one of public record. Setting him up to compete against the likes of Bill Joy and others who helped to develop UNIX is ludicrous. The slow development of A/UX at Apple reflects more upon management than upon the product managers.

Which raises another question. As the company grows, is it building mechanisms to allow it to make the right decisions? One of the company's newest buildings houses its executive staff: John Sculley, Jean-Louis Gassée, Allan Loren, Del Yocam, Deborah Coleman, and a host of other VPs. Does this improve decision making by bringing together key managers who can share information more easily, or does it create an executive ghetto where upper management

(continues)

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is isolated from midlevel managers? Two years ago you could see Sculley having lunch in the cafeteria of the engineering building of the company. Does that still happen?

Until recently Apple had no plan to provide for the retirement of its employees. Sculley's position was that people don't retire from Apple. "They come here and spend a few years and then go to other places," he said. Such a theme would be anathema at organizations like 3M or IBM where the staff is seen as a company's most precious resource. In late October Apple did announce a plan to begin contributing to the 401(k) plans of its employees. Some point out that this is only fair, as the company has become tightfisted with stock options.

Still, the point has to do with Apple's willingness to invest in people—to train, to retrain, to relocate. On the one hand the company has Apple University for internal training courses, provides for reimbursement on outside coursework, has cooperative agreements leading to an MBA with a neighboring college, and has management-training sessions. Its unique sabbatical, the ReStart program, provides a six-week vacation to people who've been employed for five years.

On the other hand I most often hear about sabbaticals from people who say, "Well, if they're going to reorg my position, then I might as well just take my sabbatical and find a new job when I get back." There is also criticism that the company's approach to management training is a mélange of pop, psycho-social fluff that imparts few skills outside of aerobics and supervisory techniques.

Farewell Developers?

Another trend at Apple, albeit unwitting, is that Apple appears to be devouring its third-party developers. "I had a programmer," says one developer. "Key architect of my product. He just went to work for Apple. They doubled his salary. I couldn't begin to compete with that." This is a frequently heard story. But as the company employee count goes over 11,000, a good question is where can Apple find talented programmers and engineers if not among the developers who know Apple best. It could even be beneficial, as Apple absorbs engineers from companies that find themselves in a losing battle with the company. It gains people who know a great deal

(continues)

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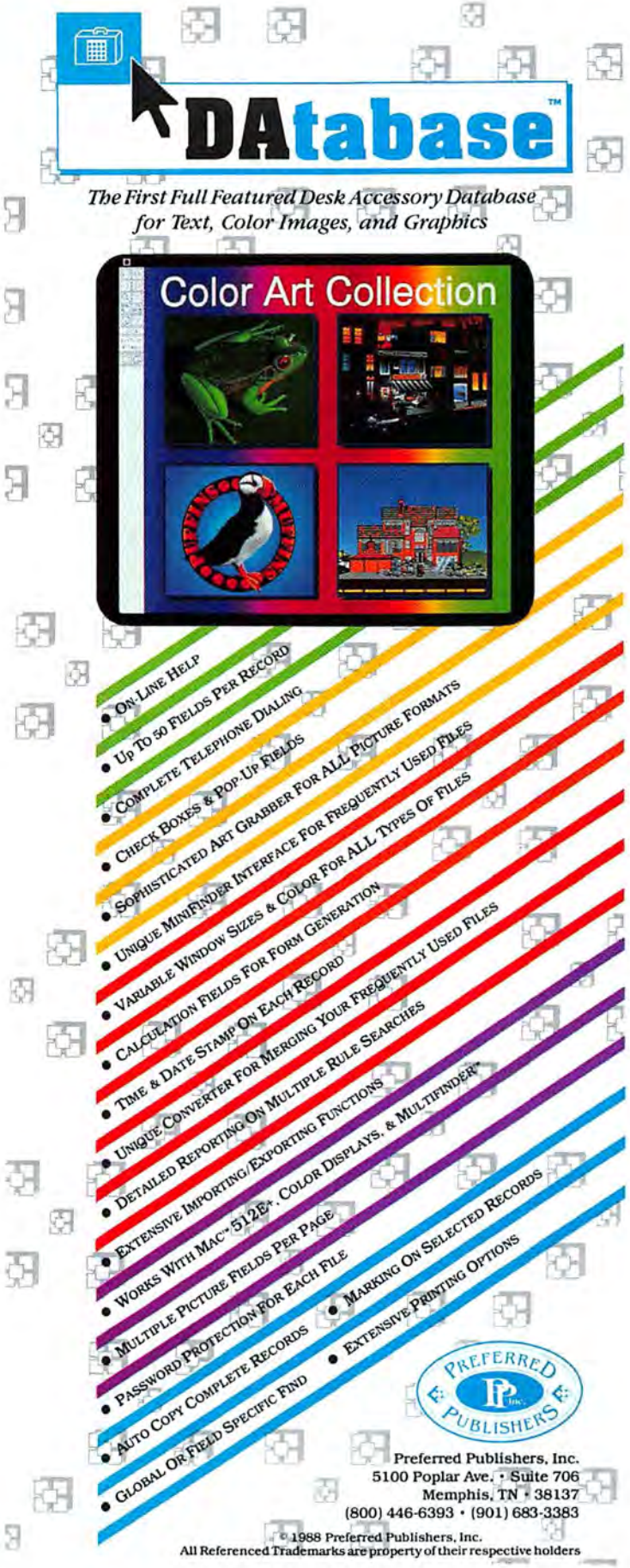

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Commentary/Jerry Borrell

about Apple's products and markets. Certainly as the company includes ever more in its System software or announces additional peripherals, some developers wonder what the future in third-party development really is.

At the same time Apple is creating a multitiered organization for its developers. With 8000-odd developers of some note, it has to find some way to help those who can help Apple the most. The evangelist group, the group most responsible for aiding Apple, is now directed by its third manager in little over a year. Nor is evangelism fully staffed. Such turnover is not likely to produce the stable, mature, and experienced management an organization needs.

Many gifted people are in charge of the evangelists—are they provided with the environment that will allow them to succeed? The complaints about Apple's infrastructure range from the global to the minute. The company is willing to provide great pay for its staff, but hires insufficient administrative staff or secretarial support to allow that talented staff to do its job.

Another internal group, Apple's Human Resources department, is the target of a love-hate relationship within the organization. On the one hand it's enlightened: recognized for its efforts in minority hiring, child-care facilities, forward-looking policies in areas such as maternity leave, and employee advocacy. On the other hand it's the bane of the organization. Rather than playing a support role, Apple's Human Resources staff is in many ways a second group of managers who focus on how the company is working.

Helpful in an organization run by consensus, HR often works behind the scenes to reconcile opposing groups' decisions. But the group can be troublesome in instances where its staff may second-guess front-line decision makers who are responsible for the outcome of decisions. Some managers find that the group disrupts supervisor/employee relationships that it understands little, effectively depriving managers of any real authority in a structure already lacking in ways to make things happen. Worse, the HR staff itself sometimes gets embroiled in its respective groups' bids for money, employees, or control.

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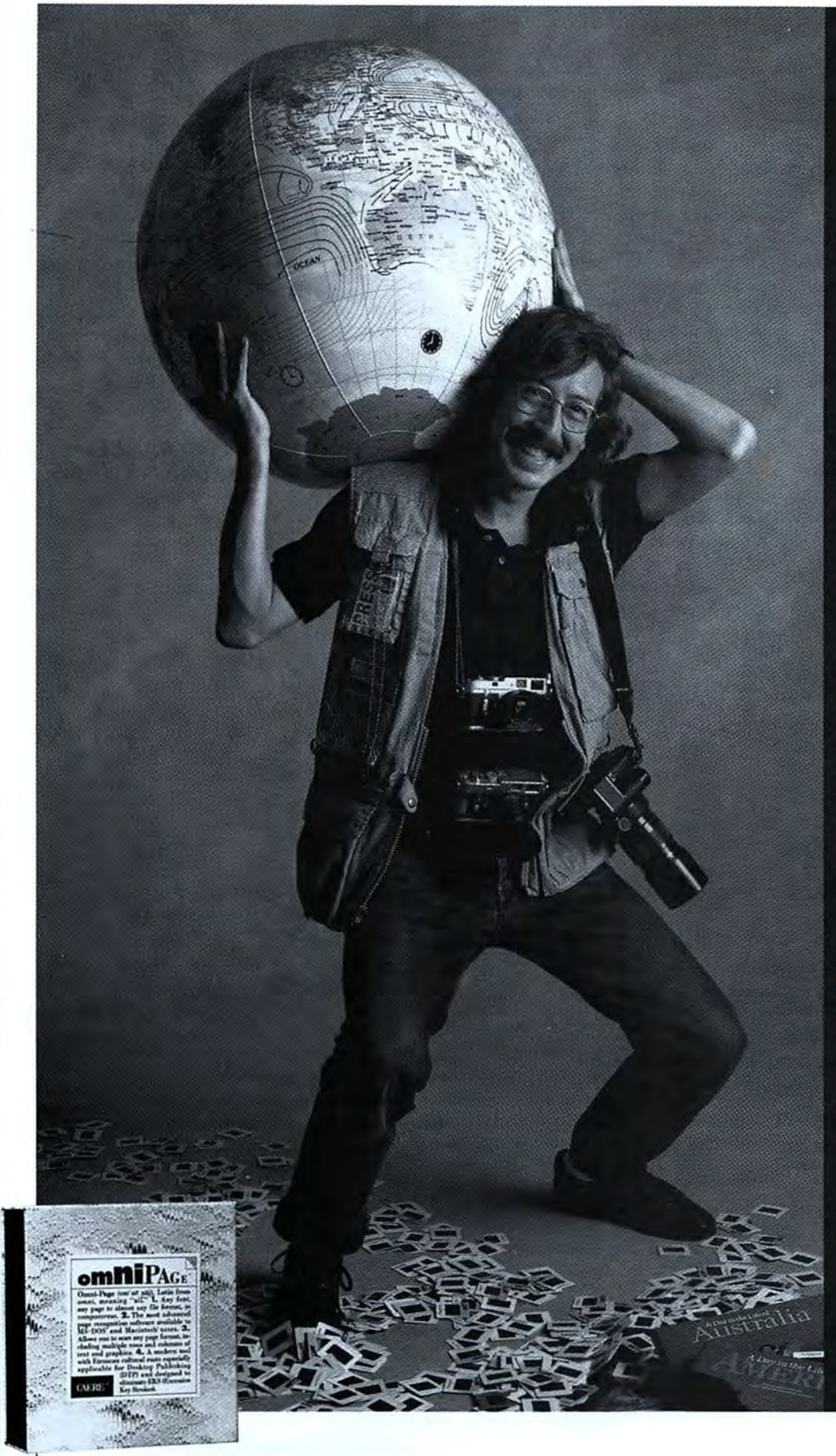

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Rick Smolan

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Marketing: Apple's Forte?

The marketing department at Apple is a moving target. I have known so many different directors and managers at Apple over the last three years, that it is truly a wonder that the company maintains any continuity at all within the group. The staff below the level of vice president never knows what is going on for longer than a few months. Even the vice presidents play office musical chairs. No other group in the company is so rife with rumors. No other group is so often affected by poor morale or left without clear goals, spending time interviewing for other jobs and speculating on who will be doing what, where, and when. There is always a reorg under way, with promises of more announcements later—heaven knows who thinks this is a responsible way to treat a large group of employees.

Apple segment marketing—education, engineering, business, consumer, and the home—are now said to be going away, to be replaced by regional marketing efforts. And the regions have recently multiplied from three to five. Is it growth, planning, or ill-communicated reshuffling? Apple does appear to be building stronger relationships with its value-added resellers. Still, I receive calls from resellers asking me for advice on who they should talk to at Apple, or complaining that Apple's policies regarding support, or the company's determination of who qualifies as a VAR, are grossly unfair. I patiently explain that I work for a consumer magazine, not the trade press, and suggest that they contact the appropriate group at Apple.

And the lesson of Apple's hubris in regard to its beliefs and goals applies to marketing efforts as well. I will never forget sitting in the audience in Tokyo as Apple unveiled its desktop publishing push for Japan. The Apple speaker was politely but firmly asked what made Apple believe that it would succeed in Japan with desktop publishing as it had in the United States, which was the contention of the speaker. The response was that, well, Apple had done it in the States, Apple would do well here. The look on the face of the questioner said, "Right. You and the rice farmers from Louisiana."

A few years ago, on the other side of the globe, Apple introduced an innovation into European marketing: the AppleCentre concept. Apple formed a partnership with strategic Apple dealers and funded expansions to their stores that provided a training and demonstration space for Apple and third party products. It looked good at first. European prices for the Macintosh are much higher than here in the United States, and the AppleCentres added a touch of class to the computer store in keeping with the high price tags. Now the owners I have talked to say the concept is winding down, becoming a financial burden, and no more support from Apple is forthcoming.

Sez Who?

It's pretty hard to argue with success, and Apple is definitely successful. It is also easy to criticize from the outside, but the company does have problems as it celebrates the Macintosh's fifth anniversary. Its ownership of the "computer for the rest of us" makes us want it to be the best possible company at a time when even a casual observer can see that some blemishes are showing up on the Apple. □

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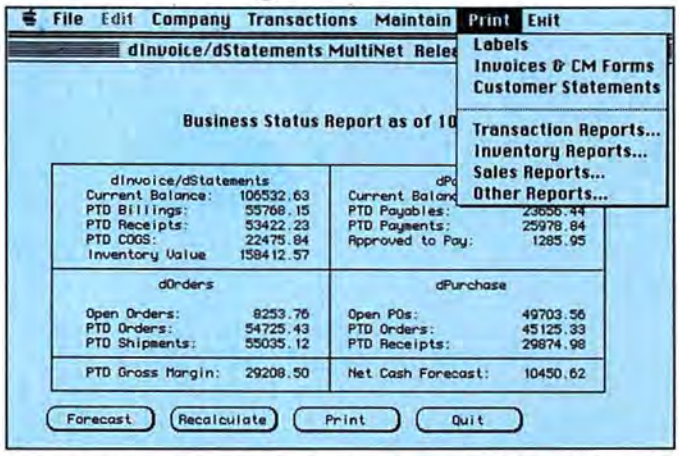

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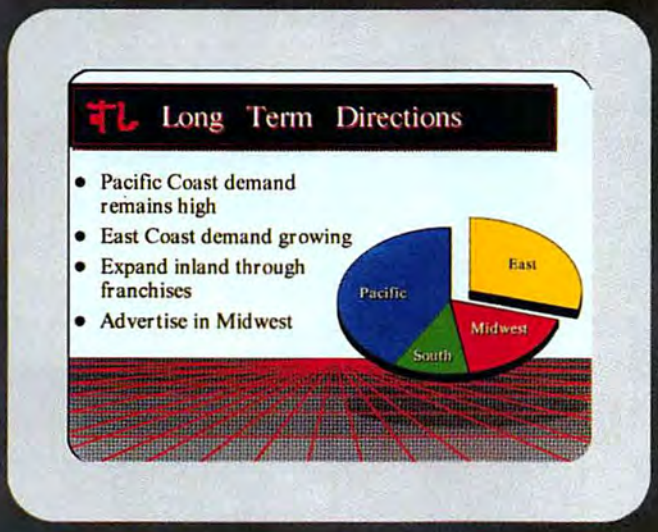

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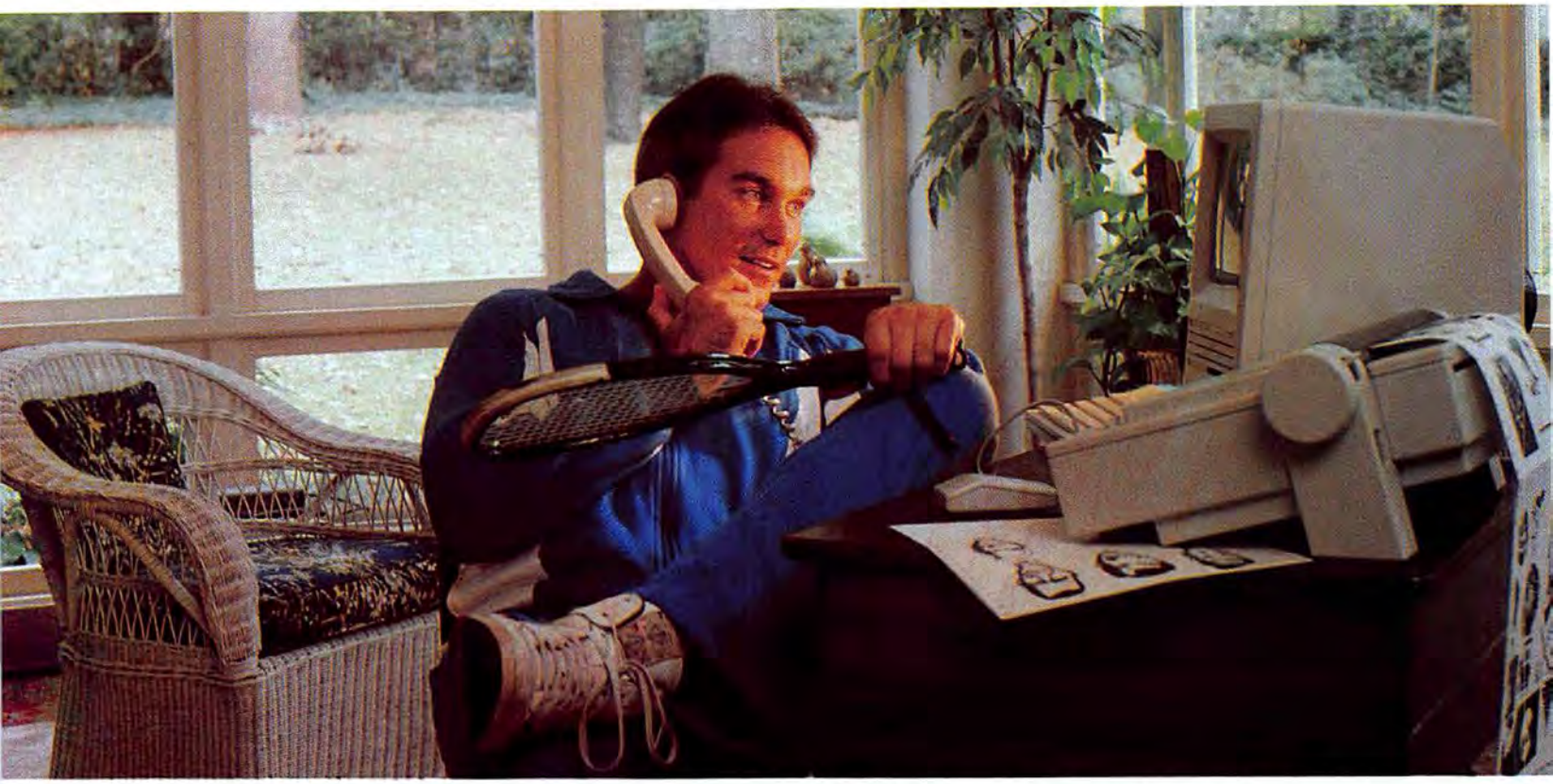

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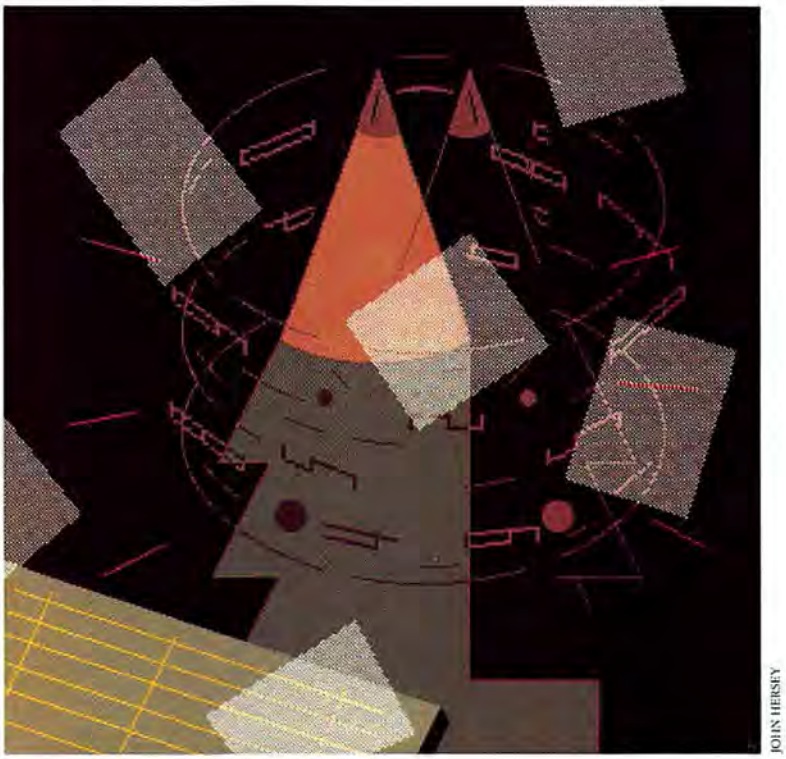
Letters

A forum for Macworld readers

On Accounting
I was very disappointed with the superficial manner in which the accounting packages were reviewed in your September 1988 issue ["Who Keeps the Books?"]. After reading this article, a novice would think that there were numerous accounting packages to choose from. As a practicing CPA, I can assure you that the current status of Macintosh accounting software is abominable.

Your review stated that a bookkeeper would love Insight. I will testify under penalty of perjury that bookkeepers hate this program. Because it saves only a summarized portion of a transaction—no detailed accounting information is stored on hard disk—bookkeepers must review paper printouts to find individual entries. No wonder the reviewer added that "the series will not begin to realize its full potential for a couple of years."

David R. Satava
Oakland, California



JOHN HERSEY

Design Costs
Let me begin by applauding *Macworld* for two very well written and informative articles ("Is Desktop Publishing Worth It?" and "A Halftone Handbook," October 1988) on the limitations and usefulness of desktop publishing and digital halftoning on the Mac. Both should go a long way toward clearing up the confusion and hype that currently surround those topics in some trade journals and computer magazines.

Here at ImageSet Design, we found the cost-comparative breakdown both interesting and informative, but we were struck—not by the relative cost savings that desktop publishing offers in terms of setting type—but by how inexpensive the designers' quotes were for design and production costs. We wondered if Frank Lee's comment in "Is Desktop Publishing Worth It?" that "some desktop publishers would earn more money mowing lawns" might not also be applicable to some of the designers who were quoted.

Mark U. Beale
Portland, Maine

Design costs vary widely and the rates quoted in the article were solicited from graphic designers. Electronic publishing

(continues)

Corrections
*Aba Software's telephone number (*Mac Bulletin, *September 1988) is 215/644-3580.*

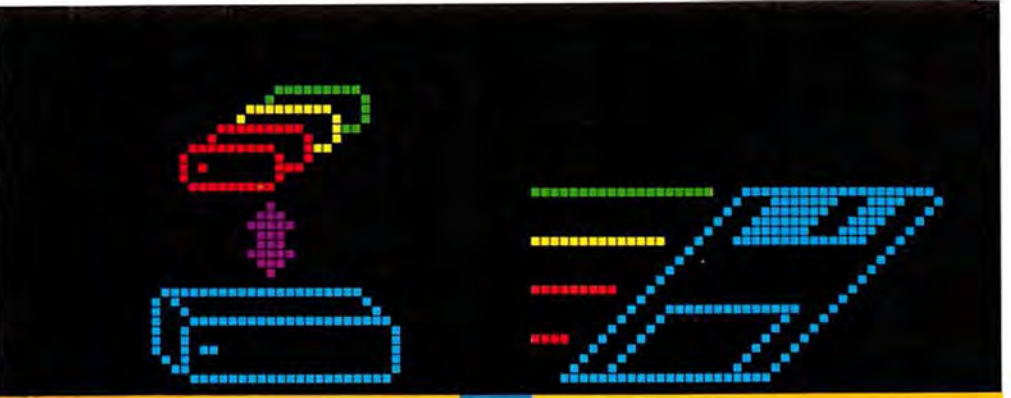
*The telephone number for LaserGraphics (*New Products, *October 1988) is 714/660-9497.*

*The correct phone number for Sphere, Inc., maker of Falcon 2.0 (*Updates, *January 1988), is 415/522-3584.*

The telephone number for Tecmar ("Why Say No to Backup?" November 1988) is 216/349-0600.

The address for Abaton ("Getting Started with Scanners," November 1988) is 48431 Milmont Dr., Fremont, CA 94538.

MacChimney ("Merry Macintosh," December 1988) is available from Silicon Comforts, 2650 Bancroft Way, #117, Berkeley, CA 94704, and the $17.95 price includes shipping in the United States.



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Letters

sometimes blurs the distinction between tasks, however, and a clarification is in order. Although artists' fees were generally excluded in the comparisons between traditional and desktop costs, in the breakdown for the events calendar, Pittsburgh To Go, the $2530 fee for halftones included the creation of original Illustrator art. The publisher of the calendar, Novus Graphic Communication, estimates the cost of the art alone at $2000, so desktop publishing actually saved about $800.—Ed.

To the Rescue

Do you know what it feels like to see the message "unrecoverable disk error" on a vital and (of course) unbacked-up Microsoft Word file? Where does the average Mac user go to get help? Your January 1988 article "HELP!" mentioned that Silicon Beach Software in San Diego takes tech-support calls for general Mac problems. Well, on two recent occasions, Silicon Beach was there for me. Ken Jones, among others, answers the phones, reassures the desperate, and is extraordinarily helpful. He even called back to check up on me. I feel Silicon Beach and its wonderful staff deserve public praise and thanks.

Carol Piston
Brooklyn, New York

Upgrade Questions

Our company has been using a seven-module, Mac-based TOPS system for about a year. All seven nodes are registered, but we have never received any communication or verification from TOPS.

Three weeks ago, having found our TOPS Spool to be incompatible with the latest LaserWriter print tool, I requested and subsequently received an upgrade disk. On the third install, I found garbage in the spooler dialog box. A call to TOPS produced the response that the new TOPS Spool is compatible only with TOPS 2.0 or later.

What 2.0? Despite our seven module registrations, we've never received an upgrade notice. Furthermore, it turned out that the spooler is not incompatible. It works just fine if you use the old dialog box button structure and ignore the garbage. You can even prep the LaserWriter by clicking on part of the Central Systems message that appears in place of the TOPS utility in the menu bar. What's going on?

(continues)

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Customer Profile

Danny Goodman

Age: 30 something.
It's hard to tell on guys with beards.

Profession: Author of the all-time best selling book, *The Complete HyperCard Handbook*, and more recently *Danny Goodman's HyperCard Developer's Guide*; software developer *(Business Class and Focal Point II)*. Described as a genuine "Renaissance Man"!

Hobbies: His idea of a good time is to scan the comprehensive quotes of the great Serbo-Croatian poets while enjoying a good glass of Chenin Blanc. Napa Valley, of course. He prefers non-computer keyboards, like the one on his Bechstein grand piano. A compulsive researcher!

His Page Recognition Software: *OmniPage*, of course. According to Danny: "In preparing a book, or working on a special project, I need to get at information quickly to avoid disturbing my work flow. With *OmniPage*, I can scan virtually any font, or font size, in any column format, and easily place it into an existing file. I'm building a library of articles, relevant to my work, on a variety of subjects."

Favorite Quote: From the *New York Times*: "*OmniPage* has the potential to do for scanners what the *Lotus 1-2-3*™ spreadsheet did for the sale of PC's."

Things Disliked Most: "Neil Simon plays done by actors from California and guys who claim to have met with beings from other planets. Most of whom also happen to come from California. No seriously, what upsets me most is some of the over-promising in this industry, especially when it comes to page recognition software."

Favorite Scan: "I'm working on a library of articles from magazines and professional journals. You might call it the ultimate scan. I want to develop a HyperCard front end, and tie it all back to *Focal Point II*, which is really the center of my *computing universe*."

Future of Page Recognition: "I hate to type, that's why I develop HyperCard products that type for themselves. *OmniPage* helps to eliminate excessive key strokes. I can relate to that. How else does my publisher expect me to get a book out in a matter of months? Being able to cut and paste between vast libraries of data, extrapolating ideas, is the very essence of page recognition. With *OmniPage's* versatility we're not just managing pages any longer, but entire blocks of thought. It's a product that delivers on the promise of the future—finally."

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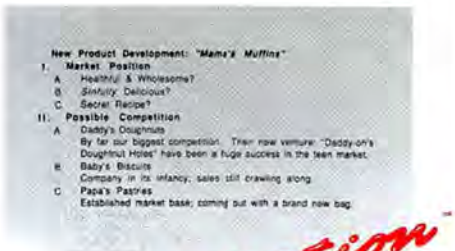

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R. D. Keith Boddaert
Don Mills, Ontario, Canada

The garbage in the spooler dialog box was tracked down to an incompatibility with versions of Suitcase earlier than 1.3. The problem can be avoided by dragging Suitcase out of the System folder before installing the TOPS Spooler and dragging it back after installation. Future versions of TOPS Spooler will look for early versions of Suitcase. TOPS recommends upgrading to TOPS version 2.0 if users have installed System software 5.0 or higher, and the company will notify its entire user base when version 2.1 is available. (It should have been released by the time you read this.)—Ed.

Two-faced Tip

In *Quick Tips* (September 1988), there's a tip on how to simplify printing two copies of double-sided output. To achieve the desired result, however, you must put your first stack of assembled pages in the LaserWriter tray *faceup*, not facedown.

Phil Russell
Waldport, Oregon

Object Logo Praised

I enjoyed your October 1988 issue very much. *Macworld* is one of the few magazines of which I have a complete collection, and it is pleasant to observe that the quality of the writing has always remained high. I particularly liked the article "Getting Smart" by Dan Shafer, and I was happy to see the inclusion of software by Coral Software. I have used Coral's Object Logo for more than a year and can highly recommend it.

Object Logo is one of the most elegant implementations of object-oriented programming (besides being the most accessible and inexpensive). It's simple to use, offers nearly complete access to the Toolbox, and costs less than $150. In more than 12 months of heavy use, I've never had this program bomb, and have never found a programming task too complex for it to handle adequately. And, the few times I've called Coral to ask about future versions or particular implementation features, I've gotten quick, courteous, and—most important—informed and helpful responses

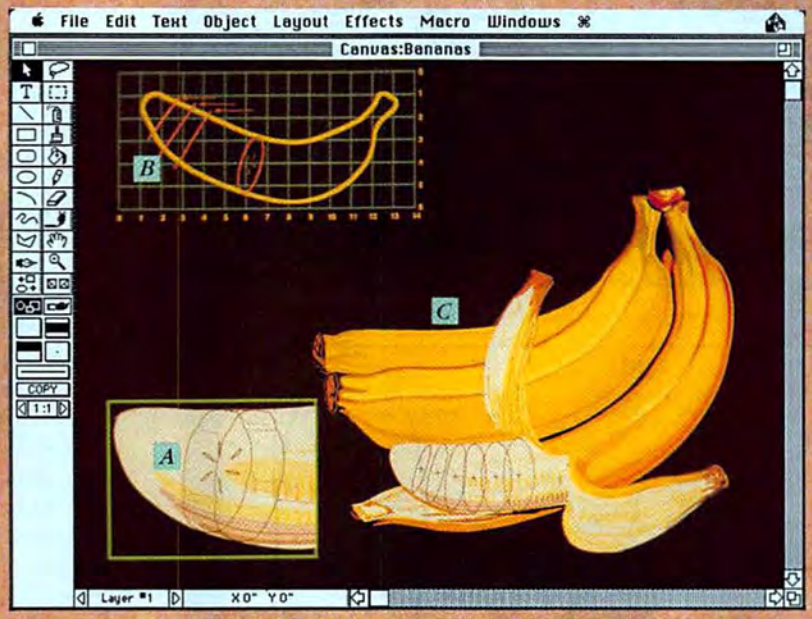
(continues)

A To an architect, fine hairlines like ours are pure poetry.

B Auto-tracing built this banana from a scanned-in produce ad. In split seconds.

C Multi-point bezier curves make drawing a bunch easier. Colors are added in layers.

D Auto-resizing helped this V.P. of Sales display the fruits of his labor, graphically.



E Smooth continuous color blending inspired this art director to new heights.

F What are mere words compared to WYSIWYG text with special effects?

G After he slipped away, we added rich Postscript® gray scales to Koko's leftovers.

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Like we said: go bananas.

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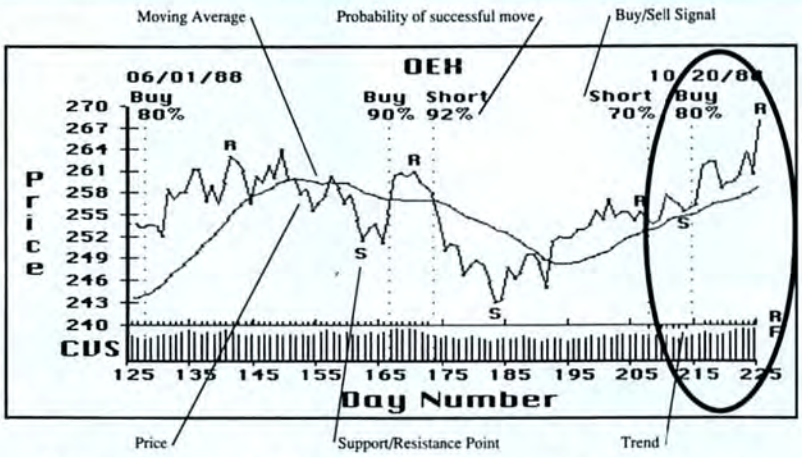

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Mark Warrian
Chicago, Illinois

Writing on the Wall

I'm an average, obsessed Macintosh devotee who got a Mac 128K in February 1984. It's been upgraded twice—to a 512K and to 1MB. I use it for writing music scores for films, letter writing, home accounting, BBSs, games, and educational programs.

We've stuck together, my Mac and I, but that doesn't mean that I'm happy with Apple. When Apple wanted $750 for an upgrade to 512K, I opened the computer myself, built a multiplexer circuit, and put in interchangeable sockets and a new chip, for a total cost of $45 and two hours time. I felt my friendship with Apple waning, but I pushed ahead in my holy trek toward the best Mac possible.

When Apple wanted $1100 to upgrade to a Mac Plus, I got it done for $450, SCSI port included. Although disillusioned with Apple, I continued to save my dollars for a Mac II, the ultimate computer. I thought I was close until I looked in the newspaper on September 17, 1988. Prices are up 29 percent when they should, in fact, be going down. My stomach is still doing flip-flops.

There's a lot of grumbling going on these days. Many of my fellow musicians are turning to Atari. Other users are turning to cheaper computers for tasks that the Macintosh should dominate.

Read the writing on the wall, Apple. It is the average folks who elect senators and presidents, and it's the average folks who make or break a computer company.

Michael N. Millard
San Francisco, California

For David Bunnell's thoughts on the subject, check out his column in this issue. —Ed.

Fruitless Logo Change

In your New Products section (October 1988), you ran an announcement for our new ribbon cartridge with a built-in reinker, then called Flying Apple. After sending you the information on the cartridge, I contacted Apple Computer's legal department and asked if they had any objections to our using the logo Flying Apple. They faxed me a reply within two hours saying that they will sue anyone who uses any piece of fruit

(continues)

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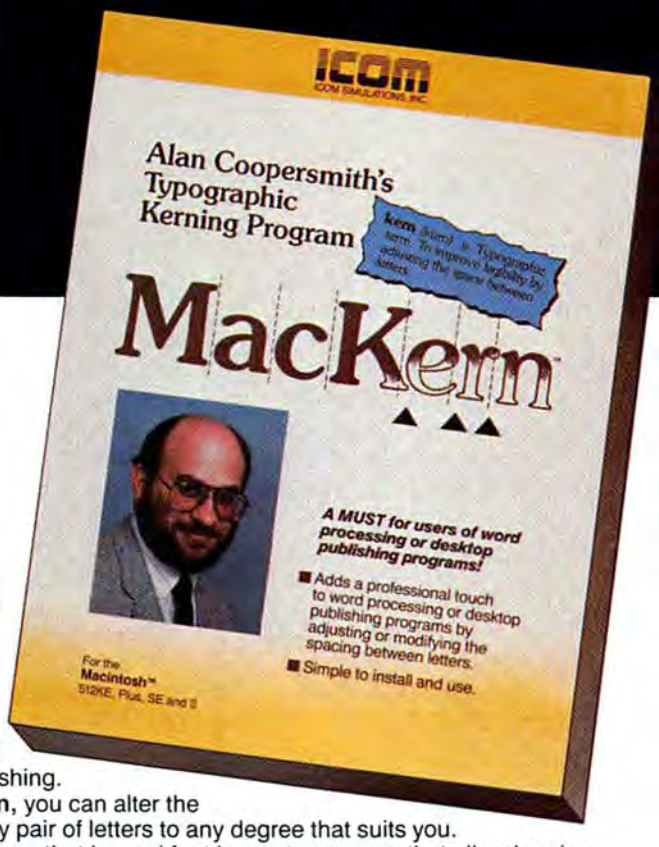

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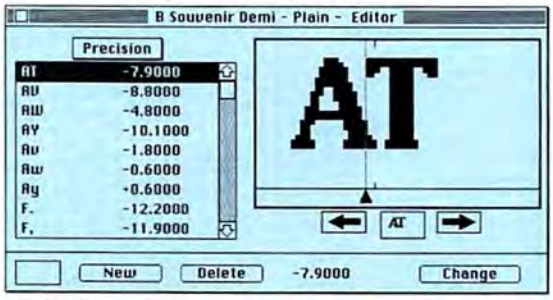

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as a logo for a "computer or computer peripheral device."

This information came too late to advise you not to run the announcement. The product is now called Flying Buckeye. Thank you.

Don Casey
Dynatron
Columbus, Ohio

Going for Brokerage

Thank you for Steven Levy's column [September 1988] on used Macs and the brokerage firm that redistributes this commodity. The only bit of information omitted was the contact information for these brokers. Can you help?

John Richardson
Roeland Park, Kansas

Computer Brokerage, Inc. is located at 330 W. 42nd St., #2420, New York, NY 10036, and its phone number is 212/947-7848.—Ed.

Hot T-Shirts

Two years ago at the Macworld Expo in Boston, I bought a package called T-Shirt Factory from an outfit named I/O Design. The package contained heat-transfer ribbons that allow Mac-created designs to be printed out on regular paper and then transferred to a T-shirt by pressing them with a hot iron. The system works great and I've had a lot of fun with it. Can you help me get in touch with the I/O folks again?

Furman S. Baldwin
Cornwall-on-Hudson, New York

The ribbon is still available from I/O Design for $19.95. The address is P.O. Box 156, Exton, PA 19341, and the phone number is 800/241-2122.—Ed.

Kiwi Lifesaver

Macworld had information on the Kiwi Envelopes program in a recent issue, but I can't find it to save my life. Could you please supply the reference? Many thanks.

Jim Wendel
via Compuserve

Kiwi Envelopes was reviewed in June 1988 and mentioned in "The (D)A Team" (September 1988). The current version of the program is 2.03, and it is free. You

(continues)

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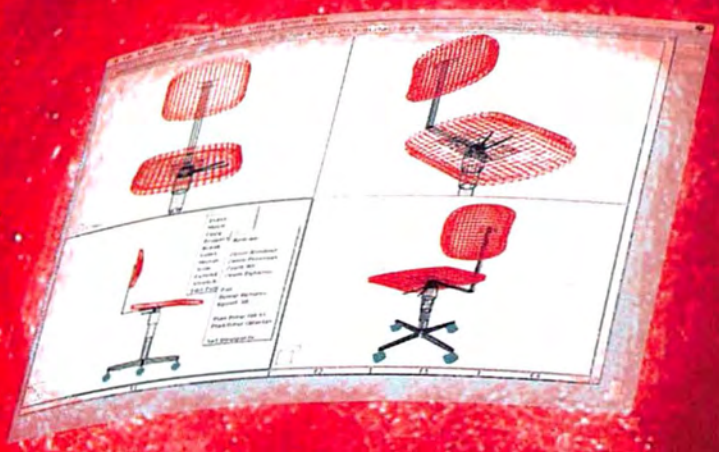

AutoCAD,® the world-standard CAD software, now runs on your Macintosh® II.

Your designs reflect the quality of your thinking. And your drawings reflect the quality of your designs. Put AutoCAD on your Mac II and nothing gets lost in the translation.

AutoCAD's extensive set of drawing tools enhances your productivity. Its effectiveness is proven every day by over 175,000 architectural, civil, construction, aerospace, electrical, cartographic, facility, industrial, manufacturing and mechanical design professionals around the world.

AutoCAD has been refined through ten major upgrades. You get menus full of powerful, high-precision drawing and editing commands, numerous drawing entities, and a multitude of easy-to-use features. You can window, zoom, fillet, scale, layer, annotate and associatively dimension, hatch, stretch and scale. And a simple click can undo anything or everything.

AutoCAD on the Macintosh also supports the features that have made Apple the acknowledged leader in user interface design, offering pull-down, tear-off, and pop-up menus, complete support for Multifinder™ and the Mac windowing system, along with file dialog boxes to make access to your drawing files quick and easy. Clipboard support allows the transfer of AutoCAD drawings to a wide variety of Macintosh applications software.

A Better Perspective. AutoCAD is an advanced three-dimensional modeler that helps you solve design challenges on your Mac the way you would with physical prototypes. AutoCAD makes 3-D easy with user-defined construction planes, dynamic viewing and multiple viewports.

You can also model complex surfaces with AutoCAD using sophisticated tools such as tabulated cylinders, surfaces of revolution, ruled surfaces and Coons patches so you can represent surfaces accurately.

For even greater utility, AutoCAD provides entity handles that allow external applications to associate alphanumeric information, such as part numbers and capacity ratings, with graphical elements in the drawing. This associativity is creating an entirely new generation of useful third-party applications software.

A Reflection of You. AutoCAD is an open-architecture system including AutoLISP,® an embedded programming language that lets you program AutoCAD to reflect your way of doing things. Add your own menus to enter your own commands, write macros, develop custom symbols and drawing functions, or program standard procedures for document production and management.

Hundreds of third-party programmers have used AutoLISP to develop entire systems that make AutoCAD perfect for applications ranging from chemical engineering to technical publishing. Many of these programs run on the Mac II and more are on their way.

Maintain Your Standards. AutoCAD is the most extensively used, most broadly supported, widely taught design software in the world. AutoCAD is backed by over 1,400 highly-trained dealers and 150 Authorized Training Centers in 60 countries. We'll make sure you get what you expect from your CAD investment. That's what standards are all about.

Opportunity knocks just once. The CAD software you standardize on today will determine your productivity for years to come. To see a demonstration at the dealer nearest you, call Autodesk at 800/445-5415, extension 25, at your earliest opportunity.

AutoCAD makes Macintosh a standard player in CAD applications ranging from architecture to automated manufacturing. And AutoCAD is the standard for communication in the CAD world. AutoCAD's file portability allows seamless transfer of drawings and applications between different platforms and operating systems—without conversion to a generic format.

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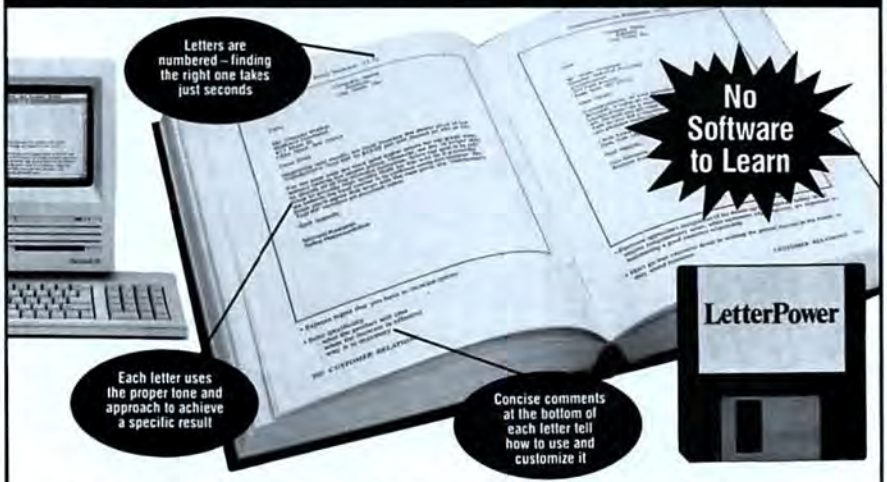

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can order it by sending $8 for shipping and handling to Kiwi Envelopes Fulfilling, Kiwi Software, Inc., 6546 Pardall Rd., Santa Barbara, CA 93117.—Ed.

Rabbit News

I have been a *Macworld* subscriber since the premier issue came out in 1984. Indeed, I now receive two subscriptions, one at home and one at the office. That way I can generously loan one, knowing that the other remains safe. In recognition of such loyalty, I hope you will perform a small service for me.

Could you provide an address for Marinell and Robert Harriman, publishers of *House Rabbit Journal*? Their publication was featured in an article by Joe Matazzoni entitled "A Halftone Handbook" [October 1988]. My pet minilop rabbit, Dave, thought Lillian (with the black ears) was quite attractive. I expect that Dave will be as loyal a subscriber to *House Rabbit Journal* as I have been to *Macworld*.

Sandy Nelson
Tucson, Arizona

Macworld *received a number of requests for information on the journal. To receive a sample copy and subscription information, write* House Rabbit Journal, *1615 Encinal Ave., Alameda, CA 94501.—Ed.*

Slots, S'il Vous Plait

First of all, I've had a Mac since the Dark Ages back in 1984. The Macintosh is clearly superior to any text-based microcomputer. No doubts here, but the dream machine has yet to come.

A Mac II has been sitting on my desk for a year now and I love it. Still, despite its explosive duo of processors, it is sometimes terribly slo-o-ow, especially when doing operations like moving PixelPaint color pictures on the screen. What if we helped the Mac Toolbox (including QuickDraw) with another microprocessor dedicated to graphics? We have slots—why not use them? I've been watching Commodore's Amiga and its multiprocessing/multitasking system. Believe me, the animations are very fast and in color, s'il vous plait.

If Apple really wants to beat the competition, it's already got the solution. The magic letters are S-L-O-T-S.

Carlo Casaccia
Monte Carlo, Monaco

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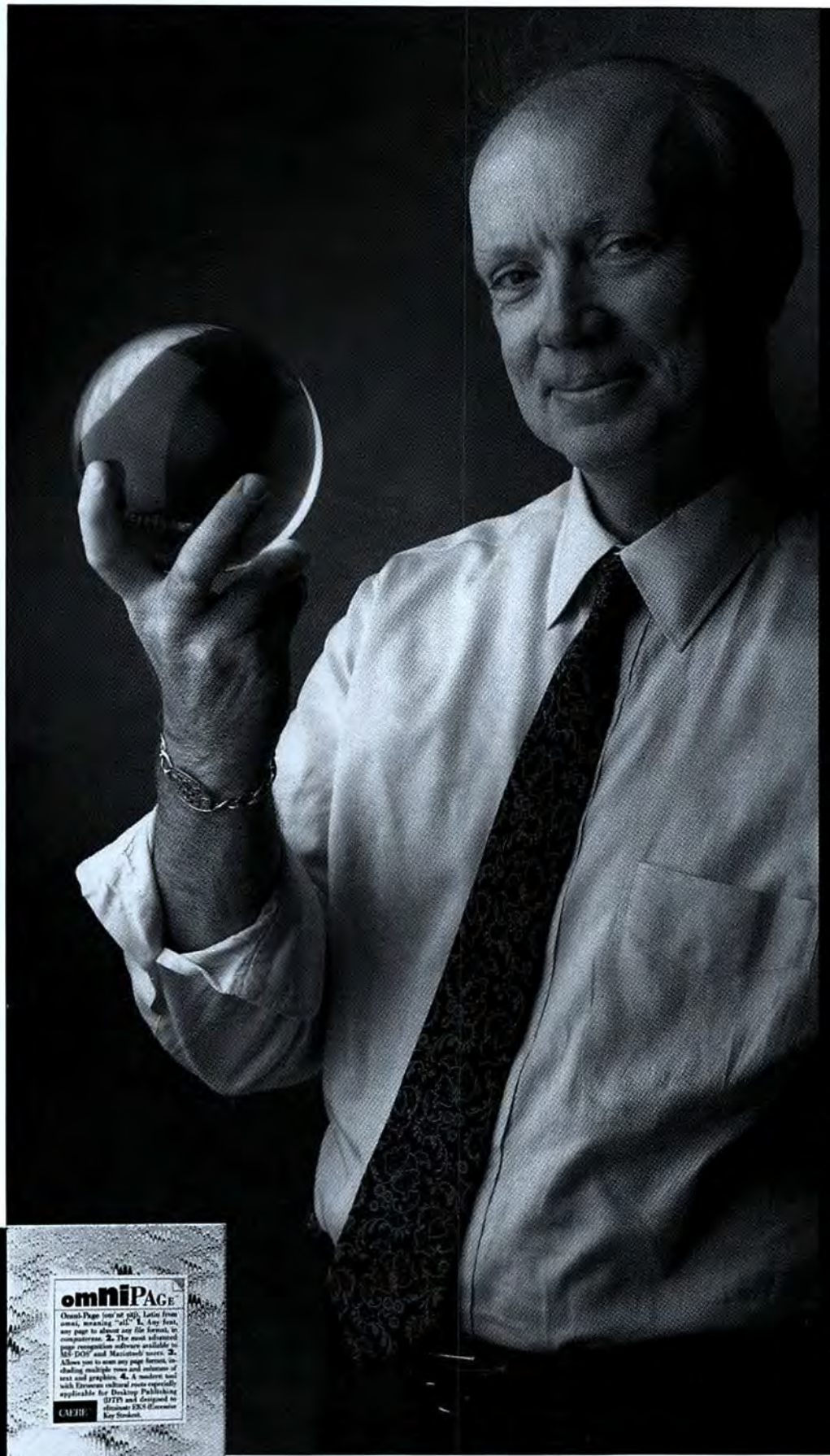

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Customer Profile

Regis McKenna

Age: Old enough to remember the day that Intel Corporation was founded.

Profession: Chairman of Regis McKenna Inc., a major marketing company based in "Silicon Valley." A general partner in the venture capital firm of Kleiner Perkins Caufield & Beyers. Author of the *Regis Touch* and most recently, *Who's Afraid of Big Blue?**

Hobbies: Enjoys doing extensive research on innovative new technologies. He recently became involved in building and archiving an extensive database, using state-of-the-art page recognition software.

His Page Recognition Software: *OmniPage* of course. According to Regis: "*OmniPage* represents one of the most complete page recognition software products; providing incredible flexibility to customize data which can be easily accessed later. All of a sudden the cost of archiving and retrieving data has dropped significantly. The 'Information Age' is upon us and we have an exciting new tool."

Favorite Quote: The New York Times: "*OmniPage* could be the most significant advance in personal computing this year."

Things Disliked Most: "Technology that is not easily accessible or powerful enough to serve the needs of people."

Favorite Scan: "I'm using *OmniPage* to build an extensive electronic library that pertains to the growth and evolution of technology over the past 25 years. Being able to scan literally any article, regardless of layout or column format, has suddenly made this all possible. It's eliminated the labor intensive task of data entry. I'll be able to share this information with employees, customers and colleagues over time. It's an exciting collection of business case studies for future reference."

Future of Page Recognition: "*OmniPage* has provided me with the customizable tool that I need. I can use the Partial Page feature to scan only that text which is relevant to my needs. Having a version that runs in MS-Windows should impress those who are committed to that environment. What we're seeing here is the emergence of a new product category."

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Los Gatos, CA 95030 Or Call: 1-800-535-SCAN

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FINALLY, A MASS STORAGE SOLUTION FOR YOUR MEGABYTE HOGS.

Your Mac can do astonishing things with graphics and text. But as you well know, those software applications, 3-D diagrams, and bloated data files are eating up storage megabytes by the bushel. In fact, they're probably dipping into your last MB right now. But there is a solution. The Bernoulli™ never-ending storage solution.

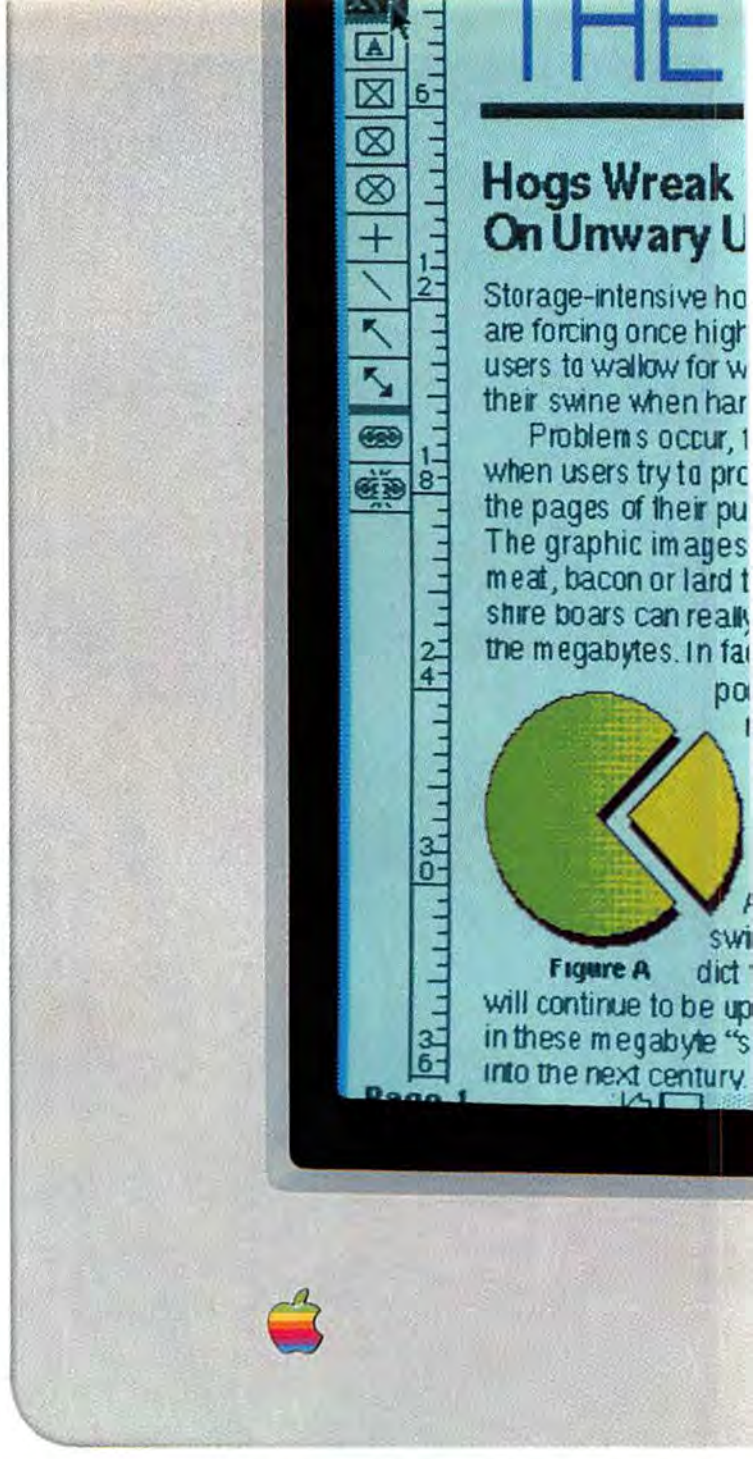
Bernoulli removable Disk Cartridges provide infinite data storage capacity.

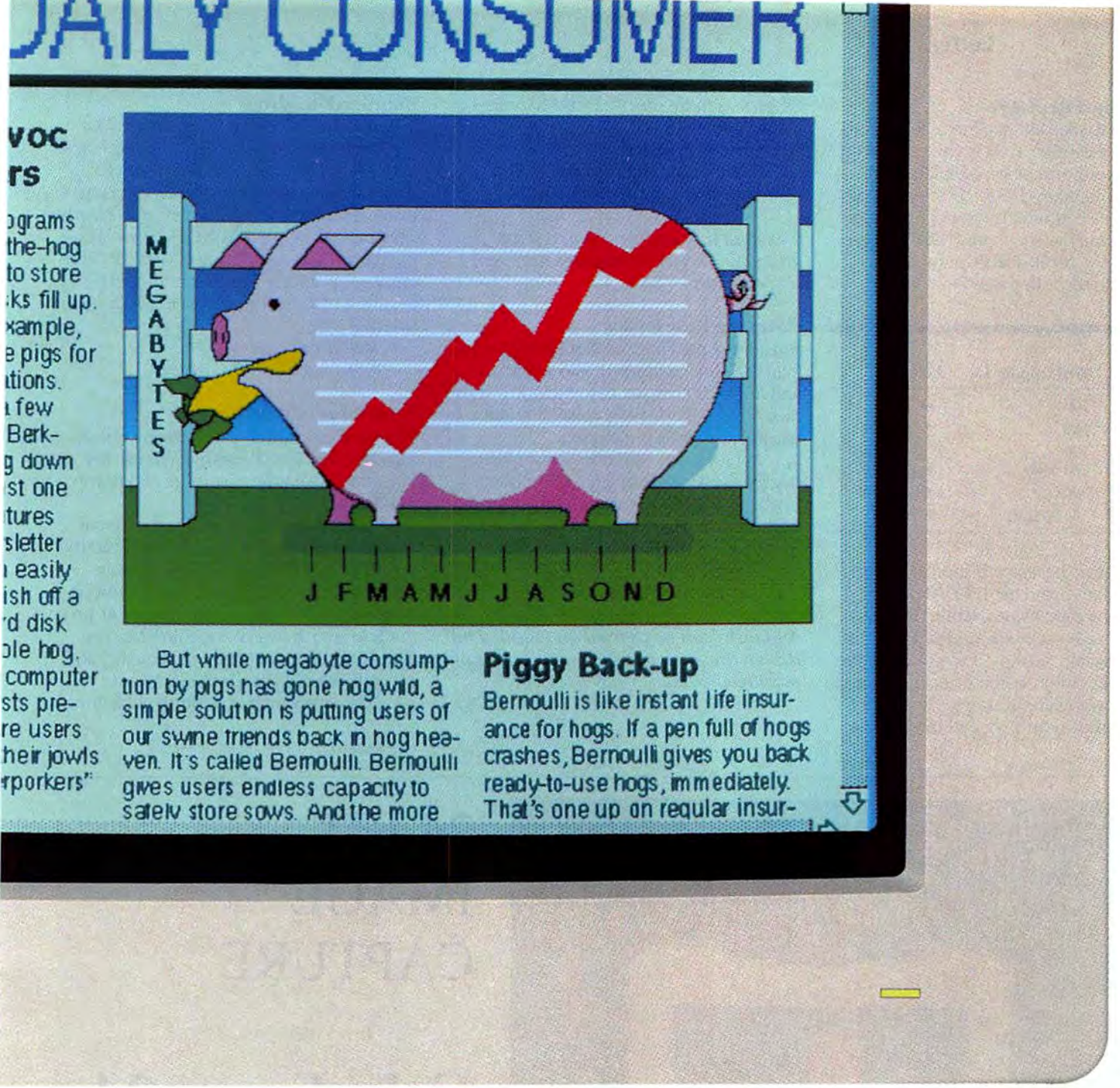
PERFORMANCE. Bernoulli offers high-performance, removable mass storage systems for the Mac. Unlimited primary storage systems with performance that compares to better hard disks (‹40msec access time). And if you already have a hard disk, Bernoulli provides infinite extended storage capacity. So you can store and manage your projects on 20MB removable Disk Cartridges easily and inexpensively as you see fit. With increased on-line capacity plus never-ending additional storage at your fingertips.

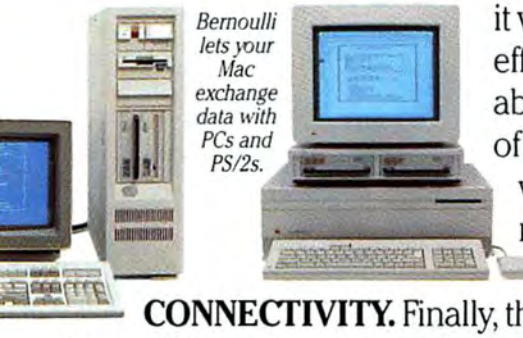
BACKUP. Bernoulli also provides backup. Working backup that can give you an immediately usable, identical 20MB copy of your original in under 2 minutes. All in all, your Bernoulli system can function as your primary storage device and backup system all in one.

Bernoulli Cartridges are lightweight and durable enough to ship anywhere.

SECURITY. Bernoulli Technology™ is the one data storage technology that's virtually head-crash and disk-contamination free. As for durability, Bernoulli Disk Cartridges withstand over 1000Gs of shock. They're built to survive the trip across town, or across the world. Add to that the physical security Bernoulli provides. With Bernoulli removable Disk Cartridges, you can lock your data in a safe or desk drawer, or take







Bernoulli lets your Mac exchange data with PCs and PS/2s.

it with you. In effect, you retain absolute control of your files. And what could be more secure than that?

CONNECTIVITY. Finally, there's one more Bernoulli benefit you should consider: Bernoulli Disk Cartridges are transferable between the Macintosh™ and PCs and PS/2s.™ So you can now exchange files with the IBM® world as much (or as little, for that matter) as you like. Bernoulli provides the missing link. What else would you expect from the number one company in removable mass storage? So roll your megabyte hogs and your other storage problems into one low-cost solution. Bernoulli Boxes for the Mac are available in three models, in 5¼" and 8" form factors. For more information, see your Iomega Authorized Reseller, or call 1-800-832-5511.

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Full Impact Reprieve

While I was pleased in general with *Macworld*'s December 1988 review of Full Impact 1.0, your evaluation of Full Impact's precision compared to Excel 1.5 was inaccurate. We replicated Lawrence Stevens's test of taking the square root of 100, then squaring the result a large number of times, with the following outcome.

No. of times	Full Impact 1.0	Excel 1.5
25	100	100
30	100	99.999977
35	100	100.000096
40	99.999994	100.005437
45	99.99972	100.421361
50	99.993236	90.01713

Full Impact is necessarily more accurate, since we have used the IEEE 10-byte extended-precision values, while Excel uses 8-byte double-precision values. Thus, to paraphrase Mr. Stevens, if you're using the spreadsheet in precision-oriented scientific or engineering applications, you might consider that in my text, Full Impact, not Excel, was more precise by three orders of magnitude.

Lane W. Freestone
Ashton-Tate Macintosh Division
Campbell, California

We regret that our precision test was faulty. Mr. Freestone's figures are essentially correct.—Ed.

Covering Your Basics

Amazing! I paid in excess of $2000 for my Mac Plus, ImageWriter II, and a disk drive; and Apple did not see fit to include a set of dust covers. Buy a $9.95 calculator and a plastic dust cover is included.

My solution—a Radio Shack plastic bag for the Macintosh Plus, a "People Crackers" dog food cardboard box for the keyboard, and a used typewriter cover for the ImageWriter II.

Tom Schmitt
Alexandria, Minnesota

And disks can be carried and mailed in the flat tin boxes in which some cigars are packaged.—Ed.

Required Reading

J. E. Arcellana's October 1988 article, "Is Desktop Publishing Worth It?," was the best discussion I have seen on the value of desktop publishing. The author, by using examples of actual publications, has clearly illustrated the costs involved in undertaking the various composing chores that generate publications. The article should be required reading for everyone who is considering DTP.

William H. Eccles
Columbia, South Carolina

True Value of DTP

I enjoyed your article on desktop publishing (October 1988). However, the writer failed to explain the true value of desktop publishing.

The Albany Medical Center's annual report, which was previously produced by traditional methods, was desktop published in-house this year. It was produced in less time, with more control over its production, and at nearly one-third the cost. The publication maintained its quality and recently received two national awards.

The true worth of desktop publishing

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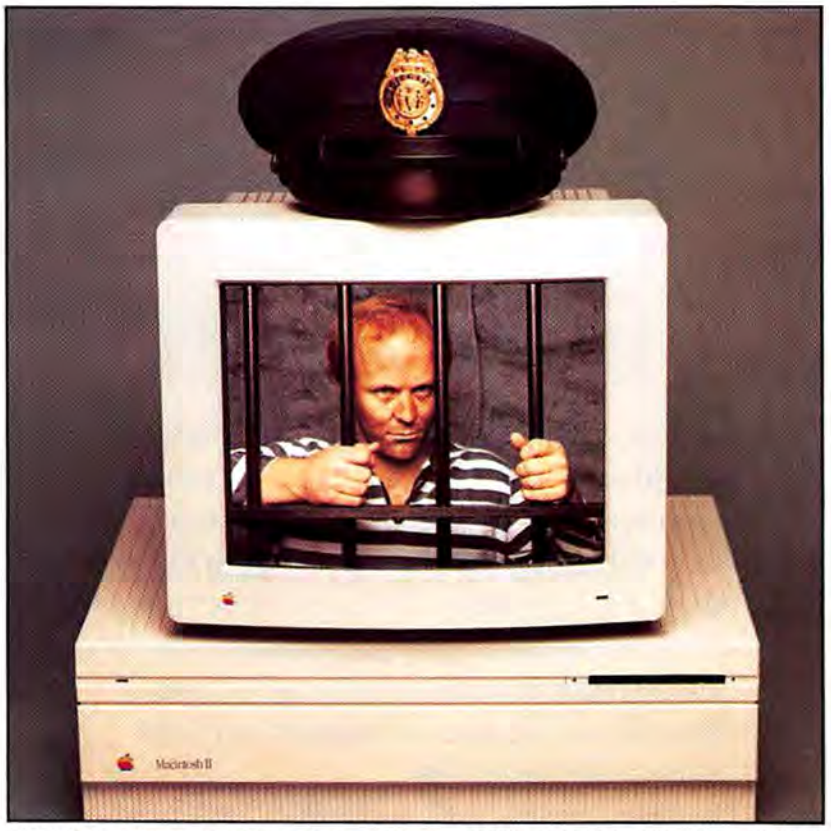

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Novell presents a net even the pickiest

Macintosh owners have a reputation for being fanatical about their Macs. And rightfully so, when you consider the elegance of the Macintosh user interface.

So when Novell set out to network the Macintosh with PCs, it was with one clear caveat: preserve the Mac environment. Create network software that would feel right to the pickiest of all Macintosh users. And none are pickier than the ones at Apple.

Full AppleTalk compatibility. Working directly with Apple, Novell's programmers created a version of NetWare® that is compatible with the AppleTalk Filing Protocol (AFP). It's an achievement hailed by Apple President and CEO John Sculley as "a very significant event for the industry." And it means that Mac users can now get all the power and flexibility of the number one local area network in the world, without sacrificing any Macintosh functionality.

AFP compatibility also means that NetWare for Macintosh will be fully compatible with future Macintosh hardware and operating system versions. So you can take advantage of new Macintosh product releases as soon as they become available.

Freedom to choose. NetWare for Macintosh lets you connect Macs with a

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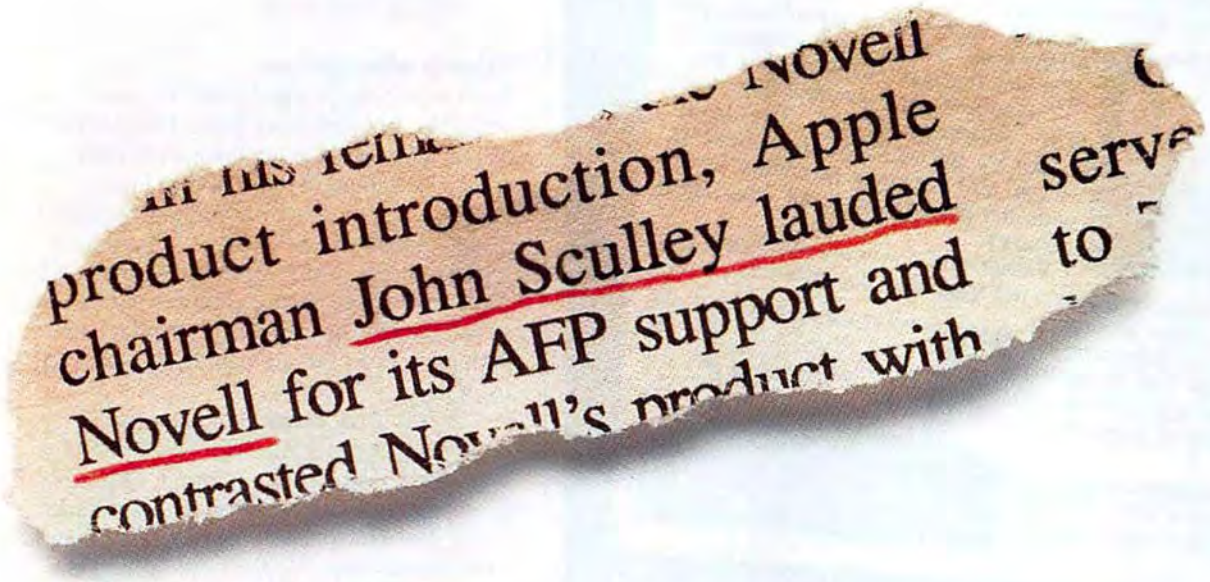

InfoWorld, June 20, 1988

work made to satisfy Macintosh user.

myriad of PC, minicomputer and mainframe environments, including OS/2. So you can choose the workstation environment that best suits your needs while communicating easily between dissimilar operating systems and sharing files and peripherals.

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To satisfy your need for a powerful Macintosh network, plug into NetWare—the network that passed the ultimate Mac test drive. See your Gold Novell Authorized Reseller, or call 1-800-LANKIND.

For more information, call from your modem 1-800-444-4472 (8 bit, no parity, 1 stop bit) and enter the access code NVMC17.

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FATHER SHOT DOWN BY OWN SON

INCLINE VILLAGE, NV--A grueling 32 minute air battle came to an explosive climax today in a conflict that pitted father against son, P51 Mustang against Me109, in the skies over France.

"He's a great kid normally, but don't fly over France with him. He'll turn on you like a hard disk gone bad", responded the loser. "He was in my sights and I shot him, that's all", explained the son.

The dogfight was accomplished using **P51 Mustang Flight Simulator**, written by the victorious son, Donald A. Hill, Jr. "For all I know, he cheats, he did write the program, after all", the father quipped.

Father and son were using the two player feature of P51 Mustang. It allows two Macintosh computers to be connected directly with a cable for one on one competition. The program also includes a replay feature that allows the previous 4 minutes of action to be reviewed, from a variety of camera angles.

The two were left hunkered down over their computers with the elder Hill proclaiming, "Watch out you ungrateful kid, I'm on yer six!"

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Letters

is found not in the somewhat slight savings of having an outside firm produce your publication. It is found in bringing the equipment and expertise in-house.

Richard A. Puff
Albany, New York

Printer Alternatives

I was very disappointed with "Printer Tools" in the November issue. I found the article heavily biased in favor of Apple's overpriced ImageWriters. When I purchased a printer for my home Mac system, I bought a Seikosha SP-1000AP. It has a nine-pin printhead, as do the ImageWriters, and its print quality is better defined, with a more sharply chiseled quality. And it came with a warranty far superior to that offered by Apple.

At $299, my Epson-Seikosha was almost $200 cheaper than the best price I could find for the ImageWriter. It requires no special hookup, no special codes, and, in the year I have used it, it has never failed to accurately translate the code sent by my Mac Plus. The Seikosha is somewhat slower than the ImageWriter II, but with SuperSpool, I can continue to use my computer while it is printing.

You do your readers a disservice in not acknowledging this inexpensive, quality alternative to the ImageWriter.

Robert Greenstreet
Ada, Oklahoma

Orphan Scanners

Our office purchased the LoDown scanner in 1987 after we read about it in your magazine. Now that the company is out of business, we're faced with the frustrating problem of where to turn for upgrades to the very buggy software. Do you know of any other software that might work with our scanner (a Canon IX-12)?

Duane Wright
Seattle, Washington

MacScan Plus by New Image Technologies will solve your problem. Its interface/software package generally retails for $648, but as a special offer to LoDown scanner owners, the package is available for $500. The address is 9701 Philadelphia Ct., Lanham, MD 20706; 301/731-2000.—Ed.

Above and Beyond

A company that goes above and beyond deserves recognition. I would like to let

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"1st Aid Kit™ falls into that special category of 'must-have' products" (*MACazine*, April '87). It lets you handle every Mac problem from difficulties copying files, printing, and using AppleTalk networks, to recovering lost data from deleted or damaged files and unreadable disks.

Acclaimed by novice and expert alike, the 1st Aid Kit is much more than powerful software. At its core is a clearly written reference manual that:

- lists every imaginable error condition
- helps you quickly track down solutions to any problem
- takes you step-by-step through each recovery effort
- shows you how to avoid problems

"The definitive product for troubleshooting on the Macintosh™" (*Macworld*, April '87). It "stand[s] head and shoulders above any other product like it . . . I can't recommend 1st Aid Kit strongly enough" (*MACazine*, April '87).

1st Aid Kit $99.95

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1st Aid Software, Inc.
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We all know backups are necessary. Without them, you're pretty much hoping that your hard disk will never, ever crash.

But let's face it. Backups are not exactly fun.

It's probably your 145th favorite chore, somewhere between regrouting the tile and dropping a bowling ball on your foot.

Which explains why our Redux™ backup program has become so popular these days. It's easy-to-use, flexible, and fast.

Whereas most backup programs give you two options (one file or the whole thing), Redux lets you specify exactly which files you want. And when.

You can then automate the entire process. And that saves time. Lots of time.

As a matter of fact, MacWorld called Redux "almost fun backups." (Sep88)

Fair enough.

Redux by Dave Winzler

microseeds publishing inc

For a free "I hate backing up." button, send us a self-addressed stamped envelope. Quantities are limited.
Redux is a trademark of Microseeds Publishing, Inc. 4702 N. Hesperides St., Tampa, FL 33614 (813) 882-8635

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Letters

you and your readers know about an exceptional manufacturer. Almost one year ago, I purchased an 800K disk drive from The Cutting Edge, of Evanston, Wyoming, via mail order. In the interim, I replaced my 512KE with a Mac SE20 and found that my old external drive wouldn't work properly with the new Mac. Although I found that no upgrade was available for my old drive, The Cutting Edge swapped my drive for one that is faster and quieter than any I have ever seen. I wish all companies could be as attentive to our needs as these fine folks.

Ronald J. Bobele
Longwood, Florida

Dictaphone Explained

In your article, "Coming Soon to a Monitor Near You" (September 1988), the word *dictaphone* is used to describe dictation/transcription equipment in general. We are most grateful to anyone who associates our trademark with equipment marketed by Dictaphone Corporation. Unfortunately, a great many people inadvertently use the word *dictaphone* merely as a synonym for such equipment, or to describe the operating skills associated with it. We trust you will understand our concern that our trademark be used properly in view of its great value to us.

Martin D. Wittstein
Dictaphone Corporation
Stratford, Connecticut

We didn't mean to be cavalier in the use of your trademark. Please accept our apologies.—Ed

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"Thanks for the memory."

—Dean Gjivovich,
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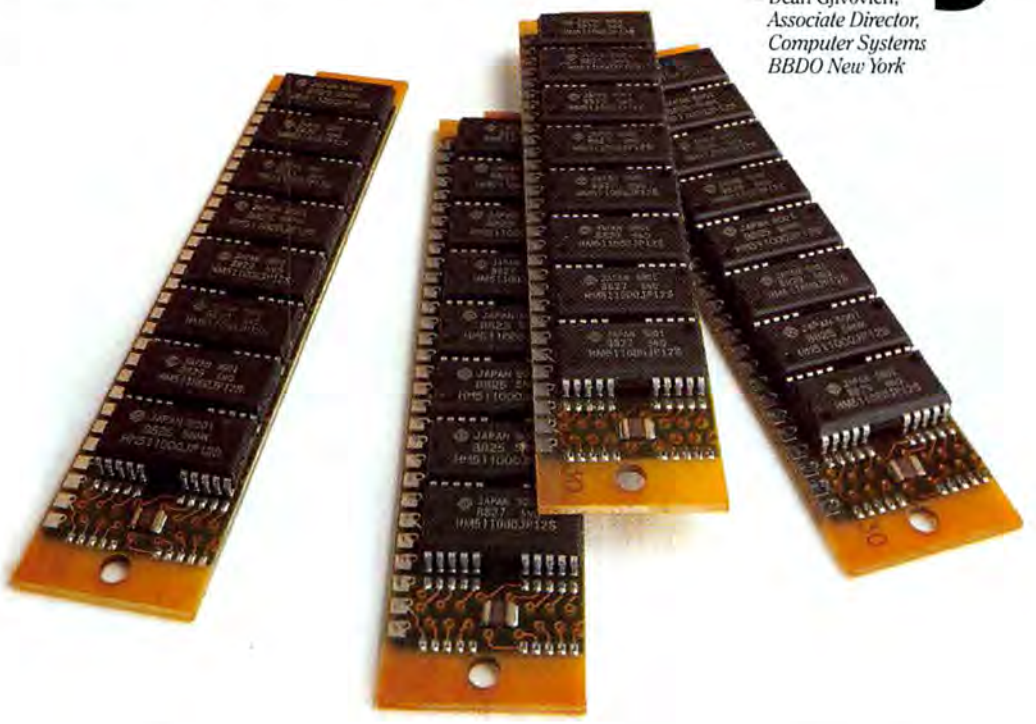

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David Bunnell

The Great Price Hike

Was Apple's price increase smart business or a slap in the face to loyal buyers?

We've recently seen the classic economic theory of supply and demand work against loyal Macintosh customers, many of whom have championed the Mac at their companies. Demand for Macintoshes, and in particular the Mac II, is at an all-time high. Estimates are that Apple has a $200 million backlog in orders for Macs. So what did Apple executives decide to do about it? Raise prices and increase their profit margin, that's what. What's wrong with that in our capitalist society? (How much time do you have?)

The fact is Apple has never been—and hopefully will never become—just an ordinary computer manufacturer. Beginning with the Apple II, and continuing with its various Macintoshes, Apple inspired a fanaticism among its followers that's comparable to the fervor one finds at a revival meeting. Even in the normally staid corporate world, the Macintosh has always been more than just a computer—many people would rather be phoneless than Mac-less. It's obviously desirable for Apple to maintain this buyer loyalty and competitive advantage.

By discouraging the development of Macintosh clones and refusing to license its technology, Apple has been in the enviable yet risky position of being the sole supplier of Macintosh technology. Like IBM mainframe customers of old, Apple and Macintosh buyers have been a captive market. Having built their computer systems on a Macintosh base, they are totally dependent on Apple when it comes to upgrading or increasing the number of their desktop workstations. As long as the Mac maintains its edge, with easy-to-use, graphics-based software that can't be duplicated on the IBM platform, Apple can maintain the highest profit margin in the industry. It can demand, and get, more and more of your computing dollars.

It is particularly discouraging to see the 29 percent increase in the price of the basic Mac II, which has been Apple's chief weapon in its assault on the business market. Some people say Apple's move is justified by the escalating cost of RAM chips, but this just doesn't compute, since Apple's record-breaking profit margins continue to rise. Meanwhile, Apple representatives claim that the price hike is not expected to lead to a decrease in demand. Talk about having it both ways. Surely many SE and Plus users who were planning to upgrade to the Mac II will delay their purchases. Doubtless many first-timers who want to come over to the SE are going to have to wait while they save more money for the higher-priced machine. What else can they do?

In the short term, I don't expect that Apple will pay much attention to criticism from any of us about its business policies. Fourth-quarter earnings, announced in late October, were at an all-time high: $107.9 million, up 52 percent from the previous year, and, of course, Apple stock followed suit. You can hardly blame John Sculley and crew if they are feeling a little smug right now. But don't you wonder whether Apple has lost sight of its corporate mission? Has satisfying customers become secondary to ingratiating itself with Wall Street? This may be the age of high stakes and quick-profit investment banking, but I'm convinced that investor gains made at the expense of smaller customers has got to be a short-lived phenomenon.

Even though the Macintosh is unbelievably popular, the market reality is that for every Mac, there are ten DOS-based personal computers. This has to be an incredibly tempting market for Macintosh software developers. It's no wonder many of them are busily porting the most popular Macintosh applications to OS/2. With OS/2 just around the corner, now is the time for Apple to think about expanding its base. Unless this happens, applications that are now being pioneered on the Mac will debut on IBM PS/2s. The Mac will lose its technological edge and Apple will have to find new ways to survive—let alone thrive—in a very hostile competitive market.

Listen up, Apple: customer loyalty can be a fickle thing. You only have to look back to 1982 to see how the IBM PC knocked Apple out of the leadership role. At that time it looked as if Apple was going to have to start producing IBM clones if it wanted to survive.

In the coming months, IBM and its ally Microsoft will mount a serious challenge to the Mac's perceived technological edge by offering software vendors a much larger market. The Mac may suddenly start looking like an expensive secondary machine. Of course, Apple can always reverse itself and start lowering prices, but by then it may have lost the hearts, minds, and pocketbooks of many loyal customers.

Supply and demand may work for ordinary companies, but not for Apple. In the final analysis, we users and buyers are Apple's future. I'd rather trust us than an economic theory any day. □

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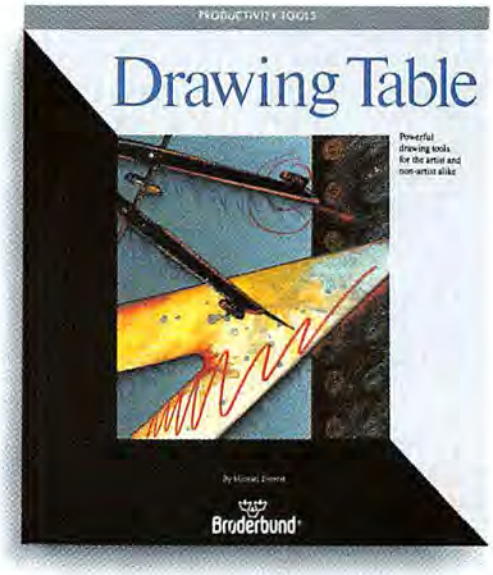

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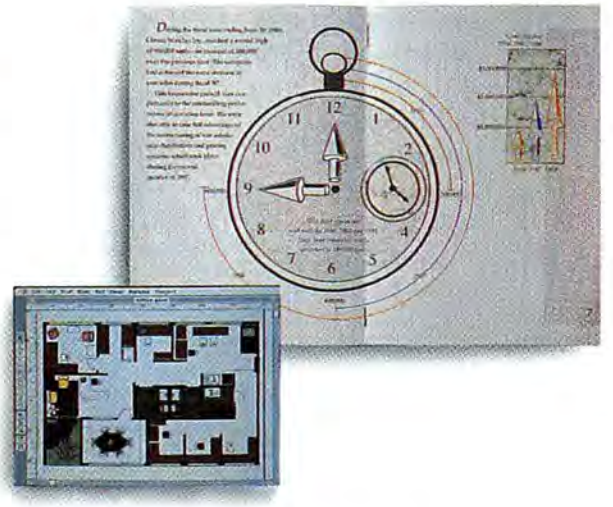

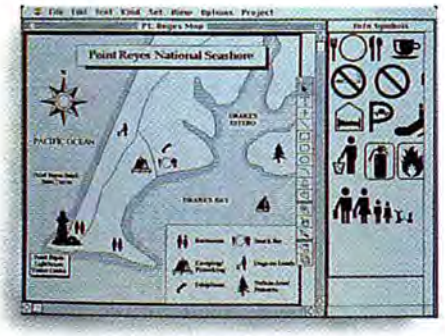

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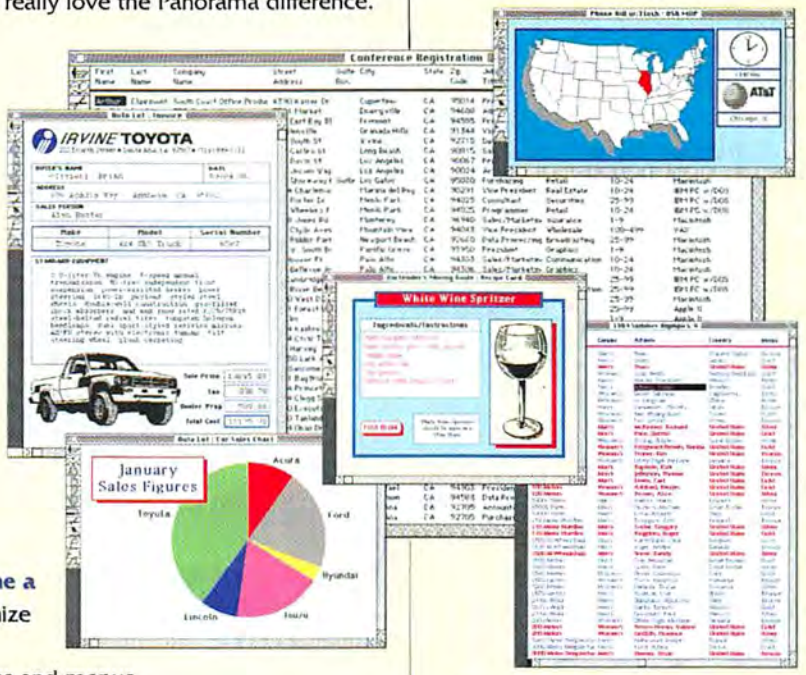

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Circle 451 on reader service card

Steven Levy

Throwing the Book at Apple

Yet another author tackles the mythology behind the Mac

This month the Macintosh is five years old. Apple Computer recently celebrated its eleventh birthday as a registered corporation. And yet another book is being released on the story of Apple.

It is called *West of Eden,* and its author is New York journalist Frank Rose. It chronicles the company beginning with the introduction of the Lisa computer (early 1983) and ending with the formation of a new company called Next by Apple's cofounder and former chairman, Steve Jobs (late 1985). Rose writes in classic new-journalism style—the subtitle is "The End of Innocence at Apple Computer," but he could have alternatively used "Bonfire of the Techies." He gives us the most thorough account we will probably ever have of those days of making Macintoshes and fighting battles in boardrooms. In fact, corporate infighting winds up in center ring here, as it did in John Sculley's *Odyssey: Pepsi to Apple* (Harper and Row, 1987) and the spotlight zeros in on the soured love affair between Jobs and Sculley—referred to by Apple insiders, we learn, as "the Steve and John Show."

Obviously the result of painstaking research, *West of Eden* takes us to the corporate retreats, strategy sessions, and boardroom confrontations that decide the company's fate. The author's main interest is not really in computers. (Rose himself uses an Epson, which in the eyes of some disqualifies him from addressing this subject.) Instead he has written a *bildungsroman*. The protagonist is Apple itself, which he considers a "brilliant experiment . . . a technological manifestation of the sixties sensibility." The key evidence of this was Macintosh, the first computer that truly did its own thing. Rose suggests that the Mac team went too close to the edge. This is reflected by a scene in which a marketing person tells the computer's designers that Apple has a challenge ahead of it in selling the Mac. Everybody jumps on this poor fish: *What do you mean?* they retort. *All we have to do is make them and everybody will want to buy them!*

In Rose's view the Apple "experiment" failed: the quixotic attempt to merge the iconoclastic views of the sixties into a corporate atmosphere was just too much to pull off. Now Apple is less a symbol of irreverence and more a traditional, bottom-line business. "The reasons are related to a complex interaction," Rose says. "Steve's faults, the marketplace, John's faults . . . also, the Reagan years were a bad time to be preaching revolution of any sort." But Rose qualifies his judgment by saying that although the Apple of old has now "grown up" to be a mature company (and a wildly successful one), it still retains much of its previous luster.

Hit or Myth

West of Eden (Viking, 1989) is only the latest addition to a groaning Apple bookshelf. Other bulwarks include *The Little Kingdom: The Private Story of Apple Computer* (Morrow, 1984), by Michael Mor-

(continues)

Steven Levy is a Macworld *columnist and the author of* The Unicorn's Secret: Murder in the Age of Aquarius *(Prentice-Hall, 1988).*

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Circle 388 on reader service card

Steven Levy

itz; *Accidental Millionaire* (Paragon House), by Lee Butcher; and *Steve Jobs: The Journey Is the Reward* (Scott, Foresman and Co., 1988) by Jeffrey Young. In addition, major sections of many other books have dealt with the story of Apple.

Which leads us to the inevitable question: Why so many? What is it about Apple that draws authors to its gates like bees to nectar?

I think it really boils down to mythology. The story of Apple combines strains of the prodigal son, Oedipus, Horatio Alger, "Dynasty," and the Brothers Grimm. The late Joseph Campbell (*The Power of Myth*) would have loved this tale. Out of obscurity come two nerdy kids who go into a garage and build a product no one thinks is necessary—a personal computer! Out of that grows a multibillion-dollar company. And then the controversial founder, the symbolic soul of the company, hires an outsider to help him run the empire. And the new guy winds up throwing him out! Not since King Lear handed over the keys to the kingdom to his nasty daughters has such a story of betrayal been told. Of course, from John Sculley's point of view, anything less would have been a betrayal of the stockholders—but even the steady-tempered Sculley churns out heart-rending prose about how painful the split was.

There is something else to the Apple myth. The title of one of the first big magazine articles about Apple (published in *California*, July 1982) says it well: "Revenge of the Nerds." The founders of Apple were the kind of kids who were high school outsiders . . . losers, if you will. While everybody else was aspiring to jockhood, or going out with cheerleaders, these were geeky wireheads more interested in EPROMs than senior proms. The vindication of the meek is a powerful component of the Apple narrative; most of us (even popular people) feel that we've been kicked around at some point in our youth and have dreamed of eventually being rich and famous enough to sneer at our tormenters. Well, these guys did it, and we're bound to get some vicarious pleasure from that tale.

Frank Rose became well aware of the myriad resonances of the Apple saga when he researched *West of Eden*. "One of the great things about Apple is that its story offered something to everybody," he says. "If you were an iconoclastic, hippie-type per-

(continues)

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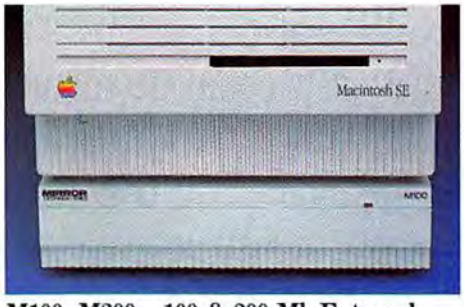

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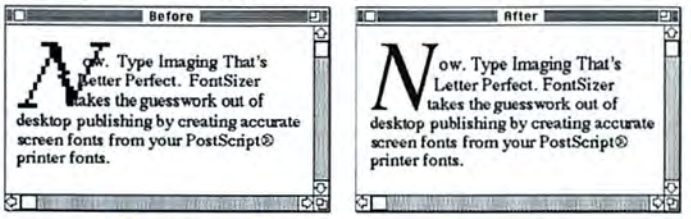

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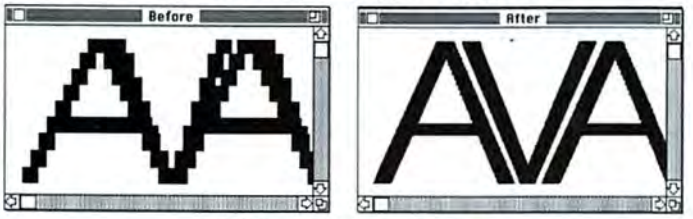

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son, you identified with Burrell Smith and Andy Hertzfeld, hackers who wanted a computer to express their wishes. If you were a money-oriented capitalist, Apple appealed to you, too. The company managed to combine the goals and aspirations of the sixties with the [materialistic] desires of the late seventies and the eighties. Along with those powerful social currents, there were the two faces you could identify with—the two Steves, Jobs and Wozniak."

Not an Easy Jobs

Writing about an institution, even one as exciting as Apple, can be terribly dry. When a writer is presented with a charismatic figure whose life parallels in some way the arc of the company's history, he or she clamps on like a pit bull. Especially such a weird guy as Steve Jobs. He seems to have gone through life leaving behind oodles of bizarre details, like Hansel and Gretel strewing bread crumbs in their wake. Mike Moritz in *The Little Kingdom* was the first to accumulate a bagful of those morsels. So we learned that when Steve got tense, he would often head to the men's room, stick his bare feet into the toilet bowl, and flush: instant foot massage. And then there was the time that Jobs, in his hippie years, became convinced that ingesting carrots was the way to holistic nirvana; as a result, the skin of the future multi-millionaire turned orange.

It's almost as if some siren song kicks in when writers encounter Jobs: *Write about me . . . write about me.* Jeffrey Young, for instance, couldn't resist. He told me that originally his unauthorized Jobs biography was to be a chronicle of the Macintosh. But when he finished a draft, he found his work flat. Then he realized that the most interesting parts were the ones about—guess who. And so, while retaining much of the Macintosh material (which stands as the strongest part of his book), he shifted the focus, from the Mac to its maker.

It would have to be an unauthorized biography, to be sure. Jobs was not ready to give his imprimatur to anyone, particularly Young (who boasts of having a "unique position as ringside observer to the development of Macintosh"—a half-truth at best). It is a recurring Silicon Valley—and publisher's row—guessing game as to what Steve himself will do in the book business. Will it be a Sculley-style autobiography, a semiauthorized account by a big-name au-

(continues)

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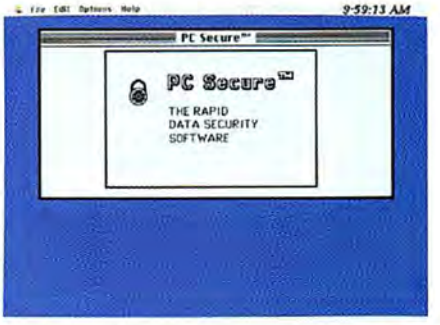

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thor, or a continued stonewall?

Meantime, there have always been plenty of people willing to spill the beans about Apple. Cupertino is Leak City. As a journalist working that beat I occasionally have had people approach me uninvited, spontaneously disgorging their favorite Jobs story.

Paradise Lost

John Sculley, of course, did not have that problem—he was his own main source for *Odyssey*, cowritten by *Business Week* writer John Byrne. Yet the ruling obsession in that book is also Steve Jobs. *Odyssey*'s narrative revolves around their relationship, and Sculley attains a melancholy apotheosis when he rids Apple of its distinctive cofounder. Only then does he grow to the point where he can merge the hardball business instincts he had honed in the tough world of East Coast management with the "softer," more idealistic virtues found in future-leaning West Coast companies like Apple. The company is saved, and our hero is free to dispense business advice and postulate future technologies.

Yet we still yearn for Jobs's voice. What does *he* think? *West of Eden* doesn't tell us. Despite Rose's terrific reporting, his book doesn't really get inside Jobs's head. (This isn't the author's fault—though Rose says he had one interview with Jobs, the cooperation ended soon afterward.)

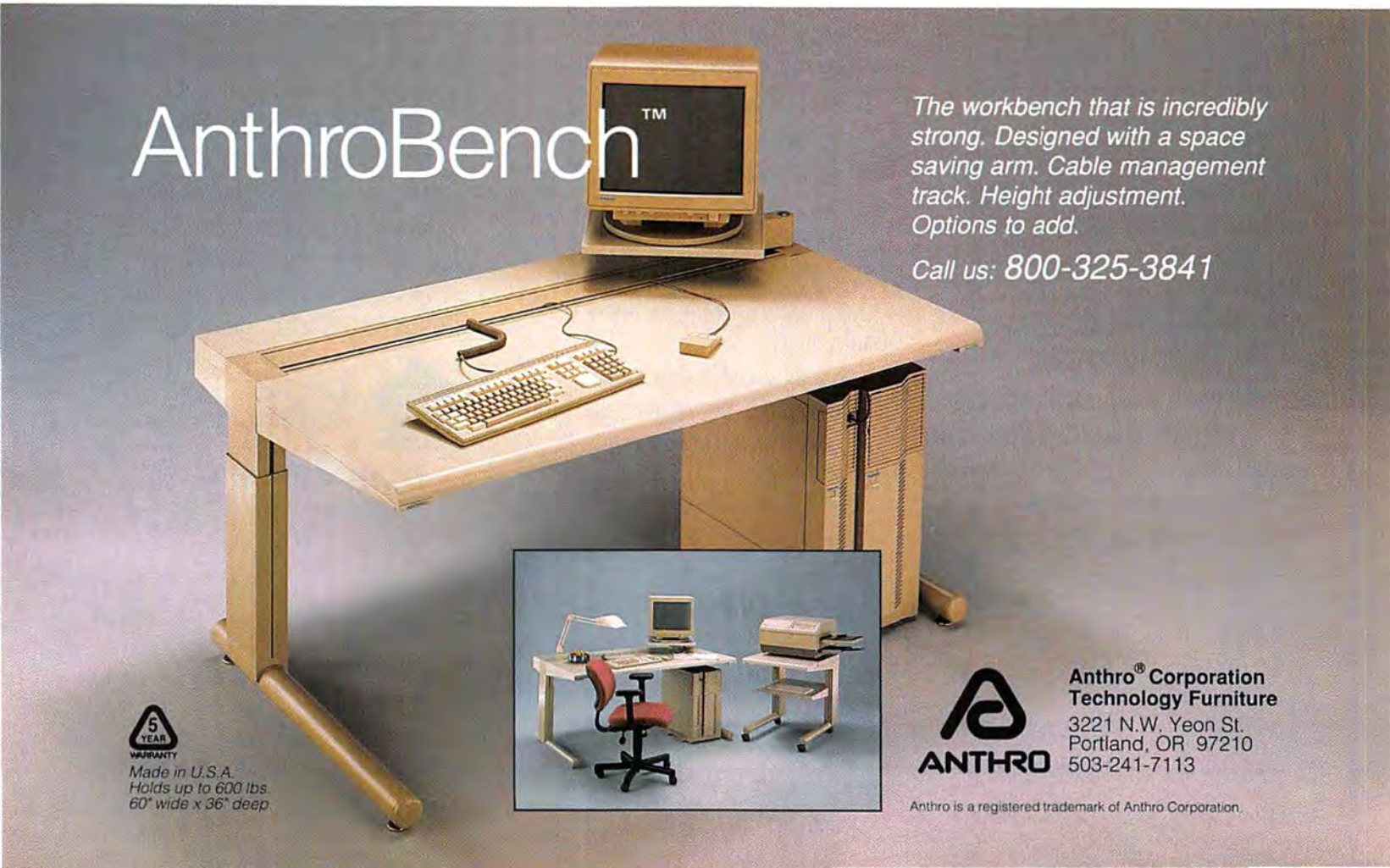
But then again, we don't really need Steve Jobs to plumb the depths of the Apple myth. The story speaks for itself. The company's history, like its computers, is a springboard to dreams. To change the world, make millions of dollars, get famous, and have the greatest T-shirt collection in the annals of mankind—this is at the heart of human endeavor!

The texture thickens with each retelling. At some point, I imagine, we'll say "enough" and refuse to listen to another word of the oft-told tales that begin with Steve and Steve pawning car and calculator to finance a run of Apple I's. By then our eyes will glaze over at hearing once more how close Apple came to not running its famous 1984 commercial.

But we're not at that point yet, so *West of Eden* is well worth a read.

If I may, I'd like to congratulate Apple Computer on the Macintosh's fifth anniversary. Working with, playing on, and writing about the Mac have given me immeasurable pleasure...and have literally provided my living. In another section of this magazine I quote one of the Macintosh designers, Andy Hertzfeld, in a moment of reflection (see "Glory Days"). He wondered what the world would have been like without the Macintosh and, pessimistic for a moment, says that maybe the world would have produced it a year later. I don't think so—the Mac pushed us much further, faster, than we would have gone without it. It was the boldness and ingenuity of a gutsy company that released the Macintosh in 1984, raising the stakes for what was to be considered an acceptable computer.

Five years from now, another computer may be the one that raises that standard further—but no matter how great that new machine is, I don't think we'll ever get the same thrill we got from the Mac. To everyone who conceived it, designed it, got it out the door, revived it in the marketplace, produced its successors, and generally made it great (but *not* to those who raised its price recently)—thanks. □



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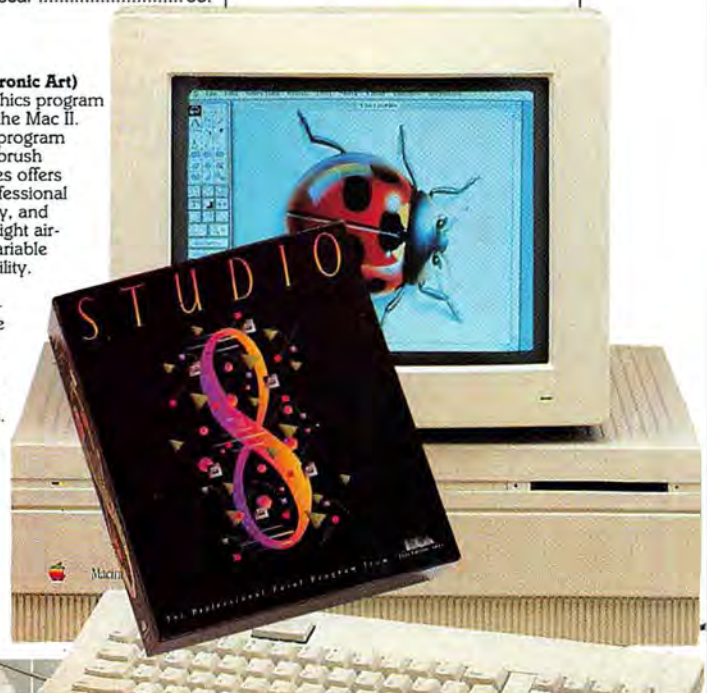

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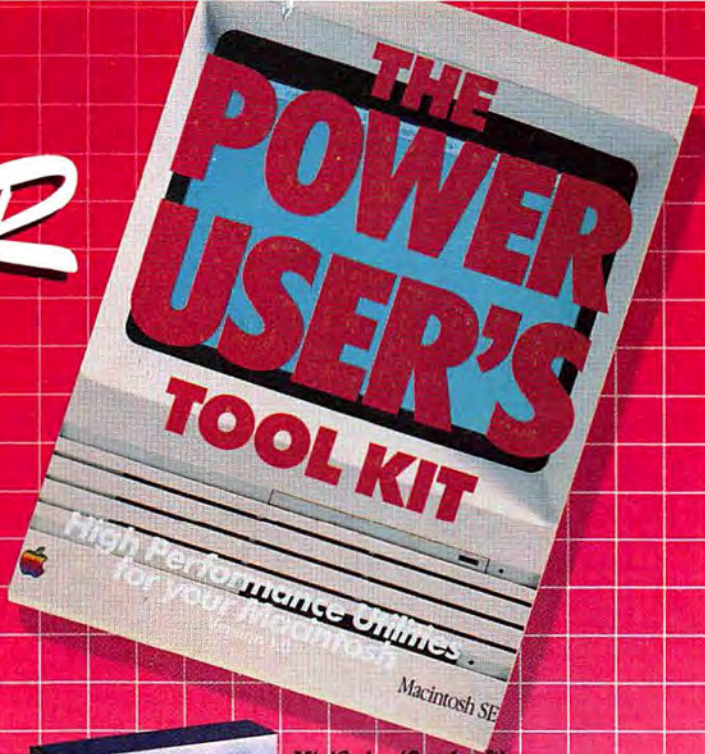

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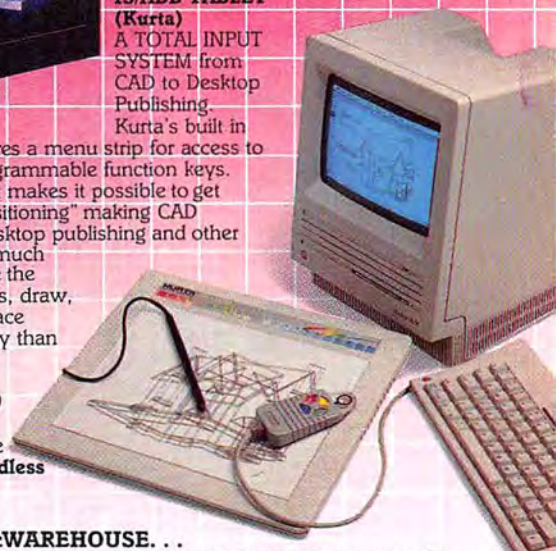

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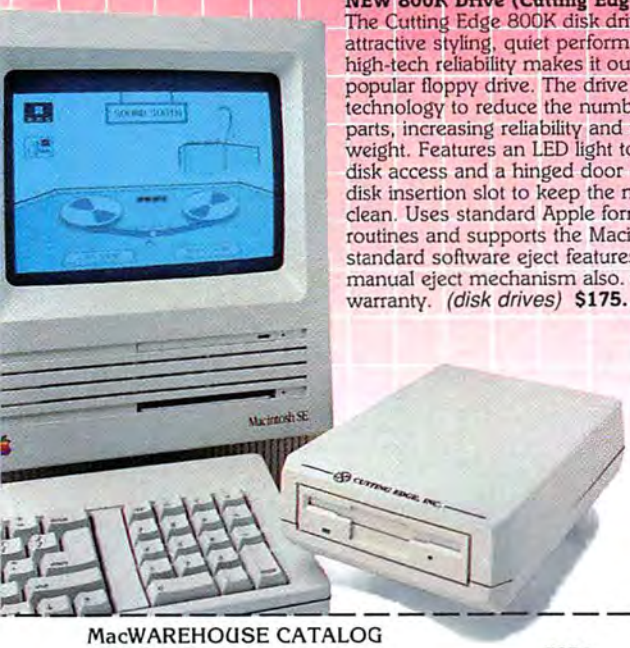

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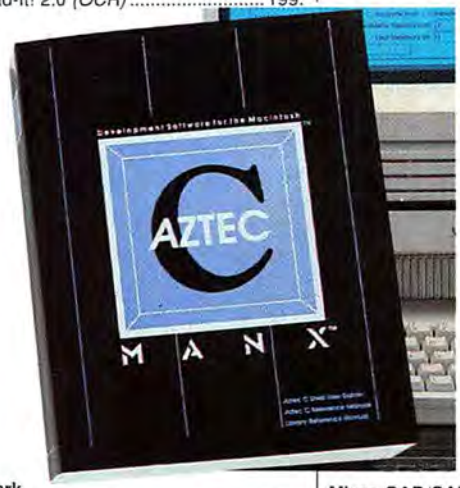
Silicon Beach
Digital Darkroom or Super 3D ..... Call.
SuperPaint 2.0 ..... Call.
Solutions
Curator *(graphics management)* ..... 79.
SuperMac
PixelPaint 2.0 ..... Call.
Symmetry
PictureBase 1.2 ..... 58.
T/Maker
ClickArt Business or Publications ..... 28.
ClickArt EPS Illustrations ..... 75.
Zedcor
DeskPaint 2.0 ..... 69.

DESKTOP PUBLISHING PRODUCTS

Adobe
Ace-Textures, Fill, and Patterns ..... 168.
Illustrator 88 ..... 319.
Streamline ..... 295.
Aldus
PageMaker 3.0 ..... 399.
Broderbund
DTP Advisor ..... 49.
Letraset
Image Studio or Ready,Set,Go! 4 .. 279.
ReadySetShow ..... 189.
Olduvai
Read-It! 2.0 *(OCR)* ..... 199.



Aztec C (Manx Software)
Includes Aztec Shell Compiler, 6800 Macro Assembler, Overlay Linker, Librarian, Run Time Libraries, Profiler, Full Macintosh Toolbox Interface, and Portable C Library interface. *(language)* **$65.**

Quark
Xpress or QuarkSytle ..... Call.
Solutions
SuperGlue 1.05 ..... 52.
Springboard
Springboard Publisher ..... 109.
Target
Scoop ..... SPECIAL 189.

NETWORKING PRODUCTS

Connect Inc.
MacNet ..... 43.
Farallon
Timbuktu 2.0.1 ..... Call.
Nuvotech
TurboNET ..... 30.
SuperMac
Network DiskFit ..... 199.
TOPS
TOPS 2.0 ..... Call.

FONTS

Adobe
Fonts ..... Call.
Altsys
Fontastic Plus 2.0 ..... 54.
Olduvai
ArtFonts ..... 59.
Postcraft
Laser FX ..... 115.

CAD/CAM

Graphsoft
MiniCad 4.0 ..... 375.
MiniCad Plus 525
Innovative Data
MacDraft 1.2a *(power drafting)* ..... 155.
Dreams ..... 319.

HyperTools #1 & #2 (Softworks)
Give stacks the one-two punch... HyperTools #1 is for creating stacks and scripts in HyperCard. HyperTools #2 adds versatility to stackware in entry and presentation of data. Each includes 16 tools plus the latest version of HyperCard. *(hyperware)* **$65.** each.

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Utilities to enhance stacks for HyperCard. Includes menu creation facility. Performs many of the tasks needed for merging and cloning stacks. *(hyperware)* **$39.**

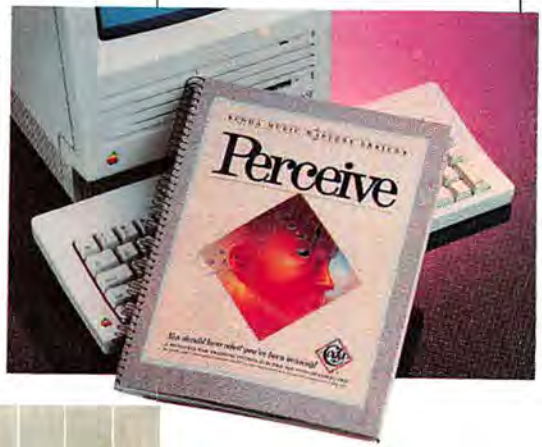
FREE For a limited time only you get Stack Cleaner Free (a value of $49.95) when you purchase both HyperTools 1 & 2.

Micro CAD/CAM
MGMStation *(professional CAD)* .... Call.

FINANCIAL AND ACCOUNTING SOFTWARE

Aatrix
Payroll 3.01 ..... 99.
Payroll PLUS ..... 159.
Bedford
Simply Accounting ..... 219.
Intuit
Quicken ..... 33.
MECA
Managing Your Money ..... 128.
Monogram
Business Sense ..... 279.
Dollars & Sense ..... 81.

Perceive (Coda Music Software)
The first interactive ear-training program on the Macintosh. Includes on-screen keyboard, workbook, textbook and MIDI compatibility. Ideal for home study and a natural for university and high school music departments. Starts at the easiest possible levels and grows in difficulty as you learn. Ability to design soundwaves with great precision and uses sophisticated music materials. *(music)* **$52.**



Softview
MacInTax Federal '88 ..... 69.
TaxView Planner ..... 64.
Survivor
MacMoney 3.02 ..... 62.

STATISTICAL ANALYSIS

Abacus Concepts
StatView II *(req. Mac II, or Plus/SE w/68881 co-processor)* ..... 369.
StatView SE+Graphics ..... 229.
BrainPower
StatView 512+ *(requires 512k)* ..... 175.
D2 Software
MacSpin 2.0 ..... 189.
Odesta
Data Desk Professional ..... 289.
Select Micro Systems, Inc.
Exstatix ..... 219.
Software for Recognition Technology
MacEqn ..... 24.

MUSIC AND SOUND

Coda
MacDrums ..... 35.
Perceive ..... 52.
Electronic Arts
Deluxe Music Construction 2.0 ..... 61.
Farallon Computing
MacRecorder *(records sound)* ..... 139.
Great Wave
ConcertWare + MIDI 4.0 ..... 79.
Impulse
Audio Digitizer w/SoundWave ..... 149.
Intelligent Music
OvalTune ..... 95.
Opcode Systems
Music Mouse ..... 39.
Passport Designs
Master Tracks Pro ..... 259.
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FoxBASE+/Mac ..... 209.
Odesta
Double Helix II ..... 349.
Double Helix II MultiUser Kit ..... Call.
GeoQuery ..... 299.
Park Row Incorporated
Publish or Perish ..... 21.
Personal Bibliographic
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Record Holder Plus ..... 45.

BUSINESS SOFTWARE

Access Technology
Trapeze 2.1 ..... 159.
Ashton-Tate
Full Impact ..... 249.
Bravo
MacCalc ..... 79.
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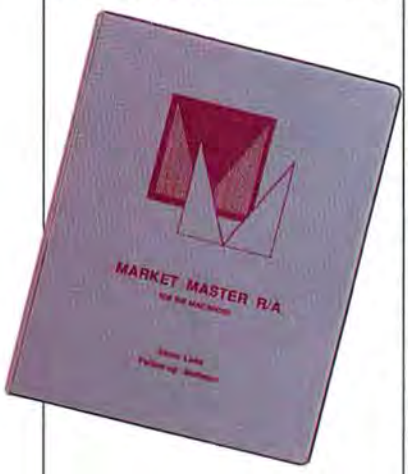
Market Master ..... 185.
Market Master R/A ..... 245.
Claris
MacProject II ..... 395.
Cognition Technology
MacSMARTS 3.2 ..... 135.
Cricket
Cricket Graph *(advanced graphing)* 119.
Cricket Presents ..... 289.
MicroPlanning International
MicroPlanner Plus ..... 445.



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Excel 1.5 ..... 249.
PowerPoint 2.0 ..... Call.
Works 2.0 ..... 189.
Nolo Press
For the Record ..... 29.
WillMaker ..... 35.
North Edge Software
Timeslips III *(time/expense tracking)* 119.
Satori
Bulk Mailer 3.2 ..... 79.
Shana Enterprises
FastForms! Construction Kit ..... 89.
Softview
FormSet ..... 55.
MacInUse ..... 42.
Spectrum Digital
TrueForm ..... 269.
Symantec
More II ..... 235.

WORD PROCESSORS AND OUTLINERS

Ashton-Tate
FullWrite Professional ..... 269.

HyperAnimator (Bright Star)
Add life to your HyperCard stacks using animated images synchronized with sound. A breakthrough in animation technology — HyperAnimator lets you create lifelike talking images on screen. Combine the spirit of animation with the power of the Mac... for fun, entertainment education, and desktop presentations. *(hyperware)* **$79.**

Claris
MacWrite 5.0 ..... 105.
Microsoft
Word 4 *(updated word processor)* .. 249.
Write 1.0 *(new word processor)* ..... 113.
Niles & Associates
End Note ..... 85.
Paragon
Qued/M ..... 109.
Symmetry
Acta Advantage w/DA ..... 69.
T/Maker
WriteNow 2.0 *(word processor)* ..... 109.
WordPerfect Corp.
WordPerfect ..... 185.

SPELLING CHECKERS

Aegis
Doug Clapp's Word Tools ..... 42.
A.L.P.
MacProof 3.0 ..... 115.
Deneba Software
Bigthesaurus ..... 55.
Spelling Coach 3.0 ..... 54.
Spelling Coach Pro ..... 105.
Electronic Arts
Thunder *(spelling checker)* ..... 30.
Microlytics
Word Finder *(synonym finder)* ..... 33.
Sensible Software
Sensible Grammar ..... 54.
Working Software
Spellswell 2.0 *(spelling checker)* ..... 45.

GRAPHICS

3G Graphics
Images w/Impact
Graphics & Symbols 1 ..... 59.
Business 1 ..... 75.
Aba Software
Draw It Again Sam 2.0 ..... 79.
GraphistPaint II ..... 289.
Aldus
Freehand ..... 349.
Broderbund
Drawing Table ..... 79.
PosterMaker Plus ..... 36.
Print Shop *(cards and more)* ..... 36.
VideoWorks II ..... 175.
CE Software
CalendarMaker ..... 27.
Claris
MacDraw II 2.0 ..... 329.
MacPaint 2.0 ..... 105.
Cricket
Cricket Draw ..... 169.
Cricket Paint ..... **SPECIAL** ... 99.
Pict-O-Graph *(color on the Mac II)* .. 105.
Deneba
Canvas 2.0 ..... 169.
Dream Maker
Cliptures, Vol. 1 Business Images ... 97.
MacGallery ..... 28.
Electronic Arts
Studio/8 ..... 319.
MicroIllusions
Photon Paint ..... 179.
MicroMaps
MacAtlas Pro *(MacDraw format)* .... 129.
NuEquation
NuPaint ..... 89.
Olduvai
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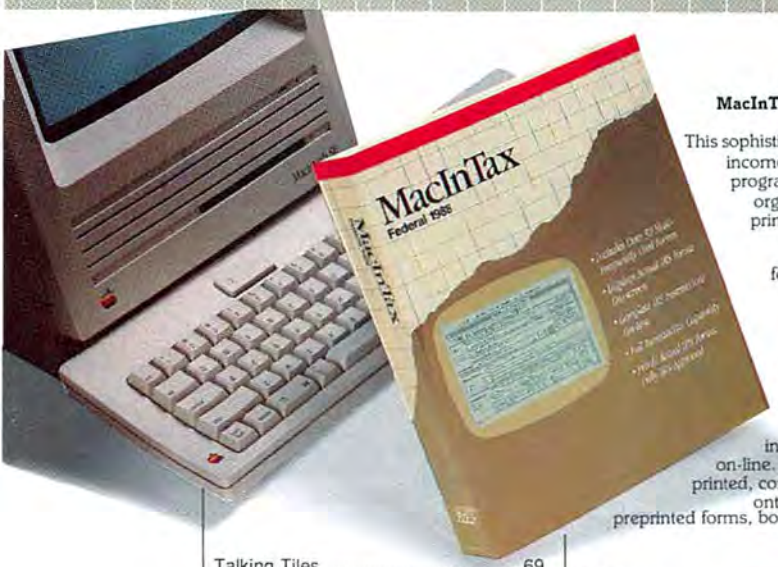
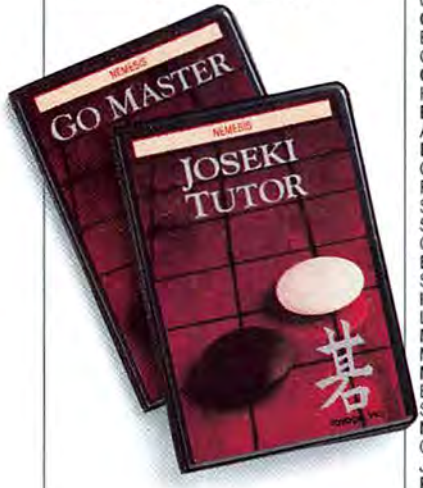


MacInTax Federal 1988 (Softview)
This sophisticated easy to use income tax preparation program allows you to organize, store, and print out income tax information. Includes 74 IRS forms, schedules, statements and worksheets. Links forms automatically to reduce input errors. Program features the IRS instruction booklet on-line. All forms can be printed, complete with data onto blank paper or preprinted forms, both IRS approved. *(finance)* **$69.**

Talking Tiles ..... 69.
Bootware Software
ResuméWriter Pro ..... 75.
Broderbund
Calculus, Geometry, Physics ..... ea.59.
Davidson
Math Blaster ..... 27.
Speed Reader II ..... 39.
Great Wave
Kids Time ..... 26.
Learning Company
Reader Rabbit ..... 33.
Mindscape
Perfect Score S.A.T. ..... 46.
Palantir
MacType ..... 31.
Simon & Schuster
Typing Tutor IV ..... 35.

Go Master (Nemesis)
The ultimate strategic board game, Go is one of the oldest games in the world, originating in China more than 4,000 years ago. The rules are simple, yet the strategy is profound. Go Master is the only Go program to successfully imitate human play. *(entertainment)* **$49.**
Joseki Tutor To further advance your study of the ancient oriental game of Go. Joseki are opening game patterns considered locally optimal and equitable for both players. These Joseki have been worked out by masters over the centuries. *(entertainment)* **$30.**



GAMES

Artworx
BRIDGE 5.0 ..... 22.
GrailQuest ..... 19.
Broderbund
Ancient Art of War At Sea ..... 27.
Shufflepuck Cafe ..... 22.
Where in the World is Carmen San Diego ..... 25.
Bullseye
Ferrari Grand Prix *(racing)* ..... 32.
P51 Mustang ..... 32.
Casady & Greene
Crystal Quest II ..... 26.
Centron Software, Inc.
BlackJack Ace ..... 27.
Crapsmaster or Roulette ..... 27.
Ciasa
Handwriting Analyst ..... 29.
Discovery Software
Arkanoid ..... 27.
Electronic Arts
Chessmaster 2000 *(deluxe chess)* ... 29.
Patton vs. Rommel *(strategy)* ..... 15.
Scrabble ..... 26.
Starfleet I: The War Begins ..... 37.
Chuck Yeager Adv. Flight Trainer .... 32.
Epyx
Sub Battle Simulator ..... 29.
Infocom
Leather Goddess of Phobos ..... 24.
Micro Sports
MSFL Pro League Football ..... 32.
Mindscape
Balance of Power, Deja Vu - ..... ea 30.
Shadowgate, Uninvited - ..... ea 30.
Nemesis
Go Master ..... 49.
Joseki Tutor ..... 30.
PBI
Strategic Conquest Plus ..... 46.
PCAI
MacCourses ..... 32.
MacGolf 2.0, MacRacquetball - ... ea 35.
Road Racer ..... 45.
Primera
Smash Hit Racquetball II ..... 22.

Sierra On-Line
Leisure Suit Larry ..... 23.
Silicon Beach
Apache Strike, Dark Castle - ..... ea 27.
Beyond Dark Castle ..... 27.
Simon & Schuster
Star Trek:Kobayashi Alternative ..... 24.
Spectrum HoloByte
Falcon ..... 32.
PT109, Gato ..... ea. 26.
Solitare Royale ..... 20.
Tetris ..... 20.
The Software Toolworks
The Hunt for Red October ..... 29.

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1 MEG SIMMS ..... Call.
AST
Mac286 Co-Processor *(Mac II)* .... 1079.
CMS
CMS TapeStack 60 Meg ..... Call.
MacStack 20 Meg ..... 569.
MacStack 40 Meg ..... 789.
MacStack 60 Meg ..... 849.

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Wedge XL 30 Plus ..... 629.
Wedge XL 45 Plus ..... 829.
XL 30 Internal or 45 Internal ..... Call.
Dayna Communications
DaynaFile single 360K *(5 1/4")* ..... 529.
Dove
MacSnap 2S ..... 750.
MacSnap 2SE ..... 439.
MacSnap 4S ..... 1488.
MacSnap 8S ..... 2975.
MacSnap SCSI Interface Port ..... 109.
MacSnap 524E *(512k to 1 meg)*.....289.
MacSnap 524S ..... 379.
MacSnap 548E *(512k to 2 meg)* .... 549.
MacSnap 548S ..... 599.

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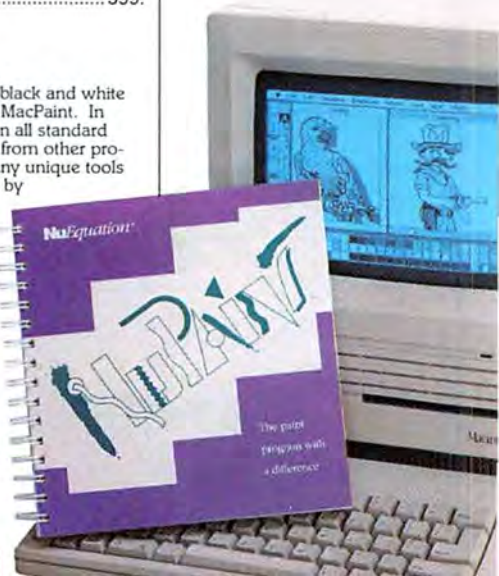
Acta Advantage
The project outliner, organizer, and planner. An indispensable desk accessory and stand-alone tool. Use within any application. *(outliners)* **$69.**

Payroll PLUS
This complete payroll program provides Federal, State, Local, and FICA tables plus 8 user-defined miscellaneous deductions. Calculates hourly wages or salary. Prints paychecks and more. *(finance)* **$159.**

Mac II Stand with Cable
Regain desk space with the Mac II Stand. Keeps your Mac II out of the way, but still handy. Special value pack comes with extension cable kit. Retails at $99.00. *(accessories)* **$65.**



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High capacity diskettes with no capacity for error. Every bit, every bite, on every track of each BASF 3.5" Diskette is certified 100% error-free. Warranted for life. *(media)* **$17.**

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MacSnap Plus 2 ..... 439.
MacSnap 1024 Mem. Exp. Board .. Call.
MaraThon SP ..... 189.
MaraThon 020 Accelerators ..... Call.
MaraThon 030 Accelerator ..... 1039.
Everex
EMAC 20D *(hard drive)* ..... 520.
EMAC 20D Deluxe *(0 footprint)* ..... 585.
EMAC 40D Deluxe *(0 footprint)* ..... 995.
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EMAC FS-102 ..... 2495.
Impact Hard Drives ..... Call.
MiniScribe
20Mb Raw Int. Drive Kit ..... 379.
45Mb Raw Int. Drive Kit ..... 549.
PCPC
MacBottom HD21 (SCSI) ..... Call for
MacBottom HD32 (SCSI) ..... special
MacBottom HD45 (SCSI) ..... 859.
MacBottom HD21 w/Modem ..... 779.
MacBottom HD32 w/Modem ..... 829.
MacBottom HD45 w/Modem ..... 979.
WSI *(With SCSI Interface)* ..... 269.
Peripheral Land, Inc.
Infinity Turbo 40 Meg ..... 1299.
UniMac
3.5 or 5.25 Int. Mounting Kits ..... Call.
Storware ..... $69.

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Abaton
InterFax 12/48 ..... Call.
Best Data Products
SmartOne 2400/1200 with cable and software ..... 169.
Everex
EMAC 2400 ..... 225.
Hayes
Smartmodem 1200 ..... 299.
Smartmodem 2400 ..... 449.
Smartmodem 9600 *(V series)* ..... 985.
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Pocket Modem *(ext. 300/1200 baud)* 115.
Prometheus
Promodem 2400 ..... 309.
Shiva
NetModem 1200 ..... 359.
Supra
Supra Modem 2400 ..... 149.
US Robotics
Courier 1200 Modem ..... 199.
Courier 2400 Modem ..... 349.

BLANK MEDIA

B.A.S.F.
DS/DD (box of 10) ..... 17.
Sony
DS/DD *(box of 10)* ..... 18.
SS/DD *(box of 10)* ..... 13.

INPUT/OUTPUT

Abaton
ProPoint ..... 89.
Asher Engineering
Turbo Trackball *(512/Plus or SE/II)* .. 69.

Sentinel (SuperMac)
Right now your documents and sensitive files can be accessed by anyone when you're not around! And networking means your data is even more accessible than before. Sentinel protects confidential material by actually encoding the data, based on your password. Encrypted documents or whole files can still be backed up, copied, or sent to remote sites. But they can only be read if you have the password. *(utilities)* **$155.**

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CE-105 ADB Keyboard ..... 99.
DataDesk
Mac 101 Keyboard ..... 139.
Kensington
New Turbo Mouse ..... 119.
Koala
MacVision *(digitizer)* ..... Call.
Kurta
IS/ADB Tablet ..... 259.
Cordless 4 Button Cursor ..... 99.
Mouse Systems
A+ Mouse *(512/Plus or SE/II)* ..... Call.
New Image
MacScan *(flatbed)* ..... 1749.
Seikosha America
Seikosha Printer *(dot-matrix)* ..... 235.
Summagraphics
Bit Pad Plus ..... 329.

Impact Hard Drives (Everex)
The EMAC Impact Hard Drive series features high speed performance, external SCSI addressing, external termination, whisper quiet operation and a compact, slim-line chassis. *(disk drives)*
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ThunderWare
ThunderScan 4.0 *(incl. Powerport)* 199.

ACCESSORIES

Computer Friends, Inc.
MacInker/Black Ink ..... 3.
MacInker *(IW & IW II)* ..... 41.
Ergotron
MacTilt or MacTilt SE ..... 68.
Mouse Cleaner 360 ..... 15.
I/O Designs
ImageWare II Carrying Case ..... 49.
ImageWriter LQ Ribbon ..... Call.
IW II Ribbons-Black or Color ..... 5.
Macinware Plus Carrying Case ..... 64.
Macinware SE Carrying Case ..... 75.
Kensington
Anti-Glare Filter ..... 33.
Apple Security Kit ..... 34.
Disk Drive Cleaning Kit ..... 20.
Mac II Stand w/Cable Kit ..... 65.
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Modem/FAX Protector 20 ..... 25.
PowerTree SurgeProtectors ..... Call.
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Mobius Products
Fanny Mac QT ..... 60.
SE Silencer ..... 39.
Omnium Corporation
Mac Desktop Workstation ..... 75.
Orange Micro
Grappler L/Q or LS ..... 92.
Polaroid
Circular Polarizing Filter ..... 35.
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Deluxe Plus/SE-XKB Case *(black)* ... 69.
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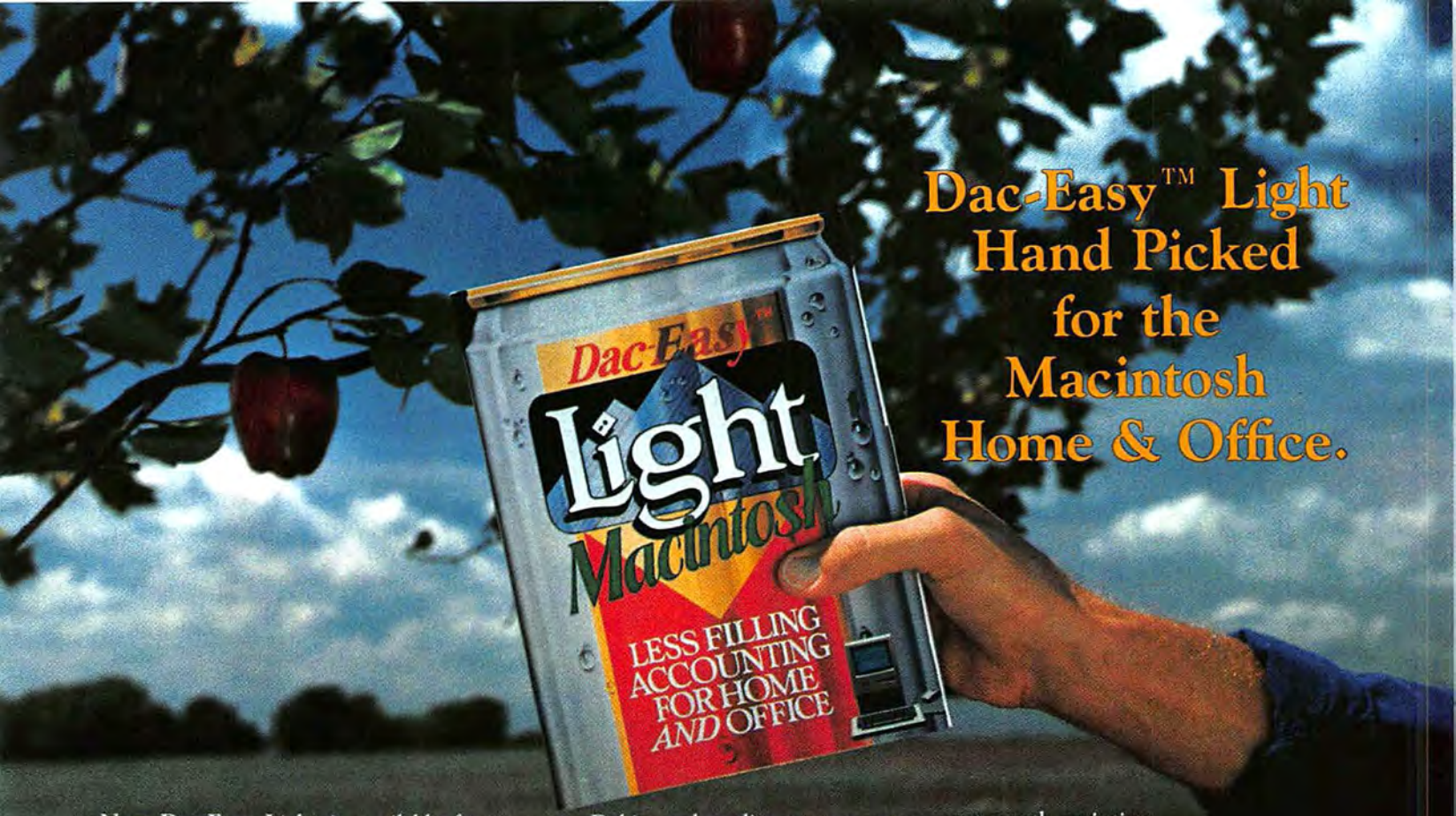

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CODE 301

Insights on HyperCard Animation

Liven any stack with simple but striking graphic effects

by Ronald Wartow

Recently, I used HyperTalk to program a fantasy adventure game that had scores of visual tricks. At first, all I could script were a few catchy effects with the **visual effect** and **flash** commands. But I wanted swords appearing and vanishing, game characters roaming a dynamic countryside, and wizards hurling lightning bolts. To my surprise, I found it easy to create concise scripts tapping HyperCard's powerful graphics and animation capabilities.

Startling visuals can enhance even serious stacks. Best of all, creating them requires no graphics or animation talent, only imagination and a casual familiarity with HyperCard and HyperTalk.

MARK ULRICH

All of HyperCard's a Stage

The theater is a useful metaphor for helping HyperTalk shed its imposing veneer. In this theater, each card within a stack is a stage containing close-up and distant scenery, with 512 tiny steps (pixels) from stage left to stage right and 342 tiny steps from the fly loft to the proscenium. The card's buttons and fields are actors, and the HyperTalk scripts are stage directions expressed in plain English.

You direct a play by showing, hiding, altering, and moving HyperCard's thespians. Scripts are logically triggered by familiar events, like mouse clicks. The actors make their entrance when you include **show [field or button]** in a HyperTalk script; conversely, they disappear from the stage when you use **hide [field or button]**. It's equally simple to script time delays. **Wait 60 [ticks]** means delay 1 second between actions (a tick is equal to 1/60 second). (Or, less grammatically, you can say **wait 1 seconds.**) **Domenu** followed by a HyperCard menu command (for example, **select all**) activates that command as if you had selected it with the mouse.

While scripting visuals requires exact HyperTalk syntax, the language fortunately recognizes synonyms and abbreviations (Version 1.2 Release Notes has a complete list of these). More important, the syntax is generally recognizable as standard Macintosh lingo (see "Taking Command of HyperTalk"). HyperCard's HyperTalk Help Stack lists the commands you'll need to become a sophisticated playwright. But to dabble in the drama of visual effects, simply follow the scripts below.

(continues)

Ronald Wartow is an attorney who left his Washington, D.C., law practice to develop entertainment software for the Macintosh.

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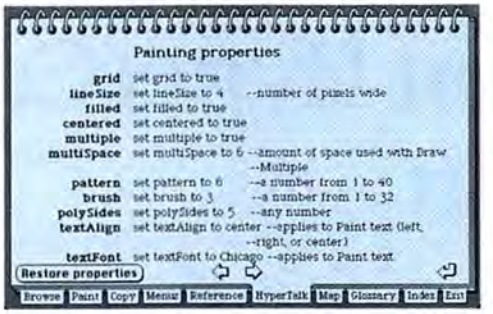

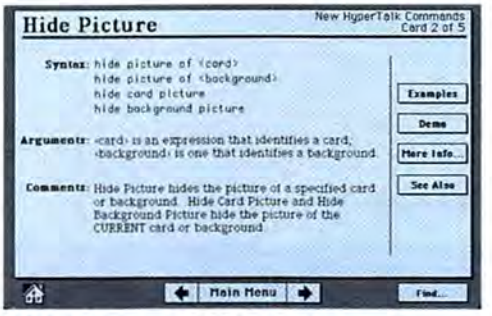

Taking Command of HyperTalk

HyperCard's Help Stack (top) and Version 1.2 Release Notes contain easy-to-follow information about HyperTalk. And the stacks bundled with HyperCard offer a wealth of scripts to explore.

Billboards and Ticker Tapes

Nothing attracts attention more than surprise movement in a stack. Let's simulate a moving billboard bearing an important message. Start by opening HyperCard 1.21, going to the User Preferences Card, and selecting Scripting under User Level. Create a new stack. Select New Field under the Objects menu and create a visible field. Select the browse tool under the Tools menu, click on the field, then type **There's no business like show business!**

Now use the Objects menu to create a new button and drag it to the bottom of the screen. You can double-click on the resulting button to fetch the button info box, then click on Script to pull down the script box. Or use this shortcut: press ⌘-Option and click on the button to go directly to the script box. Insert the following (without my parenthetical comments) between **on mouseUp** and **end mouseUp** in the script box:

```
show card field 1 at 75,171
```

(The field appears in the left center of the screen. The numbers 75,171 represent the location of the card field. Locations are points measured in pixels from the top-left corner of the card window. The first number is the horizontal coordinate; the second, the vertical one.)

```
repeat 10
   put the location of card field 1 into it
```

(HyperCard puts field location into memory.)

```
   add 30 to item 1 of it
```

(HyperCard adds 30 pixels to the horizontal coordinate of the field location.)

```
   show card field 1 at it
```

(Field jumps 30 pixels to the right.)

```
end repeat
```

(The field stops at 375,171; right center of card.)

Press the tab key to make sure the script is aligned properly. Click on Okay, hit ⌘-Tab to choose the browse tool, and press the new button. The field dances across the screen from left to right. (Now that we've walked through setting up an effect once, I'll use a bit of shorthand. The instruction *script/click* means that you should insert the script that follows in a button script box between **on mouseUp** and **end mouseUp**, click on Okay, choose the browse tool, then press the button for action.)

By cutting and pasting the script, you can alter or add desired variables, like the number of jumps or where the field begins its journey. Substitute **261,20** for **75,171** and substitute **add 30 to item 2 of it** for **add 30 to item 1 of it**, and the field appears at the top center and takes 10 jumps down to the bottom center of the card. If you insert **hide card field 1** and **wait 60** before **end repeat**, the field disappears for a second after each jump. You must add **show card field 1** after **end repeat** to make the card field reappear.

You can create a new card, button, and field for new scripts or simply delete the original script and experiment with one card. To paint a message on the screen in MacPaint, choose the text tool; set the font, style, and alignment; click at the desired insertion point; and type. HyperTalk commands easily automate the process. Script/click

```
choose text tool
set textfont to venice (or any font you prefer)
set textsize to 14
set textstyle to bold
set textalign to left
```

(Font set to Venice 14 bold, text typed left to right.)

```
click at 75,271
type "The rehearsal will break for 8 minutes."
domenu revert
choose browse tool
```

(continues)

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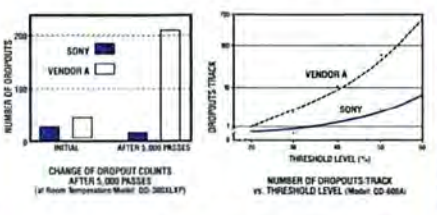

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The message scrolls from left to right at the bottom of the screen after you press the button. If you make **domenu revert** and **choose browse tool** the last two lines of scripts that use paint tools, the graphics will reset to a pre-mouse-click state after each script executes.

Using the same idea, but in a text field, let's imagine a bull market for high-tech stocks. Script/click

```
select line 1 of card field 1
type "APPLE 38.5 DEC 91 IBM 119.5"
wait 120
select line 1 of card field 1
type "APPLE 80 DEC 170 IBM 150"
wait 120
select line 1 of card field 1
type "MARKET TOPS 3000"
```

These three examples demonstrate not only the ease of effective visual scripting, but also the substantial control a scripter has over what appears on the screen.

Buttons and Fields

Rather than manually selecting one icon for a button, you can script a selection by using the number assigned to each icon. (You'll need to double the height of the button so the largest icon fits.) Script/click

```
repeat 5
   set the icon of card button 1 to 6179
   set the icon of card button 1 to 29484
   set the icon of card button 1 to 19162
   set the icon of card button 1 to 32650
end repeat
```

This displays four different hand icons in order from smallest to largest, an effective animated attention-getter.

Not all scripts have to be utilitarian. To playfully frustrate browsers, you can create a "run away" button that leaves home. Script/click

```
show card button 1 at the clickH,the clickV +70
```

(The button jumps down the card 70 pixels when it is pressed. Be careful—depending on where the button is placed, it may leap off the card.)

My fantasy game required lots of small graphics, but I'm no artist. Instead, I used graphics fonts; since fields hold text and graphics, HyperCard considers font charac-

(continues)

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Circle 232 on reader service card

ters as text. To animate a field with a designated graphics font, script/click

```
repeat 5
set textfont of card field 1 to cairo
```

(or any graphic font)

```
set textsize of card field 1 to 18
   put "z" after character 6 of line 1 of card field 1
   put " n" after character 13 of line 1 of card field 1
   put "o" after character 4 of line 2 of card field 1
   put "m" after character 15 of line 2 of card field 1
end repeat
```

With a few easily scriptable enhancements, you could make a card look like the Golden Gate Bridge at rush hour. For a little spice, heighten or widen the field by inserting anywhere in the above script **set height of card field 1 to 120** and/or **set width of card field 1 to 250**.

Hiding and showing fields and buttons is another simple way to create flashy visuals. Script/click

```
put "Hide and Seek" into card field 1
hide card field 1
lock screen
show card field 1
unlock screen with barn door open very slow
```

(or any visual command)

Using the **lock** and **unlock** screen commands causes HyperCard 1.2's visual effects to operate on fields and buttons. Please note that if you're using a Mac II, visual effects such as barn door, dissolve, wipe, and so on, won't work unless you set the monitor characteristics in the Control Panel to Black & White/Grays, and you set the number of Colors to 2.

For some nifty scripting footwork, script/click

```
repeat 10
   show card button 1
   show card field 1
   hide card button 1
   hide card field 1
end repeat
set textfont of card field 1 to geneva
lock screen
show card field 1
put "On with the show!" into card field 1
unlock screen with dissolve slow
show card button 1
```

The button and field appear and disappear alternately; then, in a nice effect, the field appears with a message.

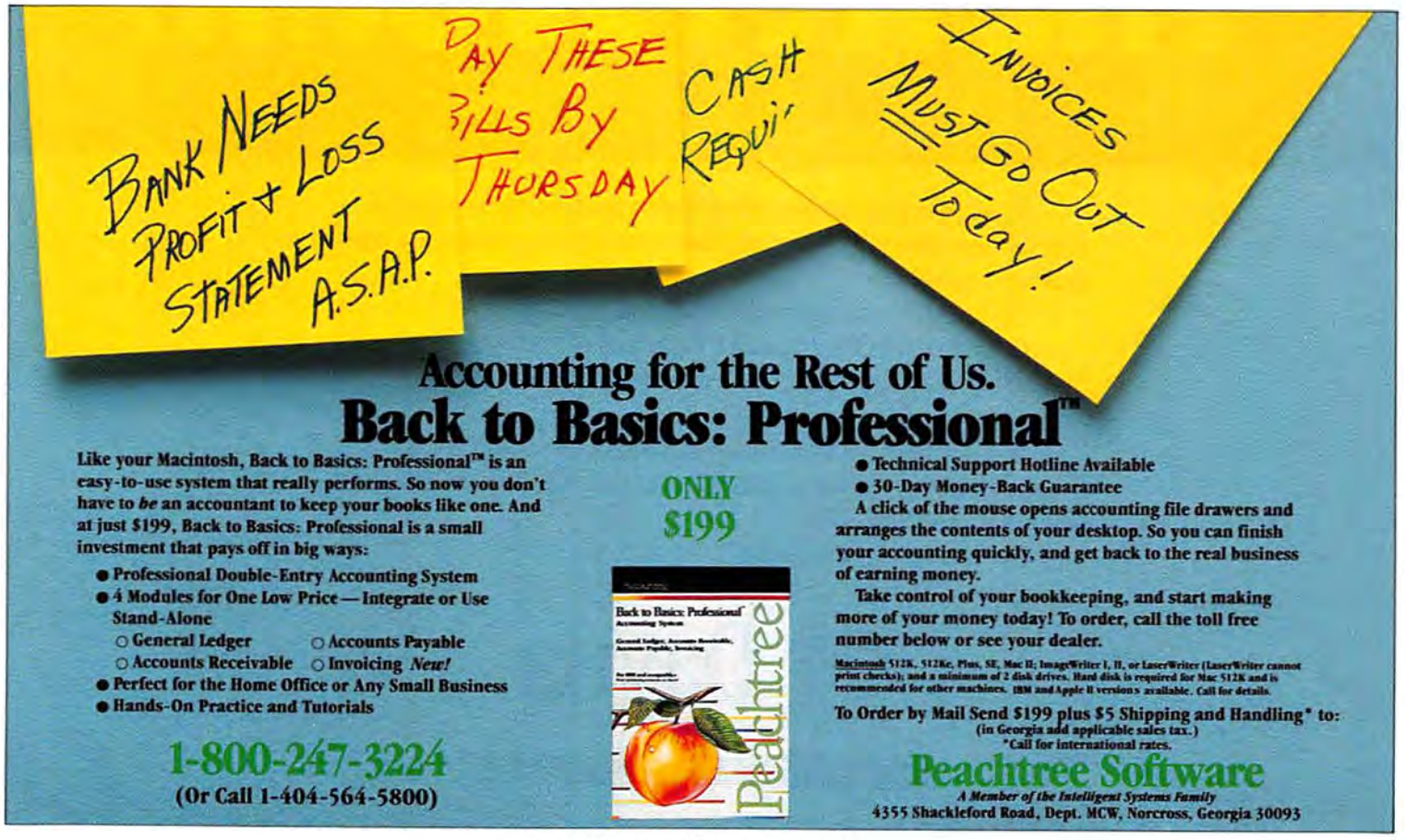
More Show and Tell

Let's display some dazzling animation combined with HyperCard's visual effects. Dazzling doesn't mean complicated, so long as you view the script as a mirror of what you would do manually. Place one graphic on a new card and another on the card's background by using the Import Paint command (or use HyperCard's paint tools to create the graphics). Script/click

```
hide card picture
hide background picture
wait 60
lock screen
show background picture
unlock screen with dissolve slow
wait 60
lock screen
hide background picture
show card picture
unlock screen with checkerboard
```

In an instant, the graphics disappear and only the button and field are visible. After a second's delay, the background graphic reappears in a dissolve, followed by the reappearance of the card graphic and the disappearance of the background

(continues)



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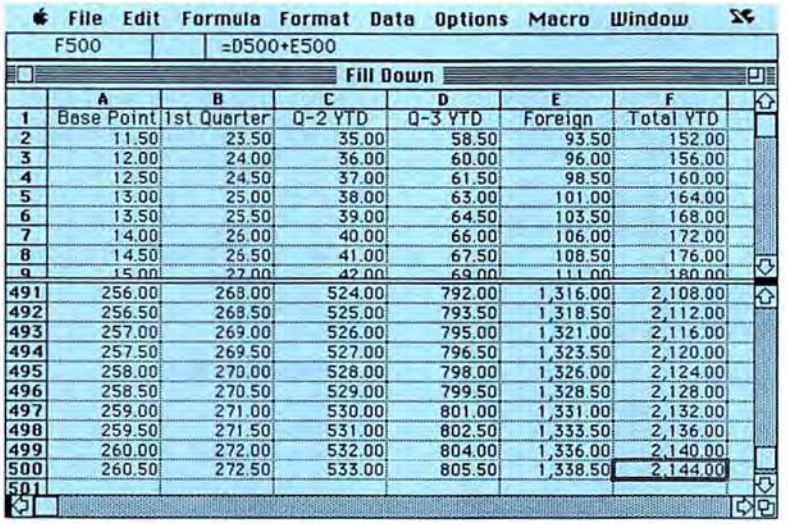

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7	14.00	26.00	40.00	66.00	106.00	172.00
8	14.50	26.50	41.00	67.50	108.50	176.00
9	15.00	27.00	42.00	69.00	111.00	180.00
491	256.00	268.00	524.00	792.00	1,316.00	2,108.00
492	256.50	268.50	525.00	793.50	1,318.50	2,112.00
493	257.00	269.00	526.00	795.00	1,321.00	2,116.00
494	257.50	269.50	527.00	796.50	1,323.50	2,120.00
495	258.00	270.00	528.00	798.00	1,326.00	2,124.00
496	258.50	270.50	529.00	799.50	1,328.50	2,128.00
497	259.00	271.00	530.00	801.00	1,331.00	2,132.00
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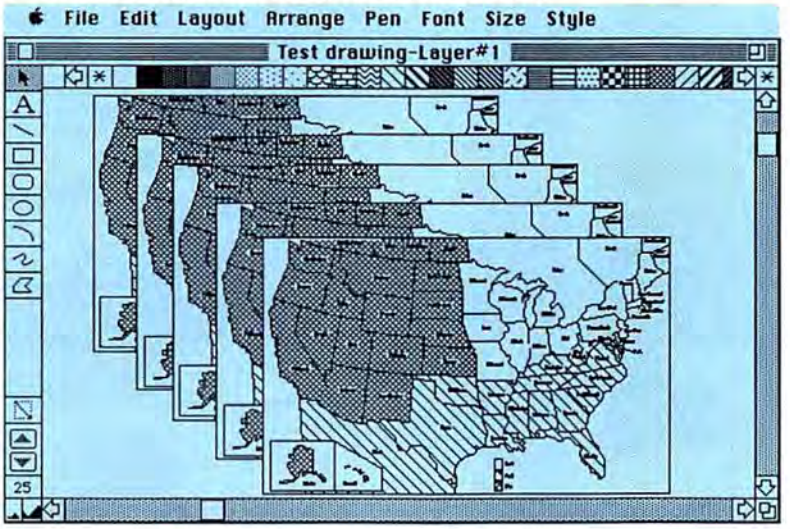

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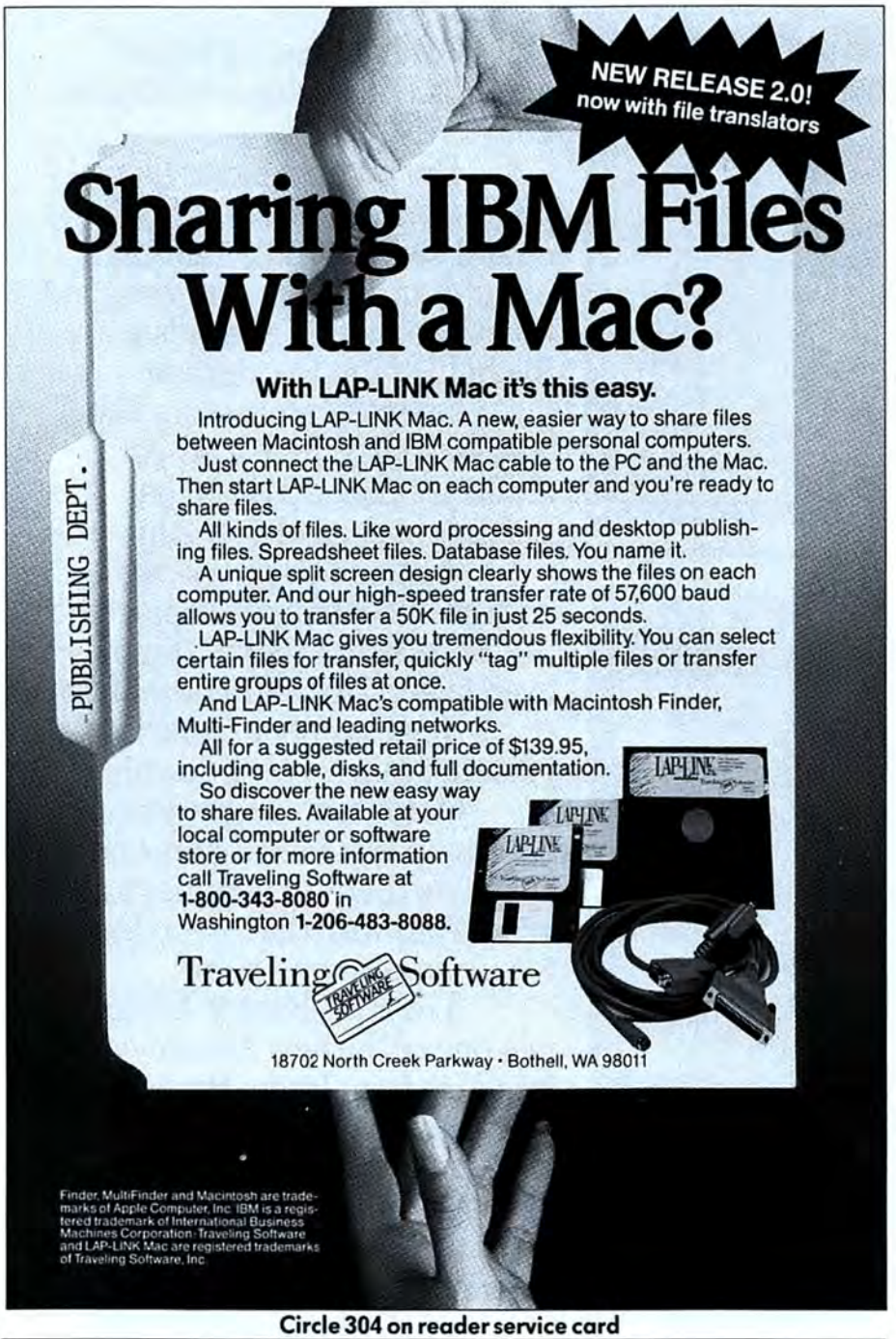

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graphic. Notice that the script is short and logical, despite its visual impact.

Want to see your name up in lights? To create a marquee effect, you can repeatedly execute the Trace Edges command around a card. Use the text tool to type your name on the card, then script/click

```
choose select tool
domenu select all
repeat 10
   domenu trace edges
end repeat
domenu revert
choose browse tool
```

Try substituting other Paint Menu goodies for Trace Edges or combine several commands in the same script. Incorporate fresh card and background graphics to experiment (see "Experimentation Pays Off").

Experimentation Pays Off

You can build on simple scripts to create a variety of graphics. You can use HyperTalk commands to select a graphic, flip it (with the Flip Horizontal command), and add a catchy line of text at the press of a button.

Dissolve and Conquer

Do you find HyperTalk's slowest dissolve too fast? For an agonizingly slow dissolve that will practically erase a card

(continues)

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Circle 319 on reader service card

Circle 26 on reader service card

Circle 12 on reader service card

graphic, script/click

```
choose select tool
domenu select all
repeat 50
   domenu lighten (or domenu darken)
end repeat
domenu revert
choose browse tool
```

Drawing an oval (or a rectangle or a polygon) filled with a pattern should be second nature to you. Dragging the mouse from point A to point B on the Macintosh screen is also familiar action easily scripted. To automate both processes, script/click

```
choose oval tool
set filled to true
set pattern to 12
```

(Sets pattern to black.)

```
drag from 150,150 to 325,350
domenu revert
choose browse tool
```

You can even simulate a fast or slow drag by setting the dragspeed. Adding **set dragspeed to 300** before the **drag** line slows down the action (300 is the number of pixels per second).

The Roar of the Greasepaint

It's fairly simple to dissect a graphic, make its parts float around the screen, and then reassemble it (see "Dark Shadows"). Create a menacing presence (could it be the Phantom of the Opera?) by script/clicking

```
hide card field 1
choose oval tool
set linesize to 4
set centered to true
set dragspeed to 60
set multiple to true
```

(Draws multiple ovals.)

```
set multispace to 1
```

(Sets spacing between ovals.)

```
set filled to false
drag from 261,171 to 520,520
```

(Black shadow looms closer.)

```
domenu select all
repeat 2
   domenu flip horizontal
   domenu flip vertical
end repeat
```

(Creates a swirl effect.)

```
put "Sorry, all seats sold out." into card field 1
show card field 1
domenu revert
choose browse tool
```

Remember the movie *Jaws*? Add sound to your animation to recreate the vil-

(continues)

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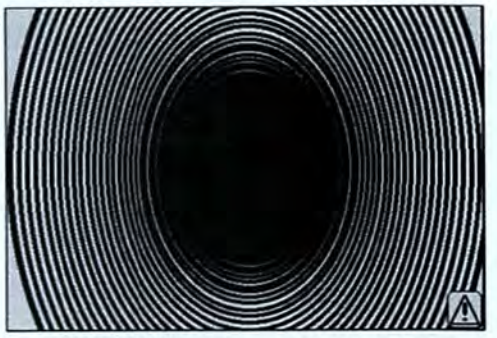

Dark Shadows
Animated shadows and swirls are easy to create with simple HyperTalk scripts.

lain of the sea. Script/click

```
choose regular polygon tool
set polysides to 3
```

(Draws a fin.)

```
set pattern to random of 40
```

(The triangle fills with one of the 40 paint patterns picked at random.)

```
set filled to true
drag from 362,320 to 362,270
choose select tool
drag from 306,265 to 420,342
```

(Marquee selects the fin.)

```
domenu copy picture
set dragspeed to 200
play boing tempo 250 "c e c e c e c e"
```

(A little travelin' music.)

```
drag from 378,283 to 100,283 with ¬
commandkey,optionkey
```

(The fin moves from bottom right of screen to bottom left of screen, making multiple images of itself.)

```
domenu select all
domenu cut picture
domenu revert
choose browse tool
```

For a more menacing shark effect, set the pattern to 12 for solid black.

Future Productions

You can rewrite any of the above scripts by adding layers of variables. You can also set and reset the object properties, move objects around, and alter objects. You have a free hand in scripting your own HyperCard productions. But don't let your thespians overact or stay on stage too long. A light touch with animation will win a standing ovation from your browsers on opening night. □

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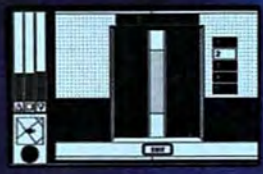

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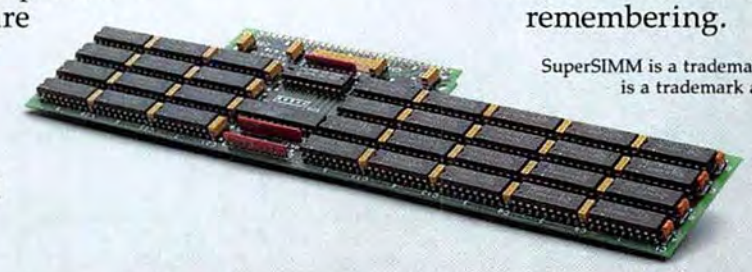

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Quick Tips

Answers to your questions

by Lon Poole

As the Macintosh systematically becomes more complex, it seems that even the most general tips don't work with all applications. Take the advice that appeared in *Quick Tips* (September 1988) about typing the ⌘-key symbol, the Apple logo, and other hidden characters. On a Mac SE or Mac II using the Chicago font, you can press Control-Q for ⌘, Control-R for w, Control-S for ◆, and Control-T for . Such a simple idea should work everywhere. But those keystrokes do nothing in MacWrite, reports Willis G. McMillan of Madison, Wisconsin. George E. Measel of Umatilla, Florida, also had poor luck. My subsequent investigation shows that the keystrokes do work with the majority of applications; notable exceptions include MacWrite, HyperCard, Cricket Draw, and MacCalc.

Mac 512K-Almost-E

Technically, you need at least a Mac 512KE to start directly from a hard disk. But if you've ever had your Mac 512K's logic board replaced, you probably have the part of the 512KE that you need to start up from a hard disk. Jim Cobb of Virginia Beach, Virginia, says Apple puts the enhanced 128K ROM on the 512K logic boards it supplies for service swaps.

Q Tape Backup Benefits

Explain to me please why it is preferable to have a tape system as a backup instead of a second hard disk. It seems to me that with a two-hard-disk configuration, should something happen to drive 1, you could be up and running in a matter of minutes on drive 2. You can't do this with tape. Price is not a deciding factor, since tape drives and hard disks cost about the same.

Harrison L. Bowers
Abingdon, Maryland

A One tape drive can back up any number of hard disks. Tape also allows you to make multiple backups. Should the most recent backup fail at the same time as the hard disk, you can use the next most recent backup. You can also keep a backup at a location away from your Mac in case the whole system is stolen or destroyed. However, many people do back up to a second hard disk for the reasons you cite. Perhaps the best compromise is a removable-media hard disk drive (see "Why Say No to Backup?" November 1988).

Q Random HyperTalk

Is there a way to get a random number in HyperTalk?

Adam Purcell
Wickliffe, Ohio

A Use the Random function, as in the following example:

```
put the random of 12 into diceToss
if diceToss is 7 or diceToss is 11
then answer "Craps, you lose!" with "Phooey."
```

(At this point, I could crassly plug my HyperTalk quick-reference book, *HyperTalk,* published by Microsoft Press [$5.95 at your bookstore], but I won't.)

Q A Tall-Adjusted Ruler

On my Mac Plus, the ruler in Microsoft Word is 6 inches wide, but on the Mac Plus in my office, the same ruler is 6½ inches wide. What causes the difference? How can I get the wider ruler at home?

Ichiro Mori
Berkeley, California

A I'll bet your Mac Plus at work is connected to a LaserWriter and your Mac Plus at home is connected to an ImageWriter. When you change printers, Word, MacWrite, WriteNow, and most other word processors adjust their formatting rulers according to the resolution, or dot spacing, of the current printer.

To see the 6½-inch ruler on your Mac at home, select the Tall Adjusted option in Word's Print dialog box, click OK, and immediately press ⌘-Period several times to cancel printing. The Tall Adjusted option makes the ImageWriter's spacing match the LaserWriter's. Note that the Tall Adjusted option appears in the Page Setup dialog of most other applications, including version 4 of Microsoft Word (which should be out by the time you read this).

Alternatively, you can copy the LaserWriter driver from the System Folder of your Mac at work to the System Folder of your Mac at home. Then use the Chooser at home to select the LaserWriter, even though you don't have a LaserWriter there. With any application except Word version 3, you must also choose Page Setup (and click on OK) to effect the ruler change.

Quick Color Overhead

Tip: Have you ever needed an overhead transparency in a hurry—and in color? Hewlett-Packard's PaintJet transparency film in an ImageWriter II with a color ribbon produces good results. Although the ink smears a little, it adheres well enough to take fine patterns. Printing a color pie chart using Cricket Graph on a Mac SE took me 1 minute 20 seconds in

(continues)

Lon Poole answers readers' questions and offers advice in his monthly Macworld *column. Many of the tips he's compiled can be found in his book* Mac Insights *(Microsoft Press, 1987) and in the more recent* HyperTalk *(Microsoft Press, 1988).*

Fast quality, 2 minutes 55 seconds in Best quality.

Michael Wilcox
Elkhart, Indiana

Bring Closest or Send Farthest

Tip: To send a HyperCard field or button behind all other fields and buttons in the same layer (card or background) and thereby set its number to 1, select the object and press ⌘-Shift-+. To bring a field or button to the front of all other fields and buttons in the same layer and thereby assign to it the highest number of all similar objects, select the object and press ⌘-Shift-hyphen. With these shortcuts, you can reorder objects more easily than with the Bring Closer and Send Farther menu commands or their keystroke equivalents.

Claude Dazelor
Marseilles, France

Field Name Reminder

Tip: When designing a HyperCard stack, it's easy to forget field names or lose track of hidden fields. To refresh your memory, simply choose Print Report from the File menu. The field-selection scroll box lists the names of all fields in the current background. When you're finished reviewing, click on Cancel to abort the Print request.

Robert L. James
Fairport, New York

Broken Keyboard Crutch

Tip: If a key on your keyboard breaks, copy the character it types from another place in the document and paste it where you need it. If the character doesn't appear elsewhere, use the Key Caps desk accessory to generate it. In the Key Caps window, click the broken key (with the Shift and Option keys pressed, if necessary) to generate the needed character. Then copy the character from Key Caps and paste it to your document.

Luc Villeneuve
Saint-Gervais, Quebec, Canada

Contributing editor Erfert Fenton suggests using a utility such as MacKey-meleon by Avenue Software to reassign a broken key's characters to another keystroke.

Two Sides in PageMaker

Tip: I use PageMaker 3.0 all day and occasionally need double-sided copies. The method discussed in *Quick Tips* (September 1988) is OK, but I've developed a better method for PageMaker. First you print the even-numbered pages in reverse order, and then on their flip sides you print the odd-numbered pages in normal order. The result is collated correctly.

Choose Page Setup from the File menu and select the Double-Sided and Facing Pages options. On the master pages, set the ruler origin to the top left corner of the left page. Choose Print from the File menu, and select the Reverse Order and Manual Tile options. Click OK, and all the even-numbered pages print, with the last one on top. (On a LaserWriter II, you can accomplish the Reverse Order option manually by opening the exit door on the side.)

Still on the master pages, move the ruler origin to the top left corner of the right page. Place the stack of even-numbered pages face down in the paper tray, top edge nearest the printer. If the document has more odd-numbered pages than even-numbered pages, add a blank sheet of paper to the top of the paper tray.

Now print again, with the Reverse Order option off but with the Manual Tile option on.

Brian Beckstead
Tucson, Arizona

Rubber Type

Tip: PageMaker lets you stretch or shrink graphics but not text. You could make text a graphic object by typing it in MacDraw and then cutting and pasting it into PageMaker. But MacDraw provides no control over kerning and less control over line spacing than PageMaker.

But you can convert text to a graphic without leaving PageMaker. Select the text using PageMaker's arrow-shaped pointer tool, not its I-beam–shaped Text tool. Next copy the text and paste it into the Scrapbook. Then use PageMaker's Place command with the Scrapbook file, which is in the System Folder. When PageMaker places the Scrapbook file, the mouse pointer changes to a shape with a number that indicates how many items are in the Scrapbook. Clicking the mouse button places the next item from the Scrapbook into your document.

After placing the graphic version of your text, you can resize it by dragging the square black handles at its corners and sides (see "Elastic Text"). The PageMaker manuals have more information on resizing graphics and on placing the Scrapbook file.

Alfred Giordiano, Jr.
Brooklyn, New York

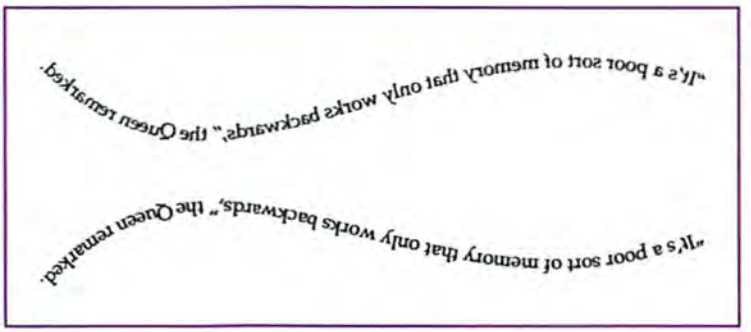
Flipped Over Bound Text

Tip: Cricket Draw 1.1 lets you bind text to a curved path (see "Bound and Reflected"). If the path to which you bind is reflected on the *x*-axis, the *y*-axis, or both, the bound text will be reflected the same way.

Tom Poehlmann
Canoga Park, California

(continues)

Elastic Text
You can stretch and shrink text in PageMaker after converting it to a graphic. Select the text using the pointer tool, copy it to the Scrapbook, and then place the Scrapbook using the Place command.



Bound and Reflected
Bound text in Cricket Draw 1.1 can be turned upside down and backwards using the Reflect On X and Reflect On Y commands from the Arrange menu.

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Sharper Printed Graphics

Tip: A LaserWriter IISC prints bitmapped graphics—MacPaint drawings, scanned images, rotated text in MacDraw, and so forth—at a jagged 72 dots per inch (dpi) instead of the 300 dpi at which it prints ordinary text and object-oriented graphics. You can double the print quality of bitmapped graphics to 144 dpi by creating them double-size and printing them half-size. For example, draw an entire MacPaint or MacDraw document at twice its printed size and select the 50% Reduction option in the Page Setup dialog box before printing. If you copy a double-size bitmapped graphic to a page-layout or word processing application that permits resizing of graphics, then downsize the graphic by half after pasting and print the document full-size.

Glenn S. Fawcett
Vancouver, British Columbia

Tip: The same technique works on other LaserWriter models, where you can specify any reduction factor. Terry Wilson of Mt. Holly, New Jersey, also recommends reducing to 50 percent. You can reduce to 24 percent for 300 dpi resolution, but your graphics may lose detail. At 300 dpi, white areas become partially filled by the natural diffusion of the black dots.

Tip: Even on an ImageWriter you can have double-printed resolution by printing a double-size graphic at 50 percent reduction. Andrew Wynn Rouse of Orlando, Florida, notes that the technique works with all graphics on a ImageWriter, even with Illustrator drawings. The results are so good he almost never resorts to renting time on a LaserWriter.

Sum Easy Formula

Tip: Excel's SUM function is very powerful but is tedious to enter. The following two-line macro relieves the tedium:

```
=FORMULA("=SUM(R[-"&(ROWS
(SELECTION())-1)&"]C:R[-1]C)")
=RETURN()
```

This macro builds a SUM formula that adds all cells in a one-column range except the last cell, and enters the formula in that last cell. After entering the macro on a macro sheet, name it and give it a keystroke shortcut using the Define Name command.

To use the macro, select the cell where you want the formula put and then extend the selection up to the first cell of the range to be summed. The macro only works if the active cell is the last one in the selection. After selecting the range to be summed, press the keystroke shortcut that you defined for the macro.

The same type of macro can be used to automate entry of other Excel functions that operate on a range of cells, such as AVERAGE, MAX, COUNT, MIN, VAR, and STDEV.

Garry R. Burgess
Winnipeg, Manitoba, Canada

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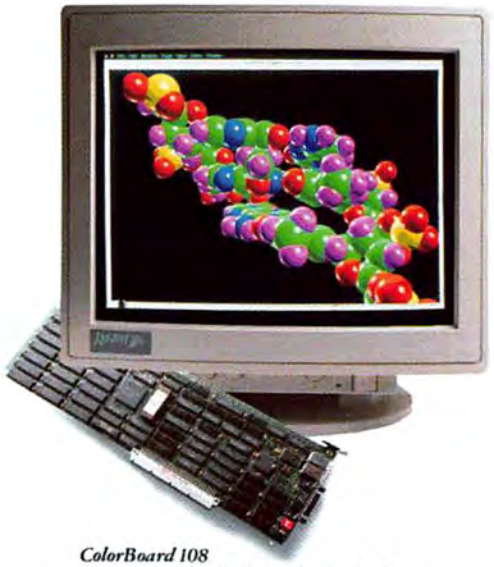

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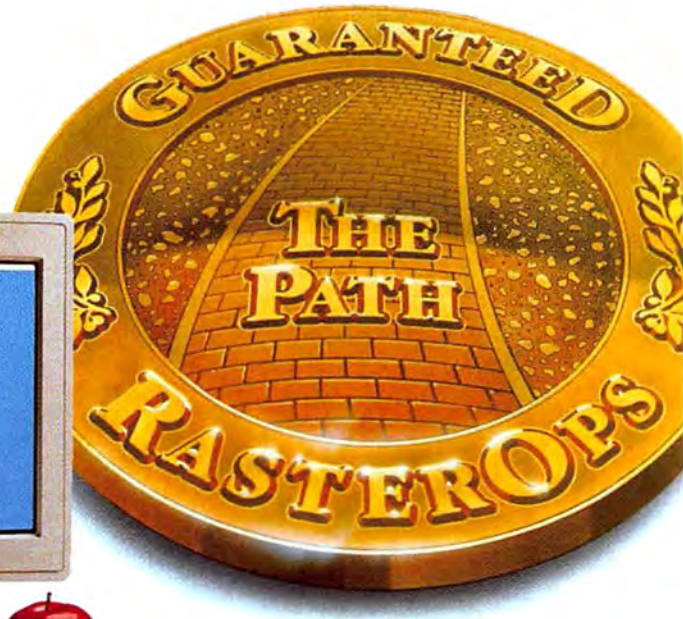

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Getting Started with Electronic Mail

Electronic mail can help you communicate with the next cubicle or the next country. Here's how.

by Jim Heid

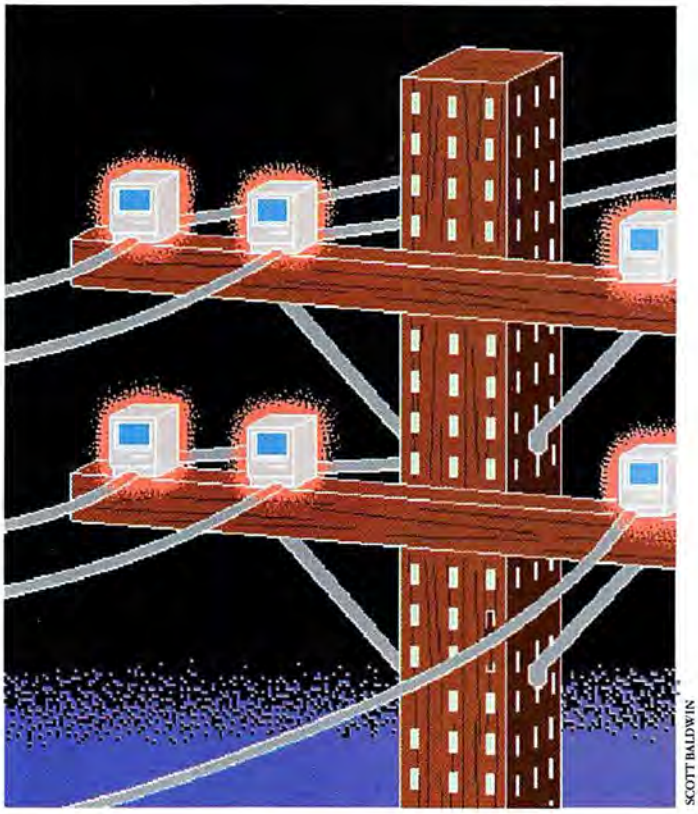
The telephone is to mail what the unexpected visit is to the appointment. A phone call is often an interruption, someone's way of saying, "Drop that and talk to me, *now.*" The mail is more civilized. It's someone saying, "Read this when you can, and get back to me."

Of course, civility has its price. Businesses shouldn't have to wait days for a response to a yes-or-no question. Nor is letter-writing an ideal forum for long-distance brainstorming. Storms die down in a few days.

Personal computers have made possible a communications medium that combines the immediacy of the telephone with the civility of the mail. It's called *electronic mail,* or *E-mail* for short, and it involves sending and receiving anything from memos to manuals using phone lines or an AppleTalk network.

Businesses are discovering that E-mail is an excellent way for people to communicate quickly, without the interruptions of phone calls or the expense of express couriers. One major software developer requires its employees to use E-mail instead of the telephone whenever possible. It makes sense. People need privacy to work productively, but they also need to communicate and exchange ideas. Electronic mail helps you achieve that delicate balance.

Most E-mail concepts have equivalents in the world of paper mail. An E-mail system's post office is a *mail server;* it stores the mail you send and receive, and it provides storage areas called *mailboxes* for everyone who has an *address.*



SCOTT BALDWIN

This paper-mail metaphor extends to the message-sending process. You can send a *carbon copy* of an outgoing message to someone other than the primary recipient. You can request a *return receipt*—a message from the E-mail system telling you when the recipient received your note. With most E-mail systems, you can also send *enclosures*—spreadsheet files, word processor documents, page layouts, or pictures.

(continues)

Jim Heid is a Macworld *contributing editor who focuses each month on a different aspect of Mac fundamentals.*

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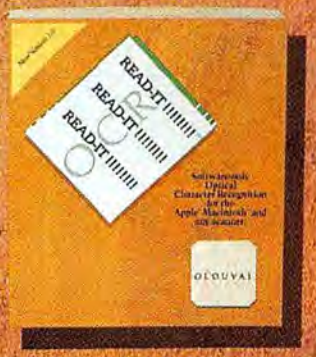

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Two Ways to Mail

Just as you can do your own payroll or send it out to a service, you can create a mail server on a computer in your office, or you can use an E-mail service provided by a commercial telecommunications service. Whether you create your own mail center or use someone else's depends on your needs. You might even want to combine the two. The E-mail world offers a great deal of flexibility, but tying everything together requires careful planning.

To create your own mail server, you put your Macintoshes on a *network* by linking them with Apple's LocalTalk cabling and connectors or by using LocalTalk-compatible cable kits from Farallon or TOPS. If you have a number of Macs sharing a LaserWriter, chances are you already have all the hardware you need. Once you've connected your Macs, you can add E-mail software that lets them communicate.

To use an external E-mail service, each Mac must be connected to a *modem,* a hardware add-on that translates outgoing data into screeching tones that phone lines can carry and turns incoming screeches back into data. If your Macs are on an AppleTalk network, you can reduce equipment costs by buying a network modem, such as Shiva's NetModem, that each Mac on the network can share.

Each user also needs a subscription to an information service or an E-mail service. The subscription gets you a unique *user ID,* which might be a contraction of your name (such as *JHEID*) or a cryptic set of numbers (such as *76174,556*). You also get a *password* (which you can and should change the first time you sign on to the system), a manual, and a list of phone numbers that will give you access to the service's mainframe computers. Completing the setup involves adding *communications software,* which lets you sign on to the service and helps you use it. (For background on telecommunications, see the *Getting Started* columns in the April and May 1987 issues of *Macworld.*)

The primary differences between a network-based E-mail system and a commercial E-mail service are the location of the mail server and the way you connect to it. With a network E-mail system, you're always connected to the mail server, and your E-mail software notifies you the mo-

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ment a message arrives. With a dial-in service, you're only connected when you're online. Checking your mail means dialing up, signing on, issuing the appropriate commands, and then signing off. Many people don't take this daily stroll to their electronic mail boxes, and thus lose E-mail's immediacy.

But commercial services also have their pluses. Any computer with a modem, from a Radio Shack laptop to a maxed-out Mac II, can be used to contact them. And in all major cities and a lot of smaller ones, you can dial a local phone number to do so. This makes E-mail services ideal for companies with field offices or traveling employees. Finally, all of today's popular services have thousands of subscribers, and you can correspond with any of them. Most computer and software companies use one or more E-mail services. A phone conversation between two people in these businesses often ends with two questions: What's your E-mail address? How often do you check it?

Ultimately, the geography of your business is the deciding factor. If you will be corresponding with people in the same office or building, an AppleTalk-based E-mail system is the logical choice. If your correspondents are scattered around the country, or around the world, a commercial E-mail service makes more sense. And if your needs fall into both categories, use both.

Network E-mail

For most businesses, allowing Fred in Flagstaff to send memos to the home office isn't as important as allowing the people in the home office to communicate efficiently with one another. This is where network E-mail systems shine. And thanks to recent developments in modem technology, network E-mail systems can even accommodate Fred.

I've already mentioned that setting up a network E-mail system involves interconnecting the Macs and then adding E-mail software. That second step is actually a two-stage process: setting up the mail server and installing the E-mail software on each Mac in the network.

Creating a mail server involves using one Macintosh to store the mail everyone sends and to inform users when mail arrives for them. For large offices, you need a Mac with a hard disk, but offices with just

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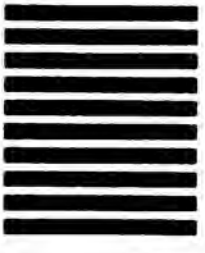

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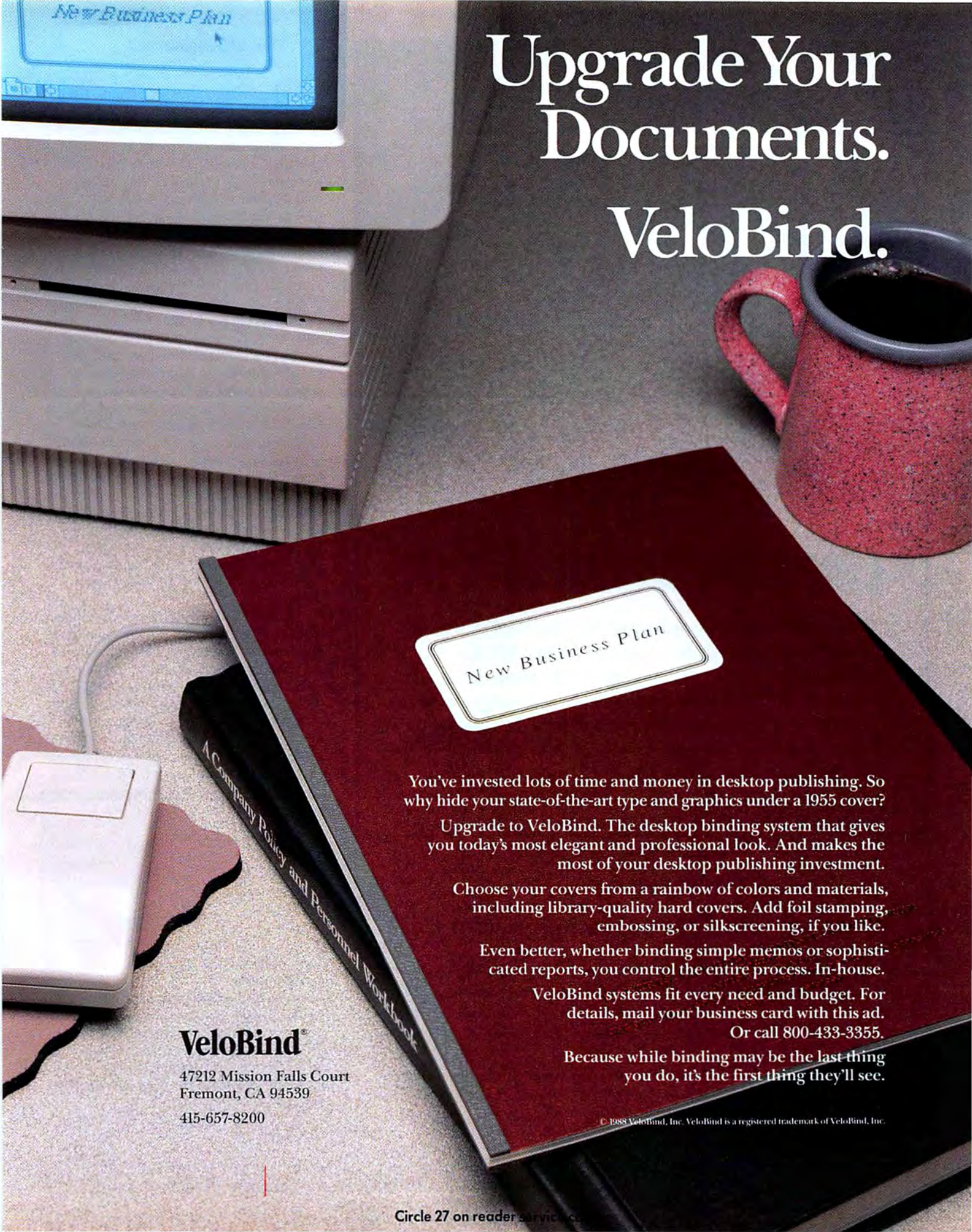

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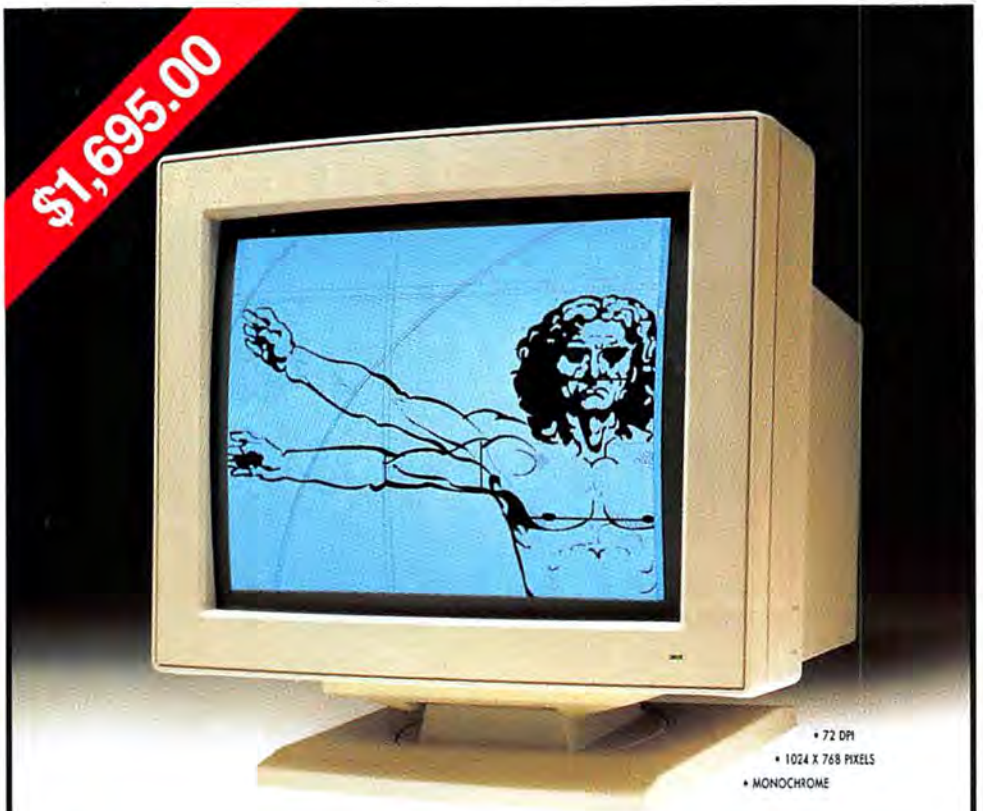

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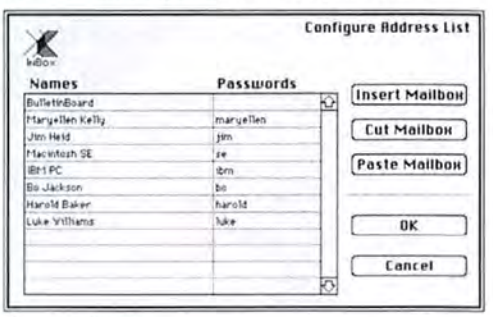
a few Macs can get by with a floppy disk–based mail server.

With early Mac E-mail products, you had to *dedicate* a Macintosh as a mail server—that is, you had to donate it to the network and use it exclusively for serving up mail. For offices with only a few Macs, that was an expensive proposition. Today's Mac E-mail packages—Microsoft Mail (formerly known as InterMail), Think Technologies' InBox, and CE Software's QuickMail—are more flexible. These packages can run the mail server software *in the background,* freeing up the server Mac for other tasks. Still, using the server Mac for other purposes does slow the E-mail system's response time, so for large offices, a dedicated Mac is still the best approach.

Fortunately, you can make a dedicated Mac earn its keep by running Apple's AppleShare *file server* software along with the mail server software, allowing the Macs on the network to use the dedicated Mac's hard disk as a central storage area for documents and applications. (For details on file servers and network applications, see "Getting Started with Networking," *Macworld,* September 1987, and "Expanding the Conversation," *Macworld,* May 1988.)

Just as every post office needs a postmaster or postmistress, so every mail server needs an *administrator*—someone to set up the mail system and keep it in tune. The administrator's first job is to add users to the system by running a special administrator's program and typing each user's name (see "Server Setup"). After the initial setup, the administrator's job becomes custodial—adding and removing users as



Server Setup

Part of an E-mail administrator's job involves setting up mailboxes for each member of the network. Here, mailboxes are being created for a Think Technologies InBox system. Remember that each user can—and should—change his or her password when signing on to the system for the first time.

(continues)

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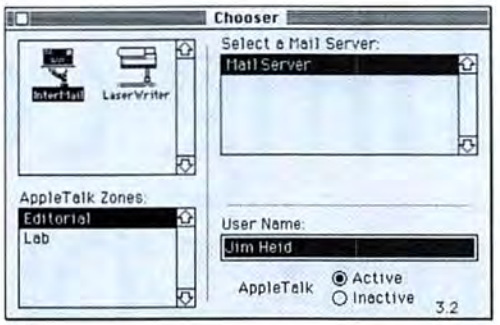

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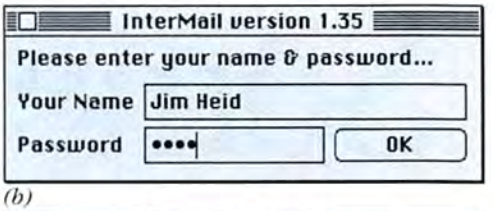

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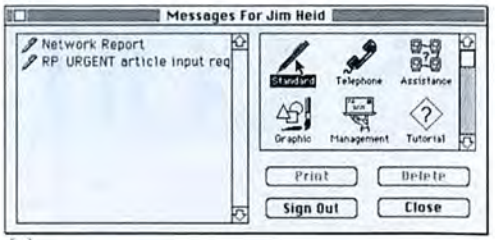

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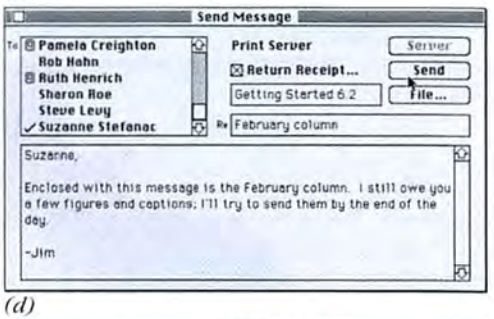

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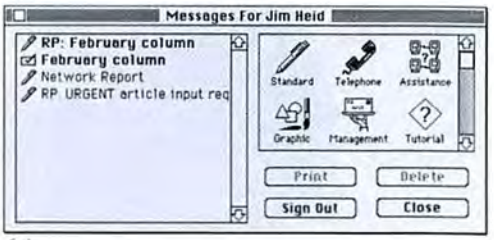

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E-mail in Action

At Macworld, *we use Microsoft Mail (formerly InterMail) running on a dedicated Mac Plus with an AST-4000 hard disk. The illustration shows the steps I take to submit a completed column. After dialing* Macworld's *San Francisco offices using a Hayes Smartmodem 9600, I use the Chooser DA to select the mail server (a). Next, I open the Mail desk accessory and supply my password (b). After a few seconds, my message window appears, listing messages I've read but haven't deleted from the server (c). To create a message, I double-click on the Standard icon, then type the message's text; I address it by clicking the recipient's name in the To box, and use the File button to "enclose" the word processor document containing the column (d). Finally, I click the Send button to send the message to the mail server. In (e), a return receipt notification appears (denoted by the check-mark icon) along with a reply from my editor (signified by "RP:"). Unread messages appear in boldface type.*

needed, helping users who have forgotten their passwords, and working to keep the mail moving.

Setting up E-mail software on each Mac in the network usually involves running an installation program that copies the software to each Mac's start-up disk. The software itself often comprises an INIT file that loads the mail software into memory during start-up, and a desk accessory that each correspondent uses to write, send, and receive mail. After the software is installed, you restart each machine to load the INIT, and you're ready to go.

No Stamps to Lick

Thanks to the Mac's metaphorical nature, writing and sending E-mail is much like writing and sending paper mail. The first step is to write the message, using the text-editing window all E-mail products provide (see "E-mail in Action"). You can also use a word processor, and then import the text via the Clipboard. But unless you use Microsoft's Word and Mail duo, which I'll discuss shortly, your message can't contain different fonts and styles.

After you write a note, you address it. With InBox and Microsoft Mail, simply click on the recipient's name in the list of mailboxes. With QuickMail, drag the recipient's name to a box labeled Send To. While all three products let you send the same message to any number of mailboxes, QuickMail and InBox also provide a community mailbox called a *bulletin board,* which everyone can access.

After addressing the message, you click a Send button, and the E-mail software beams the communiqué across the network and stores it on the server, which sends a message to the recipient that he or she has mail. InBox's message scrolls across the menu bar like a Times Square marquee. With Microsoft Mail, a dialog box appears. With QuickMail, a small icon

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MacUser, March 1988 ★ ★★★★★

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flashes over the Apple menu. All three packages can also notify you aurally.

Reading mail is as easy as opening the E-mail desk accessory and double-clicking on the message. You can reply to a message with a mouse click, forward it to someone else, delete it, or save it in your mailbox. All three E-mail products distinguish between opened and unopened mail, so you always know which messages you've read and which you haven't.

All three packages also let you create and send electronic "while you were out" phone-message forms. QuickMail goes a step further, providing a forms-design program that lets you create custom E-mail forms for your business. For example, a sales department might create an order-taking form to allow a secretary to take orders for salespeople who are away from their desks.

I mentioned earlier that only the Microsoft Word and Mail combination lets you create and send memos containing different fonts. Word 4.0's Send Mail and Receive Mail commands let you exchange formatted Word documents without having to summon the Mail desk accessory. Simply write or open the document, choose Send Mail, select the recipient, and Word sends the document. This makes Word and Mail a powerful duo for offices where documents are forwarded to several people for comments and revisions. Of course, you can send formatted word processor documents with InBox and QuickMail by "enclosing" them within messages, but that involves more steps.

Remote Control

But what about Fred in Flagstaff? If you equip your mail server with a modem, Fred can use his own modem to dial in and connect to the network. When the two modems establish a connection, Fred's Mac becomes a *remote node*. He then can perform any network task that the people in your office perform—printing on a LaserWriter, copying files to or from a file server, and exchanging E-mail. To learn what you need for remote network access, see "Networking from a Distance," *Macworld*, June 1988.

Because a remote node isn't always connected, it's up to Fred to dial in regularly and check his mail. There's an even bigger drawback: because a 1200-bits-per-second (bps)—and even a 2400-bps—modem transmits data far more slowly than a network does, remote E-mail can seem as slow as the Pony Express. With high-speed modems such as Hayes' Smartmodem 9600, however, performance is quite acceptable—not as fast as a local node, but fast enough so that electronic mail still seems electronic. I used to use a 1200-bps modem for connecting to *Macworld*'s E-mail system (built around Microsoft Mail), but I switched to a Smartmodem 9600 after a few too many cobwebs formed between me and my Mac.

CE Software's QuickMail is particularly versatile, since it can talk to any computer with a modem. If you dial into a QuickMail server using a computer other than a Mac, QuickMail discards the Mac interface and presents special text menus for accessing the QuickMail system. Combine that capability with a $300 Radio Shack laptop computer, and you have an inexpensive way to keep in touch.

When to Go Commercial

Remote-node setups allow AppleTalk E-mail systems to span the miles, but commercial E-mail services still have their place. For starters, their multiline phone networks can accommodate thousands of callers at once. With remote-node access, only one person at a time can check his or her mail.

Commercial E-mail systems also offer additional mail-handling services. With MCI Mail, one of the largest E-mail services, you can send E-mail to someone without a computer. Supply the person's mailing address, and MCI Mail will print a hard copy of the letter at the service center closest to the recipient and then put it in the conventional mail, reducing the time your message will spend in the clutches of the Postal Service. You can also specify overnight, or even four-hour, delivery at prices lower than those most courier services charge.

The CompuServe Information Service provides its own E-mail system, called EasyPlex, and it also offers a *gateway* to MCI Mail that lets subscribers send mail to MCI Mail users. Other information services, including The Source, GEnie, and DELPHI, also offer E-mail services that give you access to vast amounts of information, from online encyclopedias to airline flight schedules to megabytes of free or inexpen-

(continues)

—MacWEEK 9/6/88

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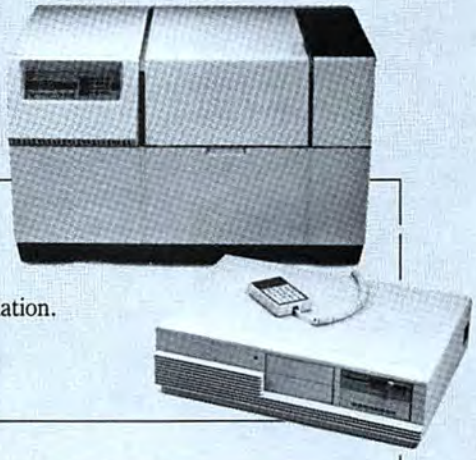

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sive Mac software stored in the libraries of online user groups.

Because commercial E-mail services are designed to talk to any computer, don't expect pull-down menus and dialog boxes. Text menus and prompts such as "Type / EXIT when done" are the norm. But recently, some clever programmers have constructed Macintosh facades for most services (see "A Friendlier Interface"). CompuServe's Navigator streamlines CompuServe access. Dow Jones's Desktop Express simplifies MCI Mail and the Dow Jones News/Retrieval service. SuperMac Software's Acknowledge communications package includes a sophisticated application that automatically sends and retrieves mail to and from any or all of several popular services—with a single mouse click.

All of these *front-end* programs work similarly. You compose outgoing messages using a text-editing window, then you ad-

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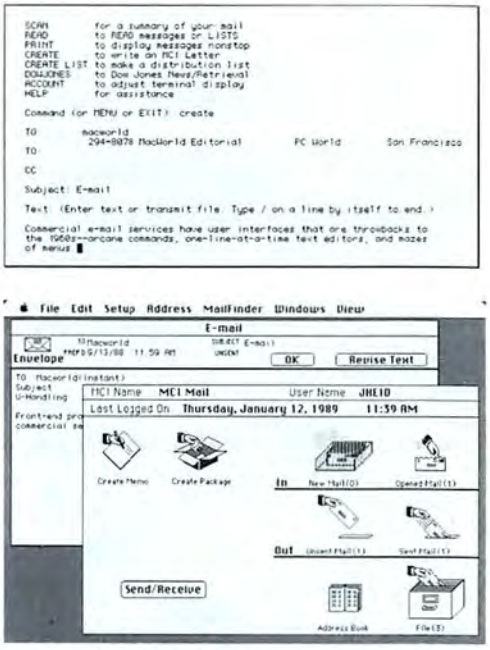

A Friendlier Interface

Because they're designed to talk to any computer, commercial E-mail services use text-oriented menus and require typed commands. Several Mac programs are available that simplify access to these services. At left, MCI Mail as it normally appears. At right, a screen from Dow Jones's Desktop Express. Use Desktop Express's commands and icons to write and address mail, then click the Send/Receive button. Desktop Express connects with MCI Mail and sends it the commands it expects.

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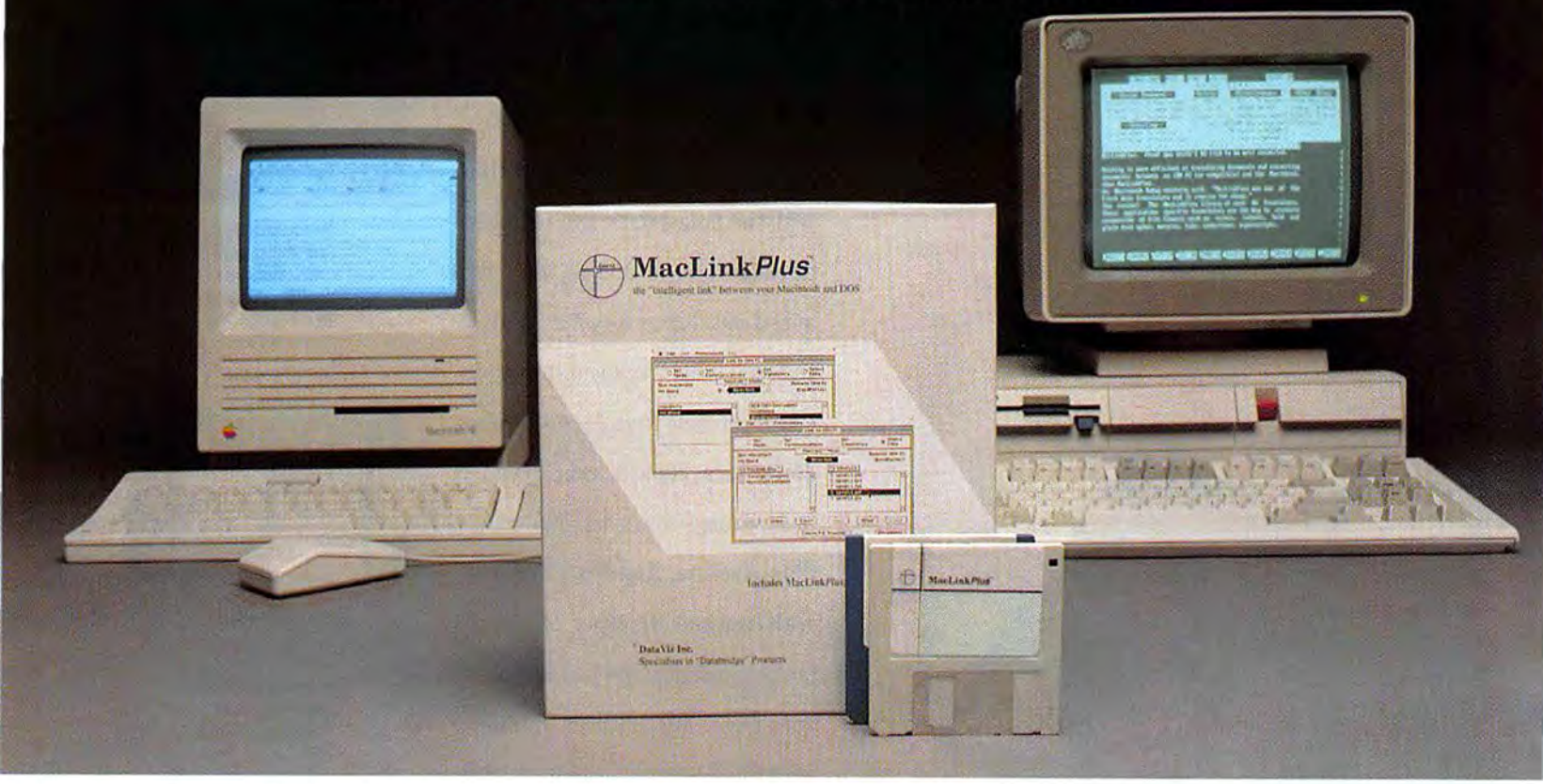

Whatever Macintosh-PC setup you have, MacLink*Plus*—at $195—provides the very best solution for transferring and translating files and documents between the two.

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And if you have Macs and PCs on a network or AppleShare server, etc., the MacLink*Plus* file translation capabilities are worth the price alone.

So, if you want to be really well connected, the size of your wallet really doesn't matter. Just call (203) 268-0030 for your nearest DataViz dealer. Because as Macintosh Today recently said, "MacLink*Plus* was one of the first data translators and it remains the champ."

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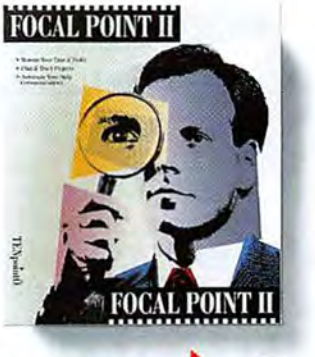

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dress your mail and choose a command or click a button. The front-end program then dials the service and sends it the appropriate commands. Because the program always knows exactly which commands to send, this approach not only tames an unfriendly interface, it reduces connect-time charges.

Another way to use commercial E-mail without discarding the Mac interface is to subscribe to MacNET, an all-Macintosh information service that provides E-mail services.

If you decide to combine AppleTalk E-mail and a commercial service, take a hard look at CE Software's QuickMail. It's the only AppleTalk E-mail product that can also talk to commercial services. You can instruct a QuickMail server to call any popular service at certain intervals so that members of the network can communicate with anyone using the service. Mail retrieved from a service appears in the recipient's mailbox, just as if it came from someone else on the network.

Hanging Up

I've been talking about Mac-only offices here, but I've heard rumors that many people use other computers, as well. Mac E-mail products can accommodate them, too. Microsoft Mail and Think's In-Box have IBM PC counterparts that let PCs and Macs communicate, and all three companies are working on establishing links with VAX minicomputers.

I tend to be conservative when it comes to recommending fancy technology, but not where E-mail is concerned. It's a wonderful way to communicate, partly because it reduces phone interruptions, but also because it resurrects the dying art of written communication. E-mail forces you to think about what you want to say, and it lets you express opinions that you might hesitate to verbalize. It establishes a written record of a discussion or negotiation process. It even helps you deal with difficult personalities.

If you use an E-mail system in your office, drop me a line and let me know how it works for you. Better yet, send me an E-mail message. On MCI Mail, I'm JHEID. On CompuServe, they call me 76174,556.

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Send us your best stackware by **March 15, 1989**. We'll award prizes to the most outstanding HyperCard applications and describe the winning SuperStacks in a feature article in the November 1989 issue of *Macworld*. Judging criteria will include creative and appropriate use of HyperCard, interface design (including use of graphics and sound), programming elegance, and success in meeting the goal of the program for the intended audience. We reserve the right to change an entry's category, if appropriate. Judges may elect not to make an award in each category.

Categories

COMMERCIAL Stacks distributed for a fee.

CUSTOM Stacks custom-made for a business, government agency, or nonprofit organization.

EDUCATIONAL Curriculum, teacher-training, and teacher/administrator productivity materials, as well as training or self-instruction stacks for the general public.

NONCOMMERCIAL HyperCard applications available through noncommercial channels (shareware, freeware), plus stacks designed for personal use and not distributed at all.

How to Enter

Entries are due in our office on **March 15, 1989**. No more than two (2) entries per contestant. Each entry must include disks (clearly labeled with the stack name, your name, address, and phone numbers); documentation (if necessary); a $5 entry fee; and a *one-page* summary headed with the stack name, contest category (commercial, noncommercial, educational, or custom), and K-count, as well as your name, address, and phone numbers. In the summary, state the purpose and intended audience of your entry and note if it requires any special hardware (CD ROM drive, for example). Mention the list price or suggested shareware fee and explain how the stack is being distributed. You may also mention any special features you want to call to the attention of the judges. Sorry, disks will not be returned. Employees of the sponsors are not eligible to enter. Winning stacks from the 1988 SuperStacks contest are not eligible. Make your check or money order payable to PCW Communications. Send entries to SuperStacks, *Macworld*, 501 Second St., San Francisco, CA 94107; Attn.: Macworld Editorial.

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5.25" HH	ST225N	21 MB	65 msec
	ST251N	43 MB	28 msec
	ST277N	64 MB	28 msec
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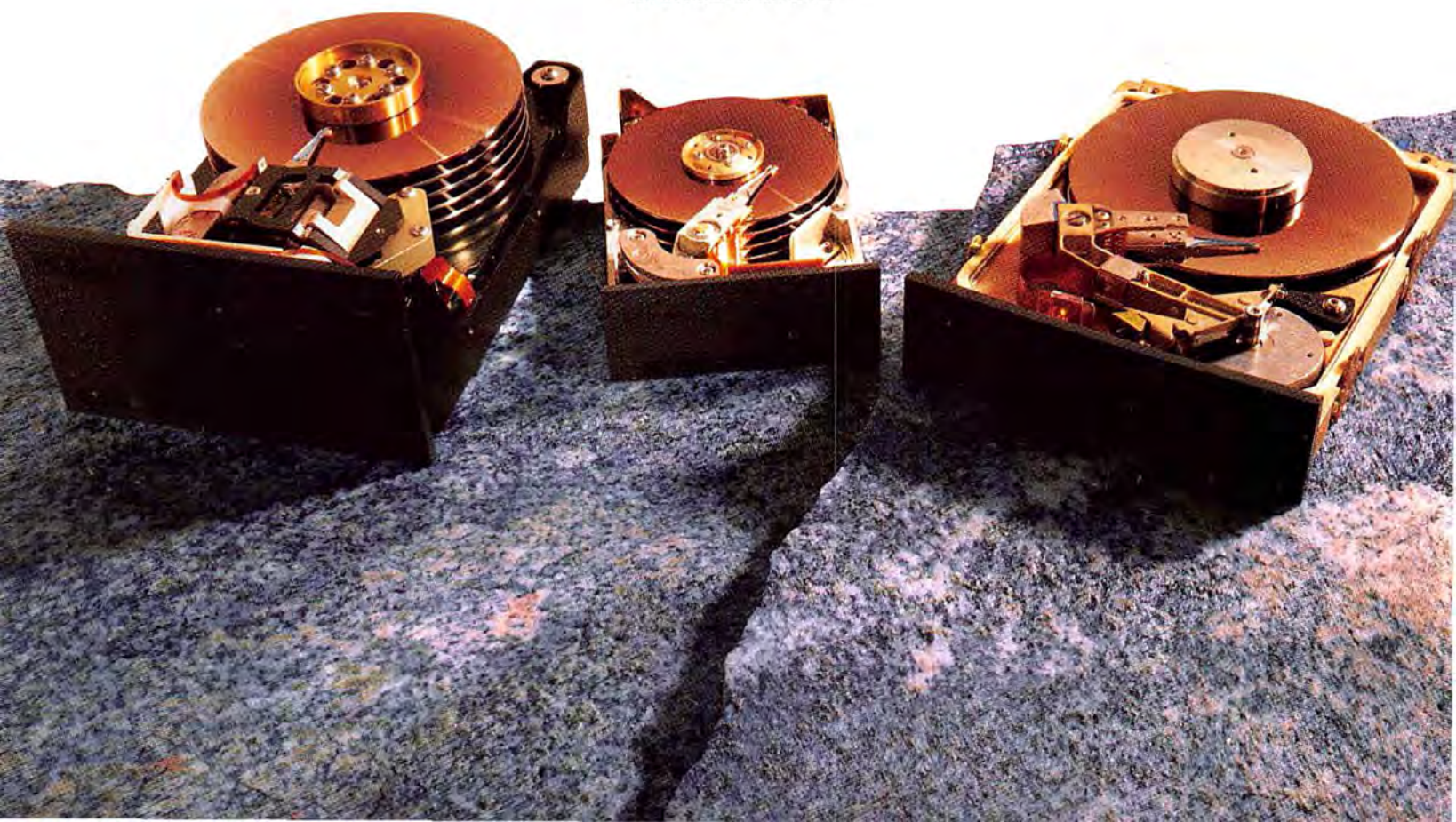

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Categories

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Animation/Video
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3-D/Image Synthesis
Architectural Rendering/Elevations
Business/Informational Graphics
Wild Card*

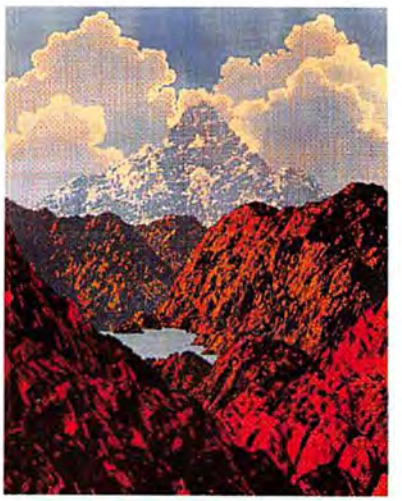
*Projects that don't fit into any of the other categories. Try us.

Prizes

Three grand-prize winners will take away a Macintosh II, a 32-bit NuVista color capture and display board, or a Tektronix color image printer. Winners in each contest category will choose one product from a selection of top programs, including Adobe Illustrator, Aldus FreeHand, PageMaker 3.0, ImageStudio, ReadySetGo, VideoWorks II, PowerPoint, SuperPaint, Digital Darkroom, and PixelPaint Professional. In addition, winners' work will be published in a *Macworld* feature article and in our 1990 graphics calendar. Grand-prize winners will also receive an expenses-paid trip to Macworld Expo Boston to claim their prizes.

Rules

Entries must be received no later than March 10, 1989, and must be accompanied by an entry form. Please send hard and disk copies of each piece (disks may be omitted when pieces run to more than 800K). Slides are acceptable hard copy for color graphics and for mixed-media or sculptural pieces. For judging purposes, however, originals are preferable; these will be returned if you include return postage and packaging. Animated entries may be on disk or half-inch videotape, as appropriate. Since work will be judged on technical innovation as well as aesthetic value, each piece should be accompanied by a detailed description of how it was produced. Please submit no more than four works (include an entry form for each). *Macworld* reserves the right to reproduce winning entries.



Entry Form

Send one entry form with each submission to Macintosh Masters, *Macworld*, 501 Second Street, San Francisco, CA 94107.

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Contest category _____

Submission format(s):

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All submissions must be received by March 10, 1989

MACWORLD

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Dick Hodges [vessel], Concept-Exclusif [brochure], Brian E. Pinz [dog], David C. Dickinson [mountain], Gunter Dunze-Wolff [camera]

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Granted, the name is a little unconventional. But the time and money Timbuktu saves will appeal to even the most conservative minds.

Install Timbuktu on each Macintosh, and everyone on the network can access other Macintoshes, share screens, and control the operation of each other's computers. In fact, you can access your own computer from another computer on the network. (Our companion product, Timbuktu/Remote, works the same way over modems.)

So, if you're the one who's always fixing things on the network, helping solve computer puzzles, and other office heroics, then leave your running shoes at home.

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Macworld News

by Ann Garrison

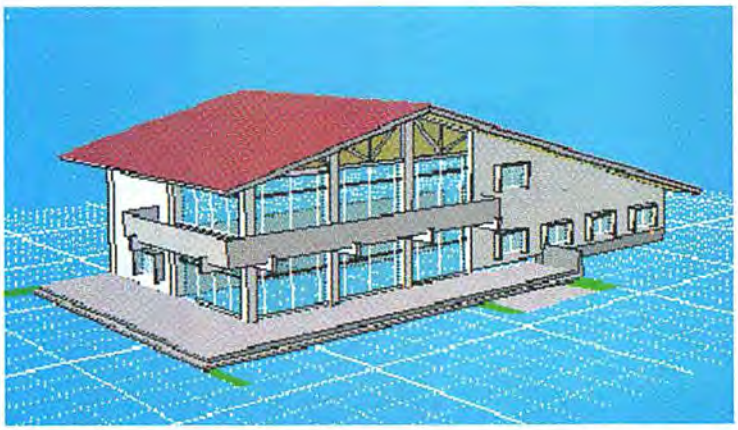
3-D In Perspective

We've all grown accustomed to reading "Made in Japan" on much of our hardware, but few of us have ever used Japanese software. Now Osaka's Dynaware Corporation has entered the American market with DynaPerspective, a 3-D architectural package for solid modeling, designing, rendering, and presentation.

The Mac II product is based on earlier versions for IBM and NEC computers, but it has more power and takes full advantage of Mac color graphics and the Mac interface. It requires at least 2MB of RAM and an 8-bit gray-scale or color video card and monitor. It uses an accurate floating-point database and has a limitless drawing area. With 2MB of RAM, its capacity is 75,000 vertices; with 8MB, 300,000.

ROBERT CARDIN

Ted Hochschwender and Susan Mayer, project managers at the architectural firm Robinson Mills & Williams, show off the power of DynaPerspective, a 3-D architectural package.



With DynaPerspective, architects and engineers can create precise models of complex architectural projects and then produce beautiful, color-shaded, perspective renderings.

DynaPerspective is so architecturally oriented that it won't be attractive to mechanical designers. But architects and engineers can create precise models of even the most complex architectural projects and then produce beautiful, color-shaded, perspective renderings.

To create or modify a design, you work with color wireframes in your choice of four windows: Top, Front, Side, and Perspective, or in all four at once. The interface is very intuitive, and 3-D program users will immediately recognize methods of image manipulation that first appeared in other Mac 3-D programs such as Mac3D, Swivel3D, and Pro3D. You can easily enter 14 three-dimensional elements including walls, roofs, circles, polygons, curved surfaces, cylinders, and stairs, and you can make them opaque or translucent, in any color. You can also store graphics entities in symbol libraries.

When you set up your own grid system, the program gives you extensive "snap-to" capabilities. United States architects may find decimals of a foot clumsy to work with, so the company may adapt the program to feet and inches in the future.

Once a design is complete, you ask the program to render the wire-frame images in shaded solid views. It does so at very high speed, and from all four views. You can then vary the viewpoint via rotation, zooming, panning, and other camera-like controls.

You can also create animation for walk-throughs. Film files allow direct viewing of a stored series of images, as well as output to VideoWorks II.

DynaPerspective is the only Mac color graphics program I've seen to date that produces shaded color renderings (via dithered color patterns) on both the CalComp PlotMaster and Hewlett-Packard PaintJet

(continues)

Call for entries

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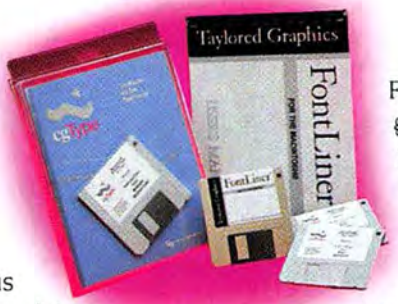

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CG TYPE, PostScript-compatible type for the Macintosh. In Canada, call 800-533-9795. MasterCard and VISA accepted. Free 48-hour delivery. FontLiner offer good through March 15, 1989.

Win the Agfa Focus 800 Scanner, 800 dpi, 64 gray scale, complete with McView software. ***Worth $5495!***

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To enter the CG TYPE Excellence Contest, send your original design sample with your name, address, and telephone number to Compugraphic Corporation, Type Division, CG TYPE Support Group, 90 Industrial Way, Wilmington, MA 01887. Contest is void where prohibited by law. You must use CG TYPE and FontLiner to create your design. Limit of one entry per person. Entries must be received by March 31, 1989. Prize may not be transferred or substituted. Winner must complete an affidavit of eligibility and release from liability, and consent to use of his/her name/likeness at Compugraphic Corporation's discretion. Entries become the property of Compugraphic Corporation. Winner will be notified by registered mail. The contest is open to CG TYPE users, 18 years or older, except employees of Compugraphic Corporation and its affiliated companies. For the winner's name, send a self-addressed stamped envelope to the address above. Compugraphic is a registered trademark of Compugraphic Corporation. Macintosh is a trademark of Apple Computer, Inc. POSTSCRIPT is a registered trademark of Adobe Systems Inc. Aldus FreeHand is a trademark of Aldus Corporation. Adobe Illustrator is a trademark of Adobe Systems Inc. FontLiner is a trademark of Taylored Graphics. ITC Novarese is a registered trademark of International Typeface Corporation. All copy typeset in ITC Novarese. All type output on a Compugraphic high-resolution output device.

cgType

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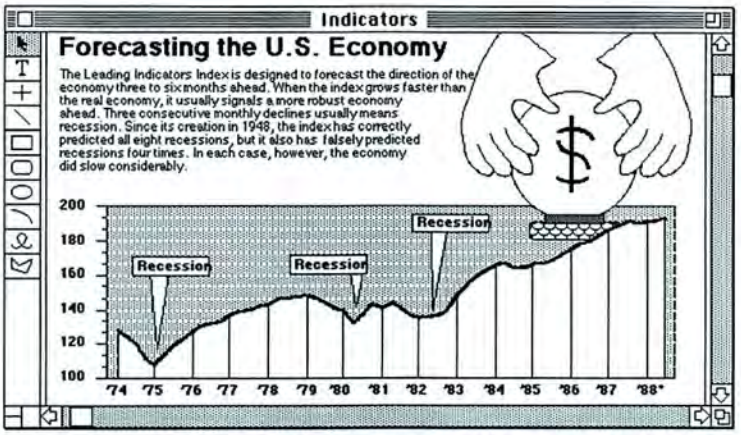
color printers. Other programs that support both of these devices allow for only eight colors. DynaPerspective also supports color pen-plotters and the LaserWriter. For further information, call Dynaware Corporation at its United States office in Foster City, California, at 415/349-5700.–*David L. Peltz*



News services and syndicates transmit graphics like these to newspapers by satellite.

Training at BellSouth

Over a century ago Benjamin Disraeli wrote "We cannot learn men from books." If he were alive today, he might write "We cannot learn programs from manuals." But what are the alternatives to trial and error or costly support calls?

With the opening of its Atlanta-based Microcomputer Training Center this past November, BellSouth Media Technologies thinks it has the answer. The Center touts a wide variety of courses ranging from Thinking-of-Purchasing-a-Mac Orientation to State-of-the-Art Desktop Publishing, teaching cutting-edge applications using cutting-edge research knowledge about how people learn.

The Center now has ten SEs to ten PCs; future plans call for six classrooms and the addition of 10 Mac IIs and 27 more SEs. One full-time instructor specializes in presentation graphics, another specializes in desktop publishing, and a third specializes in word processing. Seven training assistants contribute their expertise in graphic arts, database management, and other areas. Among the programs taught are PageMaker, Microsoft Word, Adobe Illustrator, PowerPoint, 4th Dimension, Microsoft Excel, Samson (BellSouth's advertising display software), and several paint packages.

Connectivity is another major focus, accounting for the presence of ten PCs in a training center designed to be Mac-oriented. The computers are not only networked together but also connected to outside phone lines for communications training.

The Microcomputer Training Center bolsters its educational repertoire with customer-site training for corporations and individualized tutoring in about 50 programs. The day-long classes cost between $17 and $43 an hour; a half-hour of individual instruction costs about $30. Various discount packages are available.

For further information contact BellSouth Media Technologies Microcomputer Training Center, 1100 Johnson Ferry Rd. NE, Atlanta, GA 30342; 800/521-9827 or 404/255-1690. –*Jeff Merron*

News Graphics via Satellite

Do you ever wonder how newspapers produce the graphics to go with the avalanche of stories breaking every day of the week? The growing need for sophisticated graphics has overwhelmed the in-house efforts of all but the largest newspapers, and many smaller papers have come to rely on news services and syndicates, which now deal in graphics as well as in photos and dispatches.

New York's Independent Network Systems (INS), a satellite communications network serving the newspaper industry, now transmits graphics between Macs, via satellite. Its ArtExpress service enables newspaper groups and other generators of graphics to send art from one location to hundreds of newspapers in a single transmission.

To transmit, ArtExpress users dial their work into the INS operations center. The graphic is then beamed to every location coded to receive it. At the receiving newspaper, the graphic is automatically passed to a designated Macintosh via an AppleTalk port, and then automatically stored on its hard disk. Documents are received at 9600 baud; PICT, Glue, encapsulated PostScript, and TIFF (scanned) documents are automatically printed on a LaserWriter. What's more, the receiving software runs in the background on a Mac Plus, SE, or II, without interrupting anyone's work.

INS signed agreements with Infographics, the Newhouse newspaper group, to transmit graphics to 27 papers with a total circulation exceeding 4 million. For further information, call Independent Network Systems, in New York City, at 212/809-7921.–*Phillippe Krakowsky*

Retail Mac

The profusion of HyperCard stackware has generated so much Hyper-excitement that one salient fact is consistently overlooked: outside of custom applications, most HyperCard stacks offer limited practical value, especially for those the software was intended to benefit most—Macintosh novices. For some consumers, however, this situation is improving.

(continues)

DAN ESCOBAR

A graphic artist at the* San Francisco Examiner *pastes up graphics transmitted Mac to Mac, via satellite.

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Circle 321 on reader service card

MICHAEL L. ABRAMSON

Macs running HyperCard guide shoppers through Chicago's Bloomingdale's.

Earlier this month Bloomingdale's, the retail giant, completed its trial of one of the most intelligently targeted HyperCard applications to date: the Safire Shopper, a point-of-purchase display system. Installed in the consumer electronics departments of the huge Chicago and New York stores in October, the Safire Shopper is a Macintosh-based system that provides shoppers instant access to product information. Bloomingdale's customers can now get information on more than 70 products—from the description of an item to its pricing and scanned image. Program surprises—animated demos—enliven the display. The system is made up of a Mac SE with 2MB of RAM and a LaserWriter Plus, which prints the results of a customer query.

Response to the Safire Shopper has been positive. More than 100 customers use it each day; half of them print out information for future reference. Bloomingdale's personnel believe the main reason for the system's success is that it makes the inquiry process enjoyable. "It's like a video game," enthused one user.

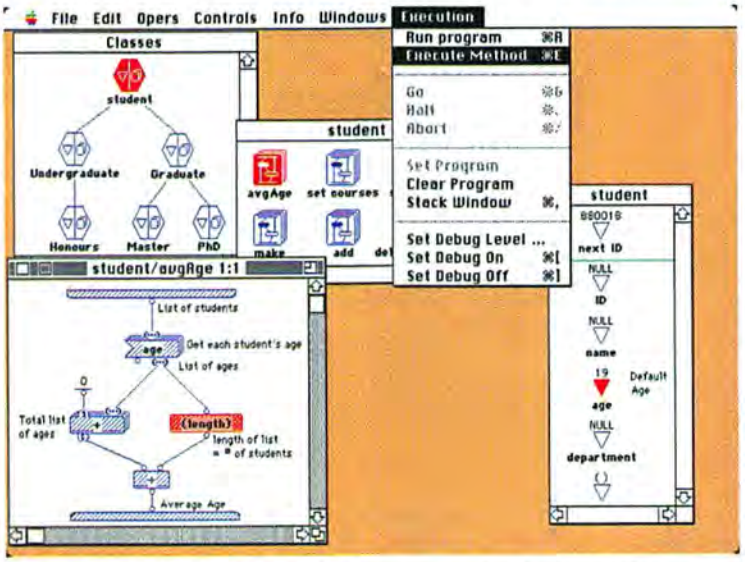
The idea for the product, however, did not come from video games. "We applied the principles used by banks in automated teller machines," explains Mark Safire, the Shopper's creator. "Our machine provides a valuable, easy-to-use service when sales personnel are not available to help the customer." Bloomingdale's seems sold on the idea—it plans to install the units in each of its 13 department stores, and has asked Safire to produce enhancements, such as a system that will incorporate diagrams of the store's layout and direct shoppers to the desired item. For further information, contact Mark Safire or Michael Spalter at Safire and Spalter, in New York, New York, at 212/529-0634.—*Philippe Krakowsky*

OOPSLA News

Supporting the Mac's user-friendly interface often entails complex programming on the part of developers, even with the Mac's Toolbox. Apple and other companies have been studying object-oriented programming as a means of simplifying the programmer's job. Also actively involved in this effort is the Association for Computing Machinery's Special Interest Group on Programming Languages, which organizes the OOPSLA (Object Oriented Programming Systems Languages and Applications) conference, an annual meeting on object-oriented languages.

OOPSLA includes not only workshops and presentations on object-oriented languages and databases, but also a small number of exhibits. This year, two exhibitors attracted a lot of attention because of their Mac-related products. One was Digitalk, with its Mac version of the SmallTalk language. SmallTalk/V Mac is a complete development environment, including complete access to the Mac's Toolbox routines, tools for organizing and browsing SmallTalk source code, and a source-level debugger. For novices, the manual includes a 12-chapter tutorial on object-oriented languages and SmallTalk programming.

The second Mac attraction was Gunakara Sun Systems' Prograph, a high-level pictorial programming language that supports the concepts of object-oriented programming. Some of the features of LISP, Prolog, and SmallTalk form the Prograph language, but everything is presented pictorially. Based on a system developed by Professor Tom Pietrzykowski of the Technical University of Nova Scotia, Prograph promises to be an excellent system for learning object-oriented programming. Later versions, which will include a compiler and perhaps code generators, could make Prograph a tool for developing stand-alone applications for the Mac. For further information, contact Digitalk, in Los Angeles, California, at 213/645-1082, or Gunakara Sun Systems in Halifax, Nova Scotia, Canada, at 902/429-5642 —*Dave Kosiur*



Prograph, a high-level pictorial programming language from Gunakara Sun Systems, supports the concepts of object-oriented programming.

Interactive Visionaries

The book *Interactive Multimedia* (Microsoft Press, 1988) synthesizes the future as seen by the visionaries immersed in creating interactive computer education. Its chapters are annotated speeches and papers delivered by scientists, developers, media professionals, and educators at a 1986 Apple-sponsored conference called "Learning Tomorrow." The experiments the book describes have not previously been publicized outside of a small circle of scientists.

In one essay Thomas Anderson, a consultant with the New York public television station WNET, explains how he reused footage from the PBS broadcast "Creation of the Universe" to

(continues)

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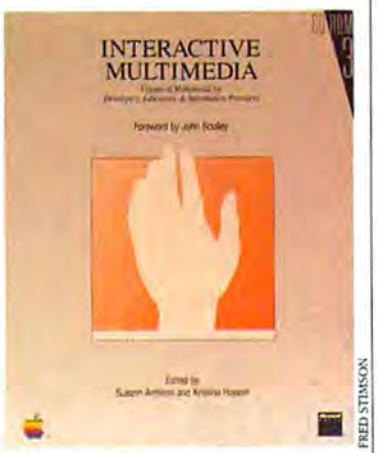
begin an interactive educational product prototype called Beyond Einstein. By putting the film and graphics on videodisk and designing a Macintosh-style interface, the WNET Learning Laboratory developed a new interface that offers five ways to interact—touring, browsing, connecting, asking questions, and changing conditions—with the graphics, photography, motion video, and narration of the original program.

Anderson laments that television tantalizes viewers instead of educating them. Why not reuse all that costly footage in a medium that allows viewers to control the pace of information and delve deeply into specific topics?

Many of those attending the conference stressed the need for new hardware and programming to support interactive media. Now, with the emergence of HyperTalk, and with interactive compact disks and digital laser disks, Mac users can get a glimpse of what education and entertainment have in store for us by reading *Interactive Multimedia,* which is available for $24.95 from Microsoft Press. *–Barbara Tannenbaum*



FRED STIMSON

Interactive Multimedia ***gives readers a glimpse of possible futures for education and entertainment.***

The black-and-white photo was scanned. The color drawing was automatically traced with Aldus FreeHand 2.0.

Autotracing with FreeHand 2.0

Autotrace is an object-oriented tool that traces bitmapped images and creates a vectorized copy of a line drawing. It saves designers the time and effort required to hand-trace line art like maps and diagrams.

Adobe Systems offered autotrace in Illustrator 88, and now Aldus is getting into the act with a major upgrade of its FreeHand PostScript drawing package. Autotrace aficionados will note that FreeHand 2.0 offers a selection rectangle feature that lets you pinpoint only the parts of the drawing you want to autotrace. The FreeHand drawing tool also enables you to edit the FreeHand path as it is drawn. Other image-conversion features include import of TIFF images, TIFF-image editing for brightness and contrast, and PICT-to-PostScript conversion.

Like Adobe, Aldus has added support for the Pantone color-matching system and a blend tool for shapes and colors. In a nod toward ease of use, Aldus has made FreeHand's interface more like the PageMaker interface, particularly in the menu structure and dialog boxes. You can edit text on an arbitrary path and format multiple text blocks simultaneously. The program also includes a clip art library, a new knife tool in the toolbox, a new stroke command for adding variable outline weights to text, and up to 100 steps of Undo and Redo.

For further information, contact Aldus, in Seattle, at 206/622-5500.*–Rusty Weston*

Mac Embroidery

It's not uncommon these days to see Enzan-Hoshigumi developers bent over their embroidery—but not with a needle and thread. Instead, they are bent on perfecting the company's latest innovation, a polished, compact desktop embroidery machine, driven by a Mac.

P.O.E.M., or Personal Original Embroidery Machine, garnered plenty of attention when it was introduced last year at the Macworld Expo in Boston, but for months afterward there were still only three machines in existence and nary a marketing plan in sight.

Now Qualitas Trading Company, which represents Enzan-Hoshigumi in the United States, says that's changing: a consumer-level version of P.O.E.M. is scheduled for release in the summer of 1989.

ROBERT HOLMGREN

The Mac-driven embroidery machine is finally coming to market.

Reasons for the delay in bringing P.O.E.M. to market are varied. The major hurdle was deciding whether to target the consumer or the industrial market. Then safety features had to be built into the machine, and needles that would not break during stitching had to be made. And perfecting the software proved to be no small task.

P.O.E.M. was jointly developed by the Aisin Seiki Company (which designed the hardware) and Enzan-Hoshigumi

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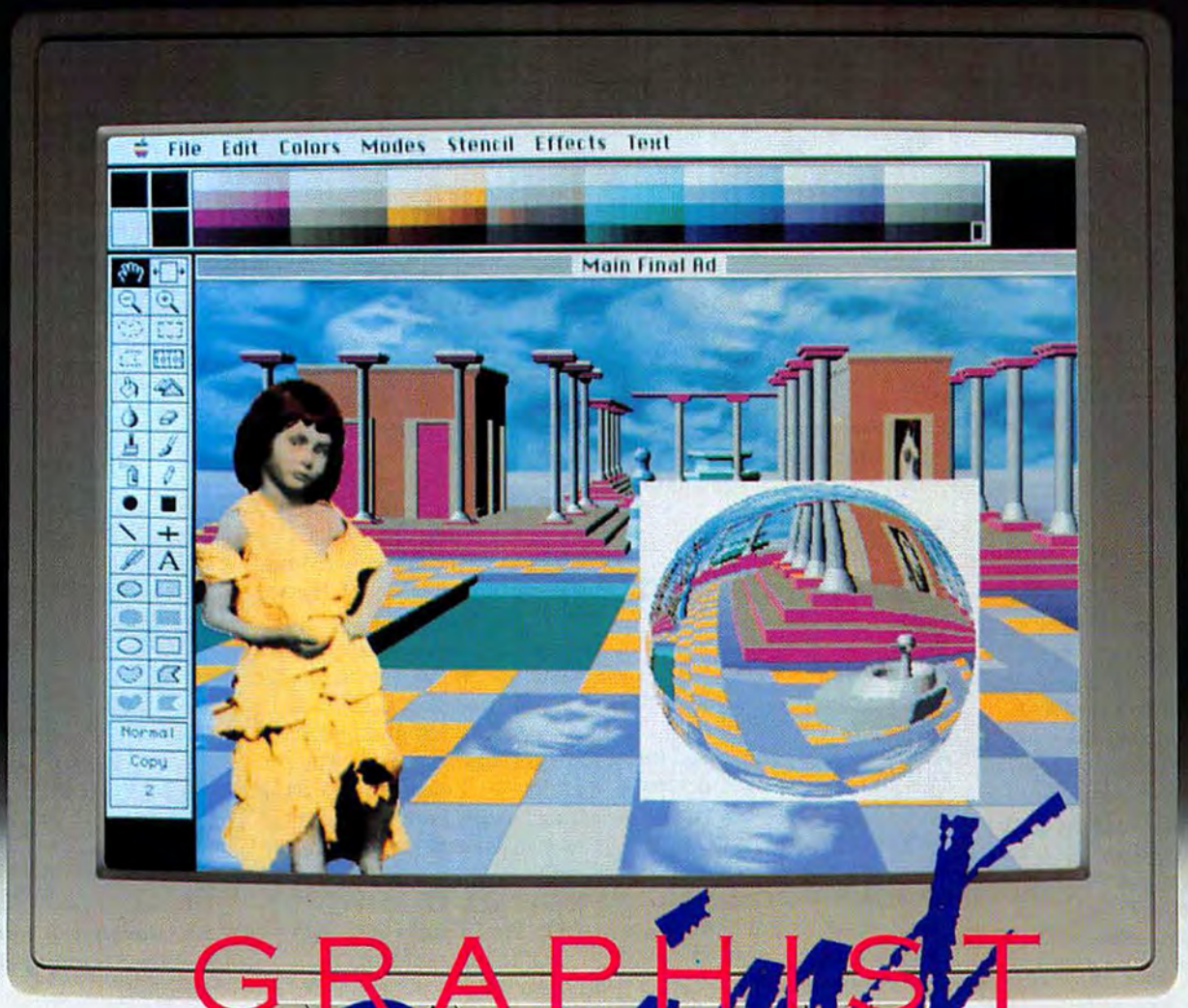
INTRODUCING



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- Two to ten times faster than any other advanced Macintosh paint or draw program.

Graphist Paint II is a new hi-end paint program with all of the standard painting tools, file formats and 16 Macintosh standard modes . . . PLUS you can:

- Import all of the standard formats, PixelPaint and video inputs (driver built-in) including PAINT, PICT I and II, TIFF and RIFF.
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- Select from 16.7 Million colors, supporting 1 palette of 256 colors at a time, on each of 2 screens.
- Pixel by pixel editing.

INCRUSTING

Take any two images, on two layers . . . incrust an image from one onto the other — in any position — or onto any other illustration — in any position — or back onto the full original.

Main original

Incrusting in progress

Incrusting completed

SPHERIZATION

Take any image, or text . . . define the area . . . and create a 3-D sphere of the entire image, or text.

Spherize Type

Spherize Art

Create Custom Spheres

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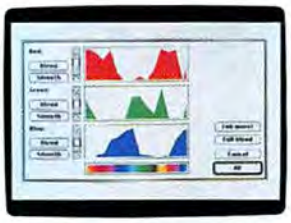
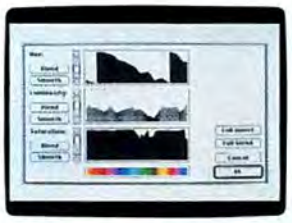
Customize color palettes by changing RGB and/or HLS wave forms — or use the standard Macintosh color picker.



Red, Green, Blue wave form



Hue, Luminosity, Saturation wave form

Macintosh Color Picker

Graphist Paint II is packed with so many new features you'll want to get your hands on it right away. For full information and the name of the Graphist Paint dealer nearest to you call:

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(which makes the software that comes bundled with it). The idea originated at Enzan-Hoshigumi: if you can output to a printer, then why not to a sewing machine?

When it reaches the retail market, P.O.E.M. is expected to run with 1MB of RAM, work with any paint program, and do a variety of delicate embroidery stitches using up to five colors of thread. It will come with a library of designs, and you can create your own.

Is there a market for desktop embroidery? Apple Italy, Apple France, and Levi Strauss are just a few of the companies that have shown interest. The machine's retail price of more than $1000 is likely to squelch dreams of buying one to monogram a favorite tablecloth or perk up old T-shirts. But for schools, small businesses, street artists, cottage industries, and the like, P.O.E.M. just might prove that it pays to mix a little haiku with high tech. For more information, contact Qualitas Trading Company, in Berkeley, California, at 415/848-8080.–*Mary Margaret Lewis*

Apple Grant

As you enter the Exploratorium, San Francisco's science fun house, you see a video monitor prominently displayed under a sign that reads "Memory and Eyewitness Testimony." Every couple of minutes the monitor screens a short segment of the political suspense movie *Z*. What's immediately apparent is that the film clip depicts an attack on a man in a town square. What's less apparent is that the video display is in cahoots with a Macintosh SE running HyperCard at the rear of the complex. When visitors later walk up to the Mac, the HyperCard application tests their memories of the film clip with a series of questions. It asks every other person a misleading question that might actually change his or her memory of the film. The SE running HyperCard is thus helping the Exploratorium study the way we remember.

This little scientific investigation is just one of the ways the Exploratorium is using Apple's gift of 44 computers, networking hardware, 3 LaserWriter IINT printers, a CD ROM player, and an AppleFax modem.

Another project is a version of "telephone," the children's storytelling game. A HyperCard application tells visitors a story. With the help of the MacRecorder, visitors then repeat the story and inevitably change it in the process. These versions of the original accrue in a database, providing the Exploratorium with what is undoubtedly the longest ongoing version of this game ever played —and, perhaps, with a glimpse of the future of fiction as well.

Exploratorium educator Ron Hitschman is most excited about a HyperCard program that cross-references exhibits. Visitors choose a scientific concept, and the program then defines it, lists many of its practical applications, and directs them to exhibits where the applications can be seen in action. Hitschman uses VideoWorks on top of HyperCard to create animations that demonstrate various scientific concepts. Harmonic motion, for instance, is depicted as an oscillating sine wave issuing from a spinning circle; moiré patterns are produced with intersecting diagonal lines in constant motion.

The cross-referencing program is still in its infancy, but Hitschman foresees two centrally located reference pods with three Macs and a LaserWriter in each, all linked to an Exploratorium-wide network. Once these pods are in place, visitors to the Exploratorium will be able to use the Mac to plot a course through the universe of applied science.

For further information, contact Ron Hitschman at the Exploratorium, in San Francisco, at 415/561-0371.–*William Freais*

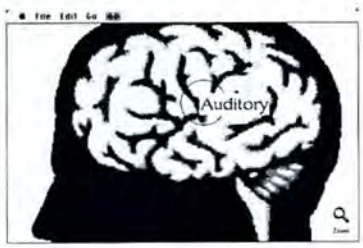
ROBERT HOLMGREN

San Francisco's Exploratorium, a science fun house, uses HyperCard to draw visitors into a human memory experiment.

HYPERCARD

Hot Stacks

HyperCard author Bill Atkinson has described his creation as a "software erector set." Unfortunately, the flood of stacks in the public domain often reflects the same functionality as those children's toys. So far, HyperCard's magnificence is appreciated most by the people who build their own stacks.



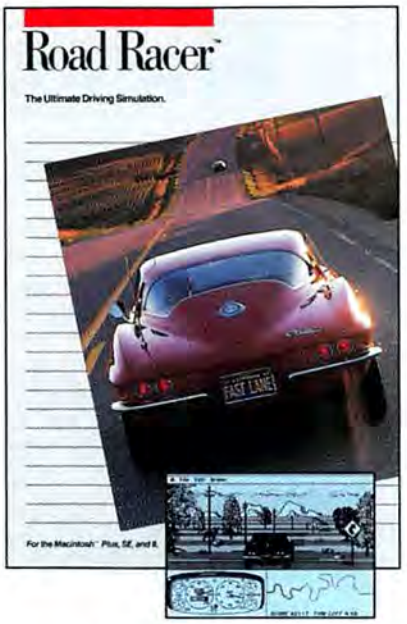
In Neurotour, you can click on parts of the brain for information about them.

As long as stacks are free or shareware, complaints about them are minimal. However, slow, sloppy, and disjointed commercial stacks selling for over $50 are drawing smirks and frowns.

The following Hot Stacks rise above this mediocrity in both cleverness and artfulness.

Neurotour *by Jim Ludtke.* This stack has been around a while, yet it remains one of the best demonstrations of HyperCard potential. You start with a handsome drawing of a brain. Clicking on particular parts of the brain reveals information about each part. Repeated clicking on a zoom button brings forth closer views, from neurons to cells to dendrites and beyond.

ScriptView *by Eldon Benz* and **Script Report** *by Eric Alderman.* Stacks that let you view the scripts of all other stacks contiguously. If you want to learn HyperTalk programming, these stacks (and others like them) will help.–*Scott Kronick*



Speed limit 200. Strap yourself in for the ride of your life.

Road Racer's detailed graphics and digitized sounds simulate driving conditions in 5 environments ranging from high-speed desert flats to twisting mountain roads. So convincing you'll actually find yourself trying to look over the hills and around the turns.

The trees, rocks, telephone poles, and other graphics fly past your 1965 Corvette at breakneck speeds. Hear its thundering 350-horsepower engine and screaming tires as you corner around wicked curves.

Steer and accelerate with the mouse, and use your keyboard for brakes and shifting.

Each level is tougher than the last with unpredictable road hazards and many courses to travel. You score points for fast, skillful driving. Road Racer is high performance you won't forget.

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Watch out! ... SMASH! ... A heat-seeking missile has just slammed into your ship.

The year is 2059. Raiders have stolen five controlling crystals that maintain the defense and supply network for the moon's 26 cities. With key commodities cut off, the cities are doomed.

Your mission is to recover the fiendishly hidden crystals while transporting vitally needed goods between cities. Traverse dangerous terrain and combat relentless attacks with your arsenal of lasers, cannons, bombs and shields.

Prepare yourself for an odyssey of furious action and strategic high stakes trading.

Lunar Rescue is an addictive adventure that challenges your imagination and sets your adrenaline on fire.

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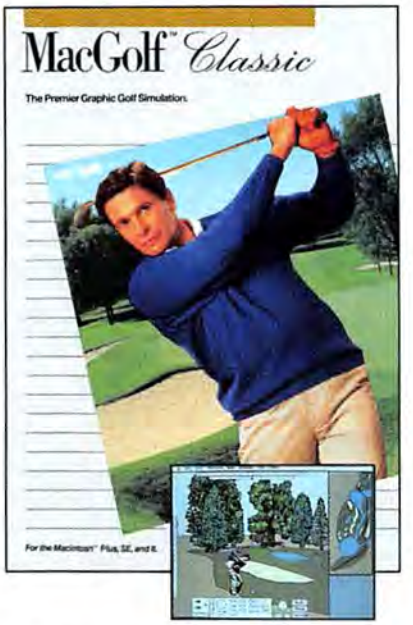

A premium edition of the best selling Macintosh game in the world.

MacGolf Classic puts you into a full perspective 3-D simulation of realistic golf action. You match your skills against fairways, roughs, sand traps, water hazards and trees.

MacGolf's two courses are together with the four MacCourses,™ for a total of 108 holes, all in vivid full screen color on the Macintosh II.

MacGolf Classic gives you a player's eye view and an aerial overview of each hole with close up options. You have complete control of your position, ball placement, ball speed and direction, and selection of all 14 clubs. Spectacular digitized graphics and sounds add to the excitement.

MacGolf Classic is so close to the real thing it will improve your golf game. Every challenge should be this spectacular.

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Joan Tierney has designed a broadcast-quality desktop video system with a Mac II. You can put it in a truck, take it to a story site, and create a videotape right there.

JONATHAN LEVINE

Broadcast Quality on a Mac II

How would you like to be able to create professional broadcast-quality television productions from your ergonomically designed, Mac II-based desktop video studio?

All you need is the interest, about $75,000, and perhaps the consultancy of Joan Tierney, a Washington, D.C., desktop video synthesist with a Ph.D. in multimedia design and development. Presently working on a PBS special called "The Silent Invaders," Tierney has spent almost a year designing and using a truly functional broadcast-quality desktop video system. Her patented system can handle slide, video, and film input; graphics; maps; drawings; and computer animation—all output to broadcast-quality video tape.

Tierney is also working with the media labs of the Smithsonian Institution, Xerox Corporation, and the National Geographic Society on the design of their desktop video systems. She claims that cost savings for major television productions can be as high as 70 to 80 percent.

Tierney sees the three major markets for desktop video to be broadcast television, corporate training, and academics. The Mac II is her computer of choice because of the growing number of peripherals that give the computer more speed, graphics, and animation, and more video-editing capability. Besides the Mac II, her system also includes video components by Sony and the new professional ½-inch M-2 videotape format pioneered by JVC and Panasonic. Her immediate goal is a mobile, multipurpose system: you could put it in a truck, take it to a story site, create the production right there, and then hand the tape to the closest TV station.

For further information, Joan Tierney can be reached at 202/554-2020.—*Allan Lundell*

MacTemps

Are you looking for a stable relationship in a world where jobs, neighborhoods, marriages, markets, and stock prices all melt into air? Maybe you should make a commitment to the Macintosh operating system. As more and more businesses go Mac, click-and-drag skills become a better hedge against sudden unemployment. MacTemps, an employment agency specializing in Mac labor, recently expanded from its New York and Boston offices to outposts in San Francisco, Los Angeles, and Mountain View, California.

When employers call MacTemps, they explain their needs to personnel brokers who speak fluent Mac software-ese: You need a graphic designer who can lay out a 100-page manual with PageMaker and ReadySetGo? Two secretaries who can use WriteNow? An accounting whiz who can program a multiuser payroll system with Excel? Four MacTemps coming up.

As long as the Mac continues its march across corporate, national, and continental boundaries, the world is MacTemps' market. The only smudge on its spreadsheet so far was a legal threat from MacDonald's Corporation, ever watchful for those who seek to offer the world a fast new MacFood. MacDonald's successfully sued to force both a hole-in-the-wall "MacSushi" bar and a "MacDharma's" health food cafe to abandon their names, but the burger colossus left MacTemps alone after being convinced that the agency was marketing fast workers instead of fast food.

It's nice to know that the world still has room for one more MacEmpire. And that even if the Mac should lose its firm foothold in the global market, our Mac skills should give us all a head start on learning to use the Next machine.

For further information, call MacTemps, in Cambridge, Massachusetts, at 617/868-8200.

Desktop Planetarium

The view of Mars is good tonight, and nearly 400 amateur astronomers have hauled their telescopes up to California's dusty Fremont Peak. Tom Mathis of Carina Software has also hauled up a couple of Macs. One will demonstrate Voyager, Carina's desktop planetarium package that has wowed astronomers across the country. The other will run a customized version of the program. It's here to drive a telescope at the click of a mouse.

Although easy enough for a child to operate, Voyager is packed with enough advanced features to excite even serious scientists.

The program is accurate to within one minute, and draws

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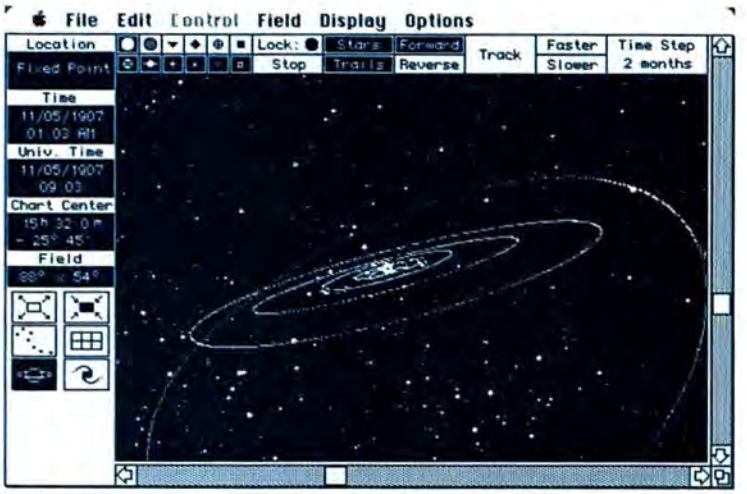
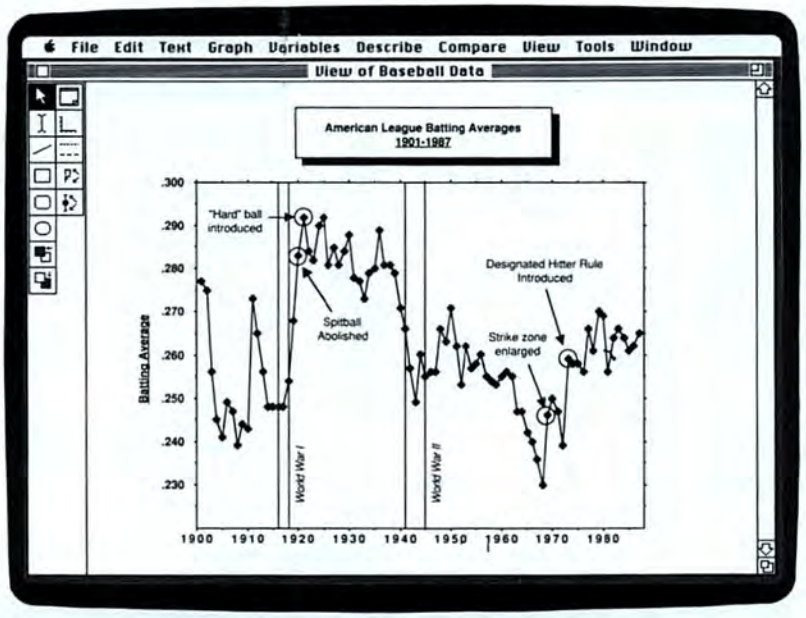


Voyager software allows you to scroll around the sky and type in the name of a star, planet, or nebula to see it on screen.

We wrote the award-winning StatView 512+ for the Macintosh. Please don't buy it.

The company that set the standard for statistical programs now exercises its right to raise it. With new features like color. Even more speed. And the expanded ability to create customized graphs and charts that let you make your point. Now called StatView SE+Graphics, it'll run on any Macintosh Plus or SE. And for those who want absolutely blazing speed and 16 million colors, we suggest StatView II for your Macintosh II.



"StatView II is StatView grown up. Meaner, faster, and more colorful, it's a remarkably complete statistics and data-analysis package."—MacUser (October 1988)

New features:

- Customize graphs with the text and drawing toolbox. Exploit the full color capabilities of your Macintosh to highlight your results. Circle key data points. Add legends and fancy type styles anywhere on your graph.
- Output color hard-copy on any Macintosh-driven printer, plotter, or slide maker.
- **Macintosh II owners:** StatView II directly accesses the 68881 math co-processor to analyze your data 30 to 50 times faster than StatView 512+.

Award-winning features StatView has always had:

- Comprehensive descriptive, comparative, and non-parametric statistics.
- Fully interactive graphic interface and spreadsheet-like design allowing for fast, simple "what-if" analyses.
- A choice of scattergram, line, bar, error bars, comparative bar, box plot, pie, histogram, univariate, percentile and comparison percentile charts.

With StatView SE+Graphics and StatView II, powerful statistics and presentation-quality graphics are just a mouse click away.

ABACUS CONCEPTS

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For more information, call (415) 540-1949 or write to us at 1984 Bonita Avenue, Berkeley, CA 94704

StatView 512+ Users

For all those who did buy StatView 512+, thanks. Registered users can now upgrade to StatView SE+Graphics or StatView II at special reduced prices. Call us for details.

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DAN ESCOBAR

Tom Mathis adjusts his telescope with Voyager, the astronomy software he created. He selects a planet and then clicks twice to slew the telescope into place.

star maps at a phenomenal two seconds per 1000 stars. You can scroll around the sky, and when you type in the name of a star, planet, or nebula, its location is instantly centered on the screen. You can select a planet or a star and click once for information, or with the customized version, click twice to slew the telescope into place.

But the program's real beauty lies in the way it piques the imagination. "It's unheard of," says Gordon Spear, who is incorporating the program into his astronomy classes at Sonoma State University in California. "You can scroll back to 510 A.D. in Mesopotamia and be there in an instant."

As if time travel weren't exciting enough, Voyager also lets you step entirely outside the solar system and then peer back in from any angle.

Astronomers have lauded the program's ability to track the movement of planets, give you a view of any area of the solar system from any other area, and let you input orbital data about our own solar system objects. And the database is expandable, in case you want to include your own data files.

The customized version of Voyager with a computer-controlled telescope mount is expected to sell for $12,000 to $15,000. But if you want to explore the universe from your desktop and you're looking for a price tag that won't make your bank balance look like it got sucked into a black hole, the Voyager desktop planetarium is available for $99.50, plus shipping and handling.

For further information, call Carina Software, in San Leandro, California, at 415/354-7328. *–Mary Margaret Lewis*

Word Publishing

What do you get when you combine two of the best-selling office applications into one package? One of the year's hottest new office products, word publishing software. The idea is that templates can bring that desktop publishing look to word processing.

Almost a year ago, Ashton-Tate introduced FullWrite Professional, a high-end word processor with advanced page-layout features such as multiple columns and drawing tools. Quark has now followed suit with QuarkStyle, desktop publishing software with enhanced word-processing capabilities.

A $295 subset of QuarkXPress, QuarkStyle includes more than 70 template designs for common projects like newsletters, magazines, books, business cards, memos, letters, and purchase orders. QuarkStyle also offers complete text creation and editing capabilities such as spell-checking and automatic hyphenation.

Quark hired eight nationally prominent designers to create the templates, including Roger Black, a former chief art director at *Newsweek*, the *New York Times*, and *Rolling Stone;* and Marjorie Spiegelman, a major contributor to the original designs of *Macworld, PC World,* and *Publish!*.

Meanwhile, two highly successful PC software vendors are expected to offer Macintosh products this spring with integrated word publishing capabilities. XyQuest is expected to finally roll out a Macintosh version of its highly customizable XyWrite word processor. The program's strengths in word publishing lie in its ability to snake text and easily merge graphics into documents.

And MicroPro is expected to offer Zeus, a Mac version of WordStar, with page layout features plus a rich set of PostScript drawing tools like those found in Adobe Illustrator 88. For further information, contact Quark, in Denver, at 303/934-2211.*–Rusty Weston*

QuarkStyle desktop publishing software includes 70 template designs.

Mac Network Designs Space Station

The Mac played a key role when 104 students from 21 countries (including the Soviet Union, China, Japan, Saudi Arabia, India, Sri Lanka, Kenya, West Germany, France, Great Britain, Australia, and Poland) gathered at the International Space University (ISU) last summer. Hosted by the Massachusetts Institute of Technology, the group attended classes on all aspects of space exploration. They also collaborated on a research project to design an internationally staffed lunar module for use early in the next century.

The students produced all of their work, including words, numbers, charts, graphs, and animation, using an AppleShare network of 15 Mac Pluses, three Mac IIs, and two LaserWriters. The resulting report covers all aspects of lunar base design, including research and development, construction, management, mining, commercial activities, and vehicular design.

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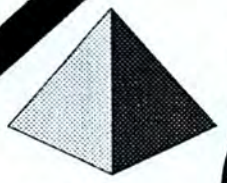
The Power to C

In the world of desktop publishing, no personal computer can match the power of a Macintosh®. It's the only choice. But when it comes to a page printer, you need to choose the one with performance to match. Now you can choose the power of the Qume CrystalPrint Publisher™.

With its ultra-high speed, compact size and PostScript®-compatible page description language, the CrystalPrint Publisher gives you choices no other page printer can.

Choose Productivity

CrystalPrint Publisher maximizes your productivity. Put more simply, it's fast. Faster than any printer with Adobe® PostScript® Faster than Apple® LaserWriter® IINTX . Even faster than LaserWriter IINTX with a hard disk. The Publisher still wins. And at a price less than LaserWriter IINT. So illustrations and type that used to take minutes to print are now in your hands in seconds. You spend more time creating and less time waiting to see what you've created. That makes you more productive than ever.



Choose Print Quality

You need top print quality to fully express your creativity. CrystalPrint Publisher delivers. The Publisher's PostScript®-compatible page description language lets you print detailed drawings with fine lines, solid blacks and smoothly graduated grays.

Mix in text using the wide range of resident authentic typefaces from ITC and Bitstream®. The result — elegant images with print quality not even the LaserWriter II can match.

Choose Convenience

The Publisher's footprint is more than 43% smaller than the LaserWriter II. That's the smallest of any competitive

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You know graphic quality when you see it. That's why we used an original printout taken directly from the CrystalPrint Publisher to produce the artwork for the adjacent page. So you can see the fine lines, the well-formed characters and uniform blacks for yourself.

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The LaserWriter IINT takes 172 seconds longer to print the same page. Even the expensive, top-of-the-line LaserWriter IINTX takes longer.

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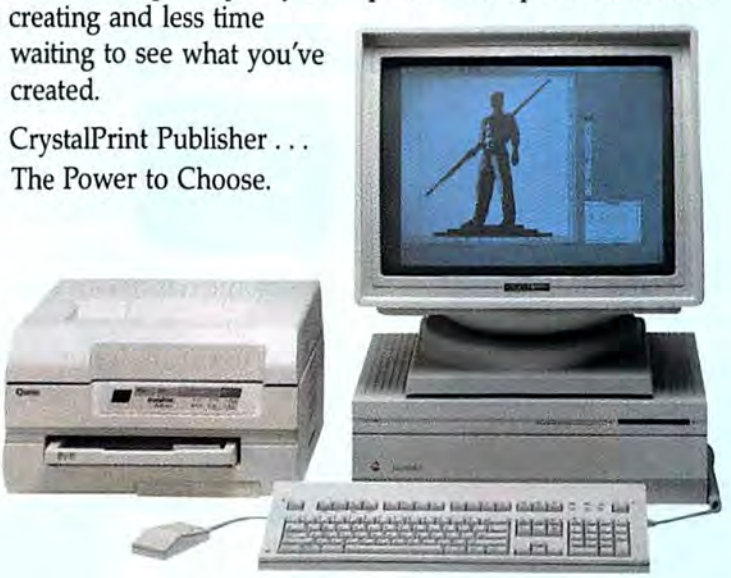

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Andrew Bennett, ISU's Director of Computing, had only one evening to plan the network. Realizing that the students were of diverse nationalities, that some had never worked with computers, and that some spoke little English, he decided that the Macintosh was his only option.

The students used MacDraft, MGMStation, and CricketGraph for graphics. MacWrite 5.0 was their word processor of choice, and Microsoft Excel served as their number-crunching tool. In addition to the printed report, the group produced a 20-minute animated videotape using Silicon Beach Software's Super3D.

Despite time limitations, multilingual communications, some inexperienced computer users, and the complexity of the final multimedia output, the project proceeded smoothly. According to Bennett, ISU is hoping to get Apple to help put together a Macintosh network for next summer's ISU meeting in Europe.—*Jeff Merron*

Macs Serve the Avant-garde

Do you harbor a secret fear of reincarnation—of being sent back to exactly the life you deserve for the way you've lived this one? What comfortable, overfed American doesn't, at least for moments in between dreams of more food, cars, clothes, and appliances? That secret fear may be stirred by *Etiquette of the Undercaste,* Antenna Theater's interactive, walk-through theatrical installation. Antenna's members don't presume to tell you what you deserve, but they do slide you into a locker at the morgue, awaken you in heaven, and then send you back through a stylized life cycle as a member of the underclass. *Etiquette of the Undercaste* opened at San Francisco's SoMar Gallery in November and is now touring the United States.

What part does the Macintosh play in this theatrical experiment? To begin, Antenna's associate artistic director Ron Davis used a Mac with Siclone's MacDraft software to design a maze that leads through abusive home life, reform school, youth gangs, juvenile court, boxing rings, prostitution, jail, soup kitchens, street scenes, and a final icy night on a park bench. You walk through the maze wearing a Walkman and listening to a sound track edited with Mark of the Unicorn's Performer software. As you walk, you hear real voices telling stories of being homeless, as recorded in street interviews by Antenna director Chris Hardman and BBC and NPR journalist Duc Qui Nguyen. The interviews were transcribed in Microsoft Word on a Mac, and the search command was used to find passages containing key words, such as *home* and *streets.*

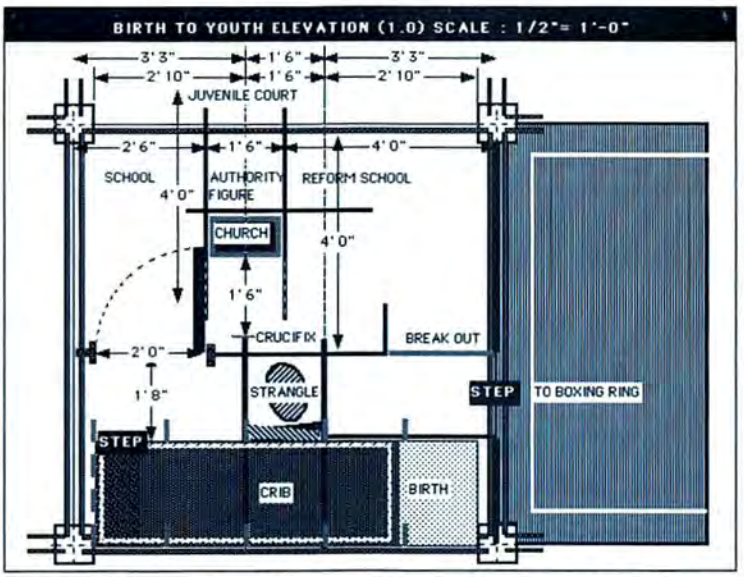
Antenna's members originally chose to use the Mac because of its possibilities for creating graphics and music. Now they find an added advantage in the Mac's popularity among other artists: collaborating is much easier when you can swap disks. A lighting designer, for example, uploaded Davis's MacDraft-designed floor plan to draw up a lighting plan.

What Hardman needs most from the Mac now is more memory. The use of taped interviews is one of Antenna's most innovative techniques, but at this point, only 15 minutes of digital audio is enough to fill a 40MB hard disk, and the half-hour sound track of *Etiquette of the Undercaste* was cut from 40 hours of taped interviews.

Memory or no, we can expect Antenna Theater to use whatever technology is available to create new forms of theatrical art. For further information, contact Antenna Theater, in Sausalito, California, at 415/332-4862.

ROBERT HOLMGREN

***Antenna Theater used the Mac to design the installation, lighting, and sound track of* Etiquette of the Undercaste.**



Antenna Theater's Ron Davis used MacDraft software to design this maze through the life of a member of the underclass.

A Multimedia Feast

You've seen the animation; you've heard the sound effects. Now from MacroMind, developer of Videoworks, comes the VideoWorks CD ROM—a collection of over 200MB of VideoWorks animations (color and black-and-white), VideoWorks Accelerator documents, clip anima-

(continues)

How I Discovered the *Ultimate* Macintosh Learning Experience

The true story of someone who wanted to learn how to use the Macintosh in business ... and how he almost went crazy doing it.

Randall D. Smith, President of F.M.I., Inc. invites you to a unique learning experience to be held in your area.

A few years ago I bought a new Porsche 911. As I was reading through the literature I came across an interesting statement. It said: "the only limitation this automobile has is the driver!"

I must admit that I felt the same way when I bought my Macintosh computer. I was like a lot of first time owners in that I never read the manuals. I simply popped in the disks and figured out the basics on my own. After having used an IBM for three years I was thrilled to be able to accomplish the Mac basics without taking a six month Lotus course!

Over the next few months I happily used my Mac for letters, simple spreadsheets, check books, a few graphics, and for games. But as a business owner, way in the back of my mind, I knew that there was a whole lot more the computer and the software could do if they just had someone else behind the mouse.

I realized I needed *training* to get the most out of my computer. I first tried reading the manuals. At some point in school they convinced me that I'm a fairly bright fellow. But after nights of reading manuals I simply didn't understand what I was reading.

My next step was to visit my local Apple dealer for help. He was friendly enough, but made it fairly clear that his interest was in *selling* computers, not *teaching* me how to use them. He did mention however, that there was some training available at $75 per hour. I had already paid for one college education and didn't really have the budget for another!

Next I subscribed to all of the Mac Magazines. Most (including this one) were very interesting. After a while though, I found myself reading the *ads* more than the *articles*. I wasn't interested in advanced graphics, HyperCard stacks, or MS-Dos connectivity. It seemed like more and more of the articles were written to the advanced user - which was definitely not me.

My last resort was a Mac user group. These were great people who were extremely bright and could quote the electrical diagram of the Mac backwards and forwards. But the group was too advanced for me. I was stuck!

In marketing, you are taught to "find a need and fill it". I definitely saw a need for good, practical instruction on the Mac for the *rest of us*. I decided to provide the answer for Mac users myself. In January we presented the very first MacAcademy. Since then we have had tremendous response. MacAcademy boasts many unique features: **Instructors:** Instead of sales people or programmers we feature only top business executives who use the Mac daily in their businesses. **Format:** Two full days of instruction on the Mac, Excel, Word, FileMaker, PageMaker, and HyperCard. **Schedule:** Attendees can design their own personalized schedule by choosing between 18 different, 2 hour workshops. **Price:** While others charge up to $1200 for workshops, we offer two full days for only $249. **Location:** MacAcademy is held in top hotels in business centers across the U.S. **Emphasis:** MacAcademy places training emphasis on techniques and *business* applications of the featured software.

The Results. Over 6,000 people have attended MacAcademy. On a scale of 1 to 5 they have given the experience a 4.6. Companies who have attended include General Electric, Kodak, G.T.E., M.I.T., Honeywell, N.A.S.A., Boeing, Citicorp, Kinko's Graphics, Mobile Oil, Gillette, TRW and 500 additional corporations. Are they happy with MacAcademy? The City of Anaheim sent one employee to our first workshop and ten to our second. We have had over 400 people volunteer to be references for those considering attending.

What about you? I'd like to personally invite you to attend MacAcademy. This year we will present our dynamic 2 day workshop in over 65 cities in the U.S., Australia, Europe, and Canada. For a schedule of our upcoming workshops call (904) 677-1918. Profit from the Ultimate Macintosh Learning Experience.

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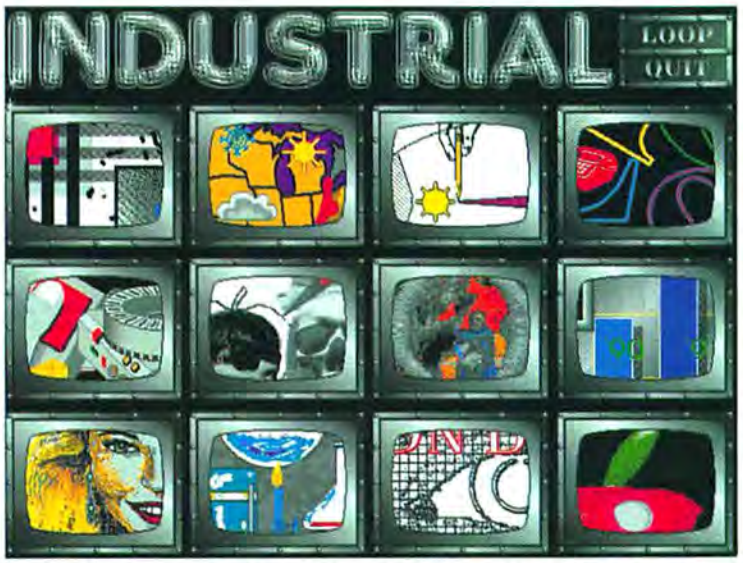
tion, clip art, clip sounds, and interactive animation shells. It's a dazzling display of the Mac's potential as a multimedia playback device in conjunction with CD ROM.

Containing all of MacroMind's commercially available Clip Animation files and color animations, the VideoWorks CD ROM also features demonstrations and presentations created by MacroMind Productions for companies such as Apple, Microsoft, Aldus, Ashton-Tate, Bell-South, and Arthur Anderson & Company. Source files are included for the VideoWorks Accelerator documents. In addition, the CD ROM disk comes with an AppleShare file-server driver so that several users can access the disk over an AppleTalk network.

You don't need a copy of VideoWorks II to view documents on the CD ROM; the interactive shell lets you see everything and move between groups of artwork and animation. The only exception to this rule is that accelerated documents do require the VideoWorks II Accelerator.

If you own VideoWorks, the disk can serve as a large database of animation, art, and sounds that you can incorporate into your own VideoWorks animations. If you've ever needed ideas for animation, this disk is full of them.

The $695 disk is compatible with any CD ROM player that supports the HFS file format—for example, Apple's CD SC and Laser Optical Technology's CD-ROM Drive. It is not compatible with the High Sierra CD ROM file format standard, which supports only textual CD ROM information, not graphics and animation. For more information, contact MacroMind, in Chicago, Illinois, at 312/871-0987.–*Brita Meng*



The VideoWorks CD ROM displays the Mac's potential as a multimedia playback device with CD ROM.

Hackers in Paradise

In 1984, when the first Hackers Conference was held in Marin County, California, everyone in attendance wandered around in a state of near-disbelief. It seemed like a human syzygy, a rare convergence where some of the world's best computer programmers, designers, and philosophers shared geographical coordinates for a weekend—the better to share information, swap obscure algorithms and jokes, and plot the future.

MARY EISENHART

At Hackers 4.0, the main action took place on the lawns and in the makeshift computer rooms, where the 238 participants networked.

But now, as far as the hackers are concerned, syzygy happens once a year. Last October, they held their fourth gathering, Hackers 4.0, in a postseason summer camp in the foothills of Silicon Valley. The theme was connectivity, and there were the usual number of fascinating semiformal sessions: Nolan Bushnell leading the games conference; Todd Rundgren hosting an evening of computer graphics; Ted Nelson on hypertext; and John (Cap'n Crunch) Draper on object-oriented programming. And history was made during Stewart Brand's interactive media session, where for the first time, four competing CD formats duked it out in demos in one room.

Still, the main action took place during conversations outside the sessions, on the lawns and in the makeshift computer rooms, where the 238 participants networked. Macs were much in evidence, and at 4:00 a.m. you could wander into a cabin and see Stephen Wolfram showing off his Mathematica program on a Mac II, or MIT veteran David Levitt sneak-previewing Harmony Grid, his real-time Mac music program.

The only blot on an otherwise perfect weekend was the CBS News report filmed by a camera crew that dropped in on opening evening. The hackers hooted, and ultimately felt hurt by, the network news's obstinate (and unfair) focus on the "dangerous" aspect of hacking—the viruses, break-ins, and other antisocial acts. To these exemplary citizens—people who had been instrumental in bringing wondrous technology to the world—this was a gratuitous slap. There was even some talk of holding a press conference attacking CBS. But by the next day tempers had cooled: people were having too much fun to be bothered by some outsiders' opinion.–*Stephen Levy*

HyperCard Book Roundup

Several books on HyperCard have appeared in the past few months, ranging from Apple's official treatise on the HyperTalk script language to a book aimed at entrepreneurs seeking to market stackware. Here, in no particular order, are rundowns on five of them. You can

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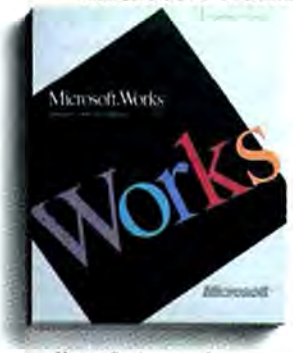
How do you explain the magnitude of the new Microsoft Works?

Whether you run a small business or your knowledge about computers happens to be less than monumental, the new Microsoft® Works 2.0 has you covered.

Microsoft Works 2.0 is actually five tools in one: word processing, spreadsheet, database, drawing and communications. But as far as you're concerned, it's one integrated program—so it's easy to move between the different tools and use them together.



You get five programs in one—and incredible efficiency when you combine their talents.

In fact, from the moment you take it out of the box, Microsoft Works 2.0 is easy to use. It comes with an animated training program written in HyperCard® format. As well as on-line help and unlimited phone support to help answer any questions you may have.

No matter how varied your projects are, Microsoft Works 2.0 can handle the job. Its newest feature, the drawing module (with page layout), can enrich otherwise plain, fact-filled documents with compelling graphics.

The word processor can create everything from a simple memo to a detailed report—and it even includes a spell-checker aimed at typos.

Of course, if your document needs to be supported with numbers, you can always jump over to the spreadsheet to compute and analyze data. And then transform it all into easy-to-read, easy-to-understand charts.

As for information that keeps your business going, the database is indispensable for keeping track of clients and orders.

And you can count on the communications module to bring information to your desktop through a modem.

If you'd like to learn more about Microsoft Works 2.0, just call (800) 541-1261, Dept. I76 for the name of your nearest dealer.

To help get you started, we've included an animated training program written in HyperCard format.

No wonder Microsoft Works 2.0 is the best-selling application in its class. Aside from being a great value, Microsoft Works 2.0 is one program that can handle a myriad of business needs.

It's that simple.

Microsoft®
Making it all make sense.™

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It's simple.

HOME FRONT

MARTIN REALTY

Real Estate News for the Greater Aspen Community - Published by Martin Realty

Lowest Lending Rates Since 1983!

Last week mortgage interest rates reached a five-year all-time low. First Mortgage offered a 30-year, 95 percent new home loan at 8.5 percent with no points. Unheard of in recent years.

Resale of homes has jumped 13 percent over sales recorded during the same period last year.

New Home sales are up 17 percent. Several local lenders have put together special new home financing packages in cooperation with local contractors. Call our Aspen office at (426) 838-2961 for details.

Crown Construction Opens This Year's Alpine Woods Development

The Alpine Woods development will be open for public tours from July 15 until August 21. Each home represents a distinct style from contemporary to French provincial – all homogeneously placed to create a uniquely attractive neighborhood.

Each home has been fully decorated by a local interior design firm and each is singular in its own way. Whether you're just shopping for ideas, we recommend this year's Alpine Woods development.

You can park at the Denny Shopping Center and take a tour bus from there between 9:00 a.m. and 6:00 p.m. daily.

HOME OF THE MONTH

Lakefront Country House: Designed for Entertaining!

This lovely brick and cedar country house can be found just fifteen-minutes from downtown Aspen. Nestled in giant firs, it represents true Colorado style!

The master bedroom suite features a panoramic view of Lake Diamond. The master suite also has his-and-hers walk-in closets, a separate vanity, and a stunning shower area made of glass bricks.

The living room, study, family room, and bedrooms (2+) feature hand-polished redwood panelling and skylights.

The three-car garage has special wall-mounted ski racks and an extra-sized third stall to accommodate up to a 24-foot boat.

Two additional baths, a stone fireplace, 800 square feet of decking, three wooded acres, and a private dock complete this rural dream home.

MARTIN REALTY

July 28, 1988

Gary and Lisa Elliot
533 4th Street
Denver, CO 54556

Dear Gary and Lisa,

This Saturday, I look forward to showing you a few of the quality homes in the Aspen community.

Per our phone conversations, we will be looking at family homes with a minimum of four bedrooms, two-and-a-half baths, a family room, and a three-car garage. It sounds like you are a pretty active family, so I've also chosen homes with a "mud room" for changing wet boots, etc.

One issue that we haven't really discussed is schools. Before Saturday, you might want to jot down a few priorities. Public, private, parochial? Level needed--from pre-school to college. And any special needs your children may have, like proximity to an indoor pool or gym.

I can also put you in touch with any youth organizations you may be interested in like The Boy Scouts or 4-H. We have it all.

You mentioned wanting a fairly good-sized lot. Does this mean that you will need stables or a barn? I can even put you in touch with a local riding stable if you wish.

Since you plan to be here for the whole weekend, let me know if I can be of any help with hotel reservations or activities. I can arrange for anything from theatre tickets to a riding lesson. Whatever might make your stay more pleasant, and leave a good impression of Aspen.

It's a beautiful place and we're happy that you've decided to make it your home.

Sincerely,

Peter Cohen
Residential Agent

cc:file

MARTIN REALTY

PETER COHEN

The Horvath Family
445 28th Street
St. Louis, MO 88990

David Doyle
6767 Diamond Place
Aspen, CO 54555

The Stefls
14 Lamplighter Lane
Ridgefield, VT 29333

The Horvath Family
445 28th Street
St. Louis, MO 88990

David Doyle
6767 Diamond Place
Aspen, CO 54555

The Stefls
14 Lamplighter Lane
Ridgefield, VT 29333

The Horvath Family
445 28th Street
St. Louis, MO 88990

David Doyle
6767 Diamond Place
Aspen, CO 54555

Greg Voornas
1013 Scott Road
Boston, MA 31222

Kathryn Windl-
Main Stree-
Salin-

Gary and Lisa Elliot
533 4th Street
Denver, CO 54556

Design Place
Santa Cruz, CA 66667

COMMISIONED SALES REPORT—JUNE

Sales Person	Type	Rate	Sales YTD	Billings	Check Amt.
Shannon Pitts	Commercial	3.80%	$275,000	$88,000	$3344.00
Lisa Doan	Residential	3.00%	$320,000	$120,000	$3600.00
Peter Cohen	Residential	3.00%	$230,000	$100,000	$3000.00
Robbie Ross	Commercial	4.00%	$500,000	$340,000	$13600.00
Mike Lucero	Residential	4.00%	$150,000	$65,000	$2600.00
Gary Gigot	Residential	7.00%	$700,000	$260,000	$18200.00
Mary Freeman	Residential	3.80%	$450,000	$60,000	$2280.00
Joan McArthur	Residential	2.60%	$250,000	$99,000	$2574.00
Barbara Miller	Commercial	3.00%	$250,000	$130,000	$3900.00
Robyn Komachi	Commercial	2.80%	$780,000	$240,000	$6720.00

Residential	704,000		
New	325,000	46.16%	
Prev. Owned	250,000	35.51%	
Land Only	129,000	18.32%	
		100.00%	

Everything you see above was created using some combination of the five tools within Microsoft Works 2.0: word processing, spreadsheet, database, drawing and communication. As you can see, the real power of Microsoft Works 2.0 comes into play when all the tools are used together.

Take The Guesswork Out Of Choosing The Best Shareware And Public Domain Software

Selecting the best programs from the thousands available is overwhelming. Our librarians have done the work for you while eliminating the risk. Each collection of 5 double-sided disks contains the very best of the Micro Star/Macintosh collection for only $23.95 per set!

- ★ **GAMES** *Monopoly - Air Traffic Controller - Aliens - Billards - Klondike - Orion - Lunar Lander - MacMissles - Golf - MacFootball - Radical Castle, etc.*
- ★ **EDUCATION** *Animals - 3D Moles - Life Hack - Orbit - Math Mtn - Full Moon - Hangman - Word Search - Math Mud - Pattern Block - etc.*
- ★ **CLIP ART** *Famous Faces - Cartoons - Borders - Cars - Sports Clips - Logos - Shadowettes - and more!*
- ★ **AUDIO** *Sound Effects - Pop Tunes - Sound Mover - Max Headroom - Monty Python - Cheap Beep - plus many more!*
- ★ **UTILITIES** *Red Ryder 9.4 - Big Screen INIT - Font Utilities - Disk Librarian - Servant - Disk Utilities - Resource Editor - and many more!*
- ★ **APPLICATIONS** *Typing Helper - BiPlane - MacAuto - Camera - MaxWrite - MacRoots - Dot-to-Dot - Memory - CK - etc.*
- ★ **STACKS NO. 1** *Your Faithful Camel - Sound Mover - Mac Tips - Hyper Slots - Guitar Tudor - Family Tree - The Aids Stack - etc.*
- ★ **STACKS NO. 2** *Jungle Adventure - Sound Manager - The Guide - Hyper Zap - Away From Home - Rez Mover - Home Desk - etc.*
- ★ **STACKS NO. 3** *Tilt - Restaurants - Hyper Jotto - Indigo Wine Man - Hyper-quackey - and more!*
- ★ **STACKS NO. 4** *Laura's Letters - Astro Stack - Hyper BBS - Star Trek Adventure Script Printer - Indigo Gets Out*

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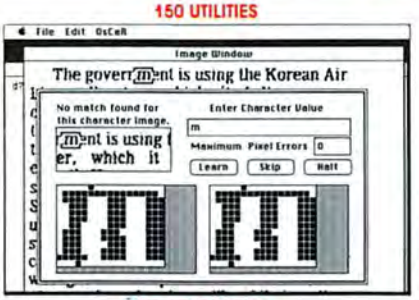
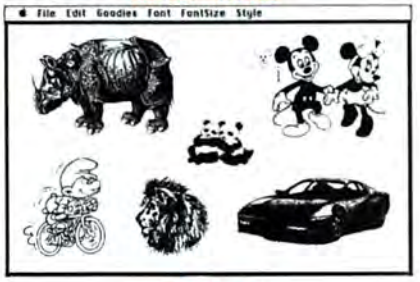
150 UTILITIES



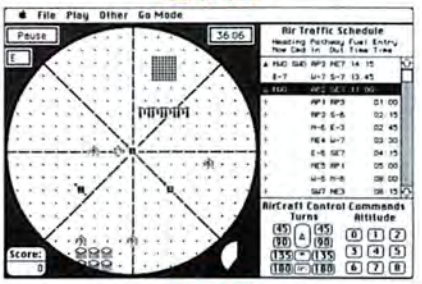
100 LAZER FONTS

100 KID PACK

250 ART PICTURES



150 GAMES



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FRED STINSON

Five books on HyperCard: one for beginners, one for new and advanced users, one for programmers from other environments, one for creating salable stacks, and Apple's official guide.

get them through your local bookstore.

Applied HyperCard: Developing and Marketing Superior Stackware, by Jerry Daniels and Mary Jane Mara (Brady Utility Software, 1988). The title handily describes this book-and-disk set, a comprehensive guide to creating salable stacks. The 462-page book covers stackware marketing, design, development, and distribution, and walks the reader through a stackware project. An interesting twist is that this book leans heavily on Buckminster Fuller's synergetics, also known as the science of structure. The 800K disk that's included is packed tightly (thanks to Raymond Lau's StuffIt compression program) with stackware and text files that include names and addresses of stackware publishers, press contacts, user groups, and so on.

Mastering HyperTalk, by Keith Weiskamp and Namir Shammas (John Wiley & Sons, 1988). Another weighty tome, this 506-page paperback is aimed at two groups: programmers coming to the Mac and HyperCard from other environments, and Macintosh users familiar with the basics of HyperCard and HyperTalk. The book explores HyperTalk in depth—both how to understand the language structure and components, and how to use it to build applications. It even delves into the basics of using Pascal to extend HyperTalk with XCMDs and XFCNs.

Running HyperCard with HyperTalk, by Barry Shell (MIS Press, 1988). Weighing in at 563 pages, this book seeks to help both new and advanced HyperCard users build stacks and design useful programs. Plenty of stackware projects are included: customer database, invoicing stack, mail merge, product catalog, and so forth. The book is generously illustrated with screen shots and contains numerous scripts; its clear, direct tone adds to its general accessibility.

Using HyperCard: From Home to HyperTalk, by Tay Vaughan (Que Corporation, 1988). A complete guide to HyperCard that even includes a Macintosh primer for beginners who have never used a mouse. After you've read about the evolution of databases, John Sculley, and Apple's vision for the future, and been taught how to use that mouse, you are introduced to HyperCard and in 700-odd pages taken all the way from your first explorations to advanced techniques like XCMDs, XFCNs, and using HyperCard on a network.

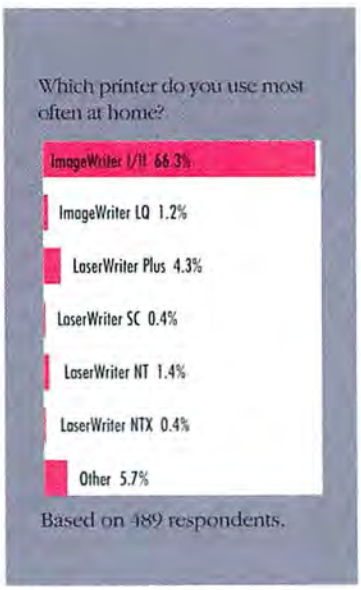
HyperCard Script Language Guide: The HyperTalk Language, by Apple Computer (Addison-Wesley, 1988). This handsomely produced hardcover is the official Apple guide to HyperTalk, aimed at those who have already read Apple's *HyperCard User's Guide* and have a basic familiarity with the program. Probably indispensable for the serious HyperTalk programmer; not a hand-holding book for beginners.
—Felicity O'Meara

Reader Survey: Printers

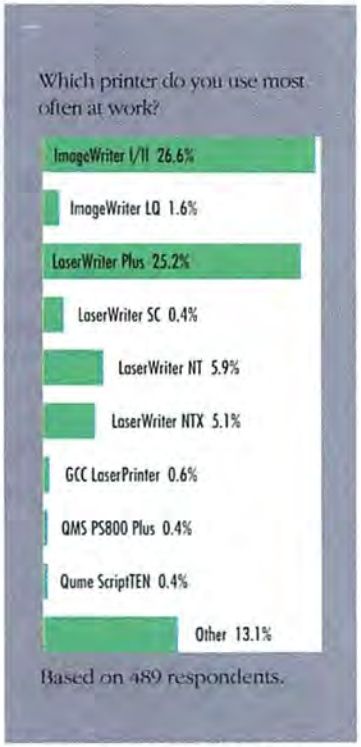
Of the 494 respondents to our survey on printers, mailed to 1000 randomly selected readers, 99 percent reported using printers with their personal computers. The printers used most often at work were the ImageWriter I and II (26.6 percent), the LaserWriter Plus (25.2 percent), the LaserWriter NT (5.9 percent), and the LaserWriter NTX (5.1 percent). The printers used most often at home were the ImageWriter I and II (66.3 percent) and the LaserWriter Plus (4.3 percent).

Most respondents said they were either very satisfied or somewhat satisfied with their printers. At work, 46.2 percent were very satisfied with the ImageWriter I and II, 78 percent with the LaserWriter Plus, 89.7 percent with the LaserWriter NT, 100 percent with the LaserWriter NTX, and 58.4 percent with other printers. At home, 48.1 percent were very satisfied with the Image Writer I and II, 57.1 percent with the LaserWriter Plus, and 64.4 percent with other printers.

When asked which printer feature would most improve printers at work, 26.2 percent picked higher resolution, 21.7 percent said faster first-page printing, and 10.2 percent opted for better paper-handling. Responses were similar when we asked which feature would most improve printers used at home: 39.3 percent said higher resolution, 10.2 percent said faster first-page printing, and 16.2 percent said better paper-handling.



Of those who responded to our survey, 66.3 percent favored the ImageWriter I or II for home use.



Of 489 respondents, 26.6 percent favored the ImageWriter I or II for use at work.

Then he called

The four-digit number next to each product is the product's ITEM NUMBER. Please refer to this number when ordering. Thank you.

SOFTWARE

We only carry the latest versions of products. Version numbers in our ads are current at press time.

CP denotes copy-protected.
NCP denotes not copy-protected.

Aatrix Software ... NCP
3976 Aatrix Payroll 3.01 ..... $99.
4020 Aatrix TimeMinder 1.7 ..... 109.
3958 Aatrix Payroll PLUS 3.02 ..... 159.

Aba Software ... NCP
1305 "Draw it again, Sam" 2.03 ..... 79.
4023 Graphist Paint II 1.0 ..... 289.

Abacus ... NCP
4482 StatView SE + Graphics ..... 229.
4481 StatView II ..... 349.

Fox Software ... NCP
FoxBASE+/Mac 1.1—Amazingly fast database, reads all IBM dBASE files while maintaining Mac interface. Includes form and application generators ..... $208.

Access Technology ... NCP
3959 MindWrite 2.0 ..... 95.
4109 MindWrite*Express* 2.0 ..... 149.
1346 Trapeze 2.1 ..... 159.

Acius ... NCP
1010 4th Dimension 1.0.6 ..... 489.
4024 4th Dimension Runtime ..... 239.

Adobe Systems ... NCP
1137 Adobe Illustrator '88 1.6 ..... 319.
1138 The Collector's Edition ..... 79.
1142 Newsletters/Publishing Pack 1 ... 255.
4565 Forms and Schedules Pack 2 .... 319.
4566 Presentations Pack 3 ..... 319.
MacConnection carries the entire Adobe Type Library (volumes 1-69). Listed below are Adobe's newest typefaces at press time.
4567 ITC Kabel 57 ..... 127.
4568 OCR A, OCR B, MICR 58 ..... 97.
4569 Helvetica #1 59 ..... 127.
4570 Helvetica #2 60 ..... 187.
4571 Helvetica #3 61 ..... 187.
4572 Times Ten 62 ..... 127.
4573 Kaufmann 63 ..... 97.
4574 Clarendon 64 ..... 97.

CE Software ... NCP
QuickMail 1.05—Send mail across local and wide area networks, to hardware devices, even other mail systems. Conferencing, remote access, and form customizing as well ... $165.

4575 Peignot 65 ..... 97.
4576 New Caledonia 66 ..... 257.
4577 ITC Clearface 67 ..... 257.
4578 Americana 68 ..... 127.
4579 ITC Serif Gothic 69 ..... 187.

Affinity Microsystems ... NCP
1014 Affinifile 1.1 ..... 46.
1016 Tempo II 1.0 ..... 89.

Aldus ... NCP
1330 Freehand 1.0 ..... 349.
1331 PageMaker 3.0 ..... 399.

Altsys ... NCP
1194 FONTastic Plus 2.01 ..... 54.
1195 Fontographer 2.4.1 *(CP)* ..... 239.

Apple Computer ... NCP
1118 HyperCard 1.2.1 ..... 42.

Ars Nova ... NCP
1215 Practica Musica 1.56 ..... 79.

Ashton-Tate ... NCP
1323 FullPaint 1.0SE ..... 69.
4098 Full Impact 1.0 ..... 249.
1324 FullWrite 1.0 ..... 269.
1322 dBASE Mac 1.0 ..... 295.

Berkeley System Design ... NCP
1541 Stepping Out II 2.0 ..... 52.

Beyond, Inc. ... NCP
4203 MenuFonts 2.02 ..... 30.

Blyth ... NCP
1470 Omnis 3 Plus/Express 3.25 ..... 129.
4318 Omnis 3 Plus/Express 3.3 *(3 users)* 399.

Bogas Productions ... NCP
1461 Studio Session 1.2SE ..... 49.
4255 Super Studio Session 1.0 ..... 79.
1458 Country Disk ..... 15.
1459 Heavy Metal Disk ..... 15.
1460 String Quartet Disk ..... 15.

Borland International ... NCP
1512 Turbo Pascal Tutor 1.0 ..... 46.
1511 Turbo Pascal 1.1 ..... 65.
1507 Numerical Methods Toolbox ..... 65.
1510 Sidekick 2.0 ..... 65.
1506 Eureka: The Solver 1.0 ..... 129.
1508 Reflex Plus 1.01 ..... 165.

BrainPower ... NCP
1532 DataScan 1.0 ..... 118.
1535 DesignScope 1.15 ..... 128.
1534 MathView Professional 1.0 ..... 144.
1537 StatView 512+ 1.2 ..... 175.
3960 ArchiText 1.0 ..... $182.
4066 The Analyzer Bundle *(includes DataScan, DesignScope, and StatView 512+)* ..... 325.

Bravo Technologies ... NCP
1539 MacCalc 1.2D ..... 79.

Bright Star Technology ... NCP
1402 Alphabet Blocks 3.01 ..... 32.
3961 Talking Tiles 1.0 ..... 69.
3962 HyperAnimator 1.0 *(includes Stax, a MacConnection exclusive!)* ..... 79.

Broderbund ... NCP
4314 Type! 1.0 ..... 20.
1423 Jam Session 1.1 *(CP)* ..... 30.
1427 Print Shop 1.3 ..... 36.
4065 PosterMaker Plus 2.5 ..... 36.
4465 DTP Advisor 1.0 ..... 47.
1422 Geometry 1.0 *(CP)* ..... 59.
1426 Physics 1.1 *(CP)* ..... 59.
4067 Calculus 1.0 *(CP)* ..... 59.
4501 Drawing Table 1.0 ..... 79.

Caere ... NCP
4476 OmniPage 1.0 ..... 575.

CAMDE ... NCP
1634 Nutri-Calc 2.4 ..... 39.
1635 Nutri-Calc Plus 1.1 ..... 169.

CasadyWare ... NCP
1575 Fluent Fonts 2.0 ..... 27.
FLUENT LASER FONTS
1576 Bodoni (V1) ..... 46.
1587 San Serif (V2) ..... 46.
1588 Ritz/Right Bank (V3) ..... 46.
1589 Monterey (V4) ..... 46.
1590 Regency Script/Calligraphy (V5) ... 46.
1591 Prelude Script (V6) ..... 46.
1592 Coventry Script/Zephyr (V7) ..... 46.
1593 Gregorian/Dorovar (V8) ..... 46.
1594 Cyrillic (V9) ..... 46.
1577 Bodoni Ultra (V10) ..... 46.
1578 Sans Serif Bold (V11) ..... 46.
1579 Sans Serif Extra Bold (V12) ..... 46.
1580 Gatsby Light (V13) ..... 46.
1581 Micro (V14) ..... 46.
1582 Micro Extended (V15) ..... 46.
1583 Galileo Roman (V16) ..... 46.
1584 Campanile-Giotto (V17) ..... 46.
1585 Alexandria (V18) ..... 46.
1586 Jott Casual (V19) ..... 46.

BrainPower ... NCP
ArchiText 1.0—Combines boolean searching and HyperText abilities to create a very practical text organization application ..... $182.

MacConnection.

MECA ... NCP

Managing Your Money 2.0–Financial power you need to succeed. Monitor budgets and bank accounts, calculate net worth, and track investments ..... $128.

4204	Gazelle & Kells Meath (V20)	46.
4205	Paladin & Abalene (V21)	46.
4206	Collegiate (V22)	46.
	CE Software ... NCP	
1727	Calendar Maker 3.0	27.
1728	Disktop 3.0.3	27.
1729	QuicKeys 1.1	53.
3963	QuickMail 1.05	165.
	Challenger Software ... NCP	
1610	Mac3D 2.1	119.
	Chang Labs ... NCP	
1613	Rags to Riches Ledger 3.1	120.
1617	Rags to Riches Receivables 3.1	120.
1614	Rags to Riches Payables 3.1	120.
1622	Rags to Riches 3-Pak	289.
1611	C.A.T. 2.0	229.
1615	Professional Billing 2.9	239.
1612	Inventory Control 2.6	239.
1616	Professional 3-Pak	359.
1618	Retail Business 3-Pak	359.
	Claris ... NCP	
1123	MacPaint II 2.0	105.
1129	MacWrite 5.0	105.
4196	FileMaker II 4.0	239.
1117	MacDraw II 2.0	329.
1125	MacProject II 2.0	395.
	Coda Music Systems ... CP	
4367	MacDrums	32.
4483	Perceive *(NCP)*	52.
	Cricket Software ... NCP	
1669	Pict-O-Graph 1.0	89.
1668	Cricket Graph 1.3	119.
4346	Cricket Paint 1.0	119.
1667	Cricket Draw 1.1	169.
1670	Cricket Presents 2.0	289.
	Dac Software ... NCP	
4502	Dac-Easy Light 1.0	45.
	DataViz ... NCP	
1823	MacLink Plus 2.11	145.
	Davidson ... CP	
1734	Math Blaster! 1.0	$27.
	Deneba Software ... NCP	
1770	Merriam-Webster's Thesaurus 2.0	35.
1767	Comment 2.0	54.
1768	Coach Professional 3.0A	105.
1769	Canvas 2.0	169.
	DreamMaker ... NCP	
4115	MacGallery *(HyperCard format)*	28.
4088	MacGallery *(MacPaint format)*	28.
	Dubl-Click Software ... NCP	
1824	Calculator Construction Set 1.04	36.
3972	World-Class Fonts! Originals (1-2)	45.
3973	World-Class Fonts! The Stylish (3-4)	45.
3974	World-Class Fonts! The Giants (5-6)	45.
3964	WetPaint Classic Clip-Art (1-2)	45.
3965	WetPaint For Publishing (3-4)	45.
3966	WetPaint Animal Kingdom (5-6)	45.
3967	WetPaint Special Occasions (7-8)	45.
3968	WetPaint Printer's Helper (9-10)	45.
3969	WetPaint Industrial Revolution (11-12)	45.
3970	WetPaint Old Earth Almanac (13-14)	45.
3971	WetPaint Island Life (15-16)	45.
	Electronic Arts ... NCP	
1843	Disk Tools Plus 1.01	31.
4619	Mavis Beacon Typing 1.0	36.
1846	Deluxe Music Construction Set 2.0	61.
4315	Studio/8 1.0	319.
3940	First Shapes	32.
3936	KidTalk	32.
3941	SmoothTalker 2.0	32.
3939	MathTalk	32.
3935	Speller Bee	32.
	Enzan-Hoshigumi USA ... NCP	
1880	Year of the Dragon	21.
1881	Japaneze Clip Art Scroll 1 "Heaven"	52.
1882	Japaneze Clip Art Scroll 2 "Earth"	52.
1878	Japaneze Clip Art "Borders" Scroll	65.
1879	MacCalligraphy 2.0	105.

Symantec ... NCP

S.U.M. 1.02–A collection of specialized utility programs designed to keep your hard disk operating at peak performance. Recovers your files faster and easier than you ever thought possible ..... $59.

	Farallon Computing ... NCP	
4208	Timbuktu 2.01	$65.
2199	MacRecorder 1.0	139.
	Fifth Generation Systems ... NCP	
4287	Pyro! *(screen saver)*	15.
3954	PowerStation 2.5	32.
3955	Suitcase II 1.0	45.
4622	Suitcase II and Pyro! Bundle	57.
3953	FastBack Mac 1.03	54.
	Foundation Publishing ... NCP	
2384	Comic Strip Factory 1.6	44.
	Fox Software ... NCP	
4195	FoxBASE+/Mac 1.1	208.
4580	FoxBASE+/Runtime	158.

Access Technology ... NCP

MindWrite/Express 2.0–Finally, a word processor that reads/writes PC, DEC, Wang, and Mac files while maintaining original format. Features spell checking, outlining, and word count $149.

	Freesoft ... NCP	
2219	Red Ryder 10.3	54.
	FWB Software ... NCP	
2232	Hard Disk Partition 2.0	45.
2231	Hard Disk Util 2.03	53.
	Generic Software ... NCP	
4319	Generic CADD Level 1	54.
4411	Flow Charts & Schedules	18.
4402	Home Landscaping	18.
4401	Basic Home Design	35.
4410	Commercial/Residential Furnishings	35.
4400	Heating/Ventilation/Air Conditioning	35.
4406	Welding	35.
4409	Bathroom Design	49.
4403	Kitchen Design	49.
4404	Landscaping Architecture	49.
4405	Pipe Fittings	49.
	Great Wave Software ... NCP	
2277	TimeMasters 1.0	22.
2276	KidsTime 1.2	26.
4334	NumberMaze	27.
2270	American Discovery 2.1	27.
2272	Crystal Paint 1.0	27.
2273	ConcertWare+ 4.0	39.
2271	ConcertWare+ MIDI 4.0	79.

910C

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MacConnection™

MacConnection, 14 Mill Street, Marlow, NH 03456 1-800/622-5472 603/446-7711 FAX 603/446-7791

...And he saw

Softworks... NCP

HyperTools #1 and HyperTools #2 1.03—Sixteen HyperCard development tools in each. #1, for stack design, icon editing and alignment. #2, for enhancing stacks, data entry, and formatting. Includes HyperCard ..... each $59.

Greene, Inc. ... NCP

2269 QuickDEX 1.4A ..... 32.

ICOM Simulations ... NCP

4084 On Cue 1.3 ..... 36.
4085 TMON 2.8.1 ..... 89.

Ideaform ... NCP

2419 DiskQuick 2.10 ..... 27.
2418 HyperBook Maker 1.0 ..... 31.
2420 MacLabeler Plus 3.0 ..... 42.

Individual Software ... NCP

4209 Typing Instructor Encore ..... 26.
4491 101 Scripts & Buttons for HyperCard 37.
2943 101 Macros for Excel ..... 37.

Infosphere ... CP

2513 LaserServe 2.0 ..... 62.
2514 MacServe 2.4 ..... 155.
4595 Liaison 1.0 ..... 185.

Innovative Data Design ... NCP

2417 MacDraft 1.2B ..... 149.

Insignia ... NCP

4089 SoftPC 1.1 ..... 479.

Intuit ... NCP

2425 Quicken 1.0 ..... 33.

Kent Marsh Ltd. ... NCP

2591 The NightWatch 1.02 ..... 89.
2592 MacSafe 1.08C ..... 89.

LaCie ... NCP

4335 Silverserver 1.0 ..... 92.

LaserWare ... NCP

4095 LaserPaint Color II 1.8 ..... 359.

Layered ... NCP

2608 Front Desk 6.0 *(multi-user,* ..... 59.
2613 Insight OneWrite 1.0 ..... 185.
2610 Insight Expert AR 2.0 ..... 459.
2611 Insight Expert GL 2.0 ..... 459.
2609 Insight Expert AP 2.0 ..... 459.
2612 Insight Expert Inventory 2.0 ..... 459.
2614 Insight Expert Time Billing 2.0 .... 459.

Learning Company ... CP

2670 Reader Rabbit 2.0 ..... 33.

Letraset ... NCP

2619 Image Studio 1.5 ..... 279.
2621 Ready,Set,Go!4 4.0A ..... 279.

Linguist's Software ... NCP

2649 Tech ..... 59.
2643 LaserTech ..... 79.

FOREIGN LANGUAGE FONTS

2628 SuperFrench/German/Spanish .... 39.
2635 MacKana/Basic Kanji ..... $39.
2630 MacGreek ..... 59.
2631 MacHebrew ..... 59.
2636 MacKanji 2.0 ..... 59.
2637 MacKorean ..... 59.
2637 MacThai ..... 59.
2625 MacChinese Cantonese ..... 79.
2626 Cantonese Supplement ..... 39.
2645 MacChinese Mandarin ..... 79.
2646 Mandarin Supplement ..... 39.
2647 Greek/Hebrew/Phonetic ..... 89.

FOREIGN LASER FONTS

2639 LaserFrench/German/Spanish ..... 79.
2640 LaserGreek ..... 79.
2641 LaserHebrew ..... 79.
2642 LaserKorean ..... 89.
2638 LaserCyrilic ..... 115.
4129 LaserThai ..... 115.

Lundeen & Associates ... NCP

2684 WorksPlus Spell 1.1 ..... 46.
2683 WorksPlus Command 1.1 ..... 59.

MacroMind ... NCP

4202 Black & White Movies *(17 of them!)* .. 30.
4291 Video Clip Animation ..... 36.
4110 Clip Sounds *(sound effects & music)* . 36.

Electronic Arts ... NCP

Studio 8 1.0—Advanced graphics program uses familiar icons for ease of use. Masking functions and color effects provide a higher level of versatility and power ..... $319.

4201 Clip Charts *(bar, pie & bullet charts)* . 36.
1430 VideoWorks II HyperCard Driver 1.2 60.
1432 VideoWorks II Accelerator 1.1 ..... 118.
1431 VideoWorks II 2.0 ..... 118.

Manx Software ... NCP

4068 Aztec C 3.6B ..... 65.
4316 Aztec C UniTools ..... 65.
4317 Aztec SDB 3.6B ..... 65.
4069 Aztec MPW C 3.6B ..... 99.
4075 Aztec C + SDB 3.6B ..... 99.

MECA ... NCP

2796 Managing Your Money 2.0 ..... 128.

MEDIAGENIC ... NCP

1334 City to City 1.0 ..... 30.
4295 Focal Point/Business Class Bundle .. 48.
4591 Open It! ..... 54.
1338 Reports! 1.2 ..... 59.
3790 Lookup 1.0C ..... 30.
3788 Findswell 2.0 ..... 36.
3792 Spellswell 2.0F ..... 45.

Microlytics ... NCP

2733 Word Finder 2.0 ..... 33.
2732 GOfer 1.0 ..... 44.

Microseeds Publishing ... NCP

2913 Redux 1.5 ..... $65.
4210 Screen Gems 1.0 ..... 49.

Microsoft ... NCP

4471 QuickBasic 1.0 ..... 65.
2863 Chart 1.02 ..... 79.
2885 Microsoft Write 1.0 ..... 79.
2866 File 2.0 ..... 129.
2884 Works 1.1 ..... 189.
4057 *Works on the Apple Mac* Book ..... 15.
2865 Excel 1.5 ..... 255.
2864 *Excel in Business* Book ..... 18.
2882 Word 3.02 ..... 255.
4056 *Working with Word* Book ..... 18.
2878 PowerPoint 2.0 ..... 255.
2875 Microsoft Mail (1-4 users) ..... 195.
2872 Microsoft Mail (5-10 users) ..... 325.
2873 Microsoft Mail (11-20 users) ..... 489.
2874 Microsoft Mail (21-32 users) ..... 639.

Miles Computing ... NCP

2768 Orchestra of Fonts Vol. 4 ..... 19.
2771 Mac the Ripper Vol. 3 ..... 27.
2769 Peoples, Places & Things Vol. 5 .... 27.

Mindscape ... CP

2748 The Perfect Score: SAT 1.0 ..... 46.

Monogram ... NCP

2780 Dollars & Sense 4.0 ..... 81.
2779 Business Sense 1.0 ..... 279.

Nantucket ... NCP

2971 McMax ..... 189.

Niles & Associates ... NCP

4602 EndNote 1.0 ..... 82.

Nolo Press ... NCP

4228 For the Record 1.0 ..... 29.
2981 WillMaker 3.0 ..... 34.

North Edge Software ... NCP

2986 Timeslips III 1.05 ..... 117.

Odesta ... NCP

4211 DataDesk Professional 2.0 ..... 289.
3014 GeoQuery 1.0 ..... 295.
3013 Double Helix II 2.0R40 ..... 339.

Olduvai Software ... NCP

3029 DA-Switcher ..... 25.
3033 Art Clips ..... 35.
3031 Icon-It! 1.01 ..... 39.
3030 FontShare 1.01 ..... 149.
3035 Read-It!TS 1.06H6 ..... 79.
3034 Read-It! 1.06H ..... 199.

Ideaform Inc. ... NCP

MacLabeler Plus 3.0, the Label Construction Set—Customize your disk labels. Place fields anywhere. Icons. Graphics. Fonts. Color. Print queuing. ImageWriter and LaserWriter support ..... $42.

it was good.

OWL International ... NCP

3082	Guide 2.0	$99.

Paracomp ... NCP

4597	Swivel 3D	249.

PCPC ... NCP

3175	HFS Backup 3.0 *(new & improved)*	54.

Postcraft International ... NCP

3157	Laser FX 1.6	114.
4058	Laser FX Pack I	29.
4059	Laser FX Pack II	29.
4060	Laser FX Pack III	29.
4061	Laser FX Pack IV	29.
4062	Laser FX Pack V	29.
4063	Laser FX Pack VI	29.

Pro Plus ... CP

4310	Wall Street Investor	349.

ProVUE Development ... NCP

4582	Panorama 1.0	209.

Quark ... NCP

3230	Quark XPress 2.0	call
4621	QuarkStyle	call

CE Software ... NCP

QuicKeys 1.1—Award-winning program features simple, powerful, and sequenceable macros. Take control of your Mac, and become a true power user ..... $53.

Rubicon Publishing ... CP

3272	Dinner At Eight-Encore Edition 1.03	45.

Satori ... NCP

3320	BulkMailer 3.22	79.
3321	BulkMailer Plus 3.22	195.
3322	Legal Billing 1.85	369.
3323	Legal Billing II 2.54	539.
3324	Project Billing 1.54	409.

Sensible Software ... NCP

3375	Sensible Grammar 1.1D	54.

Silicon Beach Software ... NCP

3504	Silicon Press 1.1	41.
3508	World Builder 1.0	41.
3506	SuperPaint 1.1	79.
3507	Super3D 1.0	157.
3980	Digital Darkroom 1.0	157.

Simon & Schuster ... NCP

4230	*The Fully Powered Mac* Book	24.

Fifth Generation Systems ... NCP

Suitcase II 1.0—Allows unlimited fonts & DAs without having to install them in your system. Load them on startup or on the fly ..... $45.

Special—Through Feb. 28, purchase Suitcase II and you may also purchase Pyro! for just $12.

3305	Typing Tutor IV 1.2	35.

SmethersBarnes ... NCP

1478	Prototyper 1.0	72.

SoftStyle ... NCP

3282	Printworks (Dot Matrix) 3.23	43.
3281	Printworks (Daisywheel) 3.0	56.
3283	Printworks (HP laser) 3.0	85.

SoftView ... NCP

3471	MacInUse 2.0	42.
3473	TaxView Planner 2.0 (1988-1992)	65.
3981	FormSet Business Forms Edition 1.1	55.
3470	MacInTax	69.

Software Discoveries ... NCP

3374	Merge Write 1.0	34.
3373	Record Holder Plus 3.0	45.

Software Ventures ... NCP

3455	Microphone II 2.0	225.

Softworks, Inc. ... NCP

4601	Stack Cleaner	29.
4599	HyperTools #1	59.
4600	HyperTools #2	59.

Solutions, International ... NCP

3448	SmartScrap & The Clipper 1.05	46.
3449	SuperGlue 1.05	52.
3446	The Curator 1.05	79.
4308	BackFAX *(reqs. Apple FAX modem)*	129.

Spinnaker/Hayden ... CP

2329	SAT Score Improvement 1.0	58.

Springboard ... CP

3530	Certificate Maker 1.0	24.
3532	Certificate Maker Library Vol. 1	18.
3531	Early Games	28.
4493	Atlas Explorer	28.
4495	Family Matters	28.
4492	Works of Art Assortment Series	28.
4494	Works of Art Education Series	28.
4496	Works of Art Holiday Series	28.
4498	Works of Art Laser Art Business	59.
4499	Works of Art Laser Fonts Vol. 1	59.
4497	Top Honors	$59.
4500	Springboard Publisher	109.

SuperMac Software ... NCP

3383	SuperSpool 5.0	54.
3382	SuperLaserSpool 2.0	82.
3378	Multi-User SuperLaserSpool 2.0	199.
3377	Diskfit 1.4	54.
3379	Network Diskfit 1.4	199.
3381	Sentinel 2.0	155.
3380	PixelPaint 1.1	199.
4086	Acknowledge 1.0	349.

Survivor Software ... NCP

3289	MacMoney 3.01	62.

Symantec ... NCP

3982	MacSQZ! 1.05	49.
3983	S.U.M. 1.02	59.
3422	More II	225.
3423	HFS Navigator 1.0	34.
3419	Laserspeed 1.6	55.
3421	Lightspeed Pascal 2.0	65.
3420	Lightspeed C 3.01	95.
3415	CAPP's for Lightspeed C 1.0	49.
3416	CAPP's for Lightspeed Pascal 1.0	49.

Symmetry ... NCP

3318	HyperDA 1.1	38.
3317	Acta 2.01	46.
4504	Acta Advantage 1.0	69.
4160	PictureBase-WetPaint	99.

Synergy ... NCP

3130	VersaTerm 3.20	69.
3129	KaleidaGraph 1.10	125.
3131	VersaTerm-PRO 2.20	195.

3G Graphics ... NCP

3942	Images with Impact!: Graphics and Symbols 1	59.
4583	Images with Impact!: Business 1	75.

Think Educational ... CP

3615	MacEdge II 1.0	27.
3616	Mind Over Mac 1.4	27.

Farallon ... NCP

Timbuktu 2.0.1—A versatile network application that allows you to observe or control another Macintosh from your own over any LocalTalk network. ..... $65.

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T/Maker ... NCP

3640 ClickArt Personal Graphics ..... $28.
3642 ClickArt Publications ..... 28.
3632 ClickArt Business Images ..... 28.
3636 ClickArt Holidays ..... 28.
3637 ClickArt Letters Vol. 1 ..... 28.
3638 ClickArt Letters Vol. 2 ..... 28.
3634 ClickArt Effects ..... 28.
3633 Christian Images ..... 35.
3635 EPS Illustrations ..... 75.
3639 WriteNow 2.0 ..... 109.

TML Systems ... NCP

3548 Source Code Library II 1.0 ..... 42.
3549 TML Pascal II 1.0 ..... 79.

TOPS ... NCP

4189 TOPS Teleconnector *(DB-9)* ..... 39.
4188 TOPS Teleconnector *(DIN-8)* ..... 39.
3726 TOPS for DOS 2.0 ..... 119.
3723 TOPS Mac 2.0 ..... 119.
3724 NetPrint 2.0 ..... 119.
4598 TOPS FlashBox *(90 days)* ..... 125.
3725 TOPS Repeater *(90 days)* ..... 132.
3720 TOPS Flashcard *(90 days)* ..... 169.
3417 InBox Starter Kit 2.2 ..... 199.
3418 InBox Connection Mac 2.2 ..... 75.

Traveling Software ... NCP

3729 LAP-LINK Mac 1.2 ..... 84.

True BASIC ... NCP

LANGUAGE & TOOLKITS

3587 True BASIC 2.0 ..... 59.
3570 Advanced String ..... 49.
3574 Business Graphics ..... 49.
3579 Mathematicians Toolkit ..... 49.
3583 Scientific Graphics ..... 49.
3584 Sorting & Searching ..... 49.
3588 3D Graphics ..... 49.
4178 Communications ..... 49.

EDUCATIONAL SOFTWARE

3571 Algebra ..... 35.
3573 Arithmetic ..... 35.
3575 Calculus ..... 35.
3577 Discrete Math *(multi-variate calculus)* 35.
3580 Pre-Calculus ..... 35.
3581 Probability ..... 35.
3586 Trigonometry ..... 35.
3585 TrueSTAT ..... 49.

Unicorn ... CP

3751 Animal Kingdom ..... 27.

SoftView ... NCP

MacInTax—A sophisticated income tax preparation program that allows you to organize, store, and print out tax information. Includes 74 IRS forms and schedules ..... $69.

3752 Decimal Dungeon ..... $27.
3753 Fraction Action ..... 27.
3755 Mac Robots ..... 27.
3756 Math Wizard ..... 27.
3754 Read-A-Rama ..... 32.

William & Macias ... NCP

3779 DiskFinder 1.07 ..... 29.
3783 myDiskLabeler w/Color 2.8.1l ..... 31.
3784 myDiskLabeler w/LaserWriter 2.8.1Ll 34.

WordPerfect ... NCP

3800 WordPerfect Mac 1.0.1 ..... 185.

Zedcor ... NCP

3986 DeskPaint 2.0 ..... 69.
3985 ZBasic 5.0 ..... 105.

ENTERTAINMENT

Addison-Wesley ... NCP

4407 The Hobbit 1.0 ..... 24.
4474 Fellowship of the Ring 1.0 ..... 24.

Accolade ... CP

1184 Hardball ..... 23.
4484 Mean 18 ..... 24.
4485 4th & Inches ..... 24.

Discovery Software ... NCP

Arkanoid—Test the limits of your strategical thinking and quick reflexes as you break through level after level of mesmerizing brick formations. An entertainment classic .... $27.

Avalon Hill ... CP

1011 MacPro Football 2.0 ..... 28.

Blue Chip ... CP

1441 Millionaire ..... 35.

Broderbund Software ... CP

4099 Shufflepuck Cafe *(air hockey)* ..... 22.
4111 Moebius *(adventure & arcade)* ..... 24.
1429 Ultima III ..... 24.
4229 Where in World Carmen San Diego? 27.
1421 Ancient Art of War ..... 27.
4540 Ancient Art of War at Sea 1.0 ..... 27.

Bullseye ... CP

1544 Ferrari Grand Prix ..... 32.
4074 P51 Mustang Flight Simulator ..... 32.

Discovery Software ... NCP

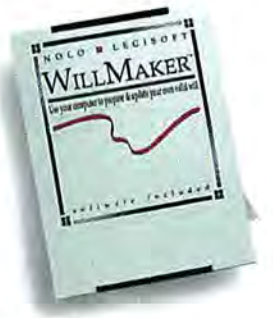
4408 Arkanoid ..... 27.

Electronic Arts ... CP

1851 Scrabble 1.0 ..... 26.
1850 Reach for the Stars ..... 26.
1842 Chessmaster 2000 ..... 28.
4064 Chuck Yeager Flight Simulator ..... 32.
4588 Life & Death *(surgery simulation)* ... 32.

Epyx ... NCP

2037 Sub Battle Simulator ..... 29.



Nolo Press ... NCP

WillMaker 3.0—Prepare your own valid will without a lawyer. Follows a simple question and answer format, allowing you to update your will whenever neccessary ..... $34.

Greene, Inc. ... CP

2268 Crystal Quest 2.2C ..... 26.
4119 Crystal Quest w/Critter Editor *(NCP)* 42.

Infinity Software ... CP

2518 GO ..... 27.
2519 Grand Slam Tennis ..... 27.

MacroMind ... NCP

2772 Mazewars+ ..... 31.

MEDIAGENIC ... CP

1339 Shanghai ..... 24.
4489 Sherlock Holmes: Crown Jewels. ... 24.
4590 Corruption ..... 27.
4486 Manhole ..... 30.
4475 Quarterstaff ..... 30.
4490 Might and Magic ..... 36.
4592 Zork Zero ..... 36.

Microsoft ... CP

2868 Flight Simulator ..... 32.

Micro Sports ... NCP

2787 MSFL Pro League Football ..... 32.

Miles Computing ... CP

2764 Down Hill Racer ..... 24.
2767 Harrier Strike Mission II ..... 27.
2765 Fool's Errand ..... 27.

Mindscape ... CP

4083 Balance of Power 1990 ..... 30.
3987 Colony ..... 30.
2743 Crossword Magic ..... 30.
2745 Deja Vu ..... 30.
4596 Deja Vu II ..... 30.
2749 Shadowgate ..... 30.
2750 Trust & Betrayal: Legacy of Siboot 30.
2751 Uninvited ..... 30.

PBI Software ... CP

3110 Strategic Conquest Plus 1.3 ..... 35.

PCAI ... CP

4321 Lunar Rescue ..... 29.
4212 MacCourses ..... 32.
3144 MacGolf 2.0 ..... 35.
4320 MacGolf Classic ..... 54.
4517 Road Racer 1.0 ..... 39.

Primera Software ... NCP

3169 Smash Hit Racquetball II ..... 22.

Psion ... CP

3132 Psion Chess 1.6 ..... 31.

Sierra On-Line ... CP

4161 Mother Goose ..... 19.
3397 Leisure Suit Larry ..... 23.

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Just for the record, all the ads in this series feature real live MacConnection customers and the real live letters they wrote us. Really!

without delay.

Nutmeg Systems ... 90 days

2992	15″ Monitor for Mac Plus	1195.
2994	15″ Monitor for Mac SE	1195.
2993	15″ Monitor for Mac II	1295.
4002	19″ Monitor for Mac Plus	1395.
4003	19″ Monitor for Mac SE	1395.
4004	19″ Monitor for Mac II	1495.

Nuvotech ... 1 year

3001	TurboNet ST *(DB-9)*	30.
3000	TurboNet ST *(DIN-8)*	30.

Orange Micro ... 1 year

4488	Grappler Spooler	39.
3036	Grappler C/Mac/GS	79.
4076	Grappler LQ	92.
4487	Grappler LS	92.

PCPC ... 2 years

3177	HD-WSI *(Apple HD-20 to SCSI)*	269.
3181	MacBottom HD 21 SCSI	659.
3180	MacBottom HD 21 w/Modem	759.
3185	MacBottom HD 32 SCSI	699.
3184	MacBottom HD 32 w/Modem	829.
3189	MacBottom HD 45 SCSI	859.
3188	MacBottom HD 45 w/Modem	979.

Practical Peripherals ... 5 years

3100	1200 Baud External Modem	79.
3102	2400 Baud External Modem	181.
3089	Mac Communications Pack	229.

Sharp ... 90 days

3453	JX-450 Color Scanner *(includes IEEE card and cable)*	5895.

Shiva ... 1 year

4347	NetBridge	279.
3444	NetSerial X232	289.
3443	NetModem V2400	479.

Summagraphics ... 90 days

4298	BitPad Plus ADB	329.

Thunderware ... 90 days

3648	ThunderScan 4.0 with PowerPort	199.
3646	MacPlus/SE Power Accessory	29.
3645	Mac II Power Accessory	42.

DISKS

2214	**Fuji** 3½″ DS/DD Disks	18.
3297	**Sony** 3½″ DS/DD Disks	19.
3772	**Verbatim** 3½″ DS/DD Disks	19.
2792	**MAXELL** 3½″ DS/DD Disks	20.

Practical Peripherals ... 5 years

Mac Communications Pack—Includes external 2400SA modem, cable, and top-selling communication software. Hayes compatible, auto-answer. A superior value! ..... $229.

INFORMATION SERVICES

CompuServe

1676	CompuServe Information Service	$24.
1671	Grolier's Online Encyclopedia	32.
1673	CompuServe Navigator 2.02	45.
1674	Standard Service/Navigator Bundle	59.

Dow Jones

1789	Dow Jones Membership Kit	24.
1785	Desktop Express 1.03	95.
1786	Market Manager Plus 2.0	189.

ACCESSORIES

Bantam Books

1403	Complete HyperCard Handbook	23.

Computer Coverup

1723	ImageWriter II Cover	8.
1722	ImageWriter LQ Cover	8.
1720	Mac Plus Cover Set	10.
1725	Mac SE Ext. Keyboard Cover Set	10.

Goldstein & Blair

2267	The Macintosh Bible *(2nd Edition)*	21.

Targus

Mac SE & Extended Keyboard Carry Case—Made of a special water-resistant material that's as strong as Cordura but much smoother so it won't wear out your clothing. Closed-cell foam protects against jolts ..... $69.

I/O Design ... lifetime

2378	MacLuggage HDware	49.
2379	MacLuggage Imageware II	49.
2376	MacLuggage Macinware Plus	64.
2381	MacLuggage Macinware SE	75.

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4623	Solid Oak Disk Case, made by New England craftsman *(holds 90 disks)*	29.

Moustrak

2694	Moustrak Pad *(standard 7″x9″)*	8.
2692	Moustrak Pad *(large 9″x11″)*	9.
2693	Moustrak Pad L/F *(9″x11″)*	10.
	Moustrak Designer Series *(Features selected photos from the book, "A Day in the Life of America.")*	
4077	Window Washer 1	12.
4006	Thunderstorm 2	12.
4007	Old Cajun 3	12.
4008	Vietnam Memorial 4	12.
4009	Dance Class 5	12.
4010	Tea Lesson 6	12.

Ribbons

3255	ImageWriter II Ribbon	4.
3261	ImageWriter II 4-color Ribbon	9.

Cutting Edge ... 1 Year

800K External Disk Drive—Sleek, new drive features the latest in technology. Compatible with 512KE, Plus, and SE. Includes LED disk access light. ..... $175.

3270	ImageWriter II Rainbow Six Pack	20.
3260	ImageWriter LQ Black Ribbon	17.
4011	ImageWriter LQ 4-color Ribbon	20.

Sopris Softworks ... lifetime

4017	ImageWriter II Cover	11.
4019	Mac SE & Ext. Keyboard Cover	15.
4018	LaserWriter II Cover	17.
4012	High Trek ImageWriter II carry case	49.
4013	High Trek Mac Plus carry case	59.
4014	High Trek Mac SE & ext. kybd. case	69.

Targus

3618	ImageWriter II Carry Case	49.
3617	Mac Plus/SE Carry Case	59.
4015	Mac SE & Ext. Kybd. Carry Case	69.

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- To order, call us anytime Monday through Friday 9:00 to 9:00 EST, or Saturday 9:00 to 5:30 EST. You can call our business offices at 603/446-7711 Monday through Friday 9:00 to 5:30 EST.

SHIPPING

Continental US: Barring massive computer failures and other natural or unnatural catastrophes, all non-C.O.D. orders phoned into MacConnection by 8 PM EST will ship Airborne the same night for next day delivery, except for those within UPS Ground Zone 1 (which is also an overnight service). The total freight charge on any order placed with MacConnection is now $3. Backorders will also ship Airborne overnight at no additional charge. Some areas require an additional day delivery.

Hawaii, Alaska and Outside Continental US: Call 603/446-7711 for information.

Orders shipped

3394	King's Quest I	$29.
3395	King's Quest II	29.
3396	King's Quest III	29.
3399	Space Quest	29.
3400	Space Quest II	29.
3398	Police Quest	29.
	Silicon Beach Software ... NCP	
3500	Airborne! *(CP)*	20.
3505	Enchanted Scepters *(CP)*	21.
3503	Dark Castle 1.1	27.
3502	Beyond Dark Castle	27.
3501	Apache Strike 1.1 *(MacSE & II)*	27.
	Simon & Schuster ... CP	
3303	Star Trek—Kobayashi Alternative	24.
3304	Promethian Prophecy	24.
	Sir-Tech ... CP	
3347	Mac Wizardry	35.
	Softstream, Inc. ... NCP	
4071	Mac•Man *(w/adapter)*	24.
4072	The Solitaire DA	24.
4073	Colour Billiards	35.
4078	Game Pak *(above 3 titles)*	75.
	SPHERE, Inc. ... NCP	
4175	Solitaire Royale *(for Mac SE)*	20.
4001	Solitaire Royale *(for Mac II)*	20.
3464	Tetris 1.1	20.
4472	Tetris *(for Mac II)*	24.
3462	PT-109 1.0	26.
3460	GATO 1.42	26.
3461	Orbitor 1.1	26.
3459	Falcon 2.0	32.
	Spinnaker/Hayden ... CP	
2328	Sargon IV	29.
	XOR ... NCP	
3816	Pro Challenge	29.
3815	NFL Challenge	59.

HARDWARE

Manufacturer's standard limited warranty period is listed after each company name. Some products in their line may have other warranty periods.

1107	**1 Meg SIMMs**	.call for availability
	Abaton ... 5 years	
1188	ProPoint ADB	89.
4589	InterFax Modem	329.

Datadesk ... 2 years

Mac-101 Keyboard—Includes macro program, Masterstrokes, to assign keystrokes and mouse clicks to 15 function keys. Beige, Platinum, or ADB version ..... $145.

	Asher Engineering ... lifetime	
1212	Turbo Trackball ADB	$69.
1211	Quadlynx Trackball *(non ADB)*	69.
	AST Research ... 6 months	
1229	Mac 286	call
	Cutting Edge ... 1 year	
3988	CE 105ADB Keyboard w/QuicKeys	149.
3989	800k Disk Drive	175.
3990	The Wedge XL 30 + SCSI Drive	629.
3991	The Wedge XL 45 + SCSI Drive	829.
	Datadesk ... 2 years	
1819	MAC-101 Keyboard *(beige)*	145.
1820	MAC-101 Keyboard *(platinum)*	145.
1821	MAC-101 Keyboard *(ADB)*	145.
	Dove Computer ... 90 days	
1801	SCSI Interface/Port	109.
1807	MacSnap 524E	289.
1809	MacSnap 524S	379.
1811	MacSnap 548E	549.
1812	MacSnap 548S	599.
1800	MacSnap 2SE	439.
1797	MacSnap Plus 2	439.
	MAC SE 68020 ACCELERATOR BOARDS	
1793	MaraThon 020 MSE1	585.

SuperMac Software ... NCP

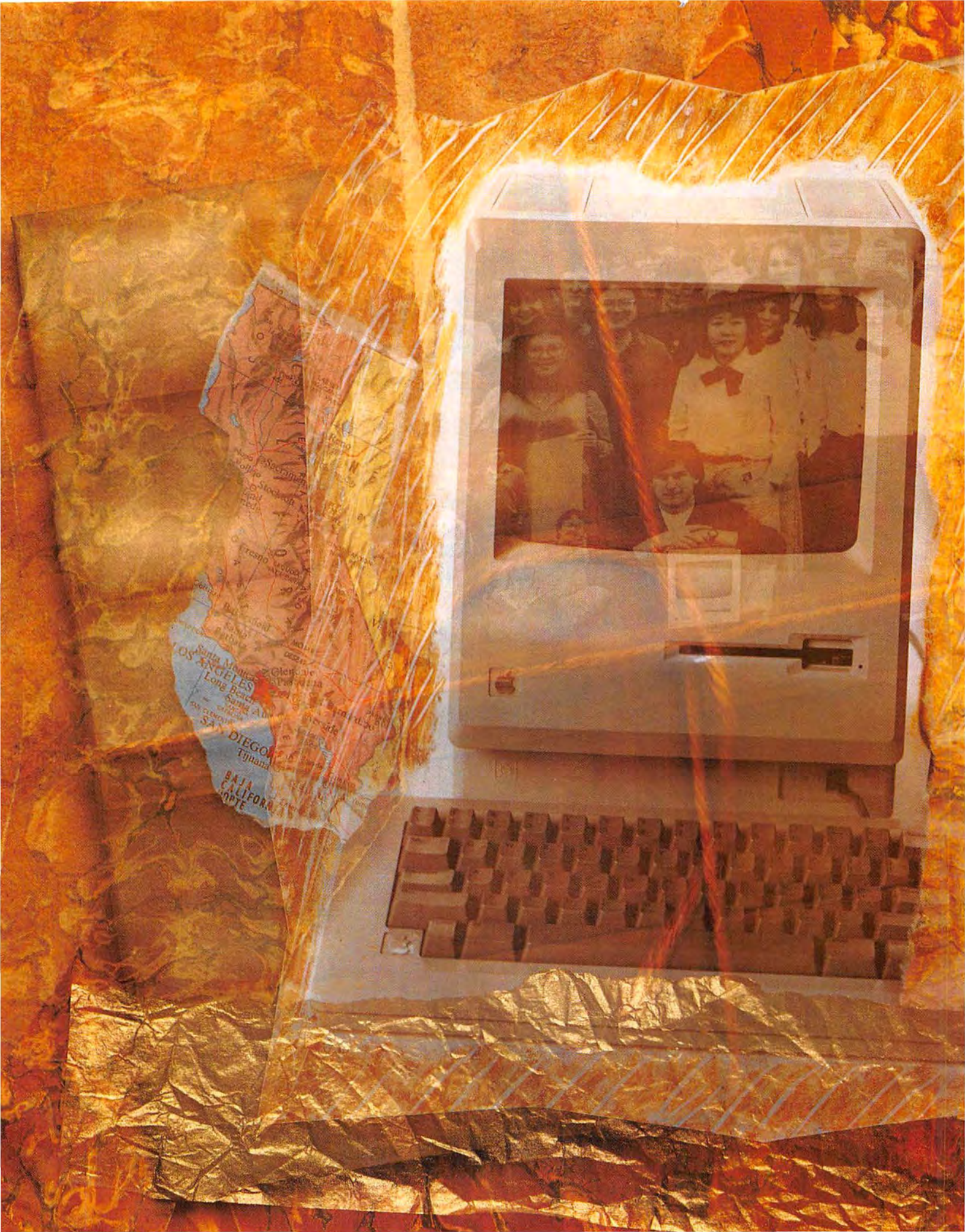
SuperLaserSpool 2.0—Fastest spooler around. Temporarily routes files to your hard disk for efficient background printing. Works with LaserWriter, LaserWriter II, and all ImageWriters ..... $82.

1794	MaraThon 020 MSE2 *(1 Meg)*	979.
1795	MaraThon 020 MSE3 *(math chip)*	779.
1796	MaraThon 020 MSE4 *(1 Meg/chip)*	1159.
4231	MaraThon 020 MSE4x4	2395.
1803	1024 Option	439.
4505	MaraThon 030 Accelerator 20MHz	649.
4515	MaraThon 030 Accelerator 25MHz	849.
4516	MaraThon 030 Accelerator 33MHz	1039.
	Ergotron ... 1 year	
2004	Mouse Cleaner 360°	15.
3992	The Muzzle *(covers power outlet)*	62.
1998	MacTilt *(platinum)*	68.
2000	MacTilt SE	68.
3993	Workstation A *(up to 40 lb monitor)*	call
3994	Workstation B *(up to 60 lb monitor)*	call
	Farallon Computing ... 1 year	
2202	PhoneNET-AppleTalk 120	9.
2203	PhoneNET PLUS *(DIN-8)*	35.
2204	PhoneNET PLUS *(DB-9)*	35.
2205	PhoneNET Punch Down Block	69.
2201	TrafficWatch	149.
2206	PhoneNET StarController	1289.
	FWB Software ... 1 year	
4263	PocketHammer40	1089.

TOPS ... 90 days

TOPS FlashBox—Easily and inexpensively increases the speed of your LocalTalk network up to 3 times. Use only in areas where you want greater speed or over the entire network ..... $125.

4264	PocketHammer80	$1639.
3998	Hammer91	2195.
3999	Hammer155	2995.
4000	Hammer300	4295.
	Hayes ... 2 years	
2300	Smartcom II 3.0B	88.
2304	Smartmodem 1200	299.
2307	Smartmodem 2400	449.
	Kensington ... 1 year	
2563	Mouse Pocket ADB	8.
2577	Mouseway *(mouse pad)*	8.
2569	Mac Plus or SE Cover	9.
4126	LaserWriter II Cover	17.
2589	Universal Printer Stand	15.
2562	Mouse Cleaning Kit w/Pocket	17.
2550	Disk Drive Cleaning Kit	20.
2580	Mac II Stand	20.
2545	Universal Copy Stand	22.
2573	Maccessories Tilt/Swivel	22.
2578	Extra Long ADB Keyboard Cable	25.
2556	Maccessories Anti-glare Filter	33.
2579	Mac II Monitor Cable Extension	33.
2559	Apple Security System	34.
2568	Maccessories SuperBase	34.
2585	Printer Muffler 80	43.
2586	Printer Muffler 80 Stand	24.
2583	Printer Muffler 132	58.
2584	Printer Muffler 132 Stand	24.
4070	System Saver SE	52.
2566	System Saver Mac *(platinum)*	64.
2546	Maccessories A-B Box	64.
2560	MasterPiece 400	64.
2561	MasterPiece Mac II	105.
2547	New Turbo Mouse ADB	109.
2576	New Turbo Mouse for Mac Plus	109.
	Koala Technologies ... 90 days	
2593	MacVision 2.0	219.
	Kraft Systems ... 1 year	
2600	3-Button QuickStick	39.
4082	3-Button QuickStick ADB	51.
	Kurta ... lifetime	
2604	IS ADB Tablet	255.
2605	Cordless 4 Button Cursor *(1 year)*	95.
	Mobius Technologies ... 1 year	
4470	Fanny Mac QT	65.
	MSC Technologies ... lifetime	
2808	A+ Mouse	65.
2809	A+ Mouse ADB	85.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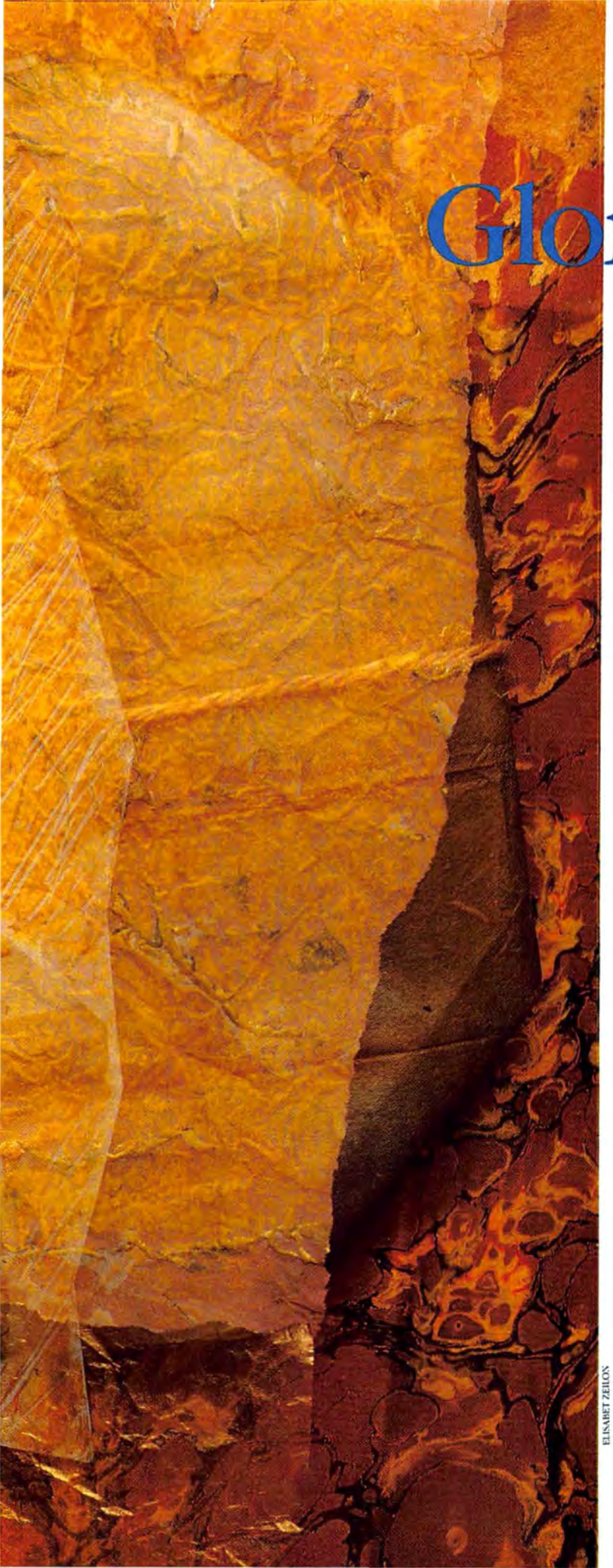


ELISABET ZEILON

Glory Days

How can you follow an act like the Macintosh? A look at the Mac team five years after.

by Steven Levy

"It's a wonderful, ecstatic feeling to create something and sort of put it back in the pool of human experience and knowledge. And we have this incredible chance to do that in the next five years. And then it'll be over. By the end of this decade it'll be all over and computers will be everywhere. We'll have incredibly great ones and cheap ones, and you know people will be making them better and cheaper than I do. But going out of the eighties, you know there won't be a Mac group. Burrell will be off in Oregon playing his guitar. Andy will be writing the next great American novel. Who knows what. But we'll be scattered all over the globe doing other amazing stuff."

—Steve Jobs, before the introduction of the Macintosh

It was November of 1983 when I was ushered into Bandley 3 to see the future. Bandley 3, of course, was the building that housed the Mac team, the so-called pirate lair on the Apple campus, where the "insanely great" computer called Macintosh was then being rushed into production. As part of the well-orchestrated media blitz that was to accompany the Macin-

Looking Back
Several key members of the Mac team in 1985: (from left to right) George Crow, Joanna Hoffman, Andy Hertzfeld, Burrell Smith (below), Bill Atkinson, and Jerry Manock.

tosh's introduction, I was to document the machine's creation for *Rolling Stone,* a publication that rarely devoted feature stories to such technologica as computer introductions.

But this was different. Not so much because this computer was reputed to be so revolutionary, but because of who was making it—a sassy young company called Apple, led by a brash young culture hero called Steve Jobs. Yes, the computer turned out to be more important than any of the creation legends it launched, but that winter something else impressed me just as much as the stocky little beige box that said "Welcome to Macintosh": the team that had brought it to fruition.

They were young and energetic and ingenuous, almost falling over themselves with enthusiasm. Passion burned in their eyes. As they spoke, they gesticulated toward the bread box–size computer—sometimes they stroked it affectionately, as if it were a magic charm. Clearly, they believed they were on a crusade; their goal was no less than freeing the world from the evil forces of IBM-style computing. They would achieve this goal simply by creating the world's greatest personal computer, which in their minds was synonymous with creating a computer that they themselves would like to own.

You hear a lot of promises in the corporate and scientific world. But this felt different. Stepping into the vortex of Mac development, you really felt as if you were standing at the nexus of history, that future generations would wonder what it was like, that you would be able to tell your grandchildren you were there. Remarkably, this sensation did not prove temporary. In fact, as we observe the fifth anniversary of the Macintosh, even some of the bolder promises made a half-decade ago by the cocky pirates have been fulfilled. True, not all the promises. And true, there was a time when it looked like the silicon love object to which they had devoted nearly all of their waking hours (a T-shirt they wore read "90 Hours a Week and Loving It") would crash and burn in the marketplace. But today, the advocates of the Macintosh have been vindicated. It has changed the world.

The Mac team members have changed as well. The success of their offspring has been bittersweet. Their leader has been shunned by the organization he founded, and has begun a venture of his own; both events have created tumult among survivors of the Mac team, which itself was effectively disbanded by the time the computer was shipped. Many of them have had to come to terms with the new regime at Apple—a majority of the key players have left—but some now look dyspeptically upon the company they once proclaimed a beacon of light in a corporate Dark Age. Almost all suffered some degree of letdown after the triumphant unveiling of the Mac in January 1984. A few sunk into serious depression for a time. It is fair to say that now, five years after the fact, none have forgotten the exhilarating months spent creating the computer For The Rest Of Us. To the contrary, it stands not only as the best time of their young lives to date, but something that they had to come to terms with in order to reconstruct their lives after Macintosh.

Joanna Hoffman, who signed on to the team in 1962 as an international marketer, puts it succinctly:

NORMAN SEEFF

Pirates
A gathering of the Mac's software artists from the early days: (left to right) Jerome Coonen, Donn Denman, Andy Hertzfeld, Rony Sebok, Bruce Horn, Susan Kare, Bill Atkinson, Owen Densmore, Steve Capps, Larry Kenyon, and Patti Kenyon with baby Tracie.

"It's hard to recapture that magic balance of a great product, great people, a great time—an electric buzz that went on for years. I don't think I realized how amazing it was when I was doing it." After it was over, she says, "nobody could go back to a job."

Put in other terms, each member of the Mac team was faced with a baffling dilemma: what to do for an encore.

Steve's Job

My quest to reinterview some of the Mac wizards I had spoken with five years previous took me, of course, back to Silicon Valley. Coincidentally, the area was abuzz with speculation about the imminent introduction of another computer: Steve Jobs's Next machine. Jobs, preparing for the elaborate introduction of this new-generation education engine, was too consumed with his new company to chew sunflower seeds with me and talk Macintosh, but inevitably his shadow still hung over each interview I did.

Steve Jobs's banishment from Apple stands as a shorthand symbol for the disposition of the Mac team. With a few exceptions, like software artisans Larry Kenyon and Jerome Coonen, and documention-leader-turned-marketer Chris Espinosa, the Mac team doesn't work there anymore. Jobs's shocking exit from the company was but a climax to a process of attrition already in motion when the Mac first shipped. Jobs himself has to shoulder some culpability for this. "There was so much fervor on the team in '83 that Steve would have had to make a real effort to get them charged up again," explains Bill Gates, the chairman of Microsoft who had worked closely with Apple during the Mac development. "Steve didn't pull them together in '84, and they started wandering off."

The irony is that many on the team were almost begging to be part of some revolutionary new project concocted from scratch. From Apple's point of view, though, their efforts could best be spent in continued work on the Macintosh, which for all its glories had some glaring flaws. So the intrepid creators of the Finder, Bruce Horn and Steve Capps, labored to do another release. Then Horn left, dissatisfied with what he considered unfair compensation and inadequate gratitude for the labors of himself and others. Capps continued on the Finder until he left in late 1984, intending to be a free man in Paris.

Capps now feels that the Mac itself suffered from not having its creators around to keep improving on it. "We bailed out too soon," he says. Capps and other Macintosh veterans now realize that some of the "religion" associated with the computer did not jibe with the needs of the marketplace. "In our efforts to change the world we were a little arrogant and unwilling to listen to reason—you have to give the customer what he needs," says Bill Atkinson. Capps reasons that if the team had stuck around longer, they might have improved the Macintosh in a manner more elegant than that of their replacements, who came up with the Mac SE and the Mac II. (Several critics on the Mac team regard those computers as necessary evolutions, but lacking the artistic flair of the original.)

Actually, some of the Mac team were trying to make something very much like the SE, back in late 1984. The so-called Turbo Mac, like the SE, would have had a hard disk, would have featured a gray-scale monitor, and would have run software faster than the origi-

Mac Software Advocates
Bill Gates of Microsoft (left), Mitch Kapor of Lotus (center), and Fred Gibbons of Software Publishing (right) appeared together at the Mac's inception to show their support for the Mac standard.

nal. More important, the warren of cubicles dubbed Turbotown was seen as a refuge from what the Mac veterans considered the "bozo" style of engineering and marketing endemic to Apple. Ultimately, the Turbo Mac went into the land of discontinued products. For Burrell Smith—the hardware genius who had done the Mac's digital board—that was the last straw for him and Apple Computer.

Andy Hertzfeld, the wizard of ROM who had done much of the Mac's operating software, also felt that Apple was providing insufficient challege and left the company in 1985. He loved Apple and loved its products, but thought that the company was on the wrong track. "For a month after I left, I cried myself to sleep," he says.

So when the fire storm surrounding Steve Jobs's departure broke in mid-1986, there was no Mac team to speak of. Some of the remaining key players in the Macintosh division, like top marketer Mike Murray and software chief Bob Belleville, left in the continuing turmoil. Since Jobs had a new project—one that would supposedly blow people away and change the world in the same spirit that the Mac did—Next stood as a possible sequel to the excitement of Macintosh. And Steve Jobs did some heavy recruiting of the Mac team. Among his starting players were the original Mac software honcho Bud Tribble and the hardware designer George Crow, who'd done the Mac's analog board. From there, Jobs began putting heavy pressure on people like Andy Hertzfeld, Steve Capps, Bill Atkinson, and other Mac vets. Joanna Hoffman and Susan Kare, the graphic artist who had worked on Mac icons and fonts, joined up (though both have now left). But some people were too burned out on Steve Jobs; others didn't think an education-directed computer was the way to go. Jobs was not easily denied. The archetypical, possibly apocryphal story is of one programmer whom Next wooed furiously. When the prospect finally turned down the offer, Jobs huffed that "we really don't want you anyway."

The Wizard of Mac

As far as Andy Hertzfeld was concerned, Next was a temptation, but not enough for him to give up his status as the last Mac crusader. Andy's continuing energy, creativity, and devotion to the cause have propelled him into the role of the conscience of the Mac team, the keeper of the flame. The compact, gregarious wizard, now in his midthirties, will bluntly state that the years he spent working on the computer were the best of his life, and that the bonds he forged with his colleagues are blood ties. "I would do anything for another member of the Mac team," he says. And for years after leaving Apple, he would do anything for the computer he helped bring to market.

"Up until 1987, I always kept thinking, What can I do to help the Macintosh? What can I do to make it great?" he explains. "I had a certain responsibility." In his view, the Mac's potential to change the world was at stake. So after working on his software for the ThunderScanner, he spurned potentially lucrative projects so he could work—with no promise of compensation—on Servant, an alternative desktop program. Likewise, QuickerDraw, his program to speed up color

Macintosh Milestones
Macworld *cover stories chronicle the Macintosh's highly successful development over the past five years.*

January 1984
Steve Jobs proudly introduces the Macintosh on the cover of the premier issue of Macworld.

November 1984
In answer to user demand, Apple upgrades the original Mac's meager 128K of RAM to a respectable 512K.

February 1985
The introduction of the LaserWriter paves the way for desktop publishing.

July 1985
Desktop publishing software helps the Mac establish a firm foothold in offices dominated by MS-DOS.

April 1986
With 1MB of RAM, a SCSI port, and 800K drives, the Mac Plus is finally ready to do business.

May 1986
A major weakness of the Mac is redressed with the Hierarchical File System.

1984 **1985** **1986**

graphics on the Mac II, was executed primarily to make the Macintosh more attractive than its competitors.

Eventually, Hertzfeld came to realize that his efforts might better be expended in other areas. Lately he has embarked on a project commissioned by the Frogdesign Company to help design the ultimate home entertainment system. "I have to be realistic, not tilt at windmills," he says. More to the point, he adds, "In the fall of '87, it became very clear the Mac didn't need me at all." He is of course delighted at the computer's success, a vindication of the claims he and others made in 1984. But he finds it ironic that "a lot of people who are smug about the success the Mac is having are the same ones who hated it when it first appeared."

The years have given him a more temperate vision of how important the Mac has been in the scheme of things. And he realizes that his celebrity in the Mac community is to a large extent a function of luck—being in the right place at the right time. He asks himself questions: What would the Mac have been like if he hadn't worked on the project? What would it have been like without Steve Jobs? What would Apple be like if the Mac hadn't appeared? And what would the world be like if there weren't an Apple Computer? The answers he comes up with reflect a candid maturity.

"Well, the world wouldn't have been that different," he admits. "Maybe things would have happened a year later."

As for Steve Jobs's off-the-cuff observation that Andy Hertzfeld would one day pen the Great American Novel, there is still hope for that. Hertzfeld is an avid reader (Vladimir Nabokov is his current passion), and he hopes one day to sit down at the computer and crunch fiction.

Howard Hughes Approximately

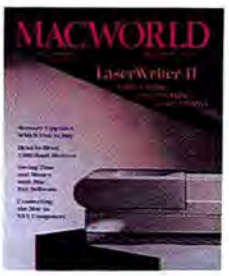
Burrell Smith's path since leaving Apple has been eventful and puzzling. The diminutive blond hardware hacker has not, as Jobs predicted, gone off to Oregon to play guitar. Instead he has continued his digital design work, and since the Mac he has been responsible for significant contributions ranging from the LaserWriter to the Radius Full Page Display Monitor. The latter product was created after Smith left Apple, apparently under bitter circumstances. When I first met Smith, before the Mac unveiling, he spoke with affection about the company that had allowed him—an obscure engineer working in the repair department—the chance to design its major new computer. Now, he reportedly will not even drive his car in the vicinity of Apple headquarters.

Supporting the Mac was something else, and one day in April 1986 he asked former Mac teammate Mike Boich to come over to his house to hear about the full-page display. Boich, co-author of MacTerminal and the first Mac software evangelist, had also burned out on Apple. For a time he even left the computer field, hoping to vent his entrepreneurial urges in the real estate business. But after seeing Burrell Smith's project, most of it spread out on Smith's Ping-Pong table, he decided to get back into computers. Boich and Smith began Ra-

April 1987
The Macintosh II signals a promising new era with its open architecture and color graphics.

May 1987
Initially hidden in the Mac II's shadow, the SE would soon become the sales leader of the Mac product line.

October 1987
MultiFinder presages future operating systems, while HyperCard is a vital sign for innovation.



March 1988
The LaserWriter II establishes a line of three printers, from the QuickDraw-based SC to the speedy NTX.

January 1989
Nearly five years after the introduction of the Macintosh, Steve Jobs unveils yet another ground-breaking design at Next.

The Future
What is the shape of things to come? Stay tuned as Macworld *covers exciting new Macs in this fifth anniversary year.*

1987 **1988** **1989**

dius. Andy Hertzfeld, eager to work with Smith again and to participate in the creation of another product that would help the Macintosh, wrote the software for the display. Alain Rossman, another Apple refugee, joined the management team, and now Radius is one of the biggest Macintosh-oriented companies, employing over 100 people.

But Burrell Smith was not happy there, either, though he won't tell us why. He preferred not to be interviewed for this piece. I was not surprised; I had heard that he had become reclusive. Supposedly he has stopped answering his phone. Friends have been calling him "the Howard Hughes of computers." He recently left Radius, despite holding stock worth perhaps millions. Quite possibly he is unhappy with the inevitable layers of bureaucracy that shroud all companies of that size; associates describe Smith as harboring little patience with "bozos" who don't share his vision or designing talent. Originally, his first project after leaving Radius was to have been the hardware design of the home entertainment system his friend Andy Hertzfeld was working on, but despite a reported million-dollar offer, Smith decided not to do it.

APPLE COMPUTER, INC.

1984
Before the Mac was unveiled, this provocative television ad ran during the Super Bowl to symbolize Apple's rebellious challenge to Big Brother: IBM.

NORMAN SEEFF

Portrait of a Programmer
Randy Wigginton in 1984

Randy's Story

In some instances, the personal fortunes of Mac team members have followed the success curve of the Macintosh itself: euphoria out of the gate, then a bleak period where success was in doubt, followed by a comeback that portended stability. Certainly this was the case with the two wizards responsible for the applications software bundled with the original Mac. Randy Wigginton and Bill Atkinson wrote, respectively, MacWrite and MacPaint. In addition, Atkinson was the author of the QuickDraw routines—originally used in Mac's big sister, Lisa—that were at the heart of the Mac's graphics capabilities. When I first met them five years ago, both were exhausted from the effort they had expended on the Macintosh. But both were fiercely proud of what they and their colleagues had produced.

Wigginton in particular was pushing the boundaries of his energies, trying to make sure that the release version of MacWrite would not blow up, thus destroying thousands of term papers, memos, and reports. He was no stranger to historic personal computer efforts—as a teenager he had helped the nascent Apple Computer ship its first product, the fabled Apple II. But that was back in the days when buggy software was shrugged off by hobbyist users. The Mac had to work right; millions of dollars were at stake. So the pressure was on Wigginton, who had independently contracted with Apple to write the Mac word processor. A solid version of MacWrite went out on time, and it was Wigginton's triumph, as well as "my swan song as a hacker," he says. "I lost 15 pounds during that period."

But not long after the intro troubles began for Randy Wigginton. He immediately started work on a "virtual memory" version of his program, a version that would hold more than the inadequate ten-pages-at-most files of the first release. He undertook this project less for financial reasons than from a desire to help the Macintosh—under the licensing agreement, he got no more money for writing a new version. But he says he did it to help the Mac.

By the time he had finished, though, the Fat Mac was out (increasing the document size of MacWrite), Microsoft Word was about to be shipped, and the need for the upgrade was questionable. Also, Wigginton had discovered that during the time he and his helpers were sweating to finish the original word processor, Apple, in a show of low confidence, had secretly commissioned another group to write a second program, just in case MacWrite failed. (Apple never released this other program, which later evolved into WriteNow.)

Wigginton began to ask himself what his herculean efforts had brought him. "The answer," he says, "came up short."

Things only got worse in 1985, as potential buyers perceived the flaws in the Macintosh and sales flattened. It was a humbling experience.

"All the publicity said—and we believed—that we were on a mission from God," says Wigginton. "But afterwards, everybody realized that they were human—and it was hard."

For him, it was particularly hard. A period of "creative paralysis" ensued. Another word for it might be depression. For six months he did no programming and spent a lot of time sleeping and watching television. It was all too easy to fall into the trap of drugs.

He alienated almost all of his friends, and this deepened his misery. "I was convinced I had done the best work of my life," he says of this period. "I had no desire to live."

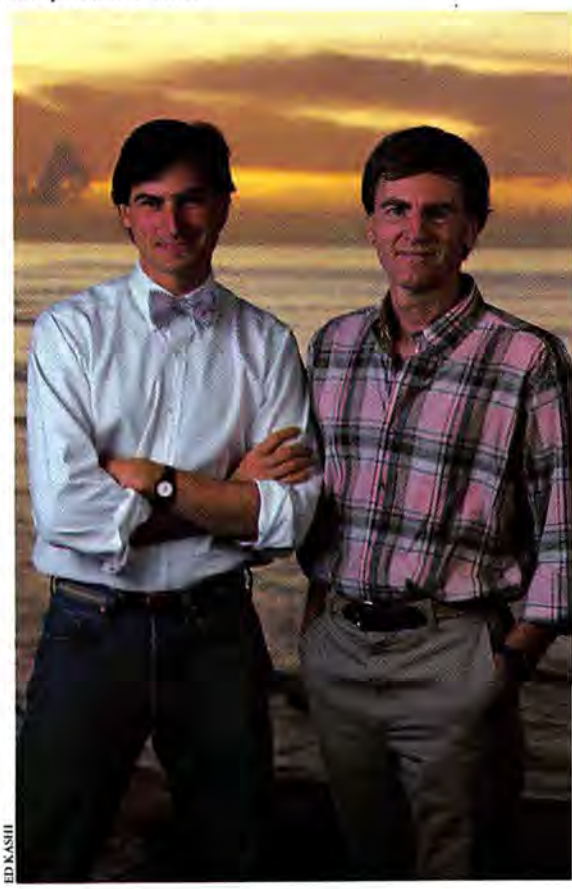
With the aid of therapy, and the support of his wife, whom he'd married in 1984, he rekindled his desire. He came to realize that "I wasn't an OK person because of the work I did—I was an OK person because of who I am." He came to realize that the fast-track world of a Macintosh hero was much like that of a rising Hollywood actor—with the same dangerous pitfalls. Wigginton got involved in living again, and though he avoided hard-core programming, he was able to oversee the development of a program that was to become Ashton-Tate's Full Impact spreadsheet.

Now he is once again fit and energetic, and was recently hired by Ashton-Tate's Macintosh division as a senior scientist. "My goal is to help them come out with products on the leading edge," he says. "I'm sort of a practical visionary." The company has made a wise choice; besides having an intuitive grasp of software design, Randy Wigginton has the experience that comes from being a participant in the early days of personal computing, as well as the maturity that comes from turning his life around. All that, and he is only 28 years old.

From Mac to HyperCard

Bill Atkinson's depression did not hit until almost a year after the Mac shipped. The guru of MacPaint and QuickDraw had immediately embarked on another project with the potential to change the world even more than the Macintosh. It was to be called Magic Slate, and besides animating some of Atkinson's most creative design ideas, it embodied some of the principles of Alan Kay's fabled Dynabook portable computer concept, as well as some of Jef Raskin's ideas about how a computer user should not have to worry about operating systems or applications: the user should just work, and the tools should appear as they are needed.

As Atkinson describes it today, Magic Slate seems like a dream computer. At 14 by 12 inches, it would be roughly the size of a tabloid newspaper—held vertically on the lap or desk—and would weigh no more than a pound or so, portable enough that no one would go anywhere without it. It would be made inexpensively enough "to figure that you would lose about six a year," he says. The memory would be sufficiently large that you could think of the information stored within it as "a notebook 80 feet thick." (Pages would be the units of storage here, much as note cards are in HyperCard.) Searching functions would be



ED KASHI

Dynamic Duo?
The close working relationship of Steve Jobs and John Sculley was highly publicized, but could not prevent a rift that led to Jobs's expulsion from the company he created.

ED KASHI

Déjà Vu?
Five years later, Steve Jobs leans on another innovative computer.

lightning-quick and powerful. There would be no keyboard or mouse—instead the user would control the Slate with fingers and a metal stylus. You would, for instance, turn pages by simply brushing against the screen in a motion that would turn a page in a book. To input text you would use the stylus, simply jotting down what you want. Atkinson says that he devised some revolutionary new techniques for character recognition—when I showed him the chicken-scrawl in my notebook and asked whether a Magic Slate could read that, he didn't even blink before answering affirmatively.

The problem with the dream was that the technology—flat panels, cheap memory, and such—was out of reach. "Needless to say, Magic Slate wasn't the kind of thing that Apple could make in a couple of years," says Atkinson. "And back then, Apple wasn't into long-term research." That was it for Magic Slate, but the time wasn't wasted: "The way to get where you want is to dream it—pretend you're living in the world where it could happen," he explains.

Still, the realization that his project wouldn't happen was tough on Atkinson—"I wanted Magic Slate so bad I could taste it," he says. So he experienced a double letdown—the death of his new idea and the delayed postpartum blues from the Mac.

"It was a period of great depression," he recalls. "There was a time when I couldn't bear to sit at the computer."

The turning point for Bill Atkinson came one night when, unable to crunch the code he does so brilliantly, he took a late-night stroll in the hills near his home. Above him was a clear sky, the ultimate bitmap, dotted with stars too numerous for any Mac to count. It was a humbling sight for one of the stars of the Mac community. The proportions of his depression seemed absurdly puny compared to the celestial epic.

Far from being a daunting observation, this recharged his thinking. Wherever he stood—wherever we all stood—in the universe, it made sense to make do with what we are, with who we are. And Atkinson realized that he was not without a certain measure of ability to make this world better. He was in a position of leadership, he had an ability to think creatively, and he had the ear of John Sculley.

And soon he had an idea—some of the virtues of Magic Slate modified to run on a 512K Macintosh. Instead of an eight-foot-high stack of notebook pages, there were note cards. It was Wildcard—now known as HyperCard—and for the next few months he worked feverishly to prepare a software prototype. He had not been unaffected by the troubles and intrigues at Apple in 1985, and he had been personally offended that Apple was planning to discontinue the practice of including MacPaint with every Macintosh. To Atkinson, hell is creating a product that does not ship. So by the time he showed the Wildcard mock-up to John Sculley, Atkinson was fed up with Apple, about to leave. But Sculley was more than slightly impressed with Wildcard.

"What do you want?" he asked Atkinson.

"I want it to ship," said Bill.

So the agreement was made—Apple would either ship the program with every computer or give the program back to Atkinson to sell it elsewhere. Atkinson gathered a small team of programmers and documentation wizards to aid him and, keeping in mind the best of his Macintosh experience, ran his project with the same fanatic devotion to quality that had characterized the other project. The rest is Macintosh history.

DAVID BISHOP

Sign Inside
The signatures of the original Mac team appear on the inside of the Mac's case.

It also represented a liberation from the shadow of Steve Jobs. Atkinson, of course, was one of those whom Jobs attempted to recruit for Next, but Bill's priority at that point was HyperCard. "It became easier for me to talk to Steve," he says. "It had been like father and son. Or apprentice and master. When I got HyperCard, it was like, 'Look, Dad, I succeeded—you trained me!' "

At 37, Bill Atkinson is recognized as the creator of one of the most popular programs of all time. Yet an equally significant advance is the distance he has gone personally in the time between Macintosh and HyperCard, to which he is currently devoting a minimum of two years support. Part of the change is his daughter, four-year-old Laura; he takes fatherhood very seriously. And part is simple maturity, which has taught him that an artist need not have an "artistic temperament." "I used to think the world was out to get me," he says. "And now I realize the world is neutral. You can make what you can of it."

Mac the Sequel

That may well stand as a generalization for what the Mac team has learned in the five years after the glory days petered out. I suspect we would hear similar stories from, say, the 1984 Olympic hockey team, or from any group that has worked closely together for a common and worthy goal, and succeeded. The Mac team members enjoyed an extended period when their priorities and choices were made for them—their lives were centered around creating the computer for the rest of us. Now they are immersed in the more complicated world of making adult choices, and are faced with the challenge of making that achievement something more than nostalgia. And I think that for the most part they are doing just fine.

The Mac team is indeed, to use Steve Jobs's words, "scattered all over the globe doing amazing stuff." And perhaps most encouraging of all is a project now under way at, of all places, Apple Computer. Among the key team members are Mac veterans Larry Kenyon and Jerome Coonen—and Steve Capps, back at Apple again after returning from Paris and working on software projects like Studio Session and Sound Designer. Capps says that John Sculley himself got involved in re-recruiting him for the job. The project is a secret, but it must be something special because everyone who knows anything about it calls it the most exciting thing Apple has designed since, well, the Macintosh.

"In some ways this is a Mac-like experience," says Steve Capps. He is talking about reviving the idealism, the energy, the fanatic devotion to detail, and the disinclination to accept what others say isn't technologically possible. On the other hand, he says, "We're being careful not to repeat the not-so-pleasant aspects, like the pressure we were under." He says that, like Macintosh, the project will be something to be proud of. And just as significant, he reports that between the members of the team a familiar electricity is being generated.

In other words, there is life after Macintosh. It's comforting to know that as the computer has grown up and thrived, so have its designers. □

Steven Levy is a Macworld *columnist and the author of* The Unicorn's Secret: Murder in the Age of Aquarius *(Prentice-Hall, 1988).*

5 Years After
Hands held in a classic Steve Jobs pose, several Mac team members at a present-day gathering pay tribute to Jobs's legacy: (counterclockwise from the Mac) Larry Kenyon, Mike Boich, Steve Capps, Andy Hertzfeld, Brian Howard, Bud Tribble, Patti Kenyon, and Joanna Hoffman (center).

Recognizing text with a scanner and OCR software

The Reading Edge

by Brita Meng

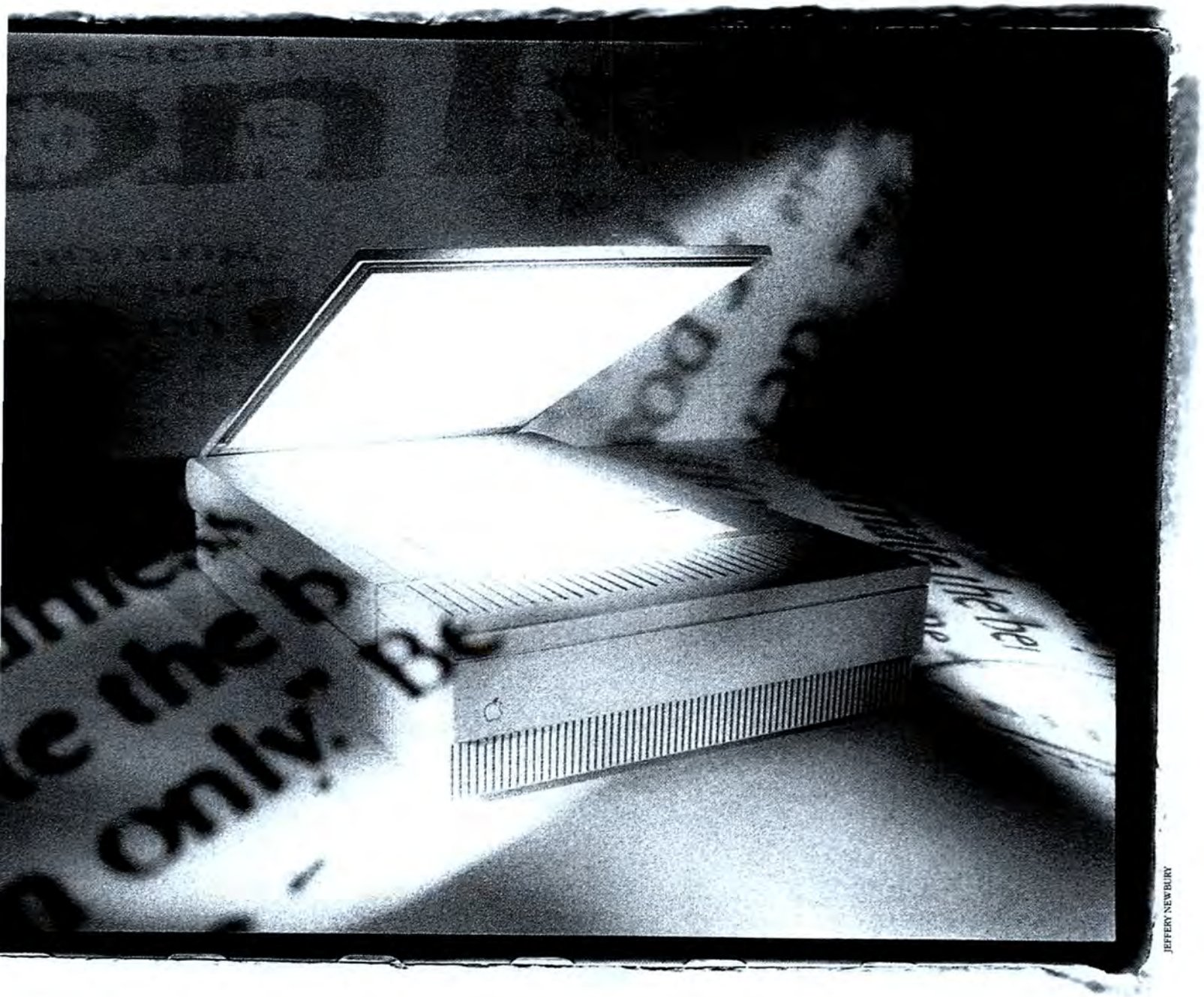
Most people's desks are still covered with paper, and the much-heralded paperless office continues to be an elusive goal. Optical character recognition (OCR), however, does offer a workable alternative to retyping all that information into the Mac. Boasting recognition rates of up to 2500 characters per minute, OCR systems automatically convert hard copy into a text (ASCII) file, which can then be edited with word processors or imported into page-layout programs, forms, spreadsheets, or databases.

To find out how accurate OCR is, I tested all eight OCR packages currently available for the Mac: Caere's OmniPage, CTA's TextPert, Xerox Imaging Systems' MacOCR, Dest's Publish Pac, Olduvai's Read-It, Inovatic's ReadStar II Plus, Microtek's MacinText, and New Image Technology's TextScan. Using both a Mac SE with 2.5 megabytes of RAM and a Mac II with 5MB, I tried to read four different kinds of documents with each package. The degree of accuracy depended primarily on the type and print quality of document I tried to read. Some OCR programs couldn't recognize typeset documents or even many LaserWriter fonts. Other packages needed a substantial investment of training time before they could recognize characters. Finally, some OCR packages required very specific hardware configurations.

Hardware Demands

OCR programs use two basic techniques to recognize characters. In *matrix matching,* also called *pattern matching* or *template matching,* the software isolates individual characters in a scanned document. A graphic map of each character is formed, and then it is compared to a reference set, or *template,* in the Mac's memory. The other method, *feature extraction,* utilizes a reference shape table of several thousand character features—vertical lines, horizontal lines, loops, and so on—instead of a graphic map.

Matrix matching and feature extraction aren't mutually exclusive. In fact, many OCR programs use both to match characters. And it's not unusual for a program



JEFFERY NEWBURY

to use artificial intelligence (AI) rule-based logic in the process of character matching.

OCR is very computation- and memory-intensive, simply because each scanned character must be compared and matched to large tables and reference sets. As a result, you generally get faster results with a Mac II than with a Mac Plus, or with a 4MB SE than with a 1MB SE.

This doesn't mean that OCR accuracy is any better on a Mac II. Some programs, however, do require significantly larger hardware investments—most notably OmniPage, which needs a 68020-based Mac and 4MB of RAM just to run.

Scanner Considerations

OCR software matches bitmapped (black-and-white) graphics with reference sets; gray-scale scans contain too much information for OCR software to interpret. Since all Mac scanners can scan text as line art, the key consideration in choosing an OCR program becomes whether or not the package you're evaluating provides direct *driver* access to your particular scanner. In some cases, OCR software comes with separate driver files for various scanners; in others the software recognizes that a particular scanner driver is in the Mac's System Folder. Direct access allows you to scan images directly into the OCR program for recognition.

Although most packages can import TIFF files, doing so involves scanning pages in a separate applica-

tion, and then saving the images. Some scanners, such as Hewlett-Packard's ScanJet, use a desk accessory to control scanning. While this solves the problem of switching between applications, you must still save the image to import it into the OCR program.

Three Approaches to OCR

The fonts, font sizes, and type styles in your text—even the printer that printed the text—make a big difference when you're using OCR software. Each of the eight OCR packages for the Mac falls into one of three categories: *nontrainable, trainable,* and *automatic.* These categories reflect the software's ability to read different kinds of text.

Nontrainable

Nontrainable programs have built-in font templates for the particular printers that they support; these templates define specific point sizes and pitches for the fonts the OCR system can read. Nontrainable systems are limited to those fonts and printers. MacinText, MacOCR, and Publish Pac are examples of nontrainable OCR software.

Nontrainable programs are fast, and you don't have to do anything to the program to get it to start recognizing documents. However, the software probably won't recognize text in a typeface that's not supported.

At the very least, recognition errors cause the program to slow down significantly as it tries to make a match between its templates and your scanned text.

Trainable

With trainable programs, you build reference sets, templates, or *type tables* for the documents yourself, "teaching" the OCR software a particular typeface.

The four trainable programs currently available—Read-It, ReadStar II Plus, TextPert, and TextScan—differ in teaching methods but share the same basic concept. The software isolates a bitmap that it thinks is a character; you type the character the bitmap represents. Essentially, you're building a template (like those used by nontrainable systems) against which the OCR program can compare scanned text.

Despite the shortcuts that some trainable systems offer (for example, TextPert allows you to base the type tables you create on fonts in the System file; Read-It comes with an assortment of type tables to get you started), you should start from scratch when building a template. It may take longer, but it offers the highest recognition accuracy.

The advantage of trainable systems over nontrainables is greater flexibility in what they can read—even typeset documents; you can customize a trainable OCR program for your documents, and create new templates at will. The disadvantage is that the training process can be painstakingly slow, depending on the quality of the original document and its fonts and type styles.

Automatic

OmniPage is the only automatic OCR system available for the Mac. As with nontrainable systems, you can use OmniPage right out of the box. Unlike nontrainable systems, however, OmniPage isn't limited to certain type styles and printers—it recognizes a wide variety of printed text, even in one document. However, should you come across a type style or page that the automatic system can't read, or if the system makes too many errors, there's nothing you can do to improve accuracy.

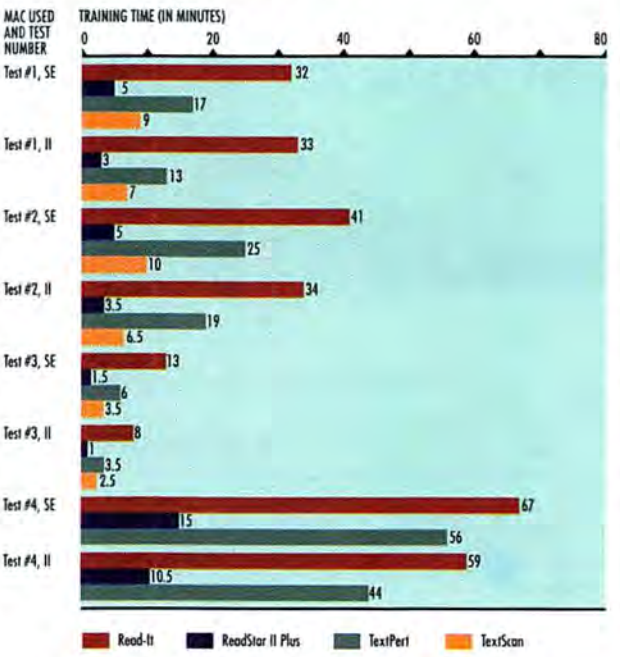
A Question of Accuracy

None of the OCR programs claim a 100 percent recognition rate. Specified accuracy rates are usually about 99.5 percent, or a little less than one wrong character per 100.

There is a very important distinction to be made when talking about errors. A *recognition error* occurs when the OCR software doesn't recognize a character. The software inserts a place-holder like "~" or "•" to indicate that it doesn't recognize the character.

Substitution errors, which are more critical than recognition errors, are not included in manufacturers' error rate counts. When a substitution error occurs, it's not that the OCR package doesn't recognize the character *at all;* the software just misreads the character. As a result, you get the equivalent of a typo.

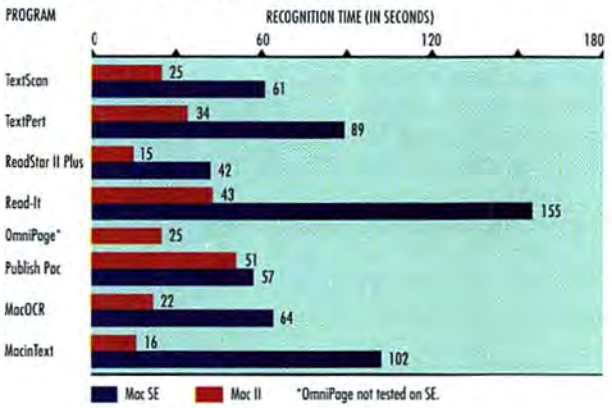
Time To Teach Trainable OCR Systems



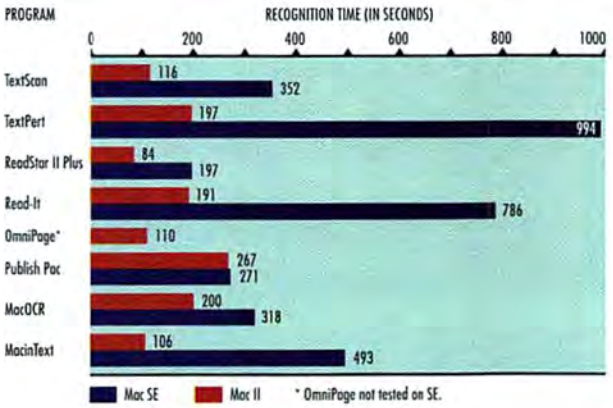
Teaching Times
There's a great variance in the times it takes to teach the four trainable OCR packages using each of the four test documents. Test Document #1 was a LaserWriter-printed document, Test #2 was a copy of a five-page typewritten document, Test #3 was a spreadsheet, and Test #4 was two Macworld *pages. I measured the training times on both the SE and the II.*

Recognition Time
Here are the times it took to recognize each of the four test documents: a LaserWriter-printed document, a typewritten document, a spreadsheet, and two pages from Macworld. *The* Macworld *pages could be recognized only by the trainable OCR packages.*

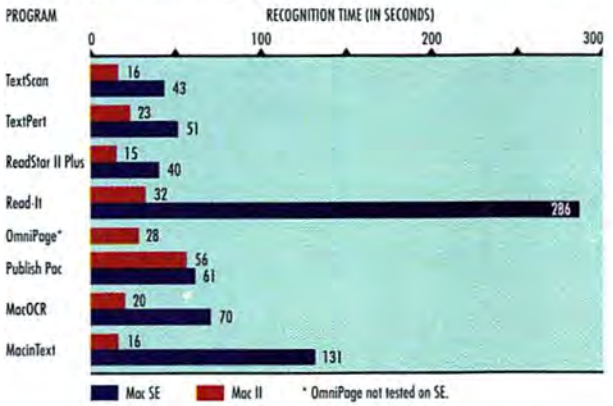
Single-Column LaserWriter Pages



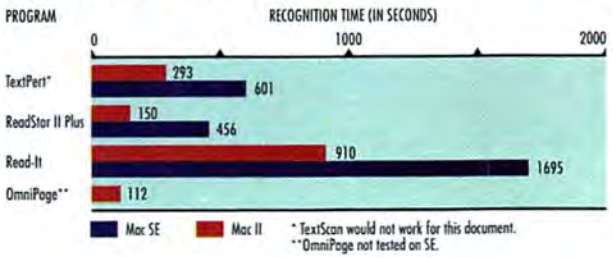
Multipage Typewritten Document



Multipage, Multicolumn Spreadsheet



Multipage, Multicolumn, Typeset Document



It's much more difficult to catch substitution errors. The best way is to carefully read the final document. You could use a spelling checker, but it can miss errors and isn't much use for checking numbers in a spreadsheet.

Comparing OCR Performance

I tried out four different types of documents with each of the nontrainable programs. The first, Test #1, was a simple double-spaced LaserWriter document six pages long. Test #2 was a five-page typewritten law brief—more challenging because it was a dirty copy. Test #3 was two pages of a three-column Microsoft Excel spreadsheet, also printed with the LaserWriter. These three document types comprised the complete test suite for the nontrainable OCR software.

For the trainable and automatic OCR programs, I added a fourth test—two pages from *Macworld,* typeset in Garamond typeface—to the previous three tests. Garamond was not a typeface supported by nontrainable software, so Test #4 would have been infeasible with those programs. Each of the trainable programs as taught with the same training documents (six pages for Test #1, three for Test #2, two for Test #3, and three for Test #4). There was no need to train OmniPage.

MacinText

Microtek's MacinText is the least expensive OCR program, and you certainly get what you pay for. While the software provides a wealth of ways to scan and set up a document, its recognition capabilities fall far short of the other nontrainable packages, except for use with very simple pages.

Even though MacinText works directly with only Microtek scanners, you can import TIFF files from other scanners into the program. You can set a scan's brightness and contrast, and use the prescan feature to set the overall scan area, define OCR text areas, even mask images and graphics on a page. However, you can't resize these windows once you define them. The program's filter, a feature designed to eliminate extraneous information, doesn't seem to help MacinText deal with scans resulting from dirty pages. Nor can MacinText handle underlined text in any form.

Options in the program let it recognize monospaced or proportionally spaced typewritten text, as well as multiple type sizes on a page (see "MacinText"). A menu selection called Vertical Format is supposed to maintain the line spacing of the original document in the recognized text file, but it didn't work very well—in fact, line spacing was more consistent without vertical format selected.

Finally, MacinText exhibits another strange quirk after you save a text file. For some reason, the saved file remains open and untitled on the desktop.

MacOCR

Xerox Imaging Systems' (formerly Datacopy) MacOCR functions only with Xerox Imaging scanners, but can import image files from other scanners in a wide variety of formats.

Unlike Publish Pac and MacinText, MacOCR requires that you manually load the fonts needed for page recognition. Luckily, the manual contains sample printouts of the typefaces MacOCR supports, to help you make the match.

You can clean up dirty scans with the program's Zoom Edit feature, which works much like MacPaint's FatBits. While the zoom is valuable, it would be better if weren't quite so close up; it's difficult to scroll through a full-page scan looking for stray bits.

MacOCR lets you frame text to read across multiple scans (see "MacOCR"). The variety of file formats to save to is very extensive: MacWrite, Microsoft Word, text with carriage returns, text with carriage returns and line feeds, and unformatted text. I did encounter some sporadic line spacing problems, primarily in the form of extra carriage returns in the resulting text file. But the biggest problem I encountered with MacOCR was that, for some unknown reason, it completely skipped several lines in my spreadsheet test during recognition.

Publish Pac

Dest's nontrainable Publish Pac works very well on documents typed or printed with its specified type styles. Publish Pac works best on single-column documents, since it can scan and recognize only one text area at a time (see "Publish Pac"). The program handles underlined text impressively and has a nice tabbing feature. Other text formatting features include the ability to preserve margins, paragraph breaks, and page breaks. Unfortunately, Publish Pac operates only in conjunction with OCR hardware in one of Dest's own scanners. Therefore, unless the scanner was hooked up to my Mac, I wasn't able to import TIFF files into Publish Pac for recognition.

There are several zoom options, which help you to position the text window, but I found image scrolling and changing zoom views very slow on the SE.

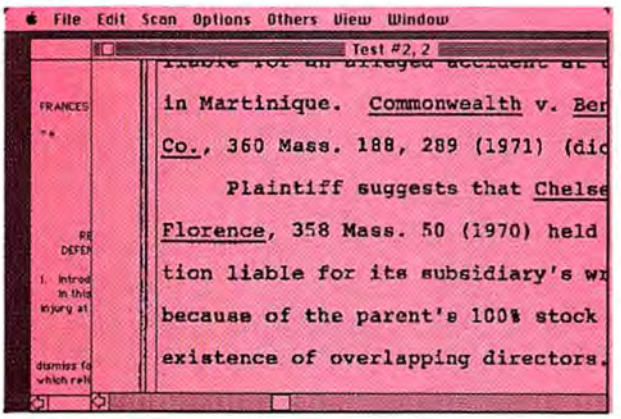
Publish Pac lets you Scan Text—recognize text in one step—or Convert to Text—scan an image, then read it in a separate step. Convert to Text lets you clean up dirty scans with an eraser tool. The two-step process took 1 minute 57 seconds, while the total time for a text scan was only 51 seconds.

Read-It

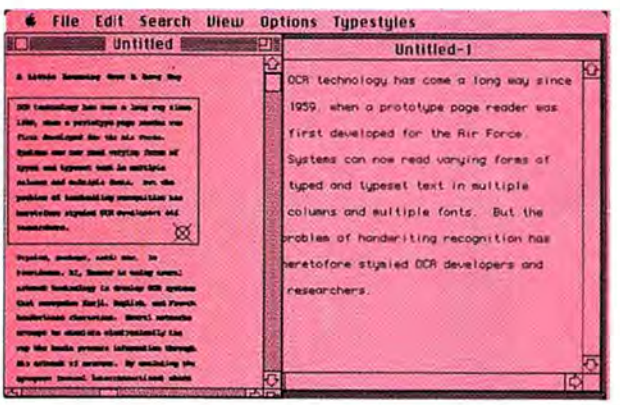
Olduvai's Read-It is the first OCR program capable of background recognition with MultiFinder. Read-It can handle all types of text—as long as you take the time to teach it the typefaces. The only kind of text it couldn't recognize during my testing was underlined typewritten text, where the underscores are not joined to the characters.

Read-It takes longer to recognize text than other programs. This is primarily because the program does a lot of prerecognition analysis—isolating lines, isolating characters, checking for kerning and monospaced characters, averaging character sizes—before any recognition can take place. And the program has to go through this process for each text area. It took Read-It five minutes to analyze some text, but only four minutes to do the actual bitmap matching.

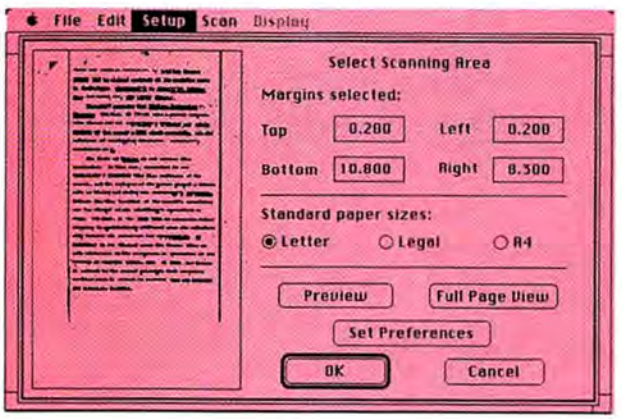
Before you can teach the program a typeface, you must set the parameters (monospaced, kerned, ligatures, and so on) of the page, as well as its line spacing. Otherwise, Read-It will not accurately perform its character segmentation tasks.



MacinText
MacinText works best with relatively simple pages and plain text (no italics, underscoring, or the like). Shown at left is the untouched file.



MacOCR
MacOCR can read only one selected frame at a time. Multiple columns must be recognized separately.



Publish Pac
You can select the scanned image area with a preview/prescan feature.

Read-It has three training modes: Learn, Learn and Recognize, and Easy-Learn. Learn takes the longest (see "Read-It"). Learn and Recognize asks you to identify only those characters that Read-It can't recognize within user-definable matching tolerances. Easy-Learn requires that you have a Mac text file that exactly duplicates the text of the scanned page (preferably one with all alphabetical characters on it). Read-It then sets up the type table using the character file.

You can frame several sections of text with resizable windows. Unfortunately, these text windows can't be moved. If you have multipage documents, you can save the positions of these windows in a selection template. To read multipage documents, which is only possible with saved image files on disk, you use the program's batch recognition capability.

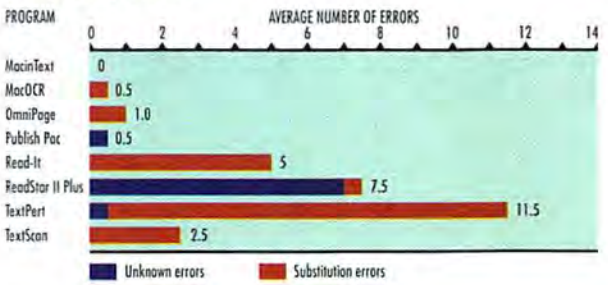
I prefer a progressive training process; start with a short Learn session and then move to Recognize and Learn mode. You'll get the best results if you train for each typeface and font (italics, bold, and so on) separately, then load all of them for recognition. A very nice feature for fine-tuning lets you examine and edit Read-It's type tables to correct any mistakes made during training.

I noticed the response time of the program during training slowed noticeably as the type table grew—especially on the SE. Image scrolling while framing text was also much faster on the Mac II.

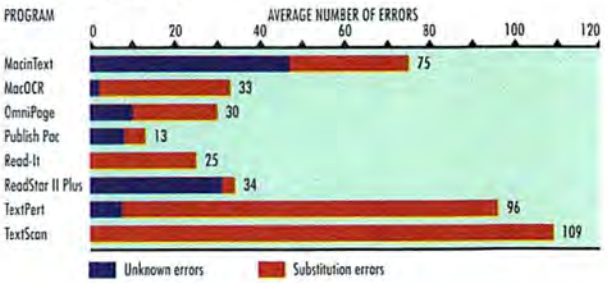
Error Count

Shown here is the average number of errors detected after scanning each of the four test documents four times. A recognition error occurs when a program fails to identify a character. A substitution error occurs when a character is recognized incorrectly.

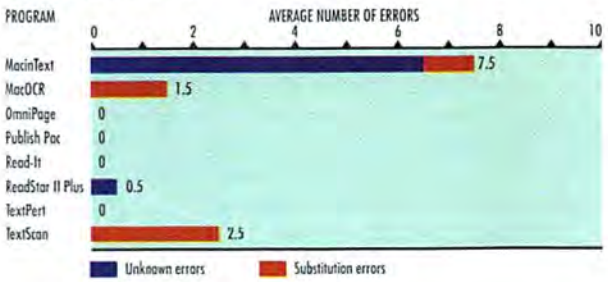
OCR Errors, Test #1



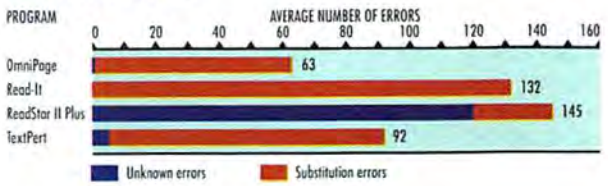
OCR Errors, Test #2



OCR Errors, Test #3



OCR Errors, Test #4



ReadStar II Plus

Inovatic's ReadStar II Plus is a fast-learning trainable OCR program. It's also the only copy-protected OCR program for the Mac. As far as recognition goes, ReadStar opts for the unrecognizable-character marker whenever it's unsure about a letter; thus, the program generates very few substitution errors in text files.

Training is accomplished in the program's Learning mode. This goes very quickly because ReadStar II Plus keeps recognizing characters while it's learning. You can actually see the rate of recognition climb as you teach the program more letters.

Although you can correct a typing mistake in the midst of the training session, ReadStar reflects the correction only when you start reading another document.

The program provides image zoom capabilities, multiple text-window selection, and a wonderful eraser for working with dirty documents (see "ReadStar II Plus"). But be careful: the eraser has no Undo command. Should you delete part of a character by mistake, you can either skip over it during training or rescan the page and start over.

ReadStar recognizes text in the order in which you position the text windows. They cannot be resized and moved about once you've positioned them, but they can be independently deleted. These windows can carryover across pages for scanning similarly formatted multipage documents.

Characters can be recognized in two ways. Automatic mode lets ReadStar recognize as best it can without your help. In Interactive mode, the program asks you to identify characters it can't match.

I had some problems with text formatting. Deselecting the word wrap (unjustified format) option kept the original document's format, with carriage returns after every line. But during recognition, the formatting occasionally switched from carriage returns

Setting Up for OCR

	MacinText	MacOCR	Publish Pac	Read-It	ReadStar II Plus	TextPert	TextScan	OmniPage
Company	Microtek	Xerox Imaging Systems	Dest	Olduvai	Inovatic	CTA	New Image Technology	Caere
Price	$199	$695	$595	$395	$995	$995	$395	$795
Required Hardware								
Minimum Mac	Mac Plus	Mac Plus	Mac Plus	Mac Plus	Mac SE	Mac Plus	Mac Plus	Mac II[1]
Recommended memory	1MB	1MB	1MB	2MB	2MB	1MB	2MB	4MB
Suggested memory size for MultiFinder	n/a	992K	328K	976K	1900K	384K	1171K	3072K
Built-In Scanner Drivers								
Agfa				•	•	•		
Apple				•	•	•		•
Dest			•			•		
Datacopy		•				•		
Hewlett-Packard				•	•	•		•
Microtek	•			•	•	•		•
New Image Technology				•	•		•	
Other				ThunderScan[2], Truvel, Sharp	Abaton 300 SF	Abaton SCSI, Sharp	Princeton Graphic Systems, Spectrum Digital Systems, QMS, Sharp	

[1] Or Mac SE equipped with 68020 accelerator board.
[2] Separate version of Read-It for ThunderScan available for $149.

to word wrap in the middle of a document. And I couldn't get the program to save any changes I'd made while I was working in its internal editor.

TextPert

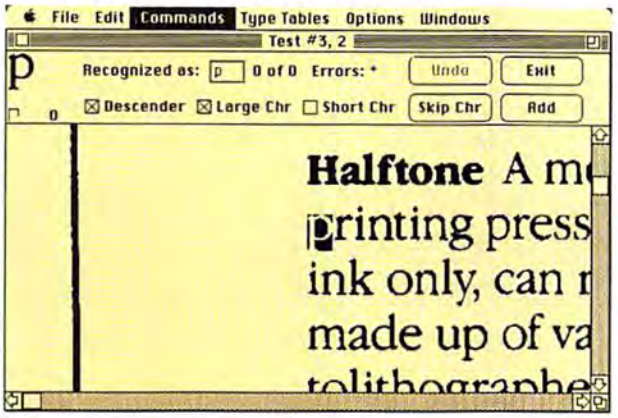
CTA's TextPert was the most flexible program I found for setting up a page for recognition. This trainable program can define text windows on its own, or you can define them manually. You can select text in multiple windows, which can be resized and moved around. You delete individual windows simply by activating them and then hitting the Backspace key. Tabs in text areas can also be manually defined, which is handy for spreadsheet recognition and formatting.

Rather than opting for the "first window placed, first text recognized" approach, TextPert lets you change the order in which it reads the text. In addition, you can change the output format from text window to text window (see "TextPert"). Both output specifications and text windows remain the same from one scan to another. Like ReadStar, TextPert keeps recognizing characters it knows while you're teaching it. But unlike ReadStar, it is fairly liberal in matching characters. The only thing TextPert doesn't do is maintain exact original spacing and indentation.

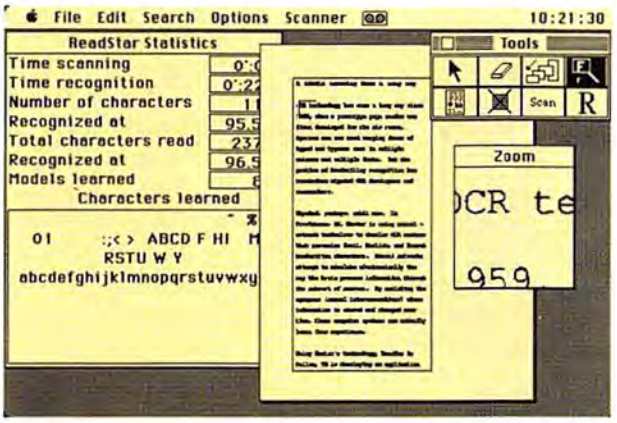
In its regular Teach mode, TextPert doesn't stop to let you correct mistakes. To keep the program from running rampant trying to match characters it can't recognize, you can use the Complete mode, which forces the program to stop whenever it encounters user-specified characters.

You can activate two windows in addition to the recognized text window, during the program's recognition process. The document window holds the entire document image, while the View window shows how TextPert is segmenting characters.

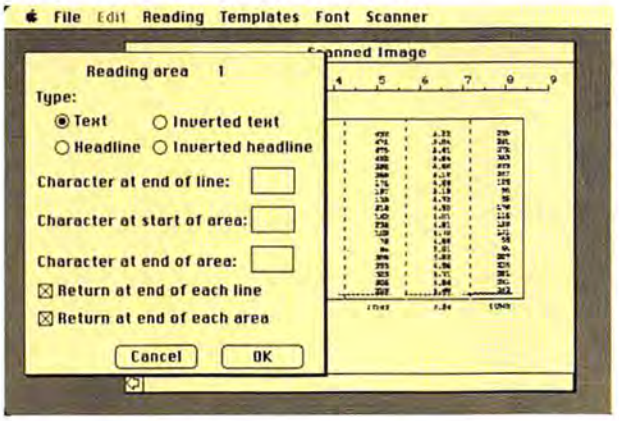
Read-It
The Learn mode asks you to identify every character in the selected text, making that mode useful for limited scans only. The Recognize and Learn mode lets you see the program's progress by displaying recognized text during teaching.



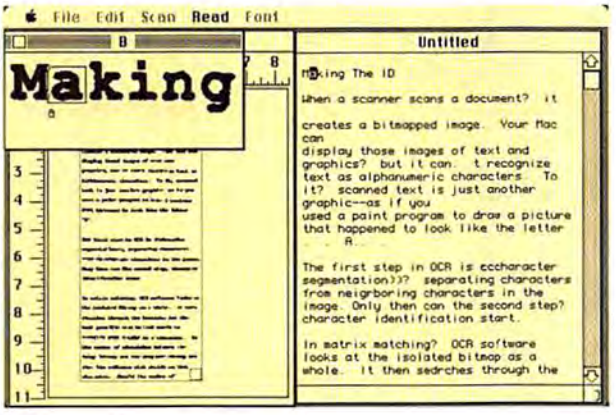
ReadStar II Plus
All image manipulation is done with the program's tool box; the Zoom window appears when you select the Frame Text icon. The statistical information is extremely useful for fine-tuning font templates and checking for recognition accuracy.



TextPert
You can ask the program to insert a return or another character after every line, a return or another character after a specific window area, or a character at the start of an area.



TextScan
Because character tables are included with the program, it won't necessarily ask you to identify every letter in a text. However, when characters get blurred because of scanning (as happened here), you'll have to help TextScan out.



I found that the speed of the program did slow from 1 minute 29 seconds to 1 minute 44 seconds in Test #1 when both windows were open. However, the document image window is especially useful during the teaching process because it lets you see the context of the character bitmap being questioned by TextPert—thus eliminating any confusion between upper and lowercase letters that tend to look the same in bitmap form (for example, s and S).

TextScan

New Image Technology's TextScan wins the prize for the friendliest icon, but it's definitely not the friendliest OCR software.

The only control you have over scan quality is to select a menu option for Normal, Dark, or Light. Unfortunately, there are no contrast settings. You can resize the scanning window, but there's no prescan feature. And the program's lack of a zoom facility hampered my ability to check scans.

You select the text to be read with a resizable, movable window, several of which can be positioned for multicolumn documents. TextScan doesn't maintain these text frames for different scans, and deleting one frame can only be accomplished by deleting all the frames you've created.

TextScan has two read modes. In Noisy mode, the program asks you to identify any unknown characters as soon as it comes across them (see "TextScan"). In Quiet mode, TextScan recognizes characters the best it can. In Noisy mode, because the program is reading two lines ahead of what you see in the text window, it can be difficult to identify unknown characters by context. Strangely, both read modes use the same keyboard command. After reading text in either mode, you have the chance to correct errors.

TextScan can handle ligatures and proportionally spaced type, but due to a program memory-handling bug, I wasn't able to get it to read pages from *Macworld*. In addition, version 1.3 of TextScan failed my spreadsheet test miserably, adding in extra spaces at random between numbers. According to New Image Technology, version 2.0 corrects these memory and spacing problems.

The program did reasonably well at reading plain text and underlined characters. And for the most part, errors were consistent across documents, making corrections easier within TextScan. But because you should correct errors immediately after the recognition process to achieve low error rates, TextScan requires more user interaction to work.

OmniPage

If you want a combination of immediate use and recognition flexibility, Caere's easy-to-use OmniPage may be your best bet. However, it isn't perfect, especially when automatically identifying text areas.

OCR Software Compared

	Nontrainable			Trainable				Automatic
	MacinText	MacOCR	Publish Pac	Read-It	ReadStar II Plus	TextPert	TextScan	OmniPage
Company	Microtek	Xerox Imaging Systems	Dest	Olduvai	Inovatic	CTA	New Image Technology	Caere
Recognizable Character Sizes	8–12 point	10–12 point[1]	10–12 point	8–72 point	4–20 point	4–72 point	10–24 point	8–72 point
Scanner Controls								
Brightness	●		●	●	●	●	●	
Contrast	●	●		●	●	●		●
Prescan	●	●	●	depends on scanner	●			
Select text areas to scan	●	●	●	depends on scanner	●	●	●	●
Mask graphics/image areas	●		●	depends on scanner	●		[2]	●
Filter	●			●		[3]		
Eraser/Fat-Bit editing		●	●		●			
Import File Formats								
PICT		●		●		●		
TIFF	●	●	[4]	●	●	●	[2]	●
Other		Datacopy, MacPaint, SuperPaint		MacPaint, ThunderScan, AppleFax, FAX stf	Foto	bitmap, Foto		
Output File Formats								
Text (ASCII)	●	●	●	●	●	●	●	●
MacWrite		●	●				●	●
Microsoft Word		●	●					
Tab format			●			●		●
Built-in Text Editor	●	●			●	●	●	●
Halftone Image Scanning		●	●	depends on scanner	●	●		●

[1]LaserWriter Courier Title in 10–18 point.
[2]Only in version 2.0.
[3]Activated by settings Low Quality, Medium Quality, High Quality.
[4]TIFF image files can be opened only if Dest scanner is attached to the Mac.

Once a scan is completed, OmniPage strips out all of the graphic elements on a page and outlines what it thinks are text blocks. The recognized text then appears in the program's text editor (see "OmniPage").

No cut-and-paste options are available in the editor while it is in MacWrite format. However, OmniPage will retain formatting information such as underlining and margins. Cut-and-paste functions do work if you recognize text as simple ASCII characters, but then OmniPage retains no formatting information. Another formatting option (not mentioned in the rather sparse manual) is an Excel-compatible file. That format recognizes spaces as tabs, so you can import recognized text into a spreadsheet.

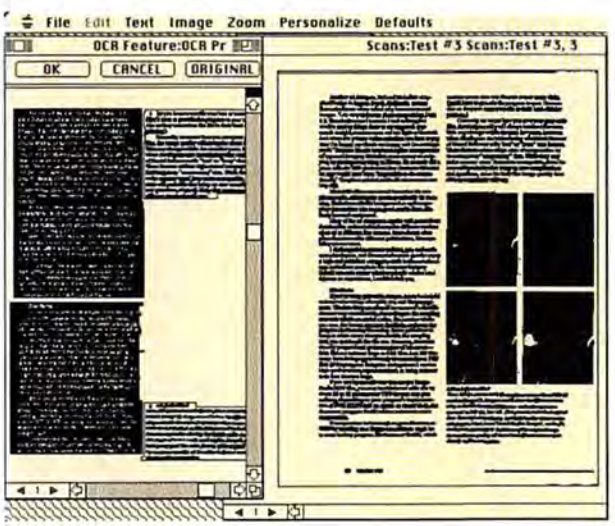
OmniPage recognizes pages of all shapes and type of all sizes without problems. You can assign the order in which OmniPage reads multiple text blocks, as well as manually select areas to read.

One thing you can't adjust is how OmniPage identifies blocks of text. For example, the program sometimes frames a section of one column as part of the adjacent column. As a result, some lines from the first column wind up in the second column instead of where they belong. To correct the problem you must restart the recognition process for that particular page.

The most impressive thing about OmniPage is its remarkable skew tolerance. Even a page scanned at a 30-degree angle is recognized reasonably well. No other OCR program offers such dramatic skew tolerance.

Sound Advice

The performance of OCR programs is determined by many factors, most of which you can control.



OmniPage
It's easy to get up and running. The program essentially makes two passes during the recognition phase, first isolating text blocks (left) and then doing the actual reading.

- Do your documents come in all shapes, sizes, and varieties of type styles? You should consider a trainable or automatic system. On the other hand, if your pages are primarily typewritten, you can probably get by with a less-expensive nontrainable package.
- If you will be scanning complex pages, you might look for a prescan feature to help you set up a document before the recognition scan. It's also nice to be able to check the placement and skew of the page prior to the recognition process.

While all OCR software lets you select scanning dimensions for an original page, only some save scanning time by letting you isolate scans to text areas on the page.

- Different OCR packages handle mixtures of text and graphics on a page differently. You can usually select noncontinuous text (like columns) by framing different areas of text in a document separately. This can get tiring when pages have multiple graphics scattered randomly.

Several packages let you scan halftone images with the same scanner driver used for OCR line-art scans. This is nice if you dislike switching back and forth between applications.

- All OCR programs produce text files. The question is, how much reformatting do you want to do to that file once you import it into a word processor. OmniPage does retain bold and underline type characteristics in its MacWrite format, but other programs offering Word or MacWrite formats just save files as text-only files for those word processors.

Only OmniPage, TextPert, and Publish Pac read spreadsheets with tabs. Other programs may retain column and row formats, but as spaces, not tabs.

Overall, OmniPage impressed me because it handled almost everything I threw at it with aplomb. However, its hardware requirements certainly put it in a higher price range. As far as nontrainable packages go, I was most pleased with Publish Pac, although its text selection capabilities limit its utility for complex pages, and it only works with Dest scanners. MacOCR has much broader image-import facilities.

My choice for trainable OCR was a toss-up between three programs. TextPert is slower at recognizing, but faster to train, than Read-It. In addition, TextPert's text-selection capabilities are extensive. ReadStar II Plus was quick to train and quick at recognizing, but the program's nonworking Save Text command only saves in ASCII format. On the other hand, Read-It gets the job done for a lot less money.

Due to errors in the scanning and recognition process and inherent limitations in OCR techniques, you just won't get 100 percent accuracy with any of these programs. So, although OCR can save you time, don't forget to keep those typing fingers limber. □

See *Where to Buy* for contact information.

The Big Match: Illustrator 88

by Erfert Fenton

It's the day of the big match. You've got a special project to do. You need a PostScript graphics program. Which of the heavyweights do you choose —Adobe Illustrator 88 or Aldus FreeHand? The pat answer is: Buy both, because each program excels in certain areas. Besides being a cop-out, this answer doesn't do you much good if you don't have the requisite $700 or $800 to buy both programs. It's like a pro wrestling referee declaring, "Well, Hulk Hogan excels at piledrivers, but André the Giant is better at body slams." Who cares? You want to know who's going to wear the big gold belt with all the rhinestones.

It's true, each program *does* have different strengths. Depending on the kind of illustration or design you do, one of the programs may better serve your needs.

vs. FreeHand

Which PostScript graphics program should you buy?

JOHN HERSEY

The following observations should clarify each program's strengths and deficiencies, helping you to decide which is right for you (for individual reviews of each program, see "A Big Hand for FreeHand," *Macworld,* July 1988, and "Illustrator: This Year's Model," *Macworld,* October 1988). But in the end someone has to make a call. Rest assured, at the end of this article only one program will be awarded the gold belt.

To help me make the big calls, I relied on two referees: Simon Tuckett of GraphiComp Design in Toronto, and David Smith of David Smith Design in Sausalito, California. Each is a professional artist who has worked extensively with both programs. For this article, Tuckett concentrated on FreeHand and Smith worked with Illustrator 88. Each artist shared his insights on what types of tasks each program is best

for. Of course, as head referee I had to make the final calls. I take full responsibility for what has happened here today.

The Overall View

Before every pro match-up you need some perspective (no pun intended). Sometimes they call it pregame hype. We'll avoid the hype, but here's the big picture to help you put these two PostScript heavyweights into context.

The way a program approaches a task is as important as the tools it provides. In this case the task is drawing, and each program offers its own digital metaphor for an artist's studio. In FreeHand, for example, you set up a style sheet for each drawing, naming line styles and weights, colors, and so on. FreeHand provides control over an entire layout: features such as multiple layers, a cursor position readout, an Align Elements command, and a snap-to grid are reminiscent of drawing or CAD programs, giving you precise control over object placement. Illustrator 88 focuses on drawing precision rather than on overall layout. Many artists find Illustrator's pen and freehand tools more fluid than FreeHand's drawing tools, allowing a greater degree of control when drawing complex shapes.

Not just Tuckett and Smith, but many other artists I've talked with, concur that Illustrator is a superior tool for intricate drawings or tracings that require minute control over drawing and editing bezier curves. Says Smith, "If you're comparing the two as drawing programs, Illustrator wins hands-down; it wins in control, sophistication, and the intuitive way it draws." But drawing isn't everything. Tuckett observes, "For a more artistic type of drawing I'd choose Illustrator, but I use FreeHand if I need to create a highly structured image, such as an advertisement, where I have to shuffle many elements up and down through particular layers, align parts of the drawing, and perhaps incorporate text."

In addition to differing design philosophies, each program offers unique features. For example, FreeHand's text-manipulation capabilities outshine those of Illustrator, allowing designers to incorporate text and graphics in a single application, rather than pasting an illustration into a page-layout program. But while Illustrator is weak in the text department, it surpasses FreeHand in other areas. For example, Illustrator's inclusion of Pantone Matching System colors takes the guesswork out of matching on-screen colors to printed results.

To get a better idea of each program's strengths, let's look at several basic areas and see how each program performs. The match will take place over four rounds: tools, text, color, and miscellaneous features. Here are the rules: Each ref keeps an eye on one of the competitors. I keep an eye on the refs and give you the play-by-play. Then I call the round.

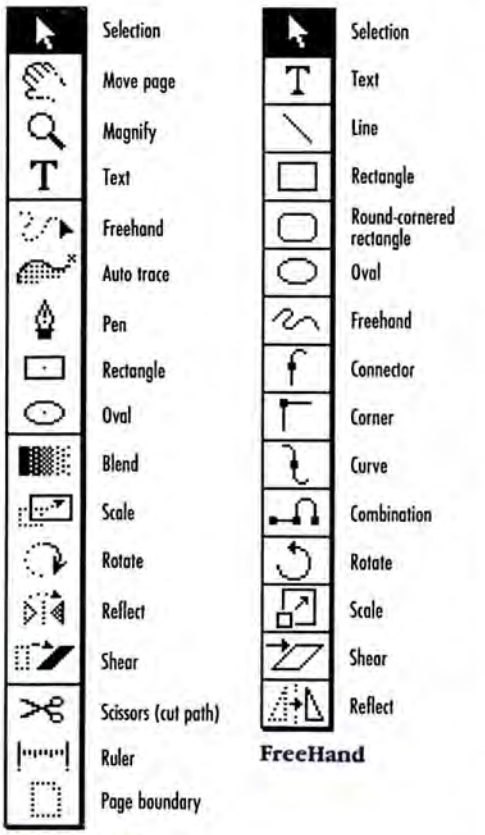


Figure 1
The tool menus for Illustrator 88 and FreeHand are quite similar, with the notable exceptions of Illustrator's autotrace and blend tools and FreeHand's multiple drawing tools.

Round 1: Tools

Both programs share many basic drawing and shape-manipulation tools. Figure 1 gives a rundown of the two programs' tool palettes. The operation of some tools varies from one program to the other, and Illustrator has several tools that FreeHand doesn't offer.

Illustrator 88

Like FreeHand, Illustrator lets you import bitmapped or PICT images as templates for tracing. Illustrator offers an added bonus, a utility called DrawOver that converts MacDraw files to Illustrator format. You can also place TIFF images into an Illustrator drawing, a feature not found in FreeHand.

As I mentioned earlier, many artists consider Illustrator better for precision drawing. A subtle but noticeable difference in feedback from the pen and freehand tools gives Illustrator an edge. In addition, many people find Illustrator's single-pen tool easier to master and more intuitive to draw with than FreeHand's four basic drawing tools: curve, corner, connector, and combination.

Illustrator lets you adjust the sensitivity of its freehand tool, as well as back up and erase a section while you're drawing—both pluses over FreeHand's comparable tool.

Illustrator has two tools not found in FreeHand: the autotrace tool and the blend tool. The autotrace tool automatically traces template paths, saving you the time and tedium of tracing intricate shapes by hand. You can autotrace an entire template (if the number of points doesn't cause an out-of-memory error) or select two points and autotrace between them. Keep in mind that autotraced paths usually need to be touched up, but even so this tool can be a real time-saver.

Illustrator's blend tool lets you set up to 1008 increments between one shape or color and another, providing smooth transitions between objects. You provide the first and the final shape or color, specify the number of steps between them, and the program calculates the intermediate steps. The tool won't create a smooth blend between two vastly different shapes, of course, but it can create impressive effects at the click of a button.

Another point in Illustrator's favor is that it enables you to create fill patterns by

drawing them on screen. Although you can create patterns in FreeHand, you must write a PostScript routine to do so.

FreeHand

FreeHand also lets you paste in bitmapped or PICT images to be traced as templates. Unlike Illustrator, FreeHand lets you edit a template—you can resize, rotate, or skew the image before tracing it. And although Illustrator won't open FreeHand documents, FreeHand can open Illustrator 1.1 documents and convert them into FreeHand format.

Unlike Illustrator, FreeHand lets you draw in Preview mode, seeing colors, line weights, and fills as you draw. Although this capability isn't practical for large drawings—where the screen redraw rate slows considerably—Tuckett finds the Preview mode handy for sketching out designs in color before starting on the actual illustration.

Although FreeHand's four drawing tools might be more difficult to master than Illustrator's single pen, they offer one distinct advantage. The curve, corner, and connector tools each lay down a different type of point indicated with a different symbol: a circle for the curve tool, a square for the corner tool, and a triangle for the connector. Unlike Illustrator, FreeHand lets you click on a point once a path is drawn and change the point's type, offering more flexibility in editing a shape or a path. While the sight of multiple tools in the tool palette may be initially confusing for beginners, keep in mind that the combination tool lets you combine curves and corners when drawing a shape.

FreeHand's shape tools operate in the traditional Mac way—you grab a handle and drag it to resize a rectangle or an oval. In Illustrator, you must select the scaling tool to resize a shape. Those accustomed to MacDraw or a similar Macintosh drawing program will find FreeHand's shape tools familiar and easy to learn. In addition, you can double-click on a FreeHand shape and view a dialog box that lets you type in new values to edit the object's shape, size, and screen position.

FreeHand's eight levels of Undo enhance its flexibility as a design tool. You can implement several steps of a design idea, view the drawing or print a proof, and backtrack if you don't like the results.

Drawing Comparison

To compare the two programs' drawing capabilities, I had each artist trace a map of the United States from the same MacPaint image (see Figure 2). In this test, I wanted to compare not only the precision of each program's drawing tools, but also to see if Illustrator's autotrace feature saved a substantial amount of time when tracing a complex shape. I asked the artists to print the map at a certain size, with a 1-point-wide outline and a 50 percent gray drop-shadow.

I asked each artist to time himself on the map. To my surprise, even with Illustrator's autotrace tool, it took Smith almost twice as long as Tuckett to complete the map. Although it took him only four and a half minutes to autotrace the country's outline and all of the states, Smith—a confessed perfectionist—used a combination of tools to touch up or redraw most of the states, taking a grand total of one hour and ten minutes to recreate the map. For example, if a state was made up of straight lines, Smith deleted the autotraced state and used the pen tool, since the autotrace tool often adds unnecessary control points or crooked patches to straight lines. For a state like California, which is made up of straight and crooked lines, he drew the outline by pressing the Control key to switch between the freehand tool and the pen. So that you can see how much detail was captured by the autotrace tool, Figure

Illustrator 88 (retouched)

FreeHand

Illustrator 88

Figure 2
Two artists employed a combination of tools to draw these maps from an identical template: David Smith used the autotrace, pen, and freehand tools for the Illustrator 88 version, while Simon Tuckett used the freehand and combination drawing tools for the FreeHand drawing. Although autotrace helped rough out the map, Smith found himself redrawing many states to improve the level of detail. The untouched autotraced map is shown for comparison.

2 shows the raw, autotraced map alongside Smith's final version.

Tuckett set up a FreeHand style sheet for his map, with one name for the U.S. outline and another for the states' outlines. If I'd changed my mind and asked him to draw the states' outlines with dotted lines, for example, he could have done it in a flash by opening his States definition and changing the line style. Despite FreeHand's lack of an autotrace tool, Tuckett took just 36 minutes, using the combination tool (straight lines and curves) and occasionally the freehand tool, to complete his map.

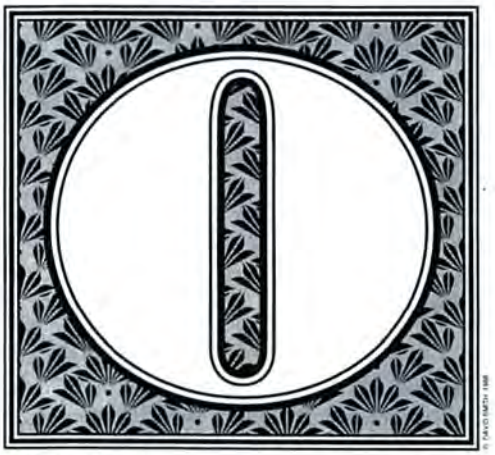
The Call

Illustrator's autotrace tool can do some of the dirty work in tracing an image, but depending on your standards and the level of detail you need, you may spend considerable time touching up an autotraced image. Illustrator's pen tool and freehand tool offer more precise control than FreeHand's drawing tools, making Illustrator a better choice for intricate illustrations.

FreeHand's drawing tools lack the finesse of Illustrator's, but facilitate editing a path by allowing you to change a point's type. FreeHand's style-sheet approach makes it easy to specify global changes in line style or other drawing attributes.

Round 2: Text

For this exercise, I had each artist create a drawing that would show off his assigned program's text-handling capabilities (see Figure 3).



Illustrator 88

FreeHand

Figure 3
Illustrator 88 lets you apply special effects such as inline (the narrow black line), outline, and fills to text, while FreeHand concentrates on features such as precise control over letter spacing and the ability to attach text to a path.

Illustrator 88

Unlike FreeHand, Illustrator lets you type text and then change its stroke width and fill pattern, making possible an almost unlimited variety of effects. Smith's decorative drop cap combines an *O* from Adobe's Bodoni Poster font with a background pattern. To create the inline effect, Smith first typed a 400-point *O* and assigned it a 24-point stroke in black. He then copied the letter and used the Paste in Front command to place the copy directly on top of the original *O*. He then assigned the copy an 11-point white stroke, then copied that version and selected Paste in Front. He then assigned the topmost letter a 5 percent fill and a 2.5-point black stroke. Finally, he applied a tiled pattern he'd created earlier to the background square.

In addition to modifying typed letters, with Illustrator you can apply effects to the letter outlines provided with Adobe's Collector's Edition, a collection of clip art in Illustrator format ($149).

FreeHand

FreeHand, too, excels at text manipulation, but in a different way than Illustrator does. While Illustrator lets you apply graphic effects to text, FreeHand concentrates on typographic features such as word spacing, letter spacing, and type styles. For example, unlike Illustrator, which provides only tracking (adding or subtracting space between all the letters in a word or a line of text), FreeHand offers precise kerning (adding or subtracting space between individual letters in a word) in increments as fine as 0.01 em.

In addition, FreeHand lets you mix fonts, sizes, and styles (italic, bold, and so on) in a single block of text, allowing you to incorporate type into a design without entering a word processor or page-layout program. If you design ads, brochures, or other layouts that incorporate type and graphics, and you want to create the graphics and text in a single application, you'll want to seriously consider FreeHand.

An additional text feature lets you place a line of text on a path of any shape. While not all designers will find this capability essential, it's handy for maps, logos, and other applications where text must follow a shape or curve. Tuckett's example in Figure 3 employs FreeHand's text-on-a-path feature. To create the logo, Tuckett used the

Times font, kerning character pairs when necessary. He set the bullets between the letters in bold, and the letters themselves in the plain (or roman) style—a feat that couldn't be accomplished in Illustrator. He scaled each line of type to fill the column width, and attached the word *curve* to an arched path above the circle.

The Call

FreeHand wins in the text-control category. It offers kerning, mixed fonts and styles in a block of text, and text on a path.

Illustrator falls behind in treating text as text, but it does allow you to apply graphic effects to text with features such as Paste in Front and the ability to alter a character's stroke and fill.

Round 3: Color

For this test, I asked each artist to duplicate a picture of the Arizona state flag, which is made up of four colors: dark blue, brown, red, and yellow (see Figure 4). The illustration itself was simple; what we wanted to show here was how each program deals with assigning colors and creating color separations.

Illustrator 88

Illustrator definitely has the advantage when it comes to assigning colors, since the creators of the program licensed the Pantone Matching System (PMS), a standard set of more than 700 colors that is widely used by graphic artists. In addition, Illustrator improves the correspondence between screen and printed colors with a utility that lets you adjust your monitor's colors (screen and printer colors rarely match even with this aid, however).

For his version of the flag, Smith used a star from Adobe's Collector's Edition, adding the rays with the pen tool. He then consulted his Pantone color-sample book, found matches for the colors on the original flag, and typed the numeric values into his document. He didn't bother to preview the flag, since the illuminated colors on the screen won't match the reflective colors of the ink. He then converted the drawing to negatives, with the Adobe Separator utility, which accompanies Illustrator.

When you print an image, a thin white line may appear between adjoining sections that don't share a common color. To guard against this, you can create a *trap* by adding a thin stroke around one of the adjoining objects, filling it with an appropriate color, and clicking the Overprint option in Illustrator's Paint dialog box.

FreeHand

Since FreeHand doesn't include PMS colors, you must create your own color library for a drawing or use the color chart and on-disk color library that accompany the program. Unfortunately, FreeHand provides percentages of cyan, magenta, yellow, and black for only 150 colors, and there's no guarantee that you'll find a good match.

To apply colors to his rendition of the flag, Tuckett first consulted his printer's color chart in order to match the colors of the original flag. He then set up a new color in FreeHand's Color dialog box and selected Process Color from the menu. He keyed in the percentages of cyan, magenta, yellow, and black from his printer's chart and named the color, which then became part of that document's color library. Tuckett repeated this procedure for each color in the flag. FreeHand creates color separations from within the program, rather than with a separate utility.

Although it's harder to predict printed results with FreeHand's color assignment scheme than with Illustrator's PMS colors, FreeHand's approach does have an advantage. Let's say you've set up a custom color library for a document, naming one of the

Illustrator 88

FreeHand

Original art

Figure 4

Both FreeHand and Illustrator 88 enable you to print either spot colors or process colors. Our Illustrator 88 artist chose to print his sample using spot colors, taking advantage of the program's Pantone Matching System library. The FreeHand artist preferred to employ the four-color process. (Note: Since Macworld *is printed using the four-color process, the colors shown in the Illustrator 88 sample won't necessarily match the PMS colors the artist chose.)*

colors "bile green." When you print a proof of the drawing, you see that the green is not what you wanted at all. You can simply open that color, change it, rename it "lime green," and automatically replace all occurrences of the first green with the second one (unfortunately, you still have no guarantee that the on-screen color will match the printed one). In Illustrator, you'd have to select each area that was filled with the original green and then replace it with the modified color.

The Call

Illustrator is the clear winner in the color category. The inclusion of the PMS color library takes the guesswork out of assigning colors to be printed. FreeHand's style-sheet approach makes it easy to change all occurrences of a selected color, but this feature doesn't offset the lack of PMS colors.

Round 4: Miscellaneous Features

For a final demonstration, each artist created an illustration that would show off a unique capability of the program he was using (see Figure 5).

Illustrator 88

For his illustration, Smith chose to use Illustrator's blend tool. He drew a flying bird with wings spread wide, then another bird with wings upraised. He assigned a different color to each bird, positioned each one on the screen, then selected the blend tool and chose to place five intermediate shapes between the starting and ending bird shapes. Illustrator did the rest, automatically calculating the shapes and colors of the blend. For a final touch, Smith applied a blend from one color to another in the background.

Illustrator 88

FreeHand

Figure 5
Both programs offer unique capabilities. Illustrator 88's blend feature creates a smooth transition from one shape to another, one color to another, or both. Here, FreeHand's 200 layers helped the designer arrange elements in a complex layout, in which line thickness changes for each floppy disk.

FreeHand

For his final drawing, Tuckett created a logo consisting of three floppy disks, the top one made up of thin lines, the middle one of medium lines, and the bottom one of thick lines. Since the screen's limited resolution doesn't match that of the LaserWriter, much less that of a high-resolution printing device such as a Linotronic imagesetter, Tuckett needed to be able to make numerous changes to the drawing as he printed out proofs.

Unlike Illustrator, FreeHand allows you to define angled dot or line screens for halftone effects. Tuckett first drew the disks' outlines, aligning them with the grid, then applied a fill of 15 lines per inch at an angle of 90 degrees to the bottom disk. He applied the lines in Preview mode so he could get at least a rough idea of how the final output would look. He then defined lines of different weights for the top disk, sending each weight to a different drawing layer and saving it as a style sheet.

Next, he cloned a layer and modified the line weights to produce the middle disk, saving each in a style sheet in case it had to be changed later. Finally, he repeated this process for the bottom disk, typed the company name and positioned it beneath the disks, and printed the results. As you can see, this drawing takes advantage of several of FreeHand's unique features: the adjustable grid, line screens, layers, and style sheets—Tuckett even kerned several letter pairs in the text.

The Call

There's no winner in this category, since the intent of the exercise was to show off unique aspects of each program. Illustrator's blend tool is an impressive feature not offered by FreeHand; it can be used to create smooth blends with no color banding, transitions from one graphic element to another, or even sequences that can be pasted into an animation program like VideoWorks.

FreeHand's line-and-dot halftone screens, a feature not found in Illustrator 88, can also be used to create striking

effects. In addition, this exercise illustrates how FreeHand's multiple layers are useful in putting together designs made up of many components. Finally, this example underscores FreeHand's text-handling superiority.

The Decision

So, which program gets the big gold belt with all the rhinestones? It's a tough call; I use both programs, and wouldn't want to part with either one. But as I tally the score, I find that Illustrator 88 wins in terms of drawing precision and color definition, with bonus points awarded for its autotrace and blend tools. In short, in the PostScript drawing program contest, Illustrator is the champ.

But wait—I'm being pelted with rotten fruit from the FreeHand partisans in the audience. I didn't say FreeHand was a bad program; I said Illustrator 88 came out ahead. If you work on complex layouts that include text and a large number of precisely aligned elements, FreeHand is a better bet. If you can get your hands on both programs, by all means try them out before you decide on one.

Matching Features

	Illustrator 88	Freehand
Edit tracing template	n	y
Convert MacDraw to PostScript	y	n
Include TIFF image in document	y	n
Blend tool	y	n
Autotrace tool	y	n
Adjust sensitivity of freehand tool	y	n
Erase when using freehand tool	y	n
Multiple levels of Undo	n	y
Select and change point type (corner, curve)	n	y
Grid	n	y
Multiple layers	n	y
Align objects command	n	y
Draw and edit in Preview mode	n	y
PMS colors	y	n
Line and dot halftone screens	n[1]	y
Create patterns	y	y[2]
Kerning	n	y
Text on path	n	y
Mix font sizes, styles in text block	n	y
Edit text fill, stroke	y	n
List price	$495	$495

[1]These screens are available in the accompanying separator utility.
[2]You create patterns by writing PostScript programs.

FreeHand 2.0

The developers of FreeHand are working on a new version that promises to keep Adobe on its toes. The new FreeHand, due out in early 1989, adds many features currently exclusive to Illustrator 88, as well as some entirely new ones. A preview of the forthcoming FreeHand 2.0 revealed the following features:

- a blend tool (for shapes and colors)
- an autotrace tool
- PMS colors
- ruler guides
- variable text stroke and fill
- customizable patterns
- the ability to include TIFF images in an illustration
- the ability to edit TIFF images (brightness, contrast, and so forth)
- 100 levels of Undo
- PICT to PostScript conversion
- a clip art library
- a knife tool for cutting paths
- an erase option with the freehand tool

A rematch may be in order when the new version of FreeHand appears (see "FreeHand 2.0"), since the new version will add many of the features that now set Illustrator apart. And while Adobe has yet to announce any plans for an Illustrator 89, I doubt that the company will be content to let Illustrator 88 rest on its beziers. Ideally, Adobe and Aldus will continue to spur each other on in the quest to create the ideal PostScript graphics program. □

See *Where to Buy* for contact information.

Erfert Fenton was editing computer publications when computers that now fit on your thumbnail filled entire rooms. She is a Macworld *contributing editor and the author of* The Macintosh Font Book, *forthcoming from Peachpit Press.*

ILLUSTRATIONS BY MICK WIGGINS

Beyond Word Processing

by Cheryl Spencer

Products that make your word processing more productive

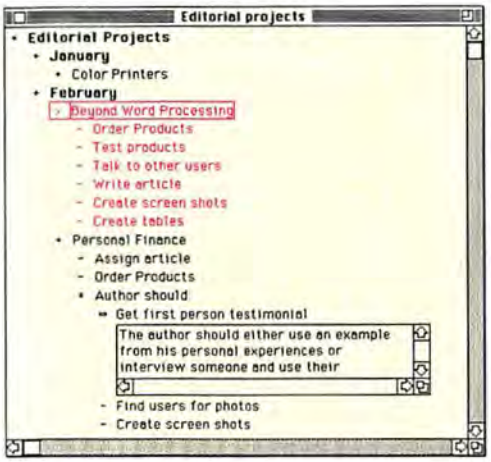
Recently, I tackled a major writing project. Before starting, I had to choose a word processor—preferably one that had a variety of writing tools. Well, I looked at MacWrite, but it can't open more than one document at a time. Microsoft Word's outline view doesn't let you change styles for any of the headings. WordPerfect doesn't automatically create bibliographies in a specific style. FullWrite has lots of nice features, but its file format is incompatible with just about everything, and besides, I wasn't sure I'd always have a Mac with 2 megabytes at hand.

Sooner or later, you'll run up against the limits of your word processor too. The best solution is to use one or more products specifically designed to do the jobs your word processor can't. Most of these add-on tools work with MacWrite, Word, Write, WriteNow, MindWrite, Microsoft Works, and text-only files. Hardly any work with FullWrite because of its complex file format; only a few work with WordPerfect because it is a relatively new product. Some of the products are so useful that you might be willing to save your word-processing files as text-only in order to use them. Others are so mediocre that a word processor's corresponding function may perform an equal, or better, job.

Outliners

Poor outliners. Second only to HyperCard in the Products We Just Don't Know What To Do With category, outliners can be flexible tools or sheer aggravation. You see, outliners can (and should) be used for much more than outlining—just as HyperCard should be used as more than a Rolodex substitute. If you can deal with an outliner's constraints (many people use HyperCard productively in spite of the one-card-per-screen limit), then you'll have a tool you can use even when you're not writing.

At the most basic level, outliners enable you to create headings arranged in a hierarchy. You can then rearrange, expand, hide, move, and sort the headings, and add text and graphics underneath them. Some outliners even calculate numbers, create a table of contents, and dial the phone. You



Hell No, We Won't Go

Although outliners are flexible enough to be used for more than just outlining, they still have some restrictions. Think Tank, like most outliners, won't let you move two headings without moving everything between them.

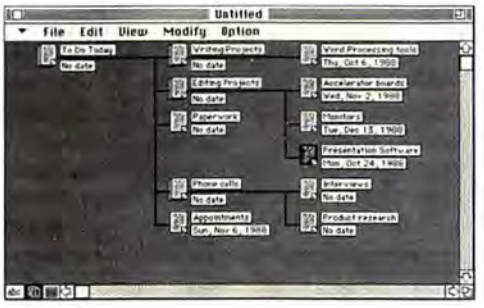
can use outliners to plan projects, create presentations, store addresses, manage to-do lists, take notes, and just plain brainstorm. Two outliners, ThinkTank and More, even include templates for customer order entries, area codes and time zones, and performance reviews.

An outliner's basic structure is that of a list maker. Added features, no matter how flexible, are still constrained by this structure. Outliners force you to stay within the proper outline format. For example, in most outliners you can't select two headings without selecting everything between them. This forces you to keep groups together and prevents your outline from containing headings that are out of order hierarchically. Only MindWrite lets you select any combination of noncontiguous topics and cut, copy, or move them.

The key to using an outliner successfully is to take advantage of its limits in creative ways. Many programs have special features that extend their power: More, for example, can automatically turn outlines into bullet charts or organizational charts. A beta version of More II includes a slew of more advanced slide-making features, and a beta version of Acta Advantage includes a stand-alone program with new features such as Page Preview and Search and Replace.

Even if an outliner doesn't have snazzy slide-making features, you can use it for creating informal handouts or overhead presentations—if it supports text styling, that is. Most outlines can be exported in text format to a word processor for styling, but you lose graphics included in the outline. Besides, who wants to move work from program to program? ThinkTank enables you to select a style for each heading level, but you must use one font and one size for the entire outline. Acta is more flexible, letting you assign typefaces, styles, and sizes to individual headings, to all headings on a level, or to the whole outline. (Both More II and Acta Advantage let you format individual characters any way you want, but most word processors are already that flexible.)

Even if you don't care about stylish outlines, you may care about how the program handles text entry. Many programs force you to keep notes separate from the main outline, usually in a special note box. Although this method works well, it isn't very interactive. For instance, if you have a brainstorm, you have to stop typing in the outline, call up a text box, and then try to remember your great idea. Acta lets you type an unlimited amount of text into each heading; you can display all of the text or just the first line of it.



Trees On Screen

A special type of outliner, Think 'n Time lets you see your files in a tree structure. You can label each file with text and/or numbers (as in a date or dollar amount). Clicking on the corner of the file icon displays the text contained in the file.

Outliners should offer a variety of numbering styles, such as military (1.2.2), numeric (1.2), bullets, and Harvard (I.A.2). If you write scientific or legal papers in which accuracy is vital, you'll want to see the numbering on screen. Only a few outliners support this feature. In addition, you should be able to print portions of the outline. Some programs let you use headers and footers, create a table of contents, and print different levels in different colors.

Although outliners share the same working style, two offer a twist. Inspiration, a MacDraw-like application, lets you create a visual outline by drawing symbols, connecting them, and adding text in a pop-up box. The program transforms your drawing into a conventional text outline that you can edit. Changes to the outline are reflected in the drawing. Unfortunately, it's easy to add more headings than the diagram can handle, requiring you to break the outline into two sections.

Think 'n Time offers a more general (and more useful) approach to visual outlining than Inspiration does. Unlike typical outliners, Think 'n Time places file icons in a tree structure. The file that corresponds to each icon holds up to 32K of text. Like an outliner, Think 'n Time lets you move files from one level to another, provides search features and some rudimentary text editing, generates a calendar, and performs arithmetic. Think 'n Time provides an efficient way to organize files of thoughts, rather than organizing just the thoughts themselves. It's an excellent personal orga-

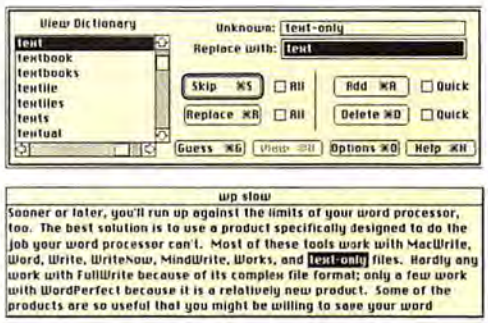
nizer, but because of the icon structure it's not the program you want for public presentations.

Spelling Checkers and Thesauruses

Although most word processors include their own spelling checkers, you may be tempted to purchase a separate package that promises additional features. None of the spelling checkers, whether stand-alone or built-in, offers anything truly distinguishing. For instance, the most important feature in a spelling checker is the size of the dictionary. Strangely, most vendors seem unaware of that fact—no dictionary offers more than 126,000 words. The figure includes not only root words, but every possible form of the word: *move, moving, movement,* and *moveable* are each considered a separate word. Compare that with a paperback dictionary that you might find on any office desk, such as the *New York Times Everyday Dictionary* (Times Books, 1982), which holds over 85,000 entries, not including plurals or other suffix forms. A comprehensive dictionary such as the *Random House Dictionary of the English Language* (Random House, 1987), whose second unabridged edition holds 315,000 entries—again, not including various forms of a root word—provides an even more striking comparison. In addition, traditional, book-form dictionaries provide definitions and some information on word derivation and usage, while spelling checkers provide only a list of words to compare documents against. Only one spelling checker, Spell Coach Professional, provides some definitions.

Some vendors justify small dictionaries because they use less disk space and because you can add words to them. Still, creating your own dictionary sl-o-o-o-ws your work since the checker stops frequently to question words you've used, but that you haven't yet added to the dictionary. In addition, spelling checkers frequently question words with common prefixes such as *predefine* or plurals such as *duplicates* because the dictionary is not large enough to contain all forms of a root word. If you are a bad speller, you may need to look up words in a traditional dictionary to find out if they are indeed misspelled. For a truly irritating time, try spell-checking a document with lots of proper nouns, such as peoples' names. A spelling checker stumbles on every occurrence. Only Thunder includes an option to ignore all capitalized words.

Spelling checkers also can't pinpoint improper word usage. You can set up Spellswell to find all possible misuses of homonyms (words that sound alike but are



wp slow

Sooner or later, you'll run up against the limits of your word processor, too. The best solution is to use a product specifically designed to do the job your word processor can't. Most of these tools work with MacWrite, Word, Write, WriteNow, MindWrite, Works, and text-only files. Hardly any work with FullWrite because of its complex file format; only a few work with WordPerfect because it is a relatively new product. Some of the products are so useful that you might be willing to save your word

Looking for Errors

Spellswell lets you view and edit the main dictionary, skip a word once or every time it occurs in the document, guess the correct spelling, and see the word in context. It also offers numerous options such as checking for homonyms and how to treat hyphens. Some word processors, such as MindWrite, include Spellswell.

Narrowing the List

With all the outliners and spelling checkers to choose from, it's easy to get confused. We've narrowed them down to our favorites.

Outliners	Company	Price
Acta	Symmetry	$79
More	Symantec	$295
Think 'n Time	Mainstay	$99.95

Acta is a readily available desk accessory and allows multiple line headings. More can turn outlines into bullet charts or organizational charts. Acta and More are traditional outliners; Think 'n Time offers a twist.

Spelling Checkers	Company	Price
Spellswell	Working Software	$74.95
Spell Coach Professional	Deneba	$195
Thunder	Electronic Arts	$49.95
WorksPlus Spell	Lundeen & Associates	$79.95

Thesaurus	Company	Price
Word Finder	Microlytics	$59.95

We don't highly recommend spelling checkers, since the one in your word processor can do an adequate job of catching typos. Some people (especially good spellers), however, will find them useful. This list narrows down the choices a bit. For a thesaurus, Word Finder is a good bet.

spelled differently, such as *two, too, to*). But this is only worthwhile if you consistently confuse homonyms. I didn't realize how many homonyms there are until I used this feature. Spellswell found 44 different homonyms so far in this article, including common words such as *so, I, the, do, or, in, you, but,* and *can't.*

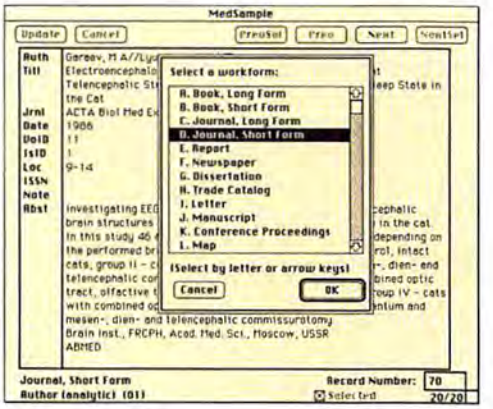
Ironically, good spellers profit the most from a spelling checker because they can easily discern whether a word is misspelled or just not included in the word list. Since the spelling checker in any word processor works well enough to catch typos, good spellers should purchase another product only if it offers a special feature or is much easier to use. Lookup, a handy desk accessory that can supplement a built-in spelling checker, lets you look up individual words instead of spell-checking a whole document. Thus, the product works like a traditional dictionary, enabling you to look up words you really don't know how to spell.

If you still think you need a spelling checker, consider the program's dictionary size and its ability to create a personal dictionary. Any worthwhile spelling checker also lets you edit the problem word in the spelling checker window, suggests correct spellings, and lets you skip or replace a word. Most spelling checkers are compatible with text-only documents, but you don't want to convert every document to text in order to check it for misspellings, so make sure the program works with your word processor. Also make sure that the spelling checker maintains formatting on checked sections of your document.

Beware of any spelling checker that bases its misspelling criteria on the root word plus suffixes or prefixes. Programs that use that type of logic will bypass obvious misspellings or gross grammatical errors. For instance, Spelling Champion assumes that any word ending with *-ing, -er, -ment,* or *-ness* can be pluralized. So, the program accepts all sorts of oddities such as *accompanyings.* What's worse is that some words commonly used in speech that are not standard English can be accepted. You might say "comings and goings" but you shouldn't write that way.

Check for flexibility in the program. For instance, if it offers an interactive mode (which checks spelling as you type), it should be optional—you won't always want your thought processes interrupted just because you made a typo. Also, some programs ignore hyphens and check the two parts of a hyphenated word separately, while others check the whole hyphenated word. For example, if the word is *man-day,* some programs check both *man* and *day* for misspellings, and others look in the dictionary for *man-day* as one word. A flexible program lets you choose.

Thesaurus programs pose fewer problems than spelling checkers. Although the word lists are smaller than those in their paper counterparts, thesauruses don't need to include every form of a word. Probably the biggest problem you'll have is learning to use a thesaurus properly—if you need to replace a word because it occurs too frequently in your text, then chances are you need to do some rewrit-



Quick-Change Artist

Bibliographic databases let you enter reference information into records. You can sort, search, and browse through the information. Best of all, you can easily reformat the information to suit a different bibliographic style. Pro-Cite lets you change the bibliography format by choosing the new style from a list.

ing. Used properly, a thesaurus helps you find the right word for the context—for instance, when you know the word you want means "something like manage, but not manage," Word Finder is the way to go. Spell Coach Professional's thesaurus often repeats entries, only putting them in a different order.

Grammar Checkers

Although spelling checkers have their limited uses, grammar checkers have just about none. Grammar checkers are better at finding capitalization errors or punctuation errors (such as transposed commas and quotation marks) than most spelling checkers. But the programs are supposed to point out errors in grammar, word usage, and punctuation as well as analyze your writing for structural weaknesses, including lengthy sentences or overused phrases.

None of these programs can find simple (and common) mistakes such as missing commas between items in a list, misuse of the words *I* and *me,* or dangling modifiers. That's because computers aren't smart enough to understand sentences. The programs work much like spelling checkers—they compare text against lists of troublesome words and phrases. So although they can find specific words or phrases that should be avoided because they are sexist, slang, or clichéd, the programs can't find a fraction of the mistakes that an individual is likely to make.

When analyzing writing, some programs calculate the length of sentences and the length of individual words to arrive at a reading level for prose. Others offer statistics on the lengthiest word used, the lengthiest sentence, or the number of sentences in the longest paragraph. While statistics like these *might* provide you with interesting facts about your writing ability, they won't turn a poor writer into an effective one.

A Clear Choice

Some types of products such as spelling checkers and outliners may present several good choices. Your final decision will be based on personal preference or price. For other types of products, the choice is clear. Here's our list of clear winners and losers.

Grammar Checkers	Company	Price
Doug Clapp's Word Tools 1.02	Aegis Development	$79.95
MacProof 3.0	Lexpertise, U.S.A.	$195
Sensible Grammar 1.1d	Sensible Software	$99.95

None of these programs lives up to its promises. Just don't bother.

Bibliographic Databases	Company	Price
Publish or Perish 2.52	Park Row	$49.95
EndNote 1.0	Niles & Associates	$129
Pro-Cite	Personal Bibliographic Software	$395

Well, we liked everything in this category—all for different reasons. Get Publish or Perish for the high school set; it's easy, cheap, and provides the basics. EndNote and Pro-Cite go nose-to-nose for the professional researcher crowd. EndNote is easier, works with some word processors, and supports superscripts and subscripts. Pro-Cite has more high-end data sorting and author handling capabilities, but is harder to learn and use.

String Search	Company	Price
Gofer	Microlytics	$79.95
RoundUp 3.0	Virginia Systems	$49.95
Sonar 4.7	Virginia Systems	$295
Sonar Professional 1.0	Virginia Systems	$795

Gofer gets our vote —it's a DA, and it searches as much or as little as you like without requiring irksome setup procedures. What's more, it's a heck of a lot cheaper than any other such product except the underpowered RoundUp.

Mathematical Expression Editors	Company	Price
Expressionist 2.0	Allan Bonadio Associates	$129.95
MacEqn 2.03	Software for Recognition Technologies	$49.95
MathType 1.53	Design Science	$149

For a long time, all of these products had major shortcomings. The Expressionist upgrade, however, has left the others in the dust.

Goodies You Can't Be Without	Company	Price
Comment 2.0	Deneba	$99.95
Macro Programs		
Tempo II	Affinity Microsystems	$149.95
QuicKeys	CE Software	$99.95
AutoMac II	Genesis Micro Software	$79.95
WorksPlus Command	Lundeen & Associates	$99.95
MacroMaker	Included in Apple System 6.0	
F1F4	shareware	
McSink 4.4	Preferred Software	$30
TopDesk 3.0	Cortland Computer	$59.95
QuickWord II	EnterSet	$149.95

If you need the capabilities these programs provide, then look no further—these are as good as it gets.

Spelling Checkers

Product	Graham Speller 1.1	Liberty Spell II	Lookup 1.0c	Spell Coach Professional 3.1	Spelling Champion 3	Spellswell 2.0	Thunder 1.1	WorksPlus Spell 1.1A3
Company	Graham Software	DataPak Software	Working Software	Deneba Software	Champion Swiftware	Working Software	Electronic Arts	Lundeen & Associates
Price	$44.95	$49	$49.95	$195	$39.95	$74.95	$49.95	$79.95
Dictionary size in words	75,000	30,000	93,000[1]	173,000[2]	126,052	93,000[1]	50,000	73,000
Customizable dictionary	•	•		•	•	•	•	•
View main dictionary	•	•	•	•	•	•		•
Interactive mode	•	•	•	•			•	•
Checks	•	•		•	•	•	•	•
whole document	•	•	one word	•			•	•
selected sections				•		optional	•	
punctuation				•	•	optional	•	•
capitalization				•		optional	•	
doubled words				•		optional	•	•
spacing	•		•	•	•	•	•	•
suggests alternate	•	•	•	•	•	•	•	•
skips word	•	•	•	•	•	•	•	•
replaces	•	•	•	•	•	•	•	•
edits word in checker	•	•	•	•	•	•	•	•
Shows word in context			•			•		
Wildcard guess	•			•				
Includes thesaurus	•	•	•	•	•	•	•	•
Saves formatting/caps	•	•	•		•	optional	•	•
Treats hyphens as spaces				•	•	•	•	•
Global skip				•		•	•	
Global replace	all major word processors	all major word processors	all major word processors	all major word processors	all major word processors	all major word processors	all major word processors	Works
Compatible software			medical, legal	medical, legal (included)		medical, legal		
Auxiliary dictionaries								

[1] 105,000-word dictionary $14.95.
[2] Includes medical, legal, and technical modules.

In short, take a basic writing class—your time and money will be better spent.

Bibliographic Databases

If your research frequently requires you to accurately track references, a bibliography program is the best investment you can make. These programs come with predefined fields for entering information about each resource you use and for entering lengthy notes. When you are ready to create a bibliography, you choose a style and the program automatically formats the reference information.

Like general database management programs, bibliographic databases vary in the amount of control they provide over data entry and output. A simple program such as Publish or Perish comes with only 2 predesigned styles and offers only 12 information fields, plus a note field. When customizing a style, you can only rearrange the order in which the fields appear. A high-end program such as Pro-Cite supports 20 predefined styles, lets you custom-create 6, and includes 45 different information fields. The program handles complex formatting such as listings for a chapter written by one author that is contained in a book edited by another.

The more complex the program, the more true database capabilities it provides, such as multilevel sorts, searches, and date and author management. Publish or Perish displays author names as you type them. If you enter Alfred J. Robertson and Jane Sommers in the author field, you cannot force the program to format the names as Robertson, A.J. and J. Sommers. EndNote

can take an entry and format it as you type it, with first-name initials, with the last name first or the first name first, or any combination of ways (for a more detailed look at EndNote, See Reviews in this issue). Pro-Cite goes one step further by enabling you to give each author a type (compiler, editor, translator, programmer), a descriptor (inventor, actor), and an affiliation (department or division). You can then apply different formatting rules to each type of author.

This may sound very simple, but it can quickly get tricky. With EndNote, if you enter an author's last name first but forget to use a comma to separate it from the first name, EndNote treats the last name as though it were the first name. Pro-Cite can be even trickier since it punctuates data as it formats it. If you want to enter information into the Edition field, you must enter **3rd** in order to get "3rd ed." If you enter **3rd ed.** you'll get "3rd ed. ed." on the printout.

Although all of the programs can create text-only files, only EndNote works directly with MacWrite, WriteNow, and Word. You place references in the text as you write, and EndNote creates a bibliography based on the references. Pro-Cite requires you to work on the bibliography separately from the paper. Fortunately, both products let you change fonts and add styling such as boldface or underlining.

A couple of other features can make or break a product for a professional researcher. Someone who refers to a lot of scientific papers needs subscripts and superscripts. Researchers who use online databases such as Dialog will want to download references either directly into the bibliographic database or into another package that can transfer the information into the database. By doing this, the researcher can format the bibliographic information so that it is easy to read (for instance, getting rid of online communications garbage and sorting references to eliminate duplicates).

Even with these programs, you must proofread the bibliography to catch data entry goofs. Still, bibliographic databases offer huge improvements over manually formatting references. Research data is stored in one place and the bibliographic formatting is consistent. Just be sure the program you use offers the right amount of complexity. Programs with limited data entry and output options work fine for high school term papers, but professional researchers need more flexibility and database functions.

String Search

Mass storage usually means mass disorganization. Several programs can help you sort through your hard disk sectors to find strings of text buried deep within documents. These programs work like the search feature in a word processor, except they can search across multiple documents for a single word, a phrase, or a set of characters. They all claim to be accurate and fast, and so they are, but only if you measure accuracy by the number of words found in a particular search, and speed by how quickly the program buzzes through a document.

All the programs search text quickly. For instance, Gofer searches most files at 1MB per minute; Sonar flies through them at 15,000 pages a minute on a Mac II. But a program's ability to narrow a search determines how much time it takes to pinpoint a file. Gofer lets you start a search in any specific file or folder and searches from that point down to the bottom of the hierarchy. You can further narrow the search by choosing folders and files to search based on their name, size, kind, or date. In contrast, RoundUp forces you to search files even if you know the text you want is not in them. You select a file within a folder and RoundUp searches the file, its folder, and all of that folder's subfolders. And, although Gofer lets you search for any text string on your disk, Sonar and RoundUp support only eight file formats (mostly word processor formats) as well as text-only.

The more complex the search is, the more accurate it will be. Gofer and Sonar can do complex searches using "and/or/not" and can specify that certain words must be found within a certain number of words or lines of each other. Instead of searching for all occurrences of *computer*, you can search for all occurrences of *computer* and *Macintosh* but not of *IBM* in order to find documents that deal solely with the Mac. Compound searches are tough to master, but eliminate a lot of false leads.

It doesn't matter how fast or flexible a program is, however, if it can't display or save the results in a useful way. All programs display the strings that are found in context, along with a listing of the text's folder location. Gofer lets you write the resulting strings to a text file that includes the name of the file the text was found in, the folder hierarchy, and the line number location of the find. Sonar prints its results and can create an index either of all the words in a document or of words that appear in a specified percentage of paragraphs. Both programs also let you add text to the Clipboard without erasing previously added text. RoundUp doesn't let you do anything with finds other than view them.

Although Sonar and Gofer offer many identical features, Sonar has special abilities that let you search for several phrases at once and also trace indirect relationships between files. But Gofer still comes up the

Outliners

	Built-In					Stand-Alone	
Product	**FullWrite 1.0**	**MindWrite 2.0**	**Word 3.02**	**WordPerfect 1.0.1**	**WriteNow 1.0**	**Acta**	**Inspiration 1.0**
Company	Ashton-Tate	Access Technology	Microsoft	WordPerfect	T/Maker	Symmetry Corporation	Ceres Software
Price	$395	$195	$395	$395	$195	$79	$175
Desk accessory						•	
Max. characters per line	unlimited	unlimited	unlimited	unlimited	unlimited	unlimited	unlimited
Word wraps headings	•	•	•	•	•	•	•
Separate text window	comment notes						•
Control of fonts	by character	by character		by character	by character	by level	by level
Control of styling	by character	by character		by character	by character	by level	by level
Style sheets	•				equivalents		
Supports graphics	•	•	•	•	•	•	
Drawing tools							•
Table of contents	•	•	•	not from outliner			
Calculations							
Prints numbering styles	6+ user defined	3 + user defined	2+ user defined	3+ user defined		5	6
Displays numbering styles	•	•	•	•	n/a		
Prints portion of outline	•	•	•	•	•[2]	•	•
Exports outlines	MacWrite, text	Word, ThinkTank, MacWrite, Acta, text	Word 1.0, RTF, MacWrite, text	Word, text	MacWrite, RTF, text	MacWrite, text	Word, MacWrite, More, ThinkTank, text

[1]Levels must be one font and style; notes can be any font and style.

[2] User can print any range of pages.

winner, because Sonar's special features are overshadowed by a few bothersome quirks: you must select the files that you want to search and then wait while Sonar creates a directory with information on the files. Each time you change a file, you must redo this set-up. More than just being a bother, the directories take up disk space, using anywhere from 40 to 130 percent of the size of the original document. Gofer, a desk accessory, is handy, simple, and takes little disk space.

Mathematical Expression Editors

It'll be a dark day in San Diego before word processors handle specialized mathematical needs. If you frequently use equations in your writing, you'll find that expression editors provide a fast, easy way to create properly positioned symbols and that learning all the commands is more efficient than proofreading typeset notation. Expression editors provide a way to edit a specialized graphic—that is, the equation—and then insert it into word processor documents.

Of the three programs available for creating expressions, Expressionist 2.0 is exemplary. A desk accessory, Expressionist offers a large library of symbols ranging from Greek symbols to horizontal braces and double vertical bars. You place these symbols into the DA, position them precisely, and then cut and paste the expression into a word processor document. Later you can move the expression back into Expressionist for editing.

Expressionist has other features that make creating expressions very convenient. A group of characters, such as a number and its subscript, is called a *composite.* Expressionist outlines each composite, making it easier to view the structure of a complex expression. The program also includes forms, which are similar to templates, for creating structures such as tensor notation and tree nodes. Another handy feature lets you save expression structures in a library for later use.

More 1.11c	SideKick for the Mac 2.0	ThinkTank Mac
Symantec Corporation	Borland International	Symantec Corporation
$295	$99.95	$195
	•	
127	250	127
•	•	•
by level	by level[1]	by outline
by character	by level[1]	by level
•	•	•
•		•
•	in SideKick	•
6	4	6
•	•	•
ThinkTank	text-only format	Word, MacWrite, text

Miscellaneous

What about all those oddball products that don't fit into a particular category? Only a few rate a place in every Mac's memory. Others, such as foreign language and scientific fonts, offer very specific capabilities for not-so-typical users.

At the top of the Everyone Needs One of These list is a $30 shareware desk accessory called McSink (yes, it's spelled right—the creators took the generic approach for some odd reason). Appropriately named, this little program lets you fix almost any formatting problem a document, or a portion of a document, may have. For instance, McSink can capitalize all words that appear at the beginning of sentences, indent or unindent paragraphs, reverse lower- and upper-case, convert tabs to spaces or spaces to tabs, add or strip line numbers and line feeds, and count the number of words, lines, and paragraphs. That's only a partial list.

Now for the bad news. You'll lose the formatting in any edited selection. Because I have simple formatting needs, however, it's much quicker for me to redo lost formatting than it is to spend time, say, changing an article that was typed in all uppercase letters to the standard lowercase/uppercase mixture. Although you might not use McSink every day, it's cheap and the one time you need it, you'll be glad it's there.

Comment, a desk accessory I use more frequently than McSink, functions like an electronic pad of Post-it notes (see Reviews in this issue for a more in-depth analysis of Comment). You use it to attach notes to any word, phrase, sentence, paragraph, or to an entire document. The notes stay hidden until you scroll through a document, holding down the Option key. When you stop scrolling, all notes attached to any visible text appear. This particular feature is handy for making notes to yourself, for instance, to check a fact or tell someone about an event—this use is really like an interactive to-do list.

Needles in a Haystack

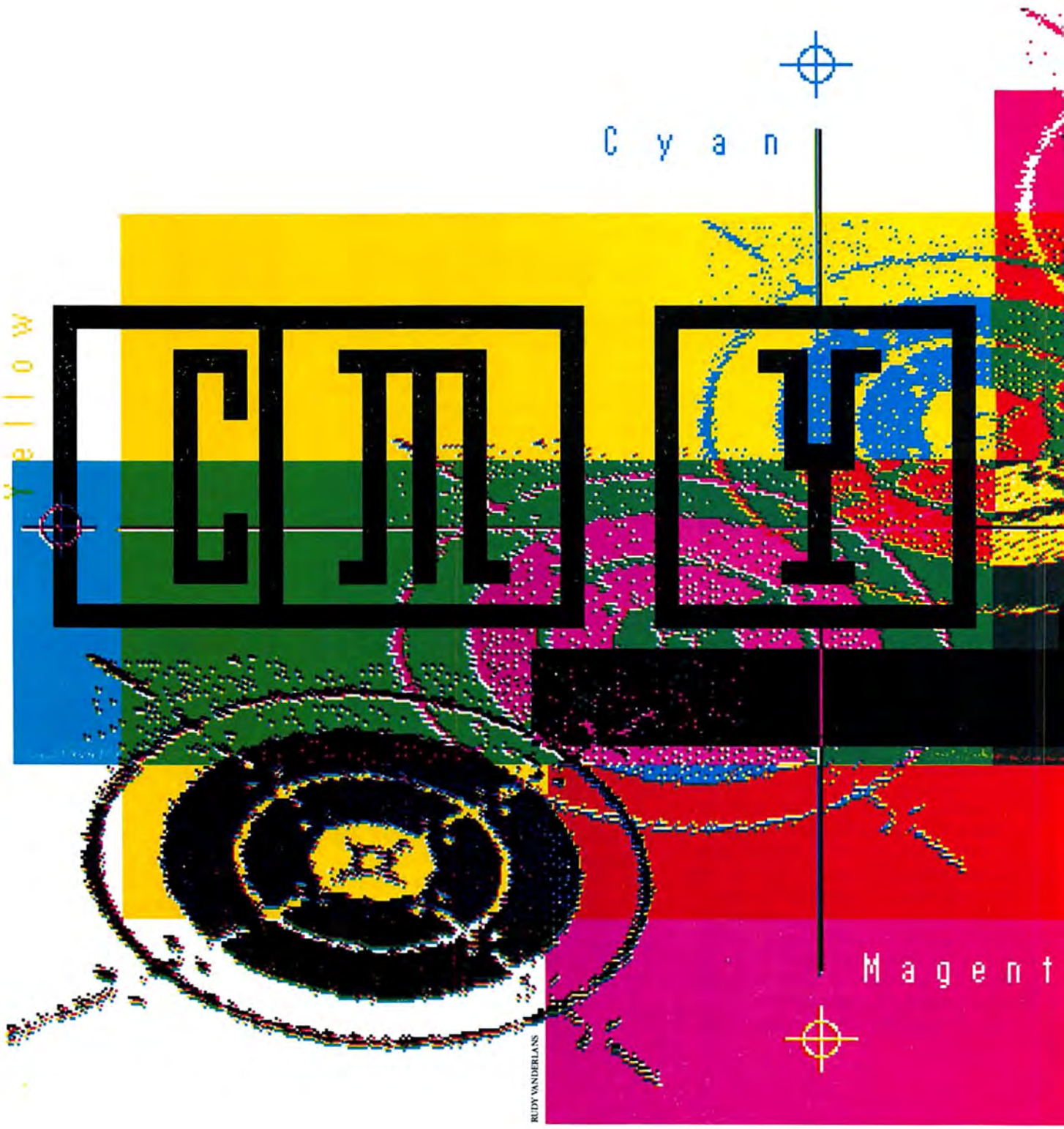
String search utilities can help you find the latest revision of an article or collect all files that contain information on a certain subject. Gofer lets you define simple searches (search for Gofer *in all files) or complex searches (search for* Gofer *but not* Mac *in all Word files in the Editing folder). The program then displays the strings it finds and lists the location of files containing the strings.*

Although Comment can be used for group editing—for instance, allowing several people to comment on a document—I've found that face-to-face communication or paper notes work better. One company, Mainstay, plans to release a product called Mark Up that is specifically designed for group editing. The product, which contains many more features for group editing than Comment, has generated a lot of excitement. Still, just how far Mark Up can go in replacing traditional methods remains to be seen.

A few other small but handy products include word-count and statistics programs that you can get from online services or your local user group. TopDesk contains a hodgepodge of utilities including one that lets you view up to eight MacWrite documents at a time. You can't edit these documents but you can cut and paste them into an already open document. Another utility in TopDesk lets you assign abbreviations to represent strings of text up to 255 characters long. When you type the abbreviation, the program immediately substitutes the complete phrase. A different program, QuickWord, also creates a glossary of abbreviations.

Most of these products work with software other than just a word processor. Likewise, you can find numerous general-use products that make your text chores more efficient, including macro programs such as Tempo, QuicKeys, or the MacroMaker in System 6.0. Many jobs, however, require electronic equivalents of traditional writing tools, such as dictionaries, grammar and style guides, and note cards. While word processors can substitute for typewriters, most can't take on additional duties. Some add-on tools, such as outliners and bibliographic databases, are ready for the electronic age. Others, such as spelling and grammar checkers, have yet to prove more valuable than a ninth-grade English book. □

See *Where to Buy* for contact information.


Cyan
Yellow
C M Y
Magent
RUDY VANDERLANS

Color Separation Explained

The ABCs of CMYK: Part one of a two-part series.

by Steve Roth

When the Macintosh II arrived on the scene, print publishers took a look, goggled with everyone else at the glorious color screen images, and asked the obvious question: How do I get those colors into print? Along came color printers, which were great for some things but no help at all for publishing. The problem of reproducing screen colors in the real world of publishing—on offset presses—remained.

Color print publishers want the same things from the Macintosh that black-and-white desktop publishers have already achieved: flexibility, control, and economy. They want to be able to see color documents on screen, modify them, and output the results on high-quality devices, ready for the printer. Since the price of color publishing is high, the possible economies are great. Color publishers have anxiously awaited the day when they can pay $50 for four pieces of Linotronic film, instead of $200 to $300 to have a color separator separate a color image.

For some color publishers, that day is here. Software tools available right now—Illustrator 88, Aldus FreeHand, LaserPaint Color II, and several color paint programs—do a creditable job of separating full-color

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Steve Roth is the editor of Real World PostScript *(Addison-Wesley, 1988) and the former editor of* Personal Publishing Magazine.

illustrations. With QuarkXPress 2.0, you can even build full-color pages and produce output that a printer can use as is to print a color publication. Using these programs you can bypass several steps traditionally relegated to specialists.

Not surprisingly, you can also make a mess of things. Those specialists are there for a reason, and bypassing them puts all the responsibility on your shoulders. The same is true with black-and-white publishing, but color adds a layer of complexity that many will find daunting.

As is so often the case when the computer moves into a new application, taking advantage of the Mac's color separation capabilities requires that users acquire a whole new body of knowledge. You need to know quite a bit about the printing process to use color publishing tools effectively; there is a vocabulary to learn, and there are a number of distinctions to understand.

Separations and Overlays

One of the biggest distinctions is between color *separations* and *overlays.*

Publishers typically use overlays when they require only one or two colors. For example, if you want red headlines and subheads in an otherwise black document, you can achieve this by creating two pieces of film for each page—one overlay for the red elements, and one for the black ones. Your printer (the person) will turn the film into separate printing plates, one each for red and black ink.

When you're working with this type of color, it doesn't matter what colors you see on screen, since the overlays you print out from your laser printer or phototypesetting machine will all be black. You choose the colors you want by number from a book of Pantone Matching System (PMS) inks, and the colors make their appearance only on press.

When you want more than a few colors, you need to use process color separations. The process color inks are cyan, magenta, yellow, and black (CMYK). By *screening* the process colors—turning them into halftones—and overlaying the screens, you can produce virtually any color you want (aside from those that require special inks, such as gold and silver). If you look under a magnifying glass at any of the color photographs in this magazine, you'll see that the process color dots are grouped in small clusters. To create these *rosettes,* it's necessary that each of the process color halftones have its dots arranged at a different, precisely calculated angle. If the halftone dots aren't angled properly in each layer, the layers won't combine correctly, and distracting patterns known as *moirés* will result. (For a more detailed introduction to basic process color theory, see "Beyond Black and White," *Macworld,* November 1987.)

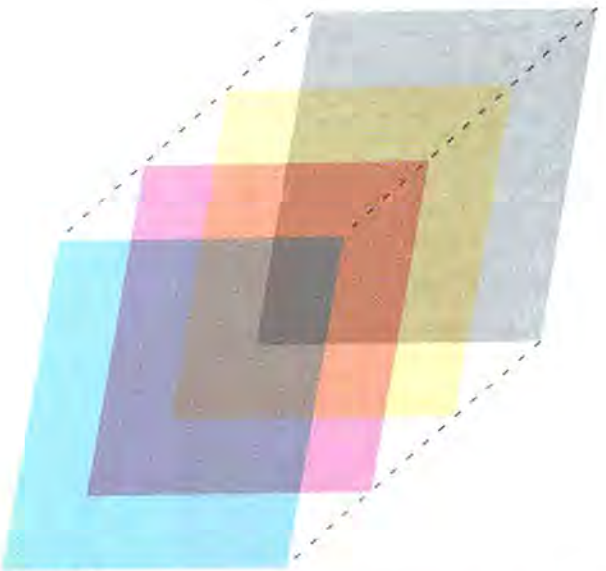


Figure 1

Building a tint. By combining different percentages of the four process inks (here 40 percent each), you can create an almost infinite variety of colors. This figure was created in Illustrator 88.

Several programs on the market state that they produce color separations when all they really produce is overlays. The program vendors can get away with this claim because printing terminology in this area is confusing. Overlays are often called *spot color,* or *mechanical,* separations. For the purpose of this article, I'll try to avoid those terms.

Separations and Tint Builds

Given that you can create this incredible variety of colors from the four printers' inks, the next question is, how to go about it? What types of color images can you separate with Macintosh software, and how do you do it?

As is always the case, the Mac graphics world is split into two camps, *bitmaps* and *objects.* Bitmapped images exist in the computer as patterns of dots. Images created with *paint* programs are bitmaps, as are images captured with scanners. Bitmaps can be black and white, as with the venerable MacPaint, or each dot can have a color or gray value, like the images produced by PixelPaint or ImageStudio.

Object-oriented art, on the other hand, is made up of (surprise, surprise) objects—circles, squares, curves, polygons. When you draw with an object-oriented program, the software uses mathematical descriptions, not dot locations, to record your designs. You create object-oriented images with *drawing,* as opposed to painting, programs. MacDraw is the original Mac drawing program, but the most popular color drawing programs now are Adobe Illustrator 88 and Aldus FreeHand.

It's possible right now to get very good results separating object-oriented graphics. That's because the colors in object graphics are, in printing parlance, *tint builds*. A tint build is simply a color that's been "built" by combining percentages of two or more process colors (see Figure 1). In Illustrator or FreeHand, for example, you would build purple by specifying a fill that combines 40 percent cyan and 100 percent magenta (40C/100M).

Separating a tint-built image is relatively straightforward because the software has little to do except print out the separate layers. You, the human, have already done most of the work, specifying the process color percentages for all of the colors you want in your drawing.

In addition to Illustrator and Freehand, the other players in this field are QuarkXPress 2.0 and LaserPaint Color II. XPress isn't a drawing program, but it does enable you to color type and import black-and-white bitmap graphics, and to draw and color lines, boxes, and other simple elements. The program can import Illustrator graphics and separate an entire color page at once. Laserware's LaserPaint is constantly derided for its obtuse interface, but nevertheless its ability to separate a wide variety of color files, including PICT2 color images—both objects and bitmaps—is outstanding.

Bitmaps and Scanned Images

When you get into color bitmaps, separations aren't so easy. LaserPaint, SuperMac's PixelPaint Professional, and Computer Friends' Modern Artist 2.0 can separate paint images and screen shots with relatively good results, although the colors that come out are often different from what you expected. The results when using these programs to separate scanned photographs, however, are far less satisfactory. The final prints are not as sharp or as vivid as separations created with high-end, dedicated color-separation systems. They may be useful for some purposes, but not for high-quality publications. Because of the nature of bitmapped images, separated color scans are also more prone to moiré patterns than object-oriented images are.

As I write this, a new generation of programs is coming to market with features designed to provide high-quality separations of color scans. Part II of this article (next month) will include tests made with prerelease versions of Avalon Software's PhotoMac and Prepress Technologies' SpectrePrint.

Color Correspondence

When you are specifying and viewing colors on the Macintosh, it's important to remember that the colors you see on screen are different from those that will come off the printing press. Even with Illustrator 88, which lets you adjust screen colors to more closely match the printed results, it's impossible to get real color correspondence. The screen simply can't produce the colors that an offset press can, and vice versa. If you are blessed with a 24-bit display board, your on-screen and printed colors will match more closely, but they still won't be the same.

Given this, how do you know what the printed image will look like? The first answer is that you must spec all your colors from a printed color chart. Most printers will provide you with one, or you can pick up a book like *Graphics Master 4* (Dean Lem Associates, 1988), which includes charts of process color combinations printed on coated and uncoated stocks. You choose your color from the chart, key in the CMYK specifications, and the color that shows on screen simply serves to remind you of what color you've put where.

Since the on-screen colors aren't the same as the printed colors anyway, it's possible to create color object graphics on a black-and-white display. In black-and-white mode, most programs use patterns to represent the different colors you've specified. A color display does help you visualize color images, however.

The second step to ensuring that colors print properly is to have a color proofing copy of the separations made before going to press. There are various proofing systems—*Cromalins* and *Matchprints* are two popular ones. The color correspondence between proofs and printed results is still not perfect, but proofs are much more accurate than screen images. Color printers—even the QMS ColorScript color PostScript printer—are unacceptable for color proofing.

Figure 2

Several color swatches created with Illustrator 88 and separated with Adobe Separator. The swatches in which moirés are apparent are those that contain a significant percentage of black.

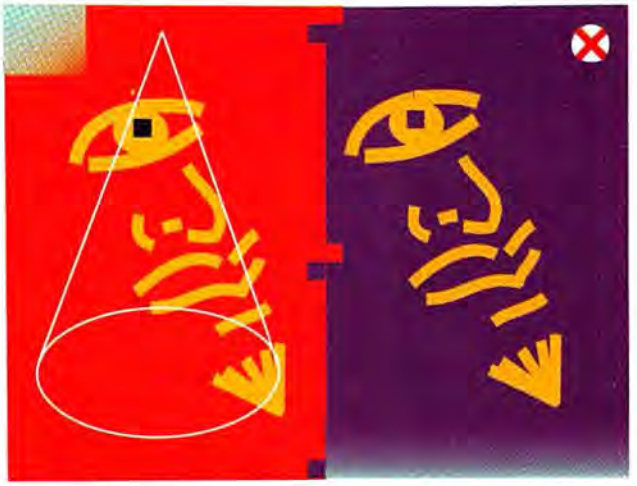


Figure 3
The moiré patterns that result from improper screen angles. This was created with FreeHand, a program that makes it easy to adjust the angles, even when it's a bad idea.

In addition to letting you check colors, professionally generated color proofs are useful for catching many of the demons that love to find their way into printed color separations.

Moiré Is Not Better

Among the little devils that may crop up in a printed image but that don't appear on your Mac screen, first and foremost are moirés—the interference patterns that result from improperly overlapping halftone screens (see Figures 2 and 3).

While moirés can appear just about anywhere, there are some things you can do to avoid them, or to get rid of them if they do show up. Moirés most often make an appearance

- in areas of graduated color (*fountains,* or *ramps*);
- in scanned images; and
- in areas that include a significant percentage of black.

We've already discussed scanned images, and the problems of fountains are discussed more fully below. As for black, the rule is simple: avoid it. Since black is the darkest ink and the color most apparent to the eye, moiré patterns generated by the black separation will likewise be more apparent. You can use black in your process colors, but keep to small percentages—particularly in fountains.

If you do run into moirés, the most likely culprit is your output device. It's a little-known fact that digital printing devices don't always deliver halftones at the angle and frequency specified by the user. Some combinations simply aren't mathematically possible. The higher the resolution of the device, the more likely you are to get your request, but even a 2540-dots-per-inch (dpi) Linotronic 300 frequently makes substitutions.

When a PostScript output device does substitute, it simply tries for the best approximation of your angle/frequency request. Since each of the layers in a separation has a different angle, you can end up with separations of varying frequencies—not good at all. (Shifting frequencies is a faster route to moirés than the slight angle shifts that also occur.)

So what can you do? To maximize your chances of getting good halftones the first time, always output on a Linotronic 300, and stick to coarser halftone screens—120 lines per inch (lpi) or less. Table 1 shows a representative sample of frequency/angle combinations on a Linotronic 300 at 2540 dpi, at some typical halftone frequencies. By using these figures, you can avoid impossible frequency/angle combinations that cause PostScript to improvise. For a PostScript program that will determine the possible combinations for PostScript devices at any resolution, see Chapter 10 of *Real World PostScript* (Addison-Wesley, 1988).

If you follow the advice in this article, many—maybe even most—of your separations will come out without moirés the first time. If you do get patterning, try shifting the angles for all four colors by 5 degrees, though it's possible this might just shift the moirés to other areas of your graphic.

Fountains and Banding

Whatever you call them—fountains, ramps, or gradients—one of the most difficult things to separate properly is a smooth change from one color to another, as in a rainbow. The more intermediate steps you have between colors, the smoother the effect. If you have only a few intermediate colors, the result is distinct banding as you move from one color to the next—like the rainbow decals in people's car windows, instead of the real thing (see Figure 5).

Because of the way digital printing devices make halftones, the coarser your screen and the more resolution your printing device has, the more shades a halftone can represent (see "Shades of Gray," *Macworld,* January 1988, for a good explanation of why this is true). The more shades you have, the smoother your gradients. This is another good reason to use the highest-resolution output device available—ideally, a Linotronic 300 at 2540 dpi—and to stick with halftone screens of 120 lpi or less.

The other rule for creating good-looking fountains is a familiar one: keep it simple. You can improve the appearance of your fountains if the colors you're blending are reasonably similar and don't include all four process colors, and if the fountains cover a relatively small area. If you start a blend with a bright green (100C/100Y) in one corner of a page, and blend down to a ruby red (100M/30K) in the opposite corner, you are almost certain to get noticeable banding, especially with finer halftone screens. If you just want to fill a two-inch square with a blend from red (100M/40Y) to yellow (100Y), you should have better luck. Size of the blend area is important because the larger the area, the wider and more noticeable the bands are liable to be.

And, once again, avoid black. Since it is the darkest color, it makes any banding more apparent.

Caught in a Trap

One problem that won't show up on screen or on a proof is the result of misregistration of the process layers. No press is perfect, so the four process colors may not be perfectly overlaid. When two colors are supposed to butt up against each other, slight misalignments may produce a thin white line between them.

The solution is to *trap* that white area by overlapping the two adjoining colors. Here's a simple example of how you can create traps in object-oriented drawings (see Figure 6). If you have a yellow circle (50Y) lying on top of a cyan square (50C), specify a one-point stroke for the circle with both yellow and cyan (50Y/50C). While that one-point circle will come off press as green, it will be almost invisible. A white line, on the other hand, is visible at a glance.

In more complicated illustrations, trapping gets more difficult. Suppose your yellow circle overlaps the cyan box by only half. To use Illustrator 88 terminology, you need to "mask" the trap stroke so that it only appears inside the cyan square. This requires that you create a separate object for the stroke, and mask it (or *clip* it, in PostScript terminology). You can achieve the same effect with FreeHand using the Paste Inside feature.

If this example seems complicated, it is. Manually trapping complex images is no fun. Few designers will want to take the time or go through the mental gymnastics. Though software developers are working on automatic trapping, the current crop of programs forces you either to do it yourself, or to skip it.

Bear in mind that you don't have to create traps if abutting objects share some significant percentage (about 20 percent) of a process color. If you are working in QuarkXPress, for instance, and want to place a purple sidebar (100M/50C) on top of your pink page (50M), you don't need to trap the sidebar box, because both colors have magenta in them. Any misregistration will result in a magenta area between the two objects —far less of a problem than a white line.

And speaking of white lines, what about white lines that you do want? The answer: forget it unless they're at least one point in width. If you try for less, any misregistration on press will result in a line that is cyan, magenta, yellow, or gray—not white.

Registration is also important when you work with colored or white (*knocked-out*) type on a colored background. With Illustrator, you can trap the colored type on a colored background by specifying the color and width of the type outline stroke, but this works well only for large type. With small type, a wide outline stroke will fill in all the gaps in the letters—the hole, for instance, in the lowercase *a*.

Small type in general requires special handling, but fine, serif faces suffer the most when you're working with process color. Slight misregistrations can make those serifs fuzzy. Try sticking to one solid color, or use a large percentage of a dominant color—cyan or magenta—with a smaller percentage of one other. And keep the background color light—30 percent or less. As usual, watch out for black mixed with other colors, since it makes misregistration more apparent.

If you want knocked-out white type on a colored background, go for large percentages (70 percent or more) of a single dominant color, perhaps with a small

What You Get

Requested		Actual		Requested		Actual		Requested		Actual		Requested		Actual	
Freq. (lpi)	Ang.	Freq. (lpi)	Ang.	Freq. (lpi)	Ang.	Freq. (lpi)	Ang.	Freq. (lpi)	Ang.	Freq. (lpi)	Ang.	Freq. (lpi)	Ang.	Freq. (lpi)	Ang.
100	0°	101.6	0°	120	0°	121.0	0°	133	0°	133.7	0°	150	0°	149.4	0°
	5°	101.6	0°		5°	119.7	8°		5°	133.7	0°		5°	149.4	0°
	10°	99.6	11°		10°	119.7	8°		10°	137.8	13°		10°	154.0	14°
	15°	102.7	14°		15°	123.2	14°		15°	133.9	18°		15°	154.0	14°
	20°	100.4	18°		20°	117.9	22°		20°	133.9	18°		20°	148.6	21°
	25°	103.3	27°		25°	123.4	29°		25°	133.9	18°		25°	148.6	21°
	30°	103.3	27°		30°	123.4	29°		30°	134.6	32°		30°	157.5	30°
	35°	100.6	34°		35°	117.4	34°		35°	134.6	32°		35°	147.6	36°
	40°	99.2	39°		40°	127.0	37°		40°	132.2	39°		40°	147.6	36°
	45°	99.8	45°		45°	119.7	45°		45°	128.3	45°		45°	149.7	45°

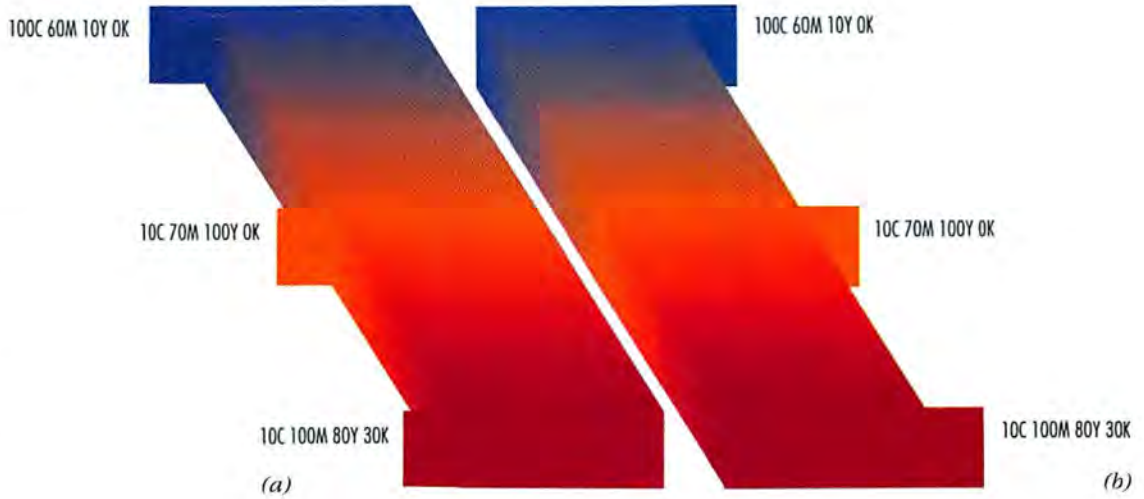


Figure 4
Similar images showing color blends created in FreeHand (a) and Illustrator(b). Both start with 10C/100M/80Y/30K. They blend through 10C/70M/100Y/0K to 100C/60M/70Y/0K. Especially note the area near the bottom, which includes a significant percentage of black.

percentage of one other color, and avoid small type with fine serifs.

If you are creating spot color overlays and printing with PMS inks, you can use a technique called *overprinting* and avoid the trapping issue by paying your printer to do it. FreeHand lets you specify that any spot color should overprint, which means that "underlapping" areas of PMS-colored objects won't be knocked out. Every object in that color will print in its entirety. You can give the color overlays to your printer and let him or her do the knockouts, creating the traps photographically as appropriate for the press. With the Illustrator/Separator combination, you can achieve the same effect by specifying overprint for every fill or stroke.

Separator offers one more feature that makes it easy to trap black-outline, comic book–type art: it automatically overprints any solid black object. If Separator finds 100 percent black areas, it will print the black ink right over the top of any underlying inks.

Is Black Black?

This overprinting of black raises another point: not all blacks are the same. Black printed with 100 percent black ink alone looks different than black that's mixed with the other colors. The plain black is not as rich or glossy. If a 100 percent black object partially overlaps a colored object and overprints, it will be glossy where it overprints, and dull where it prints by itself.

To solve the problem of uneven blacks, add a bit of the other three colors to black areas. Try using 30C/30Y/30M/100K. Some people just add 30C to their blacks, which avoids the problem of too much ink on the page. With thin black lines, it's not as important to add the extra colors, but with large black areas, it makes a big difference. You do have to be careful, though, to avoid specifying too much color.

Too Much Color

Yes, you heard right—too much color. Macintosh users who have suffered for years with black and white may think there's no such thing, but when you're printing offset, there definitely is. If you specify 100 percent of all four colors in an area, you end up with some very wet paper on press. Ink from one printing cylinder can be transferred to the next one, the later-printed inks may have trouble adhering to the wet paper, the job may not dry properly, and there's a good chance the press will tear the work. If you give your printer separations with too much color in an area, he or she will probably refuse to print the job.

The maximum color percentage allowed varies with the press and the type of paper. The recommended standard, Specifications Web Offset Publications (SWOP), created by a printing industry committee, specifies that the total percentage for any spot should not exceed 300 percent, and that only one color should print solid (this is usually black). For newsprint the total percentage allowed is much lower.

There's no reason to specify even a 300 percent color mix, because the result is just black. But when you are producing color separations from scanned photographs or other bitmaps, you don't have the control that you have over total color percentages in drawing programs. You may have an excessively high color percentage in a given area and not even know it. Or if you are using Illustrator 88's Separator utility (which automatically overprints black objects), a black object on top of a colored object may result in an excessive amount of ink in a given area.

The solution to these problems is a process called *undercolor removal* (UCR). This technique removes a certain percentage of the three nonblack colors from areas with too much ink, theoretically resulting in con-

sistent blacks throughout an image. UCR is a common function on high-end separation systems, but it's still in its infancy on the Mac.

LaserPaint implements UCR when creating separations, as do the separation utilities included with PixelPaint Professional and Modern Artist. UCR is also implemented in color correction and photo-retouching programs like Avalon's PhotoMac and Prepress Technologies' SpectrePrint. Separator, FreeHand, and XPress do not provide undercolor removal. You have to specify your colors carefully, especially when using

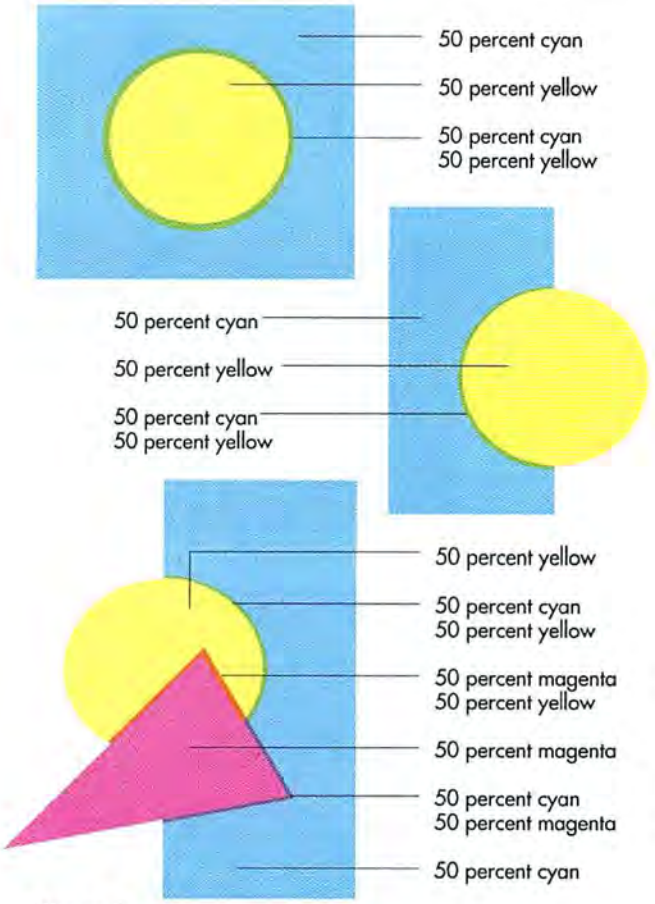


Figure 5

You can stroke objects in a drawing to create traps. Traps solve the problem of white areas appearing due to misregistration of colors on press. These strokes are three points wide, rather than the usual one point, for the sake of clarity. Using LaserPaint's or Illustrator 88's masking feature, or FreeHand's Paste Inside, you can limit the stroke to the areas that need to be trapped. As illustrations get more complex, however, the complexity and difficulty of the trapping increases as well. This illustration was created and separated with FreeHand.

Figure 6

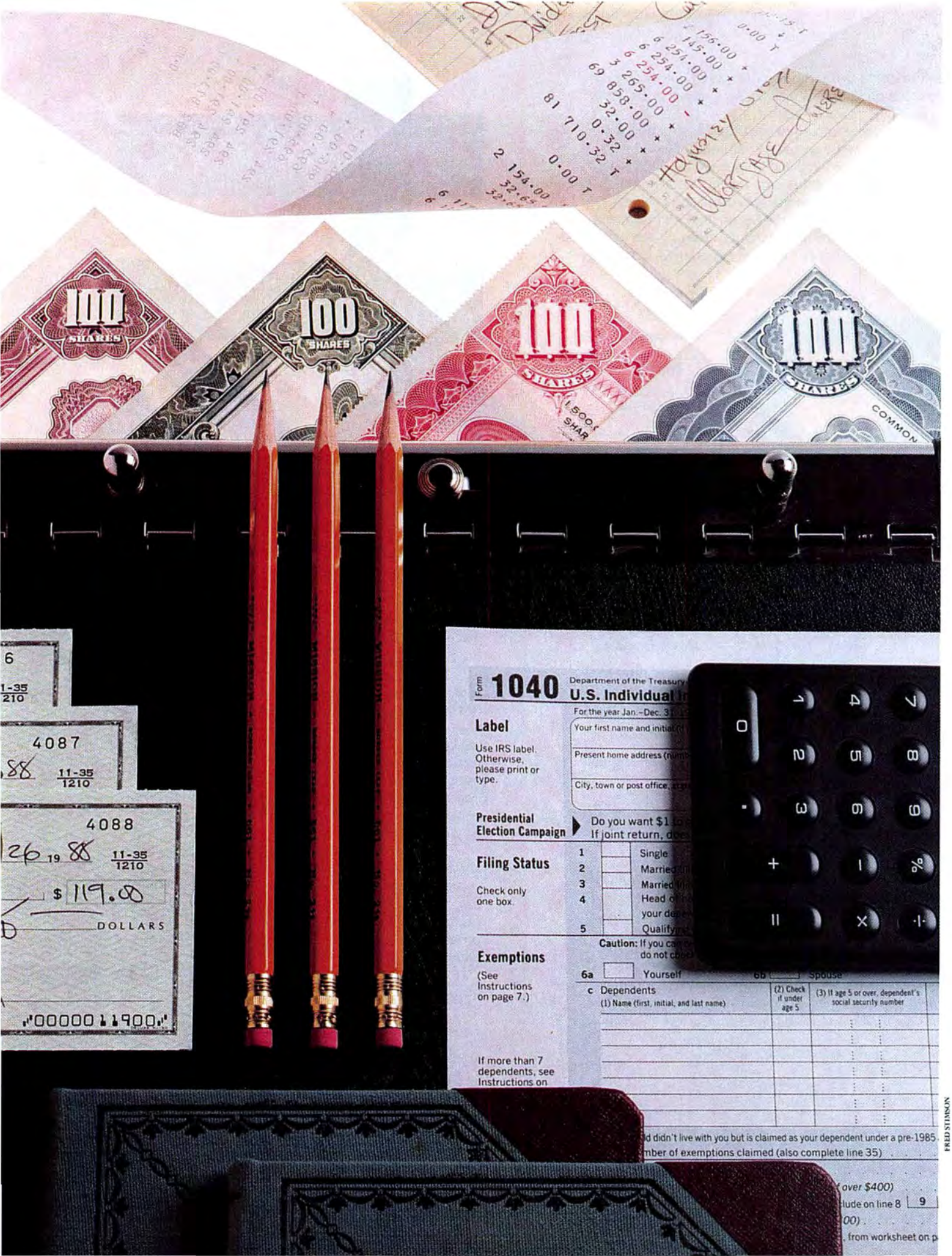
When you overprint black areas on top of colors, the appearance of the black can change. The top bar is 100 percent black (0C/0M/0Y/100K). The bottom bar is 30C/30M/30Y/100K. The underlying bars are 100 percent cyan, magenta, and yellow. Notice how the bottom black bar has a consistent appearance all the way across. Adobe Separator, which was used to create these separations, automatically overprints 100 percent black objects.

overprinting, to avoid excessive amounts of ink in a given area. If you're using Separator, be sure to check the percentages wherever black overlaps a dark color.

Another color correction technique, *gray component replacement* (GCR, also referred to as gray component reduction and gray component enhancement), gives the same consistency to gray areas that UCR provides for blacks. It removes a given amount of cyan, magenta, and/or yellow from gray areas that are produced by combining these three colors, and adds black in their place. Black ink results in a much more consistent gray on press than a combination of the other three colors.

So much for theory. Next month we'll take a look at the Macintosh software on the market for producing color separations from both object-oriented and bit-mapped graphics. We'll also get into the nitty-gritty of pulling separations from Linotronics. The number of programs that produce separations seems to grow daily, so stay tuned for the latest and greatest. □

See *Where to Buy* for contact information.


100 SHARES
100 SHARES
100 SHARES
100 SHARES
COMMON
4087
11-35
1210
4088
11-35
1210
$ 119.00
DOLLARS
Form 1040
U.S. Individual
Label
Use IRS label. Otherwise, please print or type.
Presidential Election Campaign
Filing Status
Check only one box.
Exemptions
(See Instructions on page 7.)
If more than 7 dependents, see Instructions on
FRED STIMSON

Mac-sumizing Your Money

If you can manage your money with a paper-based system, then you'll appreciate the conveniences that financial-management programs offer

by Alan L. Slay

About 15 years ago, my wife and I were very unhappy that we "weren't getting anywhere" financially. Our credit cards were out of control; we were finishing each month in the red; and our economic life was a constant battle to keep from falling off the edge.

After reading a few books on personal-finance management, we created a system for managing our finances as though we were running a business. We kept ledgers and tracked all our expenditures, such as credit card purchases. Before long we were budgeting and planning for savings and investments. Our former economic chaos settled into a routine of writing most checks once a month and keeping our finances under control. Finally, we learned to handle money systematically.

From Paper to Personal Computer

Once you establish a financial routine, you're a natural candidate for automating your personal finances. If you write just a few checks each month, and you receive your income from one source (along with some interest and dividend payments), you have

no great need to automate. If, however, you have two or more checking accounts; three or four credit cards; several investments; you write many checks to pay bills; and you transfer money between checking, savings, and other accounts, you will be able to handle your financial chores more easily with a financial-management program.

When I decided to move my books from paper to a personal computer about five years ago, I had some concerns: could I refer to my electronic check register as easily as I could to my manual one? Could I reconcile my checkbook as easily? Could the liability segment of a program replace my People We Owe binder?

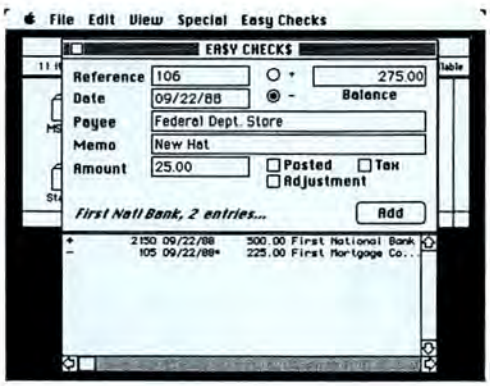
My fears were unfounded. Working with an electronic register is almost the same as working with a checkbook. Tracking credit card purchases and reconciling checks is much easier to do with a computer program than it is to do manually. Assigning expenses to the categories I predefine is much, much easier than manual tracking. And, most important, I can use recurring transactions to automatically write checks to myself (to deposit in my savings account, children's education fund, and investment funds).

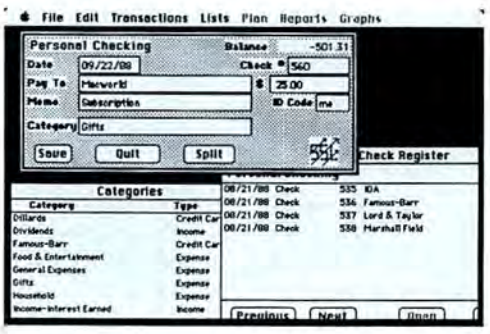
I have reduced the amount of time I spend on my personal finances by using a personal computer. I'm always in control, and I always have a complete picture of my financial situation. Since the software lets me keep information in a central database, at tax preparation time I can print my tax-deductible expenses, saving considerable information-gathering time.

One caution (you've heard this before): *Back up your financial data.* Once you become dependent on electronic management of your personal finances, you should always be prepared for database damage. Although not an every-day occurrence, it will happen. Don't, however, consider a damaged data disk any worse than the harm that can come to manual records (your check register makes a nice doodling pad for a youngster with a crayon). In the past five years I have survived the few disasters that occurred—even when I had problems using my backups. On the whole, the programs themselves contain numerous safeguards, and the vendors I've dealt with provide excellent technical support.

Writing Checks and Deposits

When you write a check or make a deposit in Easy Checks (top), you cannot assign the amount to a category such as rent or auto loan. You can, however, add a memo to the register below the entry form. MacMoney (bottom) allows you to display your check-writing form as well as your check register and category list. MacMoney's screen is similar to those in Dollars and Sense and Managing Your Money.





Three Types of Finance Management

Most personal finance-management programs let you write checks and track how you earn and spend your money. For instance, you can figure out how much you spend on clothing or groceries each month, or how much you owe on different charge cards. You'll learn about managing personal assets, loans and credit, and whether or not your family has a profit or loss for the year. One program, Managing Your Money, goes beyond money management, helping you (under the humorous but enlightening guidance of Andrew Tobias) to start tax, investment, and insurance planning. Many personal finance programs can even replace accounting programs for managing a small business.

Investment programs, such as Wall Street Investor and Profits, help you sort through a variety of options so that you get the best returns in accordance with the risks you take. Unlike general accounting programs, investment programs are dedicated to specific areas such as stocks, bonds, or real estate. If you don't have a basic knowledge of the stock market, you should take a community college class that covers the fundamentals before you use one of these programs. The programs will help you apply these fundamentals to your own investment plans, and they can give you much of the information available to professional investors and money managers. (Remember where you got your start, please, and send me 5 percent of your first million.)

Tax preparation programs calculate income tax; some even print forms that you can submit directly to the IRS. As adjuncts to tax preparation programs, tax planning programs help you plan your finances so that you keep the legal maximum (and the IRS gets the legal minimum) of your hard-earned dollars. These programs can save you a considerable amount of time—possibly halving the time you spend preparing your tax return—and can help you to be more accurate in preparing your taxes.

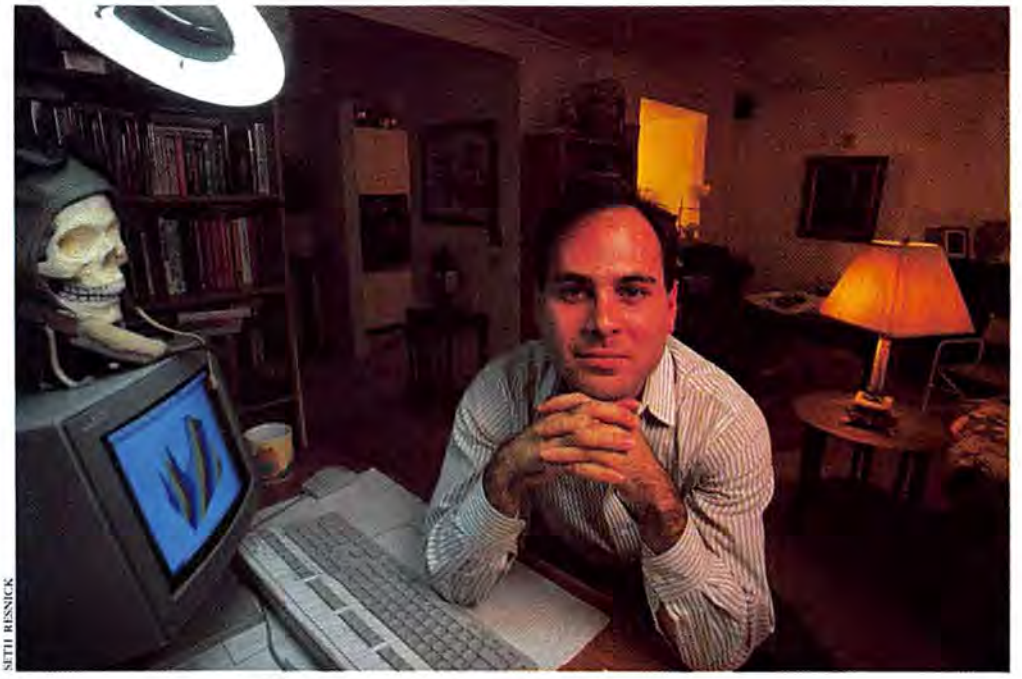
Personal Finance Packages

	Easy Checks 1.0	Quicken 1.0	MacMoney 3.0	Dollars and Sense 4.1	Managing Your Money 1.0	Personal Accountant 2.5
Company	Par Software	Intuit	Survivor Software	Monogram Software	MECA Ventures	Softsync
List price	$39.95	$49.95	$119.95	$149.95	$219	$49.95
Maximum $ entry	$999,999.99	$9,999,999.99	$999,999.99	$999,999,999.99	$9,999,999,999.99	$999,999,999.99
Maximum number transactions	32,000	limited by disk space	3000–6000	limited by disk space	limited by disk space	limited by disk space
Preprinted checks		•	•	•	•	
Customized checks	•	•		•		
Planning calculations			•	•	•	•
Asset categories			•	•	•	•
Liability categories			•	•	•	•
Income categories		•	•	•	•	•
Expense categories		•	•	•	•	•
Budgeting capability		•	•	•	•	
Recurring transactions		•	•	•	•	
Automatic interface between categories			•	•	•	•
Edit previous transactions	•	•	•	•	•	
Charge to multiple categories	•	to 5	to 8	•	•	•
Multilevel sorting of transactions	•	•	•	•	•	
Search and replace transactions	•		•	•	•	
On-screen reconciliation						
checking	•	•	•	•	•	
credit cards		(separate file only)	•	•	•	
asset accounts		•	•	•		
mark entries (such as Tax Deductible)	•	•	•	•	•	•
Reports						
printed	•	•	•	•	•	•
screen		•	•	•	•	•
balance sheet/net worth			•	•	•	•
cash flow by period			•	•	•	•
income statement			•	•	•	•
custom designed	•	•	•	•	•	•
Imports data				•		
Exports data		•	•	•		

Investment Software

	Wall Street Investor 2.3	The Investor 1.14	Real Estate Investment Analysis 6.0	Profits 1.2.3	Financial Decisions	Options 80A Advanced Stock Option Analyzer	Market Analyzer	Market Manager Plus
Company	Pro Plus Software	P3	RealData	Button Down Software	GenMicronics	Options-80	Dow Jones Software	Dow Jones Software
List price	$695	$150	$250	$495	$45	$170	$299	$299
Stand-alone	•	•	needs Excel, Works, Jazz templates	•	needs Excel template	•	•	•
Access online services	•	•		•			•	•
Dow Jones	•	•					•	•
CompuServe				•				
I.P. Sharp	•							
Dial/Data				•				
Criteria-based online search	•						[1]	[1]
Portfolio manager	•	•		•				•
Reports	•	•	•	•	•	•	•	•
Charting	•	•		•	Excel	Excel	•	
Access financial data	•	•						
Securities (stocks, bonds)	•	•[2]		•	•		•	•
Commodities	separate				•			
Real estate			10-year projection					
Options				•		•		
"What-if" simulations		•	•		•[3]	•		•
Stock symbols in document	•						[1]	[1]

[1]Available only in Dow Jones database.
[2]Includes funds, options, short sales, margin.
[3]Simulates appraisals, depreciation, loans, mortgages.



SETH RESNICK

Dr. Jeffrey Kane uses Dollars and Sense to separate personal and business expenses. Although Kane loves the program, he has found one problem with its method of account reconciliation. The program clears all the transactions and displays an account total that should agree with the bank balance. If the totals don't agree, Dollars and Sense can reconcile your account by adjusting a hidden amount. Kane finds it confusing when he can't see the discrepancy.

Personal Finance-Management Programs

Easy Checks, one of the simplest personal-finance programs, offers little more than a checkbook in a desk accessory. But it's a great program if you want to churn out a bunch of checks quickly and easily, and you don't need to keep many financial records. You will, however, spend time loading checks into the printer (it's unlikely you'll dedicate a printer to check printing).

Two programs, Personal Accountant and Quicken, occupy the middle ground between Easy Checks and the high-end programs. Quicken tracks the areas (or categories) where your money is spent and earned, but it doesn't go beyond that. Personal Accountant, on the other hand, provides a wide range of features, but does not let you write checks. (Softsync, Personal Accountant's manufacturer, plans to add this and other features to an upcoming version.)

To get an idea of what these programs do, take a look at Quicken. The program assigns a distinctive file name to your main account (for instance, Personal Checking Account) and then prompts you to define various income and expense categories, such as rent, auto expenses, or dividends. When you create a check or enter a deposit, you must assign the dollar amount to one of these categories. You can also split a transaction between several categories. For instance, if you write a check that must be split between your principal and mortgage interest accounts, you may subtract the appropriate amount from each of the two categories when you create the check. So long as you don't demand too much sophistication (like tracking investments or moving money between accounts—remember, each account is a separate file), Quicken does an excellent job of providing accurate, detailed information with a minimum of effort.

Three sophisticated general personal-finance packages—MacMoney, Dollars and Sense, and Managing Your Money—go beyond Quicken's income, expense, and budgeting options, allowing you to include assets (such as a home or auto) and liabilities (like loans, credit cards, mortgages) in a single file. They also offer various features for forecasting such items as loan costs and savings goals.

Monogram's Dollars and Sense is considered the "old reliable" by many MS-DOS users; the Mac version, however, does not offer portfolio management nor does it allow you to do tax planning. But when it comes to managing assets, liabilities, income, and expense, Dollars and Sense is nothing short of excellent.

Using Dollars and Sense, you can set up a fairly sophisticated accounting system. For instance, you can move money between various categories (say from a checking account to a savings account) and Dollars and Sense automatically updates the totals. You can also track credit purchases and reconcile all the appropriate categories, including credit cards and bank accounts.

With the release of version 3.0, MacMoney enters the high-end category of personal finance programs. The newest version has features comparable to Dollars and Sense but offers fewer keyboard shortcuts. For example, Dollars and Sense offers a shortcut for select-

Banking by Mac

About a year and a half ago, I investigated banking by home computer. I expected to pay for the service, since I would save on postage and gain the convenience of banking directly from my computer. No more writing checks by hand, folding papers, and addressing envelopes. I would also have electronic access to my bank records, so I wouldn't have to go through the monthly ritual of reconciling my checking account. One disadvantage: I'd lose my float time (the delay between the time I write the check and the time it is charged to my account) because my "check" is posted the same day that I create it. But by using electronic transmissions, I wouldn't have to send my payments until I was good and ready. How much was this worth to me? Perhaps $5 a month, maybe a few bucks more.

I sent away for information from a few of the banks on CompuServe who offer this service. When I calculated how much I would have to pay, I was surprised. The cost came to around $10 per week. Since I had a free checking account, I figured so much for home banking.

Recently, I examined Monogram's Moneylink program and caught the home-banking bug again. Using Moneylink with Dollars and Sense, I could do my home banking through Citibank. Had prices dropped in the past 18 months? The software lists for $179.95, but maybe, with this cost amortized over a five-year period (which nets to about $3 per month), electronic banking wouldn't be a bad deal.

To get details on Citibank's charges, I tried calling Citicorp/Citibank branches in South Dakota, in my home state of Missouri, and in Illinois. I was finally referred to someone in the New York office. The good news: the service is available for a flat charge of $10 per month to authorized accounts. The bad news: to become an authorized account, you have to live within 50 miles of New York. So much for Moneylink. [Editor's note: Both Citibank and Monogram have updated their software, unfortunately making the electronic banking connection currently incompatible.]

Checkfree Technologies to the Rescue

But then Checkfree Technologies came to the rescue. According to information the company sent me, Checkfree offers an electronic banking service that costs peanuts and is available nationally. Here's the deal.

Starting around January 1989, Checkfree will offer electronic banking for the Mac. After purchase of a start-up kit (price unknown as I write this), the service costs only $9 per month, for which I can write up to 20 checks. Above 20 checks, the charge is $3 for each additional batch of 10 or fewer transactions. Since I write about 30 checks per month, my monthly cost would be $12. Telephone connection charges would also be nominal.

Do I have to sign up with a participating bank? No, I can keep my account at my regular bank, since Checkfree works through the Federal Reserve. Of course, I have to figure in my bank's charge for this service, but it should be minimal. Since I normally spend around $7.50 per month for postage, I still might come close to the $5 or so charge I was willing to pay.

How about recurring transactions? With Checkfree I can write out electronic checks for recurring expenses in advance and send them on specified days. For example, I could designate that my mortgage payment be made on the fifth of each month, and it would be. How would I know the bank got my electronic check? My bank would continue sending its usual monthly statement. And, of course, I could write single checks whenever necessary.

What if I need a copy of a cleared check? If I can't use my statement as proof, I can get a printed copy of the electronic check for $2. From all indications, Checkfree can do for home banking on the Mac what Henry Ford did for the automobile—bring it within reach of everyone (providing the start-up kit is reasonably priced). And when I merge Checkfree with my personal finance software, so I can do budgeting and planning too—look out, 21st century, here I come.

ing category names. To charge a check to a category simply type the first few letters instead of the full name; Dollars and Sense displays the first category that begins with those letters on its alphabetized list of existing categories. In MacMoney, you must type the category name precisely (no substituting *rents* for *rent*), or else select the category with the mouse from a scroll box. MacMoney's screen font is also harder to read. The program offers minimal features for loan, retirement, and goal planning.

Another successful MS-DOS program brought over to the Mac, Managing Your Money, does everything a sophisticated personal (or small business) money manager needs, including helping you to maximize investment return and minimize taxes. The program strongly emphasizes the management of personal finances with a business focus, so you can handle finances just like the big guys at corporate headquarters. The program embraces tax, college, and retirement planning; insurance coverage; investment analysis; loan analysis; annuities; and all the usual corporate planning that increases bottom-line net worth. The program has some fun touches: for instance, a small light bulb sits in the lower-left corner of the main screen. When you click on it, the program brings up a bit of humorous financial wisdom. I find this lighter side (pun intended) really appealing.

Investment Management Programs

Investment programs for the Mac offer a wide variety of features and run a gamut of prices. One category includes programs that track securities (for example, stocks, bonds, funds, options). Although none of these programs requires a modem, you'll want one in order to use a powerful feature—the ability to access and download information from a financial database. With a modem, you can access a variety of historical and performance indicators that cover stocks, bonds, and mutual funds.

Wall Street Investor, one of the most popular and powerful programs, allows you to set up criteria for the securities you would like to consider. You can then search the I. P. Sharp database to extract investment opportunities meeting these criteria. The program also offers online trading through Fidelity Discount Brokerage Service.

A less powerful—and less expensive—program, the Investor, accesses the Dow Jones News/Retrieval Service to obtain current quotes (it does not, however, download data). Its portfolio-management reports and charts make it a good value for the money. An even less expensive securities program, Financial Decisions, runs as an Excel template and prepares a number of reports on a potential securities investments. It also simulates loans, mortgages, and depreciation based on different conditions such as interest rates or amortization methods. You have to key in the data, however.

A few specialized investment packages also exist. The Options-80A Advanced Stock Option Analyzer works exclusively with stock options and offers "what-if" simulations. Another type of investment program, Real Estate Investment Analysis, deals exclusively with investments in real property. Since this program is an Excel template, you must fill in a spreadsheet with information about an actual or a potential real estate investment. The program analyzes the information and prepares a ten-year projection of investment potential.

CYNTHIA MOORE

Theo Dawson has run her own business for ten years, but until 1986 when she bought MacMoney, Dawson hired an accountant to handle her personal finances. Because MacMoney proved so easy to use, Dawson overcame her fear of handling books, began tracking every penny she spent, and fired her accountant. Dawson, who was never a financial guru, now enjoys juggling figures.

Real Estate Investment Analysis calculations include the different tax, depreciation, and amortization options available to you as an investor, so you can choose the options that best meet your needs.

Add-on programs for Real Estate Investment Analysis handle mortgages, residential and commercial/industrial applications, appraisals, and loan qualifications. These add-ons range in price from around $100 for commercial/industrial applications to around $700 for a complete residential listing system.

Tax Time

EZTax-Prep 1040

EZTax-Prep 1065

MacInTax

TaxMaster 1988 Preparer

TaxMaster Pro

Company	EZWare	EZWare	SoftView	Island Computer Services	Chesapeake Software
List price	$99.95	$250	$119	$50	$49.95
Type program	Multiplan, Excel template	Excel template	stand-alone	Excel, Works template	Excel, Multiplan template
W-2 form			•		
IRS forms—personal:					
1040	•		•	•	•
1040EZ	•		•		
1040A			•		
1040 worksheet			•		
1040A worksheet			•		
Schedules:					
A	•		•	•	•
B	•		•	•	•
C	•		•	•	•
D	•		•	•	•
E	•		•	•	•
F	•		•		
R	•		•	•	•
SE	•		•	•	•
W			•		
2106	•		•	•	•
2119	•		•	•	
2210	•		•		
2441	•		•	•	•
3800	•				
3903	•		•	•	•
4952	•				
4562	•			•	•
4684	•			•	
4797	•			•	
4972	•				
6251	•			•	•
6252	•			•	
8582	•				•
8598	•				•
8606				•	
8615	•				•
Client letter	•				
Help/Info available	•			•	
Cross reference of entries	•			•	
1065 (IRS Partnership form)		•[1]			

[1]Includes Schedules A, D, E, H, K, K-1, L, M, 4562, 4797, 6252.

Tax-Preparation and Planning Programs

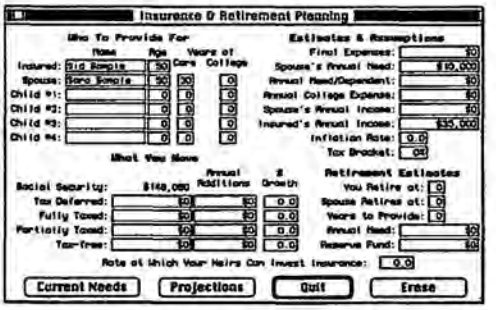
When preparing a tax return on the Mac, don't expect to just answer a few questions and then print all the information the IRS needs in a few minutes. First, you have to gather the same information you would need to prepare a return manually. Tax-preparation programs start to show their value once you have assembled all your information and keyed it into the program. High-end programs not only perform all the tedious calculations but also automatically fill in other forms that are affected by your initial entries. Many people who have prepared taxes on a Mac say they would never go back to the manual method (some say they never *could* go back).

As ideal as this sounds, there are still a few things you should know:

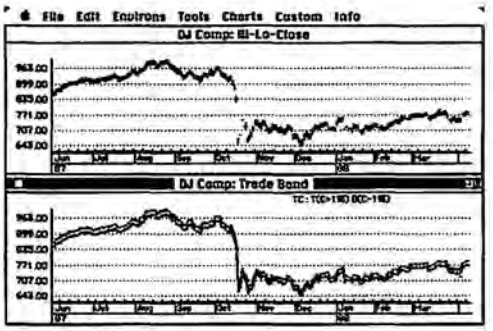
- A program's results will be no better than the information you put in; remember the old saw, "Garbage in—garbage out." If you enter the wrong information in the forms, the IRS will come to you for answers, not to your Macintosh or to the program's publisher.
- A tax-preparation program is no substitute for knowing what is allowable and what is not. MacInTax provides help screens that give you (often word-for-word) IRS rules and regulations. But if you don't know when or how to use these help screens, you can still make mistakes. It's a good idea to buy a tax guidebook, or request a copy of the expanded IRS tax-preparation booklet. (This free booklet is excellent; you will find instructions for ordering a copy in the gift packet you get from the IRS right after Christmas.)
- Unless you live in California or New York (or some other state where a lot of people are buying tax-preparation programs), you'll have a tough time finding a program that prepares both federal and state returns. Software publishers often add new state programs every year, so check with your dealer or the publisher to find out which states are supported by your program of choice for the 1988 tax year.
- Tax-preparation programs for anything other than personal returns are rare. The only program available for partnerships is EZTax-Prep 1065, from EZ/Ware. Currently no programs exist for a small business operating under a corporate structure.
- You must purchase a new tax program every year, the same way you have to order new forms every year. Many companies offer you up to half off on updates after you have purchased your first program.

When choosing a tax program, find out what forms it supplies, and then use your last return as a guide to what forms you'll need. Don't worry if no program offers all the forms you need—it's a lot easier to prepare one or two forms manually than it is to write out all of them. You may, however, need to order some of the lesser-used paper forms from the IRS.

Some tax preparation programs can use information exported directly from a tax planner. TaxView Planner, an adjunct to MacInTax, can also import data from many of the personal finance programs. Other programs work with general finance packages that don't include tax planning features; as a result, some tax planning programs have been designed to work with finance packages. Managing Your Money includes a tax planner that isn't high-end, but it performs reasonably well.



Insurance Planning
Although Managing Your Money offers a core money-management program, it also has major segments for insurance, general investment, and tax planning.



Historical Charts
These charts from Profits show a stock's history. You create charts by making simple menu selections. You can type in data or download it from a financial service.

Financial Form

Whether you're interested in personal finance, investment, or tax preparation and planning, you'll find a wide range of Macintosh products from which to choose. Features and prices vary enough to fit almost every need and every budget. Currently, the only link missing is tax-preparation programs for state taxes.

Don't worry about the learning curve when moving your finances onto the Mac. Unlike many kinds of software, financial programs tend to follow standard rules and formats, so if you're accustomed to paper-based systems you'll quickly feel comfortable using financial-planning software. You may even find that once you get used to these programs you'll wonder how you've managed for so many years without them.

See *Where to Buy* for contact information.

Alan L. Slay is a freelance writer based in St. Louis; he specializes in financial and accounting software.

BE A WINNER!

ANNOUNCING THE THIRD ANNUAL

World-Class Macintosh Contest

Macworld **is proud to offer you an opportunity to cast your vote for excellence in computing—and perhaps win the ultimate Macintosh hardware and software system. Each year we invite all of our readers to voice their opinions and pick the best Macintosh products in 42 categories.**

Usually we give you our opinions on the latest Mac products, but now, with the World-Class Macintosh Contest, we want to hear what *you* think. Which Mac products do you find significant? Which have served you well during the last year? Which would you recommend to a friend? By voting for the Mac products of your choice on the attached contest-entry form, you can both reward the hard work of your favorite product developers and help keep *Macworld*'s editorial coverage on track.

You also earn a chance to win hardware and software worth thousands of dollars. To show you our appreciation for taking the time to participate in this contest, we will pick three winners at random from among the World-Class entry forms. The lucky grand-prize winner will receive most of the top-voted hardware and software products. A copy of each winning software package will go to the runner-up, and the third-place winner will receive a selection of the winning software programs.

Entries must be received no later than March 15, 1989; we will announce the results in our September issue. To accurately reflect readers' preferences, we'll publish figures for all significant vote-getters in each category. The following explanations define product categories that are not self-evident, to help you cast your votes appropriately.

CONTEST RULES

Each person may enter the contest only once. Entries must be printed by hand or typed on the form included in *Macworld* or on a reasonable facsimile. Your entry must include at least one product vote, plus your name, address, and daytime phone number. Entries must be received no later than March 15, 1989. Employees of PCW Communications are not eligible. Thank you and good luck!

Name_____

Company_____

Address_____

City_____ **State**_____

Zip_____ **Daytime phone**_____

Send Entries to: 1989 World-Class Macintosh Contest, *Macworld*, 501 Second St., San Francisco, CA 94107.

1989 World-Class Macintosh Entry Form

Please use this entry form to vote for products you are familiar with and would recommend, based on their performance and value. Choose one product per category; you need not vote in all categories. Eligible products must be compatible with the Macintosh computer and commercially available as of February 1,1989. To ensure accuracy, we will not count a vote unless the following three items are provided: (1) correct product name, (2) manufacturer name, and (3) model number (for hardware only). Version numbers of software products are not required. Please print or type your entry; it must be received by March 15, 1989.

HARDWARE	PRODUCT	MANUFACTURER/MODEL
Alternative Mass Storage		
Display—Black-and-White		
Display—Color		
Communications Board		
CPU Upgrade		
Digitizer/Scanner		
Graphics Board		
Hard Disk (80MB or less)		
Hard Disk (above 80MB)		
Input Device		
Modem		
Most Promising Newcomer		
Plotter		
Printer—Dot Matrix		
Printer—Laser		
Printer—Color		

SOFTWARE	PRODUCT	MANUFACTURER
Black-and-White Paint		
Business Accounting		
Business Presentation Graphics		
Color Paint		
Communications—General		
Computer-aided Design		
Database Management		
Desk Accessory		
Desktop Publishing		
Drawing/Illustration/Animation		
Education/Training		
File Server		
Game		
Integrated Package		
Micro-to-Mainframe Communications		
Most Promising Newcomer		
Music		
Personal Finance/Taxes		
Programming Language		
Project Management		
Outline Processing		
Spreadsheet		
Statistics/Math		
Utility—Disk and File		
Utility—Programming		
Word Processor		

Hardware

Alternative Mass Storage — All types of mass storage devices except hard disks. Examples include external floppy drives, removable cartridge drives, and tape backup units.

Communications Board — Add-in boards that help the Mac communicate with other Macs and other computers. Examples include Ethernet boards, and 8086 and 80286 coprocessor boards.

CPU Upgrade — Products that increase the Mac's processing capability, either by using faster 68000s, or 68881, 68020, or 68030 devices.

Display—Black-and-White — Monochrome or gray-scale monitors that serve either as a component of the Mac II or as an alternative to the standard display provided by other Macintosh systems.

Graphics Board — Add-in boards that let the Mac II display color or gray scale images.

Input Device — Mice, trackballs, graphics tablets, keyboards, joysticks—everything but digitizers and scanners.

Printer—Color — Any printing device, other than a dot matrix printer or plotter, that produces color output. Examples include thermal printers and ink-jet printers.

Software

Business Accounting — A series or an integrated package rather than a single module (such as a ledger). You can choose a modular package or an all-in-one program as long as it is designed for serious business use.

Business Presentation Graphics — Packages that produce or lay out text; pie, bar, or line charts; or other graphics used by businesspeople to present information.

Computer-aided Design — Computer-aided design includes products that offer two- and three-dimensional capabilities for working with geometry, especially for applications in mechanical, architectural, and electrical engineering.

Desk Accessory — Any programs that install under the Apple menu and that don't fit in any other category. Examples include calculators, notepads, schedulers, calendars, and phone dialers.

Education/Training — Training programs provide tutorials on such subjects as typing or computer applications. Education software includes courseware, examination-preparation programs, and learning aids for children.

File Server — Products that enable multiple network users to share one storage device.

Integrated Package — Products that include several applications—such as word processor, spreadsheet, charting program, and data manager—that share data and a command structure. The applications may be on one disk or in separate modules.

Micro-to-Mainframe Communications — Programs that perform terminal emulation and data conversion for mainframes and minicomputers.

Outline Processing — Stand-alone programs or desk accessories that organize ideas and notes in outline form.

Personal Finance/Taxes — Programs that help you retrieve and handle stock information; that perform portfolio management; that assist in fundamental or technical analysis; and that help you plan or prepare your taxes.

Project Management — Programs that manage resources and scheduling, usually for large, complicated tasks.

Utility — Programs that perform a wide variety of housekeeping chores, such as file conversion, file recovery, disk backup, and keyboard enhancement.

Most Promising Newcomer

Which new products—in both the hardware and software categories—are making an impact? (You may vote for a product you've cited in another classification.) For our purposes, "new" products are those released within the last six months.

Reviews

Apple Scanner

Document scanner with software. ***Pros:*** *Works well on photos; software supports regular scanning and scanning into HyperCard; good documentation.* ***Cons:*** *Needs more gradations of gray scale, contrast, gray maps; requires large amounts of disk space; resolution not sufficient for professional typesetting.* ***Company:*** *Apple Computer.* ***List price:*** *$1799.* ***Requires:*** *Hard disk; 1MB of RAM (more recommended); System 6.0 or later version; SCSI cable; laser printer recommended.*

Information flow from a computer is varied: text, graphics, printed output, sound, and slides, with new forms constantly under development. However, despite the diversity of data that you would like to be able to input, the information going into the computer has largely been limited to the data you can type on a keyboard. It would be a lot like taking a nicely prepared meal and pushing it through a strainer. And because the Macintosh is also a graphics machine, being limited to text-oriented input is doubly frustrating.

No wonder scanners have become increasingly popular over the last few years, especially for the Mac. You can think of a scanner as half of a copy machine: it scans the document, but doesn't produce an actual physical copy. Instead, it sends the scanned image, encoded as digital values, to a computer. Once the image information is there, you can save it, convert it to various formats, cut and paste it into other documents, or send it to a printer. In fact, the combination of a scanner, a Macintosh, and a laser printer is functionally equivalent to a copy machine, albeit a very expensive one.

Apple Enters the Market

Apple considers this market important (and lucrative) enough that it has introduced its own product, the Apple Scanner. This scanner is a low (4-inch), narrow (13¼-inch) unit that's relatively deep (20½ inches, with additional clearance needed for the cables in back). It also requires a sufficient amount of overhead clearance; the lid, when fully open, is 19 inches high in the back. The glass surface under the lid is 8½ by 14 inches, and a thin moving bar within the unit does the scanning. The attractive grooved design and platinum color coordinate with current Macintosh styles.

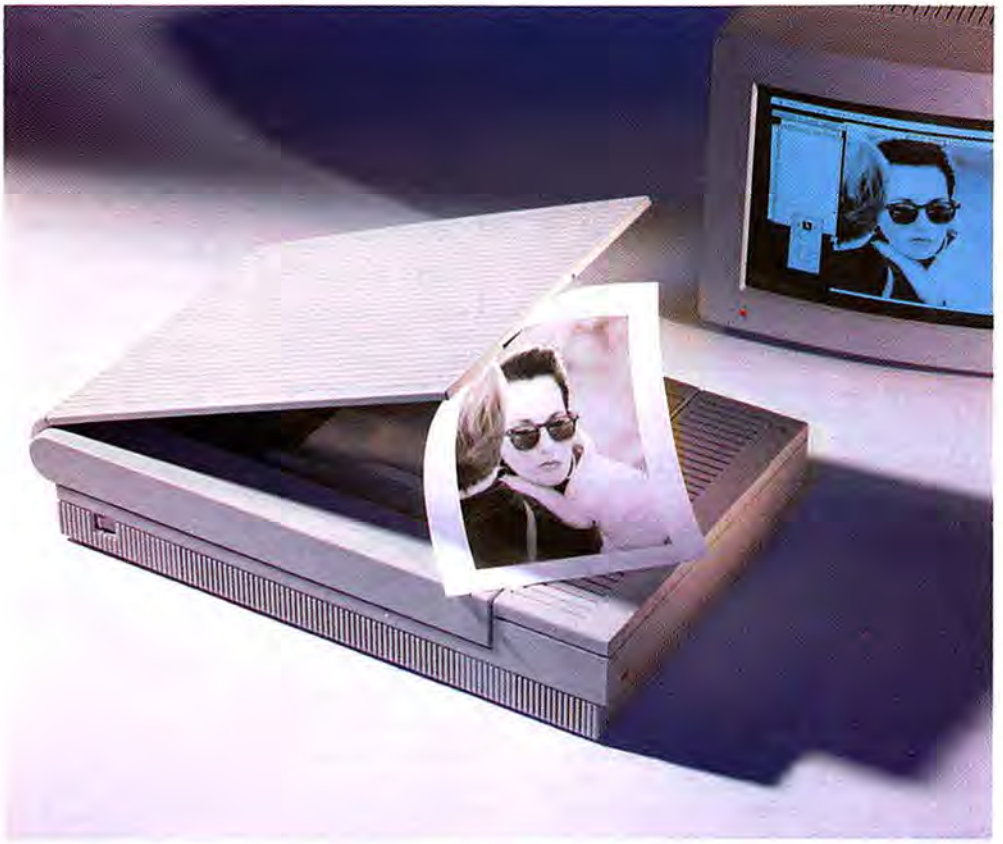
Cables and switches are minimal: a power cord, an extra SCSI cable or two (if you're chaining to other SCSI devices), and an on/off switch. There are no other switches or buttons; you control the unit entirely from the Mac. This doesn't mean the Apple Scanner lacks functionality. The unit scans at several resolutions (75, 100, 125, 150, 200, and 300 dots per inch [dpi]); it performs multiple levels of scaling (from 25 to 400 percent, depending on resolution); and it accepts various settings for contrast, brightness, threshold, and gray map, allowing you to choose from several predefined halftone patterns, as well as to define your own.

Even so, scanner hardware by itself is useless; you need some kind of software to control the scanner, read the data from it, and convert that data to appropriate formats. Apple provides two major software packages with the unit: AppleScan and HyperScan.

AppleScan is a stand-alone application that gives you full control over the scanner. It lets you do a preview scan of a document, then use the results to set various options and levels, including what portion of the document you actually want to scan, and whether the document should be treated as line art, halftones, or a gray-scale image. When you're satisfied with the settings, you ask for a full scan, which is copied into an empty window. Much of this scanned image is stored on disk. You need

This image was scanned at the 300-dots-per-inch default setting on the Apple Scanner, with film produced from a Linotronic 300 output device.

MARK JOHANN

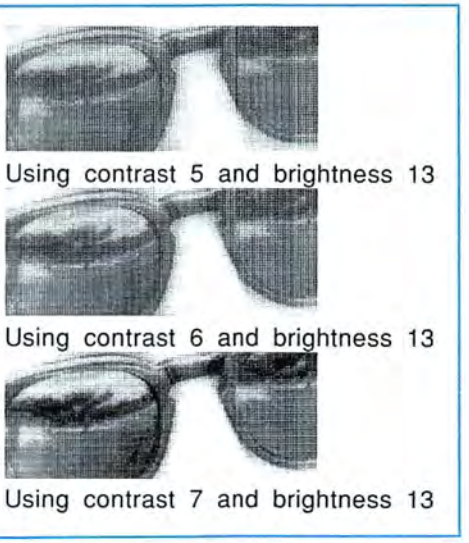


Apple Scanner with AppleScan software

to have several megabytes of free space before you start scanning. You can display an image at several levels: Actual Size, Reduced to Fit, Dot for Dot, Chubbybits, Fatbits, and so on. The standard Mac display is around 72 dpi, so an image scanned at 300 dpi will be greatly enlarged when viewed in dot-for-dot mode (and even more so in the Chubby- and Fatbits modes).

Once you have scanned the image, AppleScan allows you to do limited editing, using the lasso, crop, and eraser tools. You can also do pixel-level twiddling with a pencil tool for line art and halftone images (but not for gray-scale images). All types of images can be saved as either PICT or TIFF files; line art and halftone images can also be saved as MacPaint documents. You can even cut and paste to combine images. The Apple Scanner allows you to produce a test strip of images using a range of contrast and brightness or a variety of halftone patterns. Halftone patterns include Spiral, Bayer, Straight Line, and 2 by 2. You cannot, however, save a test strip file; the test must be sent directly to an output device.

HyperScan is like AppleScan but is designed to operate under HyperCard. It enables you to scan images and text for incorporation into HyperCard stacks.



Test Strips

AppleScan software allows you to print out test strips to compare print quality over a range of halftone patterns or brightness and contrast settings. This is useful for determining the best possible combination of settings needed to produce high-quality finished output.

The 280-page Apple Scanner manual is complete and has a strong tutorial orientation. It goes to great pains to show you—step-by-step—how to perform most tasks, what the various options and tools are, and when to use them. In some cases, the forest gets obscured by the trees, and you complete a section unsure about what you have just learned. Still, that minor error is preferable to the major failing of many other manuals: documenting features without teaching how to use them. And just to help out the terminally confused, a Guided Tour of the Scanner program (complete with animation) shows you just how the whole system works.

Drawbacks

So, what's the output like? On an ImageWriter II, it's OK but not great. Line art scans come out the best, especially at 300 dpi. Halftone scans aren't terribly good, and you can't print gray-scale scans on the ImageWriter.

And other drawbacks? First, the Apple Scanner supports only 16 levels of gray scale, brightness, and threshold; 8 levels of contrast; and 3 different gray maps. This means that you must do a fair amount of tweaking to get an acceptable scan. Even then you might not be able to do it.

Second, the top resolution is 300 dpi—fine, if you're using a LaserWriter, but not so fine if your destination is a 600 (or 1200) dpi typesetting system.

Third, AppleScan demands more disk space than it actually needs. When I attempted a 300-dpi gray-scale scan of an 8-by-10-inch photograph, AppleScan indicated that there wasn't enough disk space, even though there were 6.5MB available on the hard disk. I was finally able to free enough space to satisfy AppleScan; the resulting image file, however, was only a bit over 1MB in size.

Even with these limitations, the Apple Scanner could be valuable to you if you need a clean, easy method of entering graphics. Combined with packages such as Silicon Beach's Digital Darkroom and SuperMac's PixelPaint, the Apple Scanner and its software can greatly increase the flow of information into your computer.
—Bruce Webster

See *Where to Buy* for contact information.

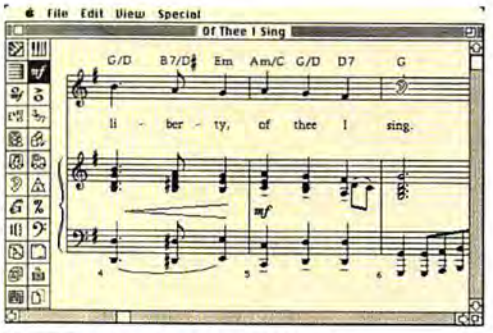
Finale

Integrated music sequencing, transcription, and notation program. ***Pros:*** *Generates any notation: ancient, standard, or avant-garde; outstanding laser-printer output; customizable macros, defaults, and spacing algorithms; extensive MIDI implementation.* ***Cons:*** *Some departures from Mac interface; runs slowly on a Mac Plus in some modes.* ***Company:*** *Coda Music Software.* ***List price:*** *$1000.* ***Requires:*** *1MB; MIDI keyboard recommended.*

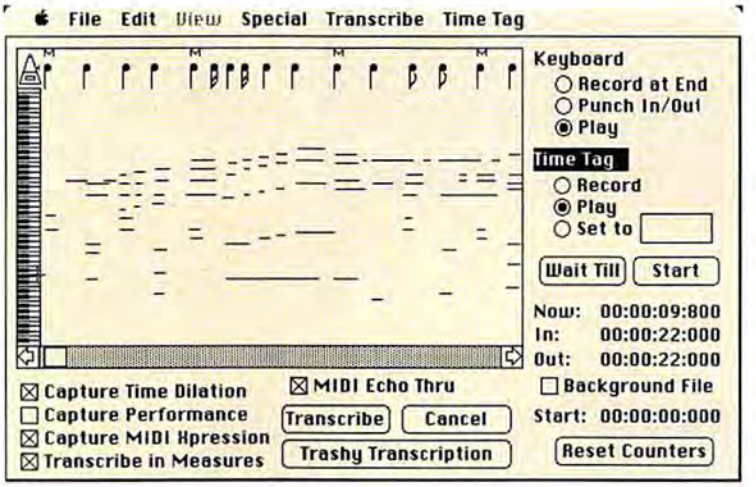
Any company with the money and the talent to develop a new program, so the reasoning goes, would be foolish to lavish them on a vertical market like music. General-interest applications like word processing or spreadsheets, of course, sell many more copies.

For years, this has been the unhappy scenario for Macintosh musicians who have had to tolerate buggy programs with severe limitations. So when Coda Music Software announced its new package, which took three years and over $1 million to develop, musicians had reason to hope.

The program, Finale, lives up to those hopes. It's an enormous, precise, intelligent music processing environment. Some of its tools are more elegant than others, but all are powerful and allow you to transcribe, edit, arrange, play back, and print music in myriad ways.



The World A-Chording to Finale
You enter chord symbols either by letting Finale analyze the music or by playing each chord on a synthesizer; in either case, the chord name pops up on screen in your choice of font and size (the little ear over the word sing *marks the current chord insertion point). Finale's chord decisions are about 85 percent correct on the first pass; you can also edit them, of course. When you transpose your music—a quick and easy process—the chord symbols transpose, too.*



Take a Note
Finale's built-in sequencer records your performance, displaying the notes as a graph. Next, Finale plays the music back, and you tap on a key in time to the music, telling the program where the beats fall (for each tap, a little quarter note appears at the top of the screen).

Making Overtures

There are several ways to get music into Finale: clicking on the staff, striking notes on a synthesizer and rhythmic values on the keyboard (step time), and importing MIDI files from a sequencer. Quickest of all, however, is using HyperScribe.

The heart of Finale, HyperScribe is an impressive real-time transcription tool. As you play the synthesizer with both hands, your performance appears on screen, fully notated, lagging a measure or two behind you. It's an amazing sight, akin to watching a word processor write out anything you say into a microphone.

To provide Finale with a metrical reference, you tap your foot on the synthesizer pedal in time with your playing; thus you're free to speed up, slow down, or even stop in the middle of a performance, and the music will still appear in standard readable notation. HyperScribe's sophisticated algorithms smoothly eliminate the problems with quantization, triplets, and enharmonics that have plagued other programs. Very complex music with crossing hands and inner voices doesn't reproduce well in this mode, but it's safe to say that Finale transcribes music more intelligently than any existing system.

Cleaning Up Your Entr'acte

Once the music is on screen, editing is fast. Using the Mac keyboard, you can zip around the score, changing pitches, rhythms, ties, and beams without touching the mouse. You can create lyrics in Finale or import them from a word processor; then, with blinding speed, the program automatically distributes and attaches the lyrics to the notes in the music, interpreting spaces and hyphens as syllable dividers.

Finale's orchestration aids include intelligent part extraction, flexible measure numbering, and superb handling of transposing instruments. You can condense music from several staves onto one, or explode it from one staff onto many. You can cut, copy, or paste any combination of 30 musical elements such as notes, lyrics, or dynamics: for example, you could paste the articulation marks from Trumpet 1 onto the notes of Trumpets 2 and 3, eliminating the drudgery of reentering them.

To list all of Finale's editing capabilities would take pages. Suffice it to say that you can move and resize literally every object in Finale, including notes, stems, beams, slurs, accidentals, clefs, lyrics, bar lines, measures, systems, pages, and so on. This is a vast improvement over existing music programs, which often make illogical and permanent decisions concerning the placement of musical symbols.

Almost as powerful as these notational tools is Finale's MIDI implementation, which goes far beyond simple playback. Each staff can send musical information over a different MIDI channel; if you have enough synthesizers, Finale can play a complete orchestration. The performance of a score will be very musical, too, because symbols and markings in Finale can convey MIDI information: an accent makes a note play back louder, a staccato mark shortens a note, and so on. Thus crescendos, ritards, trills, and even text expressions like *Swing* affect the score's playback. You could, for instance, create a marking named Barry Manilow, which, when inserted into the score, makes the music transpose up a half-step when it plays back.

Finale Ultimo

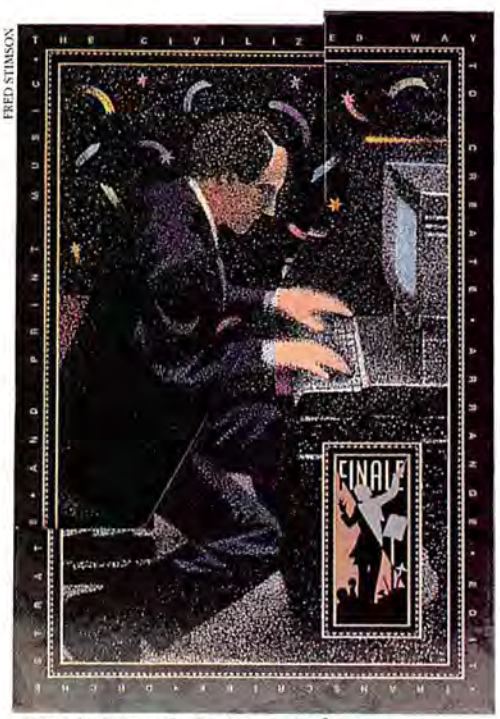
If there is a price to pay for this power and elegance, it's a result of the program's size and scope. Finale is a rich environment, with its miniprograms for word processing, graphics creation, page layout, and sequencing. In squeezing the program onto an 800K disk, the developers have taken a few liberties with the Mac interface. You seldom use the four menus, for example; instead, you have to master the 32 tools and 300 dialog boxes. The learning curve isn't steep, but it's long. And the manual, while well organized, is often dry and technical, and it doesn't offer many examples. Finale comes with a videocassette, too; unfortunately, Coda has inexplicably filled the tape with a 25-minute Finale advertisement instead of a tutorial.

Remember, too, that Finale pushes the Mac to the utter limits of its processing power. If you're using a Mac II or an accelerated SE, you'll be in composer's heaven; but on a Mac Plus, an orchestral score in reduced full-page view can take 30 seconds to redraw after each tweak you make. Under those circumstances, an accelerator board would help.

For $1000, you get five Finale disks, a 550-page manual, free (and toll-free) phone support, and a well-constructed music laser font. What is priceless, however, is the integrity of Finale's data; even in its initial release, it's far stabler and more bug-free than current versions of its older competitors. For Mac musicians, the days of rogue slurs slashing across the score, inexplicably corrupted files, and superimposed music symbols are over.

Finale, with its hundreds of features designed for maximum efficiency and power, seems destined to become the industry standard in music processing and publishing. If you've been going from program to program in hopes of finding an intelligent, flexible music processor, the switch to Finale may well be your final movement.
—David Pogue

See *Where to Buy* for contact information.



Finale from Coda Music Software

Since writing this review in September 1988, David Pogue has become a paid consultant for Coda Music Software.

Digital Darkroom 1.0

Graphics program for enhancing scanned gray-scale images for output as halftones. ***Pros:*** *Extensive list of effects; supports eight file formats; informative manual.* ***Cons:*** *Slow; memory intensive; tiny, imprecise controls.* ***Company:*** *Silicon Beach Software.* ***List price:*** *$395.* ***Requires:*** *1MB; System 6.0 or later version; Mac II and gray-scale monitor recommended.*

If you deal with images professionally, Digital Darkroom should be on your shelf. The program enables you to edit many kinds of graphics: scanned gray-scale images, images captured from a video camera, simple black-and-white line art, images scanned at 256 gray levels and 300 dots per inch (dpi). The program outputs halftones for PostScript and non-PostScript devices. Digital Darkroom is a serviceable replacement for the airbrush and provides low-cost electronic photo retouching.

The program's closest competitor is Letraset's ImageStudio. There are two main differences: ImageStudio currently supports fewer gray scales (64 versus Digital Darkroom's 256); and ImageStudio provides better tools for gray-scale drawing à la MacPaint, while Darkroom provides more and better special effects.

Four Kinds of Features

Digital Darkroom's features fall into four categories: cut and paste, autotrace, transformation, and gray-scale painting.

Pasting—the feature that lets you place a high-contrast cloudscape in an otherwise bland sky—is the heart of Digital Darkroom. ImageStudio has no pasting feature. The concept takes some getting used to, because it is a two-step method. For example, before you paste the cloudscape into your target image, you select which grays from the source image you want to apply to the target image, and you must select the grays in the target image that you want to change. You can also control whether the source image replaces, blends with, lightens, or darkens the target image. Art professionals claim that the pasting feature alone makes Darkroom worth the price.

Digital Darkroom's autotrace feature is similar to the tracing feature in Adobe Illustrator except that with Darkroom you can trace gray-scale images too. Autotrace converts bitmapped graphics to object-oriented graphics (paint images to draw images) and creates PostScript bezier curves. You then load the Darkroom traces into an object-oriented drawing program for editing. If you work with line images created from scanned art, Darkroom fits together nicely with Illustrator or Aldus Freehand.

Autotrace can actually create an individual path that has more points than PostScript can print. If the trace path is too complex, you can simplify it by removing points with the smoothing controls, but this is a trial-and-error task—since the drawing changes in the process. The job is not made any easier by having to slide imprecise-looking scale-indicator icons. (Another approach to simplifying a tracing is to save the file, open it in Illustrator, and use the scissors tool to cut the path into shorter segments).

The set of transformations available in Darkroom is familiar: you can scale an image by a given percentage, rotate it, and flip it. In addition, you can stretch, distort, and slant. You can also change the perspective, which is useful when working with photo images.

Digital Darkroom's gray-scale painting feature falls short of ImageStudio's. Darkroom allows you to use a paintbrush and

(continues)

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Cabinet (Holds 45 Disks) ..... 19.
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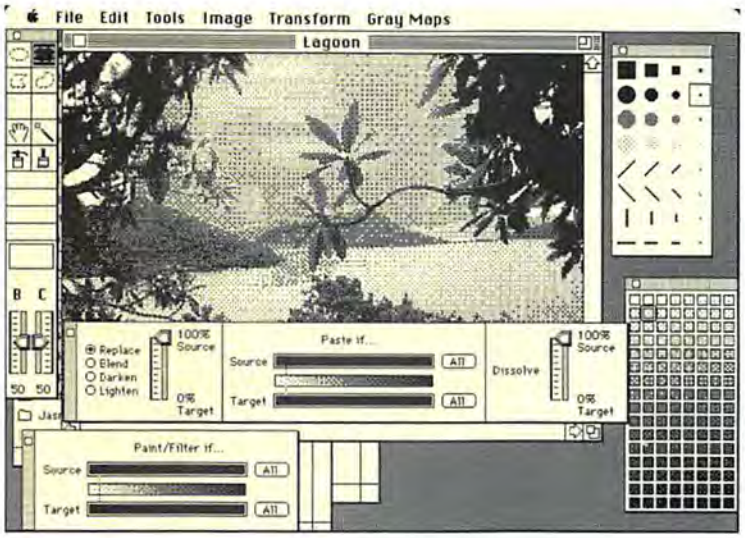

Control Panel
Tiny sliding scales in Digital Darkroom's control panels are particularly hard to manipulate. It's difficult to make 1 or 2 percent adjustments. Some scales have no digital readout at all—you have to guess in order to reproduce an effect.

an airbrush with a selection of brush sizes. ImageStudio provides brushes in several shapes and allows you to create new shapes. Darkroom has one advantage, the lighten/darken capability its brushes provide. You can brush across a particular area and change the gray shades.

Darkroom reads and writes eight file formats: PICT, PICT2, TIFF, Thunderscan, MacPaint, EPS, Illustrator, and its own Archive (compressed) file format.

Output options include standard halftone and Darkroom's own Advanced Halftone, which works best with 300 dpi laser printers that do not use PostScript (Apple LaserWriter SC or General Computing's Personal Laser Printer, for example).

The manual is excellent and includes an entire chapter on halftones—how digital halftones differ from true photographic halftones and how best to compensate for those differences (more memory and better output devices, such as a Linotronic phototypesetter).

Caveats

This package is the Jaws of software, however, when it comes to memory. It's not that the program is large, but images can be large. And image manipulation is memory intensive. Silicon Beach estimates that an 8-by-10-inch image scanned at 150 dpi and at 256 levels of gray, can claim 1.75 megabytes for the base image alone. For speed, Digital Darkroom works exclusively in memory, and a transformation can require up to twice the memory of the base image. Add memory for Undo and the image maps Digital Darkroom uses to avoid altering the base image, and memory needs quickly mount up. On a Mac II with 5 megabytes of memory, running MultiFinder and no other software, Digital Darkroom did not have sufficient memory to perform more than one transformation (rotate) on the four-by-two-inch Tower of Pisa demo image that comes with the package.

For all its power and memory-hunger, Digital Darkroom is not particularly fast. Its algorithms may be highly efficient, but on the 5MB Mac II, it took 25 seconds to straighten the Leaning Tower of Pisa. In all fairness, Darkroom is moving a lot of information. But on a really large image, you may find yourself drumming your fingers.

Another problem is Darkroom's tiny control panels and cramped sliding scales. We found it difficult to pick up the indicators with the mouse for accurate settings, especially when blending a paste, an operation that requires great accuracy. The sliding scales are short; 1 or 2 percent movements are difficult to manage—and almost impossible to repeat exactly. The graphic interface seems to have been miniaturized to fit the 9-inch screen of the Plus and SE (the software runs on those computers, but not efficiently).

All in all, any problem with Digital Darkroom is overshadowed by its assemblage of features. It is more than equal to the current generation of scanners. Although Digital Darkroom is fun to play with and easy to learn, it's really a product for the art and photographic professional—someone who is also more likely to have the strongly recommended Mac II, a gray-scale monitor, and *beaucoup* memory.
—Jeff Walden with David Smith

See *Where to Buy* for contact information.

High-End Data Acquisition

MacLab ***Pros:*** *The easiest system to use for general scientific work.* ***Cons:*** *Single analog output channel; no digital output.* ***Company:*** *World Precision Instruments.* ***List price:*** *$2925 (includes software).* ***Requires:*** *512K.*

IDAC/1000 ***Pros:*** *Full 16-channel digital I/O; spreadsheet-based programming system; usable with non-Mac computers.* ***Cons:*** *Slow data converter.* ***Company:*** *International Data Acquisition and Control.* ***List price:*** *$1045; HyperCard interface $75; Macontrol $695.* ***Requires:*** *512K.*

MacAdios II SE ***Pros:*** *125-kHz maximum acquisition rate; FORTRAN, BASIC, C, and Pascal interfaces included.* ***Cons:*** *Effective use requires extensive programming.* ***Company:*** *GW Instruments.* ***List price:*** *$1890 (includes BASIC software only).* ***Requires:*** *1MB; runs only on Macintosh SE.*

Computer data acquisition has many possible functions. A physiologist may want to replace a battery of chart recorders with a single computer and a printer. An electrical engineer may want to use a computer as a high-speed storage oscilloscope. A plant manager may need to control arrays of switches and valves in response to data from industrial sensors.

One sign that the Macintosh has finally arrived as a serious instrument for science and industry is that data acquisition systems tailored to many different markets are now available. Each of the three systems reviewed here works best in a particular range of applications. Each also represents more power (and expense) than the systems examined last month.

MacLab for Simplicity

MacLab is a straightforward box, with highly evolved, convenient software. The front panel has four pairs of BNC connectors for differential analog inputs, a pair for analog output, and a pair for an external trigger. The software lets you use MacLab as a single-channel general-purpose oscilloscope, or as a set of four chart recorders (see "Charting Your Course"). MacLab

(continues)

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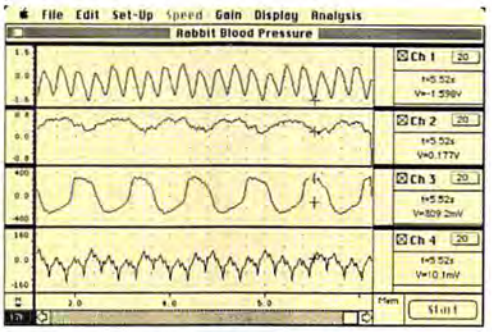
Circle 297 on reader service card

uses a 12-bit, 40-kHz converter and connects to the Mac modem port.

This doesn't sound like much for $3000. In fact, it's a bargain if you want a trouble-free system that requires relatively little engineering or programming effort on your part. It took me 15 minutes to set up MacLab as a two-channel chromatography recorder, and that includes opening the box and scanning the relevant parts of the manual. The difference between this and the typical data acquisition experience is that it worked perfectly the first time.

Simple editing commands, used with MacLab's Data Pad, enable you to transfer data from charts or scope windows to Excel. You can easily zoom and scale on-screen data and drag-select pairs of regions in charts for *x-y* display. You can also vary colors and pen patterns in plots.

Although MacLab has no digital control lines, its software lets you use the single output port as a programmable signal generator. Other electrical niceties include 13 steps of programmable gain, independently specifiable for each channel, and a software-selectable high-pass filter. You might want extensions, such as more input or output channels or different front-end connectors, but you couldn't ask for an easier system to use.



Charting Your Course

This display is an automatic option in MacLab—you select gain levels for each channel. The cursor gives you a readout of individual points on each of the charts, and data can be transferred to other applications with cut-and-paste operations.

IDAC for Control

The IDAC/1000 is an impressive design—a slender, uncluttered, flat box with no obvious inputs or outputs. Removing the top back panel reveals a set of screw-terminal blocks to support the system's superior facilities as a low-cost controller: 16 digital I/O channels. With a 12-bit converter running at a leisurely 3600 conversions per second (it uses the modem port for Mac connection), the IDAC/1000 would not be my first choice for bench-testing electronics parts, but for strain gauges, thermocouples, and pressure sensors it's certainly adequate.

IDAC features an inexpensive HyperCard interface (see "Dealing with Cards") that allows it to perform basic data acquisition chores and limited digital I/O. For advanced applications, you may want to consider the company's specialized software (an $895 chromatography package called IDAC-Chrome, for example) or its main product, Macontrol. In Macontrol each channel of the IDAC/1000 board corresponds to a row in a predefined spreadsheet application template so that programming information is placed in appropriate columns to produce output in spreadsheet form in Excel or Multiplan. Macontrol requires low-level programming (most of the commands you place in the programming spreadsheet are in hex notation), but the documentation provides some examples.

This approach has some advantages: for mixed Mac/PC labs an exactly analogous program called Icontrol works with Lotus 1-2-3, so different computers can share this unit (the other units reviewed here are Mac-specific). Its main disadvantage is that since data appears in spreadsheet form only in Macontrol, you can't view the data in real time. If you want to see chartlike output you have to graph it separately. If you are programming a system to turn on cooling units when the fluid in vats A and B goes above 30 degrees Fahrenheit, using Macontrol is the most flexible and efficient one. If you're trying to adjust a stimulation sequence to observe an evoked potential in a lobster nerve, it's nearly useless. IDAC clearly recognizes the industrial-control strengths of its system, and most examples in the documentation discuss applications with thermocouples and photocells.

Pictured are MacLab from World Precision Instruments, IDAC/1000 from International Data Acquisition and Control, and MacAdios II SE from GW Instruments.

MARK JOHANN

MacAdios for Speed

The MacAdios system is for advanced users, physicists or electrical engineers, for example. Not only does MacAdios II SE use the fastest converter in this group (12 bit, 125 kHz), but it offers piggyback board options with 16-bit resolution or a super-fast 833-kHz converter. This is a higher data rate than an SE can support, but gives an idea of the range of MacAdios possibilities. The device itself is basically a Mac II board with its own interface and power supply, adapted for use in an SE. It includes two analog outputs, eight digital I/O lines, and three independent counter/timers. MacAdios also uses a separate board that takes up the SE's slot—at 125 kHz the modem port is no longer fast enough.

MacAdios II SE provides the most extensive documentation of the systems tested, and you're going to need it. The set of applications included in the four disks of software is unlikely to satisfy serious users. To take advantage of MacAdios's capabilities, you'll want to program it; GW Instruments, therefore, provides I/O libraries and

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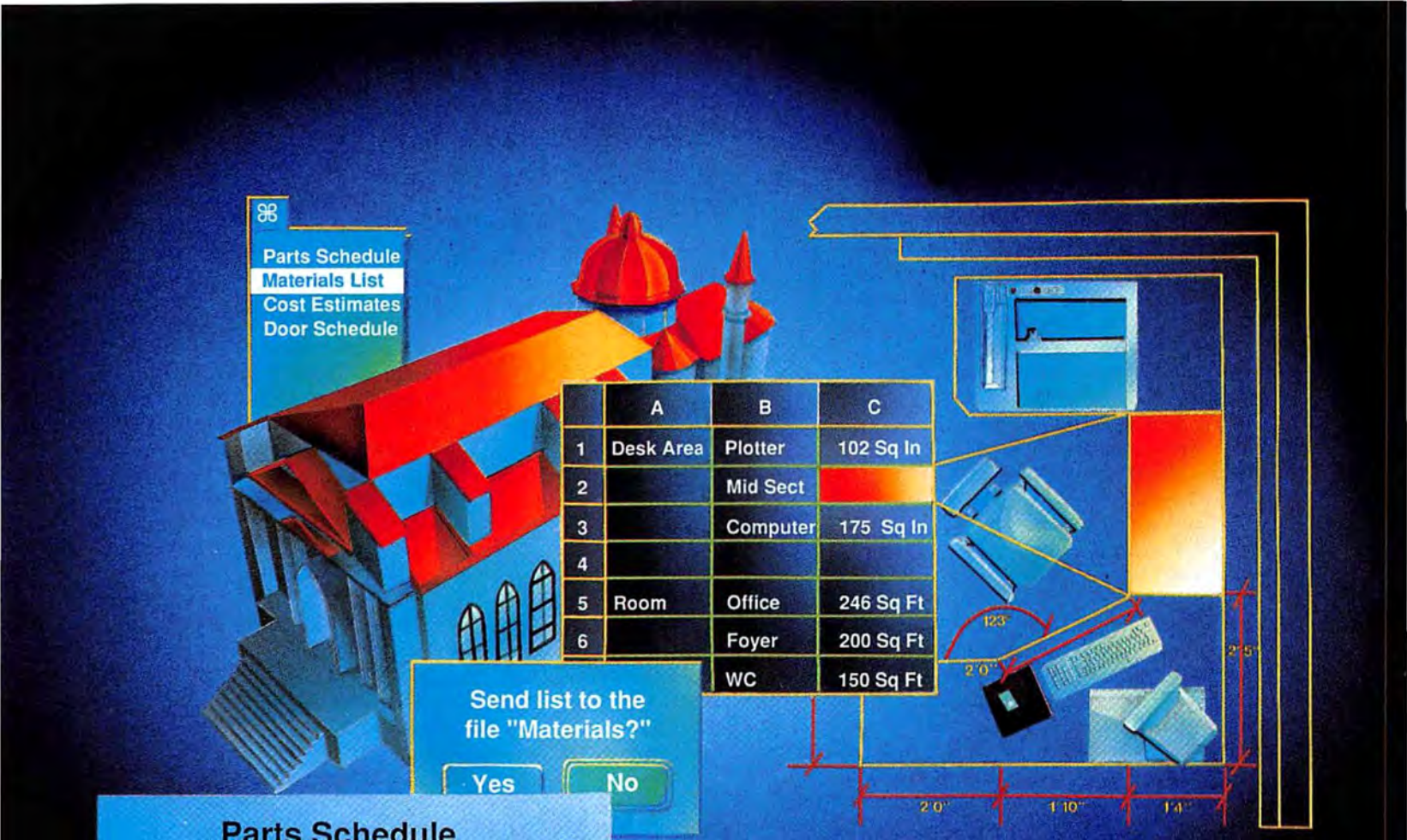

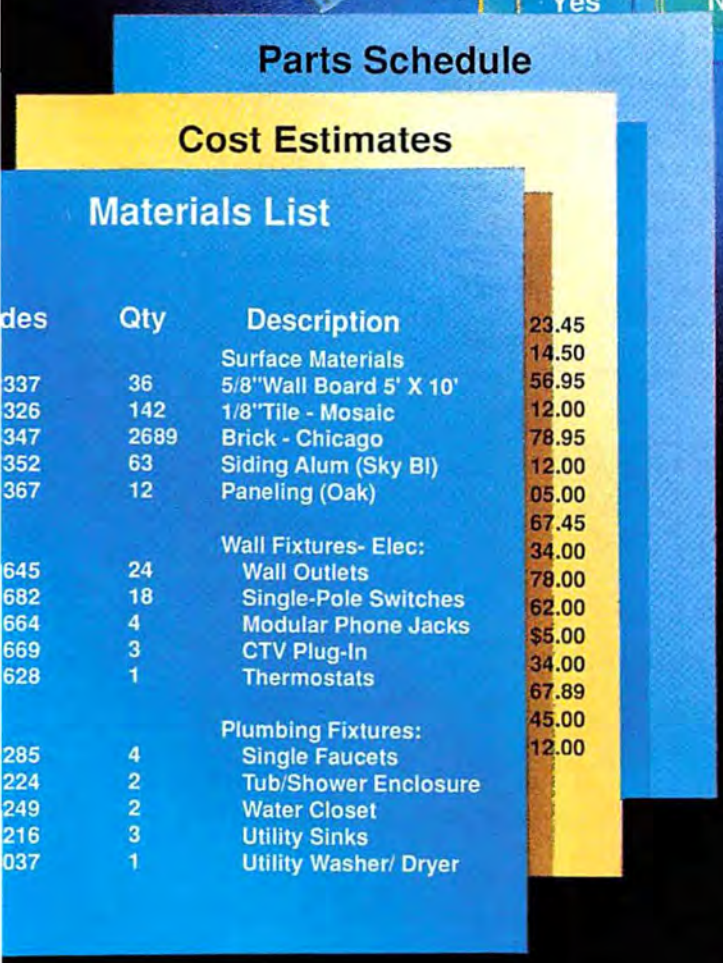

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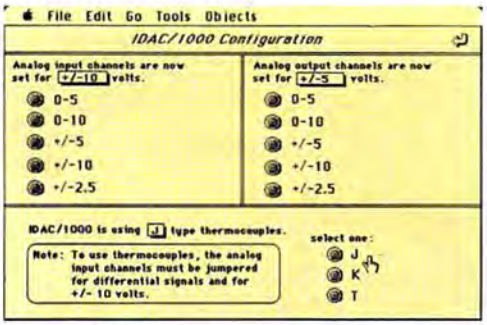

Dealing with Cards

HyperCard interfaces are used in data acquisition this year, and IDAC's system is adequate for basic applications. This straightforward screen is used to configure ranges for input channels.

data manipulation libraries for six common variants of FORTRAN, BASIC, Pascal, and C. The libraries cover all types of I/O channel management, including highest-speed operations; transformations through scaling; basic statistics; and fast Fourier transform. For total control, the MacAdios manual includes a discussion of the SE memory map and assembly language control of data acquisition and control functions. If you need to generate a well-defined 20-kHz sawtooth wave, MacAdios is your best bet.

Recognizing that inexperienced programmers may be put off by the responsibilities of power, GW also sells a version of LabView (National Instruments' icon-driven programming system) that includes custom drivers for the MacAdios board. This makes managing the system simpler, at an additional cost of about $2000.

Conclusion

It's obvious from the hardware capabilities and the examples given in the manuals that these products reflect their developers' specific backgrounds. MacLab was probably designed by biologists or biochemists, IDAC was set up to solve industrial-control problems, and MacAdios was developed for general-purpose, high-speed engineering uses. In principle, any one of these systems could work for a wide range of applications, but in practice you will find it easier to use a system designed with your application in mind. With the current set of possibilities (five closed-box systems and almost as many boards now on the market for the SE), that should be no problem.—*Charles Seiter*

See *Where to Buy* for contact information.

NEC SilentWriter LC890

300-dpi PostScript printer. ***Pros:*** *Has 3MB RAM; informative LCD display; two paper hoppers; one-year warranty.* ***Cons:*** *Can't print envelopes; picky about paper quality.* ***Company:*** *NEC Information Systems.* ***List price:*** *$4795.* ***Requires:*** *AppleTalk cables.*

Among the dozens of PostScript-compatible laser printers available, the NEC SilentWriter LC890 is something of a renegade. Unlike most PostScript printers in its class, it doesn't contain the Canon or Ricoh printing engine (the actual printing mechanism); instead, it's equipped with a proprietary engine that employs several new technologies. Heavy and squat, it won't win any awards for good looks. But its designers seem to have gone out of their way to create an extremely functional, quick, and sturdy machine.

LED the Way

The most unusual aspect of the SilentWriter is that it's not really a laser printer at all. All other PostScript printers use a laser beam bounced off of a moving mirror to etch the printed image onto a drum. NEC, however, has replaced the laser-and-mirror system with a row of tiny light-emitting diodes (LEDs). The 300-dots-per-inch output is the same as that of a laser printer, yet the absence of the laser apparatus, according to the manufacturer, means that there are fewer moving parts to wear out.

Sixty-Eight Pounds of PostScript

The NEC SilentWriter LC890 comes with a clear, heavily illustrated manual, several paper-handling attachments, a kit containing cleaning supplies, and some replacement parts. Its 35 resident fonts are the same as those in the Apple LaserWriter II series.

The SilentWriter compares favorably with other PostScript printers in its price range, including Apple's middle-of-the-line LaserWriter IINT. The SilentWriter comes with a megabyte more memory than the IINT, meaning you can download more fonts and more complex images. It has a paper feed capacity of 500 sheets, compared to the LaserWriter's 200 sheets. In addition, the SilentWriter's one-year warranty is four times longer than Apple's and includes 90 days of on-site service. The NEC engine's 600,000-page life expectancy is twice as long as the IINT's and that of almost every other PostScript printer in its price range.

The SilentWriter's most dramatic improvement over its rivals is its 2-line LCD front panel, which constantly tells you what's happening inside. As your document is printed, the display says, in turn, Online, Processing, Printing, and finally Idle. Clear messages alert you if the paper jams, the toner runs out, or the cover isn't quite closed. The front panel has a 30-character readout with hierarchical menus that let you disable the start-up page, run a printer self-test, and select the paper feed and emulation mode (Diablo 360, HP LaserJet, or PostScript). This readout makes the SilentWriter much more communicative than its blinking-light-only rivals.

NEC's engineers seem to have put great care into making the SilentWriter convenient to use. The paper feeds are vertical slots on top of the printer, instead of removable paper trays; adding a stack of paper is much like dropping a slice of rye into a toaster. There are two 250-page hoppers, so you can put a different size of paper in each. The SilentWriter's stubby shape provides a short and accessible paper path. When you pop the lid open, the entire course traversed by the sheet is visible, making paper jams easy to clear.

After 3000 pages, you need to replace the toner through a slot on the printer body; after 7000 pages, you need a new developer drum, which clicks solidly into place. Apple's LaserWriter and most other printers, on the other hand, combine toner and drum into a single cartridge. The two-in-one method is convenient, since there's only one item to replace, but it has a disad-

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vantage: you have to replace the entire cartridge if either the toner or the drum is exhausted, which means you waste what is left of the remaining component.

Finicky Eater

The SilentWriter's only significant drawback is its fussiness about paper. Although it's a thoroughbred performer when fed its preferred diet of 16-to-20-pound smooth paper, it chokes on anything lighter. If you use much paper with rag content you will eventually have to clean the printer's innards of particles the paper leaves behind. And you can't print envelopes without an extra-cost manual-feed hopper; even then you have to babysit while printing to make sure the envelope goes into the printer straight.

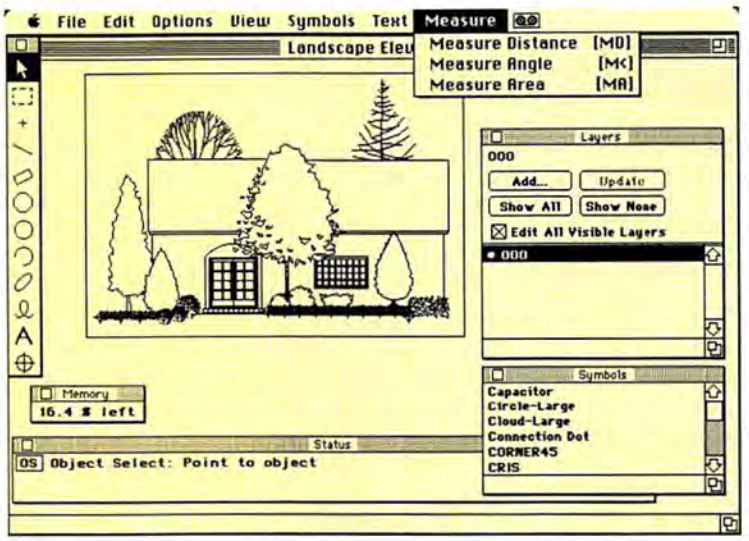
What the SilentWriter does accept, however, falls into the output tray with crisp, nicely black images. The extra RAM means you rarely run out of memory for downloading fonts, and the easy-to-read front panel keeps you constantly apprised of the SilentWriter's status. If you can get by without printing a lot of envelopes, this 68-pound ugly duckling will perform as gracefully as a swan.—*David Pogue*

See *Where to Buy* for contact information.

Generic CADD Level 1

2-D CAD program. ***Pros:*** *Mac Plus/SE and Mac II versions; symbol libraries; layering; proprietary fonts and font editor; named views; 16-decimal floating-point database; MultiFinder-compatible.* ***Cons:*** *No fills or color; no line-width choices or arrowheads; no plotter support; no import/export facility; no autodimensions; no tangents, fillets, or chamfers; deviates somewhat from standard Mac drawing interface.* ***Company:*** *Generic Software.* ***List price:*** *$99.95.* ***Requires:*** *1MB; hard disk or external drive recommended; math coprocessor recommended.*

Generic's CADD, for the PC, has been a phenomenal success, competing toe-to-toe with AutoCAD for market leadership in terms of units sold. But since Generic's base price is $99.95 and AutoCAD's is nearly $3000, the lion's share of both revenue and attention has gone to AutoCAD.



CAD on Draft
Generic CADD Level 1 may not have color, but it offers more precision and drafting-style commands (such as layers, area and angle measurement, and a symbol library) than most drawing programs. It doesn't have such CAD necessities as cross-hatching, autodimensions, or even line-width options.

Now that leading DOS CAD packages such as AutoCAD and VersaCAD have gotten serious about the Mac, it should be no surprise that Generic too is stepping into the fray. Generic CADD Level 1 is the first of several programs Generic has planned for the Mac. It does a decent job of following the standard Mac interface without getting too far away from its DOS roots.

CADD Level 1 has some important and well-crafted features, including basic commands for layering, symbol libraries, and named views of a drawing, as well as support of a math coprocessor. However, there are major omissions: no plotting ability, no drawing import or export except through the Clipboard or Scrapbook, no color, no autodimensioning, no fills or cross-hatching, and no fillets or chamfers. It doesn't even sport arrowheads for lines. CADD Level 2, which is scheduled for release in the second quarter, will give you some of these features, including color and autodimensions. (A coupon for a $99 upgrade is included with the CADD Level 1 package. The list price of CADD Level 2 has already been set at $199.95.) With the proposed features Level 2 will be an inexpensive, but serious, CAD package. You can only consider CADD Level 1 as a sketching pad with a surprisingly precise underlying database (16-decimal floating-point if you choose), or as a training tool until you can get Level 2.

CADD Level 1 comes in two versions, both packed onto the same floppy. The Plus/SE version does not support a math coprocessor; the II version demands one (and will run on any Mac that has one). That's the only difference. In timed trials on a Mac II, the II version redraws 25 to 100 percent faster. Although CADD Level 1 uses a precise, 16-decimal-place floating-point database, it doesn't have to deal with dimensions, fills, or other sophisticated features on a drawing. For that reason, and because there is no provision for translating files into DXF, IGES, or some other standard CAD format, you can't really compare the speed of CADD Level 1 to that of other CAD programs. CADD Level 1 itself requires a minimum of 512K RAM to run, and works better with at least 750K; the more memory you use, the larger the drawing file you can work on and the faster your work will run.

Hybrid Interface

Just like the PC version, CADD Level 1 for the Mac can be manipulated by keyboard or mouse, in much the same way as AutoCAD is driven. You either click on menu commands and then point and click on the screen to direct those commands, or you type abbreviated names for the commands and then enter the appropriate coordinates (with mouse or keyboard). Commands sit under typical Macintosh pull-down menus that have secondary pull-out menus and dialog boxes for lower-level options and commands. Extra "palettes," or windows, on the screen contain drawing tool icons, status information on the cursor position and current command, layer information, and available symbols. CADD Level 1 asks you to choose a command and then an object to act upon, instead of the other way around, and to

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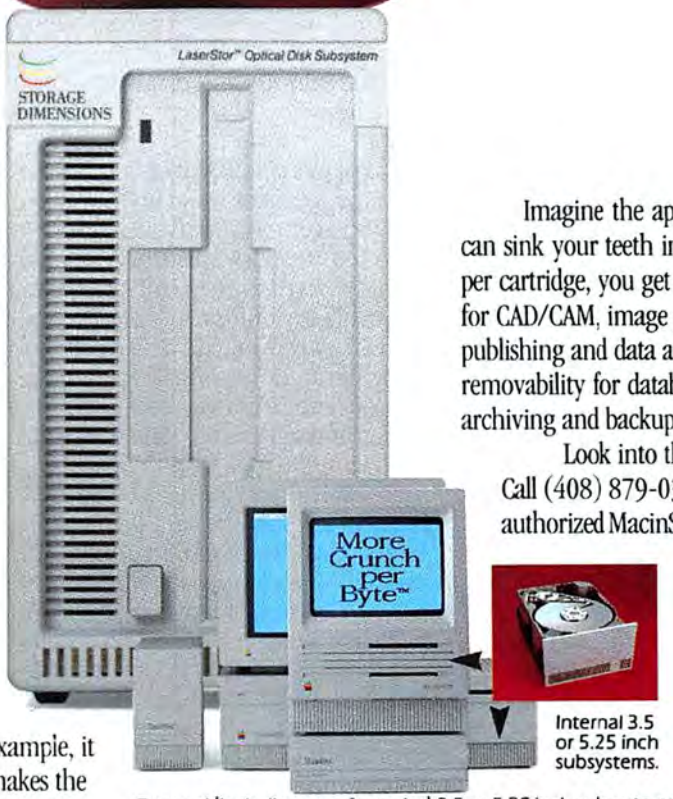

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choose points without dragging the mouse. This is different from standard Mac CAD practice, but not too hard to get used to. And since CADD for the PC uses the same approach, switching from PC to Mac is easy. There are some touches, such as holding the Shift key to constrain to vertical or horizontal, and holding the Option key to snap to a near point, that make drawing easier.

The drawing tools comprise the basics: circles, arcs, freehand, lines, and text. You can choose the number of sides in a polygon and enter coordinates in absolute or relative, Cartesian, or polar modes. You can manipulate objects using move, rotate, scale, and mirror. The standard Macintosh Cut and Paste commands are where they should be. There is an adjustable grid and a Snap to Grid command, and you can work in English or metric units. You can also draw bezier and spline curves, as well as measure distance, angle, or area by clicking on chosen points of a drawing.

The Bright Side

Not only can you zoom in or out on a drawing and jump back to a previous zoom, but you can also name specific views that will then appear on a menu, and automatically go directly back to them. Panning can be accomplished only by selecting a new center for a drawing: there are no scroll bars.

Generic CADD Level 1 doesn't use standard Macintosh text fonts. Instead it comes with three of its own that can be slanted, sized, rotated, and otherwise positioned on a drawing. CADD Level 1 also has a built-in font editor for creating and saving your own character sets by using the same drawing tools that you use for general work in CADD Level 1.

Symbol libraries are one of the strongest features of CADD Level 1. A separate window lists the symbols available and lets you load new symbols from disk, save your symbols to the library, and scale symbols for placement on a drawing. The symbols are listed by name, not shown graphically, but are easy to locate and use. Generic Software sells specialized symbol libraries for use with its CADD programs. Each one holds about 100 symbols and costs $49.95.

Not many inexpensive drawing packages have the layering facility of CADD Level 1. A separate palette shows you the names of layers and which ones are displayed. You can create and shuffle up to 256 layers per drawing, displaying and printing the set you prefer.

The Dark Side

It's easy to summarize the shortcomings of CADD Level 1: mainly, the problem is a lack of features that are common in CAD. Besides the major omissions mentioned earlier, lines are drawn with only one thickness and most of the drawing tools lack versatility. Circles, for instance, can be drawn only by specifying the center and a perimeter point, not by using three points or by other methods. Although you may break lines or objects and choose which part to throw away, there are no chamfer, fillet, draw-tangent, or extend commands. You can only snap to the grid, not to other objects or endpoints. There is no way to enter dimensions for an object other than to type some text on the drawing.

Once you have completed a drawing, you can select the part of the drawing you want to print on a standard Mac output device, but there is no plotting utility or option, and no export command for translation to DXF, IGES, or other standard format. You can move objects to another program through the Clipboard or Scrapbook, but that defeats the purpose of a highly precise CAD drawing database. Generic says that a translator for moving between Generic PC and Generic Mac CADD files is on the way.

Forget the Second *D*

You'll probably get up to speed on CADD Level 1 in less than an hour, because it fits reasonably well to the Mac interface, has a HyperCard Help stack, and comes with a clear, deftly written, and lengthy manual. However, you may experience some frustration with the ways the interface deviates from Mac standards—such as no scroll bars. You'll be even more frustrated if you expect this to be anything more than a drawing tool. Sure, there are the symbol libraries, named *views,* and 256 layers. That's not bad for a simple sketching program—and the price is reasonable when you think of it that way. But even simple work often calls for fills and color. Without the ability to import/export to standard formats, without fills or fillets, without different line widths, CADD Level 1 can't be considered a true drafting tool. Calling it one is CAD—computer-aided dreaming. Perhaps Level 2 will change that.—*Phillip Robinson*

See *Where to Buy* for contact information.

QuickCapture 1.0

Video frame grabber hardware and software. ***Pros:*** *Accepts up to four video inputs; clearly written manual.* ***Cons:*** *Need to change jumpers to reconfigure board; can't convert Macintosh images to video output.* ***Company:*** *Data Translation.* ***List price:*** *$1595.* ***Requires:*** *Macintosh II with extended video card; 20MB hard disk; 1MB.*

Data Translation's QuickCapture is one of the first products designed to satisfy the Mac II's appetite for gray-scale images. Also known as a frame grabber, the board accepts pictures from any standard video source (a camera or VCR) and converts them into 480-by-640-pixel gray-scale images.

Playing the Slots

You can slip the QuickCapture board into any free expansion slot, with the help of its clear, step-by-step documentation, which also includes a section on how to write programs that access the board. The only tricky part of installation involves inserting or removing five tiny, hard-to-handle plastic jumpers to configure the card for your particular video setup. Once the jumpers are in place, though, you'll rarely have to change them.

QuickCapture comes with a cable that has eight BNC "push and turn" type connectors on one end. With this cable, you can attach up to four different video sources to the board, but only one can be active at a time. Another of the connectors

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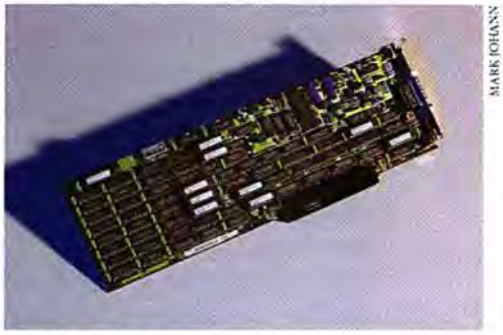

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QuickCapture
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is for connecting a trigger device to initiate image capture in response to an external event. The other three connectors are used for monitoring the video signal, and for video synchronization.

Grab It

The QuickCapture application lets you capture and edit images, but doesn't provide a way to convert Macintosh images into video form. Select Live Video from the Image menu, and whatever is on the currently selected input channel appears on the screen in an Untitled window. You can display live video in more than one window at a time, but each new window you open slows the overall update rate. Even with only one window open, the board can't quite keep up with rapidly changing scenes.

When you see a picture that you want to save, a mouse click anywhere in the active window stops the action so you can save the image. The program allows you to alter the gray scale of incoming images before they're frozen. You can select from 2, 16, 64, and 256 shades of gray in either Positive or Reverse mode. If the video picture is too dark or too light, you can multiply or divide all the gray levels by a factor of 2 or 4. QuickCapture can export images as PICT, TIFF, RIFF, or EPS files, as well as in Data Translation's proprietary IRIS format. Only IRIS files can be opened, though.

You can also use the software to manipulate saved or captured images. The program includes filters for sharpening, smoothing, edge detection, and vertical and horizontal line accentuation. QuickCapture's Image Calculator is an unusual feature that looks and works like the Calculator desk accessory. It lets you add to and subtract from an image's pixel values or add, subtract, and perform Boolean operations on pairs of images.

The results you get with QuickCapture depend on the quality of the pictures you feed it. I was able to obtain excellent gray-scale images with both an older video camera and a VCR. The program's image processing functions are a bonus, but don't expect them to substitute for a fully functional application like Digital Darkroom. If you need to import black-and-white video images into your Mac II, QuickCapture is an excellent choice.—*Franklin Tessler*

See *Where to Buy* for contact information.

Micro Planner 6.1e

Project-management software. ***Pros:*** *Uses standard project-management logic; closely ties resources and activities.* ***Cons:*** *Difficult to learn; Mac user interface could be improved.*
Company: *Micro Planning International.*
List price: *$595.* ***Requires:*** *1MB.*

Project-management software helps track large-scale projects such as publishing a magazine, building a house, or bringing a new product to market. It creates charts to help manage and monitor resources, deadlines, and other aspects of the job: it diagrams the activities that need to be accomplished, tracks resources to make sure they are not overutilized, and establishes dates when the various activities, as well as the project as a whole, should start and end.

If you're looking at project-management software for the Mac, you have two choices: MacProject II and Micro Planner. The first is inexpensive and relatively easy to learn. The second is more complex and more powerful, and costs about twice as much.

With MacProject II, you enter task names in boxes and join the boxes by drawing MacDraw style lines to represent the sequence of tasks. This becomes the schedule chart. If you have used other Mac applications, the process is familiar, and you'll probably master the program in half a day or less. With Micro Planner, you input the data and the program automatically creates the chart. This process is less intuitive, and if you're unfamiliar with project-management concepts, it will take a few days before you're comfortable with it.

Complex Charts Made Easy

Micro Planner has the advantage of producing more legible charts partly because it uses standard project-management symbols to represent the relationship between activities. MacProject II, by contrast, has only one major logical convention: left-most activities must be completed before activities displayed to their right can begin. In straightforward sequential projects, that convention is adequate. Micro Planner's more advanced logical conventions allow you to represent complex relationships that are not available with simple boxes and lines. For example, the three activities required to install a sewer pipe might be to dig a trench, lay the pipe, and close the trench. But it would be a waste of time to begin each task only after the preceding one is completed, because after the trench digger has been working only a day or two, the pipe laying can begin, and so on. Micro Planner has symbols to represent lag- and lead-time activities that can be combined in complex ways to create these staggered structures.

Micro Planner also simplifies diagrams using *hammock* activities. These span, and therefore summarize, complex series of events for more concise reporting. For example, suppose there are ten steps to installing sheet rock, including cutting the sheet rock, nailing the sheet rock, sanding it, and so on. You can specify a hammock event called "Start Sheet Rock" at the beginning of the process, and at the end of the process another hammock event called

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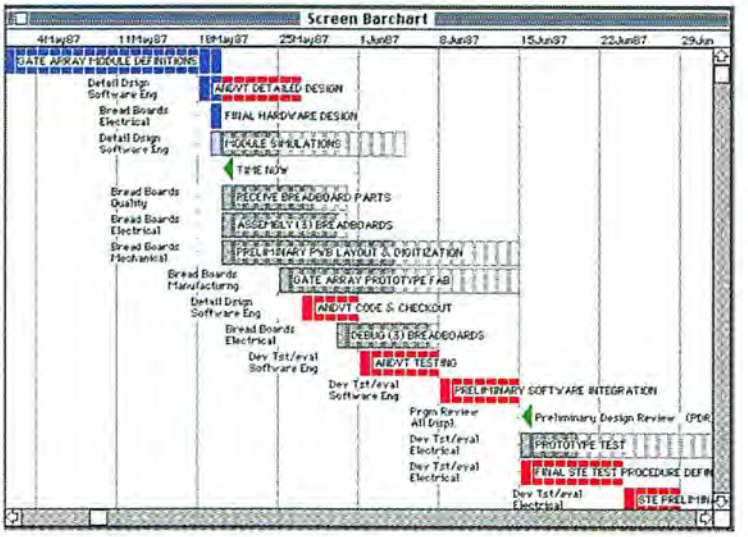

Logic Diagrams *Micro Planner automatically draws the project "road map" (called* logic diagrams *or* network diagrams*), calculates and displays deadlines and resource needs. It also shows schedule bottlenecks.*

Right, it's efficient.
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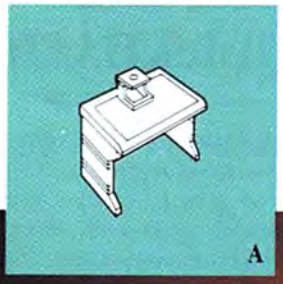
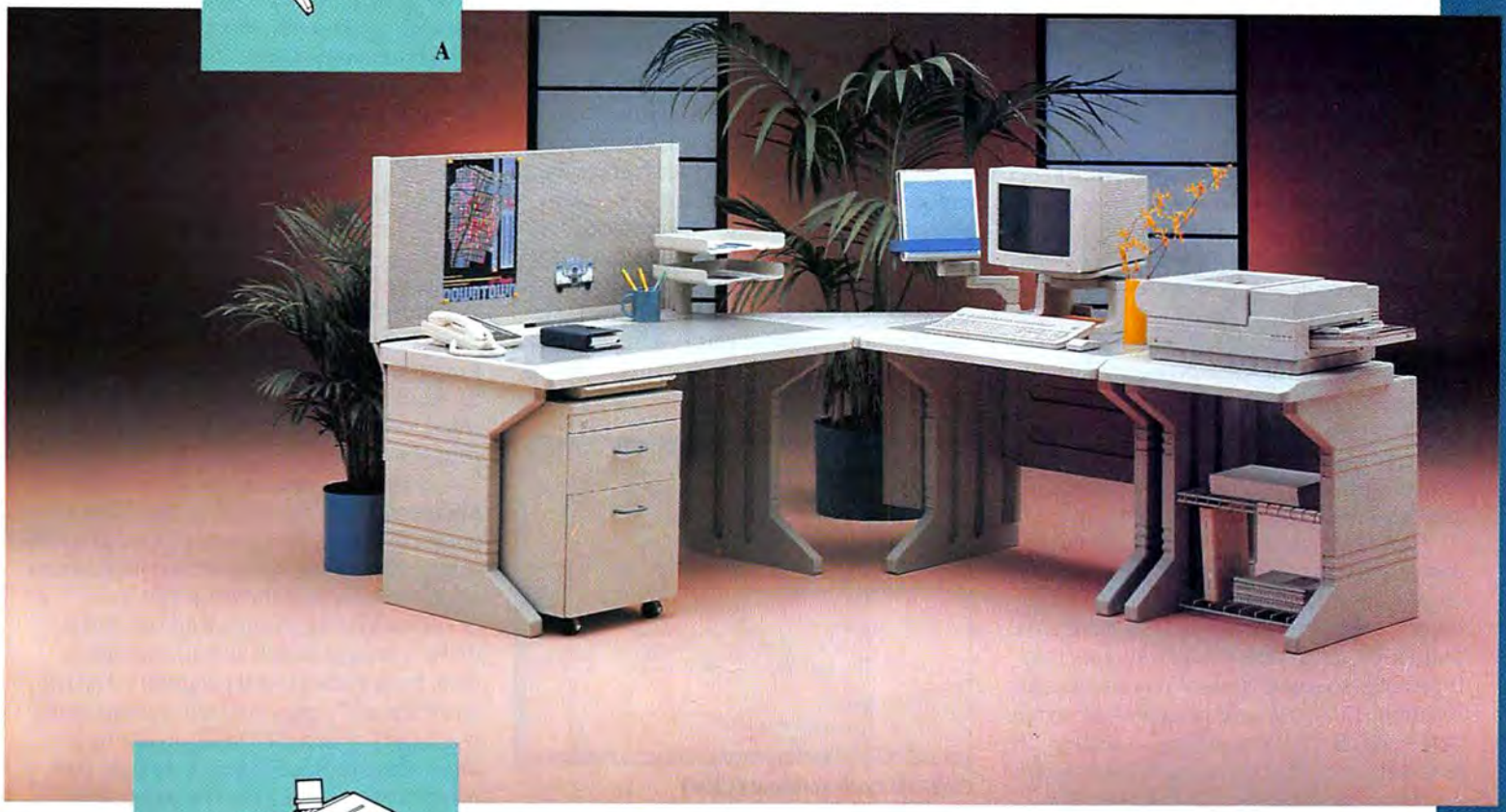
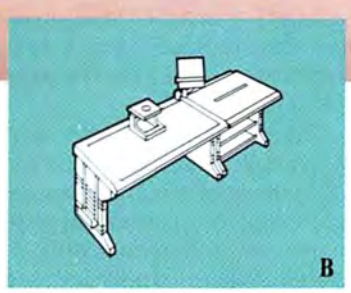
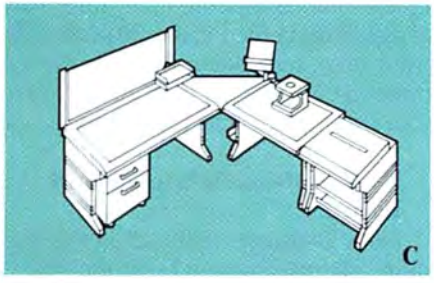
Costs an arm and a leg, right?









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Breakthrough prices. The basic workstation (drawing A) costs less than $305. For under $635, you can set up the intermediate workstation (drawing B). And the full featured workstation (drawing C and photo) is less than $1300. Since the WorkManager™ System is modular, you can start small and add on as your needs—and resources—grow.

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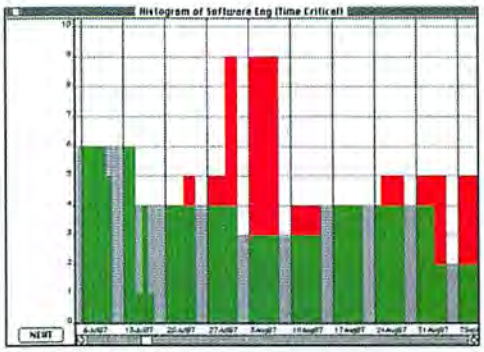
MicroComputer Accessories Inc



Resource Analysis
The histograms graphically depict project demands for all resources, showing where demand for resources is greater than the supply (the red bars indicate demands that exceed supply) so that users can determine the best use of specific resources given time and budget constraints.

"Finish Sheet Rock." The program automatically adds up the duration of the events within the hammock activity. You can access reports that include just hammock activities, and you can also use hammock activities in allocating resources.

Another advantage of Micro Planner is that it lets you consider resources such as employees, machinery, and supplies when determining the start and finish dates of activities. For each task you can specify two types of resources. Normal resources—for example, bulldozers or people—are available each day. Pool resources—such as plywood sheets—are consumed. Each normal resource can have its own calendar. You can specify that a bulldozer is only available for this project on Monday through Wednesday, or that a painter can only work in the office on weekends when no one else is there. The program also keeps a running total of pool resources, taking into account how much will be used at each activity and when new resources are expected to arrive.

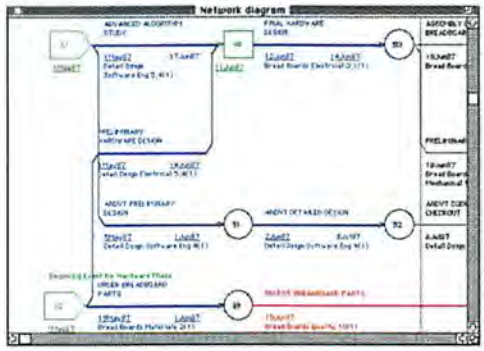
Once you input the resources, the time each activity is expected to take, and the sequence of activities, Micro Planner can do either a Forward Pass, which specifies the earliest day the project can be completed given a specific start date, or a Backward Pass, which gives the latest day the project must be started if it is to be completed by a given deadline.

The program can generate a number of reports and diagrams. The Network Diagram is a graphical representation of all the activities; the Bar Chart shows activities along a time scale; the Activity Listing shows all activities, along with their stop and start dates; and the Progress Report compares the actual performance with projected performance.

Micro Planner is MultiFinder compatible and can be used on an AppleShare network. It also allows transparent file transfer with its IBM PC version.

Steep Learning Curve

Because project management is a complicated discipline, it is natural that a program like Micro Planner is not easy to learn. It could be made easier by providing a more familiar user interface. For example, when you input data, you can only scroll over a limited part of the document using the scroll bar. Then you have to click at the side of the screen to move the data and get more room to scroll. Also, some boxes do not have Close or Cancel buttons.



Critical Path Method (CPM)
Micro Planner's color-coded CPM lets you determine which tasks must be completed immediately if a given deadline is to be met (red), which ones have been completed (blue), and which ones can be delayed without affecting the deadline (extra days are indicated by boxes outlined in green).

And to enter data from an options list, you cannot just double-click, you must select the data and press enter.

Steep as it is, the learning curve on Micro Planner doesn't look so bad when compared with the majority of project managers running on PCs, DEC minis, and IBM mainframes. And Micro Planner can compete with any other system in terms of versatility and power.—*Lawrence Stevens*

See *Where to Buy* for contact information.

Microsoft QuickBASIC 1.0

Integrated BASIC compiler and interpreter. ***Pros:*** *Good integration of compiler and interpreter; provides access to Macintosh Toolbox routines; can generate 68020 code; quick run-time performance.* ***Cons:*** *Compiling an application is slow; poor index in manual.* ***Company:*** *Microsoft.* ***List price:*** *$99.* ***Requires:*** *1MB.*

In the past there were a variety of reasons not to program in BASIC on the Macintosh. Programmers complained of an inability to directly access the Mac's toolbox routines, a severe lack of control structures, antiquated debugging tools, and no support for linking to other languages. In addition, BASIC was interpreted, not compiled, and was therefore slow.

With the latest release of QuickBASIC, Microsoft has responded to these grievances, fusing its BASIC compiler and BASIC interpreter into a sophisticated and diverse implementation of the language.

QuickBASIC comes with two 800K disks: a program disk and an examples disk, both packed with programs. Also included is a 571-page manual so hefty that I constantly referred to items in the index. Most of the topics I needed, though, had no reference, since only the most obvious topics are indexed.

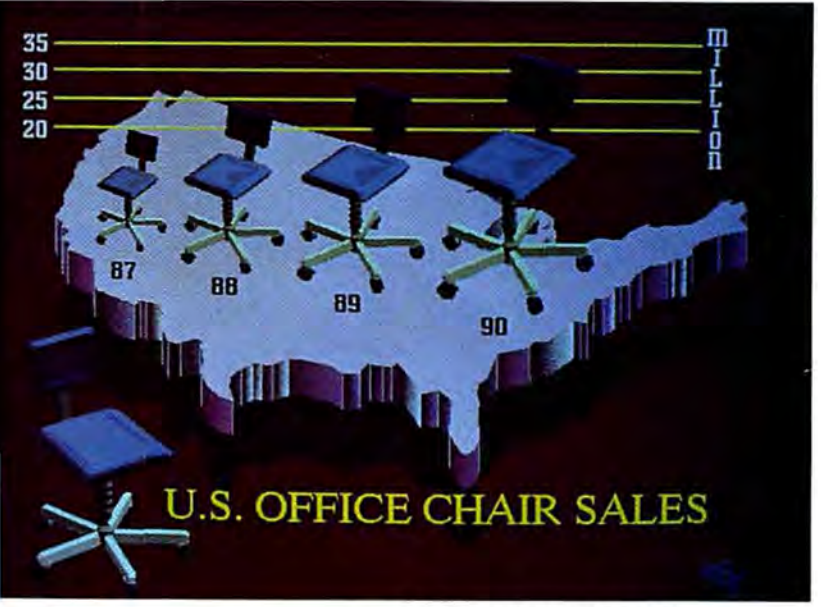
Version 1.0 of QuickBASIC comes with two compiler/interpreters on the program disk. A decimal version generates BCD code suited for financial applications, and a binary version generates IEEE code more suited to scientific applications. QuickBASIC also includes three run-time packages, for BCD code, IEEE code, and for running with a 68881 coprocessor. Included on the examples disk are many informative and well-commented example programs, as well as source-code utility programs written in QuickBASIC that enable you to create cursor and pattern resources.

The Toolbox, Debugger, and Editor

Many languages that run on the Mac require intimate knowledge of the Mac toolbox and its calls. QuickBASIC makes

(continues)

William Lombardo, Modelmaking & Illustration
Created with Swivel 3D and PixelPaint



Roy Santiago, Business Presentation
Animated Swivel 3D images in VideoWorks

"A superb presentation tool... Swivel 3D raises the standard of 3-D graphics on the Macintosh."
Joost Romeu, MacWeek

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Salvatore Parascadolo, MacUser

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David Peltz, MacWorld

Jim Ludtke, Graphic Artist
Magazine illustration created with Swivel 3D.

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Jack Davis, Verbum

Paracomp Redefines the Graphics Standard

Swivel 3D, the essential Graphics Tool

Swivel 3D lets you create stunning graphics never before possible. By simply rotating, scaling and casting shadows, Swivel 3D generates a limitless amount of images from a single 3D drawing. Explore presentation ideas quickly — you have the power to produce your best graphic presentations and animations.

Create beautiful illustrations by combining the visual power of Swivel 3D's images with the special effects found in today's graphic applications. Swivel 3D's presentation images can be easily moved to popular paint and draw programs. For animation, Swivel 3D pastes a series of color animation frames to the Scrapbook which you can easily import into VideoWorks or Hypercard.

Swivel 3D is the first and only program to feature Linking. Linking allows you to create realistic images with wheels, doors, levers, arms, legs, and objects that move.

An extensive library of images, shapes and alphabets, is included. Swivel 3D is a powerful graphics program for anyone involved in animation, business presentations, and graphic design — *it is the essential tool for all of your graphic needs.*

Three-Dimensional Drawing/Modeling for the Macintosh.

Suggested Retail Price: $395

Minimum System Requirements: 1 meg

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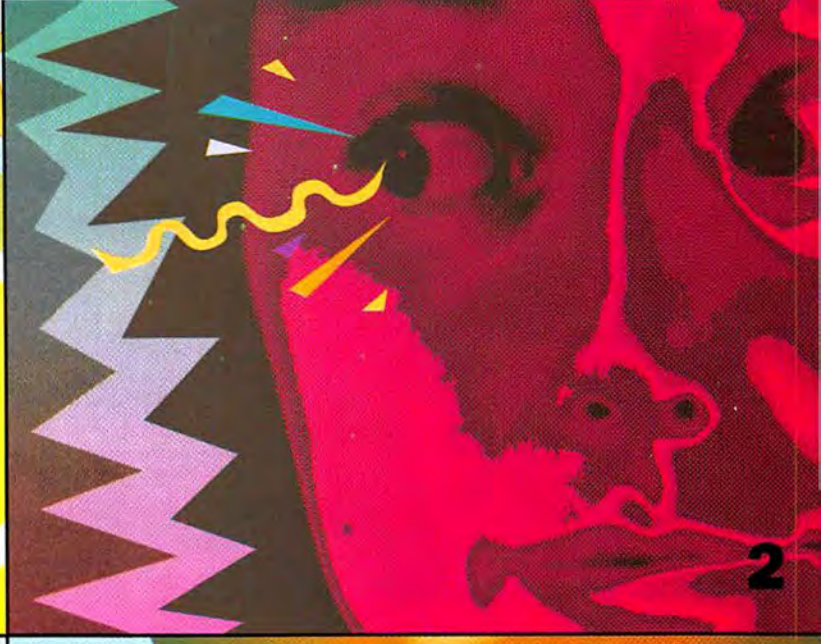

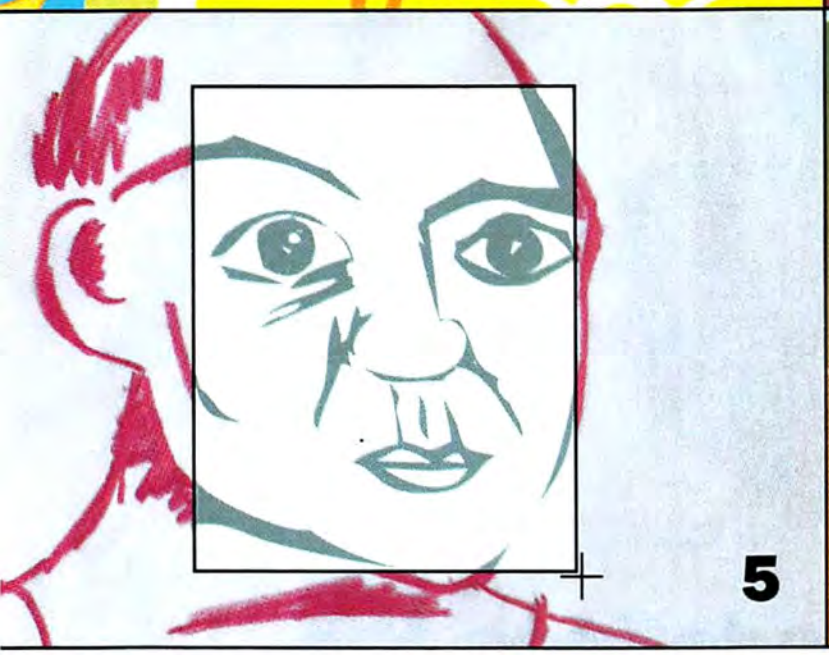

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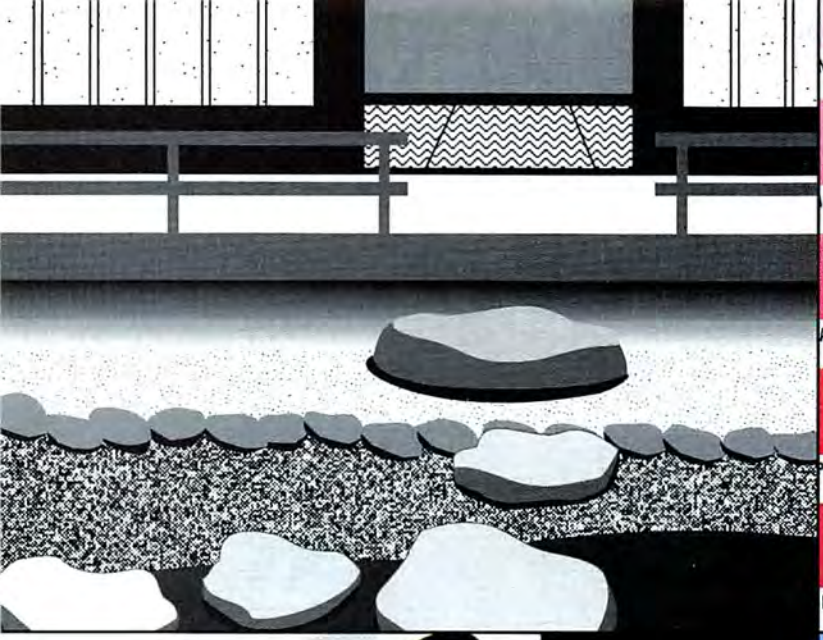

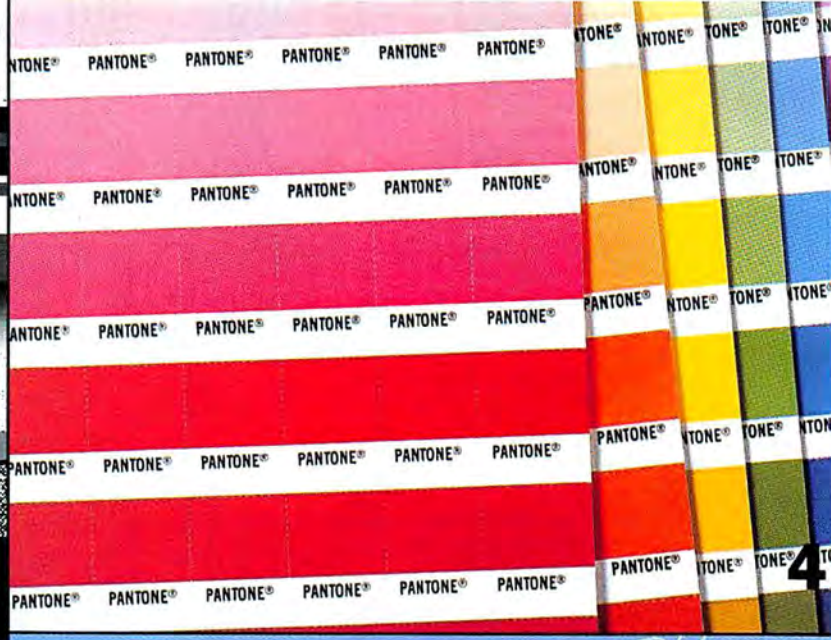

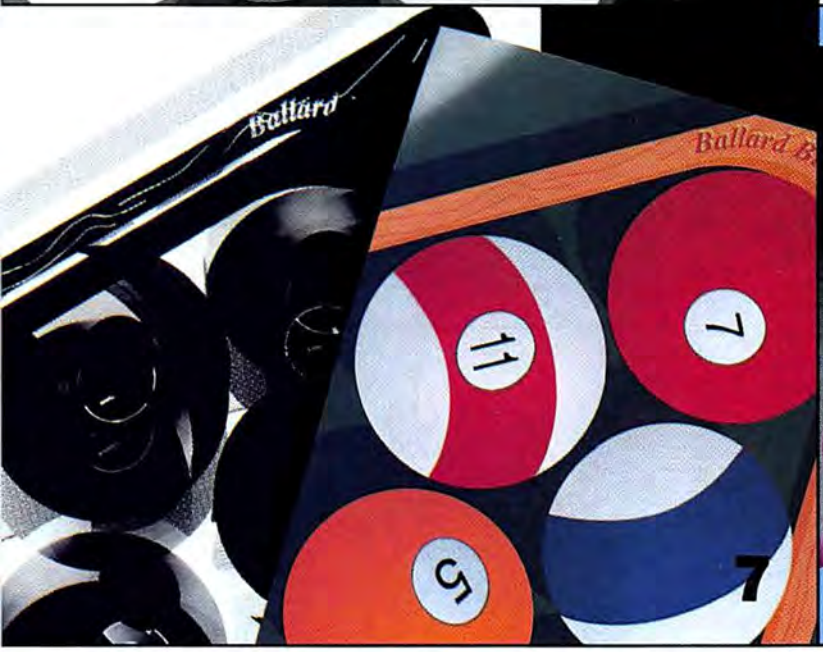

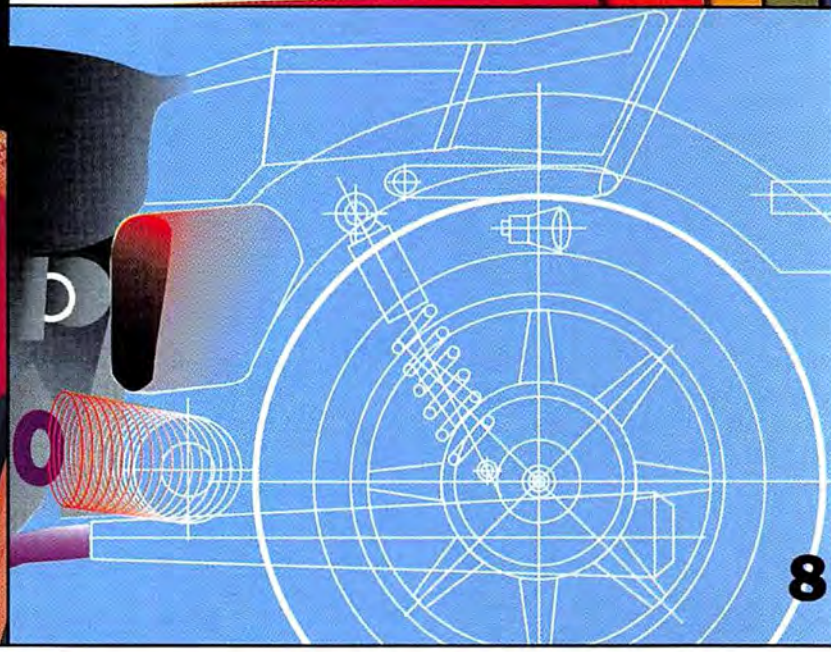

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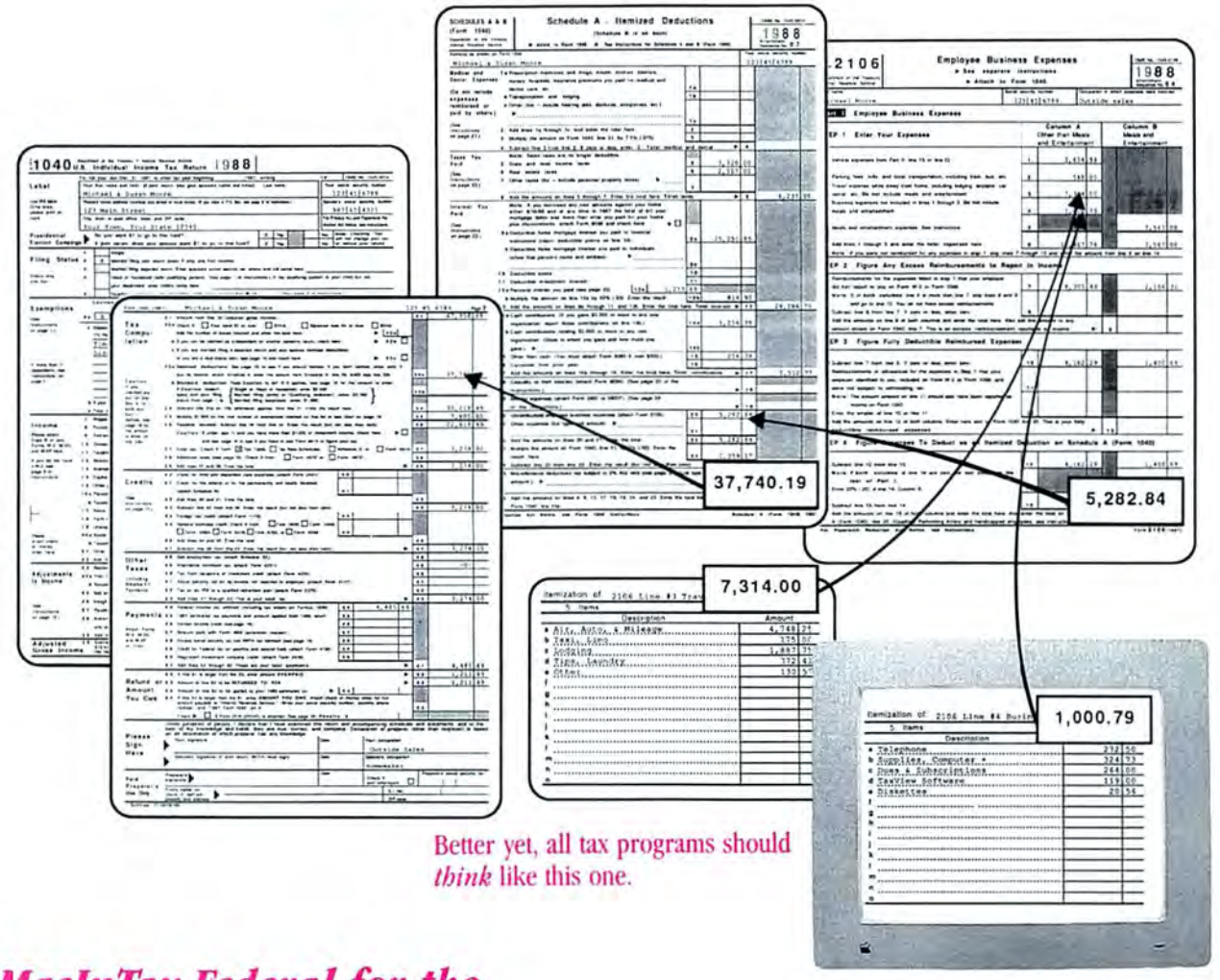
All tax programs should look and print like this one.



Better yet, all tax programs should *think* like this one.

MacInTax Federal for the Apple Macintosh.®

Simply put, MacInTax whisks you through stacks of receipts and W-2's by allowing you to enter data directly into 72 IRS forms, schedules, worksheets and statements displayed on-screen in identical IRS format. The program totals all entered amounts, automatically makes all tax calculations, and instantly links data to and from individual forms, schedules, worksheets and statements.

It even checks your input and helps you prevent illogical, inconsistent or incomplete entries.

The complete IRS instruction booklet is stored on a line-by-line basis.

What's more MacInTax lets you easily import text files from a variety of outside spreadsheet, database and accounting programs.

When you're ready to sign and send your completed return, the program prints forms and schedules identical to the official IRS versions (complete with your data) onto blank paper using your supported laser *or* dot-matrix printer. Of course, all printed forms are fully IRS-approved.

MacInTax Federal 1988

One look and it's easy to see why, each year, users give this program their highest rating.

To order your copy publisher-direct, call SoftView at 1-800-622-6829. Or, visit any one of 10,000 retailers offering MacInTax.

MacInTax Federal for the Apple Macintosh.

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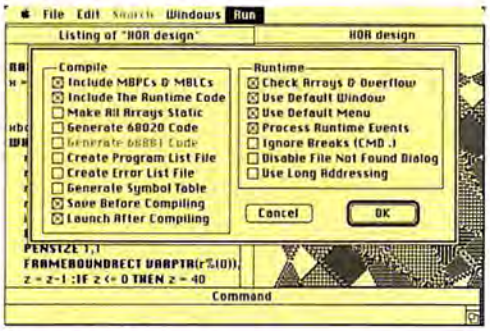
all this automatic so that the developer can concentrate on ideas, rather than getting lost in typical Macintosh housekeeping details. A routine named ToolBox lets you access toolbox routines based on the trap address and other parameters. QuickBASIC also enables you to create and access libraries. Another powerful feature is the ability to call routines written in other languages (such as LightSpeedC, assembly language, or any language that can generate pure code resources) to fine-tune the QuickBASIC application.



Compiling Options

QuickBASIC offers many different compiling options, including creating static arrays, Error List files, Program List files, and generating 68020 code.

Microsoft has provided a good BASIC debugger in QuickBASIC, with which you can both step through and trace through a program. In Step Mode, each time you press a key, the next statement in the program is executed and surrounded by a rectangle (the same result occurs when the interpreter finds an error). In Trace Mode this process is automated. By using the TRON and TROFF calls to surround selected sections of program code, you can watch specific parts of your program execute at a slower pace. One of the nicest features of the Trace Mode is that you can see each of the graphic call statements in your program as it executes. You can also set dynamic breakpoints by selecting an option on the menu or by dragging a small Stop icon to a chosen spot in your program.

QuickBASIC's editor is fully equipped. While editing you can cut, paste, and copy; unfortunately, the Undo function has not yet been implemented. When you press the Return key or move the cursor to a new line, each QuickBASIC reserved word is boldfaced. I liked this feature, but could find no way to disable it for those who may not.

In the Search menu you can find, search, and replace text (there is no wrap-around option). You can also get information about specific QuickBASIC reserved words by placing the cursor on the desired line and selecting Get Info. You can change this stored information with the Set Info option to suit your programming style. The final touch is the Bookmark option, which lets you mark lines of your program that you want to return to quickly. Using the Next Bookmark option you can easily traverse the bookmarks you have set.

The Compiler

QuickBASIC comes with two compilers, one for the BCD format and another for the IEEE format. These compilers offer many options: compiling the run-time code directly into a program, generating code for the 68020 processor or the 68881 coprocessor, generating static arrays, creating an error list, and many more (see "Compiling Options").

I did a simple benchmark on the speed of the QuickBASIC compiler and interpreter, using the Sieve of Eratosthenes. To perform the tests I used QuickBASIC's binary (IEEE) compiler on a standard Mac II with 1 megabyte of memory.

The interpreter took 28 seconds to execute the Sieve. QuickBASIC's compile time (22 seconds) is not as fast as that of other languages. It took 4.2 seconds to execute; with the 68020 and 68881 options enabled, however, this time was reduced to 2.3 seconds. I also ran the Sieve under Symantec's LightSpeedC and found that although that language compiled machine code much faster than QuickBASIC did, it executed the Sieve in a comparable amount of time.

Quick and Basic

Microsoft has listened to its users and modified the language it helped spawn into a powerful product. This new version of QuickBASIC bridges the gap between a serious development tool and an easy-to-use learning tool. From its quick run-time performance to its inherent ease of programming, QuickBASIC will surely entice some of those disenchanted programmers.
—David J. Rudolph

See *Where to Buy* for contact information.

AppleShare-Compatible File Servers

AlisaShare 1.0. ***Pros:*** *Enables transparent access to Mac files on VAX server; allows VAX users to share files with Mac users; supports all features of Apple's AppleTalk Filing Protocol.* ***Cons:*** *Best performance cannot be achieved while providing AlisaTalk's other services unless second Ethernet controller is installed in VAX.* ***Company:*** *Alisa Systems.* ***List price:*** *Version 1.1 running on MicroVAX 2000 $4700, for larger VAXes up to $21,000.* ***Requires:*** *DEC VAX; Mac 512KE; LocalTalk with Ethernet gateway or EtherTalk.*

PacerShare 1.0. ***Pros:*** *Enables transparent access to Mac files on VAX server; allows VAX users to share files with Mac users.* ***Cons:*** *Does not support AppleShare's Guest logon or drop folders.* ***Company:*** *Pacer Software.* ***List price:*** *For 5 users $2400, for 500 users $45,000.* ***Requires:*** *DEC VAX; Mac 512KE; LocalTalk with Ethernet gateway or EtherTalk.*

While we wait for Apple and Digital Equipment Corporation (DEC) to determine how their two systems and networks will interact, third-party developers are filling the connectivity gaps. AlisaShare and PacerShare now provide the AppleShare file server interface to Mac users connected to VAX computers running the VMS operating system. With either package you can benefit both from the larger disks usually found on VAXes and from the regular backups from VAX system operators. You can even exchange files with your VAX cousins.

AlisaShare and PacerShare are but a part of the VAX-based networking packages offered by their respective companies. Alisa Systems' AlisaTalk includes network virtual-terminal support as well as print services for PostScript printers on AppleTalk or connected directly to VAXes, in addition to the new AlisaShare file services. Pacer Software's PacerLink supports virtual disks and print servers for VAXes as well as terminal emulation with multiple session capability. AlisaShare and PacerShare can both be installed and operated independently of the rest of the VAX software from the two companies.

(continues)

ANNOUNCING 162 NEW PRINTERS FOR THE MAC!

"The Implications of this Product are Staggering... This is a Great Product!"
Ezra Shapiro, Consulting Editor
BYTE Magazine, Feb., '88

Freedom to choose the best!

The Grappler LS, Grappler LQ and Grappler C/Mac/GS give you the freedom to use the printer you want with your Macintosh Plus, SE or II. No longer are you constrained by Apple's limited printer options. Whether you need special printer features, portability or just a lower price tag, the Grapplers now leave the choice up to you. Wide carriage dot matrix, portable 24 pin output, 300 dpi on an H.P. DeskJet ($995 suggested retail) or just getting productive use out of the old parallel printer in the closet, the Grapplers do it all! With support for popular Epson, Okidata, Toshiba and Hewlett Packard printers, and many more, the Grapplers will interface the large majority of the printers available today.

Choosing the Right Grappler

The Grapplers are computing devices and software that work like translators, modifying ImageWriter print output so your printer can understand it. The Grappler C/Mac/GS makes 9 pin printers work like the ImageWriter II. The Grappler LQ drives 24 pin and parallel HP compatible laser printers as if they were ImageWriter LQ. And the Grappler LS connects serial HP compatible printers, including the 300 DPI Hewlett Packard DeskJet, to your Macintosh. All you do is set the Grappler for your printer, plug it in and start printing. Your Mac thinks it's talking to an ImageWriter, so all your software will continue to operate as usual.

Experience in Printer Connectivity

Over 700,000 Grapplers have connected Apples and printers for over eight years. Now, you can connect your Macintosh to your choice of 162 different printers with the same reliability and confidence.

NEW! Powerful Grappler® Spooler for Grappler C/Mac/GS users

The new Grappler Spooler allows you to work on your Mac even while your printer is printing. This time saving software loads easily into your System Folder and is accessed through the Mac Control Panel, permitting extensive user control. Queue commands include: Move to Top, Delete, Defer/Restore, Cancel, Pause and more. The Grappler Spooler stores print jobs in seconds, uses minimal disk space, and is fully compatible with the Finder and Muli-Finder. Let the Grappler Spooler take your time back from your printer.

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Moving Along

	Mac SE → MicroVAX 2000			MicroVAX 2000 → Mac SE			Duplicate on MicroVAX 2000			Mac SE → Mac SE
Transfer File	Alisa (B)	Alisa (−B)	Pacer	Alisa (B)	Alisa (−B)	Pacer	Alisa (B)	Alisa (−B)	Pacer	
5K data, 0K resource	3.2	2.8	3.1	2.9	3.3	2.0	3.0	3.0	4.9	2.9
14K data, 1K resource	5.0	4.2	7.7	3.3	2.8	3.2	3.7	3.7	5.8	3.6
93K data, 0K resource	10.3	6.5	8.8	9.0	4.7	5.0	4.2	4.2	12.8	5.0
0K data, 256K resource	23.9	12.6	19.9	20.8	9.4	11.7	7.1	7.1	25.0	10.8
296K data, 0K resource	25.9	13.6	15.4	23.6	12.7	15.4	7.2	7.2	28.7	11.1
Launch Application										
MacWrite 5.0	22.0	14.1	13.5							
MS Excel 1.04	27.6	14.3	13.5							
FileMaker+	13.3	8.6	9.9							
ReadySetGo 4	19.8	13.3	11.8							

Moving Along

Different sizes and types of files were transferred between a Mac SE with an internal 20MB hard disk and a MicroVAX 2000 running either AlisaShare or PacerShare. The SE was connected to Ethernet with a Kinetics EtherPort SE card. Times are also shown for launching various applications from the server. All times are in seconds and are averages of three transfers. Alisa (B)is AlisaShare with the AppleTalk for VMS bridge, Alisa (-B) bypasses the bridge, Pacer is PacerShare.

AlisaShare and PacerShare are designed to provide AppleShare-like services to Macintosh workstations connected to a VAX. The Mac workstations must have some type of Ethernet link, either directly (for example, using an Ethernet interface board in an SE or a II) or via a LocalTalk-Ethernet gateway (for example, using the Kinetics FastPath). AlisaShare supports two types of software access to the VAX's Ethernet controller: you can use either the bridging software that's a part of AppleTalk for VMS (which AlisaTalk also uses), or you can bypass the bridging software and access the controller directly. PacerShare currently accesses the Ethernet controller directly, but you can run PacerShare alongside AppleTalk for VMS by replacing a module within AppleTalk for VMS with one provided by Pacer.

Is It Really AppleShare?

Since the Macintosh and VAX/VMS do not implement the same style of file security (while the Mac has no security, AppleShare software provides security on server volumes), Alisa and Pacer were faced with the problem of satisfying the security requirements of both systems. The diametrically opposed routes the two companies took may satisfy either the Mac or VAX user, but not necessarily both at the same time.

Alisa's approach is to be completely compatible with Apple's AppleTalk Filing Protocol (AFP) specifications that form the basis of AppleShare. In doing so, Alisa ensures that AlisaShare supports all of the AppleShare features, such as drop folders (write-only folders) and guest accounts. Thus, although a Mac user must have a VMS account to use AlisaShare, AppleShare supports Guest logons with guest accounts on the VAX. Files and See Folders are two different levels of access under AFP, but they are represented as a single level of protection under VMS. AlisaShare maintains information within a special VMS catalog file to offer this distinction to the Mac user.

On the other hand, PacerShare supports only those aspects of AFP that can be implemented through VMS, using privileges that a user would normally have. For example, since VMS operations that require write access also require read access, the AppleShare concept of drop folders is not mirrored by VMS and is not implemented by PacerShare. Also, Pacer has decided not to allow any AppleShare Guest logons, even though a VAX administrator could create a special guest account.

Both servers have incorporated some of the features of VAX/VMS account security. VMS users who are restricted to logging on at certain times of the day, for example, will be able to use AlisaShare or PacerShare only in that restricted time period. Other factors—such as network access, user privileges, and disk quotas—also may have a bearing on server access.

Handling Files

On the Mac, each file has a data fork and a resource fork, as well as added information that's used by the Finder (such as Creator and Type). A VAX/VMS file is a singular entity. For each Mac file both Alisa and Pacer create an extra VAX file that stores the resource fork of a Mac file when the file is copied to the server volume on the VAX. In addition, the VAX directory maintains a special information file to store Finder-related information. These extra files are not visible to the Mac user but are used by AlisaShare and PacerShare to provide compatibility between the two computers.

The presence of these extra files in the VAX directories that represent the AppleShare folders poses a special problem for the VAX operator. First, the VAX operator must be sure to back up both the data file and resource file for each Mac file, as well as the extra file that contains the Finder-related information. If this is not done, a restore operation will not recreate the original Mac file and the restored file may prove to be unusable. On the Mac side no such problems occur, as both AlisaShare and PacerShare create the entire Mac file when it's copied to a device on the user's Mac.

(continues)

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Fast on Its Feet?

While a VAX may offer more storage space for files, it won't necessarily become a faster server for your network—especially if you're already hooked up to an AppleShare server via Ethernet. It takes about the same amount of time for a single user to transfer files between a Mac SE and a MicroVAX 2000–based server as it does between a Mac SE–based AppleShare server on Ethernet and the VAX (see "Moving Along").

When you run AlisaShare through an AppleTalk for VMS bridge, you can also use AlisaTalk's print services, but AlisaShare runs slower than PacerShare. To get the same performance from AlisaShare as from PacerShare, you must link directly to the Ethernet controller, which prevents AppleTalk for VMS from running through the same controller. On the other hand, adding another Ethernet controller to the VAX allows you to use both AppleTalk for VMS and the faster configuration of AlisaShare; this is not an unusual solution, as many larger VAXes have two different buses and often have an Ethernet controller on each bus.

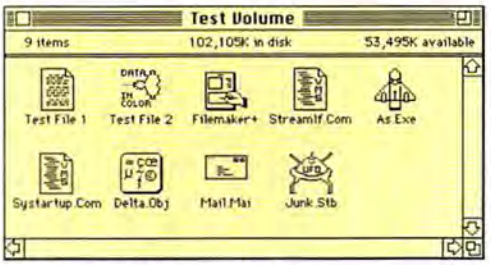
The Bottom Line

Using a low-end MicroVAX as a server is not necessarily a better choice than using a Mac II running AppleShare (the minimum MicroVAX would sell for around $10,000, while a Mac II with a large disk might cost $6000). On the other hand, better performance can be achieved with Digital's larger, faster VAXes—an option that would certainly be appealing to companies already using such machines.

The choice of AlisaShare or PacerShare depends on your needs. If your Mac users already know AppleShare and work with drop folders and Guest logons, then AlisaShare should be your choice. And if you expect to use mail or multiuser applications that depend on AFP's guest logons or drop boxes to operate properly, then again, you'll want AlisaShare.

While both systems utilize standard VMS security for the VAX-resident files, PacerShare offers the added capability of Access Control Lists (ACLs) for security as well as resource accounting. If you need this type of security then you'll prefer PacerShare.—*Dave Kosiur*

See *Where to Buy* for contact information.



Is It Real or Is It MemoVAX?
Opening an AlisaShare volume on the VAX, the user sees the regular icons for Macintosh files (first three files, upper row) as well as custom icons assigned by AlisaShare to files that were transferred to the AlisaShare volume by VAX users (.Com, .Exe, .Obj, .Mai, .Stb files).

Early Reading Software

Reader Rabbit ***Pros:*** *Challenging, varied games for a wide range of reading levels; customizable difficulty and speed levels; great graphics and sounds; excellent documentation.* ***Cons:*** *Children may find this game addictive.* ***Company:*** *The Learning Company.* ***List price:*** *$59.95.* ***Requires:*** *512K.*

Alphabet Blocks 1.0 ***Pros:*** *Digitized voice and HyperAnimation provide realistic phonetic sounds.* ***Cons:*** *Games are static and repetitive; cannot be customized.* ***Company:*** *Bright Star Technology.* ***List price:*** *$59.95.* ***Requires:*** *1MB, double-sided disks.*

It is best to select educational software for children, as you would their clothing and shoes, with a lot of growing room and a little skepticism. As motivating as computers can be, there is no guarantee that a child will learn simply by sitting down in front of one. Reader Rabbit, from the Learning Company, and Alphabet Blocks, from Bright Star Technology, are two Macintosh programs for beginning readers. Although they teach different skills in different ways, they share a common audience and a common goal: to make the Macintosh an interesting and entertaining tutor. Of the two programs, Reader Rabbit is the more successful.

Teaching Reading's Hidden Skills

Reader Rabbit, a series of four games that challenge beginning readers four to seven years old, shines at teaching reading skills. Noticing details, finishing tasks, matching patterns, and solving problems are some of the skills that good readers have mastered; yet these skills are difficult to teach. Reader Rabbit finds ways to do it combining great visuals with funny sounds and constant motion.

The Sorter game asks children to practice identifying letters by storing words that match a given pattern on the shelves of a gigantic machine. In the Labeler game, children unscramble the names of three related pictures. Hints based on the positions of letters help to differentiate beginning, middle, and ending sounds. Word Train is more difficult. Children must fill up a train with three words, each of which differs from the preceding word by one letter. This game helps develop creative problem-solving and pattern-matching abilities. The fourth game, Match Up, is a computer variation on the old favorite, Concentration. Children match cards containing words, pictures, or sounds. Match Up helps improve spatial awareness, concentration, and memory.

Each Reader Rabbit game is challenging in a different way and always fun to play. Words fall into the trash can with a resounding *thunk,* trains roll away to a merry tune, and Reader Rabbit dances a spirited jig to celebrate a child's mastery of a given task. The games provide constant feedback: highlighting incorrect words and greeting them with a spoken *uh oh,* putting correct words in bold type, and awarding winners carrots from Reader Rabbit. Each game ends with a review of the words and pictures presented.

Structured Practice

To provide cumulative learning, words missed in one round reappear in the next, along with new words of a similar level of difficulty. The program thus provides children with a structured practice of specific reading skills, building on strengths while working to improve weaknesses.

Although Reader Rabbit succeeds admirably at getting and keeping a child's attention, educators clearly designed it to complement a school program and provide parents with a tool for reinforcing reading skills at home. Parents or teachers can adjust the speed, level of difficulty, and vocabulary using pull-down menus, providing an added level of control.

The documentation outlines the skills covered by each game and comes with word lists and follow-up activities. It includes over 200 three-letter words and

(continues)

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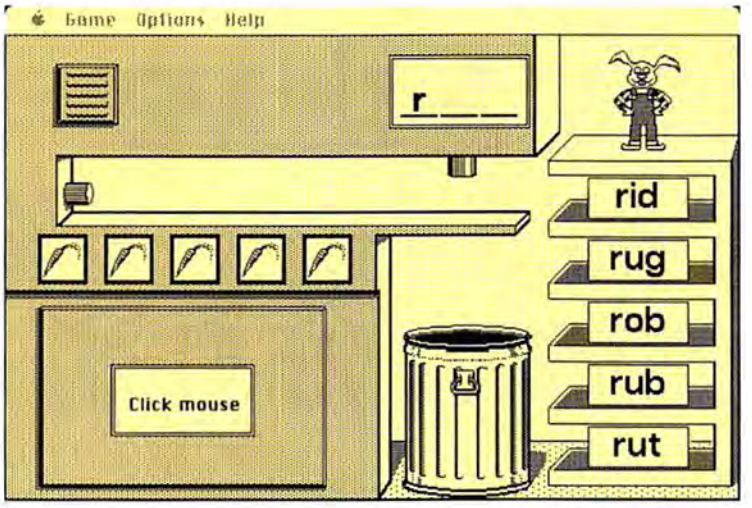


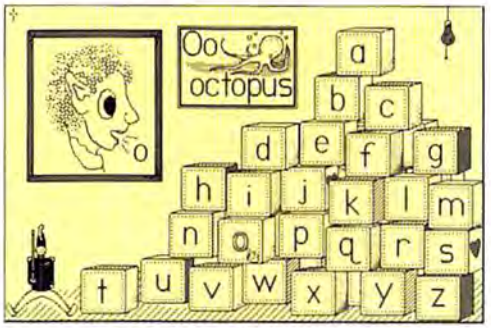
The Sorter Game
Children practice letter-recognition skills by selecting words that match a given pattern. New words emerge from the left side of the Sorter machine. The player must select those that match the pattern. If the player is too slow or decides that the word doesn't match, the word falls into the trash can.

more than 50 pictures and should provide many hours of learning and fun.

Newfangled Phonics

Alphabet Blocks is designed to teach phonics to children three to eight years old. Although it claims to be an integrated product using revolutionary technology to teach traditional phonics, it fails for an old-fashioned reason: it doesn't capture the short attention span of its intended audience.

Made up of two parts, Letter Names and Letter Sounds, Alphabet Blocks is set in a child's playroom. An elf presides over a pile of old-fashioned alphabet blocks and a toy soldier. By clicking on a light bulb hanging from the ceiling, a child can hear the elf pronounce either the letters' names or their sounds. Clicking on the toy soldier causes him to stand up or sit down, making the letters on the blocks alternate between upper- and lowercase. Click on the elf, and he asks you to identify a given letter or sound. When the child selects the block, a picture that illustrates the sound being taught flashes, matching a book of alphabet pictures that comes with the program.



Point and Click Phonics
To reinforce the learning of phonics, Alphabet Blocks enables the child to choose a letter, hear the elf say the letter's sound, and see a picture that illustrates the sound being taught.

Unlike Reader Rabbit, Alphabet Blocks is repetitive to hear and static to watch. Using a proprietary system of HyperAnimation that synchronizes voice and motion, the program was designed to have the elf say the names and sounds of the letters in the most natural manner possible. Unfortunately, the elf speaks in a monotone and says virtually the same thing every time.

The elf has a limited set of facial expressions, and his movements are confined to a small frame in the upper-left corner of the screen. Besides smiling at correct responses, the elf's only other trick is to fall asleep after the mouse has been inactive for 30 seconds. An appropriate response. Any child I know would probably be off in another room playing with something else long before the elf nods off.

Patient, or Unimaginative?

Touted as an endlessly patient tutor, Alphabet Blocks is actually a rather unimaginative teacher. The program's repetitive cycle asks a question and then waits a full 15 seconds before repeating it. During the waiting period the elf's eyes roll, nothing else moves, and there is no sound. The first time I ran the program I was sure it was stuck or broken. What would a five-year-old think?

Worse, Alphabet Blocks seems to encourage the kind of rote memorization and blind guessing that take the fun and magic out of learning to read. Rather than presenting the child with a variety of questions and ways to answer them, the program asks the same questions and gives the same hints every time. Because children learn in different ways, such repetition reduces the possibility for learning—if a child doesn't understand the question, repeating it won't help.

Alphabet Blocks doesn't successfully justify its cost. There is nothing about the program that is more interesting, more challenging, or more motivating than traditional methods of teaching phonics to young children. Songs, stories, puppets, and wooden alphabet blocks would be a better investment of parents' time and money and would provide far better memories a few years down the line.
—*Liza Weiman*

See *Where to Buy* for contact information.

Statistical Analysis Software

StatView SE+ Graphics 1.02 ***Pros:*** *Simple, intuitive operation; superior graphics customization.* ***Cons:*** *No time series or cluster analysis; no 3-D plots.* ***Company:*** *Abacus Concepts.* ***List price:*** *Version 1.03 $399.95.* ***Requires:*** *1MB, two 800K drives or hard disk.*

Systat 3.2 ***Pros:*** *The most complete Mac statistics system; includes 3-D plotting.* ***Cons:*** *Modules are really separate applications; interface not Mac-like.* ***Company:*** *Systat.* ***List price:*** *$595.* ***Requires:*** *1MB, 2MB for coprocessor; hard disk recommended.*

The field of statistical analysis presents two challenges to microcomputers: memory and graphics. Currently, only the Macintosh can meet these challenges successfully. That's why the Mac has developed a following among statisticians. This review looks at upgrades of two market leaders. StatView SE+ Graphics is aimed at statistics users who need advanced presentation graphics; Systat 3.2 is targeted more toward research and academic users who require a range of analyses.

A View of the Stats

StatView SE+ Graphics is the latest result of the continuing evolution of StatView 512+, the perennial favorite in *Macworld*'s

(continues)

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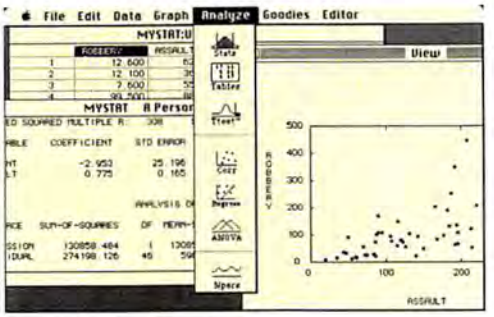
World-Class competition. Abacus Concepts licensed StatView 512+ to Brainpower several years ago, but has developed advanced variants of the program to distribute on its own.

The main distinction between StatView SE+ Graphics and StatView 512+ is, as the name suggests, the integration of presentation graphics. The list of statistical tests in both programs is the same, and the StatView SE+ Graphics package includes the StatView 512+ manual. StatView II, Abacus's other product, is similar to StatView SE+ Graphics but includes math coprocessor support and full color graphics (StatView SE+ Graphics offers only eight QuickDraw colors).

Thus the Graph menu contains most of the new features of StatView SE+ Graphics. The original StatView already provided a respectable assortment of graph types, from the usual scattergrams and line charts through box plots and several styles of handling data-point overlap (see "It's Showtime for StatView"). Now you also have detailed control, through hierarchical menus, of point type, line width and texture, chart scaling, and fill patterns. You can overlay legends and other text (for example, arrows connecting text to points of interest in a plot), and include tables directly as inserts in a graph. The organizing principle for chart modification is the separation of each graphic into four superimposed planes: Background, Statistics, Drawing, and Legend. In StatView SE+ Graphics, you can control the artwork on each plane to style a data presentation for maximum impact.

The developers at Abacus claim that 90 percent of the users of the original StatView requested better graphics and easier data-file exchange, rather than a wider range of tests. Thus, besides adding presentation charting, Abacus has enhanced the Import command under the File menu with a background program that intelligently evaluates the data in an imported file. In practice this means that you can bring an Excel file, for example, into StatView, and find that the program has properly distinguished variables from categories and assigned correct variable names. It's exceptionally convenient.



Systat Looks Ahead

Mystat shows the future form of Systat on the Mac. Unfortunately, Systat 3.2 still uses BASIC-like command-line prompts instead of being fully menu-driven.

Systat Systematics

While StatView provides ease of use and visual impact, Systat provides completeness. Every statistical test found in standard undergraduate textbooks occurs in some module of Systat. If you need a test that somehow is not provided (Cochran's Q? Mantel-Haenszel statistic?), Systat includes its own version of BASIC for programming that function.

This completeness is the reason for buying Systat. Despite a wonderful manual, the program is not easy to use and retains much of the command-line style of the original non-Mac program. Version 3.2, however, introduces two significant advances toward an improved Mac interface. First, Systat now features a data-management system that provides the usual cut, copy, and paste features. You can cut data from a table in Excel, for example, and paste it into Systat's own spreadsheetlike data entry template. Second, a View window now enables you to plot a set of graphs and page through them on screen. The extensive facilities (including excellent 3-D plotting) offered piecemeal in earlier versions are now more usable with the addition of the View window.

The graphs can now be saved to PICT files for further editing. While this doesn't mean that Systat now competes with StatView's lush editing facilities, it means that you're no longer stuck with minimal chart labeling in Systat's austere proprietary font. New graphing features also include varieties of exponential and contour smoothing, step smoothing, and spline functions.

The remarkable inclusion in the new version is the $3 demo program (you can order all the copies you want, but it only holds 50 records per file) called Mystat. This program has a complete, interactive Macintosh interface (see "Systat Looks Ahead"), with nearly complete graphing features, icon menu choices, and a basic assortment of statistics. The challenge facing Systat's developers is to integrate all 4 megabytes of statistics module code in a program that is as easy to use as Mystat. It's not clear how to do this, given the memory and disk size limitations of the mainstream Macintosh market, but the resulting program would have no competitors.

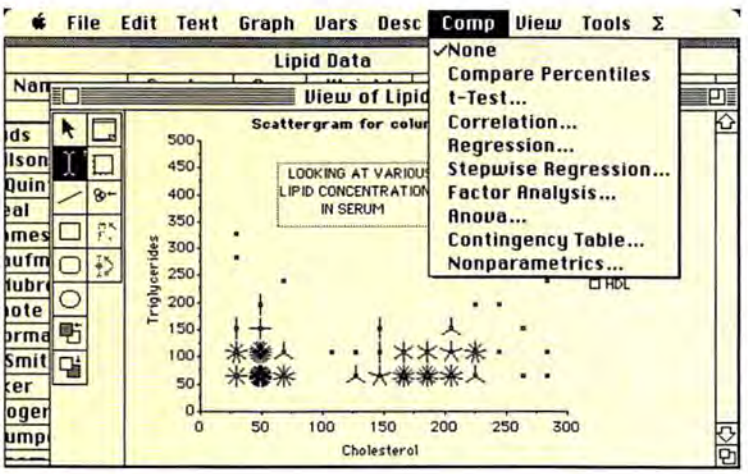
Let Your Purpose Be Your Guide

Systat is shipped on five disks. It includes program modules for descriptive statistics; factor analysis; nonlinear and multivariate linear modeling; nonparametric statistics; and cluster, correlation, and series analysis. Other included modules handle graphing, construction of tables, and data scaling. In contrast, StatView SE+ Graphics fits on one disk, offering standard descriptive and comparative (ANOVA) statistics, factor analysis, nonparametrics, and presentation graphics that rival the best stand-alone packages (for example, Cricket Graph). Although their markets overlap, the upgrades of StatView and Systat mainly enhance StatView's position as a business package and Systat's position as a research standard.—*Charles Seiter*

See *Where to Buy* for contact information.

It's Showtime for StatView

The StatView+ Graphics View window for plots features a complete palette of tools for customizing graphs. Control over charting elements rivals that of most desktop presentation packages, and the program offers a range of chart styles. The Comp menu lists StatView's statistical test categories.



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Macintosh II

Turbo SE

SE accelerator and optional adapter for Mac Plus. ***Pros:*** *Relatively inexpensive upgrade; 68881 math coprocessor works with 68000 processor; full compatibility with older software.* ***Cons:*** *Difficult installation.* ***Company:*** *Siclone Sales & Engineering Corporation.* ***List price:*** *$398, math coprocessor $298, MacAdapt $298.* ***Requires:*** *1MB; 512KE with MacAdapt.*

MARK JOHANN

Siclone's Turbo SE

Accelerator boards for the Mac SE have become popular lately. However, the high price of the 68020 accelerators keep them beyond the reach of many SE owners. Turbo SE, a 16-MHz 68000 accelerator, offers an excellent compromise between price and performance.

One problem with the newer 68020 is that it will not run some older applications properly or, in some cases, will not run them at all. As a result, the 68000 remains a popular processor, with an installed base that is far greater than that of the newer 68020. Turbo SE squeezes the 68000 for extra speed and performance, while preserving its functional characteristics.

Turbo SE uses its own 16-MHz 68000 processor—twice as fast as the Mac SE's standard processor—to increase performance. However, the Turbo SE is not simply a double-time accelerator: it uses innovative methods to tweak extra performance.

A chip's speed is determined by its clock crystal, not by some internal speed setting. By installing the Mac SE's ROM chips on the Turbo SE board, you can make them run with the Turbo's clock crystal. The result is that the Mac ROM runs twice as fast as before. The processor doesn't need to wait as long for certain instructions, and you can do your job faster.

The Turbo SE also performs some tricks with the Mac SE's RAM. It provides 128K of dedicated RAM to displaying work on the SE's screen. To take advantage of the video RAM, remove the memory from the Mac's system board and place it on the Turbo SE. The 128K of video RAM then replaces the main RAM on the Mac's system board. If you have extrafast memory (below 120ns) you're out of luck—the Turbo SE can't handle it.

When removing your SE's ROM, be careful not to bend or break the pins. The ROM chips are securely inserted into their sockets on the Mac's system board and are likely to pop out quickly when you begin to pull on them.

Cooperation Is the Key

The 68020 is designed to work automatically with the 68881 math coprocessor. Applications compiled for the 68020 will automatically route all floating-point math to the 68881.

The Turbo SE 68000, on the other hand, was not designed to work automatically with the 68881. To get them to work together, Turbo SE uses some ingenious hardware and software. The hardware provides a pipeline from the 68000 to the 68881 on the Turbo SE board. The software, called 68881 INIT, provides an alternative numeric environment to SANE. Specifically, the 68881 INIT intercepts math routines that are amenable to the coprocessor and sends them along for quick floating-point treatment.

While the Turbo SE gets the 68000 and the 68881 chips to work together, you should be aware of a couple of problems.

First, in order to work properly, the 68881 must be rated at 16 MHz—the same speed as the 68000 that comes with the Turbo SE. If you buy the 68881 from Siclone along with your Turbo SE, you will not have a problem. However, if you already have a 68881, or are planning to purchase it separately, be certain to specify one rated at 16 MHz.

Second, because the 68881 INIT is an alternative numeric environment to SANE, some custom advanced math applications may not perform predictably with the Turbo SE and the 68881. Or the results may differ in precision from those obtained when using SANE. This problem should affect only a small percentage of Turbo SE users. Off-the-shelf software should not be affected negatively by the 68881 INIT.

Of course, the 68881 is entirely optional—you can leave its socket empty and run all the software you ran before you installed the Turbo SE.

Performance Is the Key

While the Turbo SE processes information twice as fast as a standard Mac SE, the system's throughput will not double when it is installed. System throughput is dependent upon several factors, such as I/O, storage speed, and the speed of primary memory; processing speed is only one factor among many.

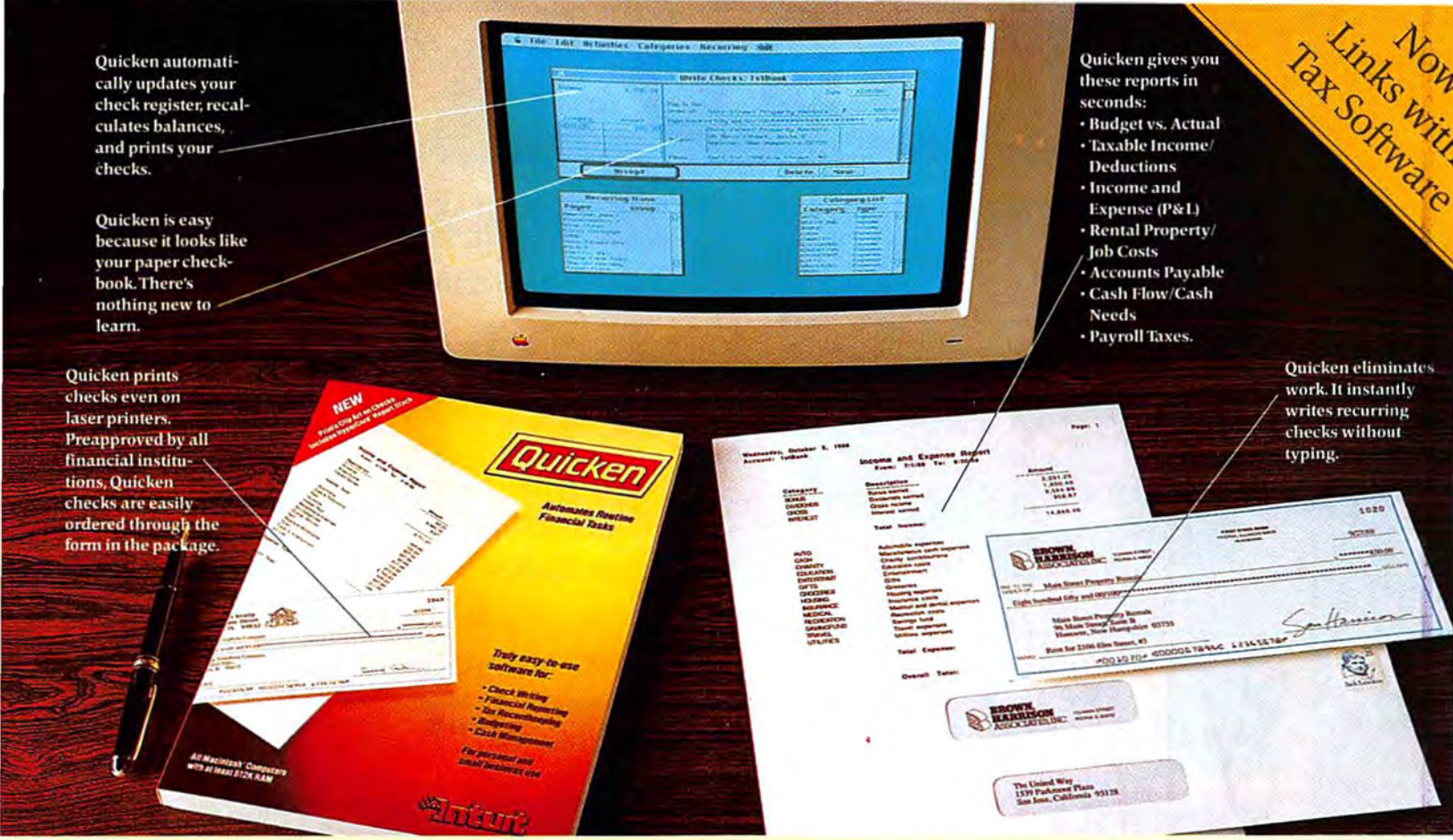
With the well-engineered, reliable Turbo SE, you should enjoy a pleasant but not dramatic increase in the Mac SE's performance. We recommend it. *—Michael Day and Steven Phillips of Savant Labs*

See *Where to Buy* for contact information.

Turbo SE Benchmarks

	Mac II	SE Control	Turbo SE
Set 1			
Sieve	719	2804	1899
Fibonacci	2838	14035	11924
Whetstone	52770	7276	48000
Set 2			
Savage	14467	n/a	4571
Float	946	n/a	1926
Transcendental	1357	n/a	896

Set 1 measures general CPU performance, including integer calculations. Set 2 focuses on the 68881 chip, which performs floating-point calculations. The values for Sieve, Fibonacci, and Float show how quickly the task was completed, so the smaller the value, the better. On the other hand, the values for Whetstone, Savage, and Transcendental indicate how much work was done within a fixed amount of time, so the larger the value, the better.



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Solitaire Games

Solitaire Royale 1.0 ***Pros:*** *Colorful; excellent manual and online help; wide variety of games; fast.* ***Cons:*** *Scoring lacks imagination; forces you to play by one set of rules.* ***Company:*** *Spectrum HoloByte.* ***List price:*** *$34.95.* ***Requires:*** *Mac II. (Version 1.1 requires only 512K).*

Klondike 3.6, Canfield 3.1, Golf 1.1 ***Pros:*** *Clever scoring; flexible playing rules; addicting; shareware.* ***Cons:*** *Simple coloring scheme; redraw not as fast as in older, noncolor versions.* ***Company:*** *Unison Software.* ***List price:*** *$10 each.* ***Requires:*** *128K.*

The Solitaire Desk Accessory 1.0 ***Pros:*** *Desk accessory; fast; flexible playing rules; includes three games.* ***Cons:*** *No scoring; simple coloring.* ***Company:*** *Softstream International.* ***List price:*** *$35.95.* ***Requires:*** *128K.*

There are a lot of very nice things about Solitaire Royale for the Mac II. It offers eight types of solitaire plus three children's games; it is colorful, with vivid cards on a bright blue background; and redraw is fast and responsive. You can choose from several decks of playing cards, so face cards can be anything from vampires to jungle animals. And you can move cards either by dragging them or by clicking on them.

Yet, in spite of Solitaire Royale's slick look and feel—and the convenience of having several games in one program—I enjoy Unison Software's shareware solitaire games much more. The clever way points accumulate in the Unison Software games makes Solitaire Royale's scoring method seem very simplistic—its points are awarded based on the number of cards played to the foundation (the stacks where all the cards should end up), with most cards worth one point.

Dull Screens and Vivid Play

If I can only find the jack of hearts, I might have a chance of winning. But since this shareware version of Canfield subtracts points for elapsed time, I might still have a low score. The game is addictive, even though the screens are not elaborate.

Vivid Colors and Dull Scoring

Solitaire Royal features vivid colors, fast card redraw, and a variety of games, but it suffers from unimaginative scoring. In this traditional game of Klondike, Solitaire Royale simply scores one point for each card played on the foundation.

Unison's programs offer much more complex and addictive scoring and play. You get 5 points added to your score for each card you play to the tableau (the playing area) and 10 points for each card added to the foundation. To make things really interesting, the games also *subtract* points from your score. For instance, in one game you lose 2 points for every 15 seconds that lapses between plays while the game window is active, 5 points for moving a top card from the foundation to the tableau, 5 points for moving a single card from one stack to another when there are faceup cards under it, and a whopping 20 points for using the Show Aces function to find facedown aces in the tableau. Since the scoring encourages you to play fast and avoid mistakes, skill, and not just luck, becomes a factor in your final score. All-time high scores are recorded on a scorecard that has room for four different players' names.

Solitaire Royale offers two games that are supposed to thrill competitive players. The challenge is mainly trying to beat a previous score—in other words, simply trying to get more cards on the foundation. Tour lets you play each game in the collection and records your score for each game as well as a total score for the set. The game also tracks the top five scores for each completed Tour. The other game, Tournament, simply tracks the top five scores for each game.

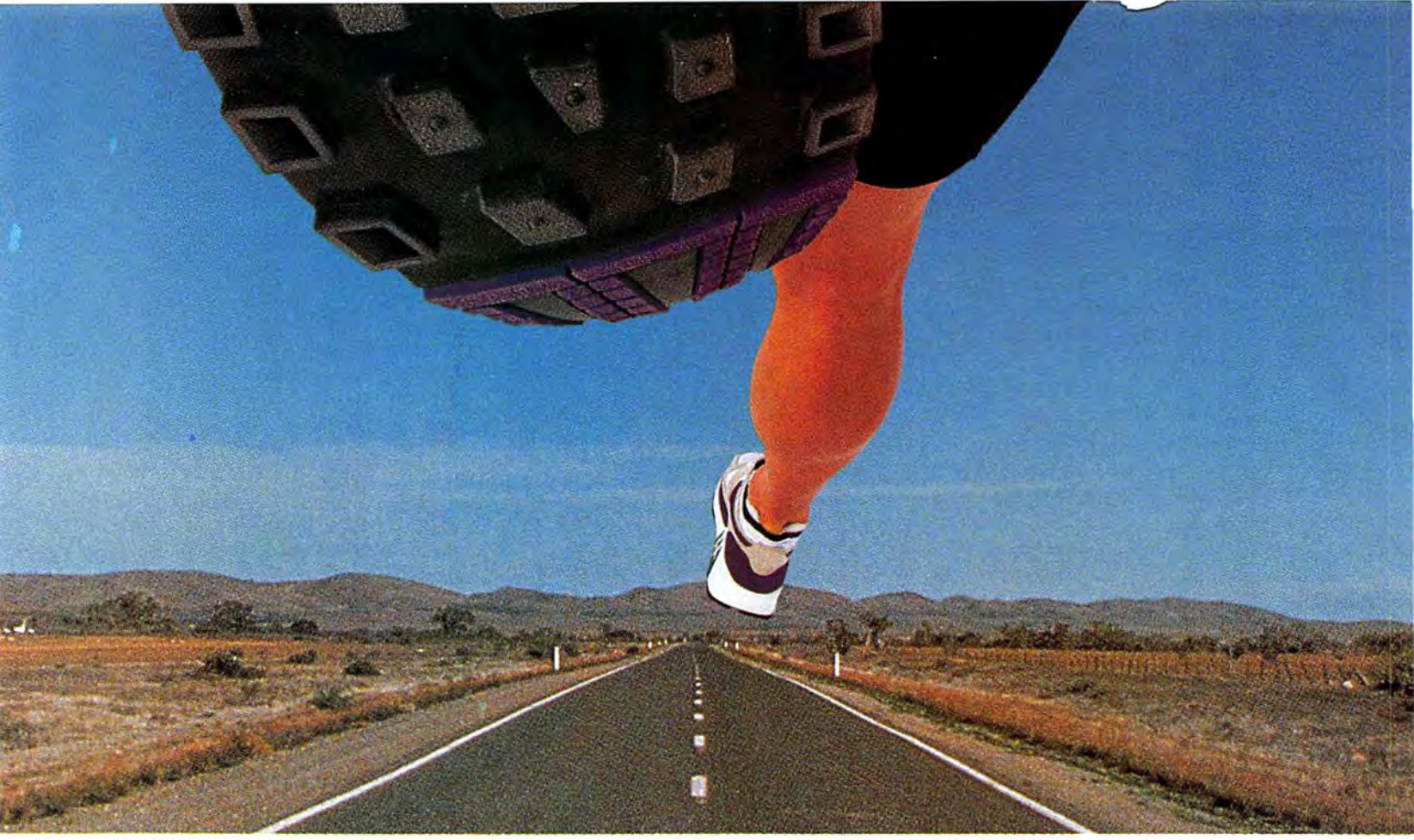
In addition to more challenging scoring, Unison's programs offer you more flexibility in playing the game. Solitaire Royale forces you to play by the rules in *Hoyle's Rules of Games* (NAL Penguin, 1946). Often Hoyle's rules differed drastically from the way I had been taught to play solitaire. Take, for instance, the most common solitaire game, Klondike. According to Hoyle's rules, you can move only the top faceup card from one column to another. I had always played that you could move a whole column of faceup cards at once. Unison's version of Klondike lets me continue to play by my own rules, while Solitaire Royale (frustratingly) forced me to "play fair."

Unison's programs aren't perfect either, however. First, only three games are currently available—Canfield, Klondike, and Golf. And, although $10 each seems inexpensive, Solitaire Royale's set of eight games costs only $34.95. Second, face cards are redrawn slowly in the newer versions that support color hearts and diamonds. Older versions of the programs (such as Canfield 1.1+ and Klondike 2.1) do not support color but are more responsive, and, therefore, more compelling.

You do have one other choice for a solitaire program—Softstream's The Solitaire Desk Accessory. Like Unison's games, the program runs on all Macs, lets you move columns of faceup cards, and includes basic black and red coloring. Like Solitaire Royale, the program includes a set of games—Klondike, Boston, and Pyramid—and redraws quickly. But it doesn't record your scores, and the only real reason to choose it over one of the other games is to have the convenience of a DA.

If you want a challenging, competitive game and you don't care about slick design, by all means download one or all of Unison's shareware games from a bulletin board or get them from a user group. If you decide later that you want a little more pizzazz or variety, you can still buy Solitaire Royale. But when it comes time to play serious cards, you'll return to Unison's products.—*Cheryl Spencer*

See *Where to Buy* for contact information.



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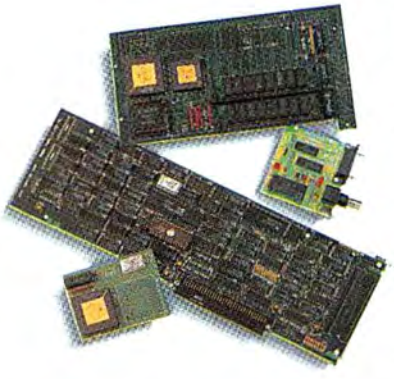

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EndNote 1.0

Bibliographic reference system. ***Pros:*** *Enables you to add citations without leaving word processor; scans finished document to create formatted bibliography.* ***Cons:*** *No error checking on data entry; limited search capabilities.* ***Company:*** *Niles & Associates.* ***List price:*** *$129.* ***Requires:*** *512KE.*

One of the most unpleasant aspects of technical or scientific writing is having to deal with references. Not only must reference works be cited correctly in the text, but the bibliography has to be formatted properly as well. Word processors, with their limited endnoting capabilities, aren't much help, so even authors who write electronically must still usually deal with references manually. Pro-Cite, from Professional Bibliographic Software, is one solution to the problem (see *Reviews, Macworld,* September 1988). Now Niles & Associates offers an alternative called EndNote. Aside from a few minor flaws, it's a joy to use.

Compiling a Bibliography

EndNote is really two programs in one: a database manager that builds and searches a reference library; and a bibliography maker that inserts citations into documents and creates a bibliography of the cited materials. The EndNote application handles all of the database-management and formatting functions. As you write, the EndNote desk accessory (DA) allows you to access the reference library and place citations in a document.

EndNote libraries are databases with fields suitable for storing information about reference works. To save you the trouble of defining fields from scratch, EndNote comes with 14 predefined reference types, ranging from journal articles to computer programs; one additional type is undefined. If EndNote's repertoire doesn't meet your needs (an unlikely situation), it's easy to customize any of the 15 reference types by adding, deleting, or renaming fields.

You add references to a library using worksheets that you can access from either the EndNote application or the DA. Each type of reference has its own entry form that you select from a pop-up menu. You can enter up to 32K of text into each reference, but there's no error checking to make sure that the data you've entered is valid. There's also no way to automatically weed out duplicate reference works. For those who've already compiled bibliographic databases with other programs, EndNote lets you import files.

Cite License

Trying to manually conform notes and bibliographies to many different styles can make huge demands on your time and patience. For example, some scientific journals ask you to indicate citations with a superscript number, others want the first author's name in parentheses. If that weren't headache enough, every editor seems to have a different scheme for formatting the bibliography. Fortunately, EndNote does an excellent job of automating the process.

EndNote enables you to create a bibliographic style for each publication you write for. The style editor allows you to indicate precisely how citations appear in the text, giving you control over font, size, and style, including super- and subscripts. EndNote is also flexible because it allows you to specify exactly how each source appears in the final bibliography.

As you write, use the DA to select reference works from a library. References appear in a scrolling list showing the author, year of publication, and title. With the Find command, you can display sources that meet certain criteria. EndNote's search function allows you to scan for a particular author, year of publication, or text string. You can combine searches, but EndNote doesn't support complex logical operations. To add a citation to a document, select the appropriate reference and copy it to the Clipboard. When you return to the document and choose Paste, EndNote places a special citation marker in the text, to tell the program which reference work the citation refers to (see "Citing It Right").

For the last step, you have to quit your word processor and launch the EndNote application. EndNote first scans through a document, matching each citation marker to a source in the library. (The current version is compatible with Microsoft Word 3.0, MacWrite, WriteNow, and text-only files.) Next, choose a bibliographic style that matches the publication to which you will submit your work. Finally, EndNote reformats the document according to the style you've chosen, building a bibliography at the end. As a safeguard, EndNote saves the new version of the file under a different name. If one journal rejects the article, it's simple to reformat it for another.

EndNote's most glaring omission is the lack of error checking on data entry. I'd also prefer a more comprehensive search function. And the lack of a horizontal scroll bar or word wrap in the reference list window is annoying. But aside from these minor faults, the program is worth its weight in gold to those of us in the desktop-publish-or-perish set. EndNote won't guarantee acceptance of your next paper, but it'll make preparing it a whole lot simpler.
—Franklin Tessler

See *Where to Buy* for contact information.

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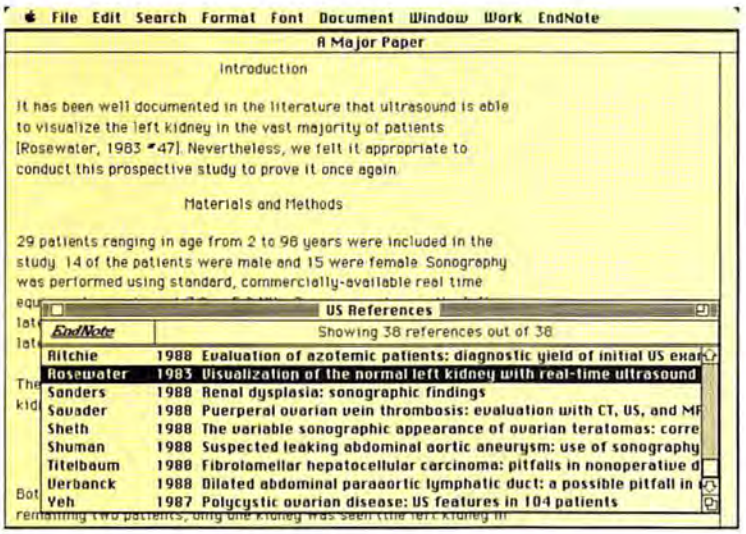

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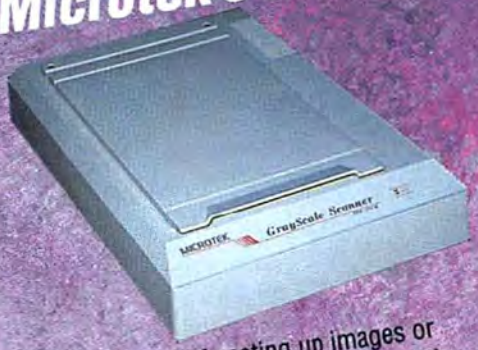

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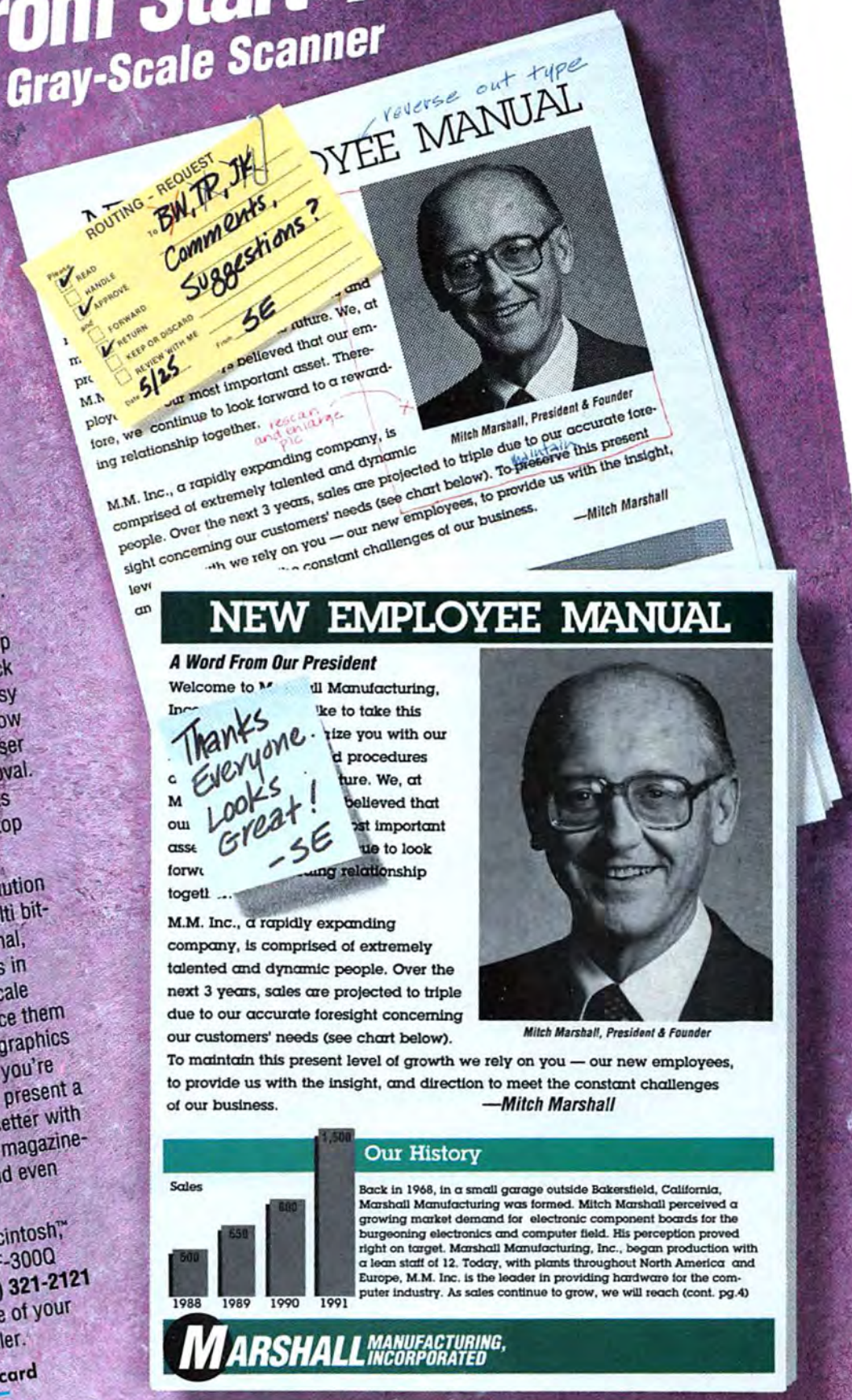

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MacMainFrame

Mac SE and Mac II terminal emulation for IBM 3278 and 3279 terminals. ***Pros:*** *Easy to install; includes file-transfer utilities; special character option for file downloading simplifies importing data in other programs; handles color display on Mac II; emulator's cursor can be controlled by mouse.* ***Cons:*** *900-character maximum record length prevents transfer of some files to mainframe; does not include graphics support.* ***Company:*** *Avatar Technologies.* ***List price:*** *MacMainFrame SE $795, MacMainFrame II $995 (both include MacMainFrame 3270 version 2.0 software).*

Avatar has now expanded its line of IBM terminal emulator hardware for Macs to include both the Mac SE and the Mac II. MacMainFrame SE and MacMainFrame II are boards that fit into the SE and II, respectively, and work with MacMainFrame 3270 version 2.0 software to emulate IBM 3278 and 3279 terminals over standard IBM coaxial cables. Plug one of these boards into your Mac and you can exchange files with IBM mainframes.

If You Can Read This . . .

The MacMainFrame 3270 software can be used with either board and provides color support for the Mac II. If you have a Mac II with a color monitor, you can choose to use either a default color palette (of eight colors) or a palette of your own. MacMainFrame is also the first program to offer the choice of a white or black background for 3278/79 emulation. I found using color characters on a black background provided better contrast and resulted in less eyestrain. The IBM screen font included in the program is one of the better-designed fonts for mimicking IBM terminals, and it looks good on the Mac's screen.

Depending on your monitor size, you'll have to reach some compromise between character size and screen size. Since MacMainFrame 3270 supports 3278 Models 2 (24 lines by 80 characters), 3 (33 by 80), 4 (44 by 80), and 5 (28 by 132), you'll find that the default 12-point font size doesn't allow you to see a full screen on a Mac SE (only the Mac II can show a full screen of a Model 2). Models 3, 4, and 5 expect a screen larger than 12 inches. Scroll bars do appear when the monitor is too small, an inconvenience if you're continually moving between a command line on the bottom of the screen and the results shown at the top. You can choose a font size as small as 7-point, but that's pushing readability. MacMainFrame 3270 lets you select a different font and font size for printing screens.

MacMainFrame SE and II

If you're working with large screen sizes and move the IBM cursor around much of the screen, you'll appreciate Avatar's use of the mouse to control cursor movement. Standard movement of the cursor is accomplished using the cursor keys and some IBM-defined function keys. If you use your mouse and option-click a character on the screen, MacMainFrame 3270 automatically generates the required cursor-key strokes to move the screen's cursor to that position.

Pick a File, Any File

MacMainFrame 3270 supports two types of file-transfer software for exchanging files between the Mac and an IBM mainframe. One is Avatar's own HFT (Host File Transfer) software, which must be purchased separately; the other is IBM's IND $ FILE, which is found on many IBM mainframes. You store the file-transfer software as part of your terminal-specifications file created by MacMainFrame 3270.

You can exchange three types of files with a mainframe: text, binary, and document. If an ASCII text file is uploaded from the Mac, MacMainFrame 3270 automatically translates the ASCII characters to IBM's EBCDIC coding (and the reverse when you download a text file). Binary files contain only the data fork of a Mac file; document files contain the resource fork as well. You can use the binary format to transfer files that can be used by PCs or some mainframe programs, while the document format is good for archiving Mac files for future downloading and reuse. MacMainFrame 3270 limited me to record lengths of 900 characters, which prevented transferring word processor files in IBM's Document Content Architecture (DCA) format to the mainframe for use by one of its word processing programs.

Avatar includes two very useful features in MacMainFrame 3270's file-transfer capabilities. First, if you're downloading a text file, MacMainFrame 3270 can insert special characters as the file is downloaded. You can instruct your mainframe's database to generate a report with \t as a column separator, for example, and when the file is downloaded, MacMainFrame 3270's Mac file will have tabs in the right places. You could then load that file into any Mac program, such as a database manager or a page-layout program, with the tabs preserved.

Second, MacMainFrame 3270 supports batch-mode file transfers. It's particularly easy to start MacMainFrame 3270 without logging onto the mainframe and to select a series of Mac files to upload to the mainframe. Then you can log on, start the batch-file transfer, and walk away to do other things. Or, if you're running under MultiFinder, you can start another program and let the files transfer in the background.

Roll Your Own

Avatar has published the specifications of an API (Application Programming Interface) for the MacMainFrame family of products. As part of the API, Avatar includes XFCNs (external functions) for HyperCard so that users can create custom interfaces to IBM mainframes.

The MacMainFrame boards and software provide the standard features for emulating an IBM 3278/79 terminal with the Mac. Even though the MacMainFrame series has yet to support multiple mainframe sessions (like Novell's PCOX board and Tri-Data's Netway 1000) or mainframe graphics displays, MacMainFrame's added features (such as mouse control of the cursor, special character insertions, batch file transfers) make it the most powerful IBM 3278/79 emulator for the Mac.
—Dave Kosiur

See *Where to Buy* for contact information.

The Colony

Three-dimensional graphic adventure game. ***Pros:*** *Smooth 3-D animated movement; stark, spooky environment; clever manual.* ***Cons:*** *Occasionally bogs down in complicated scenes; unnecessarily difficult to play; requires entry of six-digit number at random "security checks" during game.* ***Company:*** *Mindscape.* ***List price:*** *$49.95.* ***Requires:*** *512KE (some sounds disabled with less than 1MB of RAM).*

This ground-breaking sci-fi adventure game from Mindscape employs a new solid-model animation technique that lets you move through buildings, around corners, and behind objects in a convincing three-dimensional world. Combined with futuristic digitized sounds and freakish aliens, this realism is enough to give you the creeps.

Dark Star

Throughout the game you'll recognize thematic devices that border on clichés, from a number of movies and games. You awake groggily in a dark room, unable to see until you find the light switch (homage to Hitchhiker's Guide to the Galaxy); it turns out you're on the bridge of your spaceship, which has just crash-landed on planet 5-Delta-5, a remote scientific colony whose inhabitants have all perished in a mysterious alien attack (homage to *Aliens*).

Before you leave your ship, you are fitted with a super-duper space suit, complete with weapons, armor, and a set of cross hairs in the visor (homage to *Robocop*). The trick is to keep the high-tech outfit's batteries from running down (whereupon you perish, and the Mac emits a digitized scream). You renew your suit's energy by gobbling little eggs strewn along the corridors of the deserted space colony (homage to Pac Man).

Your mission is to find out how a group of evil aliens were accidentally teleported to the colony from another dimension, to learn how they can be destroyed, and to carry the cryogenically frozen children of the colonists back to the safety of your ship. As you wander the halls and rooms of the colony in search of answers, you must avoid the bizarre, pyramidal, one-eyed aliens that seek to destroy you with a burst of noisy static (see "Alien to Me").

Planet of the Shapes

What makes The Colony a delight to play is its three-dimensional environment. At first you'll be a bit unsteady, careening drunkenly into walls and wildly overcompensating for sudden moves; but as your mouse hand gets steadier, you'll love the feeling. Walls, furniture, and aliens fly by as you move past them; you tiptoe cautiously around corners, ready to retreat if an alien lies lurking; and you can escape observation by ducking into a stairwell or closet. As is usual with 3-D simulations, objects in The Colony are represented by simple, geometric, straight-line figures. Yet in this deserted outpost in space, that sparseness is completely convincing.

What makes The Colony frustrating is that it's fiendishly difficult to play. Certain inconsistencies and convolutions seem to have been thrown into the story just to make it harder. For example, most players will be utterly baffled as to why they die when they attempt to step out of the spaceship. I was, too; only a call to Mindscape revealed that you must close the inner airlock door behind you. Unlike other doors in The Colony, this one doesn't shut automatically.

Furthermore, there are seven floors in the colony's building complex, nine types of aliens, and dozens of red herrings and dead ends; there's even a room from which there is no escape (the Dave Bowman suite —homage to *2001: A Space Odyssey*). If you can stick with it, this game will keep you occupied—or perhaps frustrated—for weeks on end.

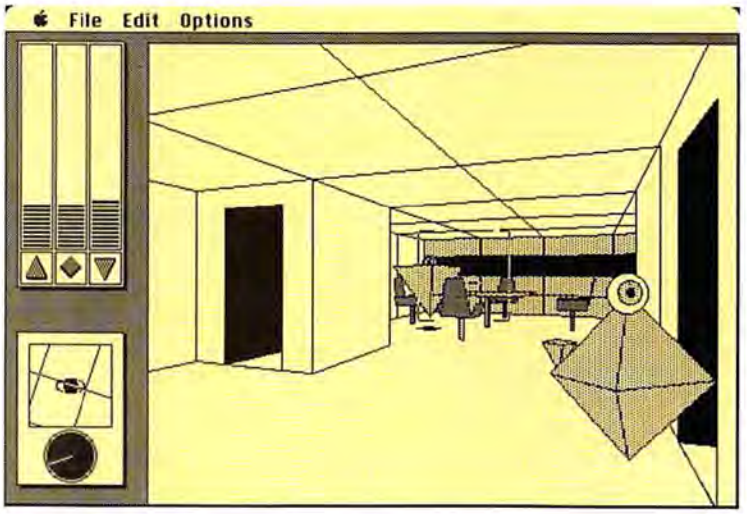
Although not technically copy protected, the game is occasionally interrupted by the intrusion of "security panels" (ostensibly part of the futuristic decor), which require that you type in a six-digit, ever-changing code. You arrive at the correct numbers by consulting a cardboard slide-rule, included with the game, which is not unlike the secret spy decoders that used to come in boxes of breakfast cereal. Without this difficult-to-photocopy item, the game is unplayable, and thus piracy of the program is ingeniously defeated. But having to look up the correct code can be bothersome.

The Last Frontier

The Colony is worth exploring, though. Despite its rehashed sci-fi story line, its realistic 3-D environment will have you poking into corners, rooting through drawers, and dodging aliens with gusto. There are plenty of witty touches (can you find the chattering false teeth in the doctor's office?) as well as chilling ones (read the final journal entry of the now-vaporized Dr. Schneider, in which she insists that the dangerous teleporter experiments proceed).

If you plan to undertake the journey, though, three words to the wise: First, get a set of colony maps from CompuServe or one of the other online services; they'll spare you hours of meandering in featureless hallways trying to get your bearings. Second, remember that there's no shame in calling Mindscape for hints; The Colony's realistic world isn't always a fair one. And third, playing it alone late at night may result in 3-D nightmares. —*David Pogue*

See *Where to Buy* for contact information.



Alien to Me
When you enter an eerie conference room, an alien floats out of the closet; another alien lurks in the background. At this point, it's blast or be blasted.

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MacUser Rating 5 mice!

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Comment 2.0

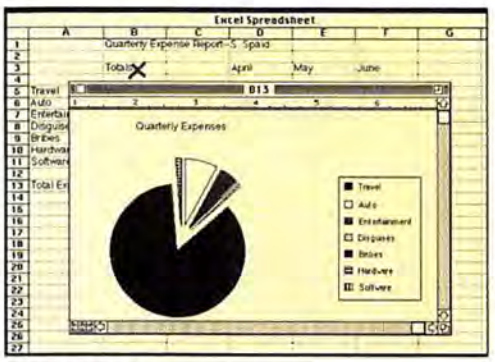
Post-it–type note DA. ***Pros:*** *Provides a variety of useful notes; Time Notes act as alarm clock.* ***Cons:*** *Not completely compatible with all applications; bug in zoom box can crash Macintosh.* ***Company:*** *Deneba Software.* ***List price:*** *$99.95.* ***Requires:*** *512KE.*

They're everywhere—small, sticky, pastel-colored squares of note paper. The concept is so simple, yet it has completely changed the way we handle paper documents. Enter Comment from Deneba Software. Inspired by the success of its paper counterpart, Comment 2.0 brings the convenience of Post-it notes to the Macintosh by providing an almost unlimited supply of electronic notes that you can attach to everything from individual spreadsheet cells to entire documents. Comment can even help you manage time by having a note automatically appear on screen at a set time.

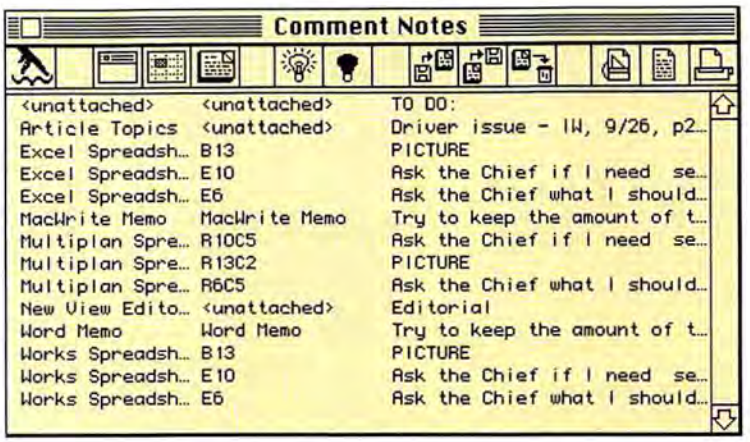
Comment is similar to the Macintosh Note Pad—both are desk accessories (DAs) that enable you to jot down a note without interrupting the main application. Comment, however, gives you the ability to create and manage different types of notes.

Different Notes for Different Folks

Comment offers four note types: Note, Window Note, Time Note, and Scratch Note. You can attach a Note to a particular location in a document. For example, you can append an explanation to a specific cell in a spreadsheet. Or, someone reviewing a desktop publishing document can attach a comment to a particular passage of text or to a graphic.



Excel with Comment
A worksheet in Microsoft Excel annotated with Comment notes. The Mark Viewable Notes command places a gray X on cells that have notes attached, making it easy to spot them on a worksheet.



Note Manager
The Note Manager is the control center for Comment. From the Note Manager's window you can view a list of notes. The icons across the top of the window allow you to manipulate the notes in the file.

The Window Note, as its name implies, is attached to a window rather than to a particular place in a file. A Window Note is handy for making general comments about a document, or for making a routing slip for document approval.

The Scratch Note, which is similar to the Macintosh Note Pad, is a free-floating note that enables you to capture a fleeting thought or jot down phone messages.

The most useful note is probably the Time Note. It enables you to enter a message in a note window and preset a time for Comment to display it. You can even set Comment to display a warning message in advance of the Time Note. Another option is to set a Time Note to repeat itself at certain intervals. Normally, when a Time Note appears, the Mac beeps once; however, you can elect to have a Time Note beep constantly until you shut it off. Just *try* overlooking that appointment.

What's on the Menu?

You can set Comment to automatically load into memory whenever you start up the Mac. Or you can load Comment manually from the Apple menu. Once Comment is loaded, it remains in standby mode until you select Quit from Comment's menu. While Comment is active, an asterisk (*) appears on the far right of the menu bar. Clicking on the asterisk displays a menu that lists many of Comment's commands. The most important item in the menu is the Note Manager, the control center for all Comment activities. From the Note Manager you can view a list of active notes, as well as search, import and export, and delete notes.

Take Note

While Comment has the potential to become as indispensable as Post-it notes, there are some annoying problems that make me wary of relying on it completely. For one, Comment doesn't work smoothly with all applications. In MacDraw II, for example, Comment will not attach a note to an object, and the location of Comment's asterisk menu moves around within MacDraw's menu bar. Comment also exhibits problems in FullWrite Professional and in Microsoft Works.

And an annoying bug surfaces when I attempt to enlarge a note window on my color monitor by clicking on its zoom box. Instead of opening the note window to the full size of the display, this makes the note disappear altogether, sometimes freezing the Mac II and requiring that I restart it. (Deneba Software has informed me that a fix is forthcoming.)

In spite of its drawbacks, Comment could easily become an indispensable member of my DA collection. It is a convenient way to annotate cells, words, or entire documents. Its Scratch Notes provide a means for instantly jotting down random ideas. And finally, its Time Notes are perfect for keeping on you top of deadlines and appointments.

But despite Comment's convenience, until Deneba Software fixes the bug that can crash my Mac, I'll have to rely on yellow Post-it notes a while longer.—*Keith Thompson*

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Window Shopping

Getting organized with two HyperCard stacks, a HyperCard utility, and FormSet

by Lawrence Stevens

The value of most commercial HyperCard stacks is usually not the information they contain—that's almost always available elsewhere for less money—but the organization of the cards. This month I review two products that help you organize your stacks, plus a HyperCard utility that helps organize your ideas, and a forms package.

Client

Client by Softworks ($195) is a HyperCard stack that maintains a list of your clients or customers along with their product or service interest, as well as financial and contact information. It strikes a perfect balance by providing enough links to make negotiating around the cards easy without confusing you with too many buttons and functions.

The title card is an attractive graphic of the cover to a *Personal Directory* with alphabetic index tabs along the side. You can access a specific customer card by clicking on the correct letter tab and then using the forward arrow. You can also search the cards by a word or a phrase.

The main client card contains fields such as client's name, address, and phone number. You can change any of the field names. For reporting purposes, you can specify that the program sort by the first field only; by the first, then the second field; or by the first, second, and then the third field.

Linked to the main client card are three preset cards: Client Interest, Financial Information, and Contact Information. You can change the titles of these cards if you wish, and you can add as many cards as you want. You can also customize each of the field names on the cards, and you can specify that a field accept only a number or a date, or lock a field from further data entry.

You can set a variety of parameters for searching through your Client file. You can search by word, phrase, client name, or other parameters you define—upper and lower numeric limits, for example. You can locate clients who purchased products costing between $20,000 and $40,000 in 1988, or clients you haven't visited for three months, or clients who have expressed an interest in a particular product.

The search function is not tied into the reporting facility. You can print lists that contain information, but you can't set parameters for those lists. This is the weakest aspect of Client. The program does enable you to export the data as text to another application such as a spreadsheet or a database.

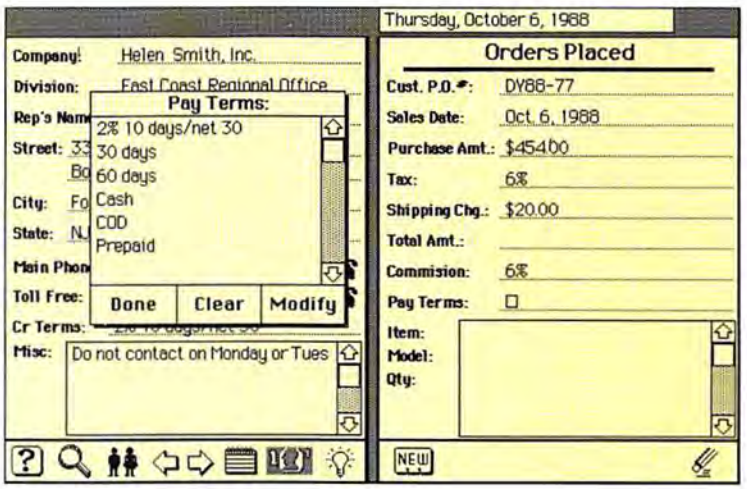
Aside from its reporting limitations, Client is comprehensive enough for any small business. It's easy to learn and well organized—one of those programs that has the potential of changing the way you do business.

Wordwise

Few HyperCard stacks have indexes. The hierarchical structure of HyperCard seems to lend itself to sinuous searching rather than to straightforward chapter- and page-indexing. Still there may be times when you wish you had an overall index for an entire stack. Wordwise ($29.95), by HyperAnnex, can create that index, and given the difficulties involved, do a creditable job of it.

In order to be useful, an index should include only meaningful words, words that point to useful information. If the index is cluttered with trivial words, such as prepositions and articles, it will be unwieldy. As Wordwise processes a stack, its filter removes words that should not be listed in the index. The filter, which contains about 1000 words, is not long enough. After filtering, the index is still diluted with hundreds of useless entries—*me, met,* and *every,* for example. You have to eliminate these unimportant words as well as alternate forms

(continues)



Choice List in Client *You can create a choice list that allows you to enter data in most fields with a click of the mouse. This is an example of a choice list in the field Pay Terms.*

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(plurals or different tenses) of words before your index is really usable. You can add words to the filter, but that increases processing time, which is already an agonizingly slow 30 to 60 seconds per card.

Once the index is created, Wordwise is easy to use. You can access the index by using a button on the Home card or by holding the option and ⌘ keys for two seconds. The index is displayed in four scrollable columns. You can get to any card that contains an indexed word by clicking on that word in the index. You can attach notes to the index that will appear when the note button is clicked. And you can store multiple indexes for the same file, so you can have one for proper names and another for medical terms (although creating indexes like those will take a lot of work). The software also comes with an index to HyperCard's Help stack.

I do wish the manufacturer had produced a manual for the program, either printed or in HyperCard form. Instead extensive help and information buttons attached to each card explain the processes. They work fine, but I would have mastered the system more quickly if I could have read an overview first.

If you want to make a good index to your stacks, you've got your work cut out for you. Wordwise will at least get you started.

HyperDraft

HyperDraft ($25), distributed by Heizer Software, is a card file system for those who want to store wordy ideas—chapter outlines, quotations, and references, for example—and then arrange, link, and access the cards in different ways. In concept, this stack is ingenious and comprehensive. Fourteen buttons at the bottom of each card enable you to find cards by text word, title word, or card number; to link cards so you can move from one to the other with a click of the mouse; to format and then export data as text; to attach reference cards (such as citations) to a main card; and even to track elapsed time. At first peek, HyperDraft seems clever—just what you need—but when you try to use it, it collapses under its own weight. The documentation is hard to follow and incomplete; some functions are awkward and others do not seem to work at all.

The main problem with the documentation is that it presupposes a familiarity with HyperCard terminology and functions. It uses terms like *Sort Tags* without defining them, and it leaves out important pieces of information. For example, to return to the main stack from the Help stack, you Shift-click. But the manual doesn't tell you which of the 19 buttons to use (it's not the Help button). In another case, the manual doesn't explain how to return to the main stack from a function card, forcing a beginner to turn off the computer in order to escape.

When the functions are good, like appending cards, linking cards, and defining key terms, they are very, very good, but when they are bad, they are horrid. In the search function, for example, you can search by single word only, not by phrase. But at least that function works; some others do not. The Move Card button does not, despite the documentation's promises, allow you to relocate a card to any number in sequence or to trade a card with an adjacent card.

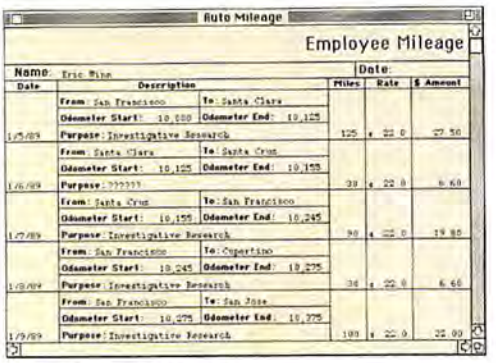
If you need a card file system, and you're willing to do some learning and patching and maybe spend time on the phone with the author (his name and number are included with the stack), HyperDraft may be worth the $25 price tag. But the program is definitely not for the HyperCard beginner.

FormSet

If you haven't computerized your company's forms on a spreadsheet or word processor yet, you may not have to. FormSet ($95) from Softview has 68 forms in five categories: general business, accounting, payable, personnel, and sales. There is a form for almost every business activity: Job Estimate, Message with Reply, Daily Cash Report, Ledger Sheet (two to four columns), Purchase Order, Employee Application, Employee Warning Notice, Bill of Lading, and so on. Even if you don't have enough Macintoshes to go around, so that the forms have to be filled out by hand, it still may be more convenient to be able to print the forms when you need them rather than buying and shelving them.

When you input the data to complete the forms, FormSet does any necessary calculations for you. And when two or more forms are linked, the data is automatically carried from one form to the others.

The forms are well organized. The fields are crafted so that numeric fields will not accept nonnumeric data; fields that are automatically calculated won't accept an input entry. You can get specific instruction on how to complete many of the fields by double-clicking on them. You can enter the letter *e* after an entry to indicate that it is an estimate, or a question mark (?) to indicate that you do not yet know the amount. The program will do the calculations, inserting *est* or *???* after the result. You can type an itemized list for each data field (for example, the cost of the parts in a job estimate), which does not get printed on the form.



Calculated to Please

In FormSet many forms are set up to automatically calculate and total numeric fields. On this mileage form, a total amount is calculated based on a per-mile rate set at the beginning of the program.

FormSet has six linked sets of forms: Inventory Records, Invoices, Sales Orders, Petty Cash, Payroll, and Payment Due Notices. The Payroll set, for example, consists of a personnel record; a payroll record, which contains year-to-date salary information; and a weekly time sheet. The personnel record data, including name, employee number, and number of dependents, is automatically posted to the other two forms. The data from the weekly time sheet determines the salary on the payroll record. Linked forms can be saved as a single file, so that all employee information is kept together.

There are only two problems with FormSet. First, the forms are not customizable. Second, although it can import text data, it cannot export data to a spreadsheet. Those objections will mean a lot to some companies. If your company needs custom forms, or if you want to be able to manipulate data on forms, your best option is to create your own forms on a spreadsheet. Other companies, however, can save days of development time using FormSet. □

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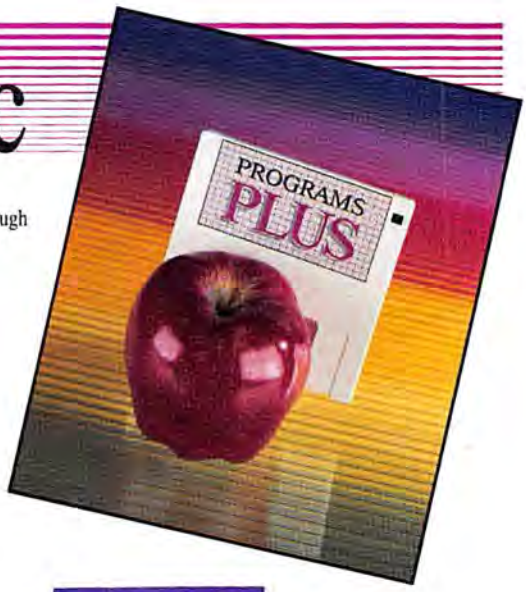

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SE Carrying Case ..... **76.**

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Sensible Grammar ..... **54.**

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Virex ..... **69.**

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Ruby-Surge Suppressor-SPF-2	55.
Cutting Edge Cutting Edge EADB-105 Keyboard *(Mac SE & Mac II)*	135.
DataDesk MAC-101 Keyboard/Beige *(128k/512k & MacPlus)*	139.
MAC-101 ADB Keyboard/Platinum *(Mac SE & Mac II)*	139.
Ergotron Mousecleaner 360°	15.
MacTilt *(Mac, SE or II)*	68.
Farallon MacRecorder Sound System *(Mac SE or Mac II)*	139.
Impulse Audio Digitizer w/soundware	145.
I/O Design *Mac Luggage in Navy* Macinware Plus Carrying Case	64.
Macinware SE Carrying Case	*Special* 76.
Imageware II Carrying Case	49.
HDware	54.
Kalmar Designs *Teakwood Roll-Top Disk Cases:* Micro Cabinet *(holds 45 disks)*	14.
Double Micro Cabinet *(holds 90 disks)*	21.
Triple Micro Cabinet *(holds 135 disks)*	31.
Kensington External Disk Drive Cover	8.
Extra Long ADB Keyboard Cable	25.
Macintosh II Stand	20.
Macintosh II Monitor Extension Cable	33.
Mouse Pocket *(Reg. or ADB)*	8.
Mouseway *(Mousepad)*	8.
ImageWriter or ImageWriter II Cover	9.
Macintosh Plus/SE Dust Cover	9.
Macintosh SE w/extended Kybd Cover	9.
Mouse Cleaning Kit w/Pocket	17.
Disk Drive Cleaning Kit	20.
Tilt/Swivel	22.
Apple Security Kit	34.
Antiglare Polarizing Filter	33.
Modem/Fax Protector 10	15.
Modem/Fax Protector 20	29.
Power Tree Surge Suppressors (10, 20, or 50)	Call
Printer Muffler Stand *(60 & 132)*	24.
Printer Muffler 80	43.
System Saver Mac *(Beige or Platinum)*	64.
Super Base	34.
System Saver SE	55.
Masterpiece Mac II	105.
New Turbo Mouse *(Reg. or ADB)*	119.
Mobius Fanny Mac QT *(Beige or Platinum)*	60.
Mouse Systems A+ Mouse *(MacPlus)*	65.
A+ ADB Mouse *(Mac SE/Mac II)*	85.
Moustrak MousePad 7" x 9" Size	8.
MousePad 9" x 11" Size	9.
Orange Micro Grappler Spooler	39.
Grappler C/Mac/GS	79.
Grappler L/Q or Grappler L/S	92.
Ribbons *Available in Black, Blue, Brown, Green, Orange, Purple, Red, Yellow, Silver & Gold* ImageWriter Ribbon	4.
ImageWriter Black 6-pack	20.
ImageWriter Rainbow Pack *(6 Colors)*	20.
ImageWriter II-Four Color Ribbon	9.
ImageWriter LQ Black	17.
ImageWriter LQ Four Color	20.
Seikosha Ribbon Black	6.
Silicon Comforts MacChimney *(Very Effective Cardboard Laminate Convection Cooling Device)*	16.
Smith & Bellows Mahogany Disk Case *(holds 96)*	30.
Sopris Softworks *High Trek Carry Cases - Platinum Gray, Navy* Imagewriter II Case	49.
Macintosh Plus, SE w/Standard Kybd	59.
Macintosh SE & Extended Kybd Case	69.
Targus Imagewriter II Carry Case Blk.	49.
Macintosh Plus Carry Case Blk.	59.
Deluxe MacPlus-XKB Blk.	69.

Blank Media

Single Sided 3½" Diskettes Bulk *(Sony)* 3½" SS/DD Disks *(10)*	12.
Sony 3½" SS/DD Disks *(box of 10)*	13.
Double Sided 3½" Diskettes Bulk *(Sony)* 3½" DS/DD *(10)*	17.
Centech 3½" DS/DD Color Disks *(10)*	19.
Sony 3½" DS/DD Disks *(box of 10)*	19.
Fuji 3½" DS/DD Disks *(box of 10)*	19.
Maxell 3½" DS/DD Disks *(box of 10)*	20.
Verbatim 3½" DS/DD Disks *(box of 10)*	19.
3M 3½" DS/DD Disks *(box of 10)*	20.

Languages

Borland Turbo Pascal	65.
Turbo Pascal Tutor	46.
Consulair Mac 68000 Dev. System	59.
Mainstay V.I.P. 2.5 *(Visual Interactive Programming)*	109.
Manx Aztec C	65.
Aztec MPW C	99.
Axtec C + SDB	99.
Microsoft Microsoft Quick Basic	69.
Smethers & Barnes Prototyper	72.
Symantec Lightspeed C	95.
Lightspeed Pascal	65.
T.M.L. TML Pascal II *(Includes MPW)*	79.
TML Source Code Library II	42.
Zedcore ZBasic 5.0	105.

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THE PLAN: Create *the* input device that is the ultimate in controller precision and versatility.

THE STRATEGY: Combine design ergonomics with state-of-the-art controller technology.

THE RESULT: *The Gravis Mouse - Stick™* . The breakthrough joystick controller technology ergonomically based on the hand's ability to perform precise movements with speed and accuracy.

A BETTER HANDLE ON TECHNOLOGY

Design makes the MouseStick™ responsive.

Technology makes the Mouse-Stick™ today's most versatile input device. For desktop use. For large-screen monitor CAD and DTP applications. And, of course, for computer games.

Plug it in and get ready! Everything opens up with an amazing 1200 point resolution that can be set to any screen size.

And the big picture resolves into fractional sensitivity modes for precise pixel by pixel control.

The secret? The MouseStick's™ true *optomechanical* digital output signal. Here's a comparison: available analog joysticks perform like an old hi-fi. The MouseStick's™ digital optomechanics perform like a compact disk player.

And there's more — the Gravis Mouse-Stick™ Processing Unit (GMPU). This little brain really frees you to select from hundreds of modes such as direct tracking with or without autocentering and fully variable pulse output. Three programmable microswitch buttons let you emulate keyboard commands, and the GMPU's 16-character display and menu system updates you on mode and function.

Thanks to the GMPU's 16K of ROM, programming options are virtually limitless and it can be user upgraded to include new features. The MouseStick™ is compatible with all MacIntosh©, Apple IIe, IIc and IIGS computers, has all the unique features of the Gravis Joystick *and* comes with a one year no-nonsense warranty!

SO TEST-DRIVE THE MOUSESTICK™ TODAY!

Get a grip on the new Mouse-Stick™ and you'll quickly discover it's light years ahead of the mouse, trackball or traditional joystick.

The MouseStick™ doesn't clutter your desk or require constant cleaning. And unlike a trackball, you don't need the dexterity of a cardshark to drag an item.

The Gravis MouseStick™ is one of the most technologically advanced and durable digital input devices available .

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Tel. 604-434-7274

Circle 401 on reader service card

New Products

Information on the Mac's latest hardware, software, and accessories

Edited by Mary Margaret Lewis

This section covers Macintosh products formally announced but not yet evaluated by *Macworld*. All prices are suggested retail. Please call vendors for information on availability.

HARDWARE

Cable Scanner Cable tester for LAN cabling systems. Pinpoints location of any cable faults in LAN cabling system. Supports variety of network configurations including AppleTalk, TOPS, and twisted-pair. Includes AC battery charger, cable adapters, cable tracer, and troubleshooting guide. $1495. Microtest, 602/971-6464.

FT-60 Bus-Link Bus-Link subsystem lets one computer access the memory of another. Links to Mac II NuBus card for memory sharing between Mac II and any other computer with VMEbus, Multibus I, Unibus, Qbus, SELbus, or Lbus architecture. $13,900 to $19,900. Flavors Technology, 603/882-8404.

GigaTape Mac subsystem backs up 2.3 gigabytes on an 8mm tape cartridge in less than 7 hours. Available in configurations ranging from 2 gigabytes to 1 terabyte. Designed for 5¼-inch form factor. Sustained data rate of 246K per second. $4995, includes SCSI interface and proprietary backup software. Summus Computer Systems, 713/492-6611.

Mac Data Display (Model A342) Three-pound LCD projection panel that displays Mac-generated images on a large screen or wall via overhead projector. Works with all Mac models. Fits on top of any standard overhead projector and connects to video port of the Mac. Comes with power supply, plug-in board, and video cable. $1499; custom carrying case $69.95. Computer Accessories Corporation, 619/457-5500.

MacinStor i Series Internal hard disk subsystems for the SE, Mac II, and Mac IIx. Comes with disk management software including formatter, diagnostics, partitioning, backup and restore, disk optimization, data encryption, and data recovery. $999 to $7999. Storage Dimensions, 408/879-0300.

Macintosh Communications Package Includes 2400-baud SA modem in platinum color, cable for use with any Mac, and MicroPhone communications software version 1.1. $299. Practical Peripherals, 818/991-8200.

MacIvory Symbolic processor board with standard Mac II desktop system for delivery of AI applications. Developers can use standard platform to deliver applications developed on Symbolics' 3600 workstation and XL400 system. Integrates with applications in commercial, industrial, and military computing environments, and accesses existing Mac applications. Starting price for system $21,900; board $10,800. Symbolics, 617/621-7500.

MACPIO-24 Interface Board High-current, 24-bit, parallel digital I/O board for the Mac II. Interfaces with variety of instruments, displays, and user-defined systems and equipment. Handles digital I/O through standard 37-pin, D-type connector. 18-inch ribbon connector cable available. $200; cable $25. MetraByte, 508/880-3000.

Magic45 Removable Removable 45MB tape cartridge for data storage. Fits under the Mac and includes four-switch power center on front panel. Units are preformatted and configured for immediate use. $1795. MacProducts USA, 512/343-9441.

NX-2400 Multi-Font Printer 24-wire, letter-quality printer. Four internal fonts, paper parking, and expandable memory. Standard with 7K buffer, expandable to 39K with optional 32K RAM card. Four resident fonts, with additional fonts available. $529. Star Micronics, 212/986-6770.

RGB/Videolink Free-standing scan converter, about the size of a VCR, converts signal from a Mac II to NTSC (television) signal or low-resolution RGB signal. Lets you use images from Mac II for videotaping, video projection, and video transmission. $9900. RGB Technology, 415/848-0180.

Spectrum/8 Series II

Spectrum/8 Series II Color video board with custom gate array replaces more than 40 components used on previous card. Produces up to an 8-square-foot desktop. Centers objects and makes panning adjustments from dialog box. $1895. SuperMac Technology, 415/962-2900.

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SSH-4 Accessory Board Four-channel, simultaneous sample-and-hold accessory board for MetraByte's DAS-20, and VMECAI-16 and VMEAI-16 analog interface boards. Allows analog input data to be acquired from two, three, or four inputs with less than 30 nanoseconds channel-to-channel sample time uncertainty. $425. MetraByte, 617/880-3000.

Vari-Sync Monitor Nineteen-inch monitor adjusts to resolutions of 640 by 350, 640 by 400, and 640 by 480 pixels. Built for CAD/CAM/CIM, factory automation, graphic design. Available in metal enclosure, cabinet, or chassis. Suitable for rack mounting. $2500. Colorgraphic Communications Corporation, 404/455-3921.

Varityper VT600W Prints on up to 11-by-17-inch plain paper for CAD/CAM drawings, financial reports, and newspaper publishing. Imaging in ledger-size format. Comes with AppleTalk interface, Centronics parallel and RS 232C serial ports, and 35 Adobe PostScript type fonts. $22,995. Varityper, 201/887-8000.

ViewFrame II+2 LCD Overhead large-screen projection panel compatible with all Macs. Gives simultaneous projection of the monitor's image on an overhead screen or wall when placed on standard overhead projector. B&W display with eight shades of gray. $1850. Nview Corporation, 804/873-1354.

SOFTWARE

Accountant, Inc. Professional accounting package that adapts to the existing accounting system of small to medium-size companies. Accounts receivable module addresses customer accounts, sales, and cash receipts journals. Accounts payable section covers vendor accounts, purchases and cash payments journals. 1MB min. memory. $595. Softsync, 212/685-2080.

AE Operator Marketing information system that temporarily holds data before sending it to spreadsheets, word processors, and other Mac applications. Acts as a cache to record telephone and written correspondence. Auto phone dialing. 1MB min. memory. $125. Archaic Engineering, 512/345-0860.

Aware Multiuser accounting software that imports data from a spreadsheet, creates a transaction audit trail, and consolidates multiple accounting centers. Designed for corporate accounting systems. 1MB min. memory. $1500; discount for multiple installations. Database International, 617/820-0018.

Blackjack Ace Simulates casino blackjack. Lets you learn the game while picking up test betting strategies. Displays game table, mouse-controlled betting and play, and card-counting and advice windows. Supports all casino bets. 512K min. memory. $39. Centron Software, 800/848-2424.

Bottomline Tax templates for Excel or Multiplan. Short and long forms and associated schedules for most personal and business tax returns. Corporate, partnership, sole proprietorship, farm income and expenses,

social security tax, IRA, and deductible home mortgage interest computation included. 512K min. memory. $49.95. CompuCraft, 303/791-2077.

BPlan Stand-alone business-plan software. Prompts you with series of worksheet questions; your responses produce a business plan. Includes word processor and modeling capability. Works with a variety of word processors and spreadsheets. 1MB min. memory. $195. Palo Alto Software, 415/325-3190.

Bridge Dealer Bridge program that generates playing hands to your specifications; lets you restrict any or all of the four hand positions via the Dialog Box. Generates hands for tournament play, bidding or play evaluation, and bidding practice. Synchronizes multiple computers to deal the same hands in the same order so you can practice bidding over the telephone. Mac II–compatible. 512KE min. memory. $50. Gonzo Systems, 501/895-1354.

Business MacBuilders and Laser MacLabels Business MacBuilders maintains lists, performs mail merges, and acts as a direct mail processor without programming. Simple MacSoftware will customize for you; some changes made at no charge. Laser MacLabels creates three-column labels on an ImageWriter or laser printer. Maintains lists; lets you select sections for mailing. Laser MacLabels and Business MacBuilders bundled together. 1MB min. memory. $100 combined. Simple MacSoftware, 415/331-4862.

Cause Personal programming software for nontechnical users and programmers. Automatically documents programs as they are written. Licenses developers to market unlimited number of application programs. 512KE min. memory. Personal version $495; professional version for developers $595. Maxem Corporation, 602/827-8181.

Clip3D Ten-volume image library of predrawn 3-D images for production of camera-ready graphics. Rotates, shades, and illuminates 3-D objects from the library; Clip3D software included with each volume. 512KE min. memory. Each volume $99. Enabling Technologies, 312/427-0386.

Crapsmaster Simulates the game of casino craps with realistic display of game table and mouse-controlled bet placement. 512K min. memory. $39. Centron Software, 407/241-1022.

Dashboard Graphic communications software that gives automatic access to electronic information services, such as Dow Jones News/Retrieval, Genie, CompuServe, and MCI Mail. Based on standard Mac interface and HyperCard. 1MB min. memory. Under $400. TenPoint0, 415/329-0500.

Data Decision analysis software that identifies sequence and linkage of events in a tree structure. Helps you evaluate intermediate points of the decision tree to identify sequence of events and probable outcomes of a particular action. 512K min. memory. $495. TreeAge Software, 617/426-5819.

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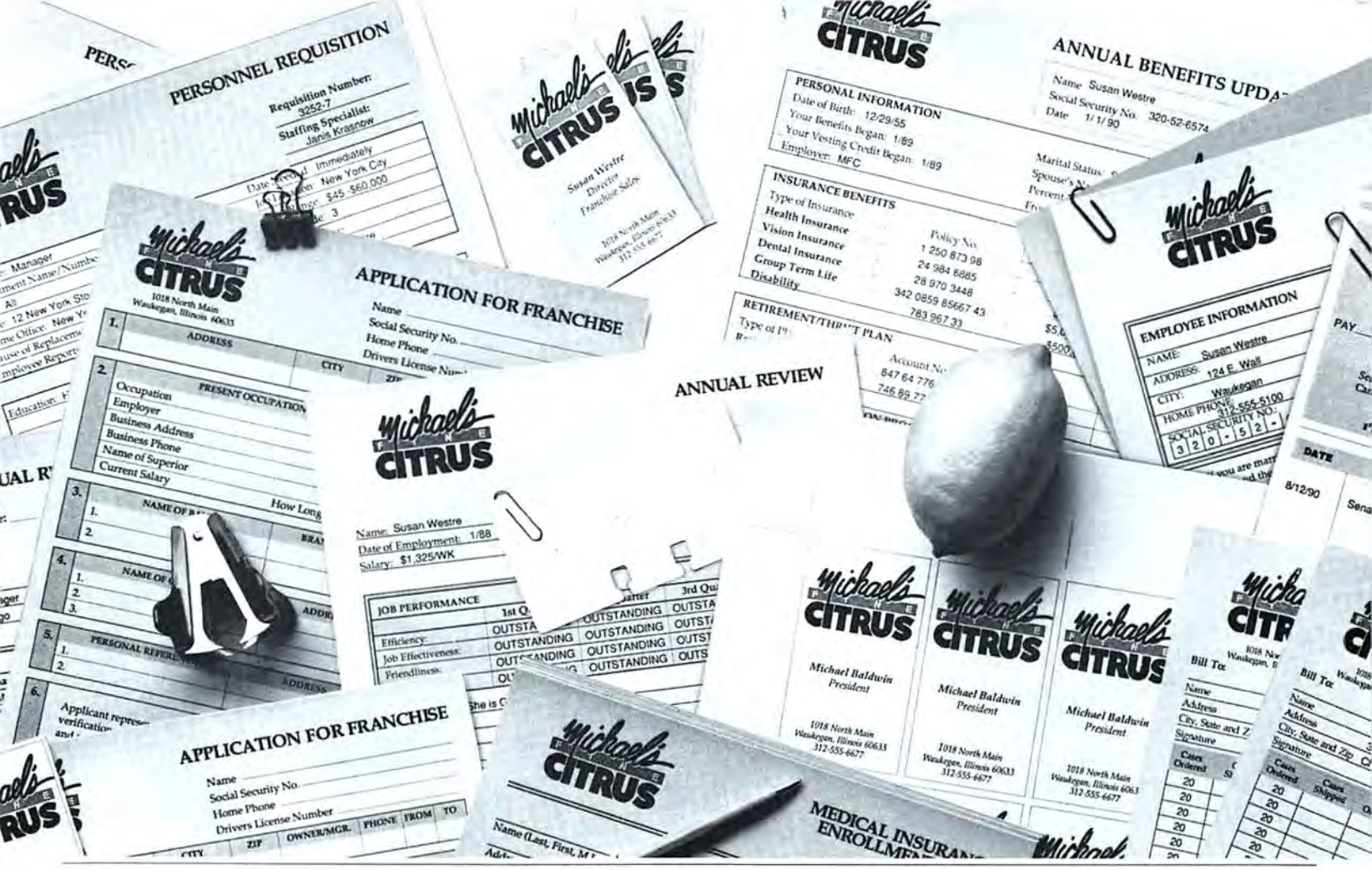


Desktop Specs Specification database for architects. Primarily for light-commercial, health-care, and residential projects. You can edit disk for specific projects or create your own specifications using the database as guideline. 512K min. memory. $220. Patrick Manley Architects, 614/469-9906.

Diskworld for the Macintosh Monthly Macintosh software subscription. 800K disks deliver a variety of software including games, desk accessories, fonts, and HyperCard stacks. 512KE min. memory. One issue $9.95; three-month trial subscription $19.95. Softdisk, 318/221-8718.

FaceIt Stand-alone set of code resources to add Mac interface to programs written in BASIC, C, FORTRAN, Modula-2, and Pascal. One manual works with all languages and compilers; multiple programs run simultaneously using a single copy of FaceIt on disk. 512KE min. memory. With sample programs for one compiler $50; with sample programs for ten compilers $100. FaceWare, 217/328-5842.

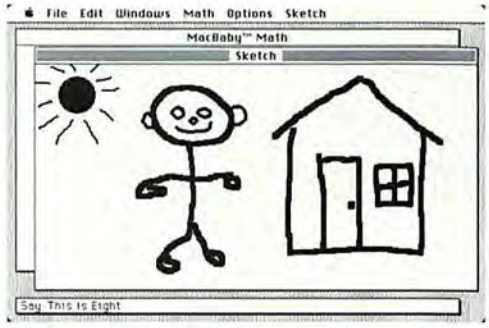
FastLabel Labeling software for mailing lists, disk labels, envelopes, and price tags. Program reads name of floppy disk in drive, stores name, and prints it as a label. You can insert many disks in succession, thereby creating a list of disk names to make into labels. Prints to standard label sheet. Formats text as it is imported. 512K min. memory. $49.95. Vertical Solutions, 206/352-2097, 800/942-4008.

The Game of Fractal Images Software adjunct to Springer-Verlag's book *The Science of Fractal Images* (1988). Contains new algorithms that demonstrate Mandelbrot and Julia sets. 1MB min. memory. $24.95. Springer-Verlag Publishers, 212/460-1500.

Graphics Shortcuts Technical clip art for architects, builders, and graphic artists. Four modules contain variety of images: trees, people, cars, signs, and more. Available for Dreams and SuperPaint. 512KE min. memory. $59.95. Patrick Manley Architects, 614/469-9906.

Hyper-Action Compilation of more than 45 non-copy-protected common-background stacks to help you manage daily sales, business, and personal activities. Stores documents hierarchically; sorts scanned-in graphics hierarchically. Includes daily calendar, notes, maps, and mini corporate tree for identifying key people in decision process for sales prospects. 1MB min. memory. $94.50. Multi Solutions, 609/896-4100.

MacBaby Math Teaches children ages six months and up numbers from 1 through 100, and teaches the basic math concepts of



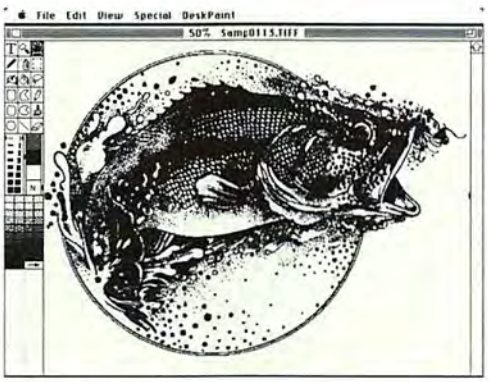
MacBaby Math

addition, subtraction, multiplication, and division. 128K min. memory. $39.95. KAR Enterprises, 408/739-9517.

MacInteriors 3-D interior design tool for designing room layouts. Gives view and print elevations, plans, and perspectives. Places up to 64 stored library units in direct position within a room plan, and lets you view perspectives from any angle or height. 1MB min. memory. $295. ComServCo, 504/649-0484.

MacSmarts Professional Inference server on TOPS or other PC/Mac network. Links databases and spreadsheets, HyperCard stacks, MacPaint and PICT images, and text files. Performs calculations and logical operations on variables and data, uses built-in functions and equations. Handles up to 4000 rules per knowledge base and 1000 examples per rule. 1MB min. memory. $495. Cognition Technology Corporation, 617/492-0246, 800/622-2829.

Metro ImageBase Fourteen categorized volumes of 300-dpi digitized artwork; volume consists of 100 images on 5 to 8 floppy disks. Subjects include business graphics,



Metro ImageBase

newsletter and report makers, and more. Works with most page layout software. 512K min. memory. Each volume $145. Metro ImageBase, 818/881-1997.

Minicad Plus 3-D software to be used within 2-D document. Write your own routines with the spreadsheet and programmable macro language. New 2-D features include complex duplication with arrays, and ability to move objects by precise measurements. 1MB min. memory. $695. Graphsoft, 301/461-9488.

OvalTune Synchronizes graphics from any Mac graphics program with music. Saves graphics in PICT format or in clipboard; saves music as MIDI files. Saves combination of graphics and music in OvalTune videotape file. Proprietary library of 128

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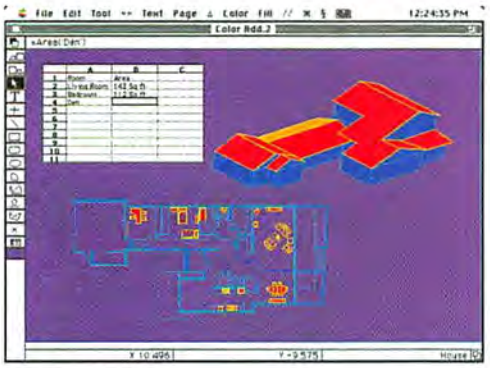

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The road to success will always be paved in triplicate. But with new SmartForm™ software and Macintosh personal computers, it's no longer the tollway it once was.

The SmartForm concept is simple: you can't reduce the paperwork, so reduce the amount of paper. And the printing, shipping and storage costs that go with it.

SmartForm Designer™ includes all you need to whip out crisp, professional forms in a hurry. Fields, lists, check boxes, grids, combs, lines, ovals, rectangles—everything. And their sizes and locations can be pinpointed to the exact inch, centimeter, point or pica.

Type flexibility is almost unlimited. You can reverse, condense and expand fonts, adjust leading and

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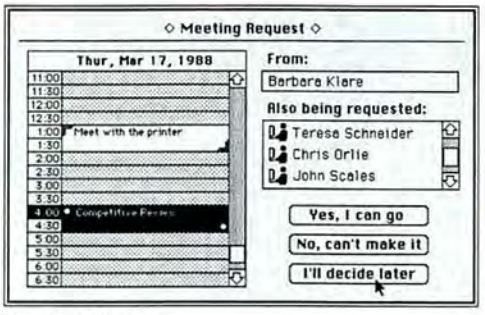
OvalTune

sounds. Plays music over Mac or standard speakers. 1MB min. memory. $145. Intelligent Computer Music Systems, 518/434-4110.

PC Tools/Mac Mac version of PC Tools Deluxe. Collection of disk utilities and data recovery tools includes Smart Locate DA, Fast Hard-disk Backup, File Undelete, File Unfragmenter, Recovery (from damaged floppies or hard disks), File Encryption and Compression, and Fast File Copy. 512KE min. memory. $79. Central Point Software, 503/690-8090.

Perfect Timing Calendar- and schedule-management system for Mac networks. Network users can schedule and confirm group meetings, and individuals can use on-screen calendar and datebook func-



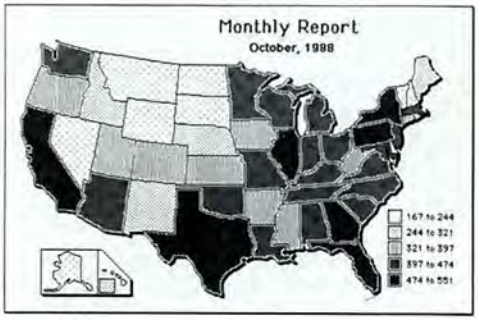
Perfect Timing

tions. 1MB min. memory. Starter kit $295, includes server, accommodates up to three workstations; three additional worksta tions $150. Imagine Software, 415/453-3944.

Photon Paint Graphics program that rotates, resizes, and flips objects, and maintains perspective when it tilts. Blend mode smooths shading and blends shapes with background. Magnification window allows sizing of magnified pixels and scrolling around magnified images. 1MB min. memory. $299. MicroIllusions, 818/360-3715.

Police Quest Hand out a traffic ticket, get tangled in red tape, bring a racketeer to justice, or go undercover to infiltrate the Death Angel's gang, when you take on the role of cop in this adventure game. 3-D graphics let you move around objects; optional joystick control. 512K min. memory. $49.95. Sierra On-Line, 209/683-4468.

QuickMap Geographic analysis tool that represents data on a map. You can build a customized geographic-analysis mapping



QuickMap

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system for your area of interest with data from a spreadsheet or database. Also lets you analyze data and create maps for reports, proposals, and presentations. 1MB min. memory. $99. MicroMaps Software, 609/397-1611.

Roulette Master Combines game table and bet placement with animated wheel spin. You select initial stake of up to $100,000 and chip value of up to $100 to make common casino bets. 512K min. memory. $39. Centron Software, 407/241-1022.

Space Quest II Sludge Vohaul unleashes the invasion of the insurance salespeople on planet Earth. You don the guise of Roger Wilco, sanitation engineer, along with your sanitary space mittens, to prepare for the onslaught that Vohaul has prepared. Includes 3-D graphics, multiple solutions, variety of scoring options, and optional joystick control. 512K min. memory. $49.95. Sierra On-Line, 209/683-4468.

Tax Stacks HyperCard income tax preparation program with computer-generated, IRS-approved forms and schedules you can print and return to the IRS. Displays only

Space Quest II

information you need to see based on your responses to Tax Questionnaire. Tax jokes included. 1MB min. memory. $69.95. StackWorks, 217/328-5257.

Timbuktu Remote Long-distance version of Timbuktu screen-sharing application for Macs over asynchronous lines. Operates at standard modem data rates. Chat window allows guest and host users to exchange messages. File transfer utility moves files from host to guest computer. 512KE min. memory. $295. Farallon Computing, 415/849-2331.

VideoWorks Professional Color animation software with color paint program, color palette control, and online help. Creates animated charts and graphs, and slides with pop-up menus, radio buttons, and text fields. Animates borders and marquees; makes text shimmer, sparkle, or scroll. 1MB min. memory. $695; upgrade from VideoWorks II $250. MacroMind, 312/871-0987.

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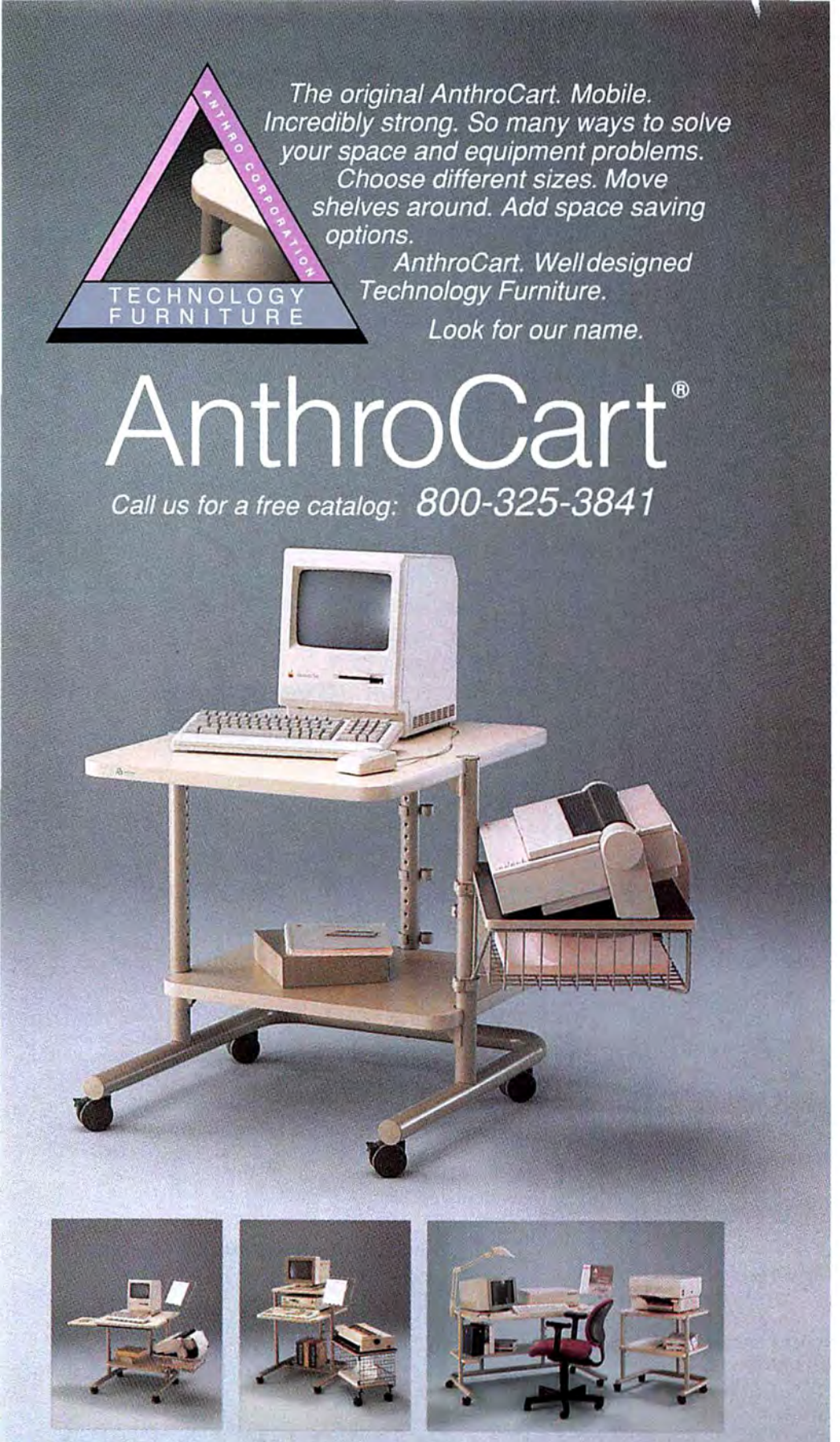
VideoWorks Professional



New Products

What's Best Add-on to Excel version 1.5. Builds mathematical models within a spreadsheet to optimize resource allocation in areas like finance, transportation, scheduling, manufacturing. Comes in three versions identical in function but different in variable capacity. 1MB min. memory; hard disk, Microsoft Excel 1.5, and HyperCard required. Personal $149; Professional $995; Industrial $1995. General Optimization, 800/441-2378.

ACCESSORIES

Colored Computer Bond Papers 24-pound paper in bright colors comes in 200-count pack of red, blue, green, yellow, or assorted; 20-pound pastel-colored paper available in 240-count pack. Bright pack $12.95; pastel pack $10.95. The Legacy Company, 413/737-4770.

Colored Computer Bond Papers

Foot Ease A 13-by-19-inch platform footrest for personal computer users. Carpet-covered and rotatable. Slope can be adjusted with foot-operated lock/unlock lever. Grips floor. $49.95. MicroComputer Accessories, 213/301-9400.

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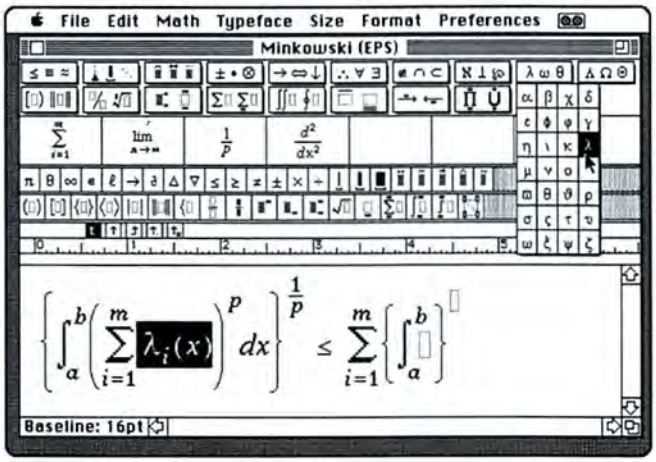

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$$\left\{\int_a^b\left(\sum_{i=1}^m \lambda_i(x)\right)^p dx\right\}^{\frac{1}{p}} \le \sum_{i=1}^m\left\{\int_a^b [\lambda_i(x)]^p dx\right\}^{\frac{1}{p}}$$

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New Products

HyperCard Script Language Guide: The HyperTalk Language Reference guide for HyperTalk through HyperCard version 1.2, written by Apple Computer. Describes vocabulary and syntax of the language, includes sample scripts to demonstrate HyperTalk concepts. $22.95. Addison-Wesley Publishing Company, 617/944-3700.

LabView Application Notes Series of technical applications notes for LabView instrumentation and analysis software system. Covers topics ranging from dataflow programming and arrays to block diagramming techniques and how to use specific instrument drivers. Free. National Instruments, 512/250-9119.

MacTrac Trackball with three-button design for left- or right-hand operation. Left and right buttons replace the single button on the Macintosh mouse. Center button activates cursor drag lock. Light indicates whether drag lock is on or off. $99. MicroSpeed, 415/490-1403.

MacTrac

PageMaker Live PageMaker 3.0 training video. Comes with printed user guide and video counter index for use with video prompter on tape. Divided into three two-hour modules. Each module $99. Image Express, 714/938-1070.

PhoneMactivator and TimeMactivator PhoneMactivator turns on Mac II via telephone when used with telephone responder (a device to turn on and off power over the telephone). TimeMactivator Standalone, a battery-operated digital alarm clock, turns on the Mac at specified time.

(continues)

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9 Turbo Mouse ADB, #62360, works with Mac SE, Mac II, or Apple IIGS. Turbo Mouse, #62358, works with Mac or Mac Plus. Both have a suggested retail of $169.95.

10 It's easy to find. For a Turbo Mouse dealer near you, just call **1-800-535-4242,** or **212-475-5200.**

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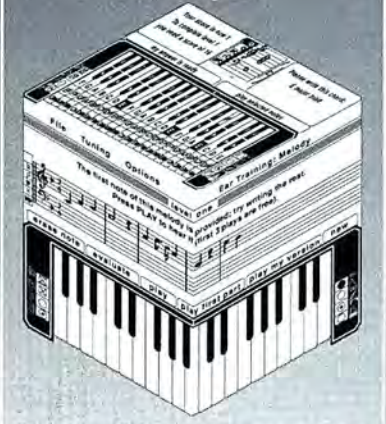

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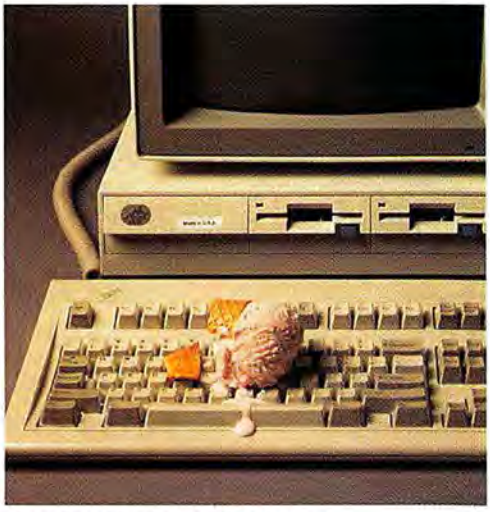
New Products

PhoneMactivator

Both plug into any Apple Desktop Bus port. PhoneMactivator $100; TimeMactivator $45. The Mactivator Company, 415/234-5178.



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To have your product considered for inclusion in New Products, *send an announcement with product name, description, minimum memory, peripherals required, pricing, company name, and phone number to New Products Editor,* Macworld, *501 Second St., San Francisco, CA 94107. We reserve the right to edit press releases.*

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* Requires a copy of FoxBASE+/LAN, our PC multi-user software, on the network file server. FoxBASE+/Mac and FoxBASE+/Mac Multi-User are trademarks of Fox Software. dBASE is a trademark of Ashton-Tate. Macintosh is a trademark of Apple Computer, Inc.

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- Dust Cover for ImageWriter II
- Mouse Pad

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Updates

This list brings you the highlights of software updates recently received but not yet tested. The first price is the upgrade cost for registered owners; the second is the current list price.

Canvas version 2.0 converts bitmapped graphics to line art with Auto Trace feature, draws unlimited multipoint bezier curves and smooth polygons, has capacity for unlimited layers, a choice of 16.7 million colors, gray scales in 1-degree increments, hairlines as small as 1/1000 inch and a zoom capacity ranging from 3 percent to 3200 percent of the original image. Deneba Software, 7855 N.W. 12th St., #202, Miami, FL 33126; 305/594-6965, 800/622-6827. Free; $299.95 new.

Financial Analysis version 4.0 combines the applications of version 3.0 with all the models formerly sold under the title Residential Real Estate. New features include amortization schedules for loans paid on a biweekly basis, a financial calculator, financial ratios, lease-versus-buy feature, and statistical estimates on the value of a home. RealData, 78 N. Main St., South Norwalk, CT 06854; 203/255-2732. $30 for registered owners of earlier versions of either Financial Analysis or Residential Real Estate, $5 for registered owners of both; $195 new.

FontShare version 1.1 stores all typefaces in one area so users can share downloadable fonts on a network. Compatible with Apple's latest System and Finder, PageMaker 3.0, and spoolers. Olduvai Corporation, 7520 Red Rd., Ste. A, South Miami, FL 33143; 305/665-4665. Free; $295 new.

Hellenic Keyboard version 2.0 remaps the keyboard, adding 11 diacritical keys, and allowing access to the 256 extended characters. When you use it with a Hellenic font, you can produce any letter/accent combination in the Greek language. Works with System 4.1 or later versions, and Finder 5.5 or later. Metasoft, P.O. Box 482, Osseo, MN 55369; 612/559-4927. $5 with serial number from original master disk; $45 new.

HFS Backup version 3.0 lets single or multiple users logged on to an AppleShare network archive data. The program also restores AppleShare user privileges. Archives any mountable volume, including other hard disks, WORM drives, and desktop-accessible tape drives. Stores data in HFS Backup or Finder format, including files larger than 800K. Can overwrite old files to save space, and will do incremental backups. Personal Computer Peripherals Corp., 4710 Eisenhower Blvd., Bldg. A4, Tampa, FL 33634; 800/622-2888. $35; $99 new.

ImageStudio version 1.5 has a virtual memory management system that lets images larger than the available memory be opened and worked on transparently. Lets you specify the amount of RAM that a particular ImageStudio file should use, as well as the amount of memory that can be used for Undo. Lets you back up a large file to several disks and reconstruct the file on another system. Letraset USA, 40 Eisenhower Dr., Paramus, NJ 07653; 201/845-6100. Free; $495 new.

MacEnvelope version 4.0 creates and saves layouts, and is compatible with MacEnvelope version 3.0. Does zip code plus 4-digit bar coding, has OCR font, color, message fields, and graphics, and saves addresses to disk. Will do bulk printing and alphabetize or sort by zip code. Imports and exports lists, and prints in any fonts available on the system. Synex, 692 Tenth St., Brooklyn, NY 11215-4502; 718/499-6293. $25 with original disk if purchased before August 1988, $5 with original disk if purchased after August 1988; $89.95 new.

(continues)

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WASHINGTON

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i. ☐ Consultant
j. ☐ Other (specify)_____

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m. ☐ DP/MIS manager
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w. ☐ 50–99
x. ☐ 100–499
y. ☐ 500–999
z. ☐ 1,000–5,000
aa. ☐ Over 5,000

Which personal computer(s) do you own/or use?

bb. ☐ Macintosh
cc. ☐ Macintosh Plus
dd. ☐ Macintosh SE
ee. ☐ Macintosh II
ff. ☐ Apple II+
gg. ☐ Apple IIe
hh. ☐ Apple IIc
ii. ☐ Apple III
jj. ☐ Apple II GS
kk. ☐ None
ll. ☐ Other (specify)_____

Where will you be staying while at MACWORLD Expo/Washington, D.C.?

mm. ☐ Home
nn. ☐ With friends
oo. ☐ Hotel (specify)_____
pp. ☐ Other (specify)_____

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Marriott, 393-2000; Grand Hyatt Washington, 582-1234; Hyatt Regency, 737-1234; Quality Inn, 638-1616; Ritz Carlton, 293-2100; The Bellevue Hotel, 1-800-327-6667; Holiday Inn-The Governor's HS., 296-2100; The Mayflower, 347-3000; Hotel Washington, 638-5900; Holiday Inn-Thomas Circle, 737-1200; One Washington

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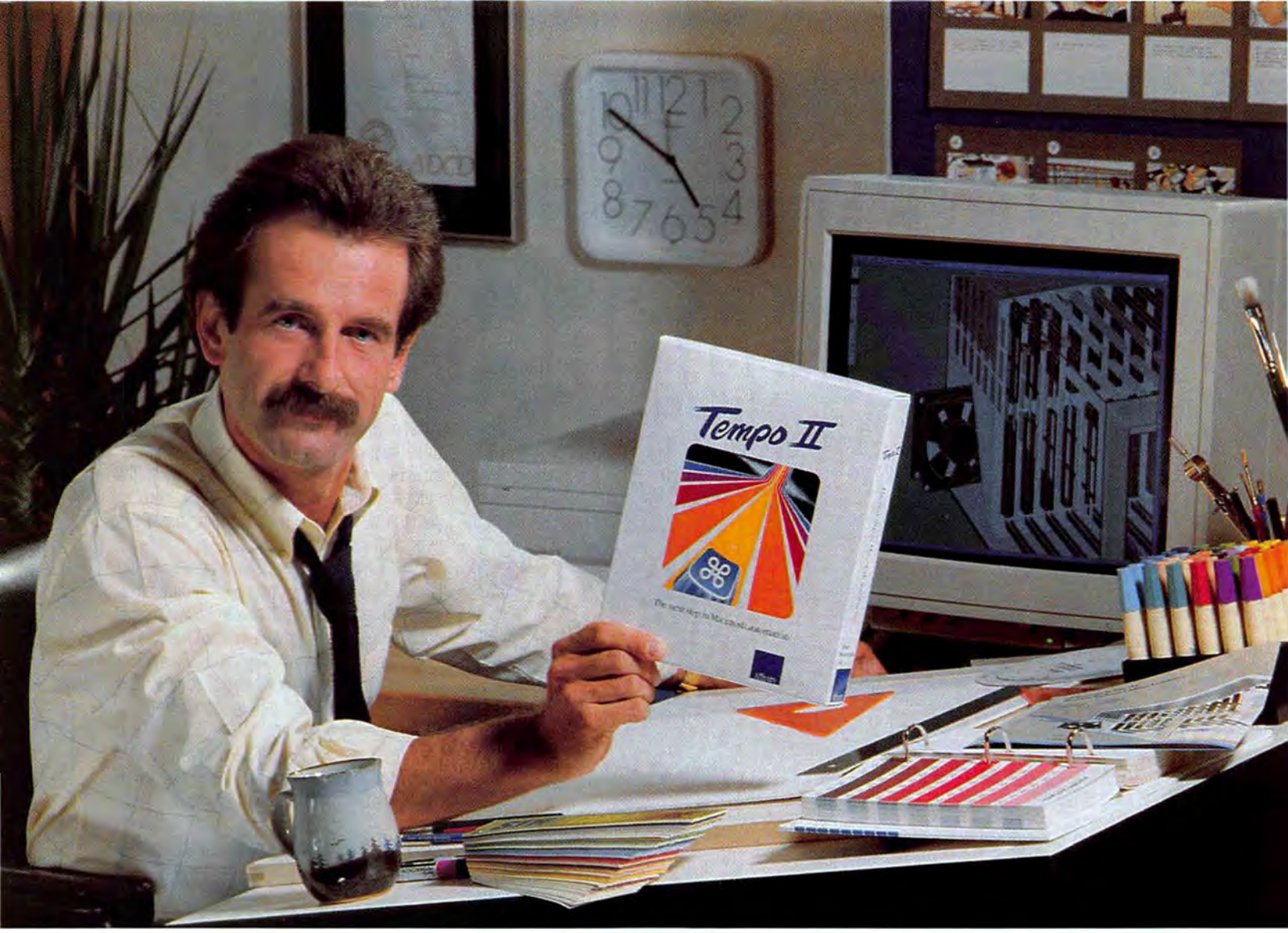
Ominis 3 Plus/Express version 3.3 executes most sequences two to three times faster. Supports color reports, Page Preview, new style characters, horizontal and vertical scrolling, and disk-based reports. Supports AFP and EtherTalk, and is MultiFinder compatible. Stores 16MB libraries, and 60 files in the Data File. Executes routines written in C, Pascal, or other languages that produce code resources. Has built-in support for Apple's CL/1 language. Blyth Software, 1065 E. Hillsdale Blvd., #300, Foster City, CA 94404; 415/571-0222. $225 for single-to-multiuser upgrade; call company for details on pricing scale if buying new.

PageMaker version 3.01 no longer misnames TIFF files transferred from the PC to the Mac. Works with System 6.0's enhanced font support and is compatible with MacDraw II capabilities, including rotated text and graphics, dashed lines, and additional line widths. Performs full screen redraws after print job cancellations, and copies style information for text passed between documents via the Clipboard. Aldus Corp., 411 First Ave. S, #200, Seattle, WA 98104; 206/622-5500. $75 plus $15 s/h if purchased before November 2, 1987; free if purchased after; $595 new.

Perfectstudy version 2.0 links files so that study questions are asked in random order as opposed to sequentially. Provides windows to revise files and offers the ability to append a file. Works with all Mac-compatible printers. Powerware Systems, 755 N. 100 W, Orem, UT 84057; 801/224-5058. Free; $79.95 new.

Stepping Out II version 2.01 fixes the problems that version 2.0 had with a small number of programs, especially in the feature that allows the virtual big screen to be turned on and off at any time. A demo version is free to dealers. Others can get it free via bulletin board, or for $2 by mail. Berkeley System Design, Inc., 1700 Shattuck Ave., Berkeley, CA 94709; 415/540-5535. Free with original disk; $95 new. □

To have products listed in this section, send upgraded software, an outline of major changes since the previous release, upgrade price, suggested retail price, company name, mailing address, and phone number to Updates, Macworld, *501 Second St., San Francisco, CA 94107.*



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Macworld 1988 Annual Index

by Erfert Fenton

This index covers the 12 issues of *Macworld* published during 1988. It lists most products alphabetically as well as under appropriate subject headings. For example, StuffIt appears under its own name and under Data Compression, File Compression, and Utilities. Boldface page numbers indicate a major reference, for example, an item that is being reviewed or featured.

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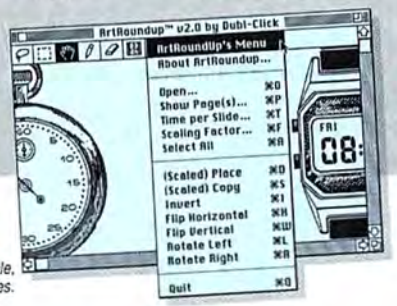

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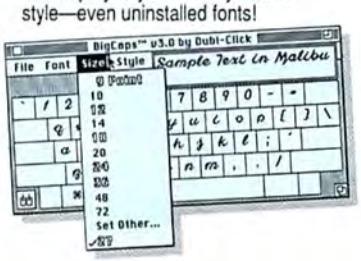

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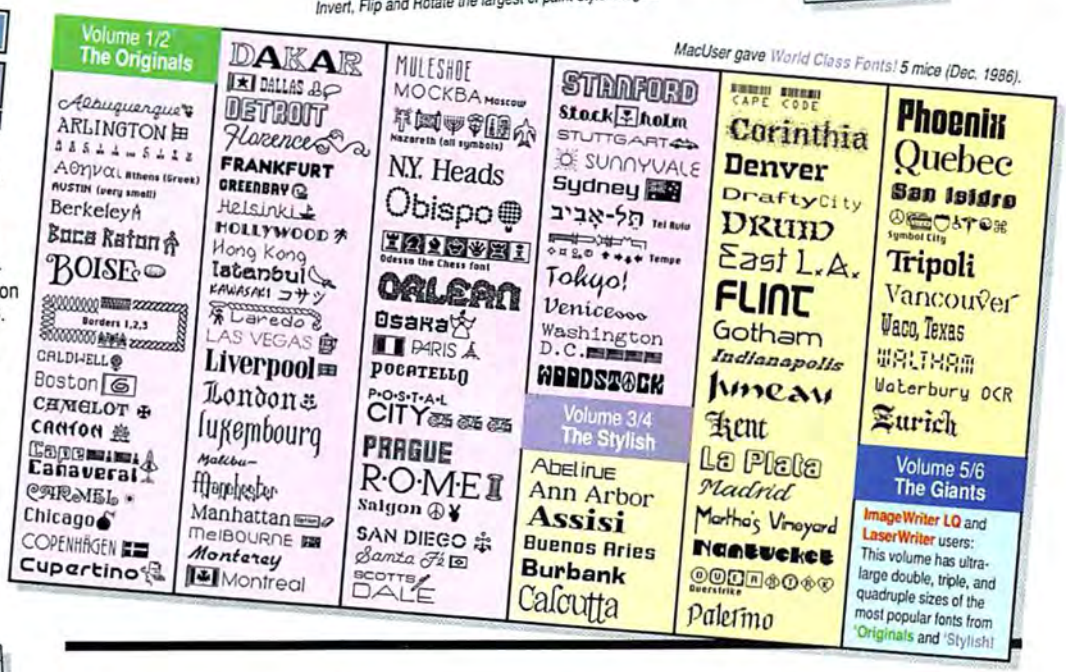

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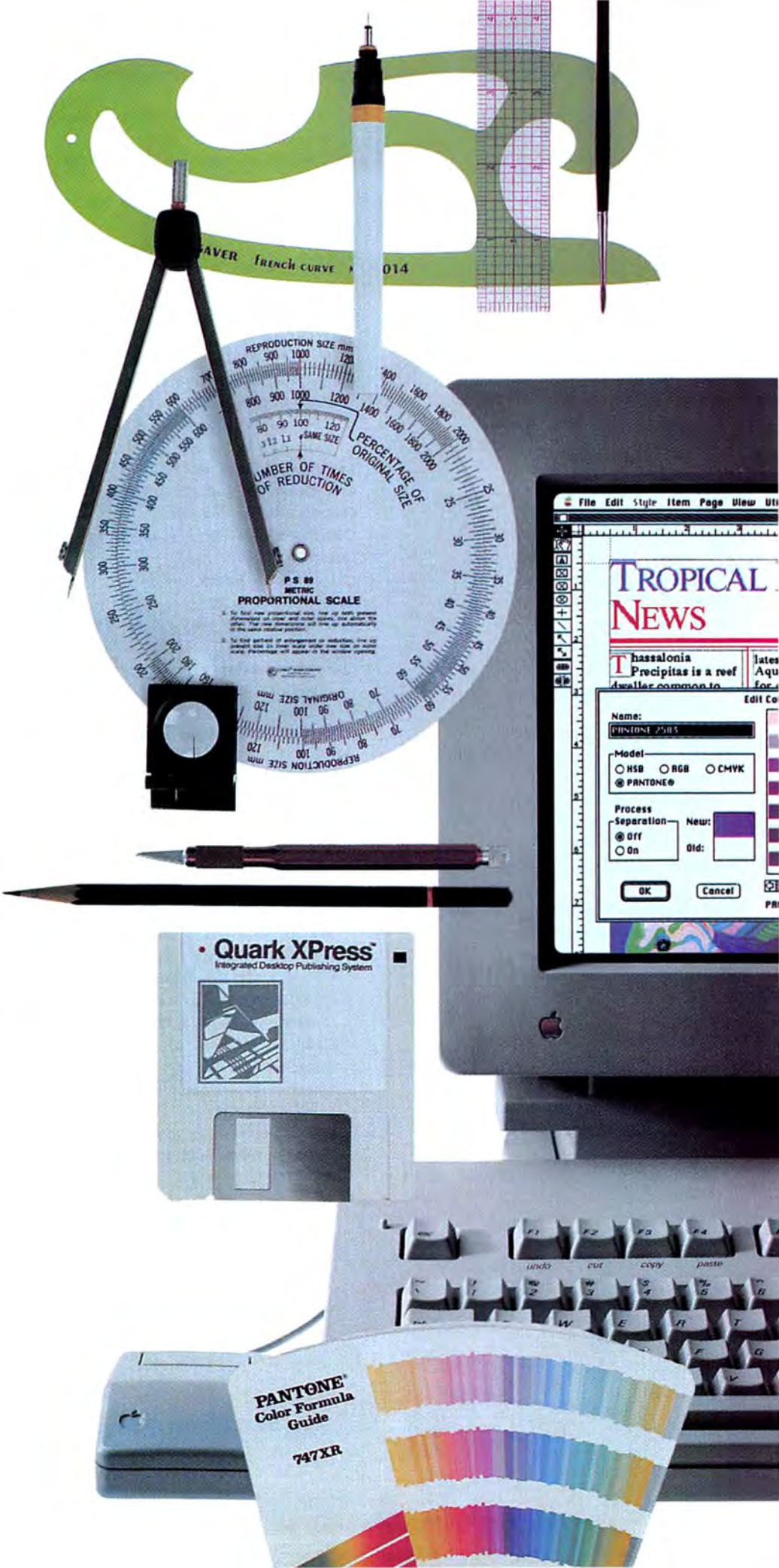

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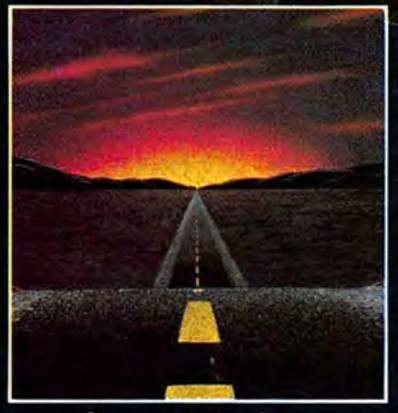

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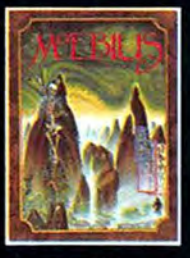

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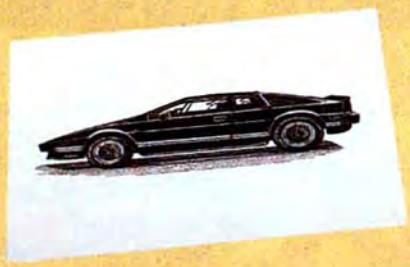

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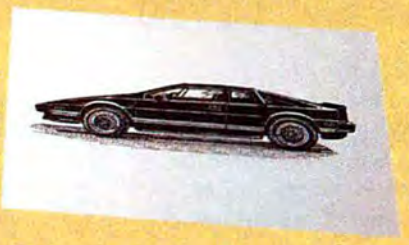

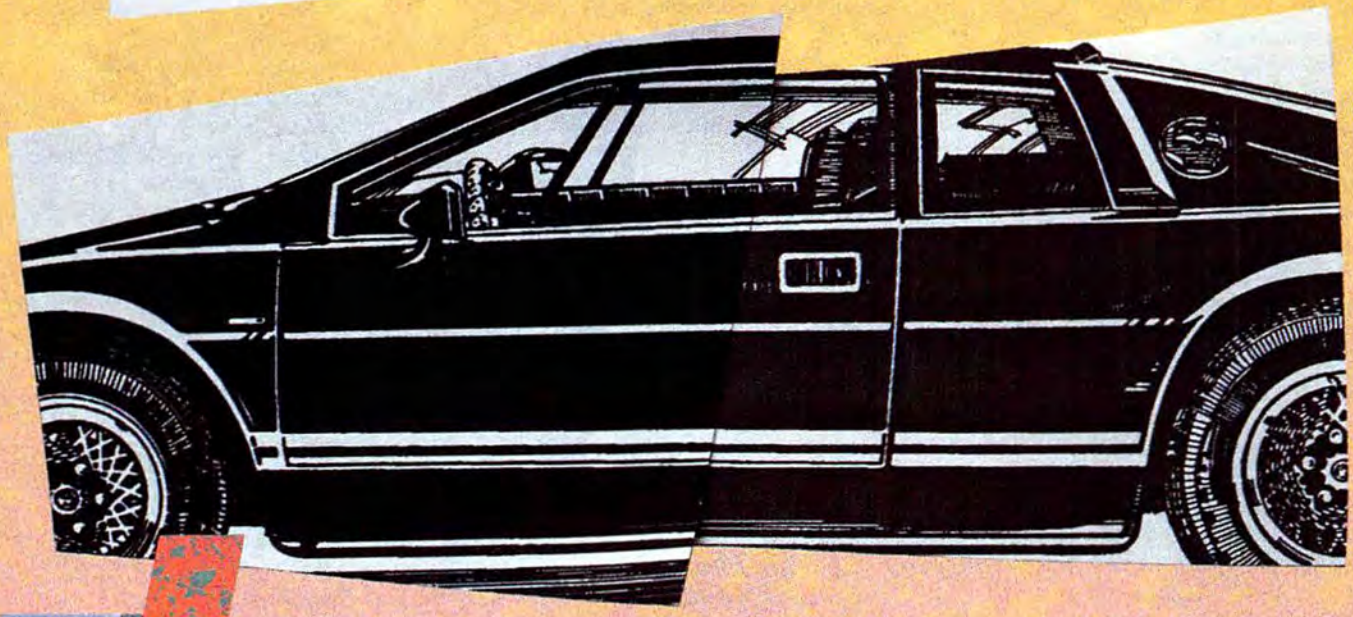

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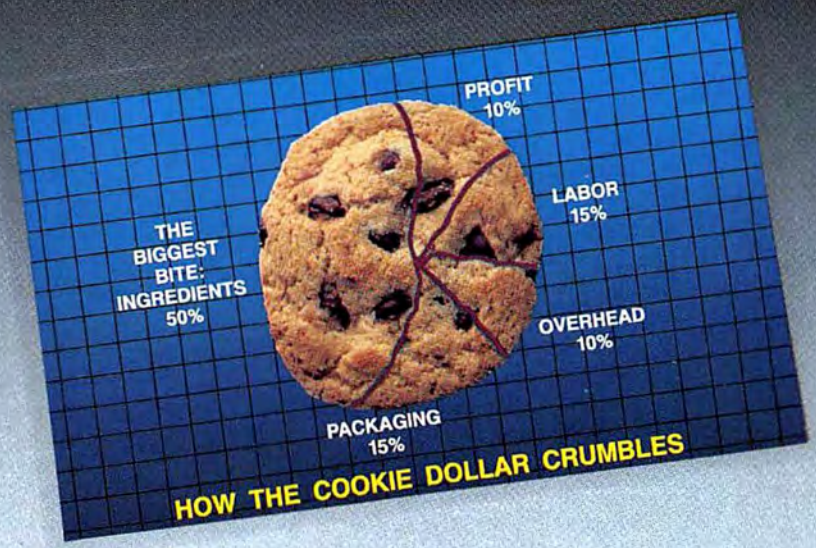

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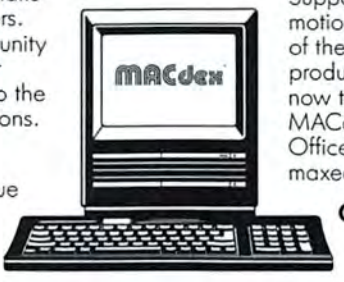

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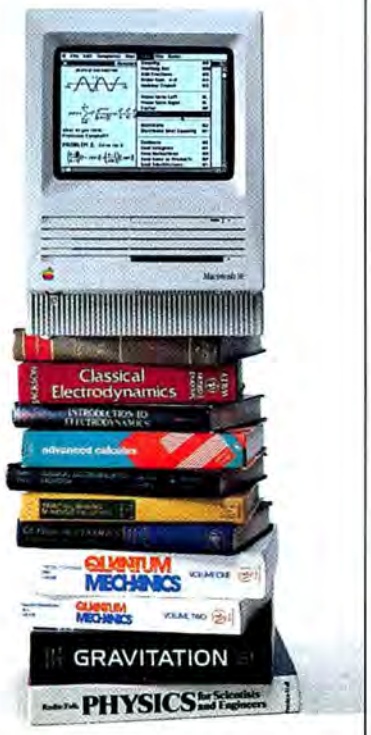

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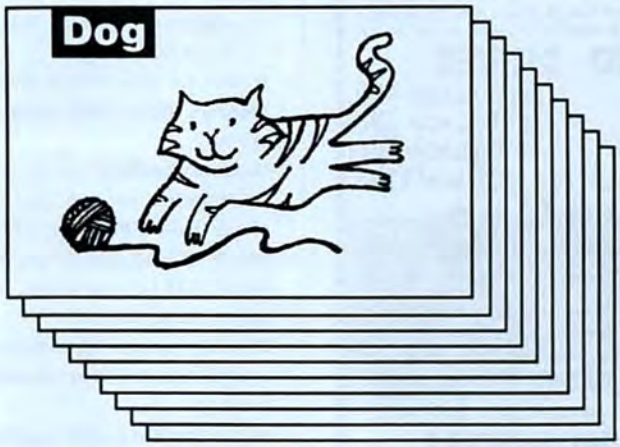

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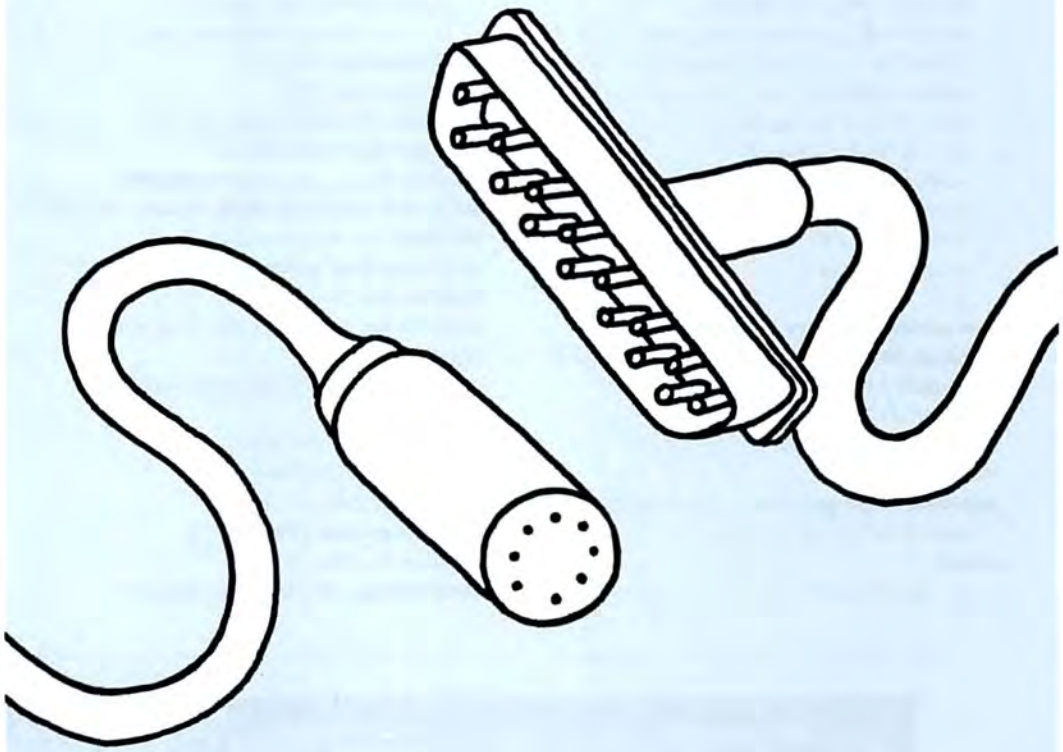

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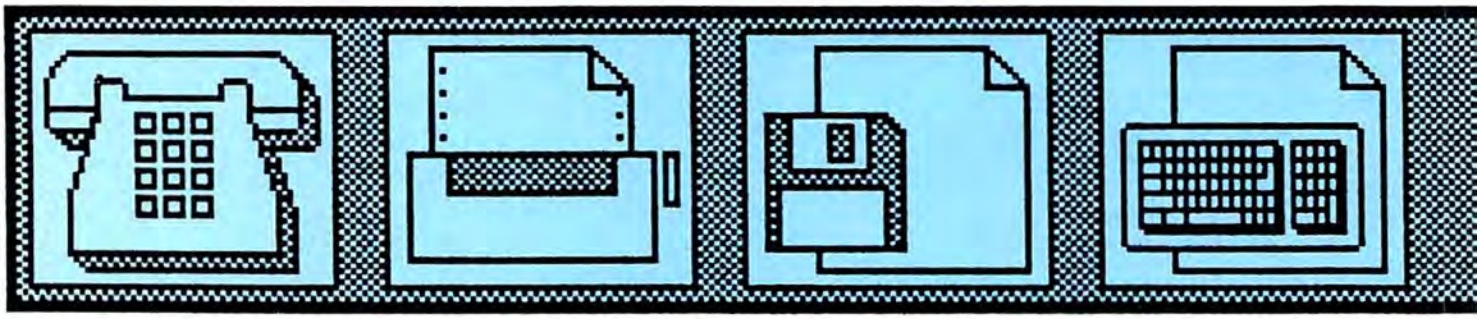

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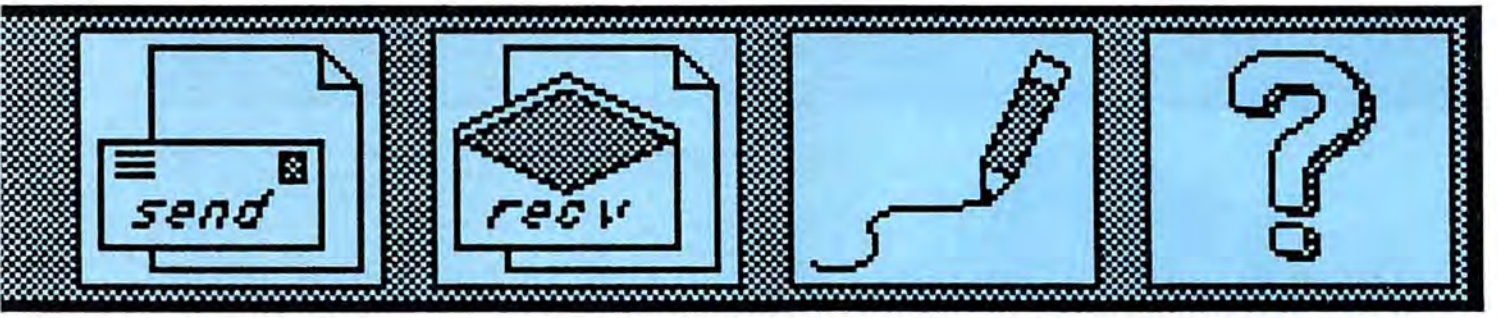

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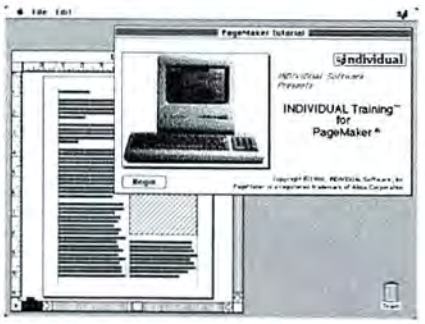

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Pop Quiz.

Stop. This is a test. For the next 60 seconds, we will be conducting a quiz about Macintosh® II Videographics. Do not turn the page until you have looked at the visual clue and answered all the questions.

Which Macintosh II graphics card offers the widest range of capture and display resolutions–NTSC, PAL, Apple® Monitor, hi-res, interlaced, non-interlaced and other modes?

a) NuVista 2M b) NuVista 4M c) All of the above

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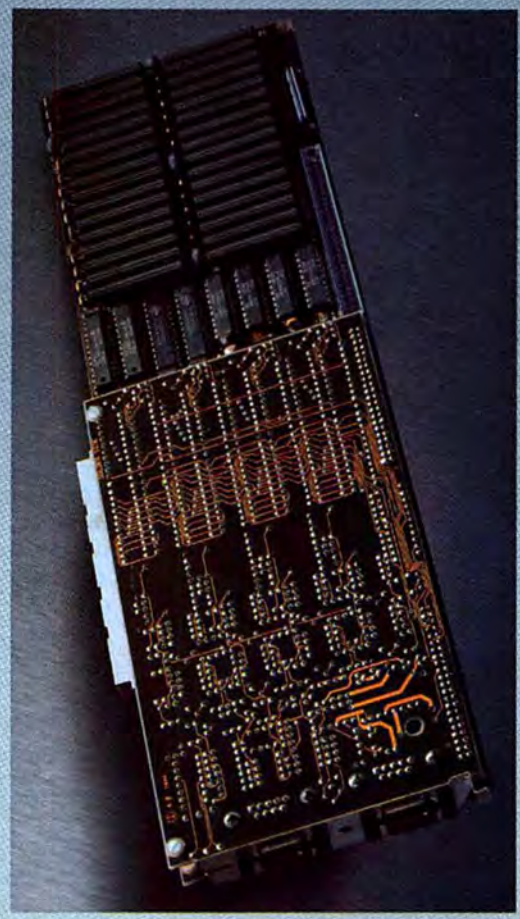
Visual clue for Videographics test.



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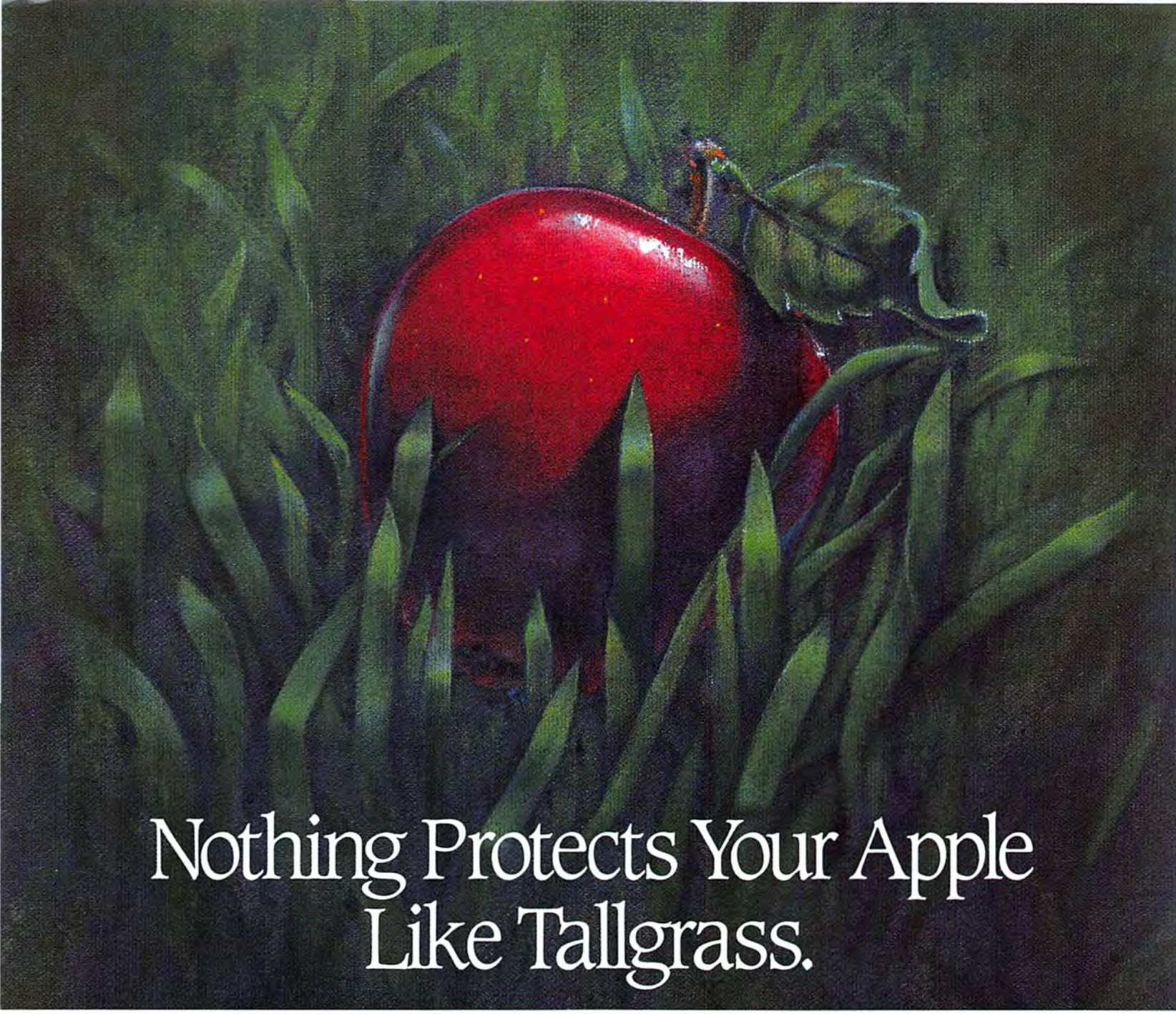

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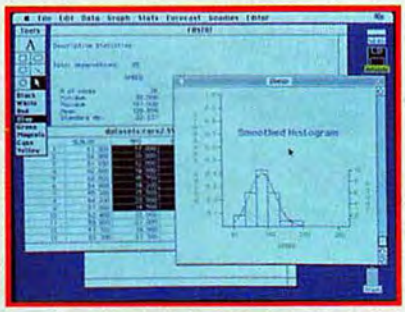

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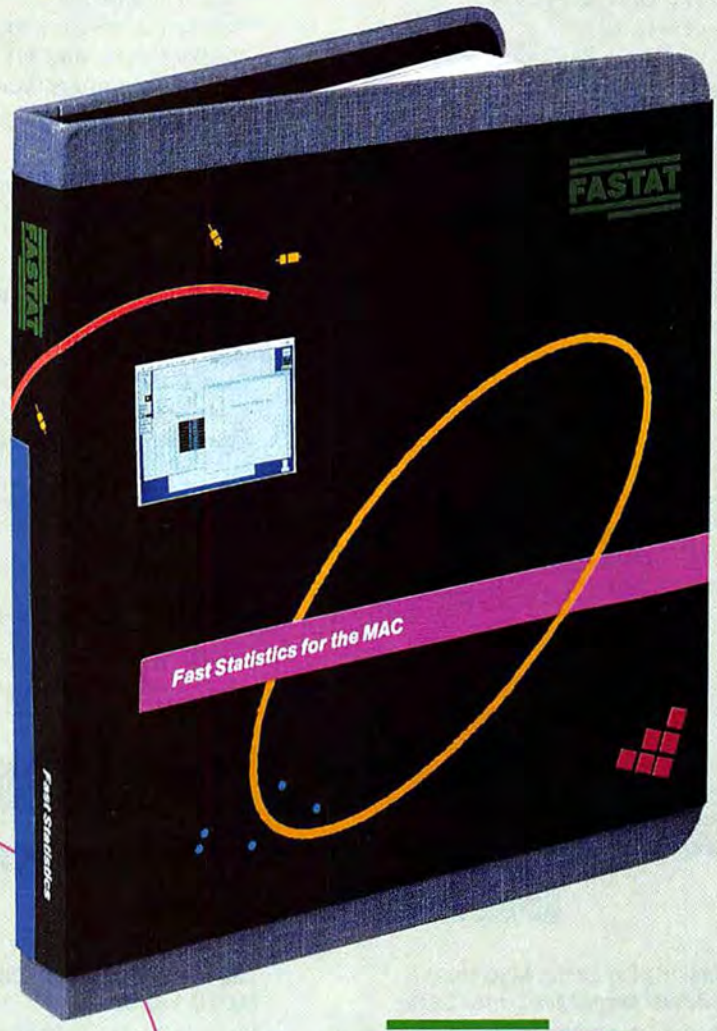

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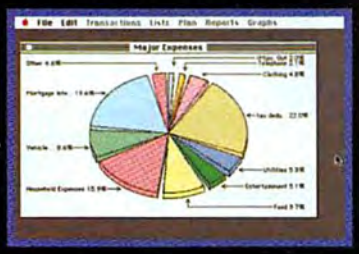

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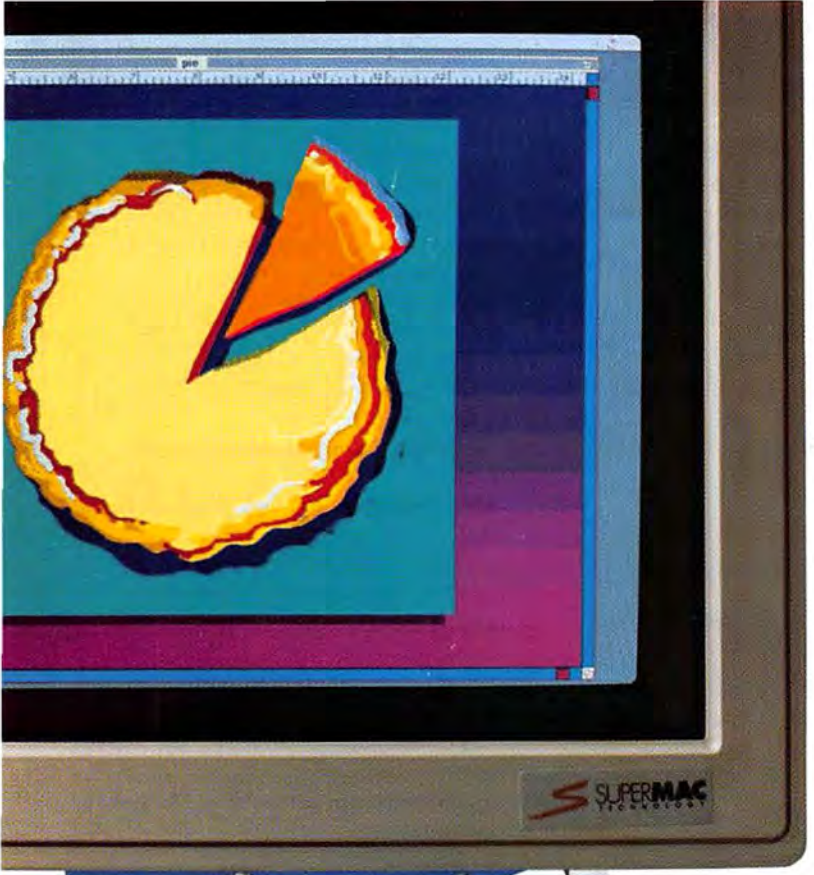

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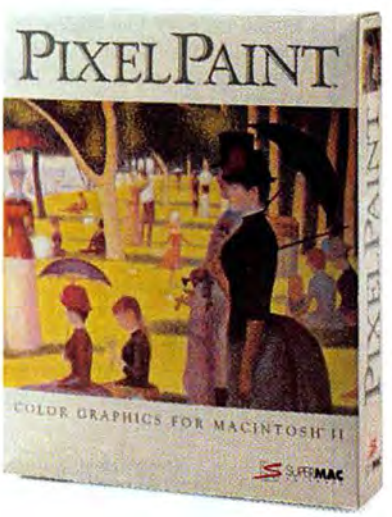

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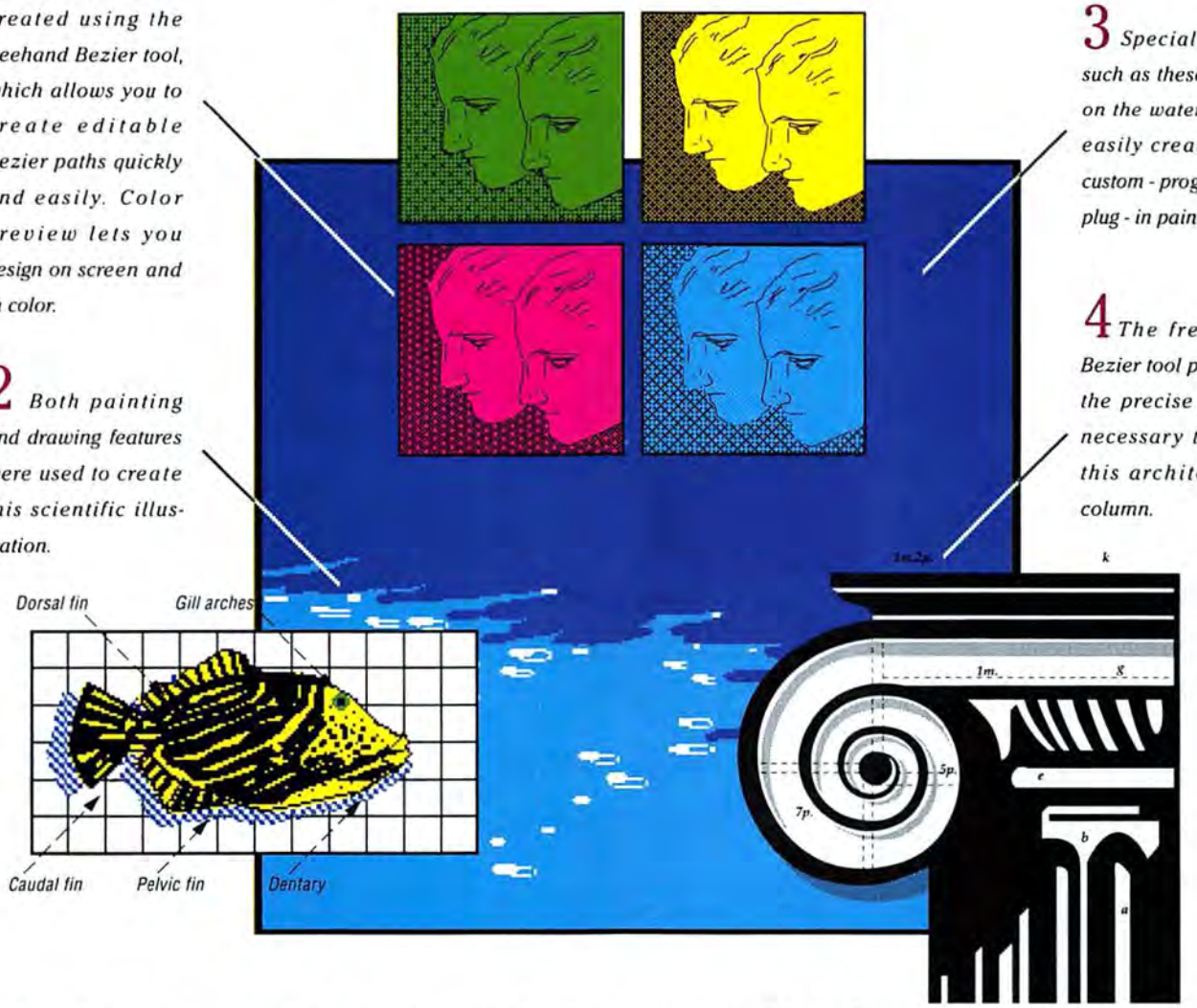

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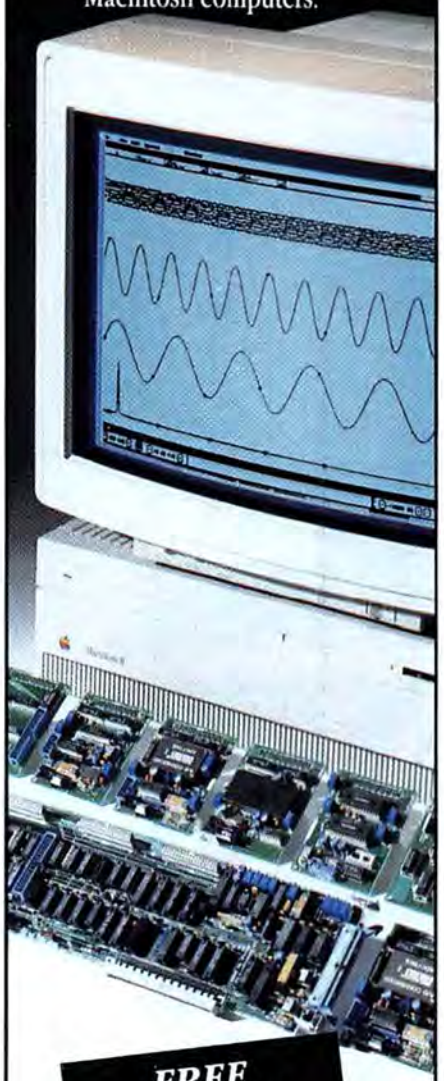

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Memorybank* offers up to 761 MB formatted capacity, all on a single disk. That's the largest storage system available for Macintosh** networks.

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Where to Buy

This listing provides company addresses and phone numbers for products mentioned in this issue. Allow several weeks for responses to Reader Service Card inquiries. Asterisks indicate vendors who prefer to be contacted by phone.

Reader Service

A

* **Acknowledge.** SuperMac Technology, 295 N. Bernardo Ave., Mountain View, CA 94043; 415/964-8884.
751 **Acta.** Symmetry Corp., 761 E. University Dr., Ste. C, Mesa, AZ 85203; 602/844-2199, 800/624-2485.
752 **Adobe Illustrator 88.** Adobe Systems, Inc., P.O. Box 7900, Mountain View, CA 94039-7900; 415/961-4400, 800/833-6687.
753 **Aldus FreeHand.** Aldus Corp., 411 First Ave. S, Seattle, WA 98104; 206/622-5500.
754 **AlisaShare.** Alisa Systems, Inc., 221 E. Walnut St., #175, Pasadena, CA 91101; 818/792-9474.
755 **Apple Scanner.** Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.
756 **AutoMac III.** Genesis Micro Software, 17124 Eighth Pl., Bellevue, WA 98008; 206/747-8512.

C

757 **CADD Level 1.** Generic Software, Inc., 11911 North Creek Pkwy. S, Bothell, WA 98052; 206/487-2233.
758 **Canfield.** Unison Software, 415 Clyde Ave., Mountain View, CA 94043; 415/968-7511.
759 **Checkfree.** Checkfree Technologies, 720 Greencrest Dr., Westerville, OH 43081; 614/898-6000, 800/882-5280.
760 **Client.** Softworks, Inc., P.O. Box 2285, Huntington, CT 06484; 203/926-1116.
* **The Colony.** Mindscape, Inc., 3444 Dundee Rd., Northbrook, IL 60062; 312/480-7667, 800/221-9884.
* **Color Map.** Shareware on CompuServe.
761 **Comment.** Deneba Software, 3305 N.W. 74th Ave., Miami, FL 33122; 305/594-6965, 800/622-6827.
762 **CompuServe Navigator.** CompuServe, P.O. Box 20212, Columbus, OH 43220; 614/457-8600, 800/848-8199.

D

763 **Desktop Express.** Dow Jones Software, Inc., P.O. Box 300, Princeton, NJ 08543; 609/520-4641, 609/520-4642.
764 **Different Drummer.** Primera Software, 650 Cragmont Ave., Berkeley, CA 94707; 415/525-3000.
765 **Digital Darkroom.** Silicon Beach Software, Inc., P.O. Box 261430, San Diego, CA 92126; 619/695-6956.
766 **Dollars and Sense.** Monogram Software, 531 Van Ness Ave., Torrance, CA 90501; 213/533-5120.
767 **Doug Clapp's Word Tools.** Aegis Development, Inc., 2115 Pico Blvd., Santa Monica, CA 90405; 213/392-9972, 800/345-9871.

E

768 **Easy Checks.** Par Software, Inc., P.O. Box 1309, Vancouver, WA 98666; 206/694-1539.
769 **EndNote.** Niles & Associates, 2200 Powell, #765, Emeryville, CA 94608-1809; 415/655-6666.
770 **Expressionist.** Allan Bonadio Associates, 814 Castro St., San Francisco, CA 94114; 415/282-5864.
771 **EZTax-Plan Business Edition.** EZWare Corp., P.O. Box 620, Bala Cynwyd, PA 19004; 215/667-4064.
772 **EZTax-Plan Personal Edition.** EZWare Corp., P.O. Box 620, Bala Cynwyd, PA 19004; 215/667-4064.
773 **EZTax-Prep 1040.** EZWare Corp., P.O. Box 620, Bala Cynwyd, PA 19004; 215/667-4064.

F

774 **Finale.** Coda Music Software, 1401 E. 79th St., Bloomington, MN 55425; 612/854-1288, 800/843-2066.
775 **Financial Decisions.** GenMicronics, 5900 Shore Blvd., #401, St. Petersburg, FL 33707; 813/345-5020.
* **F1F4.** Shareware on CompuServe.
776 **Forecast.** Monogram Software, 531 Van Ness Ave., Torrance, CA 90501; 213/533-5120.
777 **FormSet.** SoftView, Inc., 4820 Adohr Ln., Ste. F, Camarillo, CA 93010; 805/388-2626, 800/622-6829.
778 **FullWrite.** Ashton-Tate, 20101 Hamilton Ave., Torrance, CA 90502-1319; 213/329-8000.

G

* **GEnie.** GEnie, 401 N. Washington St., Rockville, MD 20850; 301/340-4494, 800/638-9636.
779 **Gofer.** Microlytics, Inc., One Tobey Village Office Park, Pittsford, NY 14535; 716/248-9150, 800/828-6293.
780 **Golf.** Unison Software, 415 Clyde Ave., Mountain View, CA 94043; 415/968-7511.
781 **Graham Speller.** Graham Software Company, 8609 Ingalls Circle, Arvada, CO 80003; 303/422-0757.
782 **Graphics Master 4.** Dean Lem Associates, Inc., 1526 Pontius Ave., Ste. C, Los Angeles, CA 92024; 213/478-0092, 800/562-2562.

Where to Buy

Reader Service

H

783 **HyperCard.** Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.
784 **HyperDraft.** Heizer Software, 1941 Oak Park Blvd., #30, Pleasant Hill, CA 94523; 415/943-7667.

I

785 **IDAC/1000.** International Data Acquisition and Control, The Meeting Place, Rte. 101, P.O. Box 397, Amherst, NH 03031; 603/673-0765.
786 **ImageStudio.** Letraset USA, 40 Eisenhower Dr., Paramus, NJ 07653; 201/845-6100, 800/526-9703.
787 **InBox Personal Connection.** TOPS, A Sun Microsystems Company, 950 Marina Village Pkwy., Alameda, CA 94501; 415/769-9669, 800/445-8677.
788 **InBox Starter Kit.** TOPS, A Sun Microsystems Company, 950 Marina Village Pkwy., Alameda, CA 94501; 415/769-9669, 800/445-8677.
789 **Inspiration.** Ceres Software, Inc., 9498 S.W. Barbur Blvd., #103, Portland, OR 97219; 503/245-9011.
* **The Investor.** P3, Inc., 246 Nottingham Ave., Glenview, IL 60025; 312/729-2555.

K

790 **Klondike.** Unison Software, 415 Clyde Ave., Mountain View, CA 94043; 415/968-7511.

L

791 **LaserPaint Color II.** LaserWare, Inc., P.O. Box 668, San Rafael, CA 94915; 415/453-9500, 800/367-6898.
792 **Liberty Spell II.** DataPak Software, Inc., 14011 Ventura Blvd., #507, Sherman Oaks, CA 91423; 818/905-6419, 800/327-6703.
793 **Lookup.** Working Software, Inc., P.O. Box 1844, Santa Cruz, CA 95061-1844; 408/423-5696, 800/331-4321.

M

794 **MacAdios II SE.** GW Instruments, Inc., 35 Medford St., Somerville, MA 02143; 617/625-4096.
795 **MacEqn.** Software for Recognition Technologies, 55 Academy Dr., Rochester, NY 14623; 716/359-3024.
796 **MacInTax.** SoftView, Inc., 4820 Adohr Ln., Ste. F, Camarillo, CA 93010; 805/388-2626, 800/622-6829.
797 **MacinText.** Microtek Lab, Inc., 16901 S. Western Ave., Gardena, CA 90247; 213/321-2121, 800/654-4160.
798 **MacLab.** World Precision Instruments, Inc., 375 Quinnipiac Ave., New Haven, CT 06513; 203/469-8281.
799 **MacMoney.** Survivor Software Ltd., 11222 La Cienega Blvd., #450, Inglewood, CA 90304; 213/410-9527.
800 **MacNET.** Connect, Inc., 10101 Bubb Rd., Cupertino, CA 95014; 408/973-0110, 800/262-2638.
801 **MacOCR.** Xerox Imaging Systems, 1215 Terra Bella Ave., Mountain View, CA 94043; 415/965-7900.
802 **MacProof.** Lexpertise, U.S.A., Inc., 175 East 400 S, #1000, Salt Lake City, UT 84111; 801/350-9100, 800/354-5656.

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This is the value you've been demanding. Actual size 72 dpi, with a palette of 16.7 million brilliant colors on a Sony Trinitron modified to E-Machines' exacting specs.

You can put a little color in the cheeks of your company president next time you produce the newsletter. Or use color to distinguish multiple layers and objects in CAD drawings. Or create charts to transform complex numbers into easily understood color graphs.

Whatever you do on your Macintosh, you'll do it more productively with a T16.

Where to Buy

Reader Service	
803	**MacWrite.** Claris Corp., 440 Clyde Ave., Mountain View, CA 94040; 415/960-1500, 800/334-3535.
804	**Managing Your Money.** Meca Ventures, Inc., 355 Riverside Ave., Westport, CT 06880; 203/226-2400.
805	**Market Analyzer.** Dow Jones Software, Inc., P.O. Box 300, Princeton, NJ 08543; 609/520-4641, 609/520-4642.
806	**Market Manager Plus.** Dow Jones Software, Inc., P.O. Box 300, Princeton, NJ 08543; 609/520-4641, 609/520-4642.
807	**Mark Up.** Mainstay, 5311-B Derry Ave., Agoura Hills, CA 91301; 818/991-6540.
808	**MathType.** Design Science, Inc., 6475-B E. Pacific Coast Highway, #392, Long Beach, CA 90803; 213/433-0685.
809	**MCI Mail.** MCI Mail, 1150 17th St. NW, #800, Washington, DC 20036; 202/293-4255, 800/444-6245.
810	**McSink.** Preferred Software, Inc., 5100 Poplar Ave., Memphis, TN 38137; 901/683-3383.
811	**Micro Planner.** Micro Planning International, 235 Montgomery St., #840, San Francisco, CA 94104; 415/788-3324.
*	**Microsoft Mail.** Microsoft Corp., 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073-9717; 206/882-8080, 800/426-9400.
*	**Microsoft Word.** Microsoft Corp., 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073-9717; 206/882-8080, 800/426-9400.
*	**Microsoft Write.** Microsoft Corp., 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073-9717; 206/882-8080, 800/426-9400.
812	**MindWrite.** Access Technology, Inc., 200 Heritage Harbor, Ste. G, Monterey, CA 93940; 408/648-4000.
813	**Modern Artist.** Computer Friends, Inc., 14250 N.W. Science Park Dr., Portland, OR 97229; 503/626-2291, 800/547-3303.
814	**More II.** Symantec Corp., 10201 Torre Ave., Cupertino, CA 95014; 408/253-9600.
	(N)
815	**NEC Silentwriter LC890.** NEC Information Systems, Inc., 1414 Massachusetts Ave., Boxborough, MA 01719; 508/264-8000.
816	**NetModem V2400.** Shiva Corp., 155 Second St., Cambridge, MA 02141; 617/864-8500, 800/458-3550.
	(O)
817	**OmniPage.** Caere Corp., 100 Cooper Ct., Los Gatos, CA 95030; 408/395-7000.
*	**Options-80A Advanced Stock Option Analysis.** Options-80, P.O. Box 674, Kihei, HI 96753; 808/874-3534.
	(P)
818	**PacerShare.** Pacer Software, Inc., 7911 Herschel Ave., #402, La Jolla, CA 92037; 619/454-0565.
819	**Personal Accountant.** Softsync, Inc., 162 Madison Ave., New York, NY 10016; 212/685-2080.
820	**PhotoMac.** Data Translation, Inc., 100 Locke Dr., Marlboro, MA 01752; 508/481-3700.
*	**PixelPaint.** SuperMac Technology, 295 N. Bernardo Ave., Mountain View, CA 94043; 415/964-8884.
821	**Pro-Cite.** Personal Bibliographic Software, Inc., 412 Longshore Dr., Ann Arbor, MI 48105; 313/996-1580.

report, here's a condensed version.

As with other E-Machines models, the T19 screen image is very sharp and has excellent color quality and gray purity. Image quality is comparable to the T16, and for those who want a larger screen, the T19 is the way to go. E-Machines has once again produced a winner in the color monitor market.

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822 **Profits.** Button Down Software, 172 Donegal Ave., Newbury Park, CA 91320; 805/499-9380.
823 **Publish or Perish.** Park Row, Inc., 4640 Jewell St., #101, San Diego, CA 92109; 619/459-2121.
824 **Publish Pac.** Dest Corp., 1201 Cadillac Ct., Milpitas, CA 95035; 408/946-7100.

Q

825 **QuarkXPress.** Quark, Inc., 300 S. Jackson, #100, Denver, CO 80209; 303/934-2211, 800/356-9363.
* **QuickBASIC.** Microsoft Corp., 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073-9717; 206/882-8080, 800/426-9400.
826 **QuickCapture.** Data Translation, Inc., 100 Locke Dr., Marlboro, MA 01752; 508/481-3700.
827 **Quicken.** Intuit, Inc., 540 University Ave., Palo Alto, CA 94301; 415/322-0590, 800/624-8754.
828 **QuicKeys.** CE Software, P.O. Box 65580, West Des Moines, IA 50265; 515/224-1995, 800/523-7638.
829 **QuickMail.** CE Software, P.O. Box 65580, West Des Moines, IA 50265; 515/224-1995, 800/523-7638.
830 **QuickWord II.** EnterSet, 2380 Ellsworth, Berkeley, CA 94704; 415/549-0539.

R

831 **Read-It.** Olduvai Corp., 7520 Red Rd., Ste. A, South Miami, FL 33143; 305/665-4665, 800/822-0772.
832 **ReadStar II Plus.** Inovatic, Inc., 1911 N. Ft. Myer Dr., #708, Arlington, VA 22209; 703/522-3053.
833 **Real Estate Investment Analysis.** RealData, Inc., 78 N. Main St., South Norwalk, CT 06854; 203/255-2732.
* **Real World PostScript.** Addison-Wesley Publishing Co., Jacob Way, Reading, MA 01867; 617/944-3700.
834 **RoundUp.** Virginia Systems, Inc., 5509 W. Bay Ct., Midlothian, VA 23113; 804/739-3200.

S

835 **Screen Gems.** Microseeds, 7030B W. Hillsborough Ave., Tampa, FL 33615; 813/878-2142.
836 **Sensible Grammar.** Sensible Software, Inc., 335 E. Big Beaver, #207, Troy, MI 48083; 313/528-1950.
837 **SideKick.** Borland International, P.O. Box 660005, Scotts Valley, CA 95066; 408/438-8400.
838 **The Solitaire Desk Accessory.** Softstream International, 19 White Chapel Dr., Mount Laurel, NJ 08054; 609/596-4373.
839 **Solitaire Royale.** Spectrum HoloByte, 2061 Challenger Dr., Alameda, CA 94501; 415/522-3584.
840 **Sonar.** Virginia Systems, Inc., 5509 W. Bay Ct., Midlothian, VA 23113; 804/739-3200.
841 **Sonar Professional.** Virginia Systems, Inc., 5509 W. Bay Ct., Midlothian, VA 23113; 804/739-3200.
842 **SpectrePrint.** Prepress Technologies, Inc., 534 Encinitas Blvd., #114, Encinitas, CA 92024; 619/753-0194.
843 **Spell Coach Professional.** Deneba Software, 3305 N.W. 74th Ave., Miami, FL 33122; 305/594-6965, 800/622-6827.
844 **Spelling Champion.** Champion Swiftware, 6617 Gettysburg Dr., Madison, WI 53705; 608/833-1777.

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Dealer Inquiries Invited

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WHITE PINE SOFTWARE

For more information call or write: White Pine Software, 94 Route 101A, PO Box 1108, Amherst, NH 03031, **(603) 886-9050.**

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Where to Buy

Reader Service

845 **Spellswell.** Working Software, Inc., P.O. Box 1844, Santa Cruz, CA 95061-1844; 408/423-5696, 800/331-4321.
846 **StatView SE + Graphics.** Abacus Concepts, Inc., 1984 Bonita Ave., Berkeley, CA 94704; 415/540-1949.
847 **Systat.** Systat, Inc., 1800 Sherman, Evanston, IL 60201; 312/864-5670.

(T)

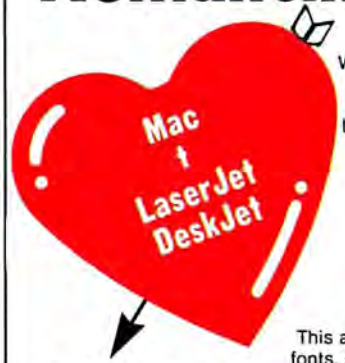
848 **TaxMaster 1988 Preparer.** Island Computer Services, 3501 E. Yacht Dr., Long Beach, NC 28461; 919/278-9483.
849 **TaxMaster 1989 Planner.** Island Computer Services, 3501 E. Yacht Dr., Long Beach, NC 28461; 919/278-9483.
850 **Tax Pro.** Chesapeake Software/MG, P.O. Box 1014, Richmond, VA 23208-1014; 804/358-7802.
851 **TaxView Planner.** SoftView, Inc., 4820 Adohr Ln., Ste. F, Camarillo, CA 93010; 805/388-2626, 800/622-6829.
852 **Tempo II.** Affinity Microsystems, Ltd., 1050 Walnut St., #42, Boulder, CO 80302; 303/442-4840, 800/367-6771.
853 **TextPert.** CTA, Inc., 866 Second Ave., New York, NY 10017; 212/759-6201.
* **TextScan.** New Image Technology, Inc., 9701 Philadephia Ct., Lanham, MD 20706; 301/731-2000.
854 **Think 'n Time.** Mainstay, 5311-B Derry Ave., Agoura Hills, CA 91301; 818/991-6540.
855 **ThinkTank.** Symantec Corp., 10201 Torre Ave., Cupertino, CA 95014; 408/253-9600.
856 **Thunder.** Electronic Arts, P.O. Box 7530, San Mateo, CA 94403; 415/571-7171.
857 **TopDesk.** Cortland Computer, P.O. Box 9916, Berkeley, CA 94709; 415/845-1142.
858 **Turbo SE.** Siclone Sales & Engineering Corporation, 1169 Borregas Ave., Sunnyvale, CA 94089; 408/734-9151, 800/862-2636.

(W)

859 **Wall Street Investor.** Pro Plus Software, Inc., 2150 E. Brown Rd., Mesa, AZ 85203; 602/461-3296, 800/227-5728.
860 **Word Finder.** Microlytics, Inc., One Tobey Village Office Park, Pittsford, NY 14535; 716/248-9150, 800/828-6293.
861 **WordPerfect.** WordPerfect Corp., 1555 N. Technology Way, Orem, UT 84057; 801/225-5000, 800/321-4566.
862 **Wordwise.** HyperAnnex, P.O. Box 1354, Saugus, MA 01906; 617/289-9801.
863 **WorksPlus Command.** Lundeen & Associates, P.O. Box 30038, Oakland, CA 94604; 415/769-7701, 800/233-6851.
864 **WorksPlus Spell.** Lundeen & Associates, P.O. Box 30038, Oakland, CA 94604; 415/769-7701, 800/233-6851.
865 **WriteNow.** T/Maker Company, 1390 Villa St., Mountain View, CA 94041; 415/962-0195. □

Public domain software and shareware are available through online information services; user groups (call 800/538-9696 ext. 500 for information on a local user group); or mail-order clearinghouses such as Budgetbytes (800/356-3551 for orders, 913/271-6022 in Kansas), Educomp (800/843-9497, 619/259-0255 in California), or the Public Domain Exchange (800/331-8125, 408/496-0624 in California).

Romancing the Mac



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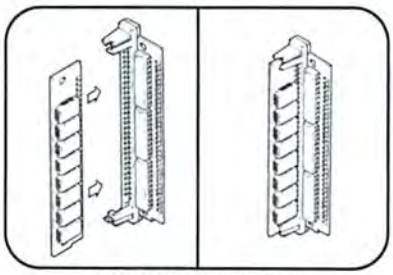

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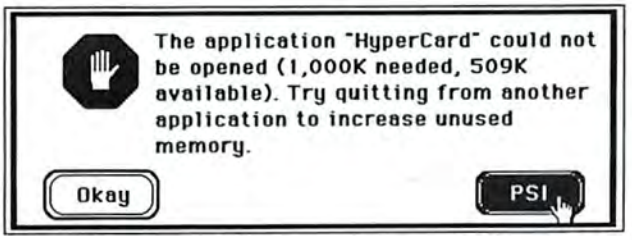

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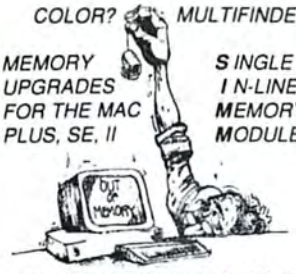

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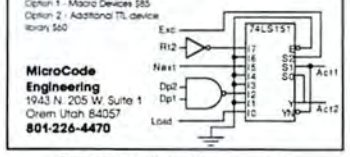

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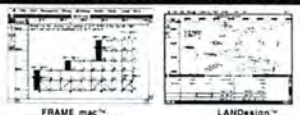

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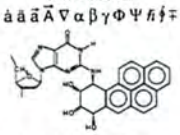

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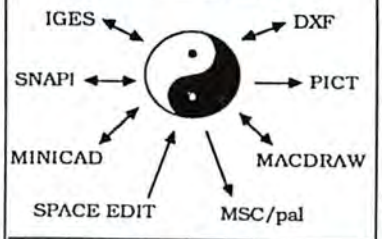

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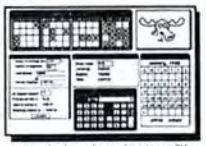

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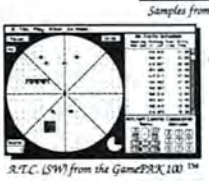

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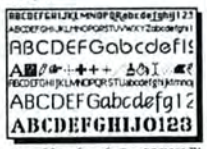

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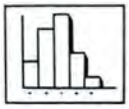

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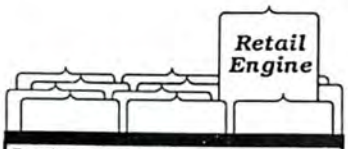

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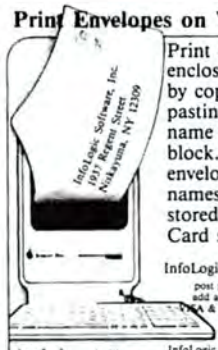

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What do you know about Macintosh® that the rest of corporate America doesn't?

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Your responsibilities will be similar to those mentioned above but with particular emphasis on systems analysis, project management and implementation. Your charter will be to ensure that appropriate solutions are delivered on time, within budget and to the customer's total satisfaction. You'll need 5+ years' experience in analysis and delivery of complex, multi-vendor computer systems.

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Macworld Best-Sellers

Business Software

Months on chart	Last month	This month	
45	2	1	**Microsoft Word** *Microsoft*
36	1	2	**Microsoft Excel** *Microsoft*
24	3	3	**Microsoft Works** *Microsoft*
32	4	4	**PageMaker** *Aldus*
21	5	5	**MacWrite** *Claris*
5	7	6	**WordPerfect for the Macintosh** *WordPerfect*
5	8	7	**Adobe Illustrator** *Adobe Systems*
35	6	8	**MacDraw** *Claris*
7	10	9	**FileMaker Plus** *Claris*
10	–	10	**MacPaint** *Claris*

Education Software

Months on chart	Last month	This month	
28	2	1	**Math Blaster** *Davidson & Associates*
12	1	2	**Reader Rabbit** *The Learning Company*
25	3	3	**Typing Tutor** *Simon & Schuster Computer Software*
25	–	4	**KidsTime** *Great Wave Software*
1	–	5	**Word Attack** *Davidson & Associates*

Entertainment Software

Months on chart	Last month	This month	
27	5	1	**Flight Simulator** *Microsoft*
28	1	2	**MacGolf** *PCAI*
24	3	3	**Dark Castle** *Silicon Beach Software*
10	4	4	**Falcon** *Spectrum HoloByte*
8	2	5	**Beyond Dark Castle** *Silicon Beach Software*

Networking/Data Communications

Months on chart	Last month	This month	
24	1	1	**TOPS** *TOPS*
20	2	2	**AppleShare** *Apple Computer*
28	4	3	**LocalTalk** *Apple Computer*
15	3	4	**PhoneNet** *Farallon Computing*
3	5	5	**Red Ryder** *FreeSoft*

Hard Disks*

Months on chart	Last month	This month	
3	–	1	**Macstack SD 30** *CMS Enhancements*
1	–	2	**PRO30-SE** *CMS Enhancements*
12	5	3	**FX20** *General Computer*
1	–	4	**Rodime 450 RX** *Rodime Systems*
3	1	5	**EMAC 20 External** *Everex*

Add-In Boards

Months on chart	Last month	This month	
15	4	1	**Radius Accelerator** *Radius*
2	–	2	**Radius Interface Display** *Radius*
9	1	3	**Macintosh II Video Card** *Apple Computer*
1	–	4	**Micro Snap Memory Expansion Kit** *Microtech International*
7	–	5	**Video Board/Large Screen** *Ryad*

Product Watch

Editors' choice: other recent or forthcoming products of particular interest.

DayStar 33/030 Accelerator II *DayStar* 33.33MHz accelerator for Mac II and IIx

MarkUp *Mainstay* group document editing and review application

ColorQuick *Tektronix* ink-jet printer

Source: Exclusive InfoCorp survey of more than 125 Macintosh retailers. Covers sales during October 1988.

**Does not include hard disks installed at the factory.*

The WriteNow difference: *Ease, Performance, and...*

	WriteNow 2.0	MacWrite 5.0	MS Write	MS Word 3.01
Spelling checker size	100,000 words	100,000 words	80,000 words	80,000 words
Font size range	4-127 pts.	7-24 pts.	7-72 pts.	2-127 pts.
Maximum recommended document size (in pages)	Over 2,000	240	50	500
Number of open documents	Unlimited *	1	30	30
Mail merge	**Yes**	No	No	Yes
Number of editable, on-screen columns (WYSIWYG)	4	1	1	1
On-screen auto-numbering footnotes	Yes	No	No	No
Automatic repagination	Yes	Yes	No	No
Graphics in same line as text	Yes	No	Yes	Yes
Multiple headers and footers	Yes	No	No	Yes
Extensive Undo	Yes	No	No	No
Variable line spacing (in points)	Yes	No	No	Yes
Selective font, size, style, and ruler changes	Yes	No	No	Yes
MacUser Magazine's Best New Word Processor	**Yes**	No	No	No
Search for a word	2.4 *sec*	7.6 *sec*	9.5 *sec*	9.7 *sec*
Spell Check document	6.3 *sec*	2 *min* 34.0 *sec*	2 *min* 2.3 *sec*	1 *min* 48.0 *sec*
Copy & Paste large area	6.8 *sec*	1 *min* 0.9 *sec*	12.4 *sec*	12.3 *sec*
Change font size of document	10.7 *sec*	50.2 *sec*	17.6 *sec*	16.2 *sec*
Change font of document	10.8 *sec*	37.1 *sec*	14.1 *sec*	15.2 *sec*
'Save As' a 12-page document	3.6 *sec*	9.4 *sec*	20.3 *sec*	19.6 *sec*
Retail Price	$195	$125	$175	$395
Happy Users	***Yes***	*?*	*?*	*?*

* Number determined by Macintosh system constraints.

...*Happy Users!*

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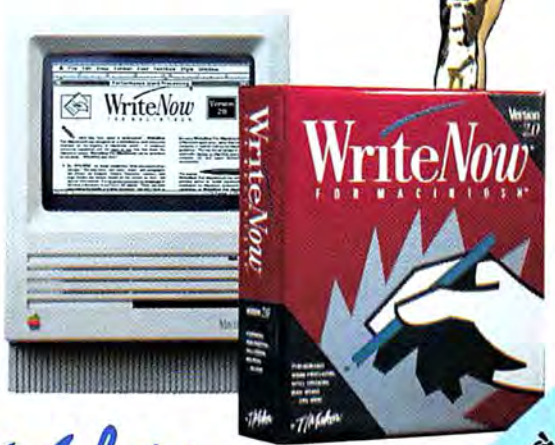

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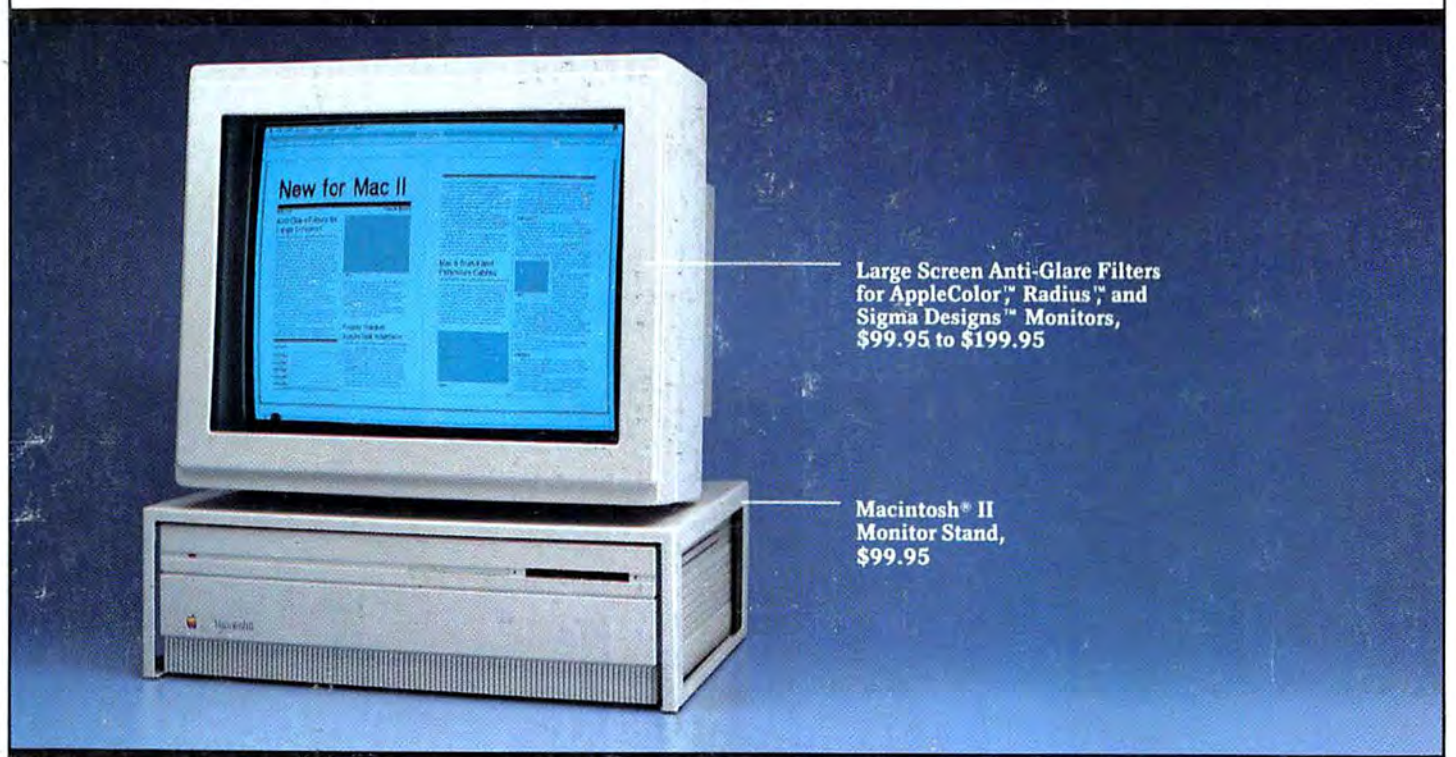

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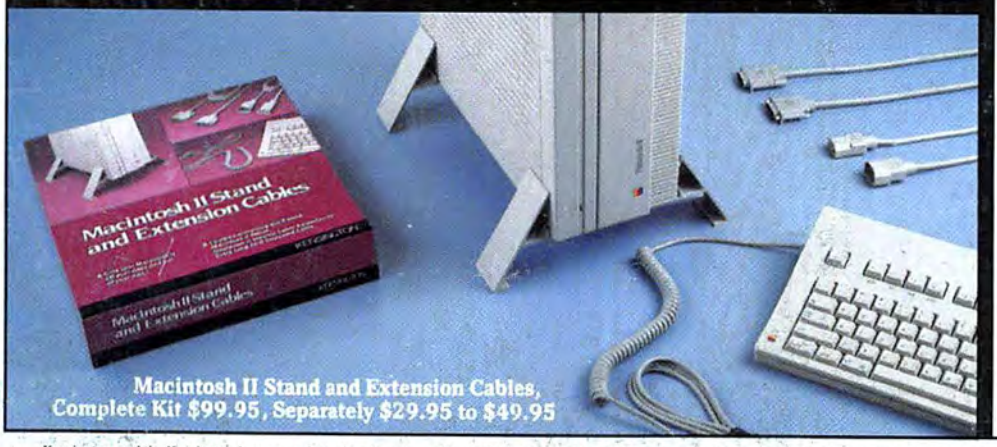

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