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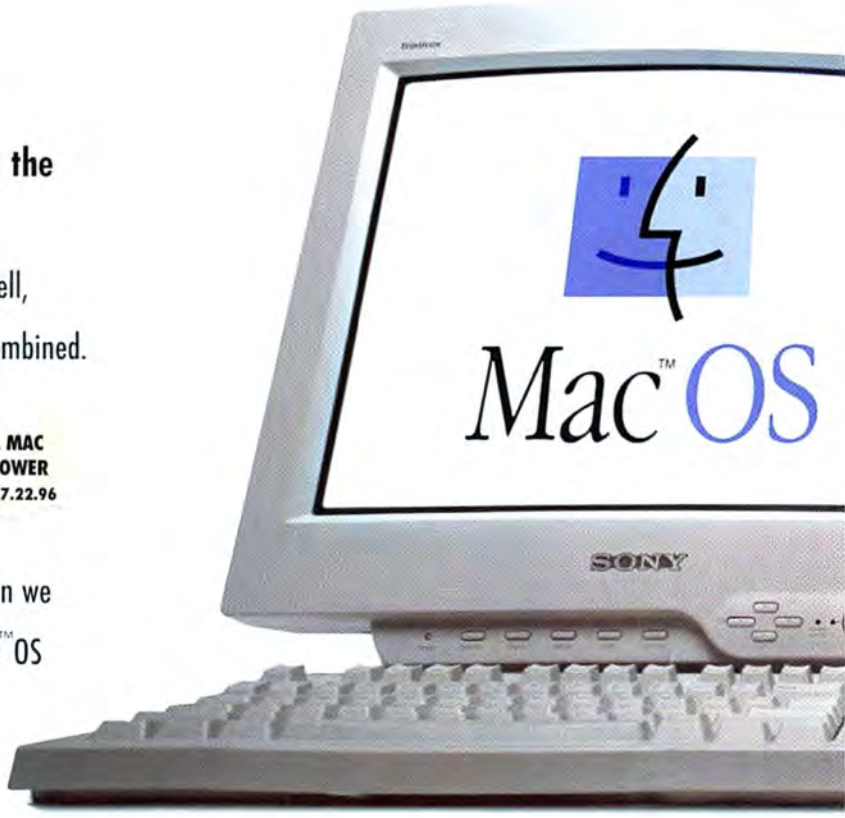

***Actually, we can't blame it all on the poor guy in forecasting.**

We never expected our growth to exceed Dell, Compaq and Gateway's first years' sales combined.

"THE POWERTOWER PRO SERIES SOARS ABOVE ALL MAC RIVALS....MAC POWERUSERS WILL SOON BECOME POWER COMPUTING USERS IN DROVES"— MacWEEK Magazine 7.22.96

We knew we made great products, but when we started getting the best reviews of any Mac™ OS system in the industry and offered our systems at the lowest prices, our sales went through the roof.

We've had our share of growing pains, but we've worked hard to iron them out. And you'll see continued steady improvement over the next couple of months. For example, if you order a PowerCenter™ 150MHz or PowerTower™ Pro 225MHz direct from Power Computing you can expect to get your system custom configured and exactly the way you want it in a couple of weeks.

A PowerCenter 604/150 starting at around two grand is an awesome buy.

Especially when you start comparing features and price points to the other 150MHz Mac OS systems on the market. (While you're at it, why not compare it to machines in the PC market

"IF YOU REQUIRE MAXIMUM PERFORMANCE, NO CURRENT APPLE SYSTEM CAN TOUCH THE POWERTOWERS."
— MacWEEK Magazine ♦♦♦♦

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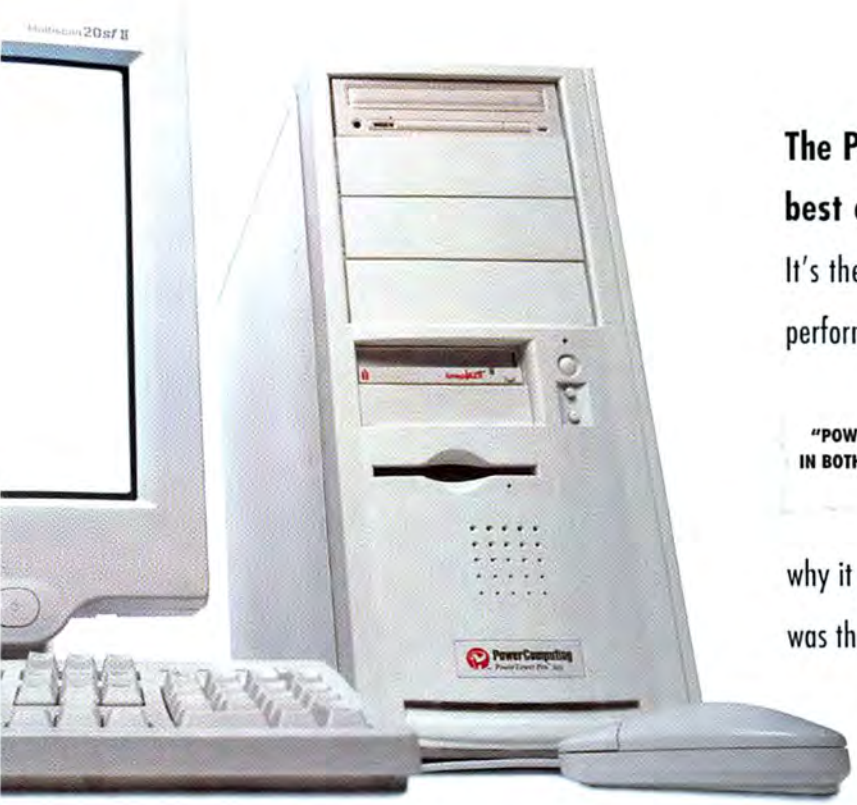

The PowerTower Pro 225 is simply the best computer investment you can make. It's the fastest, most expandable and highest-overall performing Mac OS system you can buy. That's probably

"POWER COMPUTING HAS THE CLEAR AND UNDISPUTED EDGE OVER APPLE IN BOTH PRICE & PERFORMANCE. YOU WANT A POWERTOWER PRO."
— MacUser Magazine SEPT '96

why it received "Best of Show" at MacWorld Expo and was the first machine in over three years to receive the coveted Five Mice from MacUser magazine. (FYI: Our PowerBase™ line was the second).

and get a glimpse of why the Mac is making a comeback). Our PowerCenter has everything you need in a mid-range system, including the upgradeability you need to ensure that it won't be sitting in a closet next to a IICX acting as a print server a year from now.

Give Power Computing a call and let one of our sales consultants help you custom configure your next system.

In the meantime, everyone at Power Computing sincerely thanks you for your continued patience and the overwhelming support. And whatever you do, never stop fighting back for the Mac.

"POWER COMPUTING HAS FIELDED SOME KILLER MACHINES. APPLE WILL BE HARD PRESSED TO CATCH-UP."
— MacUser Magazine July, 1996

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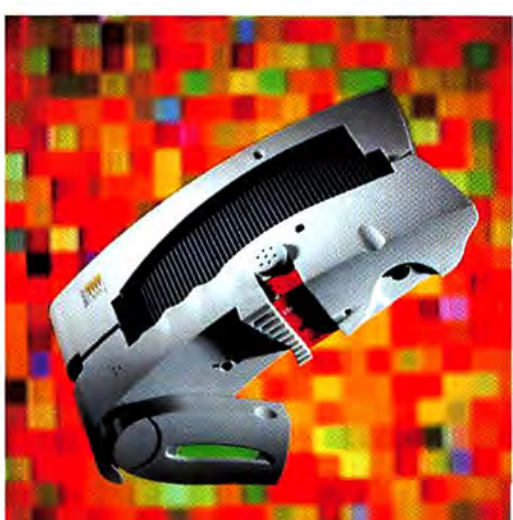

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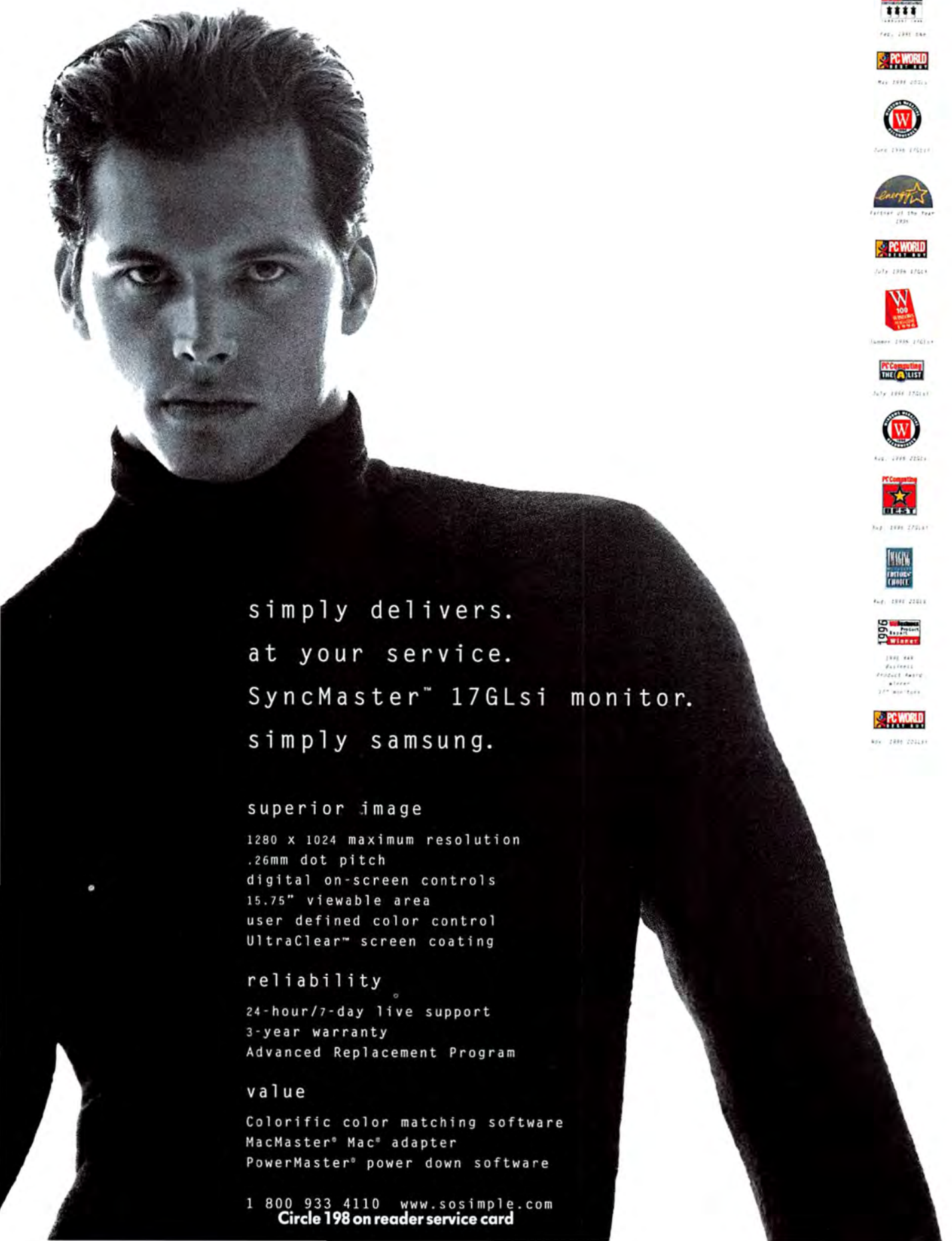

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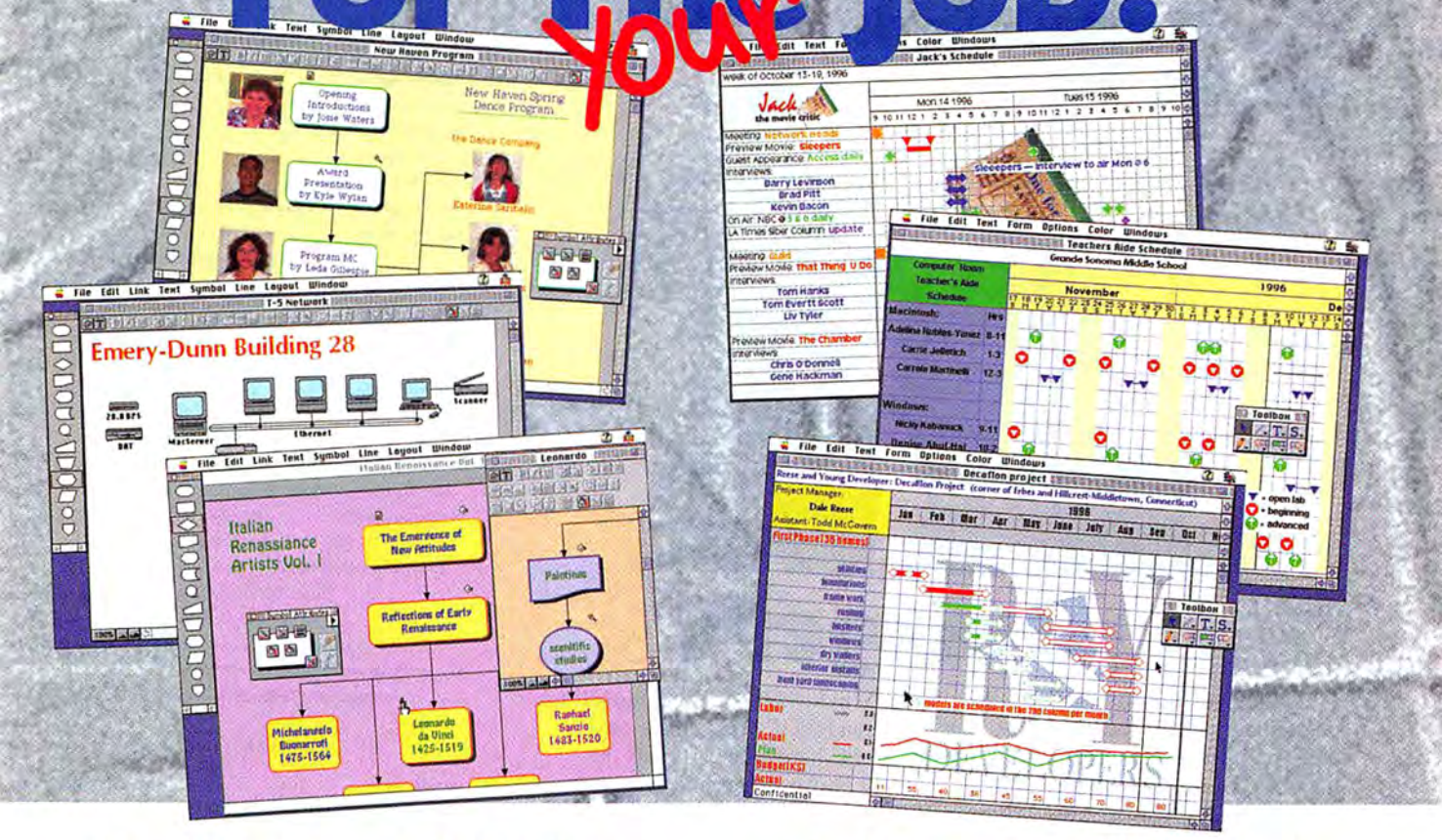

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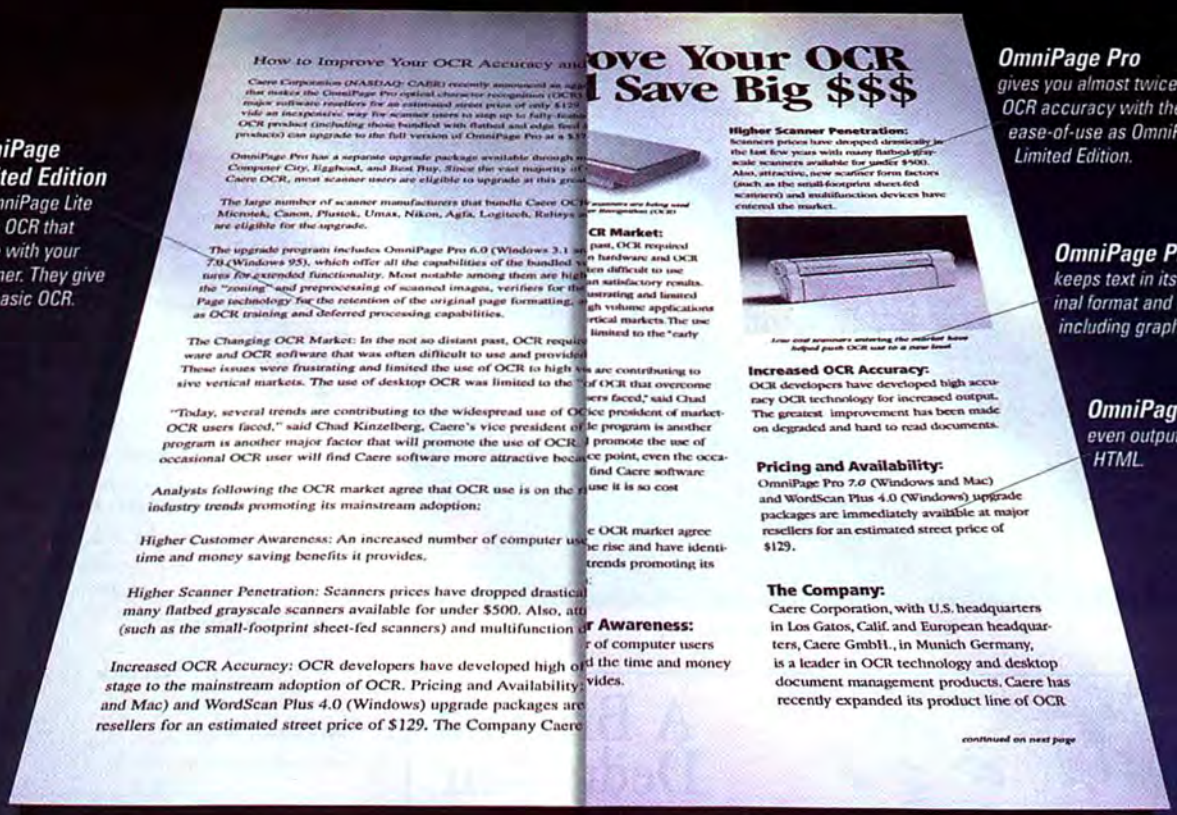

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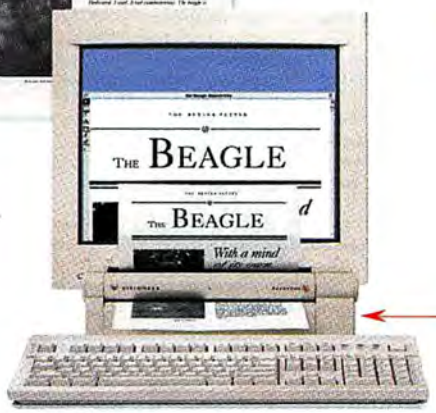

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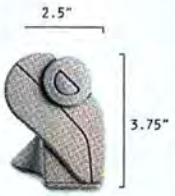

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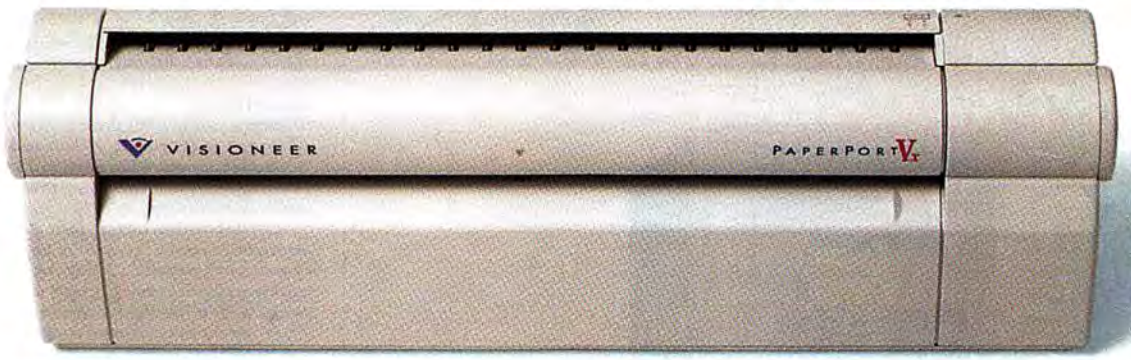

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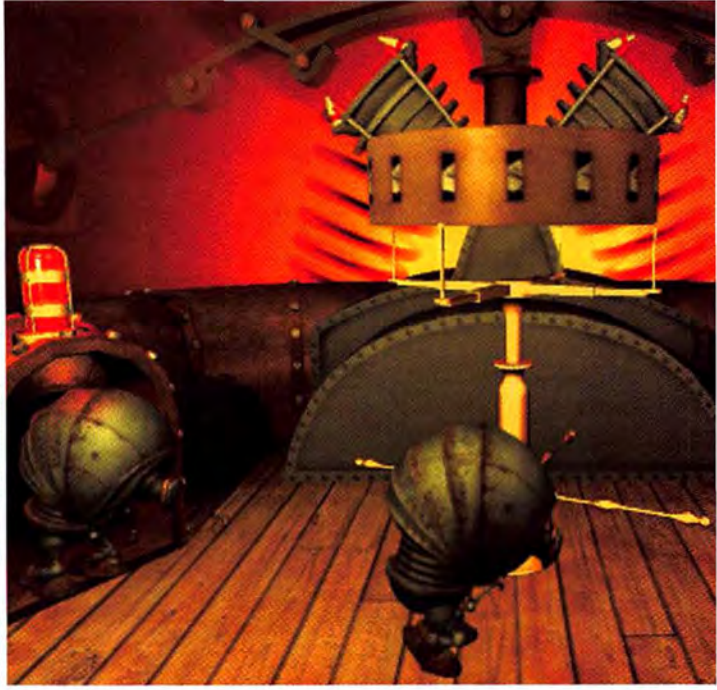

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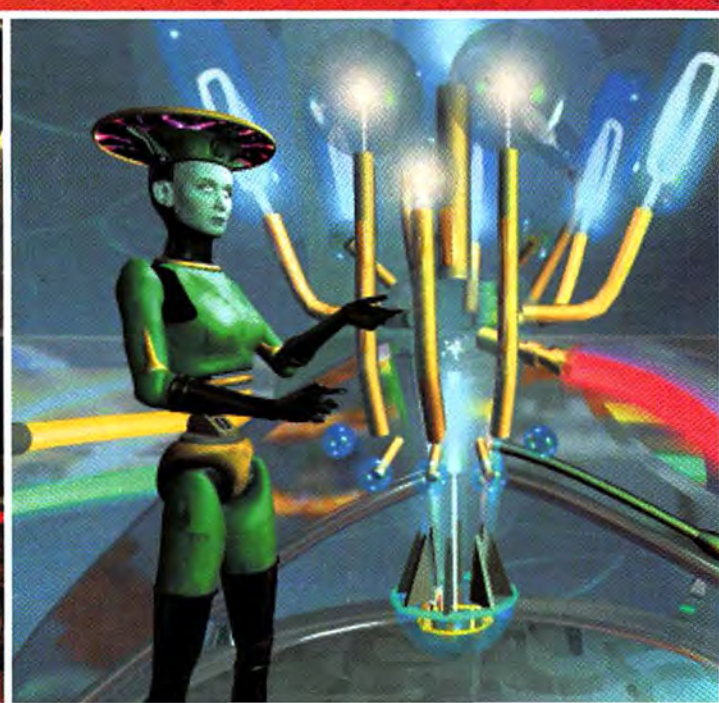

Letters

New Horizons for Apple

MACWORLD'S INTERVIEW WITH Marco Landi, Apple's new chief operating officer, seems to suggest that Apple wants to try selling to first-time buyers as well as convince corporations to tolerate a mixed network of Macs and Windows machines ("Where to Now, Apple?" *News*, October 1996).

That's all well and good, but Apple is ignoring a potentially huge market: people with machines running Windows 95 who wish they had a Mac. What they need, and what they're not getting from Apple or the clone makers, is any word about how to transfer their files from their present machines to a new Mac. Most of them don't know it can be done, or how to do it.

DONALD MINTZ
Ringwood, New Jersey

More Thoughts on Copland

AS A PRODIGAL SON RECENTLY RE-turned to the Mac fold after four years in the Windows world, I must confess that it's taken a few weeks to reacclimate myself to Mac menus that behave like dysfunctional window blinds. I've coveted most of David Pogue's wish list myself at one time or another (*The Desktop Critic*, October 1996). I'm gratified he put it down on paper for Apple to see and (hopefully) program into future Mac OS releases.

PAUL JAGNOW
via America Online

AS FAR AS I AM CONCERNED, TEXT clippings have made Stickies obsolete, so here's another Copland suggestion: instead of automatically naming the

clippings Untitled Clipping, why not have the clippings file automatically generate a name from the first 10 to 15 letters of the clipping text?

JEFF ULICNY
Monaca, Pennsylvania

DAVID POGUE DIDN'T MENTION ONE handy thing that Windows 95 users have over us: Uninstall. Imagine being able to uninstall, say, QuickDraw GX and have the program, extensions, and control panels all go away. No more searching around the System Folder for things we may or may not need. That would be living!

PETER DEEP
Yoncalla, Oregon

*We're still waiting for someone to come up with Uninstaller Plus, which David Pogue wrote about several months back (*The Desktop Critic, *April 1996), not to mention Concatenator Pro.—Ed.*

Not Quite PGP for Dummies

THE AUGUST 1996 *LETTERS* COLUMN ran a letter from Robert D. Callahan, who mentioned his inability to find a MacPGP manual. Several years ago I published and posted online a minimal MacPGP manual to fill this very need.

I recently dug up a copy of that old manual and retooled it for MacPGP 2.6.2. This should make it close enough to any recent versions of PGP for the manual to still be useful.

The MacPGP Minimal Manual v2.5 is available (in English only) via anonymous FTP from the Public Access Publications FTP site: *ftp://ftp.public-access.org/pub/misc/PGPManual_v2.5.sit.bin*.

It is free for downloading and use; I ask only that whoever obtains a copy does not sell it or include it with other software for sale without my prior consent.

I hope this helps Mr. Callahan and others who have no idea how to get MacPGP to work.

TIM MITYAK
Mesa, Arizona

Much Ado about Junk

I DON'T AGREE WITH GALEN GRUMAN'S position as stated in "AOL Should Win Its Spamming Case" (Macworld Online News, *http://www.macworld.com/cgi-bin/dailyads.pl/daily/dailynews.main.shtml*). Gruman says that "if Cyberpromo and other similar junk-mailers let people like me opt out of their solicitations, I would not be siding with AOL." He implies that junk mail is OK, as long as marketers allow you to unsubscribe from their lists—which you never voluntarily subscribed to in the first place.

continues

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CORRECTIONS

- *SmartStuff's FoolProof 2.5 security software ("Secure Your Mac," November 1996) uses a separate, bundled application to prevent users from booting a Mac off another disk. The capability has been incorporated into version 3.0.*
- *The original Mac was designed by Jerry Manock, Terry Oyama, and Steve Jobs ("The Mac Reborn," September 1996); Frogdesign created the look of the Mac SE and Apple IIc, as well as other, later Macs.*
- *The phone number for Philips Electronics is 408/453-7373 ("CD-ROM Drives Accelerate," December 1996).*
- *Only one copy of CyberGauge (*Reviews, *November 1996) may reside on a user's machine at any one time per the software license.*
- *The 3.6-volt lithium cell in the 128K, 512K, and 512KE Macs is the Eveready 523-BP; most others use the Duracell PX-21 ("The Battery Time Bomb,"* News, *December 1996).*

Junk mail should be illegal—just like fax marketing is illegal—on the grounds that the advertiser doesn't bear the full cost of the advertisement. It costs me money to receive those messages. This is a hugely important point—especially when you extrapolate what today's junk-mail situation will be like in just a few years' (or months') time.

MATT HENDERSON
Darmstadt, Germany

If, like me, you've been unable to persuade the people at Cyberpromo to remove your E-mail account from their bulk-mail lists via the address provided in their mailings, try calling them on their nickel at 800/650-9110.—Ed.

One Tough PowerBook

IT MAY COME UNDER THE HEADING OF operator error, but I ran over my PowerBook with my truck—and it still works!

I had set my (fortunately) padded briefcase down—with the PowerBook snuggled inside—before entering my vehicle to rearrange the interior to accommodate a passenger. I finished but thoughtlessly got in my truck, backed up, and heard a crunch as I ran over the briefcase containing my PowerBook. I plugged it in when I got home and heard the reassuring bong of a living computer. The brightness control no longer works and the case doesn't close as easily as it once did, but all the data is intact (as far as I can tell) and the functions seem remarkably unimpaired.

I called Apple to tell my story, but after spending an hour on hold with nothing but canned music and an answering machine, I gave up and wrote to you.

JIM KELLY
Los Angeles, California

No-Hands Typing

WHEN YOU REVIEWED ARTICULATE Systems' Power Secretary Power Edition 2.0 last year, the list price was $2495 (*Reviews*, September 1995). This week I got a catalog offering Power Secretary Personal Edition for $595. Last year's review said that Power Secretary Power Edition 2.0 does not work with Microsoft Word 5.X. In the catalog, Articulate Systems says Power Secretary Personal Edition works with Word but it doesn't give a version number.

Have you seen this product yet? Do you have any new information? Basically the question is, should I run out and get it or should I wait?

RICK MOONEY
via America Online

Power Secretary Personal Edition is virtually the same as Power Secretary Power Edition 2.0, except that I believe it works only in a single word processor—and if you use Word, that would be Word 6.X, since Power Secretary still doesn't work with Word 5.X.

Should you get it? If you're just a bad typist then go for the Personal Edition. But if you have trouble with your hands, as I do, get the full version, which is now $2000. This program will absolutely change your life.—David Pogue

Love That Interface

RECENTLY, UPON FINDING MYSELF IN a rental car without the benefit of the car's manual, I lowered the driver's window, which was labeled as having a power auto-down feature. This feature worked differently than in my own car, however, because holding down the button an extra

continues

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second didn't engage the auto-down function. I instinctively double-clicked the button the next time and was delighted when the window lowered itself automatically. Now if I could just get an Undo command for my oven . . .

RODNEY RHODES
The Woodlands, Texas

An Undo command for the oven—the mind reels! How about an eyedropper tool for selecting the exact shade of toast you want? Or for a real killer app, an oven-cleaner macro?—Ed.

Outbound Forgotten?

THREE OR FOUR YEARS AGO, THE OUTbound Notebook computer rated as one of the best available. I bought one, but shortly thereafter Outbound went out of business. A company named PerFit in Boulder, Colorado, did repair work on Outbound Notebooks but its phones are now disconnected. Do you have any information about where I can get my Outbound Notebook serviced?

CLAIR S. WEENIG
via Macworld Online

As you found, support, service, and upgrades from PerFit ceased as of mid-1995. Now, Outbound support is provided via the Internet through a special-interest group of the fabulous Colorado Macintosh User Group. The Outbound support page is at http://www.cris.com/~comug/outbound/index.shtml.*—Ed.*

Hands Off STF

WHILE I'VE VALUED *MACWORLD* FOR years, I must write to disagree completely with the review of STF Technologies' Faxstf 3.2 (October 1996). I was especially surprised that the author was troubled by multiple features to accomplish the same task. This diversity strikes me as increasingly important as software becomes more and more personal. As another reviewer noted about the new StuffIt Deluxe 4.0 (ironically in the same issue), different routes to the same end allow users to select the method that best suits them. With another software package, Free PPP, I also appreciate different ways (via a menu or control bar, for instance) to achieve the same end, using the one that works best at any given moment. If I find I never or rarely use a particular feature, I simply Trash it.

I must confess a sort of reverse loyalty to STF. I've struggled with its fax software for two years, always loving the interface but often confronting problems. The latest version is the first to work perfectly and I am thrilled. So hands off!

DALE GARRISON
Liberty, Missouri

Site Advice

I AM 13 YEARS OLD AND HAVE BEEN ASKing my father to let me have access to the Internet for one year now. He said he would let me have it if I could find a program that would restrict my use, so I could not get into any of the bad Web sites. I have looked and looked for a program like this but cannot find one. Where can I find one?

JAMES SHAHAMIRI
San Francisco, California

Give this to your dad along with his slippers and remote when he gets home from work. Cyber Patrol ($34.95 for home users; Microsystems Software, 508/879-9000, http://www.cyberpatrol.com*) allows parents to selectively (and with the help of pregenerated lists) block access to inappropriate sites, as does SurfWatch ($19.95 plus tax and shipping; Spyglass, 708/505-1010,* http://www.surfwatch.com*). In addition to blocking sites deemed unsuitable for kids, SurfWatch and X-Stop ($39.95 plus tax and shipping; Logon Data,* http://www.xstop.com*) have filters that prevent kids from giving out personal information or using rude language in chat rooms. Not that I think you're that kind of kid, mind you. Finally, your dad can peruse Yahoo!'s Internet: Blocking and Filtering site (*http://www.yahoo.com/Business_and_Economy/Companies/Computers/Software/Internet/Blocking_and_Filtering/*) to get a listing of many other Internet filter utilities for both the Macintosh and PC.—Ed.* m

Letters should be sent to *Letters*, Macworld, 501 Second St., San Francisco, CA 94107; via fax, 415/442-0766; or electronically to CompuServe (*70370,702*), MCI Mail (*294-8078*), America Online (keyword *Macworld*), AppleLink (*Macworld1*), or via the Internet (*letters@macworld.com*). Include return address and daytime phone number. Due to the high volume of mail received, we can't respond personally to each letter. We reserve the right to edit all letters. All published letters become the property of *Macworld*.

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July 24, 1995

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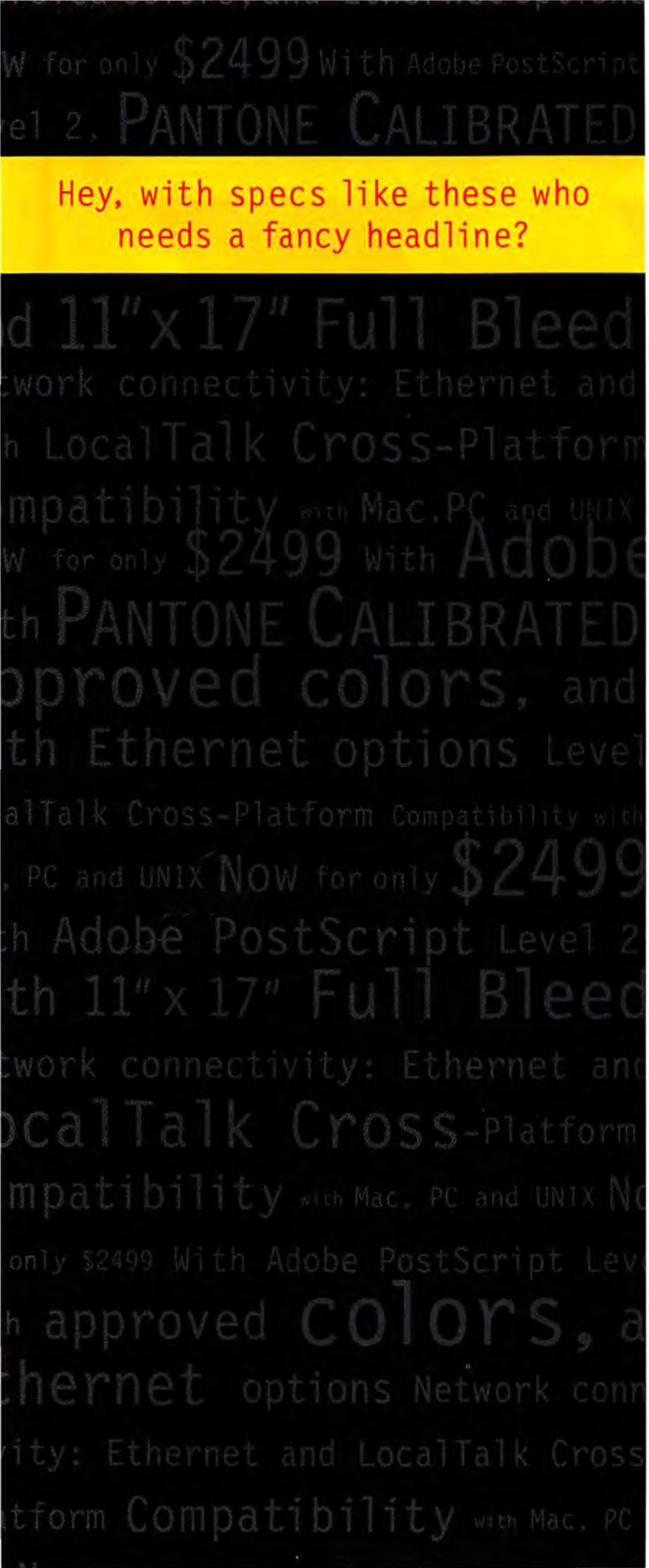

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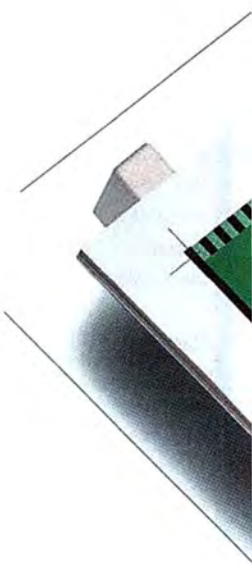

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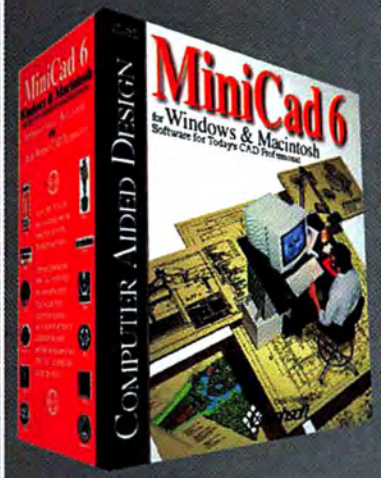

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State of the Mac

by Adrian Mello

Solving the Macintosh Buyer's Dilemma

A PROLIFERATION OF NEW MODELS—SOME REAL, SOME NOT

TWO YEARS AFTER APPLE announced its plans to license the Macintosh Operating System, we can finally choose from a variety of Mac models offered by a variety of Mac makers, including APS Technologies, DayStar Digital, Motorola Computer Group, Power Computing, and Umax Computer. It's true that the number of Mac vendors and models doesn't compare with the immense variety of the Windows PC world, but it *is* a significant change for Macintosh users.

Having more choices means you have a better chance of finding a Mac model that fits your needs, thanks to an increased selection of product features including CPU speeds, expansion slots, memory capacities, and accessories such as storage options and video-editing bundles. But that also means you'll spend more time figuring out which products offer what you want. As anyone who has ever looked at a multiple-page wine list can tell you, more choices can be bewildering.

As more computer makers enter the Mac market, increased competition is the inevitable result, and that means better prices for Mac buyers. You'll not only find lower prices on standard models, but a growing number of special promotions and bundling arrangements should provide further savings.

However, with increased price competition, a vendor's willingness to stand behind its products becomes more important. Some vendors will reduce prices by using cheap hardware components that may have higher defect rates. When those components fail, whether you really got a good deal will depend on how the vendor responds to your problem.

Mac clones also may present compatibility and configuration challenges. Hopefully, these problems will not be as bad as those in the PC market, but some incompatibilities are the inevitable by-product of increased complexity. Some Mac hardware and software companies will opt to test their products only on Apple-branded Macs or on a limited number of Mac models.

Some compatibility and configuration challenges are subtle. For example, Motorola's recently announced StarMax systems support VGA monitors but require an adapter for Mac-specific monitors. *Macworld* was still unable to locate such an adapter for purchase several weeks after Motorola announced the StarMax.

It's certain that buyers will regularly confront similar configuration challenges as Mac makers start the transition from Mac standards to PC ones, a trend that

the Common Hardware Reference Platform design will accelerate. (Expect the first CHRP systems this summer.)

Macworld's Mac Superguide

In the face of so many choices, how do you figure out which Mac to buy? *Macworld* has always been the best resource for complete and accurate reviews of Mac systems. In this issue, *Macworld* goes a step further by introducing a new section called *Mac Superguide*. Every month the *Mac Superguide* will help you choose from the wide variety of Mac models available. The *Superguide* lists every shipping Mac model we've been able to get our hands on and includes Macworld Lab benchmarks and Star Ratings for every one. And every month the *Superguide* will add new models as they appear, making it your up-to-date, one-stop buying reference.

Which model is right for you ultimately depends on how you intend to use it. Therefore, in addition to the comprehensive list rating all Macs available, the *Mac Superguide* showcases *Macworld*'s current choices for the best systems in eight key applications: office, small office/home office, education, portable, image editing and 3-D graphics, publishing and design, multimedia and video creation, and Web and intranet server.

Unkept Promises

One immediate result of the Mac-system expansion is that some newly announced products just aren't available. If these were software products, they'd be called vaporware. In the face of competition, some Mac companies push to be the first to trumpet exciting new products so they can capture potential customers' imaginations. Unfortunately, sometimes companies push too hard and their marketing campaigns outpace their engineering efforts.

In any case, it disappoints and angers customers when companies fail to deliver the goods. Once you set your heart on a specific Mac, it's particularly frustrating to find out that you can't get it.

This frustration is exacerbated when Mac companies string customers along week by week when they know they can't actually fulfill orders for several weeks.

continues

HANK O'SUNA

Anyone who has ever had to wait at the gate for a delayed flight whose departure time is pushed back every ten minutes knows just how aggravating it can be to be strung along with false expectations.

Last summer many customers were disappointed to find out that some Mac models highly touted for blazing CPU speeds would be unavailable for several weeks at best. And this doesn't just apply to top-speed models. For example, *Macworld* has been waiting for months for some Mac companies to send us shipping versions of several new value-oriented PowerPC 603e–based systems that were announced last summer.

Occasionally, companies can't ship computers due to design and manufacturing defects, as happened with the PowerBook 5300 series this summer. Another more common reason for nonshipment is that companies don't have enough manufacturing capacity to meet demand.

The problem of vaporware goes far beyond Macs and includes all types of software and hardware products. Technological change accelerates continually, so companies must develop and update products more quickly to remain competitive. Several months ago in this column, I asked readers if they would like to see *Macworld* provide more reporting on beta products. Your answer was clear: although readers want to stay abreast of these product developments, most don't want to see reviews based on nonshipping versions.

Real Products, Real Ratings

At *Macworld*, we don't believe our readers should have to worry about whether ratings and reviews are based on a real product or on a prototype. Thus, we simply don't rate products unless they are real, shipping versions—the products we rate and review are the same products you end up buying. This has always been *Macworld*'s policy, and it will remain so.

With this issue, we've taken the extra step of making our commitment clear with our "Real Products, Real Ratings" pledge. Whenever you see this pledge or whenever you see a product with a *Macworld* Star Rating, you can be sure that our rating was based on a real, shipping product.

Not all magazines follow this policy. Some, caught up in the rush to cover late-breaking developments, review nonshipping versions of products. A few of these magazines are honest about this and clearly call out when they are reviewing prototype versions so you are not misled. But many are not so honest with you and instead rate and review unreleased products without telling you. The problem with reviewing a nonshipping version is that the version you actually purchase may not measure up to the version reviewed.

There is a place for previews of nonshipping products, because they give you a sense of exciting new product developments. But these should not be construed as reviews. *Macworld* regularly provides such previews in our *News* section, labeled as "Sneak Peeks." We give you a first look at an upcoming product but stop far short of providing ratings or any kind of definitive buying recommendation. Of course, when the product is actually shipping, we will follow up with our official review.

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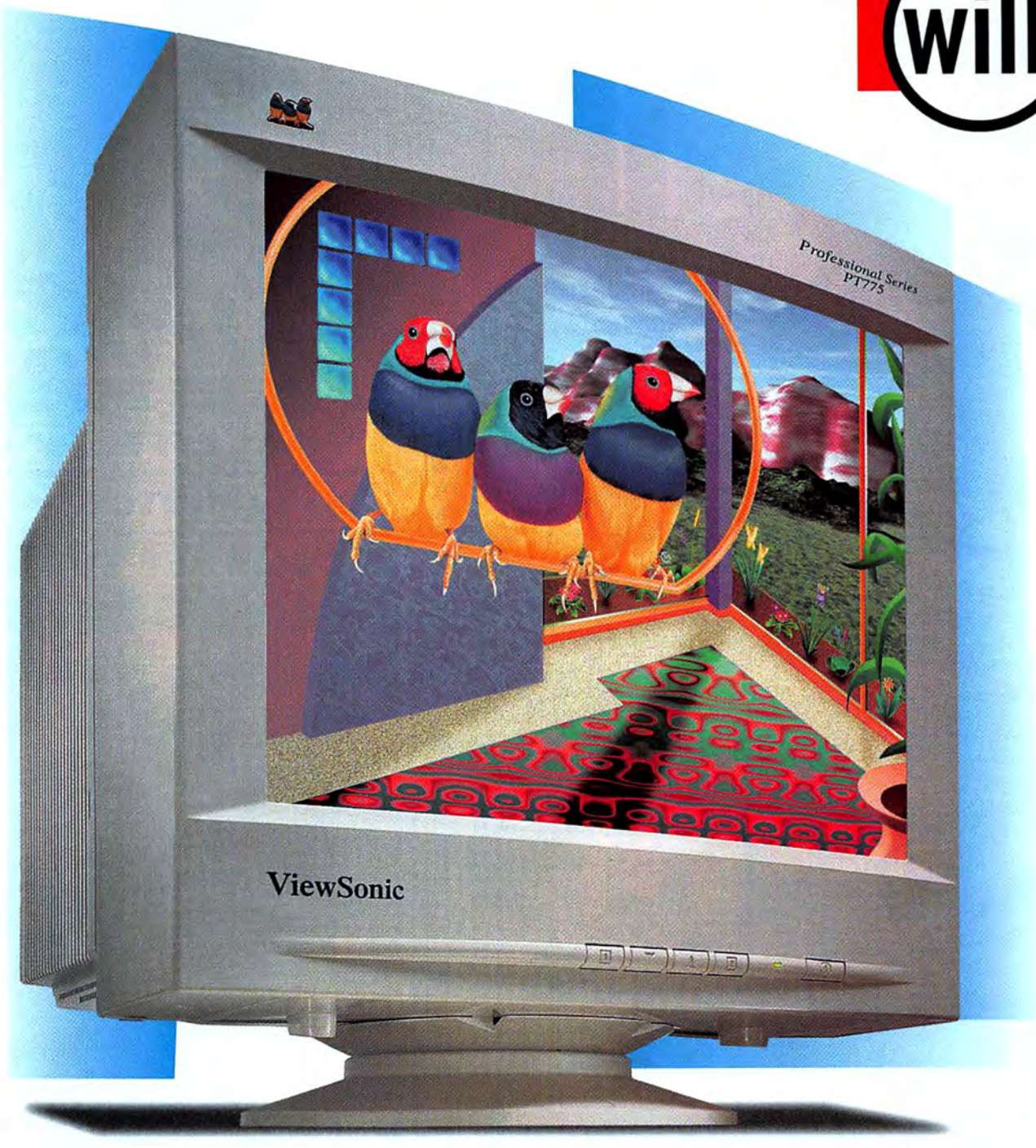

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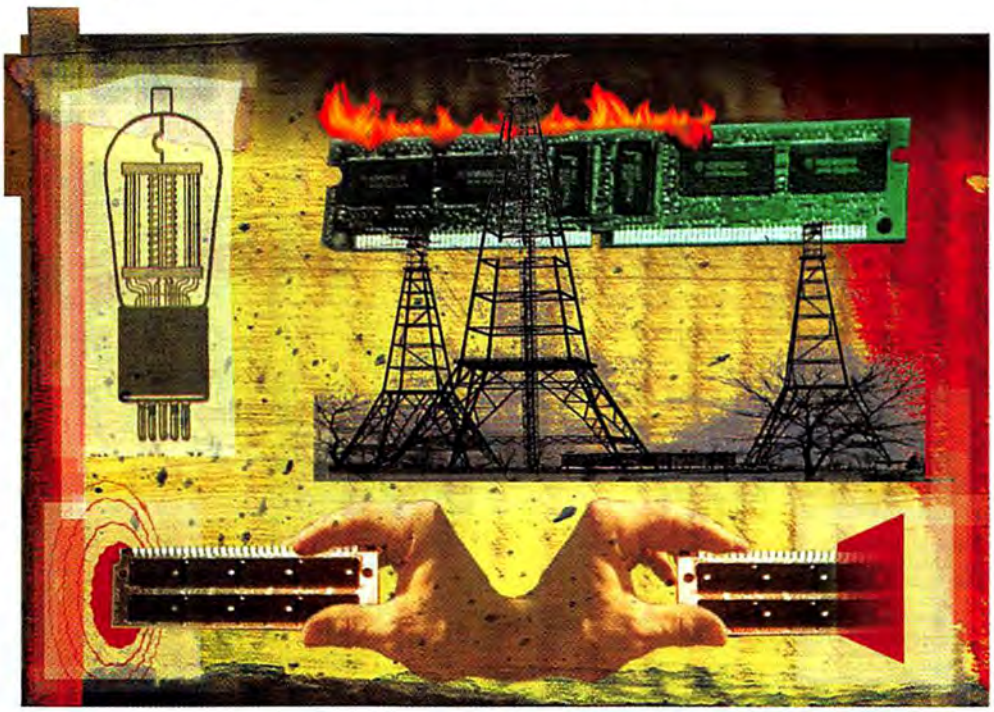
News

systems

A New Memory Standard Debuts

NEW 3.3-VOLT DIMMS INCOMPATIBLE WITH CURRENT MODULES

by Stephen Beale



JON CONRAD

Get ready for a new memory standard in the Macintosh market—one that's incompatible with the 5-volt double in-line memory modules (DIMMs) in Apple's current Power Macintosh systems and in most Mac clones.

The new Motorola StarMax Macintosh clones, with their Tanzania motherboards codesigned by Motorola (800/759-1107, *http://www.mot.com*) and Apple (408/996-1010, *http://www.info.apple.com*), use 3.3V DIMMs, and other Mac system developers are expected to follow suit. The new DIMMs, which cannot be used in motherboards designed for 5V modules, are also likely to become a standard among Intel-based systems.

"You can count on it," says Deniz Teoman, director of engineering for Umax Computer (510/226-6886, *http://www.supermac.com*), which currently offers Mac OS systems that use 5V DIMMs. He will not say when Umax will move to the new memory standard, but expects the new DIMMs to become common system components within the next year.

The Low-Power Advantage

The 3.3V DIMMs have several advantages over 5V modules. The computer industry is moving toward systems that consume less power, so any component that advances this trend is welcomed. In addition, the 3.3V DIMMs offer higher manufacturing yields, which ultimately makes them cheaper to build, vendors say.

In addition to their lower power consumption, the DIMMs use a technology called Extended Data Out (EDO) that enables faster performance than the Fast Page Mode (FPM) memory chips in current Macs. However, this feature is independent of the chip's power consumption; 5V EDO DIMMs are also available for some PCs.

Mac Vendors Climb Aboard

Mac system vendors appear ready to climb on the 3.3V bandwagon. Bryan Hartlen, program manager for IBM's PowerPC Industry Marketing group, says the 3.3V DIMMs will be standard components in the forthcoming Common Hardware Reference Platform

(CHRP) architecture. Power Computing (512/388-6886, *http://www.powercc.com*), another Macintosh OS licensee, will move to the new DIMMs "when the market's there to support it," says spokesman Mike Rosenfelt. He expects this will take 6 to 12 months.

DayStar's (770/967-2077, *http://www.daystar.com*) marketing director, Gary Dailey, was not so definite about his company's plans, but says the clone vendor is "looking at" the possibility of incorporating the DIMMs into future Macs.

Apple itself had no comment on its plans. But considering the company's involvement with the Tanzania and CHRP architectures, it's a safe bet that Apple, too, will eventually move its product line to the 3.3V DIMMs.

Incompatible Connectors Like their 5V cousins, the 3.3V DIMMs have 168 pins, but the connectors are slightly offset to prevent users from accidentally installing them in systems designed for 5V modules.

One consequence is that you won't be able to move memory from current Power Macs to newer systems that use the 3.3V DIMMs. This means a huge expense for graphic designers, digital video editors, and other high-end Macintosh users who need lots of RAM and like to move to the latest, fastest CPUs.

This could provide a boost for the new Motorola systems and other models based on the Tanzania design, such as the MPower series (see "First Mac for Just $1400," *News*, December 1996), from APS Technologies (816/483-1600, *http://www.apstech.com*). If you load these Tanzania-based systems with memory, you'll be able to move the RAM to new Macs as they're released.

Roger Kasten, vice president of technology and product development for Newer Technology (316/943-0222, *http://www.newertech.com*), says it may theoretically be possible to develop adapters that would permit use of 5V DIMMs in motherboards designed for 3.3V DIMMs. But any such solution would probably come at a high cost in performance and reliability, and thus may not be economically feasible.

On the other hand, if you're planning to stick with your current Mac system, don't worry about the supply of 5V DIMMs drying up; memory vendors expect to offer the modules well into the future, given the large installed base of systems that require them.

Newer Technology, Advantage Memory (714/453-8111, *http://www.advantagememory.com*), and Kingston Technology (714/435-2600, *http://www.kingston.com*) all say that they plan to offer 3.3V DIMMs by the time the Motorola systems hit the shelves in November. At first the 3.3V DIMMs may be slightly more expensive than 5V DIMMs, but eventually economies of scale will reduce the prices.

PETER HOEY

communications

New Modems Break the Speed Barrier

DIGITAL CONNECTIONS PERMIT 56-KBPS ACCESS

by Cary Lu

Just when you thought it was safe to buy a modem, a new, faster protocol is on the horizon that will leave your 28.8- or 33.6-Kbps model in the dust. Promising 56-Kbps connections on ordinary phone lines, the protocol is able to exceed the fundamental speed limits of a telephone circuit by changing the way your telephone company and online service handle modem calls.

However, your phone company cannot simply pass along the 56-Kbps connection to your online service over an ordinary voice-grade line. Instead, the two must connect digitally (at 64-Kbps ISDN or faster); the only analog connection is between you and your phone company.

Faster Browsing and Downloading The new protocol is asymmetrical, providing 56-Kbps transmission in only one direction—from the online service to you—for high-speed Web browsing and downloading, but only about 14.4 Kbps to 33.6 Kbps from you to the online service.

The 56-Kbps speed works only when the modem is connected to an online service that has a digital circuit and only over a clean phone line. On their own, a pair of these new modems can connect to each other only at 33.6 Kbps or slower.

Right now, four different companies—including Rockwell, the dominant maker of modem chip sets—are independently developing different, and incompatible, variants of the 56-Kbps modem. But they'll most likely settle on a single protocol before the modems hit the market in mid-1997. Because the new protocol depends on online providers' and telephone companies' establishing digital connections, expect its adoption to take longer than that of previous speed increases. For the user, phone-line costs should not change, although these modems will undoubtedly carry a price premium and online services will probably apply a surcharge to 56-Kbps connections, somewhat like the present premiums charged for ISDN connections.

systems

PowerPC Aims for Higher Power

500MHZ CPU LEAVES INTEL IN THE DUST

by Tova Fliegel

The Macintosh has again eclipsed the PC in raw horsepower: start-up chip maker Exponential Technology (408/441-6050, *http://www.exp.com*) has developed the X704 processor with a blazing core speed of 533MHz. Expected to ship in the second quarter of 1997, the CPU will also be available in 466MHz and 500MHz versions. And although Intel has said the Pentium class will graduate to clock speeds of 200MHz and above sometime in 1997, no specific time frame for delivery has been announced.

Innovative Design Industry analysts and vendors acknowledge Exponential's innovation—it puts some new twists on traditional CPU design—but many are uncertain about whether the new chip can give the PowerPC platform a need-

continues

ed leg up on the competition.

The X704 uses BiCMOS technology, which combines bipolar CPU design—a speed-enabling holdover from the world of powerful mainframes—with the CMOS technology common in today's processors, but it uses a greater number of bipolar cells than other BiCMOS implementations. In short, bipolar logic is much faster than CMOS.

However, the experts say that Exponential still needs to prove itself on several counts. As Eric Lewis, a researcher with International Data Corporation, puts it, "You don't just take a 500MHz chip and plunk it down into a box. Heat, bus speed, cache—all these things have to be tuned."

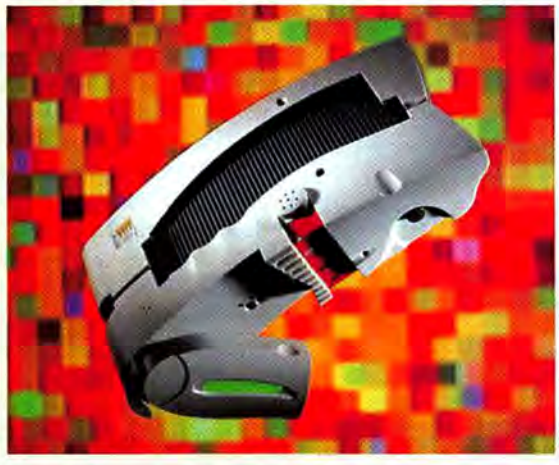
Exponential says it carefully considered exactly these issues to provide a thoroughbred processor. For example, Rick Bergman, vice president of marketing, points to a deceptively simple yet effective solution for dissipating the heat generated by the increased power consumption of bipolar logic: use existing fans, but add ducts to channel the airflow directly over the heat sink. And he claims that the CPU's dual-caching system will enable the X704 to run at 500MHz in spite of current limitations in bus speeds (today's Macs are typically limited to 50MHz).

Many vendors of high-speed processors turn to caching systems to improve application performance in light of bus bottlenecks, but the X704, which will plug into existing machines via a special daughtercard, will include a 2K Level 1 data cache, a 2K Level 1 instruction cache, and a 32K Level 2 cache—all on the CPU itself. Most CPUs contain only Level 1 cache, with Level 2 cache residing on the board. Essentially, Exponential's scheme adds a third level of cache, since on-board Level 2 cache will still be available.

Of course, while additional cache can improve the performance of nearly any application, it's no substitute for greater bus speed. According to Motorola, we'll begin to see 75MHz buses during the life cycle of its next-generation PowerPC CPU, the G3 series, due out in midyear. (See "Blindingly Fast Chips," *News*, November 1996.)

Relatively Low Premium As to whether Exponential will be able to provide an attractive price/performance ratio, Bergman maintains that the cost for all this innovation will be relatively low, particularly given its target market of high-end graphics users. When sold in volume, the chip/card combination will be $1000, a premium that CPU makers will pass along to users, though consumer pricing has yet to be determined. Exponential believes high-end graphics users will be happy to pay for the performance jump. Market researcher Nathan Brookwood of Dataquest agrees: "A little improvement in productivity is worth a lot of money to them [designers] or to their employers." Currently, a 200MHz PowerPC 604e processor sells for about $570. And although production problems have stemmed the flow of higher-speed 604s, Bergman is confident that by the end of the second quarter this year Exponential will be able to produce the X704 in volume.

Clone vendors including Power Computing and Umax, as well as Apple Computer, endorse the Exponential effort.



KEVIN CANDLAND

A New Look in External Modems

Breaking from the usual boxlike designs that characterize external modems, the Quicktel II-C, from Logicode Technology (805/383-2500, *http://www.logicode.com*), looks like something you'd find on the starship *Enterprise*. Behind the snazzy exterior is a $360 33.6-Kbps modem with a built-in speakerphone and adjustable LCD arm. You can position the modem vertically or horizontally. For $420, you get a DSVD version with a digital voice-mail system and simultaneous data and voice transmission capabilities.—STEPHEN BEALE

systems

PCI Comes to the Rescue

BUS ARCHITECTURE PROVIDES BOON FOR USERS AND VENDORS

by Cameron Crotty

Sometimes Superman really does come to the rescue. A scant 16 months after the transition from the 680X0 to the PowerPC chip, Apple dramatically revamped its hardware platform, switching from the ten-year-old NuBus structure to the Intel-based PCI standard. Now, a little more than a year later, the move appears to have been a resounding success, dramatically increasing the capabilities of desktop Macs, opening the Mac peripheral-card market to new competition, and moving Apple closer to industry-accepted standards.

While NuBus had served the Macintosh more or less well for several years, Mac peripherals developers had hit serious technical roadblocks by 1994, mostly in the area of data throughput.

"The best throughput we could ever get on NuBus was 17MB to 18MB per second sustained," recalls Eric Herzog, vice president of marketing for StreamLogic, who was at FWB when Apple shifted to PCI. PCI provided an immediate jump to 33 MBps.

Digital Video Benefits Digital-video component vendors interviewed by *Macworld* are especially emphatic about the shift to PCI. "It would not have been possible to do what we're doing today on NuBus," says Tom Corn, who manages the Industry Marketing Group at Avid Technology.

Currently, different vendors claim varying upper limits on data throughput—as high as 64 MBps—but agree that the data bus is no longer the limiting factor. Vendors also agree that there appears to be plenty of headroom in the spec even without advancing to higher-speed versions of PCI.

Back in the days of NuBus, fewer than a dozen companies were making Macintosh cards, and nearly all were Mac-only vendors. Now you'd need both hands just to count the number of companies making graphics accelerator cards for the Mac.

While the Mac market was characterized by relatively low competition and high prices, not a single PC peripherals company would touch NuBus. One good example is Adaptec, a manufacturer of storage peripherals.

"We wouldn't be in this market today if it weren't for PCI," says Jim Miller, marketing and business manager of Adaptec's RISC Products Group. "We wouldn't have made the investment in NuBus." Adaptec is one of several PC companies, including ATI, Matrox, Number Nine, and Miro, that have begun selling Macintosh boards.

Falling Prices Since the introduction of the PCI architecture, card prices have dropped dramatically.

Atto Technology, for example, listed its SiliconExpress IV NuBus SCSI accelerator card for $995 at the time of the PCI Macs' introduction. Today, the SiliconExpress SCU, a PCI card with similar functionality, sells for $395 on both the PC and the Mac platforms. Atto still sells the SiliconExpress IV, but the list price was cut to $645 late this summer, reflecting the price pressure created by low-cost PCI boards.

Storage isn't the only market that's been affected. Back before the days of PCI, Truevision's NuBus TARGA 2000 digital-video board carried a list price of $4995, and you could purchase an upgrade to its TARGA 2000 Pro for another $3500, for a total of $8495 (list price). Today, you can purchase the full TARGA 2000 Pro product for $4995.

Examples like these exist across the board—Macintosh owners are paying dramatically less for peripheral cards today than they did before Apple introduced PCI, and most vendors interviewed said that there was no longer any difference between their Mac and PC pricing.

Because Mac owners are no longer paying a premium for their peripherals, they have responded by "upgrading to PCI Macs and buying PCI peripherals as fast as they can," according to Christopher Majeske, director of sales at Cyberian Outpost, an Internet-based retailer.

Apple's move to PCI is a good example of a successful technology shift. The company chose a technology that offered clear benefits to its customers and then moved decisively to implement it, aggressively evangelizing key developers and rapidly phasing out products that depended on the older technology. In a time when Apple is at another technology crossroads, perhaps it can learn from its own experience how to do a technology shift right.

PETER HOEY

Systems WATCH

BY STEPHEN BEALE

New Power Macs for Schools Only

Apple Computer (408/996-1010, *http://www.apple.com*) announced three new Power Macs exclusively for schools (see *Mac Superguide*, in this issue). The $2000 Power Macintosh 5400/180, replacing the 5400/120, is a self-contained system that features a 15-inch monitor, a 180MHz PowerPC 603e CPU, 16MB of RAM (expandable to 32MB), a 1.6GB hard drive, and a slot for an optional 256K cache card. With 1MB of video memory, the system can display thousands of colors in 640-by-480-pixel mode or 256 colors at 832-by-624-pixel mode. The Power Mac 6400/200 is a $1900 tower system featuring a 200MHz 603e, a 256K cache card, 16MB of RAM (expandable to 136MB), and a 2.4GB hard drive. Equivalent to Apple's consumer-targeted Performa 6400/200, it has the same limited internal expandability: one internal SCSI connector that supports one device, one free internal drive bay, and two 7-inch (short) PCI slots. It does not have a modem (the Performa does), but has a 10BaseT Ethernet connector. It does not include a monitor. The $1499 Power Mac 5260/120 is similar to the 5400 except for these major differences: it runs at 120MHz, uses a 4× CD-ROM drive instead of an 8×, includes a 1.2GB drive rather than a 1.6GB drive, and has a lower-quality monitor with 640-by-480-pixel resolution.

Some Macs Won't Run OS Update

Apple has released an update to the Mac OS that offers numerous bug-fixes and performance boosts, but if you have an Apple Workgroup Server or a Motorola StarMax clone, you'll have to get by with System 7.5.3 until System 7.6 ships early in 1997. System 7.5.5 has a revised virtual memory scheme and an improved Code Fragment Manager designed to reduce the launch time of some PowerPC-native applications. It is also the last Mac OS release that will support older (pre-68040) Mac models that can't handle 32-bit memory addressing. However, the update won't run on systems based on the Tanzania motherboard codeveloped by Apple and Motorola. These include Motorola's StarMax (see "Motorola's Hot New Macs," November 1996) and APS Technologies' MPower series (see "First Mac for Just $1400," *News*, December 1996). Motorola program manager Amod Patwardhan says the impact on users will be minimal. "A lot of the bug-fixes in 7.5.5 don't necessarily apply to us," he says, adding that the 7.5.5 installer will "gracefully" quit if you try to install the OS on a Tanzania system. Also, in a technical note, Apple acknowledged that the update hasn't been quality-assurance tested for its Workgroup Server series, and recommended that users of the 6150, 7250, and 8550 models stick with System 7.5.3.

Special REPORT

Apple's Newton Branches Out

BY CAMERON CROTTY

Sometimes, if you want something done right, you have to do it yourself. While several manufacturers have licensed the rights to make Mac clones, the number of mainstream Newton licensees remains limited. So Apple is extending its own product line. Early next year, it will ship the next two Newton-based products: the business-oriented MessagePad 2000 and the education-bound eMate 300.

MessagePad 2000

With the MessagePad 2000, Apple has continued to resist pressure to reduce the size or restrict the function of its flagship personal digital assistant (PDA). Recently, U.S. Robotics garnered attention by offering the Pilot, a pen-based device that is smaller, simpler, and significantly cheaper than the MessagePad. But Apple's new Information Appliance division, now responsible for Newton development, believes that mobile workers are looking for more powerful tools.

The MessagePad 2000's design reflects this sentiment. For starters, the chip driving the MessagePad 2000 is a powerful 160MHz StrongARM from Digital Equipment Corporation.

Apple claims that the new CPU makes the MessagePad 2000 up to ten times faster than its immediate predecessor, the MessagePad 130, and cursory tests performed by *Macworld* on a prototype machine confirm that the new MessagePad is significantly more responsive.

Larger Screen The MessagePad 2000 also features a new, larger LCD screen. The display, which required that the 2000 be slightly longer and wider than the 130, is 480 by 320 pixels, or precisely one-half of a VGA screen. The display supports 16 levels of gray, and the screen resolution is sharper (100 dpi, compared with 72 dpi on the MessagePad 130). The display's larger size and improved resolution give users more room in which to work, and simplify such common tasks as viewing incoming faxes. The screen is also backlit, which improves readability in many lighting situations.

While the screens of earlier MessagePads using version 2.0 of the Newton operating system could be physically rotated 90 degrees counterclockwise, the MessagePad 2000 screen can be rotated in software to read out in any direction (a bonus for lefties), and the navigational icons at the bottom of the display are no longer permanently silk-screened on but are instead displayed by the OS.

Long Battery Life Long-distance travelers should note that the additional computational and visual horsepower apparently will not come with any sacrifice in battery life; Apple expects the MessagePad 2000 to operate continuously for 24 hours on 4 AA batteries, or for 3 to 6 weeks under typical use.

Other Features The basic MessagePad hardware has also undergone a slew of less obvious but no less dramatic changes. There are now slots for two Type II PC Cards, and the serial port has been replaced by the Newton InterConnect port at the top of the device. Through adapters, the InterConnect port will support serial and LocalTalk connections (with auto-docking), power in and out, and audio in and out. Additionally, the infrared transceiver now supports the industry-standard IrDA mode, so the MessagePad 2000 can communicate with properly configured IrDA devices. Several printers, such as the Hewlett-Packard LaserJet 5MP and DeskJet 310, support printing directly from IrDA beamed transmissions, and the MessagePad 2000 will work with those printers.

The MessagePad 2000 is configured with 8MB of ROM, 1MB of volatile system RAM, and 4MB of user-accessible flash RAM.

Newton OS The Newton 2.1 operating system, which will ship with both the MessagePad 2000 and the eMate 300, incorporates only minor changes, primarily intended to deal with the hardware differences from previous Newton generations.

In the case of the MessagePad 2000, Newton 2.1 adds a new type of note: a condenser microphone in the MessagePad 2000 can be used to record audio notes. The audio is compressed on the fly, and Apple claims that one hour of voice audio will fit on 4MB of flash RAM.

Bundled Software Apple has always seen the Newton as a replacement for the laptop computer, and software bundled with the MessagePad 2000 supports that vision: a spreadsheet (with a Microsoft Excel 5.0 plug-in for your desktop), a word processor, and an E-mail client (EnRoute). Users will also get version 1.1 of the Newton Connection Utilities (upgraded to allow automatic docking) and the NetHopper Web browser.

continues

Apple's new MessagePad 2000 (left) and eMate 300

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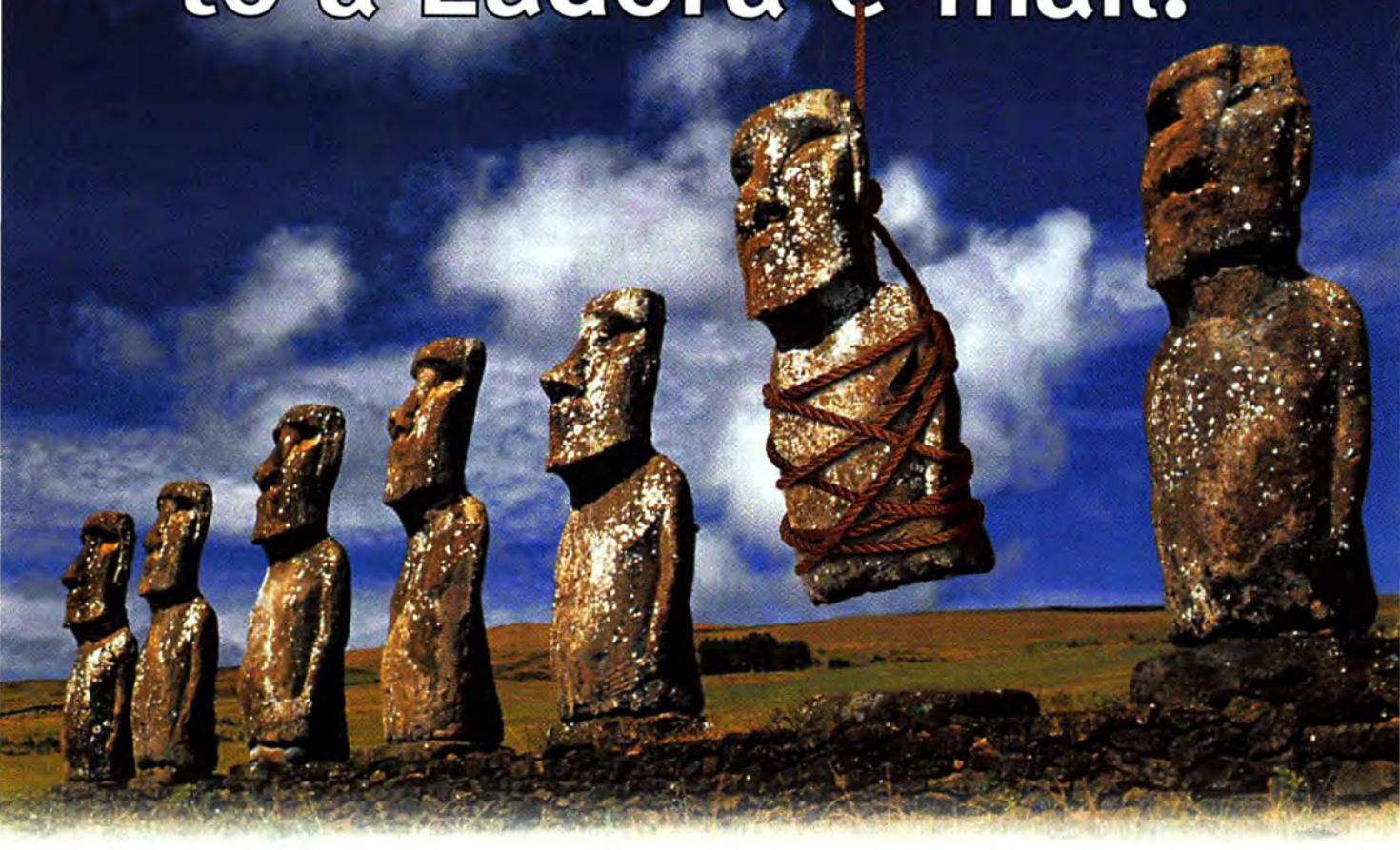

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Apple expects the MessagePad 2000 to ship by March 1997 for less than $1000. One of the available configurations will include an optional keyboard.

The eMate 300

By the time the kids are headed off to college, mom and dad might consider springing for a laptop, but what parents (or teachers) in their right mind are going to hand a $3000 portable computer to a seventh-grader on a field trip, and what school budget could handle a purchase order for even 5 laptops, let alone the 25 it would take to equip an average-size classroom? Apple is hoping that the Newton-based eMate 300, with an expected price of around $800, will let schools put powerful portable computers in the hands of students.

Kid-Friendly Design Despite its Newtonian soul, the eMate 300 has a clamshell design with a keyboard on the lower half and a display on the upper, like a traditional laptop. PowerBook veterans can rest easy, though—Apple's Information Appliance division uses a different source for its keyboards than the one that produced the delicate, defect-prone keyboards that are standard equipment on PowerBooks.

The hands of children might be the hands of the future, but they can also be the hands of destruction. Apple built the eMate 300 with an abusive environment in mind, with steel-reinforced innards, a shock-mounted display, and an ABS-plastic housing with rounded corners. The eMate 300 is designed to appeal to kids, not just survive them; your first thought when you see the eMate 300 will probably be, "Batman is back," followed quickly by, "Cool. Let me play with it."

Heart of a Newton Underneath that protective shell is a true-blue Newton-based system, running on a 25MHz ARM 710a chip, which Apple says should be two to three times faster than the MessagePad 130.

The standard memory configuration is 1MB of volatile system RAM and 2MB of flash RAM. Like the MessagePad 2000, the eMate 300 has a 16-shade gray-scale and half-VGA-resolution screen (480 by 320 pixels), but it comes in at 72 dots per inch instead of 100 dpi.

To connect it to the outside world, the eMate 300 has both a Newton InterConnect port and a standard serial port (mounted together under a nifty sliding door that prevents access to one while the other is in use). There is also the ubiquitous IrDA-compliant infrared transceiver, as well as a PC Card slot that will accept either one Type II or one Type III card.

Different Software The eMate 300 shares its operating system with the MessagePad 2000 but comes with a slightly different set of included applications, the better to serve its young audience. Users will find the same word processor, EnRoute E-mail client, and NetHopper, but the eMate 300 also comes with an object-oriented drawing program and a graphing calculator.

The Bottom Line With its latest Newton offerings, Apple is still showing a marked penchant for high-function, premium-priced devices. But while the MessagePad 2000 is simply a next-generation technology tweak, the eMate 300 is a dramatic design departure—an attempt to create a new niche. Perhaps Apple's bold moves will inspire other developers to take the Newton architecture into uncharted territory.

storage

Is the Floppy Drive about to Retire?

130MB CONTENDER READS AND WRITES TO FLOPPIES

by Cary Lu

Despite its low capacity and sluggish performance, the floppy disk drive has persisted because it is cheap and ubiquitous. Iomega's 100MB Zip drive can't replace the floppy because it can't read floppy disks. The LS-120 floppy drive jointly developed by Matsushita, 3M, and Compaq does read and write to standard floppies as well as to its own 120MB disks, but its laser-guided mechanism is expensive to build, especially in a thin package.

New Contender But now there's a new (yet to be named) floppy drive being developed by Swan Instruments and Mitsumi that uses high-density 130MB disks—and it looks to be a better prospect than either the Zip or the LS-120 for replacing the floppy drive. Not only does it read and write to standard floppies, but it also has a simpler mechanism than the LS-120—and it can be made easily in a size thin enough to fit inside a laptop. Swan says that the drive will transfer data from a 130MB disk six times faster than a floppy drive, and that it will initially cost $80 to OEMs in large quantities—not much less than a Zip drive except that it saves money and space by replacing the $20 floppy disk drive.

Dual Connections Like the LS-120, the Swan-Mitsumi drive can connect as a pure SCSI device or as a dual floppy-and-SCSI device; in the latter mode, it behaves exactly like a floppy drive, becoming the highest-priority start-up device. It would need a modified controller to read and write the old 800K Mac floppy, a format that could well be abandoned if the new drive catches on. The Swan-Mitsumi drive will not be in mass production until well into 1997, so no computer company has announced adoption of the new drive yet.

online

Jazzy Fusion Rocks Web

NETOBJECTS SITE-DESIGN WUNDERKIND COMING TO MAC

by Cameron Crotty

Web-page design tools are a dime a dozen, but NetObjects (415/482-3200, *http://www.netobjects.com*) hopes that its Fusion Web-*site* design tool will be one in a million. The company has just posted the first beta release of the Mac version, and expects to ship the final product by the end of this year.

Fusion was built from the ground up as a complete Web-site creation tool, and attempts to address many of the problems that plague online designers, from managing multiple-page, cross-linked sites, to creating and maintaining site-wide visual themes, to executing pixel-precise page layouts.

continues

PETER HOEY

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Circle 65 on reader service card

A Modem for Bandai's @World

MOTOROLA MODEM TO BE BUNDLED WITH SET-TOP

The long-awaited Pippin @World Internet appliance, from Bandai Digital Entertainment (310/404-1600, *http://www.bdec.com*), has many interesting features, but until recently it lacked one key component: a modem. That problem's been solved with Bandai's announcement that it will bundle an external 28.8-Kbps modem from Motorola with the $600 set-top device. Sporting a 66MHz PowerPC 603 CPU and an operating system based on the Mac OS, the @World turns your TV into a combination Internet surfer and CD-ROM player. Available in Japan since March, it is scheduled for U.S. shipment in November 1996 (pushed back from September) along with a Web browser and bundled CD-ROM titles. The system includes a keyboard and controller. —STEPHEN BEALE

GIBSON

Instead of diving right into page layout, Fusion encourages designers to think about the overall shape of a site. The software graphically displays a site in a hierarchical flowchart style, and designers can change the hierarchy by simply dragging and dropping pages while Fusion automatically updates the page links.

Building a Theme Without help, maintaining a single visual theme throughout a complex site can be a tedious exercise, requiring that a designer manually keep track of art elements to make sure changes are replicated across the entire site.

NetObjects built Fusion on a database that manages page elements as central, shared assets. Need to change your corporate logo from green to red? Just make the change once in the database, and the entire site changes. However, Fusion cannot manage text blocks as objects, a major drawback that NetObjects acknowledges; but it will not commit to a timetable for fixing the problem.

For most of the Web's life, page designers have lived with the nightmarish possibility that even moderately complex pages stood a good chance of crumbling into incomprehensibility due to different browsers' interpretations of HTML tags. With Fusion, NetObjects has taken advantage of the solidification and wide adoption of the Tables specification. Since all Fusion pages are built on tables, designers can place objects wherever they desire, instead of being constrained by primitive spacing tools such as carriage returns. Placing multimedia objects like movies or Java applets is as simple as placing still images, and Fusion comes with a number of basic Java scripts and CGIs.

Saving Labor Fusion is crammed with features created to ease a site designer's workload. For instance, the software will automatically publish a text-only version of a site, and will actually handle the complete publishing process over FTP.

The package comes with numerous entire-site templates and even more numerous site styles, complete with navigational tool bars and buttons that designers can use to jumpstart their own work.

Minor Flaws Again, Fusion is not infallible: the software does not support the visual creation of pages with Frames, an HTML tag that is growing in popularity. Also, Fusion can only import preexisting sites page by page, making it difficult to shift existing projects to the new environment.

Fusion will retail for $695, and NetObjects expects to ship the final version by early December.

printing

Tek Enters Wide-Format Printer Market

PHASER 600 TAKES ON HP AND ENCAD

by Stephen Beale

Until recently, the market for wide-format ink-jet printers was dominated by two companies, Hewlett-Packard and Encad, with CalComp bringing up the rear. But now the market has gotten a bit, well, wider, thanks to the introduction of the Phaser 600 from Tektronix (503/685-3150, *http://www.tek.com/Color_Printers*). Coming on the heels of September's Seybold San Francisco show, where wide-format printers were seemingly at every other booth, the Phaser 600 sends a strong signal that these systems could soon become as common as color copiers in offices, service bureaus, and quick-print shops.

The Phaser 600, developed in conjunction with Mutoh, uses the same solid-ink technology found in the company's Phaser 300x and Phaser 350 desktop printers. Unlike those printers, the 600 produces output on roll-fed paper up to 36 inches wide in addition to cut sheets. Despite its name, its resolution is 300 dpi in both standard and enhanced print modes. In enhanced mode, the print head passes over the paper twice, but the number of dots per inch remains the same.

The solid ink, loaded in the form of crayonlike ColorStix, has several advantages over the liquid inks used in other wide-format printers. It solidifies immediately after hitting the page, permitting use with a wider range of paper stocks and eliminating dot gain (the tendency for ink to spread when it hits paper). It also provides more consistency when you're printing images on different surfaces.

Tektronix claims that the solid-ink technology is faster than liquid-ink engines, producing a 34-by-44-inch print in less than 12 minutes in standard mode, about half the time required by other ink-jet devices. Moreover, ink sticks can be added during a print run.

Perhaps the most noteworthy aspect of the printer is its use of an integrated PostScript Level 2 controller. Until now, most large-format systems have been configured in much the same way as an imagesetter, with the raster image processor (RIP) housed in a workstation separate from the print engine. While it's certainly much bigger than a desktop ink-jet printer, the

continues

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Tektronix

Phaser 140 Phaser 240 Phaser 350 Phaser 440 Phaser 550 Phaser 480X Phaser 300X

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Circle 143 on reader service card

Phaser 600 is configured like an output device you'd find in an office environment as opposed to the kind found in a service bureau. This should raise the comfort level for corporate users, even if the price—about $12,000—is comparable to what you might pay for a printer-RIP combination.

online

VRML to Become a Mac Reality

APPLE MOVES TO UPGRADE VR EFFORTS

by Jim Heid

The Mac has a large following of Web developers and Web surfers, but it's a mere bit player in the most futuristic areas of the Web: virtual worlds built with the Virtual Reality Modeling Language (VRML). Few VRML browsers or plug-ins are available for the Mac, and except for Netscape Communications' Live3D plug-in for Navigator 3.0, all of them are in beta or are otherwise limited (see the feature "Face-to-Face Online," in this issue).

And in the hottest VRML neighborhoods—VRML chat worlds that enable you to assume an on-screen character, an avatar, and talk with others—the Mac is locked out entirely: no VRML chat products are available, and while some developers say they plan Mac versions, none have announced availability dates.

This second-class standing is a painful blow to a computer renowned for its graphics, multimedia, and 3-D talents. Fortunately, several Apple technologies and initiatives should help shore up the Mac's status over time.

QuickDraw 3D With its fast interactive rendering and support for hardware acceleration, Apple's PowerPC-based 3-D graphics technology is an ideal foundation on which to build VRML browsers and plug-ins. Some VRML plug-ins currently use QuickDraw 3D, but the biggest shot in the arm would come if Netscape adopted it—and not only on the Macintosh, but on Windows, too. Sources say Apple and Netscape are talking about exactly that.

VRML Binary File Format Currently, VRML worlds are stored and downloaded as text-only files—which contributes greatly to their plump size and lengthy download times. Apple, ParaGraph, and IBM have collaborated on a binary file-format specification that provides for dramatically smaller files. The specification is currently being evaluated for adoption by the VRML Architecture Group. (For details, see *http://www.quickdraw3d.apple.com*.)

QuickTime VR Apple's photographic virtual reality technology is already a big hit on the Web (see *Media*, in this issue). QuickTime VR 2.0, due in January 1997, will enable VR developers to create URL hot spots: you click on one to jump to a Web page, switch to a different movie, or play a sound. In addition, Apple engineers are exploring ways to marry QuickTime VR and QuickDraw 3D to enable full-screen, hardware-accelerated playback of QuickTime VR panoramas.

QuickTime Conferencing Combined with QuickDraw 3D and VRML, Apple's videoconferencing technology has the potential to literally change the face of VRML chat by enabling VRML chatters to map real-time images of their faces onto their avatars.

Internet WATCH

BY CAMERON CROTTY

Privacy Issues Stir Online Passions

Many Internet citizens are yelling about high-profile attacks on personal privacy, such as the well publicized P-Trak database from Lexis-Nexis, which included individuals' Social Security numbers and maiden names. But even though Lexis-Nexis has removed the most sensitive information from P-Trak, it remains far too easy to collect, collate, and disseminate personal data online.

AOL in the Spotlight America Online is near the center of this war; it began banning messages from E-mail marketeers identified as spamming AOL members. One banned company, Cyberpromotions, initiated legal action to remove the barriers. Beginning in late October, AOL introduced its Marketing Preferences service, which allows members to block E-mail from alleged spam sites in addition to AOL's own pop-up marketing pitches.

But the biggest firestorm was ignited by a recent incarnation of P-Trak, which included names, addresses, and telephone numbers of consumers, along with more sensitive information that could be used to perpetrate credit fraud. Although this information is also available from public sources, the outcry forced Lexis-Nexis to remove the most controversial elements of the database.

While these privacy invasions have received much attention, many consumers often naively expose personal information, and some companies are taking advantage of simple ignorance. The most common example of this is when a consumer is asked to fill out a form in exchange for membership at a particular site. While most folks are savvy enough not to send a credit card number blindly, many will give away other personal information.

There is hope for a solution short of federal regulation. Many companies doing business online have begun disclosing what information they collect from consumers, promising not to share that data with third parties.

Building eTrust Further, in October, the Electronic Frontier Foundation (*http://www.eff.org*) and CommerceNet (*http://www.commerce.net*) joined to form eTrust (*http://www.etrust.org*), a project dedicated to establishing consumer trust in electronic transactions. eTrust's first initiative is to develop an auditing and accreditation program for companies that conduct business online. Companies that adhere to certain standards of privacy and security with respect to consumer data will be able to display the eTrust logo on their Web pages.

PETER HOEY

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Circle 201 on reader service card

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Figure out what you'll back up to—removable cartridges or a dedicated backup drive. For lots of files, you want a device with the capacity for unattended operation—say DAT, DLT, or an autoloader.

3. *How to back up if you're a small company.*

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The answer is Retrospect Remote®, our network backup product. Use a set schedule or the more flexible Backup Server™ which automatically backs up Macs with the oldest backup first—ideal for PowerBooks that appear and disappear off the network. The bottom line: Retrospect Remote covers your network like a blanket.

5. *How to laugh in the face of danger.*

We're not suggesting standing on the top of the building during a lightning storm. But when disaster strikes, Retrospect can restore whatever you're missing—files from your latest backup, older files, or the entire hard drive.

Take the next step. There has to be a reason why more people rely on Retrospect than all the rest combined. Why it consistently earns the top scores, the best reviews. We have the answers. Call us at 800-982-9981 for our *Understanding Backup* white paper. It would be a disaster not to.

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Circle 26 on reader service card

New Products

THE LATEST MACINTOSH RELEASES

BUSINESS

Procrastinators: Get Organized

Seeking a cure for procrastination? Claris (408/987-7000, *http://www.claris.com*) has shipped Claris Organizer 2.0, a Net-aware version of its personal information manager. Now you can send E-mail and address letters using Organizer's AppleScript-based E-mail and Web links. Organizer automatically pastes URLs and E-mail addresses from its contact cards into the Web browser; a Letter Link function can launch ClarisWorks or MacWrite Pro for linking a letter to the contact card. Claris Organizer 2.0 sells for $69; upgrades cost $49.

COMMUNICATIONS

A Faster Modem

For those of us who need higher modem speeds (and who doesn't?), Global Village (408/523-1000, *http://www.globalvillage.com*) is now shipping the $169 TelePort 33.6 Internet Edition, which provides 33.6-Kbps data speed and 14.4-Kbps fax speed. The TelePort 33.6 ships with Netcom's Internet access software and adds a Setup Helper to simplify fax-software configuration.

DISPLAY

Clearer Viewing Ahead

Make your presentations stand out with one of Polaroid's (716/256-4436, *http://www.polaroid.com*) new desktop projectors. Available now is the $10,900 Polaview 220 SVGA, which features resolution of 800 by 600 pixels and Digital Light Processing with Super Video Graphics Array (SVGA) for brighter, sharper images. The Polaview 305 LCD Projector, due in mid-December 1996, provides 24-bit color at 1024 by 768 pixels with Extended Graphics Array (XGA) support. The $16,995 Polaview 305 offers an optional Adobe Acrobat Player System ($2495), which eliminates the need for a computer connection.

Polaview 220

GRAPHICS

Textures for Photoshop

The latest Photoshop plug-in package from Andromeda Software (805/379-4109, *http://www.andromeda.com*) is Series 4 Techtures, consisting of 900 hand-rendered color and black-and-white textures whose highlights, shadows, and orientation are user-controllable. You can apply a texture in various ways to produce tiled, embossed, refractive, geometric, and other effects. Series 4 also includes Velociraptor, which lets you create motion trails such as arc, bounce, cascade, converge, decline, fade, jolt, jitter, loop, and spiral.

Shooting for the Low End

Agfa (508/658-5600, *http://www.agfa.com*) has entered the low-end digital camera market with the ePhoto 307, which captures images at either 640 by 480 pixels or 320 by 240, storing 36 high-resolution or 72 regular-resolution pictures in its 2MB flash memory. The ePhoto 307 comes with built-in flash, self-timer, four AA alkaline batteries, and a serial cable to connect to a Mac. The $599 list price includes Adobe PhotoDeluxe and Agfa PhotoWise.

Millions of Photos Online

Index Stock Photography (212/929-4644, *http://www.indexstock.com*) has introduced the Telefocus Image Browser, a password-protected proprietary software system that permits direct access to its digital library of more than 1 million images. New photos are uploaded daily. The Telefocus Image Browser lets you view, sort, group, and rearrange images on the page. Other features include photo protection, copyright control, and access control.

Giving QuickDraw 3D a Boost

Newer Technology (316/943-0222, *http://www.newertech.com*) has introduced two QuickDraw 3D accelerators for PCI machines. Both offer full hardware texture mapping, hardware Gouraud shading, antialiasing, and Z buffering. The $2195 PCI/500 RenderPix card provides 2-D and 3-D acceleration of 832-by-624-pixel double-buffered images. With memory upgrades, the board can draw images with resolutions of up to 1600 by 1200 pixels. The $3645 PCI/502 doubles the triangle processing speed of the PCI/500.

Image Collections

Here are three new image collections, two featuring 3-D art.

- The latest LifeArt collection from TechPool Studios (216/382-1234, *http://www.lifeart.com*) is 3D Super Anatomy, a $229 CD of more than 120 three-dimensional medical images in TIFF format.
- RubberBall Productions (801/224-6886, *http://www.rubberball.com*) has added another volume to its Faces collection. Volume 2: Characters & Occupations consists of 100, 300-dpi images with clipping paths. Retail price is $249 each volume, or $449 for both.
- Cause & Effect Productions (619/578-8332, *http://www.3dpix.com*) has released 3D Pix, a $149 CD-ROM of more than 120 fully rendered 3-D objects in a variety of categories, including business, sports, science, and everyday items. Each TIFF-format image has built-in alpha channels and comes in 72-dpi, 150-dpi, and 300-dpi resolutions.

Faces, Volume 2

MULTIMEDIA

Authoring Gets Easier

Pitango (617/275-5150, *http://www.scitex.com/pitango*), a division of Scitex, has released ClickWorks, a multimedia authoring application that lets nonprogrammers quickly create multimedia projects that can be integrated into a Web site. ClickWorks' introductory price is $985, $400 off the regular price.

NETWORKING

Ethernet on a Shoestring

Small-scale operations that couldn't afford Ethernet connections now have an option. Farallon (510/814-5100, *http://www.farallon.com*) has a new line of compact and inexpensive EtherMac cards designed to bring Ethernet to schools, small businesses, and workgroups. Small enough to fit in Performa 5400 and 6400 LC models, the cards are currently available in 10BaseT ($70) and 10BaseT/thinnet ($84) configurations. In December 1996 Farallon will release EtherWave PCI cards that can be daisy-chained to create 10BaseT networks with or without hubs. The EtherWave cards will cost $109 each, or $495 in five-packs.

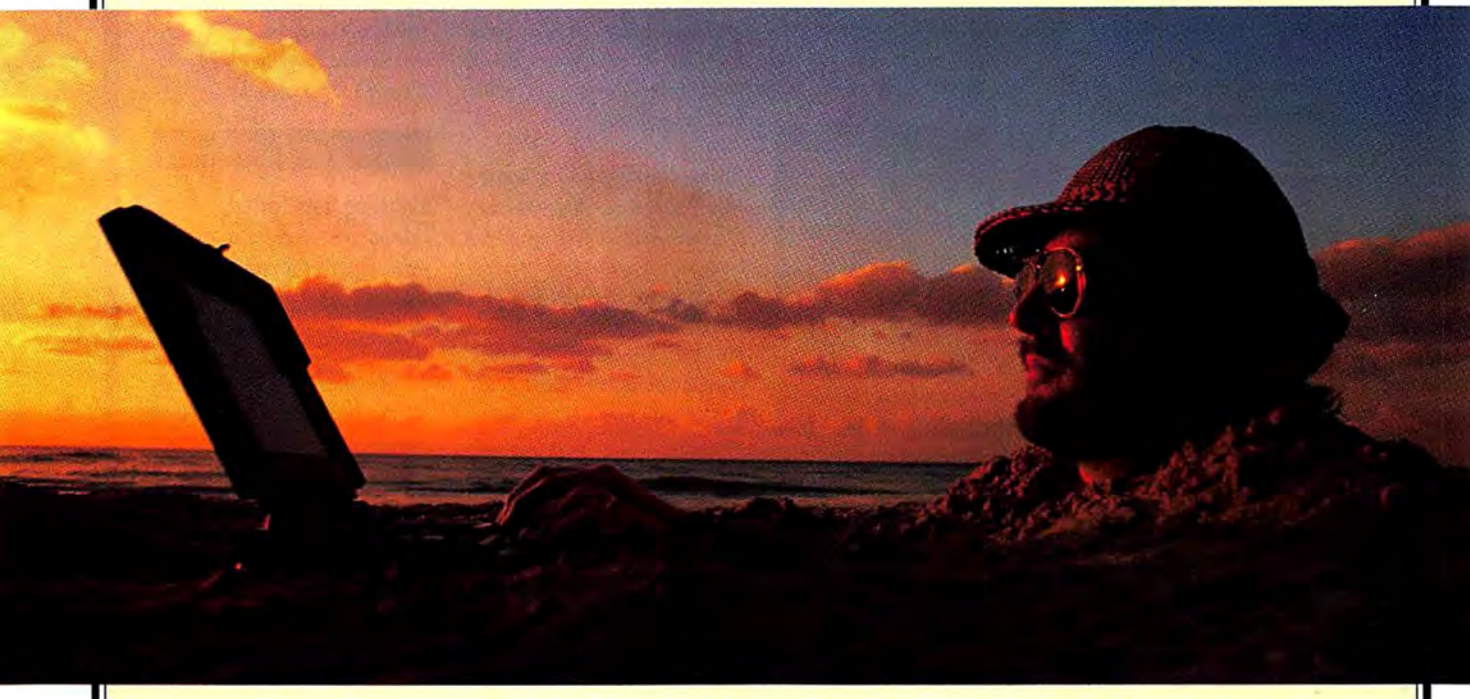
ONLINE

Easy Web Authoring

A mere eight weeks after shipping Claris Home Page 1.0, Claris announced version 2.0 of its $99 WYSI-

continues

IF YOU CAN CLICK A MOUSE, YOU CAN CREATE A WEB PAGE.



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It's sunset in Fiji. While sitting on the beach, you were unexpectedly buried up to your neck by an overachieving three-year-old. Can you still create a stunning web page? Yes. Even if you don't know HTML? Yes again. How? With Claris Home Page™ software, the web authoring tool that doesn't care whether or not you know HTML. With our easy-to-use interface you can start creating pages with text and pictures right away, and add *Tables* with the click of a button. Save and reuse text, graphics, and other objects with *Libraries*. Use *Drag-and-Drop* for quick creation of links and forms. And once you've created them, Claris Home Page will even upload your pages to a server, and post your site for up to six months free of charge.* For the more experienced web publisher, Claris Home Page offers sophisticated features like frames, forms, HTML editing, and support for Java applets, JavaScript, QuickTime® movies, Shockwave, and more. For more information or a free trial version of the software, visit www.claris.com/chp/mw. To order, call 1-800-392-9877 ext. 1385, or visit the Claris reseller nearest you. For a ticket to Fiji, see your travel agent. †And as they say in the islands, *vinaka vakalevu, sa moce.*

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*Claris Home Page includes a coupon from HoloNet™ redeemable for up to six (6) months of free web hosting services. The web hosting service is subject to HoloWWW™ terms and conditions. Offer expires June 30, 1997. Site publishing and multimedia plug-in support are new features of Claris Home Page 2.0, which is a free, downloadable upgrade to registered owners of Claris Home Page 1.0.
† Translation of vinaka vakalevu, sa moce: thank you very much, good bye.

New Products

WYG Web authoring software. A free upgrade for owners of 1.0, it's due to ship in December 1996. Home Page 2.0 will let you preview background GIF images, create tables by dragging and dropping tab-delimited text from spreadsheet and database files, and resize or reposition frames by dragging. There's also support for QuickTime, Shockwave, and other multimedia browser plug-ins. Other features include a spelling checker, support for multiple fonts, and the ability to build client-side image maps.

PRINTING

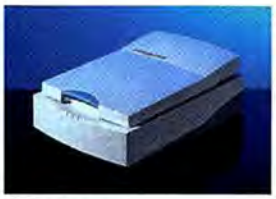
Improved Color Output

Apple Computer (408/996-1010, *http://www.apple.com*) has introduced enhancements to its color printing products. The Color LaserWriter 12/660 PS, an upgrade to the Color LaserWriter 12/600, prints 30 percent faster than its predecessor and comes with 16MB of RAM. The $6000 price includes free setup and installation. The $60 Color PhotoGrade Print Kit improves the print quality of photographic images on Apple's Color StyleWriter 2500 ink-jet printer. The package includes a new ink cartridge, 60 sheets of PhotoGrade paper, and an updated print driver.

PUBLISHING

Scanners Low and High

Whether your scanning needs are at the entry or professional level, Linotype-Hell (516/434-2000, *http://www.linocolor.com*) has a model for you. The $895 LinoColor Jade is a one-pass 600-dpi scanner that can accommodate 8.5-by-11.7-inch prints and 8.5-by-10-inch transparencies. A transparency option costs less than $400. Retailing for $5495, the 1000-dpi LinoColor Saphir Ultra scans reflective art up to 8.4 by 11.7 inches and transparencies up to 8.3 by 10 inches.



LinoColor Jade

Extending QuarkXPress

Further enhancing QuarkXPress's features are these XTensions.

• CyberPress ($150), from Extensis (503/274-2020, *http://www.extensis.com*), turns QuarkXPress 3.31 and later versions into a Web publishing tool. It lets you export all or part of a QuarkXPress document in HTML format. It is bundled with Adobe's PageMill 2.0.

• Imposer is a $129 QuarkXTension from A Lowly Apprentice Production (available from The World-Wide Power Company, 303/940-0600, *http://www.ThePowerCo.com*). The program creates printer's spreads from a QuarkXPress document while it's printing, eliminating EPS-conversion errors. It also supports crossover trapping, on-screen previews at a user-definable size, and the placement of custom printer's marks (when used with the company's Markit XTension).

STORAGE

Ultra SCSI Drives

APS (816/483-6100, *http://www.apstech.com*) has added three hard drives to its lineup: the $349 APS Q 1280, the $449 Q 2100, and the $599 Q 3200—all using Quantum's Ultra SCSI mechanisms. Internal versions are priced at $100 less than the external models.

Easy Image Management

NSM Jukebox (630/860-5100, *http://www.nsmjukebox.com*) is shipping Macready, a complete jukebox, server, and image-data-

continues

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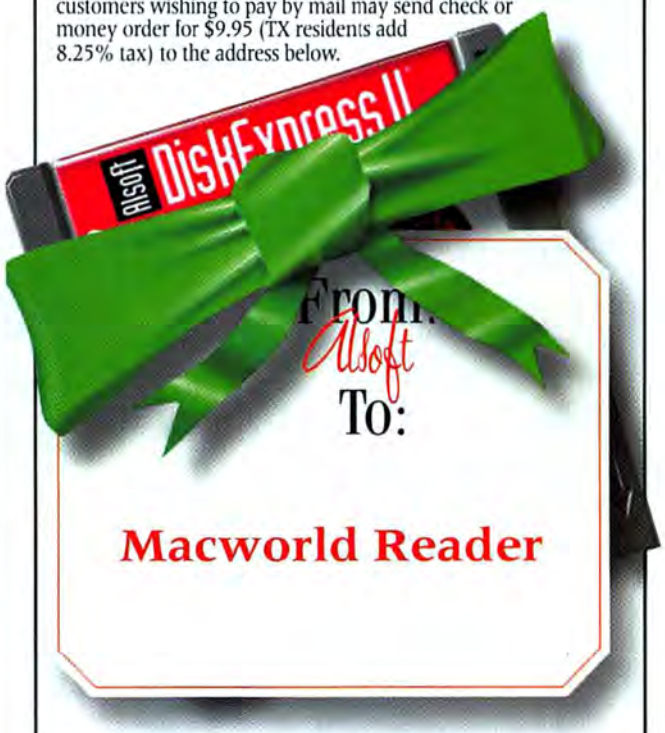

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Circle 6 on reader service card

New Products

base–management system that connects to an Apple file server and lets you access and manage files, images, fonts, and programs from any Mac on the network. With nearly 100GB data capacity, the Mercury Jukebox holds 150 CDs in 3 quick-change compact magazines of 50 CDs each. Prices start at $8995.

Macready Jukebox

Speedy Optical Drives

StreamLogic (415/325-4392, *http://www.streamlogic.com*) is shipping two new high-performance optical drives and a CD recorder under its newly acquired FWB Hammer brand. The $2529 HammerDisk2600 uses 2.6GB cartridges; has an average sustained data-transfer rate of 3 MBps, according to the company; and has a 4MB cache/buffer. The $819 HammerDisk PE640 uses 640MB media, transfers data at an average rate of 2.2 MBps, and has a 2MB cache/buffer. The $939 HammerCD-R 2×/4× can read data at 600 Kbps and write at 300 Kbps, with an average access time as low as 250ms.

SYSTEMS

Maxpowr Upgrades

Newer Technology (316/943-0222, *http://www.newertech.com*) has introduced its Maxpowr cards, 604e-processor upgrade cards that fit in the CPU slot of 7500, 7600, 8500, and 9500 Power Macs. They feature true 225MHz, 200MHz, and 180MHz 604e CPUs. The 180MHz card will cost $885, and the 200MHz card will be $1075. Pricing has not been set for the 225MHz card.

TITLES

Guide to Digital Printing

Everything you need to know about producing short-run, high-quality color print jobs is covered in *Digital Printing: A Guide to the New World of Graphic Communications*, Noel Jeffrey's 200-page book from Micro Publishing Press (310/212-5802), which walks readers through new digital printing technologies. Topics include preparing files for digital presses, computer-to-plate systems, and wide-format output. It retails for $27.95.

Legal Help Online

Why pay a lawyer $200 an hour when the information you need could be available free on the Web? Nolo Press (510/549-1976, *http://www.nolo.com*) has published *Law on the Net*, a $39.95 book with a CD-ROM that offers hot links to more than 2000 legal Web sites. Topics include intellectual property, privacy, credit, and health care.

UTILITIES/TOOLS

PC Reads Mac

Syncronys Softcorp (310/842-9014, *http://www.syncronys.com*) is shipping MacAccess2, a $29.95 utility that allows Windows 95, Windows 3.1, and DOS users to mount, read, write to, and format Macintosh floppy disks and other Mac removable media, such as Iomega Zip and Jaz drives.

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What you never thought possible.™

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Holiday Gift Guide

Origami: The Secret Life of Paper

RECYCLE WITH STYLE

Remember the Domino's Pizza commercial with the delivery guy who could make a pterodactyl out of a pizza box? Origami: The Secret Life of Paper (★★★★/7.9; $39.95 list price) from Casady & Greene (408/484-9228, *http://www.casadyg.com*) can't promise such miracles, but it *can* get anyone folding Japanese cranes, irises, and magic stars in no time. A winning combination of clear instructions is offered: text describes each folding step, a diagram illustrates the fold, and a video clip shows you how to do it. Twelve origami shapes are illustrated, and another couple are diagrammed with the included pack of paper. When you run out of the paper provided, you can use the printing template to color and print your own origami pages, or go whole hog and learn how to make your own paper out of junk mail.—S.C.

Origami: The Secret Life of Paper

Digital Lab

BUILD ELECTRONIC STUFF

If your kids tear apart your computer to see how it works, give them Digital Lab (★★★★/7.8; $44.99 list price) from Philips Media (303/739-4131, *http://www.philipsmedia.com*) instead. A digital version of the company's analog Fun With Electronics (*Reviews*, May 1996), Digital Lab combines a 1-foot-square cardboard workbench, electronic components, and a CD-ROM to lead you through hands-on projects demonstrating how digital electronics works. Clear animated instructions make building the 20 projects easier. The one drawback? It took me 70 thumb-blistering minutes to assemble the workbench. If you've got the callouses for it, Digital Lab makes a good choice for budding wire-heads.—J.F.

Gryphon Bricks

LEGO LOVERS' LANDMARK

If you liked playing with Lego building blocks as a kid, you can relive the fun of your youth with Bricks (★★★/6.9; $30 street price) from Gryphon (619/536-8815, *http://www.gryphonsw.com*). As you'd expect, you're offered more than 300 shapes ranging from basic bricks to windows, but unlike the plastic blocks of yore, Bricks gives you a choice of 12 brick colors. You can print out your creations as an image, step-by-step building instructions, or a parts list—perfect for mocking up real-life Lego models without all the tricky trial and error. You'll have to temper your desire to make multithousand-brick creations (the larger your construction, the slower Bricks responds), but if you are a Lego fan, this CD is a must-have.—J.S.

Williams-Sonoma Guide to Good Cooking

COOKBOOK DELUXE

Anything designed to make domestic life easier usually makes an unwelcome gift, but Brøderbund's (415/382-4400, *http://www.broderbund.com*) latest offering may be an exception. A CD full of the tastiest recipes from Williams-Sonoma's cookbook series, the Williams-Sonoma Guide to Good Cooking (★★★★/7.8; $39.95 list price) offers recipes ranging from foolproof to challenging, low-fat to sinful. All are clear and easy to follow, and the accompanying color photos and descriptions will make your mouth water. Sluggish performance and the lack of a back button are frustrating, but the exceptional recipe finder, culinary glossary, and video clips put this CD-ROM cookbook a step above many others. This is one gift that won't gather dust alongside that unused crockpot.—L.C.

America Rock

NOT JUST A BILL

Anyone who spent time in front of the tube in the 1970s knows the tunes from *Schoolhouse Rock*—perhaps a bit too well. Capitalizing on the solid learning theories of the TV original is America Rock (★★★★/7.1; $39.95 list price) from Creative Wonders (800/543-9778, *http://www.cwonders.com*). (If you miss Conjunction Junction and pals, there's a Grammar Rock CD, too.) The entertaining core adventure—you help a bill become a law—is composed of smaller puzzles of geography, strategy, and critical thinking, all based on the familiar TV spots.—A.E.

KEVIN CANDLAND

MACWORLD'S STAFF SUGGESTS SOME SEASONAL SURPRISES FOR THE MAC LOVERS ON YOUR LIST

Sundial: The Original Timelapse Desktop

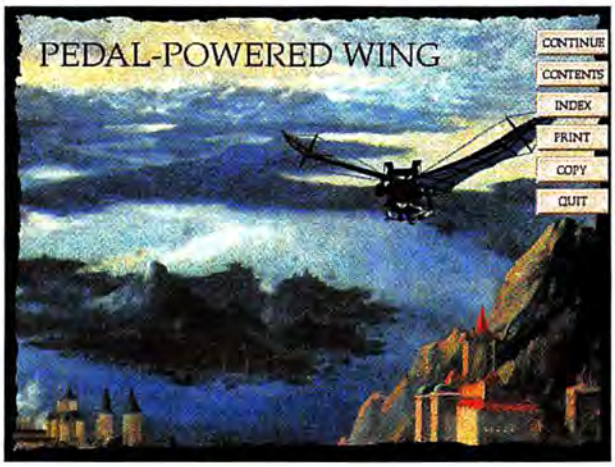
HELP FOR THE SCENICALLY CHALLENGED

The only way I see the great outdoors on beautiful weekdays is by leaning *way* back in my chair and craning my neck to take a peek out the window at the ships on San Francisco Bay. Fortunately there's Sundial: The Original Timelapse Desktop (★★★★/7.0; $24.95 list price) from John Neil & Associates (415/905-3000, *http://www.jna.com*), a CD full of some of California's most gorgeous scenery. Instead of a gallery of snapshots, Sundial employs QuickTime movies and a control panel that syncs the scenery to your Date & Time control panel—your view of Mount Whitney goes from early morning through the day and on into the evening in an ever-changing vista. Load a picture as your background, sit back, and take in the view.—S.C.

Leonardo the Inventor 2.0

THE ORIGINAL RENAISSANCE MAN

Leonardo da Vinci was much more than the man who made the *Mona Lisa* smile. He was an engineer, musician, artist, and inventor, whose journals are brought to life in Leonardo the Inventor 2.0 (★★★★/7.7; $29.95 list price) from SoftKey (617/494-1200, *http://www.softkey.com*). Leonardo the Inventor incorporates da Vinci's biography, 3-D representations of his inventions, a contextual timeline, and even a couple of games. Both the opening screen and hyperlinks in the text make for easy navigation, and video clips show how da Vinci's ideas, like the parachute and the helicopter, have evolved into present-day devices.—H.B.



Leonardo the Inventor 2.0

Chess Mates

Chess Mates

ANTIC ANIMATED INSTRUCTION

There are 64 squares on the board, but Wigby, the brains behind Chess Mates (★★★★/7.2; $34.95 list price) from BrainStorm (888/427-2467, *http://www.brainstormfun.com*), isn't one of them. This wisecracking wizard gives fledgling chess nerds clear explanations of how to set up the board and move the pieces, and although the wiz makes one surprising gaffe in terminology—mixing up *rank* and *file*—he gets it right in subsequent references. Wigby's always got a hint for unsure players, and even rank beginners have a chance to triumph on lower levels. Older or more experienced players may find Chess Mates insufficiently challenging, however, and Wigby takes forever to move at higher levels. But for a real ego booster—at any age—you can't beat the look of surprise on the opposing king's face as the blaring trumpets announce checkmate.—K.U.

Where in the World is Carmen Sandiego?

A CLASSIC REVISED

My family keeps a dictionary in our car, so you might guess our pleasure when we opened the box for Where in the World is Carmen Sandiego 3.0 (★★★★/7.8; $39.95 list price) and found a 1996 *World Almanac and Book of Facts* inside. This latest incarnation of the classic detective adventure game from Brøderbund (415/382-4400, *http://www.broderbund.com*) offers the same goofy, crime-solving fun as the previous versions, with more video clips, more animated characters, and new countries to explore (there's a new U.S. version, too).—S.C.

continues

Green Eggs and Ham

Green Eggs and Ham

A DELICIOUS FAMILY TREAT

In a house, with a mouse, in a box, with a fox, wherever you are—as long as you have a computer with a CD-ROM drive available—you'll like Green Eggs and Ham (★★★★/7.2; $29.95 list price), a new addition to the library of animated children's books from Living Books (415/352-5200, *http://www.livingbooks.com*). This charming, lighthearted adaptation of the classic work by Dr. Seuss brings music, animation, new dialogue, and three mini-games to the story of the reluctant grouch confronted with the ever-so-pushy Sam-I-Am. As an added pleasure, other Seuss visitors, including the Cat in the Hat and a star-bellied Sneetch, wander through the pages. Although the CD is less inspired than the original book, it's sheer delight to watch *Green Eggs and Ham* come to life.—W.S.

Blizzard's Holiday Jamboree

WILD WESTERN HOLIDAZE

Though Brøderbund (415/382-4400, *http://www.broderbund.com*) bills Blizzard's Holiday Jamboree (★★★/6.5; $19.95 list price) as an activity package for kids ages three and up, you'd be hard-pressed to find many preschoolers who appreciate Elvis references or enjoy dressing Santa in drag, and the elf-proxy snowball-fight game is a bit too tricky for most kids' budding dexterity—even our grown-up testers took a couple of games to get the hang of frosty clobbering. Still, adults and youngsters alike chuckle at the Caroling Cafe, a jukebox-like contraption that transforms holiday standards into wacky musical styles, including surf, lounge, and mariachi. Families with a color printer can craft their own greeting cards, although the stationery interface is a bit clunky. If you're looking for a silly way to spend the holidays, Blizzard is cool.—A.E.

3M Precise Mousing Surface

NO MICKEY-MOUSE PAD

Who'd have thought that a sheet of plastic would contend for stocking stuffer of the year? I didn't know how pleasant and responsive my mouse could be until I started using the 3M Precise Mousing Surface (★★★★/8.9; $15 list price) from those clever folks at 3M (612/733-1110, *http://www.3m.com*). With 3M's pad my cursor moves crisply where I want it to move. This pad's secret lies in its patented technology (really!). Like a subdivision for microscopic pharaohs, the pad's surface is covered with rows of tiny pyramids that provide enough friction for your mouse ball to grip, but not so much that it bogs down. Throw out those neoprene freebies and enjoy.—J.F.

Corel All-Movie Guide 2

FILM BUFF IN A BOX

If you frustrate your neighborhood video-store clerks by making them guess the name of "that film with what's-his-face in it," then it's time to get the All-Movie Guide 2 (★★★/6.1; $25.95 list price) from Corel (613/728-8200, *http://www.corel.com*). Over 100,000 movies and 35,000 movie-industry bigwigs are included on this CD-ROM, along with pictures, credits, bios, and plot summaries. A too-slow profile function makes film recommendations based on your ratings of other movies, or you can browse by any combination of genre, period, and rating from a clever video-store interface, or by using hyperlinks in each film's record. Anyone who frequently rents films will thank you for this gift.—K.M.

Macworld's gift guide elves are: Howard Baldwin, Linda Comer, Suzanne Courteau, Anita Epler, Jim Feeley, Keith Mitchell, Jeff Sacilotto, Wendy Sharp, and Katherine Ulrich.

Corel All-Movie Guide 2

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MW EDITORS' CHOICE

MacUser

Reviews

PowerBook 1400/117

WELL-DESIGNED NOTEBOOK LACKS TRUE INNOVATION

KEVIN CANDLAND

JUDGING BY USER-GROUP CHATTER and online forums, Mac laptop fans' sentiments run along two lines: "How come Windows laptops have CD-ROM drives, and PowerBooks don't?" and "Forget the fancy features: just give us one rock-solid, reliable, glitch-free PowerBook."

Apple, it seems, was listening. The PowerBook 1400 series' new optional 6× CD-ROM means that, for the first time, you can listen to Mozart through headphones as you crunch numbers at 39,000 feet—or install Microsoft Office without shuffling through dozens of floppy disks. The CD tray slides out of the front edge of the machine (with less oomph than a regular CD tray, however, out of consideration for your stomach). When the laptop's asleep, you can pop the entire CD-ROM drive neatly out of the PowerBook and slide the modular floppy drive into its place. (Apple says that third-party companies are developing Zip drives, hard drives, and magneto-optical drives for this socket.) This is no ordinary CD-ROM drive, either; it doesn't skip, even when playing digital movies and being banged hard with the heel of a reviewer's hand.

As for stability, this new model is a revelation. Examples of crispness and solidity refinements abound. The trackpad's clicker feels tighter and more controlled; the screen hinge's brake grips better than the 5300's when you change the lid's angle; and the new full-size keyboard is the best in years, offering a satisfying rigidity (thanks to a metal foundation) that eliminates the mushiness of previous models. Like other PowerBooks, this one automatically sleeps when you close the lid—but the detector is now magnetic, not mechanical, so you're less likely to walk off with a closed, but still running, laptop. After testing every variety of stability-stressing hardware and software (MIDI, external SCSI devices, RAM Doubler, Speed Doubler, screen savers, shareware doodads, and so on), I didn't uncover any 5300-style glitches.

The 1400's new case design is crisp, sleek, and attractive, lacking both the bulbous look of the 5300 and 190 and the boring boxiness of other laptops. Although the dimensions haven't changed, the new shape seems thinner than the preceding design—perhaps because its halves close tightly together, whereas the 5300's clamshell left some air around the edges.

The plastic panel that forms the top two-thirds of the exterior lid is removable; under the clear plastic replacement,

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Outstanding ★★★★★ = 9.0–10.0 Very Good ★★★★ = 7.0–8.9 Good ★★★ = 5.0–6.9 Flawed ★★ = 3.0–4.9 Unacceptable ★ = 0–2.9

you can insert a BookCover, a paper insert cut to fit the see-through area. Apple provides several colorful but goofball inserts. Fortunately, Apple also provides some more practical suggestions for this feature—displaying your travel itinerary, phone numbers, photos, or business cards behind the plastic. The real fun has yet to start, however: Keep It Simple Systems has announced a solar-panel BookCover to prolong the battery charge, and other companies are certain to jump in with leather, woodgrain, or stainless steel covers for the ultimate PowerBook customization.

Something Borrowed

Except for the CD-ROM drive, though, there are few new electronics in the 1400—and even the drive is no real innovation when compared with the PC notebook market. However, the 1400 does include many features that cost twice as much in older models. For example, from the 5300 series, the 1400 inherits two PC Card slots; 16-bit sound input and output; an infrared LocalTalk transceiver; and an enormous, brilliant, 800-by-600-pixel screen (a resolution about equivalent to that of a 17-inch CRT monitor). With this much area, activities such as Web browsing and page layout are actually practical on a PowerBook. This 16-bit-color-capable screen is available in a breathtaking active matrix model (the 1400c) and an improved passive matrix one (the 1400cs).

From the PowerBook 190 line, the 1400 line adopts a trackpad that responds to taps and double-taps just as a mouse button does. You can also perform a double-tap and drag to produce a drag lock—great for manipulating menus and dragging icons without having to keep your finger down. On the 1400, this feature finally comes into its own; the older, slower PowerBooks responded to trackpad taps with disconcerting sluggishness.

From the Duo line, the 1400 gets a back panel door that slides into the computer when open, solving the perennial breakage problem on older full-size PowerBooks. The back panel offers all the usual jacks—SCSI, keyboard/mouse, microphone, speaker—but no video-output jack. An internal slot accepts video-out upgrade cards as well as Ethernet cards. As with previous models, if you want to add an internal modem, you'll have to buy one in the form of a PC Card.

Like the Performa line, the 1400 series comes with preinstalled software (ClarisWorks, Claris Organizer, the superb Internet Connection Kit) and—a first for a PowerBook—a system software CD-ROM. (It's System 7.5.3; interestingly, System 7.5.5 doesn't run on a 1400.)

The Chips Are Down

Also inherited from the discontinued 5300ce, alas, is the 117MHz PowerPC 603e processor. Considering the breathless improvement in desktop-model PowerPC speeds (from 100MHz to 250MHz in a year), it's disappointing that the state of the laptop PowerPC art hasn't improved. Furthermore, Apple has once again hobbled its laptop's speed by omitting a cache, which could have boosted the 1400's speed.

Money and patience will help: Newer Technology has created a 200MHz PowerBook 1400 upgrade card with a cache, and in January Apple will release a more expensive ($4000) PowerBook 1400 with a 133MHz chip and cache—a model that's likely to earn high scores from buyers and *Macworld*.

The 1400 is no lighter than its predecessors; with the CD-ROM drive, it's still about seven pounds. The pessimist calls that heavy; the optimist calls it rugged. (If, like me, you've seen your PowerBook 5300 survive several falls from desk level unscathed, you're now a grateful optimist.) A peek inside the new PowerBook's flip-open keyboard—designed to make do-it-yourself upgrades easy—confirms that this laptop is built like a tank.

The Last Word

The PowerBook 1400 family represents no breakthrough in weight, size, battery life (it's the same old NiMH battery as in previous models), or speed. The rest, however, is a delight. This computer's case, screen, keyboard, CD-ROM drive, and trackpad are so well designed that you may forget you're using a laptop. This handsome machine is meant to be the low-end model of Apple's PowerBook line: prices begin at $2495, including 12MB of RAM, the floppy drive, that enormous color screen, and a 750MB hard drive. In other words, everyone—both potential 1400-model purchasers and those who'll wait for Apple's expensive, superpowered PowerBook family due this spring—has a lot to look forward to.—DAVID POGUE

PowerBook Series

POWERBOOK 1400C/117 ★★★/6.4

POWERBOOK 1400CS/117 ★★★/6.4

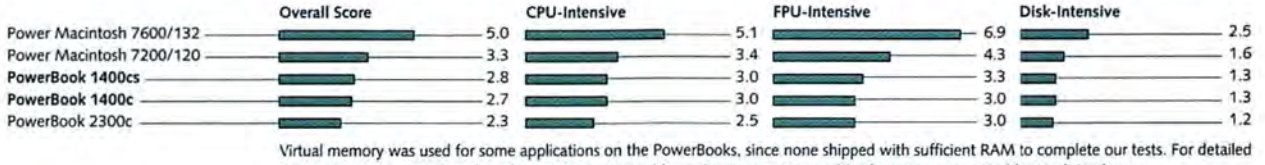
PROS: Outstanding design; CD-ROM drive; improved larger screen, trackpad, and keyboard. **CONS:** No cache; no improvement in speed, battery, processor, or weight. **COMPANY:** Apple Computer (408/996-1010, *http://www.info.apple.com*). **COMPANY'S ESTIMATED PRICE:** 1400c/117 $3500 (active matrix screen, 16MB of RAM, 1GB hard drive, 6× CD-ROM); 1400cs/117 $2495 (passive matrix screen, 12MB of RAM, 750MB hard drive, no CD-ROM).

MW LAB

PowerBook 1400 Offers Moderate Performance

The newest PowerBook's claim to fame is not speed but its larger screen and optional CD-ROM drive.

Longer bars are better. Results are times as fast as a Centris 650 (Centris 650 = 1.0). Products are listed in order of overall performance.



Virtual memory was used for some applications on the PowerBooks, since none shipped with sufficient RAM to complete our tests. For detailed information on systems benchmarks, see *Mac Superguide*, in this issue.—**Macworld Lab testing supervised by Mark Hurlow**

PowerBase Series

LOW-COST CLONES BUILT FOR SPEED

AFTER MUCH ANTICIPATION, low-cost, high-performance Macs are finally here: Power Computing's PowerBase systems are now shipping after months of publicity. Luckily, these systems were worth the wait and live up to their hype. In a very real sense, the PowerBase series offers affordable midrange office systems.

KEVIN CANDLAND

No Performance Penalty

Any way you slice it, the PowerBase series is highly competitive. Macworld Lab tests show that the fastest PowerBase—the 240MHz model—is roughly equivalent in speed to a Power Mac 8500/150, a system that a year ago was a speed demon and today remains a strong performer. The Power Mac 8500/150 costs $2000 more than the PowerBase 240. The PowerBase 240 is 28 percent faster than the Power Mac 7600/132, its closest match in terms of cost.

Factoring in a combination of price, design, and processor, the PowerBase's closest competitor is the Apple Performa 6400/200 (see *Reviews*, November 1996). Although the PowerBase 240 costs about $200 more, it outperforms the Performa 6400/200 by 14 percent overall in Macworld Lab's benchmark test suite. Even the middle-of-the-road PowerBase 200 beats the Performa by 4 percent, yet costs about $200 less.

Feature Rich

The PowerBase also beats the Performa 6400/200 in terms of expandability. PowerBase tower systems offer three full-size (13-inch) PCI slots versus two short (7-inch) slots in the Performa, and three free drive bays compared with just a single bay in the Performa. (Power Computing offers a low-profile desktop case for the PowerBase at a $100 savings; its features are identical except that there are no free drive bays.) The PowerBase sports two PS/2-style input ports in addition to one typical Mac-style ADB connection; hard-core gamers will find these handy for using PC joysticks.

The PowerBase also includes onboard 3-D video acceleration and better video support—2MB of standard VRAM expandable to 4MB, versus the Performa's nonexpandable 1MB. The PowerBase lacks the Performa 6400/200's TV-tuner slot, but most people will consider that a minor disadvantage.

My only complaint is the inelegant design of the PowerBase's tower chassis, which makes adding internal drives or upgrading the cache card a real chore; the Performa 6400/200's slide-out motherboard is far more convenient.

The Last Word

The PowerBase series is more expandable than either the Performa 6400 or the newer Performa 6360 (see *Mac Superguide*, in this issue)—and more powerful as well. Even though Apple's new Performa prices nearly match those of Power Computing's PowerBase, the PowerBase still offers more value for the money. The landscape may change when the other low-cost systems arrive—Motorola Computer Group, APS Technologies, and Umax Computer expect to ship their low-cost systems around the time you read this—but for now, the PowerBase series is the low-cost champ.—GALEN GRUMAN

PowerBase Series

POWERBASE 180 ★★★★/7.3

POWERBASE 200 ★★★★/7.3

POWERBASE 240 ★★★★/7.6

PROS: Fast performance; good expansion capacity; support for PS/2-style input devices; built-in 3-D video acceleration; good price. **CONS:** Motherboard design makes adding hard drives or cache cards tricky in tower models. **COMPANY:** Power Computing (512/388-6868, *http://www.powercc.com*). **DIRECT PRICE:** PowerBase 180 $1595; PowerBase 200 $1895; PowerBase 240 $2295; low-profile desktop versions cost $100 less.

MW LAB

PowerBase Performs Well

Power Computing's new PowerPC 603e–based systems more than hold their own compared with 604e-, 604-, and 601-based systems.

Longer bars are better. Results are times as fast as a Centris 650 (Centris 650 = 1.0). Products are listed in order of overall performance. Boldface indicates systems reviewed here.

	Overall Score	CPU-Intensive	FPU-Intensive	Disk-Intensive
Apple Power Macintosh 8500/180	6.7	6.6	10.3	2.4
Power Computing PowerBase 240	6.4	6.5	9.1	2.5
Motorola StarMax 3000 MT603e-200 *	5.9	5.9	8.2	2.5
Power Computing PowerBase 200	5.8	6.0	8.0	2.4
Apple Performa 6400/200	5.6	5.6	8.1	2.6
Power Computing PowerBase 180	5.4	5.6	7.5	2.3
Apple Performa 6400/180	4.0	4.1	5.2	2.0

**Prototype.*

For detailed information on *Macworld*'s systems benchmarks see *Mac Superguide* in this issue.—**Macworld Lab testing supervised by Mark Hurlow**

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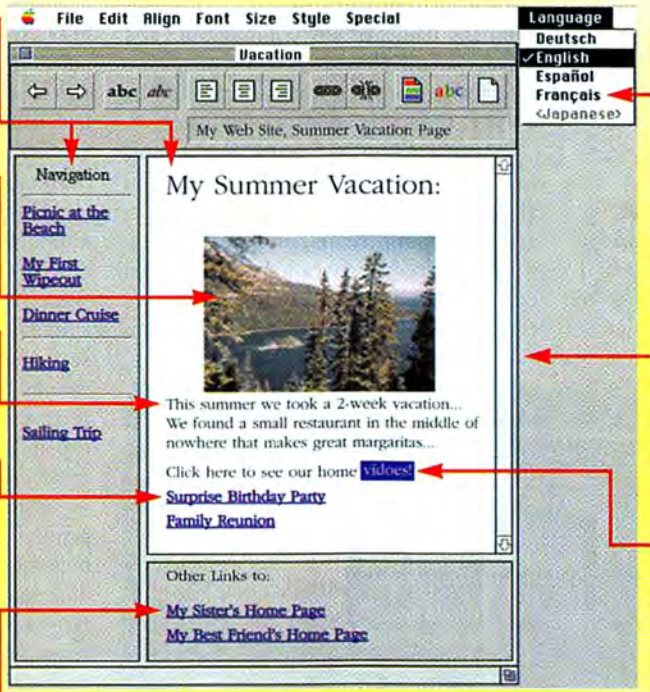

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Circle 27 on reader service card

Claris Organizer 2.0

SOLID UPGRADE IS WORTH THE WAIT

AFTER NEARLY TWO YEARS, CLARIS Organizer has finally gotten a thorough face-lift and a slew of new features. The updated personal information manager (PIM) now provides complete contact and calendar management while retaining its unique ability to link contacts, tasks, notes, and events automatically.

Organizer Gets Its Act Together

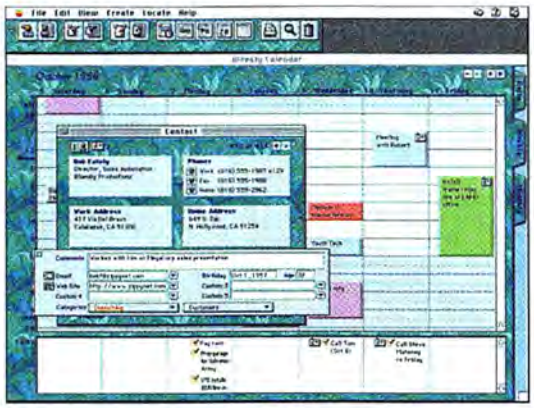
Data-entry aids abound; the program formats text and phone numbers automatically and completes repetitive data for you (for example, you type the first few letters of a city name, and the remainder appears automatically). The new contact card hides unused fields, making it easier to view your information. Organizer 2.0 even figures out a contact's age after you enter a birth date, then adds an annual reminder to your calendar.

The calendar still has daily, weekly, and monthly views. Appointments appear in the daily and weekly views as blocks spanning the appointment's time, with tasks relegated to a separate frame in the window. The new event banners can span several days, and they appear in any calendar view. Organizer's sorting of list views has been improved, and it can now memorize an unlimited number of custom views (such as "uncompleted tasks" or "customers in Oregon").

Claris Organizer lets you easily attach any item to any other item—a contact to an event, for example, or a note to a contact. A paper-clip icon appears next to items with attachments; clicking on the icon displays a pop-up menu listing the attachments. To associate coworkers with a meeting, you simply drag their names from the contact list onto the appointment in your calendar. You can also create new items by dragging any event, task, note, or contact to buttons on the tool palette. If you drag a contact named Charlie Parker onto the Note button, for example, you get a new attached note called "Conversation with Charlie Parker."

Organizer's smart Find command is one of the best I've seen: you enter a few letters of a contact's first or last name, company name, or any combination, and it narrows the choices as you type. If you type in the contact's initials separated by a space, the name appears even faster.

Another handy feature is the new Instant Organizer, a menu that appears in all your applications. It lists the day's events, appointments, and tasks, along with your frequently called contacts. You can also find any contact and create events, tasks, contacts, and banners from Instant Organizer without launching Organizer itself. And the new Decors feature lets you change the program's look—including the windows, fonts, and buttons—to suit your mood (see "Organizing with Style"). Fifteen types of decor are included, ranging from the Laura Ashley–esque Rose Garden to the high-tech Midnight Nouveau.



Organizing with Style The new features on display here include the window decor; the contact cards with pop-out entry boxes; and the contact card's Web Site and Email buttons, which trigger AppleScripts to send mail or load a Web page.

Part of the Team

Organizer now uses Apple events to link to other programs. Each address on the contact card has a button that brings up a list of letter templates for either ClarisWorks or MacWrite Pro; when you choose a template, Organizer starts up the word processor and inserts the contact's name and address at the top of the template. This feature could be a bit more intelligent—the letter begins with "Dear John Smith" rather than "Dear Mr. Smith"—but it's still convenient. Saving the letter links the file to the contact.

You link to Internet applications via the contact card's Email and Web Site fields. Clicking on the Email button launches Claris Emailer and creates a new mail message with the address already entered; clicking on the Web Site button starts up Netscape Navigator and takes you to the specified URL. You're not limited to these applications, however—you can whip up your own links to any AppleScriptable program.

Unlike groupware PIMs such as Now Contact/Now Up-to-Date, Organizer is designed for a single user. While you can't share your Organizer files with others on a network, you can share them with yourself when you're using a PowerBook, thanks to the new file-synchronization feature: it lets you update both the desktop and portable versions of an Organizer file, then synchronizes your changes.

One thing that hasn't changed is the program's frugal RAM and disk requirements (about 2MB of RAM and 5MB of disk space), half of Now Contact/Now Up-to-Date's appetite. But there's still room for improvement in Organizer. You can't choose to list contacts by company rather than by name; nor can you turn off all alarms, though you can specify whether new items will have alarms by default. The autodialer can't use Apple event–based dialing hardware, such as Big Island's YoYo or Sophisticated Circuits' Desktop Dialer. And I found a few minor printing bugs with envelopes and mailing labels. In general, though, printing is much better than in version 1.0.

The Last Word

Claris Organizer 2.0 is a robust PIM that's fast, easy to use, and powerful enough to satisfy the vast majority of users. If you don't need to share your contact and calendar data with coworkers, this PIM should meet your needs.—TOM NEGRINO

RATING: ★★★★/8.1 **PROS:** Excellent interface; good links with other programs; superior Find feature. **CONS:** Can't list contacts by company; can't globally turn off alarms; minor bugs. **COMPANY:** Claris (408/727-8227, *http://www.claris.com*). **LIST PRICE:** $69.

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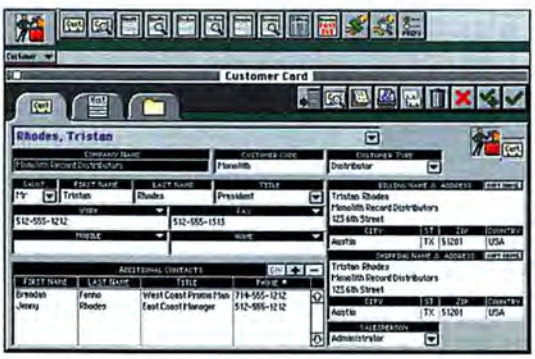
Big Business 2.0

NEW VIEWS OF ACCOUNTING

THERE'S MUCH TO LIKE ABOUT BIG Business, an all-in-one business application that integrates sales, marketing, ordering, and accounting functions into a large yet understandable package. Big Business provides all the standard features, including accounts receivable, accounts payable, and general ledger functions; automated bank statement reconciliation; forms-based data entry; and interactive processing for reports that are always current. Customer sales quotes, sales orders, and purchase orders are nice additions. But Big Business's user interface and information-generating capabilities really set it apart.

Data In, Information Out

An innovative icon-driven interface makes learning to use the program simple. You select a tool bar from 11 options in a pull-down list. Each has a characteristic color and a series of icons. A descriptive line explains each icon, but they are so well designed that this information is practically superfluous. You can customize a tool bar called MyDesk, and set preferences to control the way each tool bar works. No program in my memory uses icons to such advantage.



A Flexible, Intuitive Interface With Big Business it's easy to keep all the information you want, just the way you want it.

Big Business includes predesigned charts of accounts for many businesses, and customizing them is easy. You can bring data into Big Business from Intuit's Quicken with account information intact. Of Big Business's cornucopia of features, some of my favorites are multiple price levels to accommodate different customer types; user-definable fields for customizing information and tagging transactions; automatic handling of customer back orders and partial shipments on purchase orders; tracking shipment weights on sales orders; and history tabs to provide a complete record of all transactions affecting the customer, vendor, or account in one mouse-click.

After you enter your data, an easy-to-use natural language interface and multiple selection criteria make Big Business's reporting capabilities far greater than any other package's in this price range. You can save reports and use them to produce targeted marketing mailings or import them to a spreadsheet for analysis. You can also perform mass updates on data extracted this way—a real time-saver.

The Philosophy of Accounting

Big Business's greatest strength is its seamless integration of business processes with the accounting cycle. For each sales contact, you create a contact card, which you can then convert to a customer card and use to produce a sales quote, a sales order, and finally an invoice, all at the click of a button. Big Business provides comment fields for virtually every document and even for individual line items on orders.

Big Business's formatting tool gives you control over every aspect of your reports and forms. Nearly 200 predesigned reports are included, and customized reports are easy to create.

Big Business also has a Web authoring tool that automatically creates an HTML product catalog and generates Web pages based on your inventory records. You can attach graphics to inventory items and include them on the page.

As your business grows, Big Business can expand from a single-user system to a client-server system. You can define password access control for each data-entry screen. Single-CPU systems are not "Big Business Lite," either, so your growth should be smooth and easy.

On the Downside

Though an excellent product, Big Business isn't perfect. The program is geared toward retailing. Service businesses will be able to use it effectively, but it's not as well suited for manufacturing organizations.

While version 2.0 lets you record employee payroll transactions, it does not have an integrated payroll module but requires you to import from Aatrix Software or CheckMark Software payroll programs. While these are excellent programs, importing is always more time-consuming and error-prone. Intuit's QuickBooks and BestWare's M.Y.O.B. each provide an excellent integrated payroll feature.

Big Business's help system is primarily an electronic, context-sensitive copy of the manual—but without the index. The manual, though clearly written, is insufficient for novice users.

Graphing is available for only a few report templates and has limited customizability. Finally, I found data entry with Big Business to be slower than in QuickBooks or M.Y.O.B. This may not be a problem for very small businesses, but as transaction volume increases, it is likely to be annoying.

While theoretically you can run Big Business on an 040-based system, you'll want to run it on a PowerPC with at least 16MB of RAM.

The Last Word

Big Business makes accounting an active part of the business process, improving communications within the company and with customers and helping managers make better decisions. Big Business ushers in a new level of performance in entry-level accounting systems, providing not just an accounting program but a business environment. If you want to grow into a big business, check out Big Business.—JAN GILLESPIE

RATING: ★★★★/7.9 **PROS:** Easy-to-use interface; excellent custom reporting capabilities; automatically creates Web pages; client-server multiuser implementation. **CONS:** Limited help files; heavy system requirements; no time-billing features. **COMPANY:** Big Software (408/725-7200, *http://www.bigsoftware.com*). **COMPANY'S ESTIMATED PRICE:** Single user $199; multiuser $999 (includes three users; each additional user $199).

New FreeHand™ Graphics Studio™ 7 with Shockwave™.

that span out around the head. It was as simple as rotate, copy, and paste. Then I layered the hi-res images in Macromedia xRes. To get seven fingers on the hands, I cloned a finger in xRes and extended it to look realistic. But I also wanted this image to be surreal, so I used Hue/Saturation to achieve the green effect. Extreme 3D came in handy to model the eyeballs and make them really pop. And voilà! My self-portrait." Thanks for the great work, Usok. (And trust us, he's much better looking face to face.)

the text around an arc. Then I used a cool 3D rotating tool, distorting it and giving it a new twist. The fonts I used were created in Fontographer; I picked them up from the Font Bureau. I saved time by using FreeHand's Union Punch/Intersect feature for the lines rotating

Soon-to-be-famous designer Usok S. Choe on the FreeHand Graphics Studio 7: "Here's how I did it. I created the type in FreeHand,

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Circle 36 on reader service card

Web-Server Add-Ons

NETCLOAK, NETFORMS FILL GAPS IN SERVER SOFTWARE

QUARTERDECK'S WEBSTAR, THE most popular Web server software for the Macintosh, is rock-solid but short on frills. Unlike its newest competitor, ResNova's Boulevard, WebStar lacks *server-side includes*—HTML-like tags that add special elements such as counters and the current date and time to Web pages. WebStar also lacks Boulevard's ability to process HTML forms.

Enter Maxum Development's NetCloak and NetForms, a supporting cast that makes WebStar shine. (They also work with other servers, including ACI US's 4D Web Smart Server and the shareware MacHTTP.) These CGIs, or Common Gateway Interfaces, fill in the gaps in WebStar—NetCloak by adding server-side includes, NetForms by adding the ability to process forms (see "Energize Your Web Site," October 1996).

Tags for Time The NetCloak tags shown here cause a different sound to be played depending on the time of day a user visits the site.

NetCloak 2.1

With NetCloak, Web developers can implement the kinds of features a modern Web site should have. One is *redirection*, the ability to route visitors to certain pages depending on the browser they're using—to send users with more primitive browsers to a less flashy set of pages, for example. Another involves displaying a different image each time a page appears. You can add randomly changing hyperlinks and text messages, too.

NetCloak works by letting you add custom tags to your pages. When a visitor hits a page, NetCloak scans the page, processes the tags, and passes the results to WebStar, which sends it out to the Web. NetCloak tags let you insert a page counter; insert the time, date, or both; show or hide HTML depending on a user's browser or domain; and request a user's name and password and control access to pages accordingly. A macro feature lets you create named sets of HTML tags and call them throughout a site.

If you're familiar with HTML, you'll find NetCloak's most basic tags easy to use. For example, **insert_time** tells NetCloak to insert the current time at the tag's location in the page. To make working with custom tags easier, NetCloak includes a freeware utility called TagBuilder that lets you insert NetCloak and NetForms tags into any editor that supports drag and drop.

With NetCloak's advanced tags, you can specify that certain tags be sent only under certain conditions. On my weather-cam site (*http://www4.heidsite.com/weathercam.html*), for example, I use NetCloak's conditional tags to play background sounds appropriate to the time of day (see "Tags for Time").

Figuring out the right syntax for advanced tags can be tricky, and NetCloak's manual is less than thorough. Fortunately, Maxum's E-mail–based technical support is very good, and Maxum employees and NetCloak users participate in an active mailing list.

A version of NetCloak that works as a plug-in for WebStar 1.3.X is included in the NetCloak package. While that gives you flexibility in setting up your server, it can introduce some problems. NetCloak can also slow a busy server under certain circumstances, and optimizing the program's performance can be tricky.

NetForms 2.0

Guest books, feedback pages, and conferencing boards are common tools for Web-site interaction. While NetForms doesn't help you create forms—that's a job for HTML editors such as Adobe PageMill—it does process the information visitors enter into Web forms.

Like NetCloak, NetForms relies on custom tags that perform such tasks as saving the entered information, sending it as an E-mail message, and creating and updating pages. You create these tags using NetForms' Forms Definition Markup Language (FDML) and store them in a file. When a visitor clicks on the button to submit a form, the FDML file and NetForms swing into action to process the data.

NetForms includes several examples for you to build on: a guest book, a classified ad bulletin board, a variety of visitor-feedback forms, and a system that lets visitors build their own home pages by filling out a form. These examples are likely to help more than the manual, which shares its cousin's shortcomings.

The Last Word

If you're committed to using WebStar, NetCloak is a must-buy—quirks and all. If your loyalty to WebStar isn't unshakable, investigate ResNova's Boulevard; it has both server-side includes and forms-processing features.

As for NetForms, its strength lies in its versatility: with just one CGI you can create a variety of interaction vehicles with no programming. But specialized CGIs may handle some tasks better than NetForms can. For example, Lundeen & Associates' $395 Web Crossing has industrial-strength conferencing features that go well beyond what you could implement in NetForms. And if you need to search or sort form-entered information, consider combining Claris FileMaker Pro with a database CGI such as Everyware's Tango for FileMaker.—JIM HEID

NetCloak 2.1

RATING: ★★★★/7.0 **PROS:** Makes sites more dynamic; CGI and plug-in included; good technical support. **CONS:** Weak manual; some performance quirks. **COMPANY:** Maxum Development (630/830-1113, *http://www.maxum.com*). **LIST PRICE:** $195.

NetForms 2.0

RATING: ★★★/6.5 **PROS:** Enables forms-based interaction; good technical support. **CONS:** Weak manual; not suited to advanced conferencing. **COMPANY:** Maxum Development (630/830-1113, *http://www.maxum.com*). **LIST PRICE:** $195.

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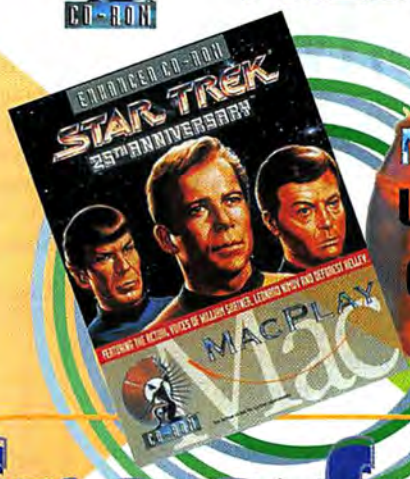

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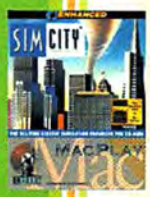

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Internet Phone Software

DIGIPHONE, INTERNET PHONE OFFER MIXED RESULTS

DEPENDING ON YOUR PERSPECTIVE, Internet telephony is either an impressive gimmick or a useful tool. The theory is simple: you speak into a microphone attached to your computer, which digitizes and compresses your voice and sends it over the Internet; the computer at the other end decompresses it and, after a slight delay, plays it back. Calling someone over the Internet is a lot cheaper than using a telephone: you only pay for your online connection. But it's much less convenient than the phone, and voice quality is hit-or-miss. And because standards haven't yet been agreed upon, both parties must use the same software to talk.

I looked at an updated version of VocalTec's Internet Phone (see "Your Mac Is Ringing," *Macworld*, November 1996) and the brand-new DigiPhone from Third Planet Publishing. Both programs support 14.4-Kbps modems—the slowest practical speed for Internet connections—but faster links yield better results. I tested Internet Phone 3.0.1 and DigiPhone 1.0 on a Power Mac 7500/100 equipped with a 28.8-Kbps modem.

Let Your Mac Do the Walking During an Internet Phone conversation, cute animated characters show who's talking and who's listening.

Although I used an Internet service provider (ISP), you can also get satisfactory results with an online service that provides a direct link to the Net.

Interfacing

Internet Phone has been around longer, and it shows in the interface—it's much more colorful than DigiPhone's, and it sports user-customizable animation (see "Let Your Mac Do the Walking"). The Macintosh version requires a PowerPC with 8MB of RAM and a microphone. (A 680X0 version should be shipping by the time you read this.) Installation is fast and easy, and the printed manual is adequate, if a bit light on details. The package comes with instructions on how to get a second user license free from VocalTec's Web site.

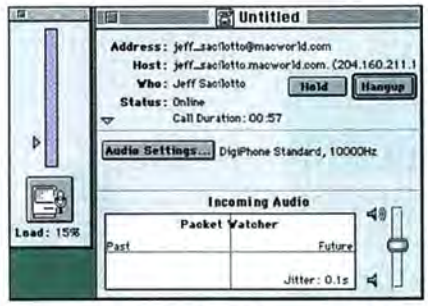
DigiPhone's interface is more spartan than Internet Phone's—color is used sparingly, for instance, and you don't see animated representations of the speakers—but it's just as easy to use (see "DigiPhone Direct"). The box includes two fully functional copies of DigiPhone—so you don't have to buy or download anything else to get a friend up and running—and you get PowerPC, 680X0, and fat binary versions of the program. The documentation is more complete than Internet Phone's, but since it's in the form of an Adobe Acrobat PDF file, it's harder to refer to while you're online.

Digital Dialing

Internet Phone lets you make calls in two ways. If you know the Internet protocol (IP) address of the person you're calling, you can enter it directly. (Most dial-up ISPs assign IP numbers dynamically, so addresses usually change from session to session.) If you don't know the address or just feel like chatting with someone at random, you can look on the Internet Phone server: when you launch Internet Phone, the program automatically connects to VocalTec's server and displays a directory of chat rooms. If you'd prefer to avoid rooms with sexually explicit titles, you can filter out names that contain the keywords you've defined; unfortunately, you can't supply a password to prevent someone from changing your forbidden-word list.

When you enter an Internet Phone chat room by double-clicking on its name, a list of connected users appears. (During peak hours, hundreds of people from around the world are usually logged on.) You can also create private chat rooms that other users can enter only if they know the room's name. When you find someone you want to talk to, you select that name and click on Call. The program looks up the IP address on the server and dials the person, and an electronic chime announces your call.

Internet Phone doesn't let you encrypt calls, but VocalTec claims that conversations using its product are harder to intercept than conventional telephone calls, even without encryption.



DigiPhone Direct DigiPhone's two windows let you monitor a call in progress (right) and adjust microphone sensitivity.

There's also no way to place a call to someone who is not connected to the Internet. (VocalTec says it may offer this service in the future by letting Internet Phone callers connect to a server, which would then transfer the calls to the telephone system.)

Like Internet Phone, DigiPhone lets you place calls by typing in an IP address. (If the person you're calling has an Internet E-mail account, you can also dial by entering the E-mail address; you can even leave a written message if there's no answer.) DigiPhone gives you more control over audio sampling rates than Internet Phone does, with 11 levels to choose from. It also comes out ahead in security, with optional call encryption.

If you don't want to talk to anyone in particular, DigiPhone lets you log on to a public server. Unlike with Internet Phone, however, you have to enter the name of the server manually. Third Planet's Web site lists several DigiPhone servers, but I wasn't able to log on to most of them. The ones I could connect to had only a handful of people signed on at any given time, even during peak hours.

Plain Talk

Voice quality with both Internet Phone and DigiPhone ranged from unintelligible to crystal clear, with most calls falling somewhere in between. With some effort, I was able to understand what the other

person was saying most of the time. And as far as I could tell, I never actually lost a connection, although a few people did hang up on me. The biggest hurdle was getting used to the brief delay between the time I stopped speaking and the time my voice reached the other end. (Because the Internet wasn't designed to transmit continuous speech, current technology must delay the sound slightly to prevent it from breaking up.)

To avoid confusion, it's a good idea to say something like "over" or "go ahead" when you finish talking. A good pair of headphones helps, but it still feels more like using a walkie-talkie than a telephone. (Both programs support full-duplex communication, in which both callers can speak at the same time, but this feature isn't available with every computer model.)

The Last Word

For now, Internet telephony makes sense for noncritical communication, though I wouldn't recommend it for important business or personal calls. If you're a novice, Internet Phone is a good choice; DigiPhone is a better option if you usually call people with fixed IP addresses or if security is a consideration. If you're at all curious, you can download time-limited demo versions from VocalTec's and Third Planet's Web sites. You have nothing to lose but those outrageous phone bills.—FRANKLIN TESSLER

DigiPhone 1.0

RATING ★★★/6.8 **PROS:** Can use E-mail addresses to dial; calls can be encrypted; less expensive than Internet Phone; comes with two copies of software. **CONS:** Short transmission delay; inconsistent voice quality; fewer people on public servers. **COMPANY:** Third Planet Publishing (972/733-3005, *http://www.digiphone.com*). **LIST PRICE:** $39.95.

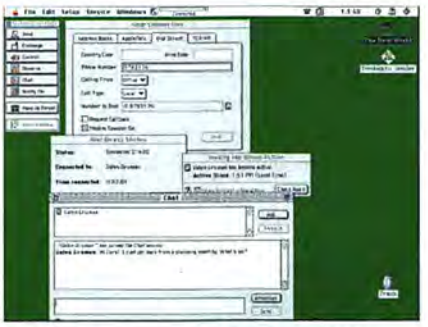
Internet Phone 3.0.1

RATING: ★★★★/7.3 **PROS:** Easy to use; animated, customizable interface; can block access to chat rooms. **CONS:** Short transmission delay; inconsistent voice quality; no way to lock chat-room filters. **COMPANY:** VocalTec (201/768-9400, *http://www.vocaltec.com*). **LIST PRICE:** $49.95.

Timbuktu Pro 3.0

NETWORK-ACCESS TOOL EXTENDS ITS REACH

THERE'S LONG BEEN ONLY ONE real choice for the remote access and control of networked Macs: Farallon Communications' Timbuktu Pro. The latest version extends Timbuktu's reach to isolated Macs, thanks to its new direct–dial-up capability. And in networked environments as well as modem ones, Timbuktu



Added Connections Farallon has added several interactive features to Timbuktu Pro's repertoire of remote-access and -control capabilities, including direct dial-up, notification of when people are back at their Macs, and live chat.

Pro 3.0 offers more personal interaction than the previous versions while retaining their strengths: letting you control, observe, exchange files with, and send messages to other Macs and PCs via AppleTalk, TCP/IP, NetWare IPX, and Apple Remote Access. These features have made Timbuktu a great tool for managing remote servers, giving help desks access to a user's system, and retrieving and managing offsite files.

The new version adds three useful communication abilities: you can create networks on the fly via direct dial-up, set a notification option that lets you know when someone you've been trying to contact via Timbuktu is available, and selectively allow or revoke access to your Mac without altering your general guest settings. Unfortunately, these new features won't work with Windows connections—at least not until Farallon revises the Windows Timbuktu software.

My only major criticism of Timbuktu involves its interface. Although the tabbed panes introduced in the last version make settings and protocols easier to manage, I still find common tasks needlessly difficult. For example, you can't save a connection to another system without also saving the specific action you want to take (such as controlling that system or exchanging files with it). And the address book that stores these connections gives no indication what action will be taken with a particular connection.

I also couldn't get Timbuktu to work with a Diamond Multimedia SupraExpress modem, despite its being listed in the manual as a supported device. It turns out that Farallon included the PC modem file, not the one for the Mac; several other modem files were PC versions as well. Farallon promises to post the Mac profiles on its Web site. I had no problem with a Global Village TelePort Platinum modem.

Another annoyance is that several controls are scattered unnecessarily. For example, the command to add a connection to the address book resides in the Service menu, not in the File menu, where you make and save connections. And you need to either have the button bar open or use the Service menu to specify the action you want to take; it would be easier if the connection dialog box simply had buttons for those actions.

The Last Word

Despite its awkward interface for making connections, I've always found Timbuktu to be an indispensable tool, and Timbuktu Pro 3.0 lets me do even more. Whether you're working at a help desk, collaborating with contractors at various sites, or switching between Macs, you're likely to find the new Timbuktu Pro indispensable as well.—GALEN GRUMAN

RATING: ★★★★/7.2 **PROS:** Provides easy access to other systems on a network or via modem dial-up; new notification, chat, and permissions features make the program more broadly useful. **CONS:** Interface is more complex than necessary. **COMPANY:** Farallon Communications (510/814-5000, *http://www.farallon.com*). **LIST PRICE:** One user $139; two users $189; ten users $679.

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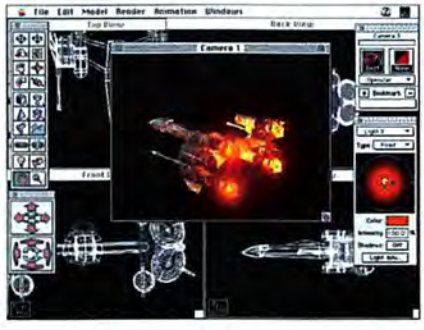
Infini-D 3.5

3-D PROGRAM'S RENDERING TOOLS AGAIN TAKE CENTER STAGE

SPECULAR'S INFINI-D HAS ALWAYS offered an impressive balance of modeling, rendering, and animation features. The program's modeling tools were overhauled in version 3.0 (see *Reviews*, January 1996); with version 3.5 the focus has returned to rendering and animation, the program's traditional strengths. I'll spare you the suspense: Infini-D is now better than ever.

With Infini-D 3.5 you can add customizable flare effects to any light source, preview object transparency in on-screen shading modes, capture shadows for compositing along with their defining objects, and produce Boolean effects on rendered objects. Also new are Safe Action and Safe Title markers denoting the viewable lim-



A Flair for Flares Infini-D 3.5 lets you add customizable flares to any light source, such as the streaks and halos I added to this sample image to create the effect of engines powering up.

its of video and film formats, greater control over ray-tracing performance, and some useful interface enhancements. Best of all, it's now only $649.

SuperFlares are unquestionably the star of 3.5 (see "A Flair for Flares"). You can now apply a customizable flare to any light source, either to enhance its glow and glare or to reproduce the internal reflections of optical lenses. You can choose from presets for various lens types or adjust individual flare components numerically or with sliders. And SuperFlares can be animated to produce high-quality cinematic effects.

Of course, lights shining on objects produce shadows, and that can be a post-production headache when you're compositing a 3-D object onto a background image. Infini-D's Shadow Catchers let you capture shadows along with a model. Any object can be a Shadow Catcher—say, a rough primitive standing in for physical elements in the background image. The modeled object's shadow information is stored in the alpha channel of the Shadow Catcher object, which is invisible when rendered. When the model and Shadow Catcher are composited with the background image, the alpha-channel mask reproduces the shadow.

Infini-D 3.5 also produces Boolean effects on ray-traced objects, letting you designate objects as positive, negative, or intersecting to control their interaction during rendering. Boolean functions can be animated over time to produce such effects as chiseling a logo into marble.

By combining ray-tracing and shading routines, Infini-D 3.5 lets you sample an object's surface-transparency settings in all preview shading modes. Other improvements include the ability to select spline-based objects individually for rendering as polygons, accelerating ray-tracing performance. And the modeling workshop now imports multiple EPS outlines, nudges outlines with the arrow keys, and displays object-defining paths and rails in shaded mode.

Specular has also added support for Apple's QuickDraw 3D. Besides Infini-D's native shading modes, you can select QD3D's interactive shading right from the Views floater. With QD3D, Library preview thumbnails appear as shaded objects—a big improvement over the program's sometimes indistinct wireframes. But while QD3D's interactive shading is great for modeling feedback, given its current limitations you're better off using Infini-D's native shaders for previewing rendering effects.

The Last Word

Infini-D 3.5 offers an approachable, practical mix of 3-D design ingredients. Excellent animation tools and high-quality rendering make it suitable for many professional-level applications, but it's easy enough for novice computer designers.—CARLOS DOMINGO MARTINEZ

RATING: ★★★★/7.9 **PROS:** Excellent rendering and animation tools; new lens-flare effects; easy to use. **CONS:** 3-D object editing remains limited. **COMPANY:** Specular (413/253-3100, *http://www.specular.com*). **LIST PRICE:** $649.

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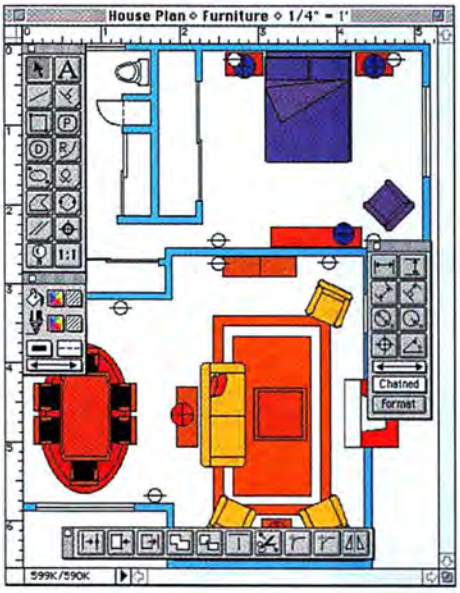

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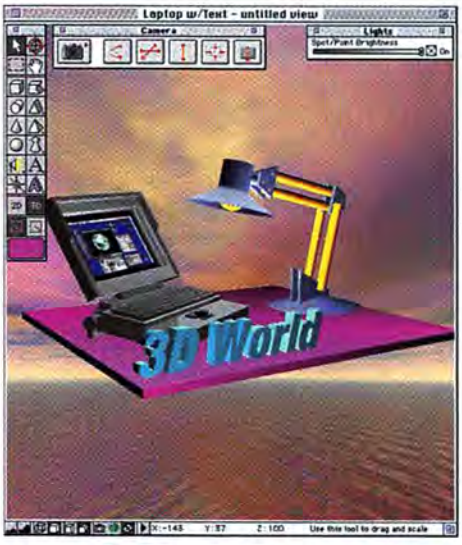

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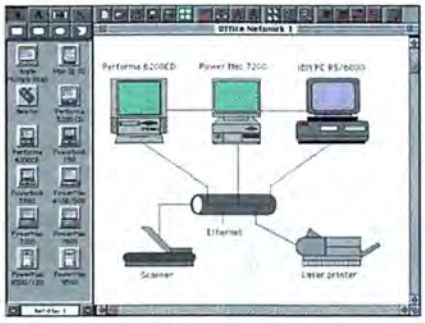
Stencil It

GOOD FOR CHARTS, BUT NOT FOR ART

OCCUPYING A UNIQUE PLACE somewhere between clip art and a drawing package, Kaetron Software's Stencil It 1.01 is a simple diagramming application that lets you design a wide variety of basic graphics. Stencil It does a good job of creating charts and diagrams, and its libraries of ready-made elements—called Stencils—save you the trouble of drawing items from scratch.

Stencil It's strength lies in its ability to link its Stencils to one another to create dynamic illustrations—flowcharts, organization charts, network diagrams, timelines, genealogical charts, and the like. With its Flowchart template, for example, you can move elements while keeping their connecting arrows intact, or add a step to the middle of a process. Similarly, you can add relatives to a family tree or relocate devices in an office network chart without redrawing the entire diagram (see "Networking Made Easy"). Certain Stencils add components as needed when you enlarge them; chairs are added around a table as you stretch it, for example.



Networking Made Easy Stencil It's linked graphics let you add, delete, or move elements while keeping their relationships intact.

Stencil It allows you to attach a set of notes to each Stencil; you can also attach documents created with other programs, such as spreadsheets or CAD packages, and view them using publish and subscribe. Stencil It lets you save drawings as Web pages that can be opened with a browser; click on an object that has notes attached, and the browser displays them. Stencil It also includes a handy spelling checker.

If Stencil It's canned graphics don't suit you, you can edit existing Stencils, import graphics from other programs, or draw your own Stencils using a set of graphics primitives (oval, rectangle, round-cornered rectangle, and polygon). Unfortunately, Stencil It's drawing capabilities are rudimentary, reminiscent of simple draw programs of yore. Even the original MacDraw had a freehand drawing tool, which Stencil It lacks. To be fair, Stencil It isn't trying to be a general-purpose draw program, and it's more than adequate for creating the charts and diagrams for which it was designed, but the addition of better drawing features would enhance its capabilities.

From a performance perspective, Stencil It and I started off on the wrong foot. When I launched the program, it first told me that the number of simultaneous users had exceeded my network-license limit (I was the only user, honest), then it unexpectedly quit, crashing my computer. Kaetron's technical-support representative suggested allocating more memory, which helped, although I still experienced the occasional crash. The technical-support staff responded efficiently to several other questions, and the manual is friendly and clearly written.

The Last Word

Stencil It does a fine job of creating basic formulaic illustrations such as floor plans and seating diagrams. The program is easy to learn, and it offers flexibility in customizing stencils and reorganizing charts. If you're artistically challenged, Stencil It probably offers the level of automation you need. If you want visually appealing graphics, however, you should look elsewhere. Stencil It's graphic elements are generally composed of simple, blocky shapes—just the ticket for a network diagram, but a bit simplistic for stencil sets such as invitations or maps. The addition of more robust drawing capabilities would transform Stencil It from an interesting shortcut to a product that's worthy of a hearty recommendation.—ERFERT FENTON

RATING: ★★★/6.5 **PROS:** Easy to learn; easily modified charts; can attach notes or additional graphics to chart elements. **CONS:** Rudimentary drawing capabilities. **COMPANY:** Kaetron Software (713/298-1500, *http://www.kaetron.com*). **COMPANY'S ESTIMATED PRICE:** $99.

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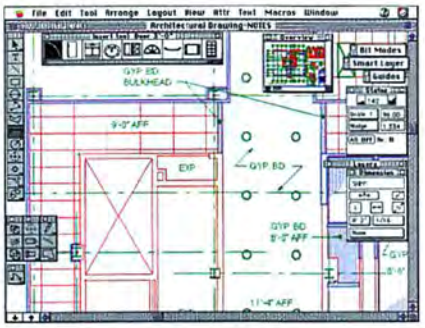
PowerCADD 3.0

FAST, PRO-LEVEL DRAFTING PROGRAM GETS SOME REFINEMENTS

THOUGH 3-D MODELING MAY BE ALL the rage, 2-D drafting is the lingua franca of real-world design; it's how architects and engineers communicate with builders and manufacturers. And you'd be hard-pressed to find a better drafting package than PowerCADD 3.0. This highly competent drafting program has expanded color-management capabilities, adds support for popular file formats, and introduces some interface refinements. It also supports 64-bit, double-precision internal calculations for outstanding accuracy.

Because version 3.0 is Power Mac native (the 680X0 version is still called PowerDraw), this always speedy program is now even faster. On a 7100/80, response to tool inputs is instantaneous; screen redraws are workstation-quick, even with reasonably complex drawings.



Drafting Prowess PowerCADD has an impressive assortment of drafting tools. A new floating palette (upper left) puts a library of objects at your fingertips.

PowerCADD's revised color-attributes dialog box lets you define and save custom color palettes and identify individual colors, either by number (such as a Pantone number) or by name. Architects who use drawing elevations as the basis for their renderings (in the traditional sense of the word) will appreciate the ability to save color palettes coordinated to specific projects. A new eyedropper tool lets you move color, pen, and fill attributes easily from object to object. And the dropper stays filled when you switch tools, so you can quickly attach a set of attributes to objects as you build them.

If PowerCADD's impressive complement of drawing tools isn't enough, you can take advantage of Engineered Software's separate collections of tool externals and symbol libraries for engineers and architects. The latest is WildTools 2.0, a $189 collection of 120 general-purpose drawing tools that automate and simplify a variety of drafting tasks.

PowerCADD 3.0 includes an external DXF translator that used to be sold separately, along with a new JPEG-Write translator that saves files for use on Web sites. The JPEG translator is installed automatically, but the DXF plug-in isn't copied by the installer; you'll find this undocumented surprise on the third program disk.

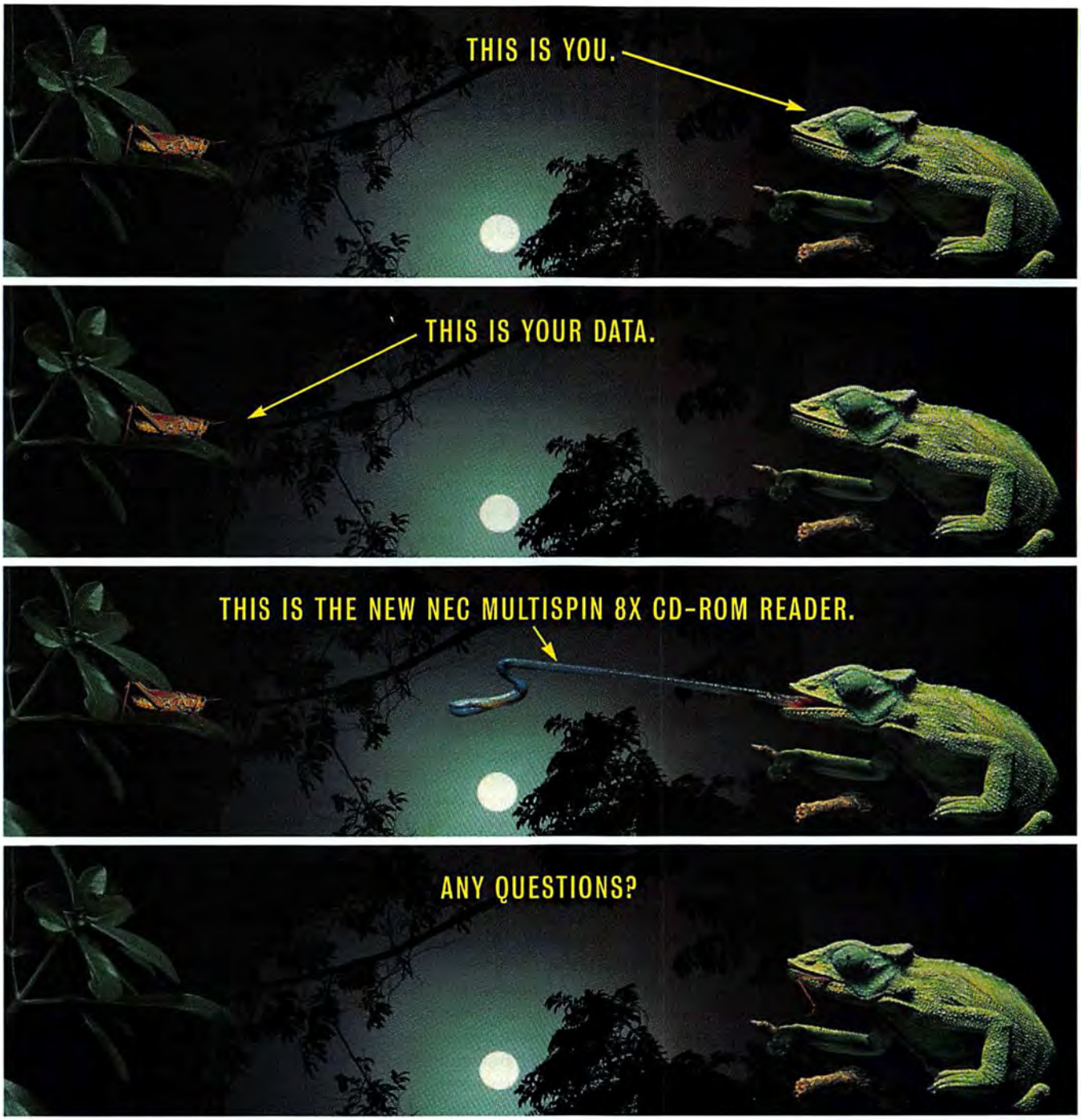
The program's excellent interface features some subtle and useful refinements. For example, moving the cursor to the floating Overview palette automatically reveals your location in the drawing; the option key is no longer required. You can define seven object-nudging distances on the Status palette, and you can now simply drag symbols onto a drawing from a resizable palette that displays thumbnails of the currently active symbol library. More important, the program now allows multiple undos and redos; you specify the number of undo levels according to your needs and available memory.

Expect to spend some time learning all of PowerCADD's nuances, but the manual is an excellent reference—it's comprehensive without being overwhelming. And system requirements remain relatively modest at a 4MB partition (though more RAM is recommended). However, given the program's multiplicity of tools and palettes, a large-screen monitor is almost mandatory.

The Last Word

PowerDraw 6.0 is still available for 680X0 machines. But if you're starting fresh, go with PowerCADD; if you're already using PowerDraw, it may be time to upgrade. For applications ranging from mechanical engineering to industrial design to architecture, PowerCADD is a fine general-purpose, professional-level 2-D drafting package—it's fast, flexible, and reasonably priced.—CARLOS DOMINGO MARTINEZ

RATING: ★★★★/8.2 **PROS:** Exceptionally quick on the draw; professional-level tool set. **CONS:** Feels cramped on a small screen. **COMPANY:** Engineered Software (910/299-4843, *http://www.engsw.com*). **LIST PRICE:** $795.



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Boris Effects 2.0

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VIDEO EFFECTS SUCH AS TRANSITIONS, filters, keying, and titles must be rendered, which means sitting around thinking of synonyms for *slow* (such as *crawl, creep*, and *plod*). If you happen to have at least $15,000 you can buy a hardware accelerator and perform some basic transitions and filters in real time. Those with a little more patience and much less cash may be interested in Boris Effects. This multichannel digital-video–effects program is available in two versions—one that runs within Data Translation's Media 100 and Adobe Premiere and one that runs only in Premiere. Though not supported by any dedicated hardware accelerators, Boris renders as quickly as do onboard Premiere effects, while offering better quality, a truckload of creative options, an intuitive interface, and support for traditional motion and transition effects.

Sneak Peek The main editing window in Boris Effects 2.0 contains a live preview window for all selected tracks, plus controls for changing position, scale, opacity, and rotation.

Boris Effects 2.0 ships with more than 120 loadable preset effects that you can customize and save (with additional presets available from Artel's Web site). The diverse selection of effects ranges from a six-sided spinning video cube to advanced motion-control keying. If the preset effects don't provide a good jumping-off point for your creative scheme, you can build an effect from scratch and save it.

Boris Effects 2.0 has some significant improvements over previous versions. Most obvious is the expansion of available video tracks to 30, up from only 2 in previous versions. Version 2.0 also features subpixel interpolation, field rendering, and antialiasing, which give effects broadcast quality and are a step up from the stock Premiere effects, which often sacrifice quality for speed. Even with this quality boost, the rendering time is at least as fast as Premiere's. More-basic transitions (fades and pushes in particular) were even faster, if only by 5 or 10 seconds for every second of transition rendered.

Boris offers soft-edged borders and shadows for moving objects, as well as blurs and trails—motion effects that even some hardware effects units don't feature. In this latest version you can use keyframes to control camera position and light, as well as the *x*, *y*, and *z* positions. You may also attach opacity, image borders, and drop shadows to keyframes. And you can make your objects or screens fly around using motion paths that support full Bézier controls, a feature more often found in 3-D packages.

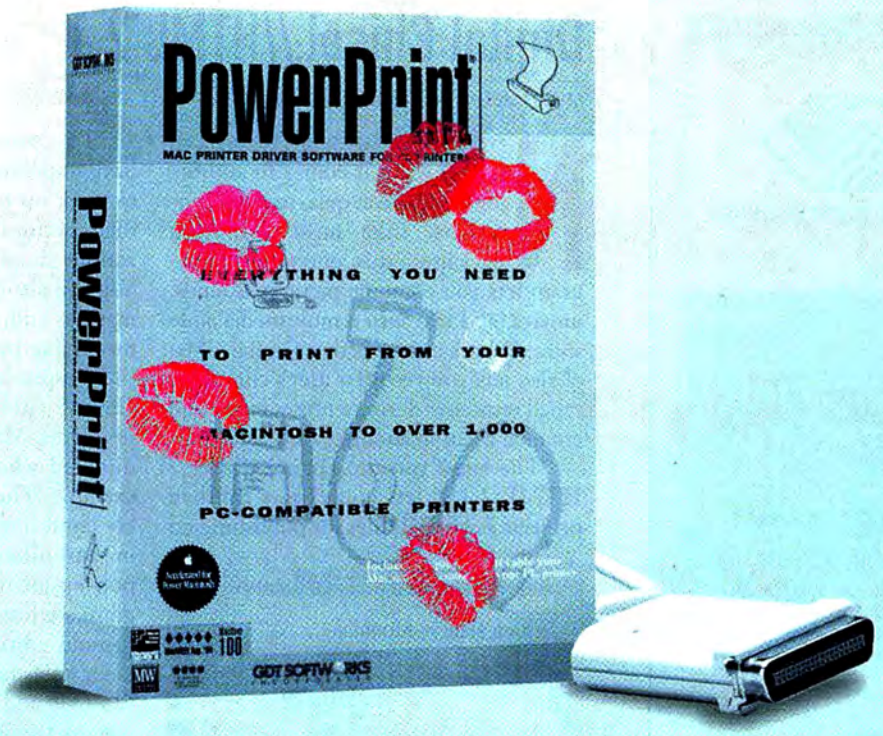
Boris Effects is especially handy because it's available inside Premiere or Media 100. Though Adobe After Effects and Strata MediaPaint have more fireworks, they are also more expensive, stand-alone packages. They require additional RAM, plus they force you to break your workflow by leaving the video sequencer to create your effects.

Unlike the sparser initial release, Boris Effects version 2.0 comes with an improved user manual, better product packaging, and a CD-ROM with examples of effects the package generates. (Registered users receive one year of technical support by telephone, fax, E-mail, and World Wide Web; a $19.95 instructional video is also available.)

The Last Word

Boris Effects is definitely worth adding to your software shelf. It's an inexpensive program that costs less than what some hardware-based suites charge for an hour of rental. The learning curve is small and the effects are powerful, and while Boris Effects is not significantly faster than Premiere, the result is definitely worth waiting for.—KENNEDY GREY

RATING: ★★★★/7.5 **PROS:** Available from within Premiere or Media 100 sequencer for creating effects on the fly; intuitive interface; high-quality renderings; up to six video inputs on a 3-D cube. **CONS:** No hardware-assisted acceleration. **COMPANY:** Artel Software (617/566-0870, *http://www.artelsoft.com*). **LIST PRICE:** For Media 100 and Premiere $695; for Premiere only $350.



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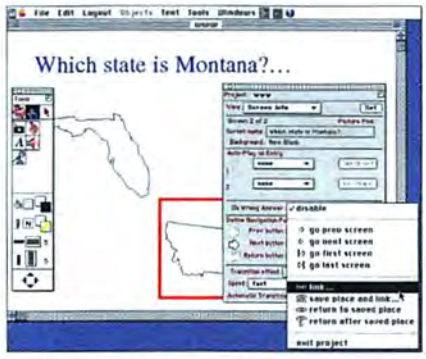
Digital Chisel://HTML 2.1

MULTIMEDIA AUTHORING DOESN'T MAKE IT ON THE WEB

NOTHING COMPARES TO DIGITAL Chisel when it comes to authoring interactive, quiz-style presentations. Like most authoring packages, this entry-level program lets you combine pictures, sounds, movies, and text into a multimedia slide show. What's unique is that Digital Chisel also lets you record a user's clicked or typed responses during a presentation and compile them in an integrated database.

The latest version, Digital Chisel:// HTML 2.1.3, lets you export finished projects as HTML files for publishing on the Web. Unfortunately, the program still has more than a few strange bugs and nonstandard interface features left over from earlier versions that detract from its otherwise outstanding features.



Pop Quiz Quiz templates let you record right and wrong answers and change the flow of a presentation based on a response.

Designed with teachers in mind, Digital Chisel://HTML 2.1.3 comes with templates that make it easy to create screens containing test questions. Setting up an electronic "test" is remarkably straightforward: you simply replace a dummy question with your own, then type in or click on the correct answer. When the presentation is run in playback mode, Chisel records correct and incorrect responses, computes the scores, and files the information in a database.

Several new features make it easier to create more-sophisticated presentations. A new library of Smart Buttons, for example, contains a nice variety of slick-looking buttons that change shape or appearance when clicked on. Smart Objects are preprogrammed to perform designated tasks when placed in a presentation.

The program's animation features have improved, too. You no longer have to click on hot-linked objects to make them perform an action; you can trigger actions simply by pointing at an object. You can also vary the speed of path animations and, with patience, record your own frame-by-frame animated sequences.

Despite the improvements, Digital Chisel's interface is still riddled with problems. Many menu commands aren't dimmed when they're unavailable, for example. The Tools palette is also terribly confusing—some options are clicked on and others are buttons that trigger pop-up menus. Other parts of the program are just awkwardly designed. Background editing is clumsy: you have to enter a separate mode, and even then you can only add objects to the background; you can't apply fills or gradients. You can't reorganize screens by dragging them into a new order, and you can't zoom in or out of screens to edit them. And although the program requires an LC II with 4MB of RAM, expect performance to be choppy even on faster systems. Also plan on increasing the RAM allocation to avoid "out of memory" messages.

While you can use Digital Chisel:// HTML to generate simple Web pages, many of its components—transitions, animations, sounds, video, and the interactive-testing features—simply don't convert when you export to HTML. Nor does the program support image maps, forms, tables, and a number of common Netscape tags. Overall, Digital Chisel just can't be considered a Web authoring tool.

The Last Word

Digital Chisel://HTML looks and feels as though it needs refinement. It's not a Web authoring tool, but its interactivity strengths make it a great tool for teachers and trainers.—JOSEPH SCHORR

RATING: ★★★/6.7 **PROS:** Powerful testing functions; integrated database; good animation controls. **CONS:** Quirky interface; no zoom tool; weak HTML export functions. **COMPANY:** Pierian Spring Software (503/222-2044, *http://www.pierian.com*). **LIST PRICE:** $109; five users $349; ten users $599; site license $995.

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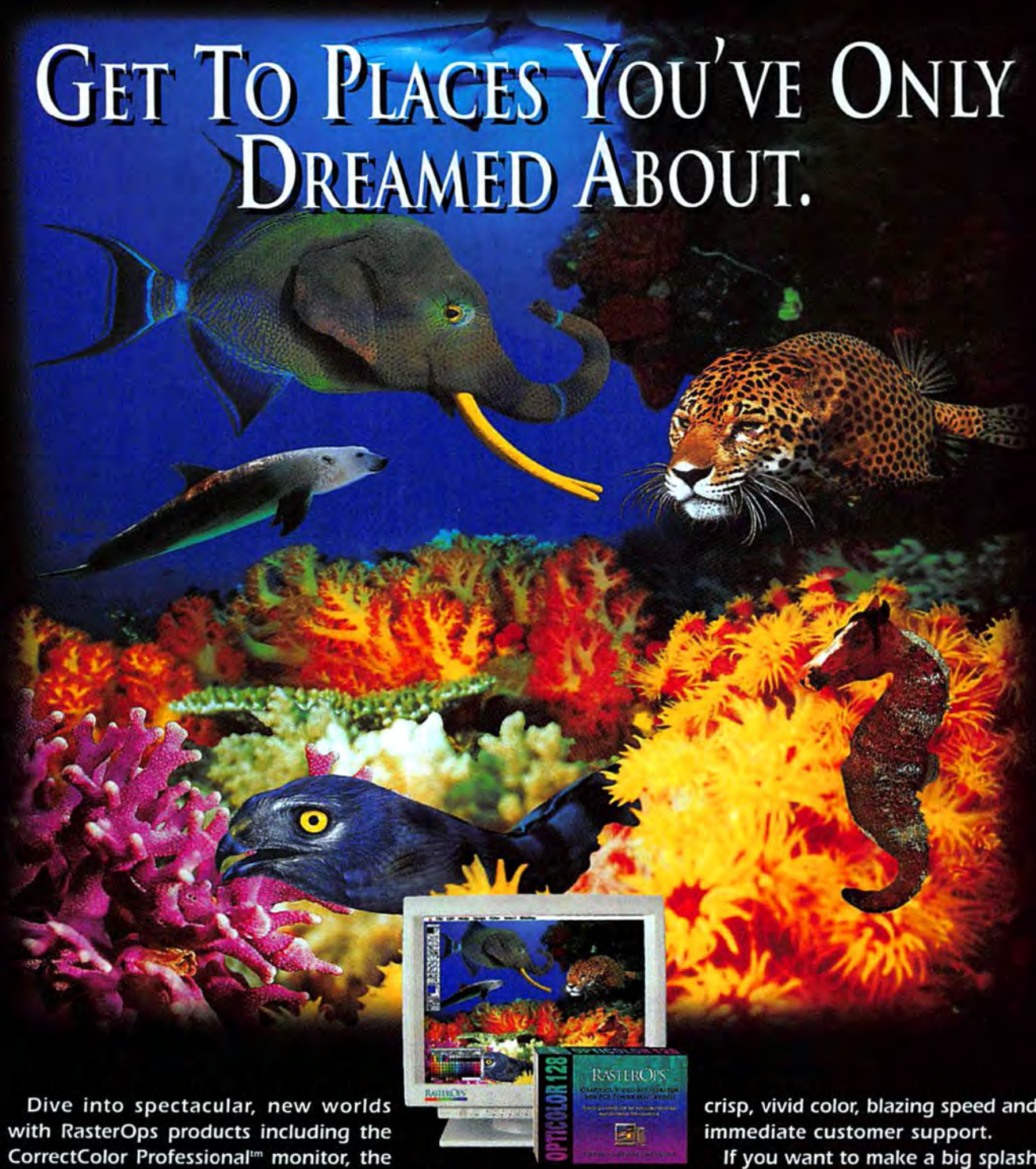

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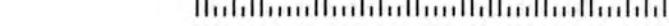
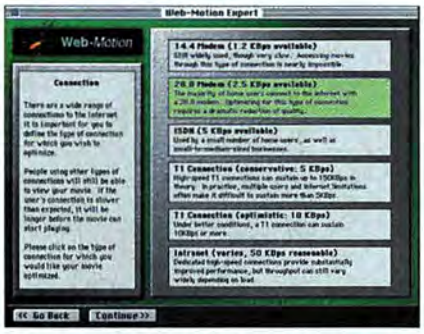


Movie Cleaner Pro 1.2, Web-Motion

FIRST-RATE COMPRESSION UTILITY GETS A WEB-SAVVY PLUG-IN

THOSE WHO THINK THERE SHOULD be an Academy Award for best film-processing technique will appreciate Movie Cleaner Pro 1.2.1. Its exquisite interface takes the black art of QuickTime compression—crunching a movie to play smoothly from a CD-ROM—and makes it easy. Beginners can use the program's Movie Expert feature to arrive at the correct compression settings by answering a series of questions, while gurus can hand-tweak the settings and use the program's batch-processing feature to apply them to an entire hard drive's worth of movies.

The tiny version-number increment implies only minor improvements, but Movie Cleaner Pro 1.2.1 sports some significant enhancements over version 1.1.1 (see *Reviews*, April 1996). New video noise-reduction options clean up dancing stray pixels and selectively blur areas of a frame with little detail; no other video-editing or -compression utility gives you this degree of control. A gamma option lets you alter a movie's brightness so it doesn't appear too dark when played on Windows computers, and deinterlacing options let owners of high-end video-capture equipment combine the odd and even video fields when compressing.



Compressing for the Web With Web-Motion, you answer a series of questions to arrive at the appropriate connection settings.

In the audio realm, Movie Cleaner Pro's support for IMA (Interactive Multimedia Association) 4:1 compression provides better fidelity than typical 8-bit multimedia sound. And an improved resampling algorithm delivers higher-quality results when you're going from, say, 44.1KHz to 22KHz.

In addition to these solid improvements, Movie Cleaner Pro now has a costar: Web-Motion, a $99.95 plug-in module that compresses movies for playback over the Internet. Web-Motion expands Movie Cleaner Pro to accommodate the Web's bandwidth limitations (see "Compressing for the Web"). Not only does it format a compressed movie to use QuickTime's fast-start feature, but Web-Motion creates the required HTML code. Sample audio and video clips let you preview your settings.

A session with Web-Motion will make you regret all the mean things you've ever said about slow CD-ROM transfer rates. Tell Web-Motion to give you a movie that plays smoothly over a 28.8-Kbps connection, and you get a jittery postage stamp with garbled sound. But it does let you explore the full range of quality and performance trade-offs Web movie moguls face. By balancing those trade-offs carefully, you can successfully cram QuickTime into the narrow pipe that is the Internet.

The Last Word

Movie Cleaner Pro 1.2.1 is a must-have for anyone who regularly endures the chore of movie compression. If you're contemplating the Web, add Web-Motion to your toolbox. If the Academy starts handing out awards for best compression utility and best supporting plug-in, Terran will get the first statues.—JIM HEID

Movie Cleaner Pro 1.2.1

RATING: ★★★★/7.4 **PROS:** Excellent interface; outstanding compression quality; batch processing. **CONS:** Can't generate custom palettes. **COMPANY:** Terran Interactive (408/278-9025, *http://www.terran-int.com*). **LIST PRICE:** $189.95.

Web-Motion 1.0

RATING: ★★★★/7.2 **PROS:** Excellent interface; creates HTML automatically; informative manual. **CONS:** None. **COMPANY:** Terran Interactive (408/278-9025, *http://www.terran-int.com*). **DIRECT PRICE:** $99.95.

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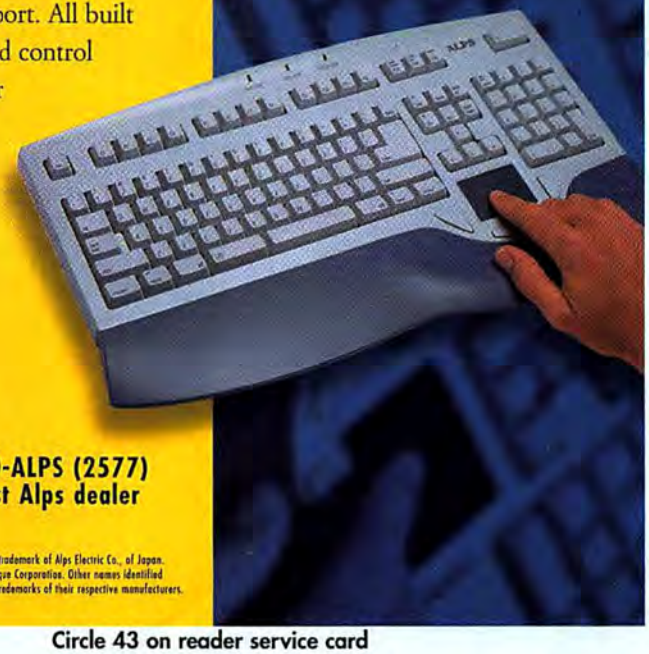

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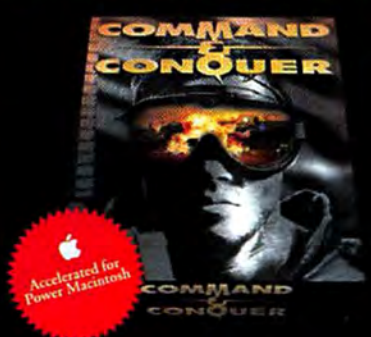

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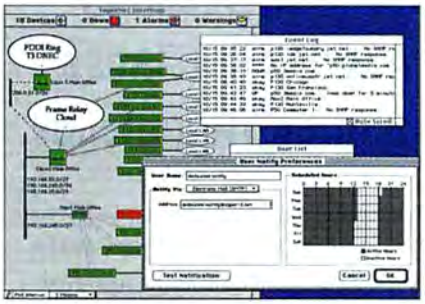
InterMapper

WORLD-CLASS NETWORK MANAGEMENT

RIVALING PACKAGES THAT COST ten times as much, Dartmouth College's InterMapper 1.0.1 is a commercial-grade—and commercially priced—network mapping and monitoring tool. InterMapper offers all the essentials necessary for administering SNMP (Simple Network Management Protocol) environments: a built-in network-diagram editor with automatic discovery; history logging; E-mail and pager notification; audible alerts; and status pop-ups. It delivers these with the reliability needed in day-to-day industrial environments, and its developers continually add new features.

Dartmouth distributes InterMapper electronically on the Internet. You can easily obtain updates online as they become available, and all registered users have access to beta versions. One of the most refreshing aspects of this kind of distribution arrangement is the speed with which the developers can test and integrate new features.

A painful prerequisite to deploying a network monitor is creating an accurate map of your network. InterMapper simplifies this process by automatically drawing a map for you. You enter a starting IP address for any SNMP-capable device in your network and specify the number of hops you want to explore, then InterMapper draws an accurate, clean network diagram before your eyes. You can use the diagram editor to rearrange nodes and links; add descriptive text; and depict devices with color coding, icons, special fonts, and other visually distinctive design elements.



Individual Freedom InterMapper's notification facility lets you set up separate schedules for each staff member in your network management group.

Once you have an accurate map, you can begin monitoring. Unlike competing products, InterMapper lets you open multiple network documents at one time, so you can monitor multiple networks or subnetworks simultaneously.

InterMapper continuously polls devices and displays the last known status of each device through color coding: green for OK, orange for overloads, yellow for error conditions, and red for down. You control the threshold at which each status change occurs. InterMapper also continuously tracks network traffic, and displays the relative volumes of packet flow using an ingenious "marching ants" metaphor—the more ants, the higher the traffic volume. This lets you instantly spot busy network segments that may require closer attention.

You can configure InterMapper to raise an alarm when a significant event, such as a router server failure, occurs. An abundance of notification options—visual highlighting, sounds, E-mail, Apple events, and application launching—let you tailor InterMapper's response to the urgency of the event. You also can set up a staff roster listing administrators, the devices for which they're responsible, and the times they're on duty.

The features list is expanding rapidly—a beta version I tested, due to ship shortly, includes remote Telnet and Web access to InterMapper statistics, strip-chart utilization graphs, and enhanced network discovery tools. InterMapper still lacks one useful feature: the ability to respond to SNMP traps, which is important for large networks where frequent SNMP polling isn't practical. But the developers say this feature is slated for a future release.

The Last Word

For managing networks of all sizes, InterMapper has no peer in the Mac marketplace. If you're a network manager, you need it.—MEL BECKMAN

RATING: ★★★★/7.7 **PROS:** Automatic network discovery and mapping; multiple notification options; traffic-flow analysis; multiple simultaneous networks. **CONS:** No SNMP trap support. **COMPANY:** Dartmouth College (603/646-2643, *http://www.dartmouth.edu/netsoftware/intermapper.html*). **LIST PRICE:** $795.

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Kai's Power Goo

FAMILY IMAGE-EDITING SOFTWARE THAT PROS WILL USE

KAI'S POWER GOO IS AN IMAGE TOOL that seems, at first glance, only as sophisticated as the family-fun "real-time liquid-image" toy its marketing slogans claim. The basic idea is to stretch, twist, twirl, and smudge portraits of people into scary or funny faces just by pushing on them with your mouse. After a few minutes of playing, though, you'll realize that Goo is destined to be a secret high-tech weapon of professional graphic artists.

Just like other MetaTools products, Goo doesn't follow any interface conventions; yet somehow, without menus, a manual, or any real help functions, Goo seems intuitive. There are four basic modules, called rooms: the In Room, where you load one of the 170 images (mostly faces) from the Goo Library or import your own from a scanner or CD; the Goo Room, where you stretch and twist an image; the Fusion Room, which lets you morph two different pictures into one; and the Out Room, where you save your images and animations.

In the Goo Room, there are two sets of rainbow-colored knobs. The first set smudges and nudges parts of the image. The second set stretches, shrinks, or twists the entire image when you pull or push a lever on the lower left. Along the way, you can save your modified face as an animation by clicking on the little filmstrip at the bottom of the screen. When you're finished, click on the movie camera icon. Goo cleverly supplies the in-between frames needed to make your transitions appear smooth and natural, in a looping movie-style clip.

Power Undo Correct mistakes anytime, anywhere in Kai's Power Goo. Even Photoshop can't do that.

The Fusion Room works in a similar fashion but lets you "paint" one face with the features of another. Imagine Newt Gingrich or Dan Quayle (both portraits are included in the library) with Bette Davis eyes and you get the idea.

Goo has an incredible graphics engine under its hood. While the effects are limited in number and best suited for manipulating faces, Goo gives you the much-desired power of multiple undo. Remove one effect or several, from just one part of an image or the whole thing. Even the latest release of the mighty Adobe Photoshop still provides only one undo level. And Goo's real-time image-editing effects and animation power are matched only by software costing several hundred dollars more.

The Last Word Yes, Goo is perfect for creating crazy greeting cards, fun screen savers, and your child's refrigerator art, but if you broke into your graphic designer's office late at night you might well find her huddled over Goo mocking up your next corporate ad campaign. The one drawback may be that you need to have the Goo CD in your drive for the software to run. Don't take any Goo from anyone—for $50 buy your own and do it yourself.—DEAN ANDREWS

RATING: ★★★★/8.3 **PROS:** Inexpensive; supports multiple undo; real-time animation effects. **CONS:** Effects are somewhat limited; must have CD in drive to run. **COMPANY:** MetaTools (805/566-6200, *http://www.metatools.com*). **LIST PRICE:** $49.95.

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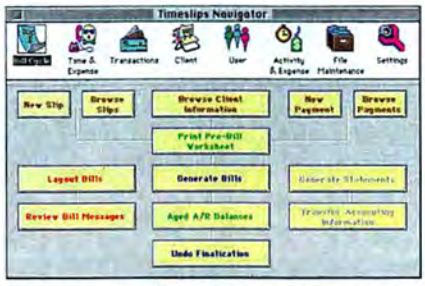
Timeslips 4.0

UNNECESSARILY COMPLEX TIME-TRACKING AND BILLING PACKAGE

TIMESLIPS DOES A GREAT JOB OF tracking and billing time for professionals who charge by the hour or by project, such as lawyers, accountants, and consultants. Unfortunately, you have to adapt to the program's idiosyncratic way of working to make the most of using Timeslips, and it takes serious effort to set up the program to run smoothly.

The Timeslips 4.0 package consists of two applications. TSTimer lets you fill out time slips on a day-to-day basis, while TSReport lets you set up clients (the people you bill), users (the people in your firm for whose services you charge), and activities (job functions performed by users). You also use TSReport to print bills and reports, and to post bills to Timeslips' accounts receivable module. TSReport's Navigator screen shows you the different tasks required for billing, using a flowchart metaphor. New to version 4.0 are many more-detailed reports, and a nifty abbreviations feature that saves you a lot of typing when you're filling out time slips.

You need to feed Timeslips a great deal of data if you want to get the best use of the package. You can assign up to five different rates to each user, activity, or client, or you can fix a flat rate for any time slip. Although you can import your existing client data from another application with the included TSImport program, you'll still need to modify each client record, entering information such as users and hourly rates. After setup, you can track and bill your time in great detail, generate invoices, and get extensive reports on your time and finances.



Navigating Your Bills Timeslips shows you the order of tasks you need to complete in its flowchartlike Navigator screen.

The program's Windows heritage shows in its interface. Tool palettes have lots of small, hard-to-read buttons, and most tasks require compulsive use of both the mouse and the keyboard—a difficult proposition if you're entering a lot of data. Worst of all is the poorly designed invoice editor. Timeslips' invoice template uses Courier, and you'll probably want to change it to a different font. Trouble is, you can't select multiple bill elements—there are as many as 60 separate data fields such as invoice date, client information, invoice number, and so on—and change them all at once; you have to modify each one separately in a modal dialog box. Luckily, since most businesses use just one or two invoice formats, you probably wouldn't have to deal with this very often.

The Last Word Timeslips' plethora of settings and choices makes it harder to learn and use than is necessary. The program would benefit from tucking away some complexity so that beginners could get running with less effort, and then unveiling its advanced features as they're needed. Still, if your time is your fortune, you want the best tool available to track and bill it. Warts and all, Timeslips is that tool.—TOM NEGRINO

RATING: ★★★★/7.1 **PROS:** Tracks and bills time in obsessive detail; extremely flexible. **CONS:** Steep learning curve; awful invoice editor. **COMPANY:** Timeslips (214/248-9232, *http://www.timeslips.com*). **LIST PRICE:** $299.95.

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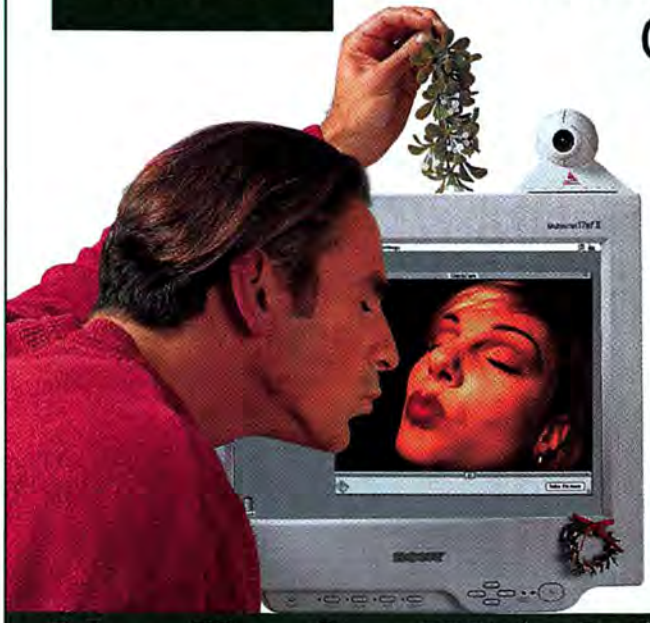

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"My Microtek ScanMaker® III Pays For Itself Everytime I Use It."

— C. David Piña, designer

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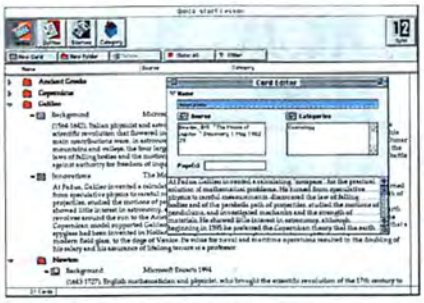
TakeNote

REFERENCE TOOL GOES HALFWAY TO REPLACING THE FAMILIAR INDEX CARD

ANYONE WHO'S EVER TRIED TO write a research paper knows that keeping track of facts and sources is the key to effective writing. TakeNote 1.0 from Academix makes the job easier by letting you manage notes, outlines, and citations with a single application.

TakeNote's electronic note cards take the place of paper index cards for storing up to 32K of formatted text (alas, TakeNote doesn't let you store sounds or pictures). You can tag each card with any number of categories that you define, and a filter function lets you view cards by name, category, content, or source (see "Taking Notes"). TakeNote also lets you organize note cards in folders nested up to ten levels deep.

To help plan your writing, TakeNote includes an easy-to-use outliner with four different formatting options: numeric, alphabetic and numeric, roman, and legal. You can rearrange outline topics by dragging them, and you can shift-click to select and move more than one topic at a time. A handy split-screen option lets you display the note and outline views side by side, so you can drag note cards into your outline. Unfortunately, when you use the keyboard to change the text style in the split view, an annoying bug makes the text appear in a random location in the window.



Taking Notes Double-clicking on a note card lets you edit its title, content, categories, and sources.

TakeNote also lets you maintain a list of sources for your note cards, including books, book sections, articles, and encyclopedia entries. For people who do their research on the World Wide Web, there's even an online reference format that stores URLs. Option–double-clicking on an online reference automatically launches your Web browser and loads the linked page.

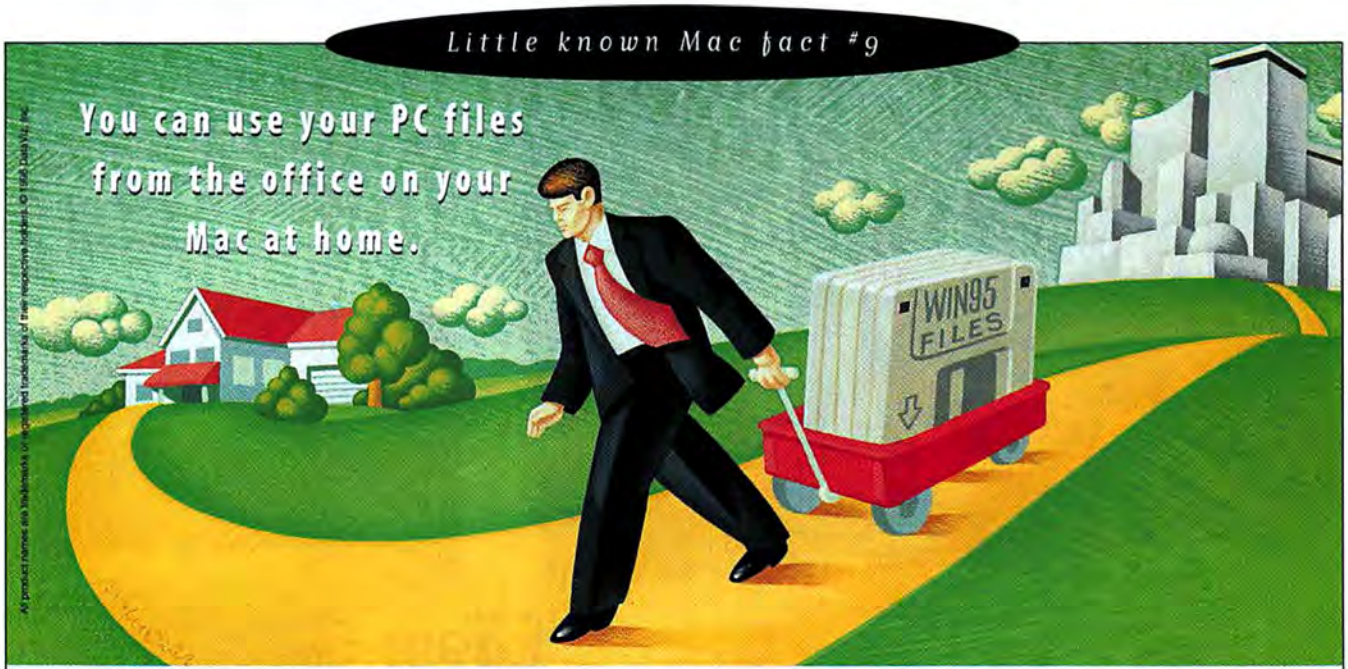
As a research tool, TakeNote suffers from a few notable deficiencies. For example, TakeNote supports only four styles for formatting sources (APA, Chicago, MLA, and Scientific CBE), and you can't create custom formats. There's also no simple way to import references from online databases, and you can only export note cards, outlines, and source lists in RTF (Rich Text Format) or HTML format. Finally, TakeNote doesn't include a global search-and-replace function or a spelling checker.

For researchers on a shoestring budget, TakeNote runs on a Mac Plus with only 4MB of RAM and 3MB of free disk space. Installation is a snap, although the installer loaded two unnecessary extensions onto my hard drive.

The Last Word Your word processor's built-in outliner may be sufficient for most uses, and TakeNote can't replace a dedicated bibliography manager such as Niles & Associates' EndNote Plus (see *Reviews*, April 1995). But if you need something in between, and you're still struggling with index cards, TakeNote is worth a look.

—FRANKLIN TESSLER

RATING: ★★★/5.1 **PROS:** Minimal hardware requirements; straightforward interface. **CONS:** Limited import/export capabilities; no custom source formats; no replace command. **COMPANY:** Academix Software (415/493-3003). **LIST PRICE:** $79.95.



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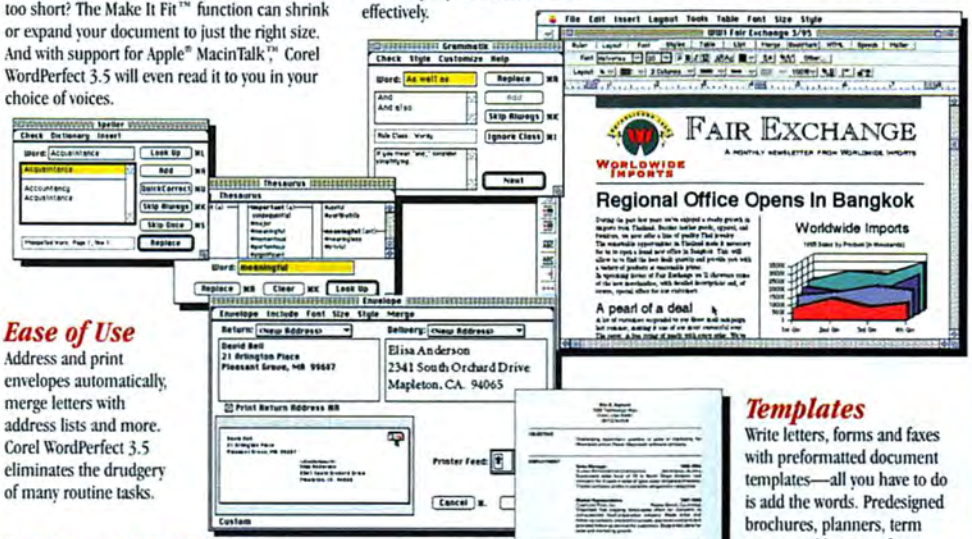

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Supra Simple Internet 33.6

MODEM MAKES INTERNET ACCESS QUICK AND EASY

SUZANNE ROADY

ANYONE WHO COULD USE A little hand-holding when it comes to the Internet will appreciate Supra Simple Internet's gentle introduction to the online world. For about what you'd spend on a plain-vanilla 33.6-Kbps modem, you get everything you need to tackle the Internet: a V.34-capable modem for connection speeds up to 33.6 Kbps; software for browsing, E-mail, faxing, and establishing an Internet connection; and an outstanding tutorial and Internet primer.

The modem gets its power from the ADB port instead of a standard bulky power supply. Don't worry if you have only one ADB port—the Supra Simple Internet cable has a pass-through into which you can plug your keyboard cable.

Setup is simple: you hook up the modem to your computer and install the software. The Supra Mosaic browser, NCD Systems' Z-Mail client software, and Supra's Faxcilitate are bundled with the modem, though the Supra works with any browser or E-mail package.

When it comes to Internet access, you have to sign up with SpryNet. You choose from three levels of service, ranging from $4.95 for three hours a month to $19.95 per month for unlimited access. Rates are competitive with those of local service providers, and SpryNet has local access numbers throughout the United States.

After signing up for Internet service, I turned to the tutorial CD. I was pleasantly surprised to find a comprehensive overview of Internet topics, as well as an easy-to-follow, click-by-click tutorial of the software bundled with the Supra. Although both the E-mail and browser programs are easy to navigate and have a clean, simple interface, those who want more detail will find it here. The tutorial is less enlightening when it comes to the faxing software, but the Faxcilitate manual is more than sufficient.

I did encounter a few problems once I got on the Internet. First, the modem is extremely loud when connecting, and there's no easy way to turn it down. After striking out with the user manual, I resorted to using AT commands (an ugly task, particularly for new modem users). I then had trouble resetting the modem. Although the modem status lights indicated I was still online, my browser insisted it had lost the connection. Finally, I had to restart my Mac to restart the modem (the Supra doesn't have a power switch). It's unclear whether the browser or the modem was the culprit; in either case, I restarted and experienced no further problems.

The Last Word Supra Simple Internet 33.6 has everything you need to access the Web (and, of course, the Internet). For newcomers to the Net, it's a nearly painless way to get connected.—MATT CLARK

RATING: ★★★★/7.0 **PROS:** Easy to install and configure for new users. **CONS:** No power or reset switch. **COMPANY:** Diamond Multimedia (360/604-1400, *http://www.diamondmm.com*). **LIST PRICE:** $159.95.

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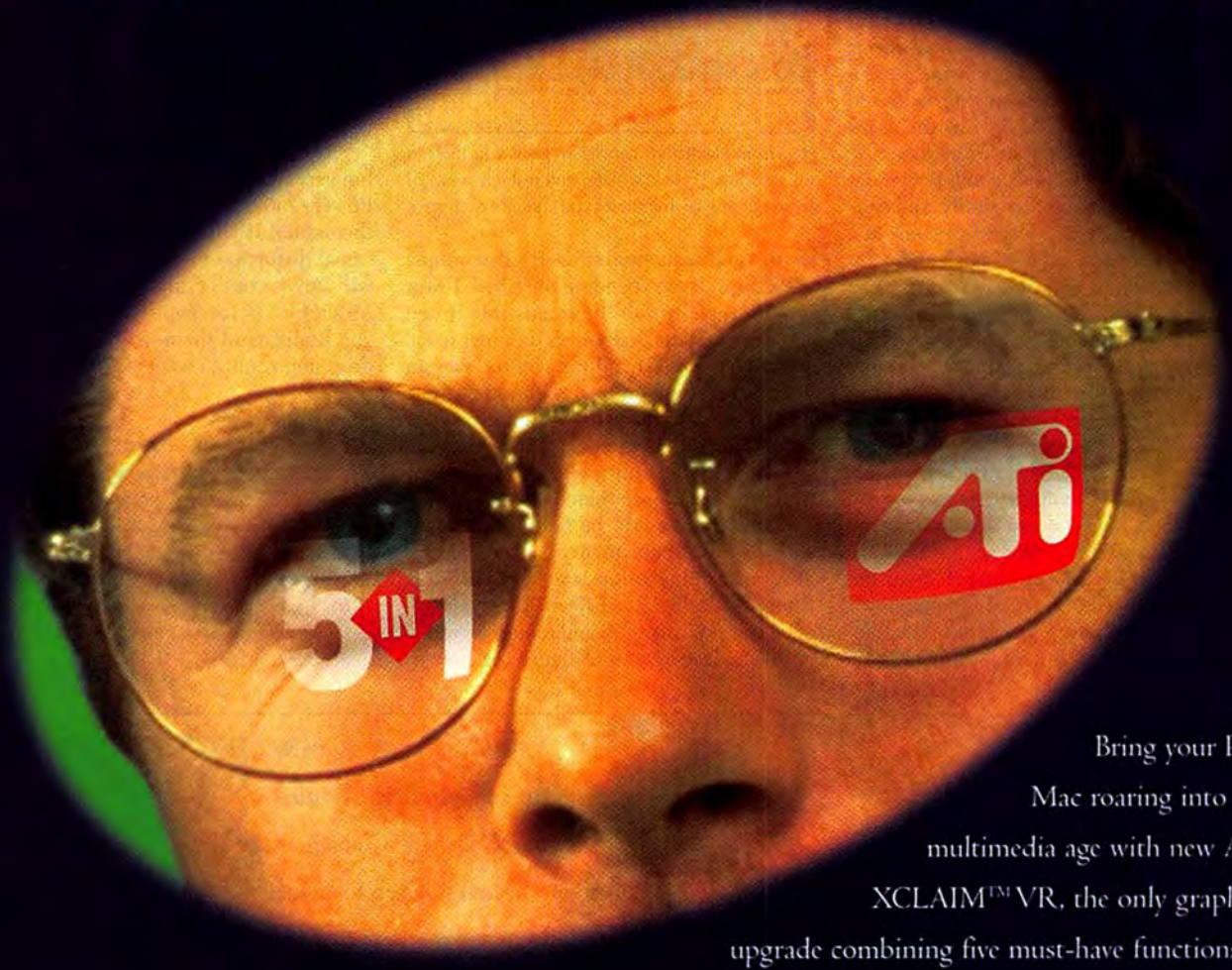

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MovieFlo' 2.0

IMAGE-DISTORTION SOFTWARE FOR PROS

WITH MOVIEFLO', YOU CAN WARP, morph, and distort still or moving images with ease. This powerful program gives professional effects artists highly controllable tools, a first-class rendering engine, infinite undos and redos, and power limited only by the user's imagination and a nonintuitive interface.

The simple tools in MovieFlo' 2.0.2 let you create basic shapes that define and control distortions. You can see a preview in a matter of seconds, then go back and redo your distortion or create a new one. You can link each action to a keyframe to animate distortions, in sequence, over time. This version also features improved keyframe controls and a timeline window for finer animation control. MovieFlo's Universal Reshape Tool is based on smooth curves, which are similar to Bézier curves but are simpler to edit. The curve controls let you match object shapes down to subpixels and change any point on the shapes. Where MovieFlo' really shines, though, is in the quality and speed of its rendering engine.

Unlike its sibling applications, MetaFlo' and Flo', MovieFlo' can import QuickTime movies and sequential stills. It's also unique in its use of layers: bending the Eiffel Tower into a pretzel would be impossible if you couldn't twist the image over or under itself. MovieFlo' not only allows you to layer an image over itself, but it also imports Adobe Photoshop 3.0 files with unlimited layers; unfortunately, it renders them only as PICT, TIFF, or QuickTime files, none of which support more than one layer mask.

Free-form Plasticity MovieFlo' gives you tools to scale, rotate, skew, translate, and reshape areas of an image; the keyframes let you animate each step.

MovieFlo' could be better integrated with its most complementary image-editing programs, Photoshop and Adobe After Effects. It lacks After Effects' highly developed compositing tools and robust keyframe interface, leaving you to figure out how to bounce between the two programs for intricate distortion and compositing. MovieFlo' also tests your RAM and processor-speed limits; running at the default 12MB yielded out-of-memory errors when rendering high-res QuickTime movies. Worse, MovieFlo' won't render without its hardware dongle. And the interface still fails to follow standard Mac conventions, forcing you to make frequent trips to the manual. Fortunately, the manual and tutorials are so improved that you'll be distorting and animating in no time.

The Last Word If you're looking for funware, check out the less-expensive Kai's Power Goo from MetaTools (also reviewed this issue). If you're looking for a professional distortion program for the Mac that will give you results to be proud of, MovieFlo' is for you. Its controls—once you understand them—offer literally jaw-dropping results.—MARK CHRISTIANSEN

RATING: ★★★★/7.2 **PROS:** Solid rendering engine; support for unlimited layers; new timeline features for sophisticated animation; many levels of user-definable control. **CONS:** Nonstandard interface; incomplete integration with related image-editing tools; hardware dongle. **COMPANY:** The Valis Group (415/435-5404, *http://www.valisgroup.com*). **LIST PRICE:** $699.

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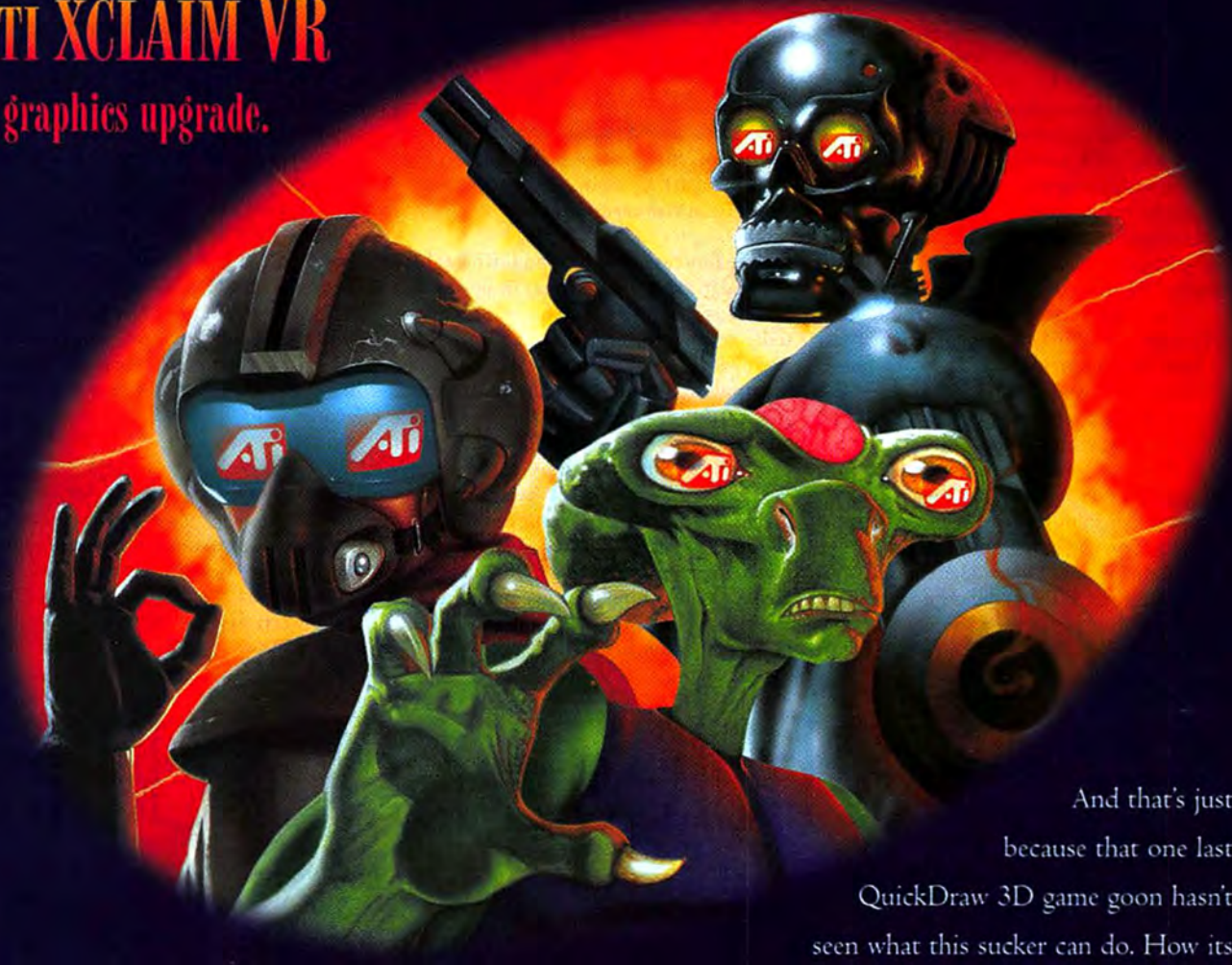

And that's just because that one last QuickDraw 3D game goon hasn't seen what this sucker can do. How its MAC2TV feature lets you plug your Mac right into your TV for the ultimate big screen spine-chiller that blows away arcade games once and for all. How its new ATI 3D technology breathes life into everything on screen. With face-blasting speed, butter-smooth 3D detail and full-screen QuickTime video. Oh ya, just in case your left brain demands some sensible reason to run right out and get one, XCLAIM™ VR does mean business apps, too. And in-your-boss's-face big screen presentations. And video capture from camcorders and VCRs. And VR on the Web. And because it's really five upgrades in one, you get more performance and features than a Power Mac 8500. On the other hand, XCLAIM VR costs just $269.* so chill out! See your dealer, or see more about it at www.atitech.ca.

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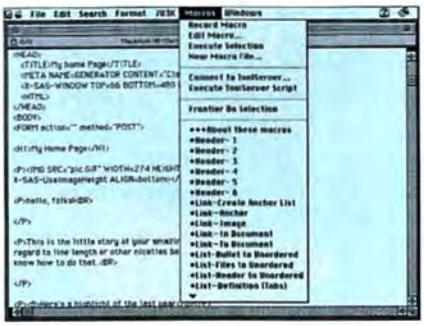
QUED/M 3.0

POWER EDITOR FOR PROGRAMMERS

YEARS AGO, WHEN APPLE'S MACintosh Programmers Workshop (MPW) was the only serious Mac development environment, Nisus Software's QUED/M was the editor of choice for most programmers. It was fast, compact, and brimming with features the primitive MPW environment lacked. Now that the Metrowerks CodeWarrior and Symantec environments—both with respectable editors of their own—have appeared on programmers' desks, is QUED/M still worth buying? With version 3.0.1, the answer is yes.

The new version supports the CodeWarrior, MPW ToolServer, and Symantec Think environments; has keyword color coding for C and C++; and lets you add common macros to a separate menu (the *M* in QUED/M stands for *macros*). Macro construction has been beefed up with its own language (you can also create macros using a Record procedure) so you can automate any function you're likely to use repeatedly. QUED/M is now Power Mac native, supports scripting with AppleScript and UserLand Frontier, and has a file-comparison tool that's a delight to use. The search-and-replace function goes beyond GREP (global regular expression parser) in power and ease of use, and the Undo function is essentially unlimited (OK, you can only undo 32,767 levels deep). QUED/M also lets you manipulate Windows- and Unix-format ASCII text files on the Web.



A Click Does It Nisus thoughtfully provides a set of macros for HTML, which you can extend to construct custom Web pages in minutes.

You can save Java applets from Sun's extensive archive (at *http://www.sun.com*) and your own applet templates as QUED/M macros—all you need is a Java-aware browser to become a cut-and-paste Java expert in a single day. Of course, you could do something like this in the Metrowerks and Symantec environments, but it's faster and easier in QUED/M.

Nisus also offers a fairly complete set of macros for HTML coding (see "A Click Does It")—most programmers will be able to figure out how to customize the HTML by skimming the macro code. Nonprogrammers will have a bit more difficulty; the language, which Nisus describes as BASIC-like, isn't at all transparent. Curiously, QUED/M's macro language is better explained in Nisus Writer 4.1's documentation. That's not a serious problem—once you get used to QUED/M and its capabilities, other word processors will seem so bloated, slow, and underpowered you'll want to switch to Nisus Writer before long.

The Last Word QUED/M is small (less than 1MB), fast, and pays for itself the first day you use it if you're a professional programmer. And because it's particularly well suited to the new world of Java, HTML, and scripting, the latest version is likely to make this old favorite the new favorite.—CHARLES SEITER

RATING: ★★★★/8.1 **PROS:** Fast; powerful; excellent scripting and HTML support. **CONS:** Cryptic macro programming language; could use more detailed documentation. **COMPANY:** Nisus Software (619/481-1477, *http://www.nisus-soft.com*). **LIST PRICE:** $119.

There's a faster, cleaner

Houston, we have liftoff. Presenting the Apple® Internet Connection Kit. Everything you need to blast onto the Internet, browse the web, and send e-mail in one simple to install, no hassle package. So what do you get? Well, the kit comes complete with Netscape Navigator™ 3.0 and Claris Em@iler™ Lite software, plus QuickTime® VR Player, RealAudio™ Player, Macromedia Shockwave, Adobe™ Acrobat™ Reader, Farallon's Look@Me, and a host of other software that installs easily in just minutes. As if that weren't enough, Apple Internet Dialer will even help you select an Internet Service Provider, and set up an account with just a few clicks of your mouse. And if you have any problems, Apple Guide online help can answer any Internet related questions you may have —

Virtual Pool

BILLIARDS SIM WITH A GUARANTEE

YOU CAN YAMMER ALL DAY ABOUT the cathartic release of blowing away hordes of demons with a hail of lead, but how often do you find yourself wielding a pump shotgun in your everyday life? Unlike most entertainment titles, MacPlay's Virtual Pool comes through in the practicality department, teaching skills you can really use in the ulcer-generating world of social reality.

As the name implies, Virtual Pool is a billiards simulator, and a quality one at that. If Virtual Pool has a drawback, it's that it's a bit too serious, perhaps as a result of the background of its developer, Celeris, in military simulators. MacPlay is so convinced of the educational value of Virtual Pool, it promises to refund your money if your game fails to improve.

Virtual Pool's focus is on the table, not on entertaining decor, eye-popping graphics, or cue-wielding avatars; still, its 3-D environment is impressive. At the touch of a mouse, you fly smoothly around the room, checking out the table from every angle and distance. You have tremendous control over every variable, including the strength of your shot, the angle of your cue stick, and the location of its impact with the ball. Once you've taken your best shot, the balls carom, rebound, roll, and spin with startling realism. When the balls stop rolling, though, it's sometimes difficult to line up shots, since the balls' lack of surface texture makes it a bit tricky to tell that they're spheres.

Fascinating Vision With the help of the Traces feature, I'm going to drop this 10–13 combo.

You can play straight pool, eight ball, or nine ball against several computer opponents—ranging in skill from computer-perfect Dead-Eye Dan to the aptly named Mrs. Offen—or you can take on a friend, either in the flesh or over a LAN, modem, or the Internet. Playing against the computer, you're limited to Virtual Pool's house rules, but against a friend you can give up your turn after a miscalled shot.

In practice mode, you can refine your skills or set up trick shots, observing the results of your adjustments in real time using Traces, a feature that's disabled during game play, and absolutely addictive (see "Fascinating Vision"). I found myself trapped for long stretches of time watching my shot change before my eyes as I adjusted the angle of the cue stick.

Virtual Pool comes with a video history of the game and a number of clips of Lou "Machine Gun" Butera performing trick shots. The clips are moderately entertaining, but their instructional value is nearly zero, and they left me with the bad aftertaste of multimedia filler.

The Last Word Am I a better player than before I used Virtual Pool? No, but at least I think I know what I'm doing wrong. Virtual Pool is a realistic-enough simulation to make me itch to rack up some real balls. It remains to be seen whether it's realistic enough to help me knock them down any faster.—CAMERON CROTTY

RATING: ★★★/6.1 **PROS:** Realistic 3-D animation; intuitive controls. **CONS:** No provision for custom rules; no surface texture on balls. **COMPANY:** MacPlay (800/462-2752, *http://www.macplay.com*). **LIST PRICE:** $39.95.

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Star Ratings

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Macworld's Star Ratings let you compare Macintosh products based on the authoritative assessments in our reviews and features.

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Vendors: Please write to Macworld Star Ratings, 501 Second St., San Francisco, CA 94107, to inform us of changes in the version number or list price of your product, or of changes to your phone number.

Software

BUSINESS

★★★/6.5 **Butler SQL 2.0.2,** EveryWare Development, 905/819-1173, $695. This SQL database is well suited for serving data over the Internet. *Oct 96, p. 104*

★★★★/8.4 **ClarisWorks 4.0,** Claris, 408/727-8227, $129 (estimated). The program has speed, a clean design, and low resource requirements. *Jun 96, p. 98*

★★★★★/9.5 **DeltaGraph 4.0,** DeltaPoint, 408/648-4000, $195. This top Macintosh graphing application still excels. *Sep 96, p. 90*

★★★★/8.2 **FileMaker Pro 3.0,** Claris, 408/727-8227, $199 (estimated). FileMaker 3 is now relational, Power Mac native, and more useful than ever. *Jun 96, p. 98*

★★★★/7.0 **GeoQuery 5.0,** GeoQuery, 708/357-0535, $295. Put your business data on the map. *Sep 96, p. 92*

★★★★/7.8 **Let's Keep It Simple Spreadsheet 1.0,** Casady & Greene, 408/484-9228, $189.95. New approach to spreadsheets uses graphical programming style. *Sep 96, p. 67*

★★★/6.3 **Map Factory,** ThinkSpace, 519/858-5047, $996. Unique raster-based mapping program. *Nov 96, p. 70*

★★★★/7.1 **Microsoft Excel 5.0,** Microsoft, 206/882-8080, $295 (estimated). Although it's the only game in town, Excel 5 is a glutton for RAM and disk space. *Jun 96, p. 98*

★★★/6.7 **Microsoft Word 5.1,** Microsoft, 206/882-8080, $320 (estimated). Fast, sleek, stable, and probably the most widely used Mac word processor on earth. *Jun 96, p. 98*

★★★/5.1 **Microsoft Word 6.0.1,** Microsoft, 206/882-8080, $295 (estimated). The most bloated word processor on earth may be mandatory in big corporations. *Jun 96, p. 98*

★★★★/7.1 **Panorama 3.0,** ProVue, 714/841-7779, $290 (estimated). This database program features easy, flexible forms, hypertext links, and fast network abilities. *Jun 96, p. 98*

★★★★/7.2 **PhoneDisc PowerFinder 2.2,** Digital Directory Assistance, 301/657-8548, $129. CD-ROM telephone directory offers instant response times. *Nov 96, p. 74*

★★/3.0 **Phone Search USA 2.0,** DeLorme Mapping, 207/865-1234, $49. Inexpensive but bare-bones telephone directory on CD-ROM. *Nov 96, p. 74*

★★★★/8.3 **Quicken Deluxe 6,** Intuit, 520/295-3220, $59.99. The best-selling package gets bigger and mostly better. *Feb 96, p. 65*

★★★★/8.8 **Sculpt 2.0,** Interactive Simulations, 619/658-9462, $895. Molecular modeling at blazing speeds. *Oct 96, p. 84*

★★★★/7.2 **Select Phone 4.0,** Pro CD, 508/750-0055, $99. Reliable telephone directory has nice interface. *Nov 96, p. 74*

★★/4.5 **Street Atlas USA 3.0,** DeLorme Mapping, 207/865-1234, $79. Map program update is better and cheaper, but still flawed. *Nov 96, p. 100*

★★★★/7.4 **WordPerfect 3.5,** Corel, 613/728-8200, $129 (estimated). In speed, interface efficiency, and Macintosh integration, WordPerfect beats all competitors. *Jun 96, p. 98*

EDUCATION/ENTERTAINMENT

★★★★/8.2 **Alphabet Express,** School Zone Publishing, 616/846-5030, $39.95. Lots of puzzles and games for teaching kids the alphabet, and so easy to use even parents might learn a thing or two. *Dec 96, p. 134*

★★★★/8.8 **Bad Mojo 1.0,** Pulse Entertainment, 310/264-5579, $54.95. Want to be a fly on the wall? *Sep 96, p. 96*

★★★★/7.4 **Beyond the Wall,** Twentieth Century Fox Home Entertainment, 310/369-3900, $29.95. Subtle but haunting emotional resonance in CD about Vietnam Veterans Memorial. *Dec 96, p. 134*

★★★/6.8 **ChemIntosh 3.4.4,** SoftShell, 970/242-7502, $799 ($199 academic, $99 student). Structure drawing tool is easy to use but isn't up to molecular modeling. *Nov 96, p. 98*

★★★★/8.0 **Cinemania 97,** Microsoft, 206/882-8080, $34.95. Indispensable multimedia guide to 20,000 films, with a streamlined interface. *Dec 96, p. 134*

★★★★/7.9 **Critical Mass: America's Race to Build the Atomic Bomb,** Corbis, 206/641-4505, $49.95. Easy interface to interactive 3-D graphics, with timelines and archival documents. *Dec 96, p. 134*

★★★★/7.7 **Descent II 1.0,** MacPlay, 800/462-2752, $59.95. Real enough to make you queasy. *Dec 96, p. 88*

★★★★/7.0 **Exploring the Lost Maya,** Sumeria, 415/904-0800, $49.95. Well-crafted interactive tour with QuickTime VR view of Mayan sites. *Dec 96, p. 134*

★★★/6.7 **Grolier Science Fiction: Multimedia Encyclopedia,** Grolier Interactive, 203/797-3530, $39.95. Fun but somewhat shallow guide to sci-fi books, movies, and culture. *Dec 96, p. 134*

★★★★/7.0 **Infinity City,** Headbone Interactive, 206/323-0073, $29.95. Educational CD for teaching math skills to kids. *Dec 96, p. 134*

★★★★/7.8 **Maple V Release 4,** Waterloo Maple, 519/747-2373, $995. Math software picks up speed and interface refinements. *Nov 96, p. 96*

★★★★/7.9 **Microsoft Bookshelf 1996-97,** Microsoft, 206/882-8080, $54.95. No other Mac CD serves up as many top-notch reference resources. *continues*

REAL PRODUCTS REAL RATINGS Reviews you can trust: Unlike other publications, Macworld rates only final shipping products, not prototypes. What we review is what you can actually buy. Outstanding ★★★★★ = 9.0–10.0 Very Good ★★★★ = 7.0–8.9 Good ★★★ = 5.0–6.9 Flawed ★★ = 3.0–4.9 Unacceptable ★ = 0–2.9

Star Ratings

Dec 96, p. 134

★★★★/8.5 **Microsoft Encarta 96 Encyclopedia,** Microsoft, 206/882-8080, $54.95. Solid information combined with maximum entertainment value. *Dec 96, p. 134*

★★★★/7.4 **Pantsylvania,** Headbone Interactive, 206/323-0073, $29.95. Highly interactive, completely off-the-wall fun. *Dec 96, p. 134*

★★★/6.8 **Paul Cézanne: Portrait of My World,** Corbis, 206/641-4505, $49.95. Interactive tour of Cézanne's life and art. *Dec 96, p. 134*

★★★/6.7 **Planet Earth: Explore the Worlds Within,** Macmillan Digital USA, 212/654-8500, $49.95. Interactive atlas goes beyond globe-trotting, but the interface could use a makeover. *Dec 96, p. 134*

★★/3.5 **Quest for Fame 1.0,** Virtual Music Entertainment, 508/688-8800, $48.95. Its execution is disappointing, but the game has a lot going for it otherwise. *Oct 96, p. 88*

★★★★/7.5 **RedShift 2,** Maris Multimedia, 415/492-2819, $54.95. Superb animations, film clips, and photographs make for a wealth of astronomical data. *Dec 96, p. 134*

★★★/6.9 **Saunders Interactive General Chemistry CD-ROM 2.1,** Saunders College Publishing, 800/782-4479, $49.95. First-year chemistry for the MTV generation. *Dec 96, p. 86*

★★★★/7.0 **Sheila Rae the Brave,** Broderbund Software, 415/382-4400, $39.95. Engaging entry for kids about a mouse, with songs and games. *Dec 96, p. 134*

★★★★/8.1 **Van Gogh Starry Night,** Voyager, 212/431-5199, $39.95. Just enough interactivity to make this a worthwhile CD-ROM, but not so much that you wander off in various directions. *Dec 96, p. 134*

★★★★/7.2 **Volcanoes: Life on the Edge,** Corbis, 206/641-4505, $49.95. Fascinating facts about volcano history from a *National Geographic* photographer. *Dec 96, p. 134*

★★★★/7.1 **Wing Commander IV,** Origin/Electronic Arts, 512/434-4263, $50. Minor improvements to a classic game. *Oct 96, p. 89*

GRAPHICS

★★★★/7.1 **Adobe Illustrator 6.0,** Adobe Systems, 415/961-4400, $595. This minor upgrade isn't enough to surpass FreeHand 5.5. *Apr 96, p. 54*

★★★★/8.5 **Adobe Photoshop 3.0.5,** Adobe Systems, 415/961-4400, $895. Still the most significant and capable image editor. *Jun 96, p. 78*

★★★/5.7 **Canvas 5.0,** Deneba, 305/596-5644, $599.95. Midrange graphics program has professional price. *Dec 96, p. 56*

★★/4.6 **CorelDraw 6 Suite,** Corel, 613/728-8200, $595. Graphics suite lacks solid image-editing and drawing programs. *Dec 96, p. 54*

★★★★/7.8 **ElectricImage Broadcast 1.0,** Electric Image, 818/577-1627, $2495. 3-D animation tool gets new price, new features. *Nov 96, p. 88*

★★/4.7 **Fastedit/Deluxe,** Total Integration, 847/776-2377, $249. Photoshop plug-in lets you edit quickly, but is expensive. *Nov 96, p. 92*

★★★★/7.5 **Form-Z RenderZone 2.8,** Autodessys, 614/488-9777, $1995. Impressive 3-D modeler gets rendering know-how. *Oct 96, p. 75*

★★★★/7.2 **Live Picture 2.5,** Live Picture, 408/464-4200, $995. Image editor can edit only the topmost visible layer, but is superfast. *Jun 96, p. 78*

★★★★/8.1 **Macromedia FreeHand 5.5,** Macromedia, 415/252-2000, $595. Draw program outperforms competitor, for now. *Feb 96, p. 74*

★★★★/8.9 **Painter 4.0,** Fractal Design, 408/688-5300, $549. Most artists should own Painter 4.0; its painting and special-effects capabilities simply can't be beat. *Jun 96, p. 78*

★★★★/7.0 **Sculpt 3D 4.1,** Byte by Byte, 512/305-0360, $495. High-end 3-D for the mainstream. *Sep 96, p. 81*

★★★★/8.1 **Slicer 1.0,** Fortner Research, 703/478-0181, $695. View 2-D slices of 3-D images. *Nov 96, p. 98*

★★★★/8.2 **Stylist 1.0,** Alien Skin Software, 919/832-4124, $199. Plug-in adds graphic and text style sheets to Illustrator. *Oct 96, p. 64*

★★★★/7.4 **TurboCAD 2D/3D 3.0,** IMSI, 415/257-3000, $149. Nearly high-end CAD program with educational-software price. *Dec 96, p. 61*

★★★/6.3 **xRes 2.0,** Macromedia, 415/252-2000, $799. Although improved, fast, and easy to learn, this image editor leaves room for improvement. *Jun 96, p. 78*

INTERNET/NETWORKING

★★★/5.7 **Amapi 2.11,** Yonowat, 415/788-1652, $398. 3-D modeler marred by awkward interface. *Nov 96, p. 87*

★★★★/7.2 **Apple Network Administrator's Toolkit,** Apple Computer, 408/996-1010, $599. Suite automates the most important chores of classroom management. *Dec 96, p. 70*

★★★★/7.0 **BeyondPress 2.0,** Astrobyte, 303/534-6557, $595. XPress-to-HTML conversion program whisks you from XPress to the Internet. *Oct 96, p. 57*

★★★★/7.7 **Bookends Web 3.2,** Westing Software, 415/945-3870, $179. Useful, flexible tool for creating bibliographies on the Web. *Dec 96, p. 82*

★★★/5.5 **cc:Mail Mobile for Macintosh 2.0,** Lotus Development, 617/577-8500, $145. Speedy and straightforward choice for PC-centric environments, but lacks many features. *Oct 96, p. 134*

★★★/6.6 **ChameleonNFS 3.6,** NetManage, 408/973-7171, $395 per user. Collection of small, fast Internet apps. *Nov 96, p. 81*

★★★★/8.6 **Claris Emailer 1.03,** Claris, 408/987-7000, $49 (estimated). The only application that dumps (almost) all of your messages in one in-box. *Oct 96, p. 134.* **Editors' Choice** for best E-mail over the Internet.

★★★/6.9 **Claris Home Page 1.0,** Claris, 408/727-8227, $99 (estimated). Home Page leads the pack of HTML editors. *Dec 96, p. 58*

★★★/6.8 **COPSTalk 2.0 for Windows 95,** CoOperative Printing Solutions, 770/840-0810, $159. Cross-platform networking for PC users who need access to Mac servers. *Nov 96, p. 68*

★★★★/8.0 **CyberGauge,** Neon Software, 510/283-9771, $139. Network monitoring for the masses. *Nov 96, p. 83*

★★★★/8.1 **Electronic Commerce Suite 2.0,** iCAT, 206/623-0977, $4995. Electronic Commerce Suite builds complex yet robust Web sites quickly and easily. *Oct 96, p. 104.* **Editors' Choice** for best software for building dynamic Web sites.

★★★★★/9.1 **EtherPeek 3.0,** The AG Group, 510/937-7900, $995. Slew of enhancements will make this network analyzer your right hand. *Dec 96, p. 77*

★★★/6.1 **Eudora Pro 3.0,** Qualcomm, 619/658-1200, $89. Internet E-mail reader improves, but not by much. *Nov 96, p. 77*

★★★★/8.1 **FirstClass 3.11,** SoftArc, 905/415-7000, $495 to $1495. Offers robust E-mail, conferencing, and other features, yet easy to use. *Oct 96, p. 134.* **Editors' Choice** for best company-wide E-mail.

★★★/6.7 **GlobalTransfer 1.0,** Global Village, 408/523-1000, $29.95. Transferring files the easy way. *Oct 96, p. 82*

★★/4.9 **golive Pro 1.1,** gonet communication, 415/463-1580, $99. Attractive HTML editor needs polishing. *Dec 96, p. 58*

★★★/5.6 **HexWeb XT 2.0,** HexMac International, 415/864-7592, $349. XPress-to-HTML conversion program whisks you from XPress to the Internet. *Oct 96, p. 57*

★★★★/7.9 **HTML Editor 1.1.4,** Rick Giles, *rick.giles@acadiau.ca,* $25. This text editor is a great all-around HTML coding aid. *Oct 96, p. 114.* **Editors' Choice** for best Web authoring tools.

★★★/6.8 **HVS Color 1.2,** Digital Frontiers, 847/328-0880, $99. Keep Web graphics small, colors true. *Oct 96, p. 72*

★★★★/8.1 **Internet Phone,** VocalTec, 201/768-9400, $50. Easy to set up once you have MacTCP—and best of all, no toll charges. *Nov 96, p. 132.* **Editors' Choice** for best telephony.

★★★/6.5 **LAN Commander,** Power On Software, 612/879-9190, $299.95 five-station pack. Network management made simple. *Oct 96, p. 79*

★★★★/8.7 **NetDoubler 1.0,** Asanté, 408/435-8388, $69.95 to $99. Boosts network speeds for large files. *Dec 96, p. 68*

★★★★/7.4 **Netscape Navigator 3.0,** Netscape Communications, 415/937-2555, $49. Still the best browser, but could use a diet. *Nov 96, p. 62*

★★★/6.6 **Now Up-to-Date Web Publisher 1.0,** Now Software, 503/274-2800, $129.95. Publish your calendars and contact lists on the Web. *Dec 96, p. 78*

★★★★/7.5 **PC MacLAN 6.0 for Windows 95,** Miramar Systems, 805/966-2432, $199. The choice for peer-to-peer cross-platform networking. *Nov 96, p. 68*

★★★/6.3 **QuickMail 3.6,** CE Software, 515/221-1801, $199 to $1449. Easy to use, but message-tracking features are limited. *Oct 96, p. 134*

★★★★/7.6 **Retrieve It 2.5,** MVP Solutions, 415/562-3457, $65. Speedy, complex searches of your computer and the Web. *Dec 96, p. 80*

★★★★/7.3 **Tango for FileMaker Pro 3.0,** EveryWare, 905/819-1173, $349. Tool kit for putting your FileMaker database on the Web. *Oct 96, p. 59*

★★★/6.7 **Tapestry 1.1,** Concept 1, 905/305-8655, $69. Beginners get help weaving the perfect Web site. *Oct 96, p. 80*

★★★/6.8 **tcpConnect4 4.0 Enterprise,** InterCon, 703/709-5500, $495 per user. Internet access suite is easy to set up, but lacks some conveniences. *Nov 96, p. 81*

★★★/5.5 **Timbuktu Pro for Networks 2.0,** Farallon Computing, 510/814-5000, $139 to $3999. Despite some drawbacks, this is the next-best thing to being there. *Oct 96, p. 134*

★★★★/7.4 **Tumbleweed Publishing Essentials 1.0,** Tumbleweed Software, 415/363-7022, $695. A faster, cheaper alternative to Acrobat. *Oct 96, p. 70*

★★★★/7.9 **Webmaker 2.2,** Harlequin, 617/374-2400, $99. For converting FrameMaker documents to the Web, WebMaker has no equal. *Oct 96, p. 114.* **Editors' Choice** for best Web authoring tools.

★★★★/8.0 **YoYo 1.2,** Big Island Communications, 408/342-8300, $149. Innovative telephony software is an amazing productivity tool. *Nov 96, p. 64*

MEDIA

★★★★/8.2 **AD-1 Pro Audio Analyzer 2.0,** Intelligent Devices, 410/744-3044, $349 to $449. Audio meters for the discriminating producer. *Dec 96, p. 84*

★★★★/7.4 **Adobe Premiere 4.2,** Adobe Systems, 415/961-4400, $795. Video editor offers significant enhancements, including CD-ROM Movie Maker plug-in. *Mar 96, p. 90*

continues

Macworld says

GOTTA HAVE IT

The Mac OS ought to work this way.

Reviews, July 1995

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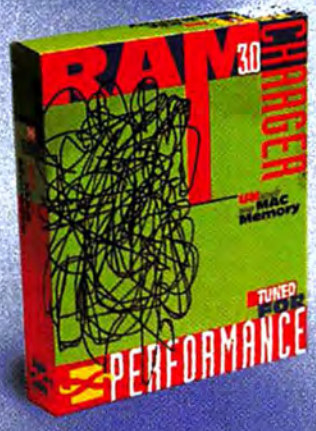

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Star Ratings

★★★★/7.1 **Apple Media Tool 2.0,** Apple Computer, 408/996-1010, $495. Easy for simple interactivity, but advanced features require add-on products. *Aug 96, p. 100*

★★★★/7.1 **Authorware 3.5,** Macromedia, 415/252-2000, $4995. Authorware offers great features and usability but is very costly. *Aug 96, p. 100*

★★/3.9 **Digital Box Office 1.0,** PowerProduction Software, 310/937-4411, $599. Combines object- and timeline-oriented authoring, but has an awkward user interface. *Aug 96, p. 100*

★★★★/7.2 **Director 5.0,** Macromedia, 415/252-2000, $1195. Multimedia authoring tool gets polish and a performance boost. *Jul 96, p. 52.* **Editors' Choice** for best authoring programs. *Aug 96, p. 100*

★★★★/7.0 **HyperStudio 3.1,** Roger Wagner Publishing, 619/442-0522, $199.95. Easy and powerful educational authoring tool. *Aug 96, p. 100.* **Editors' Choice** for best authoring programs.

★★★★/7.0 **mTropolis 1.0,** mFactory, 415/548-0600, $4995. Fast and easy to implement; but limited text support, and it's expensive. *Aug 96, p. 100*

★★★/6.8 **Oracle Media Objects 1.0.5.4,** Oracle, 415/506-7000, $495. Good interface and multiplatform support, but requires too much scripting. *Aug 96, p. 100*

★★★★/7.8 **Pro View 1.3,** E-magine, 800/603-1474, $99.95. Back-to-basics presentation tool. *Nov 96, p. 95*

★★★★/8.0 **QuarkImmedia 1.0,** Quark, 303/894-8888, $995. An easy move from print to multimedia. *Dec 96, p. 57*

★★★★/7.0 **Special Delivery 2.1,** Interactive Media, 415/948-0745, $259. Easy to use, but lacks hypertext. *Aug 96, p. 100.* **Editors' Choice** for best authoring software.

★★★★/7.1 **SuperCard 2.5.2,** Allegiant Technologies, 619/587-0500, $595. Superb resource-management and interface support, but can be sluggish. *Aug 96, p. 100.* **Editors' Choice** for best authoring software.

PUBLISHING

★★★★/7.1 **3D Web Workshop 1.0,** Specular International, 413/253-3100, $249. Instant Internet presence in 3-D. *Oct 96, p. 68*

★★★★ **Adobe PageMaker 6.0,** Adobe Systems, 206/622-5500, $895. Page-layout program has practical and powerful improvements. *Nov 95, p. 60*

★★★★ **FrameMaker 5.0,** Adobe Systems, 408/975-6000, $895. Page-layout program is a good choice for technical-document creation. *Nov 95, p. 63*

★★★/6.0 **MasterJuggler Pro 2.0,** Alsoft, 713/353-4090, $89.95. MasterJuggler wants to be your favorite font manager. *Sep 96, p. 72*

★★★/6.1 **Ready,Set,Go 7.0.2,** Abbott Systems, 914/747-3116, $395. Revamped page-layout software offers more than the basics. *Sep 96, p. 83*

★★★/6.1 **Suitcase 3.0.1,** Symantec, 503/334-6054, $69.95. Suitcase vies with MasterJuggler for superiority, and still no clear winner. *Sep 96, p. 72*

★★★/5.3 **UniQorn 1.01,** SoftPress Systems Limited, 415/331-4820, $895. Page-layout program has QuickDraw GX support—but not much else. *Aug 96, p. 56*

UTILITIES

★★/4.1 **At Ease 3.0,** Claris, 408/987-7000, $49. Can be easily defeated with a Disk Tools floppy or separate startup disk. *Nov 96, p. 146*

★★★★/7.9 **BorderGuard Access Router,** Network Systems, 612/424-4888, $1700. Transparent encryption of AppleTalk and TCP/IP lets you use the Internet instead of a WAN. *Nov 96, p. 146*

★★★/6.2 **cypherPad,** usrEZ Software, 714/756-5140, $49. Easy setup and usage; good basic security. *Nov 96, p. 146*

★★★★/7.3 **DiskGuard 1.5,** ASD Software, 909/624-2594, $79. Good combination of low price and easy installation. Solid, basic protection. *Nov 96, p. 146*

★★★★/7.9 **DiskLock 4.0,** Symantec, 541/984-2490, $129. Easy automatic setup makes this a snap to configure; has most protection features you need. *Nov 96, p. 146*

★★/4.9 **DiskWorks 3.0.2,** MicroNet Technology, 714/453-6100, $299. Disappointing hard-drive formatter has an awkward interface. *Dec 96, p. 62*

★★★/6.1 **Dr. Solomon's Anti-Virus Toolkit 7.61,** S&S International, 617/273-7400, $85. Antivirus utility can check DOS disks. *Dec 96, p. 60*

★★★/6.0 **Empower 5.0.4,** Magna, 408/879-7907, $129. Decent design, but overpriced for features offered. *Nov 96, p. 146*

★★/3.9 **Faxstf 3.2,** STF Technologies, 816/463-1412, $99 to $295. Faxing application suffers from its revision. *Oct 96, p. 66*

★★★★/8.0 **FileGuard 3.0,** ASD Software, 909/624-2594, $139. Most features, combined with reliable performance and robust protection. *Nov 96, p. 146.* **Editors' Choice** for best desktop security software.

★★★/6.6 **Font Box 1.8.3,** Insider Software, 619/622-9900, $79.95 to $169.95. Font fixer could use some repairs. *Nov 96, p. 90*

★★/4.9 **FoolProof 2.5,** SmartStuff Software, 503/231-4300, $39. Decent design, but lacks features and is too easy to defeat. *Nov 96, p. 146*

★★★★/7.0 **Hard Disk ToolKit 2.0.1,** FWB, 415/463-3500, $199. Reliable hard-drive formatter can actually tweak a drive to run faster. *Dec 96, p. 62*

★★★★/8.2 **Here & Now 2.0,** Software Architects, 206/497-0122, $75. The best choice for helping Windows 95 files work with the Macintosh. *Sep 96, p. 60*

★★★★/8.5 **HSM ToolKit 1.0,** FWB, 415/325-4392, $79. Infinite storage made infinitely more simple. *Oct 96, p. 77*

★★★/6.8 **KeyQuencer 2.0,** Binary Software, 310/449-1481, $39.95 direct. Macro program for speed addicts and control freaks. *Dec 96, p. 59*

★★★★/7.8 **KeyServer 4.1,** Sassafras Software, 603/643-3351, $800. Easy-to-install tool enforces usage thresholds and lets you track applications. *Nov 96, p. 146*

★★★/5.6 **LaserMerge Electronic Paper 2.0,** MindGate Technologies, 615/937-6800, $95. Souped-up printing utility multiplies your output options. *Sep 96, p. 87*

★★★/5.9 **Mac Drive 95 1.0,** Media4, 515/225-7409, $60. Mac Drive 95 offers acceptable, if inelegant, file sharing with Windows 95. *Sep 96, p. 60*

★★★★/8.3 **Mac Manager 3.1,** ELS, 352/375-0558, $299. Provides both safe and impenetrable access protection and data encryption. *Nov 96, p. 146*

★★★/6.7 **MacOpener 2.0,** DataViz, 203/268-0030, $50. A marked improvement over the flawed original, but its reliance on DOS extensions is disappointing. *Sep 96, p. 60*

★★★/6.8 **MacTransfer 1.0,** Insignia Solutions, 408/327-6000, $55. For inexpensive simplicity with some limitations, MacTransfer is a solid choice for cross-platform file exchanges. *Sep 96, p. 60*

★★★★/7.5 **MATLAB Statistics Toolbox 2.0,** The MathWorks, 508/647-7000, $395. Statistical analysis tool on steroids. *Dec 96, p. 75*

★★★★★/9.3 **MATLAB Wavelet Toolbox 1.0,** The MathWorks, 508/647-7000, $895. Wavelet analysis tool on steroids. *Dec 96, p. 75*

★★★★/7.7 **McAfee VirusScan 2.0,** McAfee Associates, 408/988-3832, $65. World-class virus protection has little impact on Mac's performance. *Dec 96, p. 60*

★★★★/8.1 **NetShade 1.1,** Atemi, 217/352-3689, $299. Easy to install and configure, it scrambles data and foils all but the most determined sniffers. *Nov 96, p. 146*

★★★★/8.1 **Network Security Guard 3.1,** Mr. Mac Software, 619/453-2845, $289. Scans your network for unintentional guest access, poorly chosen passwords, and other security loopholes. *Nov 96, p. 146*

★★★★/7.1 **On Guard 2.1,** Power On Software, 216/735-3116, $70. Easy install, attractive Finder-like configuration menu; low-priced. *Nov 96, p. 146*

★★★★/8.2 **QuicKeys 3.5,** CE Software, 515/224-1995, $119. QuicKeys exists to make macros easier. *Dec 96, p. 59*

★★★★/8.6 **RAM Doubler 2.0,** Connectix, 415/571-5100, $99. Control panel now triples your RAM. *Dec 96, p. 67*

★★★/6.1 **SecretAgent 3.0,** AT&T, 847/405-0390, $249. An overpriced one-trick pony; its advantage is cross-platform compatibility. *Nov 96, p. 146*

★★★★/7.8 **Spell Catcher 1.5.6,** Casady & Greene, 408/484-9228, $59.95. Resurrected Thunder 7 is still much more than a spelling checker. *Dec 96, p. 73*

★★★★/7.3 **StuffIt Deluxe 4.0,** Aladdin Systems, 408/761-6200, $129.95. Same compression format, but faster and with a brilliant Finder twist. *Oct 96, p. 61*

★★★★/7.0 **ultraSecure,** usrEZ Software, 714/756-5140, $239. A textbook of required security features, hampered by so-so manual and complex installation. *Nov 96, p. 146*

★★★/6.4 **ultraShield,** usrEZ Software, 714/756-5140, $149. Mixed combination of terrific features with complex installation and multiple warnings about use with other software. *Nov 96, p. 146*

★★/4.3 **UnderCover,** SmartStuff Software, 503/231-4300, $39. A slightly buggy one-trick pony. *Nov 96, p. 146*

★/2.1 **ViaCrypt PGP 4.0,** ViaCrypt, 602/944-0773, $129. Hard to install, hard to use; few saving graces. *Nov 96, p. 146*

★★★/6.9 **Virex 5.6.7,** Datawatch, 508/988-7000, $100. Fast scanning, but caused general system slowdown. *Nov 96, p. 146*

★★★★/7.0 **WebLock 1.0,** Maxum Development, 708/830-1113, $195. Gives your Web server access protection via password log-in to protect private pages. *Nov 96, p. 146*

★★★★/8.5 **WebStar SSL 1.2.4,** Quarterdeck, 310/309-3700, $1295. Lets you use transparent encryption to exchange sensitive data safely with security socket layer-capable Web browsers. *Nov 96, p. 146.* **Editors' Choice** for best network security.

Hardware

CD-R DRIVES

★★★/6.9 **APS CDR 2X4,** APS Technologies, 816/483-6100, $900. This 2X CD-R drive offers average performance at a good price. *Sep 96, p. 132*

★★/4.6 **C104 0354,** ClubMac, 714/768-8130, $1019. Not much of a bargain for one of the slowest of the big drives. *Sep 96, p. 140*

★★★/6.4 **CDD2000,** Philips Electronics, 408/453-5129, $1035. Reasonably priced 2X CD-R drive, but HFS support not impressive, and support for many other formats nonexistent. *Sep 96, p. 132*

continues

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Star Ratings

★★★/6.8 **CDM240,** DynaTek Automation Systems, 902/832-3000, $999. This 2X write/4X read CD-R drive's faster read is of limited value in a drive built primarily for writing. *Sep 96, p. 132*

★★★★/7.2 **CDM400,** DynaTek Automation Systems, 902/832-3000, $1199. Low cost 4X CD-R drive, with no sacrifices in software, features, or performance. *Sep 96, p. 132.* Editors' Choice for best CD recorders.

★★★/6.5 **CD-R 1002,** Smart and Friendly, 818/772-8001, $899. This 2X CD-R drive is a decent performer but company skimped on the SCSI cable and passive terminator. *Sep 96, p. 132*

★★★★/7.2 **DCDR-100,** Direct Connections, 612/937-6283, $1195. This 4X CD-R drive came with our favorite premastering software. *Sep 96, p. 132.* Editors' Choice for best CD recorders.

★★/4.9 **DisKovery 650CDR,** Optima Technology, 714/476-0515, $1395. CD-R Access software is great, but the QuickTopix software is the pits. The Toast bundle boosts its value . . . but not as high as the price tag. *Sep 96, p. 132*

★★★/6.2 **HammerCD-R 2X,** FWB, 415/325-4392, $1400. Solid construction and robust software bundle are pluses, but this average 2X CD-R mechanism is pricey. *Sep 96, p. 132*

★★★/5.6 **Master CD Plus,** MicroNet Technology, 714/453-6100, $1195. CD-R drive gives 2X performance at a 4X price. *Sep 96, p. 132*

★★★/6.6 **Master CD Pro,** MicroNet Technology, 714/453-6100, $1895. This CD-R drive performs as well as other 4X units, but has exorbitant price tag. *Sep 96, p. 132*

★★/4.4 **PlayWrite 2000,** Microboards, 612/470-1848, $1195. Poor software, cheap SCSI cable, and no terminator for this expensive 2X CD-R drive. *Sep 96, p. 132*

MISCELLANEOUS HARDWARE

★★★★/8.2 **AirCommunicator Lite,** Air Communications, 408/567-8000, $695. Cellular fax modem with flair offers a complete solution. *Nov 96, p. 79*

★★★/6.4 **Alps Adjustable Mouse,** Alps Electric, 408/432-6000, $39.95. Mouse's movable shell tilts for optimum angle. *Sep 96, p. 98*

★★★/6.5 **Color QuickCam 1.0,** Connectix, 415/571-5100, $299. Low-cost camera for passable digital video. *Sep 96, p. 79*

★★/4.6 **Fujix DS-220,** Fuji, 914/789-8100, $1200. Digital camera misses the mark. *Sep 96, p. 85*

★★★★/7.0 **MessagePad 130,** Apple Computer, 408/996-1010, $695. Apple adds backlighting to the Newton. *Aug 96, p. 78*

★★★★/8.8 **MicroWorks,** Cambridge SoundWorks, 617/332-5936, $349. In terms of price for performance, speaker system is in a class by itself. *Dec 96, p. 66*

★★/3.1 **Midi Land S35/818 Systems,** Midi Land, 909/592-1168, 818 desktop speaker $79.95, S35 subwoofer $239.95. Speaker system has mediocre sound quality. *Nov 96, p. 72*

★★★/6.0 **NovaModem 288 1.0,** NovaLink Technologies, 510/249-9777, $229. Decent performance from PowerBook PC Card modem. *Nov 96, p. 94*

★★★★/7.3 **Nupowr for PowerBook 500 series,** Newer Technology, 316/943-0222, $745 with no RAM, $975 with 4MB, $1215 with 8MB. Solid path to PowerPC for 500-series notebooks. *Aug 96, p. 54*

★★★★/7.8 **Polaroid PDC-2000,** Polaroid, 716/256-4436 ext. 868, $3695 as tested. New breed of camera creates output as cool as its hardware. *Aug 96, p. 52*

★★★★/7.6 **PowerBook 500 PowerPC Upgrade,** Apple Computer, 408/996-1010, $769 with 8MB of RAM. Solid path to PowerPC for 500-series notebooks. *Aug 96, p. 54*

★★★★/7.6 **SoundWorks,** Cambridge SoundWorks, 617/332-5936, $219.95. High-quality audio product at an affordable price. *Dec 96, p. 66*

★★★/6.9 **Viewpoint Model 100,** Lightware, 503/641-7873, $5795. Much light, some sound in a surprisingly small projector. *Nov 96, p. 85*

★★★★/7.1 **Yamaha System 45,** Yamaha, 714/522-9240, $249.95. Speakers give you decent sound at a decent price. *Nov 96, p. 72*

MODEMS/NETWORKS

★★★★/8.6 **Netopia 440,** Farallon, 510/814-5000, $1475. ISDN router has Mac-centric features so is easy to set up and maintain. *Sep 96, p. 68*

★★★/6.9 **Pacesetter,** ADC Kentrox, 503/643-1681, $1199. Versatile and easy-to-configure router can be used with ISDN or frame-relay connections. *Sep 96, p. 70*

★★★/5.9 **Pipeline 130,** Ascend Communications, 510/769-6001, $1995. Router supports ISDN or frame-relay connections, but with limited diagnostic indicators. *Sep 96, p. 70*

★★★/6.8 **Pipeline 25,** Ascend Communications, 510/769-6001, $895 to $1495. ISDN router with analog ports is useful for home offices. *Sep 96, p. 68*

★★★★/7.1 **Pipeline 50,** Ascend Communications, 510/769-6001, $1695. ISDN router has IP routing and multiprotocol bridging, but no Mac-specific setup aids. *Sep 96, p. 68*

★★★★/8.0 **PowerPort Platinum PC Card,** Global Village Communication, 408/523-1000, $399 (list). A complete, well-conceived mobile communications package. *Jul 96, p. 141.* Editors' Choice for best PC card modems.

PRINTERS

★★★/5.7 **4039 10plus,** Lexmark, 606/232-2000, $1249. Fast on text, but slow PostScript emulation; high-quality output; expensive. *Sep 96, p. 181*

★★★/6.5 **Canon CLBP 360PS,** Canon USA, 516/328-5000, $12,500. Color laser printer had good text output, but other tests were mediocre. *Nov 96, p. 157*

★★★/6.7 **Color LaserWriter 12/600 PS,** Apple Computer, 408/996-1010, $6989 (estimated). Slow speed but excellent text output. *Nov 96, p. 157*

★★★★/7.2 **Digital Science 8650 PS,** Eastman Kodak, 800/235-6325, $10,795 plus $995 for Ethernet. Top performance and solid image quality highlight Kodak's newest dye-sub printer. *Oct 96, p. 60*

★★★/5.1 **HP Color LaserJet 5M,** Hewlett-Packard, 408/246-4300, $9195. Inferior output; slow; messy consumables. *Nov 96, p. 157*

★★★★/7.1 **HP LaserJet 5MP,** Hewlett-Packard, 408/246-4300, $1299. Consistently quick performance and high-quality output. *Sep 96, p. 181.* Editors' Choice for best personal laser printers.

★★★/6.5 **HP LaserJet 5Si MX,** Hewlett-Packard, 408/246-4300, $4899. Pricey, but offers top speed and quality. *Jun 96, p. 116.* Editors' Choice for best workgroup printers.

★★★/5.8 **LaserWriter 12/640 PS,** Apple Computer, 408/996-1010, $1599 to $1829. Workgroup printer is slower—but cheaper—than HP's LaserJet 5M. *Oct 96, p. 62*

★★★/5.6 **LaserWriter 4/600 PS,** Apple Computer, 408/996-1010, $929 (estimated). Slow overall performance, good text and adequate-quality graphics output. *Sep 96, p. 181*

★★★/6.6 **magicolor CX/32,** QMS, 334/633-4300, $7999. Unexceptional output for this color laser printer. *Nov 96, p. 157*

★★★/6.5 **microLaser Pro/8,** Texas Instruments, 800/848-3927, $1299. Speedy performance, but poor-quality graphics output. *Sep 96, p. 181*

★★/4.9 **OL610e/PS,** Okidata, 609/235-2600, $949. Middling performance; poor text and graphics output quality. *Sep 96, p. 181*

★★★/6.1 **OL810e/PS,** Okidata, 609/235-2600, $1439. 1200 by 600 dpi; quick performance; excellent text but poor graphics output. *Sep 96, p. 181*

★★★★/7.0 **Optra C,** Lexmark International, 606/232-2000, $6849. This color laser printer has easy-to-use controls; good text and graphics output. *Nov 96, p. 157*

★★/4.3 **Personal LaserWriter 300,** Apple Computer, 408/996-1010, $652 (estimated). Slow performance, grainy output, low price. *Sep 96, p. 181*

★★★★/7.9 **Phaser 350,** Tektronix, 503/682-7377, $3495. Solid-ink printer delivers laser-quality output. *Nov 96, p. 67*

★★★★/7.6 **Phaser 550,** Tektronix, 503/685-3067, $6995. Fastest color laser printer tested; superior output; true 1200-dpi resolution. *Nov 96, p. 157.* Editors' Choice for best color laser printers.

★★★★/7.2 **XPrint 4915 Plus,** Xerox, 716/442-4028, $4995. Top-notch graphic output; a great color laser printer value. *Nov 96, p. 157.* Editors' Choice for best color laser printers.

★★★/6.9 **XPrint 4925 Plus,** Xerox, 716/442-4028, $8995. Color laser printer's graphics results are among the best, but speed was unimpressive. *Nov 96, p. 157*

STORAGE

★★★★/7.6 **2.6GB Optical,** La Cie, 503/520-9000, $1999. Low price, great software, and uses high-performance Sony mechanism. *Oct 96, p. 141.* Editors' Choice for best optical drives.

★★/4.8 **704.2GB,** Liberty Systems, 408/983-1127, $1799. Far too costly for a just-above-average performer. *Sep 96, p. 140*

★★★/ 6.6 **8 Plex,** Plextor, 408/980-1838, $539. Uses its own mechanism, FWB driver software, but costs more than other bundles. *Dec 96, p. 145*

★★★★/7.1 **8× External CD-ROM Drive for Mac,** La Cie Limited, 503/520-9000, $199 (estimated). Price/performance leader, well-implemented audio software. *Dec 96, p. 145.* Editors' Choice for best CD-ROM drive.

★★★/5.8 **Advantage 8× External CD-ROM,** MicroNet Technology, 714/453-6000, $249 (estimated). Performed well, but lacks power-on light and external audio-control buttons. *Dec 96, p. 145*

★★★/6.0 **APS 4.0,** APS, 816/483-1600, $1100. Very fast drive, decently priced. *Sep 96, p. 140*

★★★/5.0 **APS 9.0,** APS, 816/483-1600, $2200. A fast drive but power supply fan was extremely noisy. *Sep 96, p. 140*

★★★★/7.2 **APS PD4,** APS Technologies, 816/483-1600, $499.95. Excellent low-priced, small-footprint unit, bundled with APS PowerTools, PowerCD. *Oct 96, p. 141.* Editors' Choice for best optical drives.

★★/4.9 **Atlas QM34300,** MegaHaus, 713/534-3919, $1299. Average performer; suffers from a passive terminator. *Sep 96, p. 140*

★★/4.6 **Blue 4000,** Microtech International, 203/468-6223, $1820. Pricey, above-average performer with faulty LCD display. *Sep 96, p. 140*

★★★/6.9 **CDS658PSD,** Dynatek, 902/832-3000, $349. Nicely designed; offers speedy performance

continues

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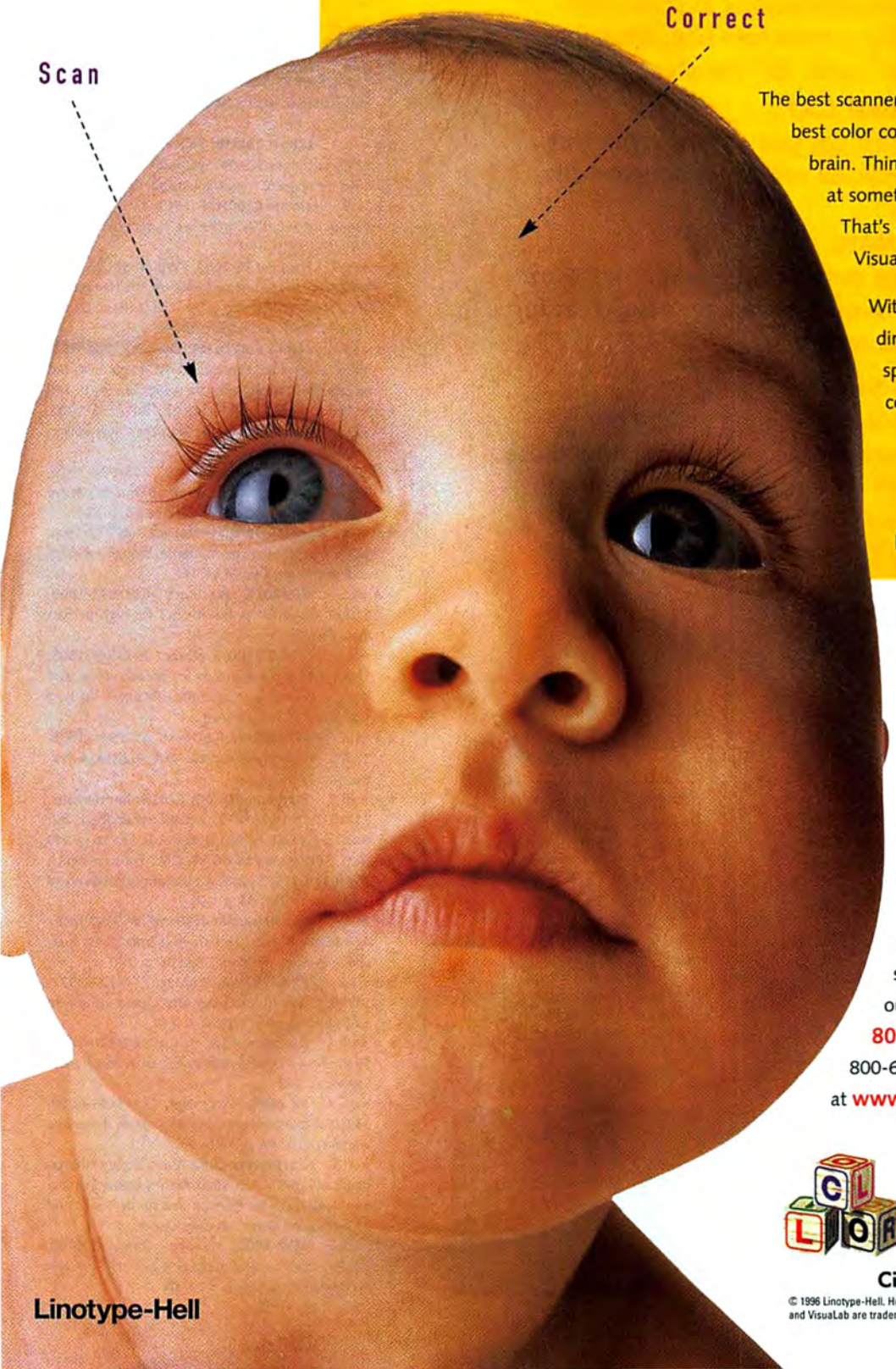

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and superior driver software. *Dec 96, p. 145*

★★★★/7.4 **DC DLT 4000,** Direct Connections, 612/937-9771, $3495. Top performer among DLT drives in price, performance, warranty. *Aug 96, p. 143.* **Editors' Choice** for best tape-backup system.

★★★/6.6 **DC SDT 7000,** Direct Connections, 612/937-9771, $999. The top performer in DAT drives for performance, price, and warranty. *Aug 96, p. 143.* **Editors' Choice** for best tape-backup system.

★★★/5.9 **DisKovery 4100W,** Optima Technology, 714/476-0515, $1565. Shipped with a Mac-to-PC file-exchange utility; beware the short warranty. *Sep 96, p. 140*

★★★/6.7 **EZFlyer 230MB,** SyQuest, 510/226-4000, $299; cartridges $29.95. SyQuest's new removable drive tries (again) to outzip Iomega. *Oct 96, p. 56*

★★/4.9 **Hammer 8700FMF,** FWB, 415/474-8055, $3449. Slow, pricey drive; we expect better from FWB. *Sep 96, p. 140*

★★★/6.7 **Hammer PE 2000,** FWB, 415/325-4392, $1079. For the fastest performance, the Hammer PE 2000 is the choice. *Jun 96, p. 153.* **Editors' Choice** for best 1.0GB to 2.5GB hard drive.

★★★/5.5 **HDA4.0MVD-M1,** DynaTek, 902/832-3000, $999. Fast, economical, AV-ready unit; but replace the bundled software driver. *Sep 96, p. 140*

★★★★/8.3 **Jaz Drive,** Iomega, 801/778-1000, $599.95. Iomega thinks big with Zip's new sibling. *Jun 96, p. 48*

★★★/5.4 **MC1991,** MegaHaus, 713/534-3919, $2399. Fast and reasonably priced, but its passive termination can be a headache. *Sep 96, p. 140*

★★/4.8 **PCA80SC,** Philips Electronics, 408/773-1304, $299. Disappointing performance, though excellent audio software. *Dec 96, p. 145*

★★★/5.0 **PD4207S,** ProDirect, 612/941-1805, $1050. Good value, but it's not for high-performance needs. *Sep 96, p. 140*

★★★★/7.0 **PDC 2400,** ProDirect, 612/941-1805, $800. 2.4GB drive is tops for speed, value, and design. *Jun 96, p. 153.* **Editors' Choice** for best 1.0GB to 2.5GB hard drive.

★★/4.8 **PDST9000W,** ProDirect, 612/941-1805, $2085. Eminently affordable, but sluggish performance. *Sep 96, p. 140*

★★★/5.2 **Platinum PL4.0G,** CMS Enhancements, 714/517-0915, $1499. Active termination, but won't serve high-performance needs. *Sep 96, p. 140*

★★/4.6 **Platinum PL4.0G-W,** CMS Enhancements, 714/517-0915, $1550. A little pricey for average performance. *Sep 96, p. 140*

★★★/5.2 **PocketHammer 4100FMF-W,** FWB, 415/474-8055, $2569. Too steep a price for a just-above-average performer. *Sep 96, p. 140*

★★★/5.5 **PR2.4207WP,** ProMax, 714/727-3977, $1995. Case with extra bay offers good value with an additional drive. *Sep 96, p. 140*

★★★/5.1 **Quantum Atlas,** La Cie, 503/520-9000, $969. An average performer for an average price. *Sep 96, p. 140*

★★★/5.4 **SB-8640,** MicroNet, 714/453-6000, $3380. A top performer, but why only a three-year warranty? *Sep 96, p. 140*

★★★/5.5 **SCSI Express CD37,** Micro Design International, 407/677-8333, $505. Slightly slower than the 8× drives, this 6.7× drive offered sturdy design and well-designed driver software. *Dec 96, p. 145*

★★★/5.3 **SSW-4100,** MicroNet, 714/453-6045, $2320. Solid, rugged packaging but only average performance. *Sep 96, p. 140* m

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What are the myths and musts of Mac protection? What are the 10 most common power protection mistakes? The top tips for adding reliability to your Mac? Get your FREE copy and find out!

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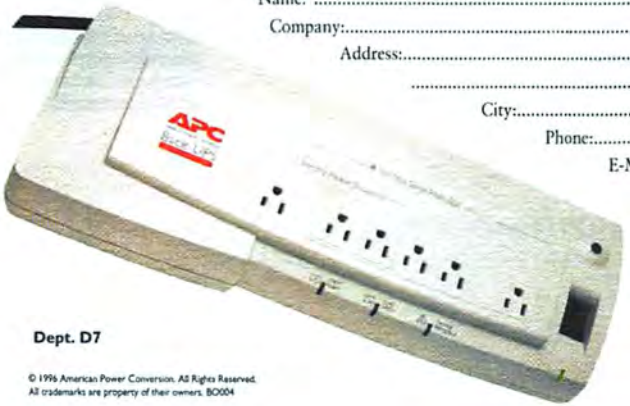

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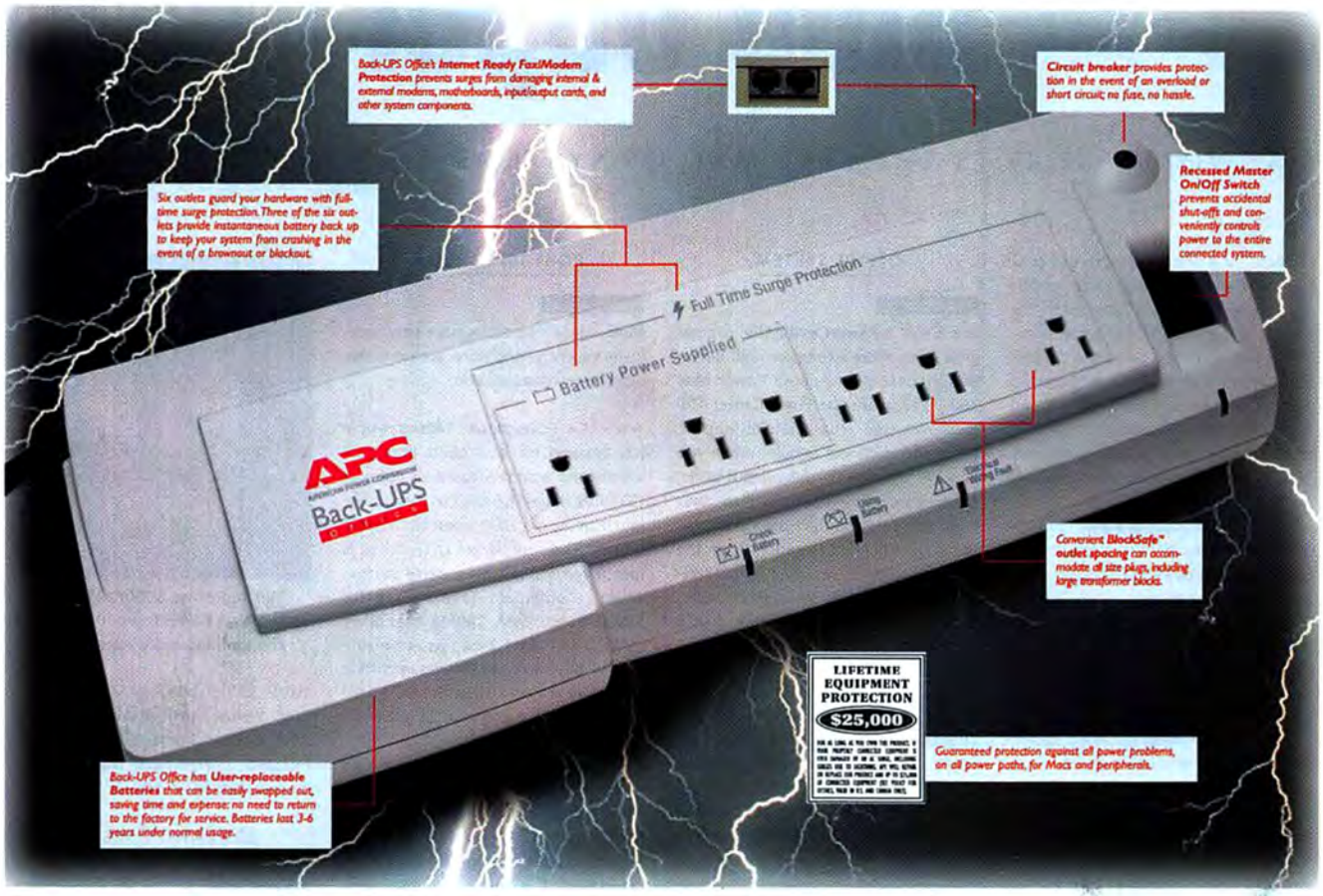
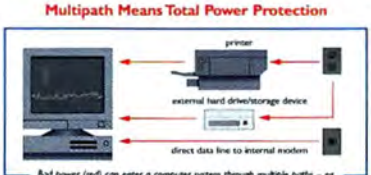


At last, a safe place to plug everything: Multipath Back-UPS Office for Mac workstations and peripherals

Facing the darkness is hard, but inevitable: You have a better chance of winning the lottery than of escaping power problems: They're the single largest cause of computer data loss and hardware damage.

Back-UPS Office provides reliable power for your entire system. Instantaneous battery backup ensures uninterrupted operation of your CPU, monitor and an external storage device. Full-time surge suppression and site-wiring fault protection spreads a true Multipath safety net under any remaining integrated peripherals, like modems, printers, faxes and phone systems. Back-UPS Office also provides convenient BlockSafe™ outlet spacing to handle all size plugs – even large block transformers.

Multipath Means Total Power Protection



Bad power (red) can enter a computer system through multiple paths – eg. printer, data and phone/fax lines – even if computer A/C is protected.

The Multipath protection of Back-UPS® Office™ shields your peripherals and guards your computer from bad power on every path, providing clean, safe power (green), to your entire system.

Unique Multipath protection keeps your Mac and data safe

Plugging a phone line into your computer doubles your vulnerability to power problems; add any peripheral, and it triples. Even if your AC power-line is shielded, when a surge hits an unprotected peripheral, it can blaze down serial and data lines, and toast your expensive Mac.

Back-UPS Office's compact design installs easily on desktop, floor or mounts to wall.

Multiple peripherals and data lines to and from your system are vital, but dangerous. Without them, you can't do your job. However, if a power sag makes your modem drop the line while you're downloading from the Internet, or locks your keyboard before you've saved work, you lose time, money and spend another late night at the office to meet your deadline.

Back-UPS Office protects your entire system

Until now, protection for your entire system required several devices. But multi-device protection can leave you vulnerable to line noise and unwanted data glitches created by the voltage differential between outlets. Those glitches are prevented with the Back-UPS Office common voltage reference.

Back-UPS Office means true Multipath protection, clean, safe power to every peripheral, and instant battery backup to keep your cutting edge system and O/S from crashing. It means protection for less by integrating the security of a surge suppressor with the power of a UPS, guaranteed up to $25,000.

RECOMMENDED 1996 ReselleNews SPRING COMDEX

"Back-UPS Office [is] a shoo-in for the small-office/home-office computing market and for general desktop workstations"
-Computer Reseller News

APC has won more awards for reliability than all other brands combined

The Multipath Power Protection Advantage	Traditional Surge Protector	Traditional UPS	Back-UPS Office
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Data			•
Phone			•
Total Outlets	7	2	6
Number of Block Outlets			2
Protection from			
Surges	•	•	•
Spikes	•	•	•
Blackouts		•	•
Brownouts		•	•
Overvoltages			•
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with Pentium 100 w/15" monitor		10	10
Battery backup for			
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Monitor		•	•
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Traditionally, protecting all your equipment meant buying a surge suppressor and a UPS. Even then, only your AC line was protected. New Back-UPS Office protects all paths to your equipment: Bulletproof Multipath protection

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Mac Superguide

MACWORLD SELECTS THE BEST MAC OS SYSTEMS

Looking for a new Macintosh but confused about which of all the new models to buy? Look no further. Each month, the *Mac Superguide* section provides *Macworld*'s picks for the best Mac OS systems. Typically we recommend three top choices: an Editors' Choice winner and two runners-up. Occasionally we'll have more or fewer top choices in categories with unusually competitive—or uncompetitive—options.

You'll also find *Macworld* Star Ratings and Macworld Lab performance benchmarks for all Mac OS systems shipping as we went to press in late October 1996. You may read about other Mac models in *Macworld* and elsewhere, but those are prototypes not yet available—the only systems rated here are those you can actually buy.

For Mac systems reviewed earlier, the summaries below include the issue date and page number of the article. In some cases, such as faster versions of existing Macs, there is no full review and thus no cross-reference. New systems are indicated in the benchmark by the ▶ icon.

Star Ratings and Editors' Choice designations may have changed since previous issues, based on the current lineup of systems and any price changes; the winners listed here are the current ones.

All prices but Power Computing's are company-estimated street prices; actual price may vary. Power Computing sells direct, so the prices listed here are the ones you would actually pay. Unless otherwise noted, all systems include a keyboard and mouse, but not a monitor or modem. Apple systems do not include a keyboard except for Performa and PowerBook models. DayStar systems do not include a hard drive, RAM, keyboard, or mouse, although we add their cost in determining the prices reported here.

For price comparisons, figure on spending about $800 for a monitor and, if they're needed, $175 for a 28.8-Kbps or 33.6-Kbps modem, $100 for an extended keyboard, $50 for a mouse, $750 for a 2GB hard drive, $125 for 2MB of VRAM, and $275 for 16MB of RAM.

OFFICE SYSTEM

Editors' Choice

★★★★/7.3 **PowerCenter 150** A great price, plus more expansion and better performance than Apple's Power Mac 7600/132, make the PowerCenter 150 minitower the ideal general-purpose office Mac for most people. While you don't get the 7600's video-input ports, chances are you won't need them anyhow. Power Computing does skimp on the video RAM but is generous on the cache. Power Computing (512/388-6868): $2095, 16MB RAM, 512K cache, 1MB VRAM (4MB maximum), 1.0GB hard drive, 8× CD, 3 free drive bays, 3 PCI slots. *Dec 96, p. 106*

★★★/6.2 **Power Macintosh 7600/132** Thanks to a recent price reduction, Apple's flagship office Mac is now only $200 more than the PowerCenter 150. While the 7600 is a bit slower and less expandable than the PowerCenter, it is

The PowerCenter 150 (shown in a now-discontinued desktop case) offers great expansion and speed.

nonetheless a strong performer. An added bonus for some people is the built-in video-input circuitry. The desktop case also saves room over a minitower. Apple Computer (408/996-1010): $2295, 16MB RAM, 256K cache, 2MB VRAM (4MB maximum), 1.2GB hard drive, 8× CD, 1 free drive bay, 3 PCI slots. *Dec 96, p. 106*

PORTABLE SYSTEM

Editors' Choice

None Apple's portables have been lackluster recently, and none warrants this ultimate recommendation.

★★★/6.4 **PowerBook 1400cs** Apple has lowered the cost of its notebook slightly and accommodated an optional CD-ROM drive. The result is a better system than the old 5300 series, but no barn burner. The new, larger LCD screen is nice, even though it's passive matrix. Apple Computer (408/996-1010): $2900, 16MB RAM, 750MB hard drive, optional 6× CD, 11.3-inch passive matrix LCD, 1 drive bay ($3500 model 1400c has active matrix LCD and 1.0GB hard drive), 2 PC Card slots. *Jan 97, p. 58*

★★★/5.9 **PowerBook Duo 2300c** A lot of power in a small package, this system could double as a desktop if you use a docking station. However, it's not cheap. Apple Computer (408/996-1010): $4699, 20MB RAM, 1.1GB hard drive, 14.4-Kbps modem, 8.5-inch active matrix LCD. *Apr 96, p. 58*

SMALL-OFFICE/HOME-OFFICE SYSTEM

Editors' Choice

★★★★/7.6 **PowerBase 240** Pro-level performance for a lower price than Apple's Performa 6400/200, plus a strong selection of features and greater expansion capability, make this tower a great buy for consultants and small businesses. Power Computing (512/388-6868): $2295, 16MB RAM, 256K cache, 2MB VRAM (4MB maximum), 1.2GB hard drive, 8× CD, 3 free drive bays, 3 PCI slots. *Jan 97, p. 60*

★★★★/7.4 **Performa 6400/200** Good performance contrasts with limited internal expansion. The recent price drop makes this tower more attractive despite its limitations. A unique feature is its TV tuner slot. Apple Computer (408/996-1010): $2119, 16MB RAM, 256K cache, 1MB VRAM (1MB maximum), 2.4GB drive, 8× CD, 1 free drive bay, two 7-inch PCI slots, TV/FM tuner slot, 28.8-Kbps modem. *Dec 96, p. 106*

The SuperMac S900/225 is not as fast as a PowerTower Pro, but it's cheaper and more expandable.

EDUCATION SYSTEM

Editors' Choice

★★★★/7.3 **PowerBase 180** Strong performance for a low price, plus good expandability and features such as 3-D video acceleration, make this tower a great buy for cash-strapped schools and students. Power Computing (512/388-6868): $1595, 16MB RAM, 256K cache, 2MB VRAM (4MB maximum), 1.2GB hard drive, 8× CD, 3 free drive bays, 3 PCI slots. *Jan 97, p. 60*

Editors' Choice

★★★★/7.1 **Power Macintosh 5400/180** This all-in-one Mac—available only to schools—eliminates the need for several cables that could get damaged or stolen in a school setting. Rich in features—including a good monitor—and moderate in speed, the 5400 is a good classroom Mac. Apple Computer (408/996-1010): $1999, 16MB RAM, 1MB VRAM (1MB maximum), 1.6GB hard drive, 4× CD, no free drive bays, 7-inch PCI slot, TV/FM tuner slot, Ethernet card, internal stereo speakers, monitor included.

PHOTOGRAPHS BY KEVIN CANDLAND

REAL PRODUCTS REAL RATINGS Reviews you can trust: Unlike other publications, Macworld rates only final shipping products, not prototypes. What we review is what you can actually buy. Outstanding ★★★★★ = 9.0–10.0 Very Good ★★★★ = 7.0–8.9 Good ★★★ = 5.0–6.9 Flawed ★★ = 3.0–4.9 Unacceptable ★ = 0–2.9

IMAGE-EDITING AND 3-D GRAPHICS SYSTEM

Editors' Choice

★★★★/7.4 **Genesis MP 720+** The ultimate Mac system speeds through multiprocessor (MP)–enabled programs like Adobe Photoshop and Strata StudioPro Blitz. Its high expandability means you could equip it with an internal RAID system and a recordable CD-ROM drive and still have free bays. The oversize tower is a bit imposing, but it leaves room for everything you might need. For non-MP programs, it performs like any same-megahertz single-CPU Mac. DayStar Digital (770/967-2077): $10,714, 16MB RAM, 512K cache, 4MB VRAM (4MB maximum), 2.0GB hard drive, 8× CD, 7 free drive bays, 6 PCI slots. *Dec 96, p. 120*

★★★★/7.5 **Power Macintosh 9500/180MP** A solid second in performance at half the price; this is a terrific deal for pros who need a multiprocessor system. The 9500's case doesn't hold as much as the Genesis MP's, and it's not as easy to add internal peripherals, but it's still sizable. Apple Computer (408/996-1010): $5199, 32MB RAM, 512K cache, 2MB VRAM (4MB maximum), 2.0GB hard drive, 8× CD, 2 free drive bays, 6 PCI slots. *Dec 96, p. 120*

★★★★/7.2 **Genesis MP 360+** Like the Genesis MP 720+, the MP 360+ features a cavernous tower case to hold an impressive array of peripherals. Like the 9500/180MP, it offers strong performance at a lower price than the 720+. But the 9500/180MP is a better deal unless you need the internal expansion. DayStar Digital (770/967-2077): $7814, 16MB RAM, 512K cache, 4MB VRAM (4MB maximum), 2.0GB hard drive, 8× CD, 7 free drive bays, 6 PCI slots. *Dec 96, p. 120*

PUBLISHING AND DESIGN SYSTEM

Editors' Choice

★★★★/8.0 **SuperMac S900/225** Nearly as fast as Power Computing's PowerTower Pro 225 for a significant $700 less, and with an extra free drive bay, the SuperMac S900/225 is the best high-performance deal around. The S900 also has an easier-to-upgrade case design than competing Apple and Power Computing towers. Expect availability to be limited until late winter 1997 as chip production ramps up. Umax Computer (510/226-6886): $4295, 32MB RAM, 512K cache, 8MB VRAM (8MB maximum), 2.1GB hard drive, 8× CD, 4 free drive bays, 6 PCI slots. *Dec 96, p. 120*

For ultimate Photoshop performance, the Genesis MP 720+ is tops—with a price to match.

Editors' Choice

★★★★/7.9 **PowerTower Pro 225** The fastest single-CPU Mac offers the top performance needed for publishing pros. With recent price reductions by Apple and Umax, the PowerTower Pro 225's price is less of a bargain than it used to be, and for many the $700 extra cost compared to the Umax SuperMac S900/225 won't be worth the 5 percent faster performance. Although the included Speed Doubler software increases the Pro 225's performance difference, you can buy that software for about $70 and still pocket more than $600 in savings. Power Computing (512/388-6868): $4995, 32MB RAM, 1MB cache, 8MB VRAM (8MB maximum), 2.0GB hard drive, 8× CD, 3 free drive bays, 6 PCI slots. *Dec 96, p. 120*

★★★★/7.8 **SuperMac S900/200** Running close behind the 225MHz Macs at a great price, this system is an excellent choice for the cost-conscious power user. Umax Computer (510/226-6886): $3795, 32MB RAM, 512K cache, 8MB VRAM (8MB maximum), 2.1GB hard drive, 8× CD, 4 free drive bays, 6 PCI slots. *Dec 96, p. 120*

MULTIMEDIA AND VIDEO CREATION SYSTEM

Editors' Choice

★★★★/7.4 **Genesis MP 720+** The ultimate Mac system speeds through multiprocessor (MP)–enabled programs like Adobe Premiere and After Effects. Its high expandability means you could equip it with an internal RAID system and a recordable CD-ROM drive and still have free bays. The oversize tower is a bit imposing, but it leaves room for everything you might need. For non-MP programs, though, it performs like any same-megahertz Mac. DayStar Digital (770/967-2077): $10,714, 16MB RAM, 512K cache, 4MB VRAM (4MB maximum), 2.0GB hard drive, 8× CD, 7 free drive bays, 6 PCI slots. *Dec 96, p. 120*

WEB AND INTRANET SERVER SYSTEM

Editors' Choice

★★★★/7.8 **SuperMac S900/200** With great performance at a great price, plus a simple-to-upgrade case design and plenty of expansion capability, this system is well suited to being a departmental intranet or moderate-demand Web server. Umax Computer (510/226-6886): $3795, 32MB RAM, 512K cache, 8MB VRAM (8MB maximum), 2.1GB hard drive, 8× CD, 4 free drive bays, 6 PCI slots. *Dec 96, p. 120*

Every Mac Tested and Rated

Longer bars are better. Core results are times as fast as a Centris 650 (Centris 650 = 1.0). Multiprocessor results are times as fast as a Power Mac 9500/150 (9500 = 1.0). Only shipping systems are tested and rated.

▶ New this issue.
Editors' Choice winners in red.

	Core Mac Performance	Star Rating*
Apple Computer		
▶ Performa 6360	4.0	★★★/5.3
Performa 6400/180	4.0	★★★/6.6
Performa 6400/200	5.6	★★★★/7.4
▶ Power Macintosh 5260/120 **	2.6	★★★/5.5
▶ Power Macintosh 5400/180 **	4.3	★★★★/7.1
▶ Power Macintosh 6400/200 **	4.5	★★★/6.4
Power Macintosh 7200/120	4.1	★★/4.8
Power Macintosh 7600/132	5.0	★★★/6.2
Power Macintosh 8500/150	5.9	★★★/6.2
Power Macintosh 8500/180	6.7	★★★/6.4
Power Macintosh 9500/180MP	6.9	★★★★/7.5
Power Macintosh 9500/200	7.7	★★★/6.8
▶ PowerBook 1400c ***	2.7	★★★/6.4
▶ PowerBook 1400cs	2.8	★★★/6.4
PowerBook Duo 2300c ***	2.3	★★★/5.9
DayStar Digital		
Genesis MP 360+	7.4	★★★★/7.2
Genesis MP 720+	7.3	★★★★/7.4
Power Computing		
▶ PowerBase 180	5.4	★★★★/7.3
▶ PowerBase 200	5.8	★★★★/7.3
▶ PowerBase 240	6.4	★★★★/7.6
PowerCenter 150	5.6	★★★★/7.3
PowerTower Pro 180	7.8	★★★★/7.6
PowerTower Pro 200	8.5	★★★★/7.7
PowerTower Pro 225	9.2	★★★★/7.9
Umax Computer		
SuperMac S900/200	8.3	★★★★/7.8
SuperMac S900/225	8.8	★★★★/8.0

	Multiprocessor Performance	Star Rating*
Apple Power Macintosh 9500/180MP	1.8	★★★★/7.4
DayStar Genesis MP 360+	1.8	★★★★/7.2
DayStar Genesis MP 720+	2.6	★★★★/7.4

**Based on features, implementation, innovation, performance, reliability, ease of use, and value. (See* Star Ratings *section for full explanation.) **Available only to educational institutions. ***Had less than 32MB of RAM, so some tests were conducted with virtual memory, which slows performance.*

Behind Our Tests

Macworld Lab tests several functions in eight key applications plus the Finder to determine real-world performance for the three critical performance areas faced by most users. CPU-intensive tasks evaluate the Mac's essential computing performance; FPU-intensive tasks gauge performance for operations that take advantage of the floating-point unit; and disk-intensive tasks gauge the performance you'll get for launching programs, opening and closing files, and copying files.

We then average the results to determine the overall score, giving the CPU-intensive score 60 percent of the weight and the FPU and disk scores 20 percent each. The software includes System 7.5; Adobe Illustrator 5.5, PageMaker 5.0a, Photoshop 3.0, and Premiere 4.0; Fractal Design Painter 2.0; Microsoft Excel 5.0; Specular International Infini-D 2.6; and Wolfram Research Mathematica 2.3. Our Power Macs have 32MB of RAM, while the 68040 Macs have 24MB.—**Macworld Lab testing supervised by Mark Hurlow**

★★★/6.8 **Power Macintosh 9500/200** A bit pricey for a server, the 9500/200 did offer the best Net server performance in Macworld Lab tests, edging out the less-expensive SuperMac S900/200. Apple's recent price cuts, though, make the price difference less of an obstacle to choosing the 9500. Apple Computer (408/996-1010): $4195, 32MB RAM, 512K cache, 2MB VRAM (4MB maximum), 2.0GB hard drive, 8× CD, 2 free drive bays, 6 PCI slots. *Dec 96, p. 120* m

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Optical 2.6GB	$85ea.	$84ea.
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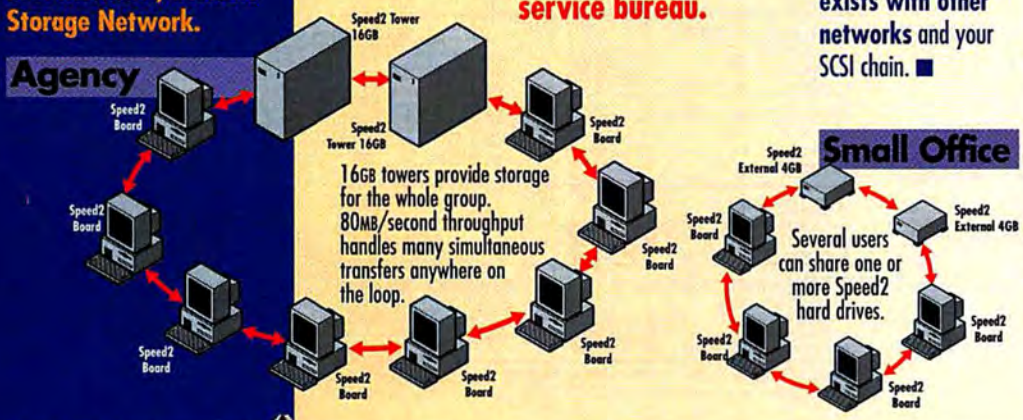

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Substance over style: four draw

THE ILLUSTRATION CHALLENGE

programs battle for the top spot

by Deke McClelland

WELCOME to the beginning of the second decade of PostScript drawing programs. Adobe Illustrator (*http://www.adobe.com*) shipped in March 1987, two years after the arrival of the first PostScript printer. And yet, ten years after it all started, the top drawing spot is more hotly contested than ever before.

Illustrator and its nemesis, Macromedia FreeHand (*http://www.macromedia.com*), have been hurling vectors at each other since the two climbed out of their respective cribs. But now, the recently bug-fixed Illustrator 6.0.1 and the soon-to-be-upgraded FreeHand 5.5 (version 7 should be available by the time you read this) must contend with two substantial competitors—CorelDraw 6, from Corel (*http://www.corel.com*), and Canvas 5.0, from Deneba (*http://www.deneba.com*). For the time being, neither CorelDraw nor Canvas is likely to attract many professionals away from the two object-oriented big shots, but they add excitement to the aging sport of object-oriented design.

All four of our contestants are big and beefy, each boasting a dozen times as many features as the original Illustrator. Although CorelDraw is new to the Mac, it's been around for eight years on the PC. And Canvas started out as a QuickDraw desk accessory before FreeHand 1.0 shipped. With a combined 36 years of experience, these programs ought to be able to draw like the dickens. So we decided to judge them all according to professional standards of usability and workflow.

To test overall efficiency, we completed 20 key operations in the smallest possible number of steps in each of the four programs (see the test results, "Which Application Saves Your Time?"). We also hired four artists to create scenes in the four programs and report back to us with their on-the-job impressions. The result is a ruling on the best overall drawing pro-

RON CHAN

gram that's based not on sheer number of features or special-effects gadgetry, but on drawing prowess. As anyone who uses one of these programs on a regular basis knows, glitz can be a lot of fun, but it rarely pays the bills.

Zooming and Scrolling

Navigation is a pivotal concern in a drawing program. Illustrator set the rules for navigation, and FreeHand quickly followed suit. As a result, you use the same techniques to navigate in both programs. Press the spacebar and drag to scroll with the hand tool, ⌘-spacebar-click to zoom in, and so on. If you know the keys, you never need to switch tools to get where you're going.

FreeHand ups the ante by permitting you to zoom to any percentage up to 256 times actual size. (Illustrator hits the ceiling at 16 times actual size.) FreeHand also provides a zoom box so that you can enter numerical zoom ratios, and more-sensible keyboard equivalents than Illustrator offers for common view sizes like 100 and 200 percent. FreeHand's sole failing is that it doesn't let you save custom views—as do its three competitors—but that's a small loss. A saved view is useful only if you find yourself continually revisiting one detail in an illustration.

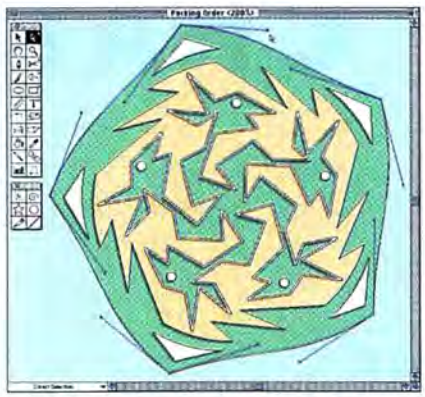
Canvas 5 almost gets it right. You can access the hand tool by pressing the spacebar, you can zoom with precision, and a handy slider bar lets you zoom to any view at a moment's notice. I wish you could enter numerical zoom values, as in FreeHand. But the real problem is the zoom tool. You can't access the zoom tool from the keyboard, as you could in Canvas 3.5 and earlier versions. So if you like to center your zooms with a click, you have to select the zoom tool, click, and switch back to the tool you want to use.

CorelDraw lets you navigate with about as much control as a tour bus driving up the middle of the Nile. You can't zoom to 100 percent from the keyboard, and there is no keyboard toggle for the zoom or hand tool. The clumsy View Manager features unrecognizable icons that don't work uniformly. But the hand tool is the absolute pits. It just draws a little line that shows you how you will scroll after you release. It's like walking with your eyes closed, stopping and opening them to see where you are, and then repeating the process.

Navigation Champ: *FreeHand 5.5.*

Drawing and Reshaping

Much as I admire the pen tool and the precision it affords, I can't say it's a lot of fun to use. When you hear an artist admit, "I'm just not much of a vector person," you can bet the message is, "I hate to draw and reshape paths." As they say in the old country, anchor points and control handles are a pain in the Bézier. Unfortunately, no one's come up with an acceptable alternative. Free-form drawing tools are inexact, and the only reliable automatic tracing tools are complex utilities, such as Trace, which is included with CorelDraw. (FreeHand 7.0 hopes to break this trend with a built-in precision autotracer, but time will tell.) You need a point-by-point pen tool and an overall reshaping metaphor that makes the process as painless as possible.



The Subtler, the Better Illustrator's anchor points and control handles have changed little over the years because they were engineered correctly in the first place. Handles appear as circles, points appear as squares—both large enough to be recognizable but small enough to be unobtrusive. Even the color of the points and handles provides a cue about what layer you're in. The paths in Canvas 5 and the upcoming FreeHand 7 borrow this look and feel.

Provided you know what you're doing, Illustrator's pen tool makes it possible to draw any shape with dead-on accuracy. Although virtually unchanged since its debut a decade ago, it remains the finest of its kind and the one by which all other pen tools are judged. Illustrator also has a special appeal for artists who appreciate a polished (dare I say elegant?) working environment. Points and handles look great on screen. They're large enough to be recognizable and small enough to permit an unobstructed view of other objects, and they move with the impossible grace of a yo-yo in expert hands.

Illustrator also offers unmatched control over editing points. You can easily drag an entire shape by a point and snap it to another shape—a task made much more difficult by other programs. You can also clone, align, scale, rotate, and skew individual points and segments. Illustrator offers more ways to combine selected paths than any other program, though it takes a fair amount of experience to become familiar with all of them.

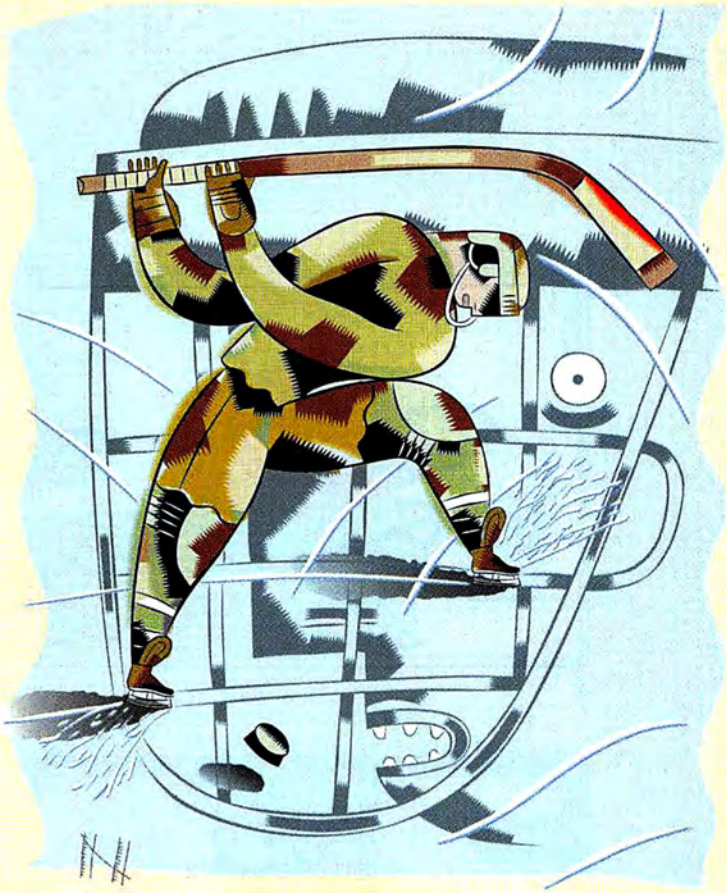
I'm personally less adept at using FreeHand's pen tool, but objectively it works every bit as well, and sometimes better. Like its Illustrator counterpart, the pen tool permits you to draw any path accurately. You can press the ⌘ key to move a point while in the process of editing a handle. And FreeHand alone offers a connector point that ensures a smooth transition from straight segment to curved. FreeHand closes a path automatically when you drop one endpoint onto another, and you can bend a straight segment by option-dragging it. The editing controls aren't quite as fine-tuned as Illustrator's—you have to marquee the path to select all of its points, and there are no point-averaging controls—but it's a very capable environment. And for those folks sitting on the fence, FreeHand 7's path animation looks like it will finally be every bit as good as Illustrator's.

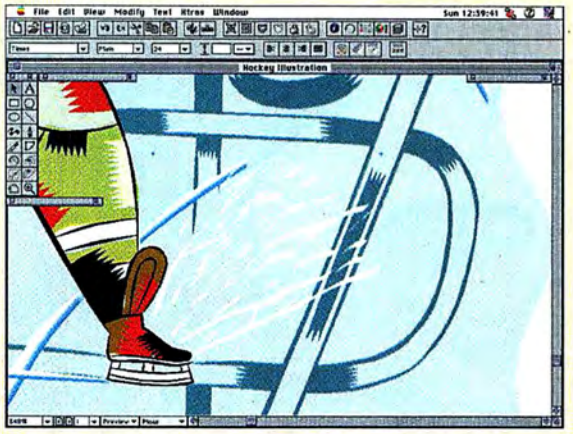
The curve tool in Canvas 5 works just like the one in version 3.5—which is to say it's terrible. You press modifier keys when drawing a point to affect not the point you're creating but the last point you drew. No other program works this way, and it doesn't make a lick of sense. The program slices off control handles where they're needed, making it quite impossible to draw an accurate path. You can't draw a new path until you deactivate the last one, and screen-display bugs are common. The path-editing capabilities are generally adequate, but it irks me that you still have to enter a special editing mode that hides fills and strokes.

The one area where Canvas excels is in combining paths. All operations are presented in a palette, along with a little preview so you get a feeling for how the effect will work. But with that curve tool, you're better off drawing paths in Illustrator or FreeHand and importing them.

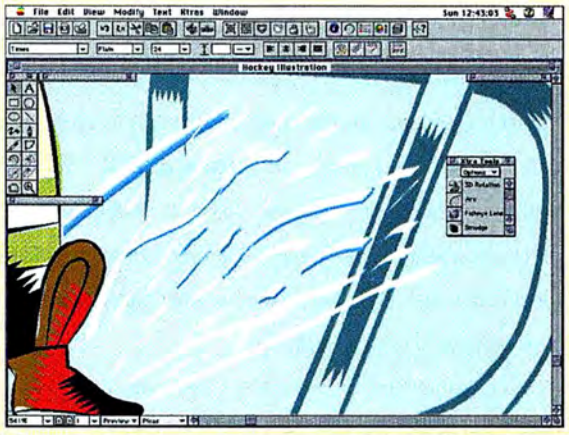
CorelDraw's Bézier tool comes very close to getting it right. The modifier keys are unusual, but they do the job. There are just two problems. First, choosing Undo after adding a point deactivates

FREEHAND CONTROLS THE EDGES





A



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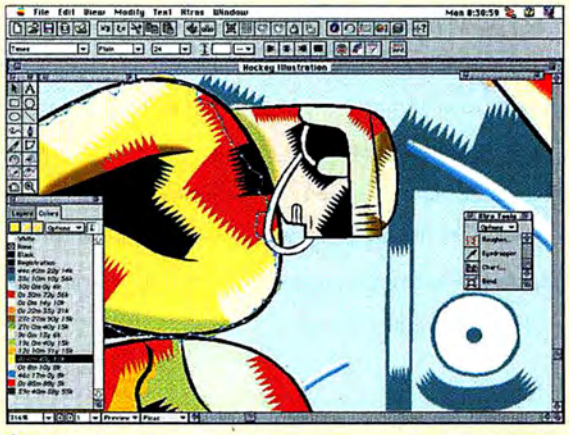


C

Artist **JEFF NEUMANN** swears by Illustrator, so we asked him to try his hand with FreeHand, and he liked what he found. "There are so many similarities between FreeHand and Illustrator," he said, "that the better program may be a matter of what you're used to. And some of the new tools in FreeHand do give you a lot more control than you have in Illustrator."

Two of Neumann's favorite FreeHand tools are Smudge and Roughen. First Neumann used FreeHand's calligraphy pen tool to create the ice spray from the hockey player's skates (**A**). Then he added blue depth and texture to the white shavings using the Smudge tool (**B**), which smears a soft shadow onto any object much more quickly than a normal fill can.

Neumann softened the edge of the hockey player's jersey using the Roughen tool (**C**); he traced the blue line over the jersey's edge to gain the softer effect seen in the final image. This tool is significantly easier to use in FreeHand than in Illustrator, because Illustrator makes you enter the percentage of Roughen effect in a dialog box manually, while FreeHand provides a convenient slider that adjusts and displays changes in real time.—CHARLES PILLER

CORELDRAW'S CUMBERSOME COMPLEXITY

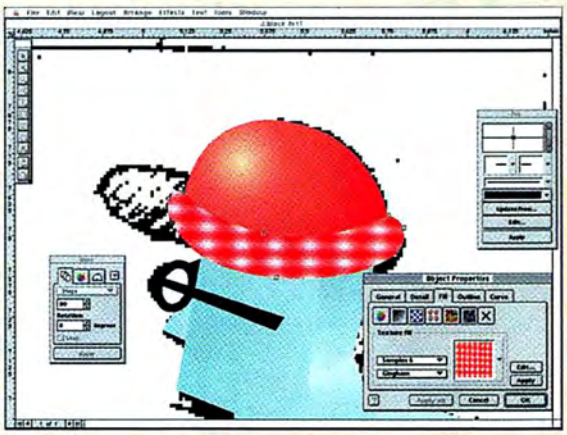
"Corel is wonderful for the number of choices it offers, but tends to be tough to use," says graphic artist **JOHN BLECK**. "You almost have to start from scratch with each new object. It's like CorelDraw was written for engineers—amazingly deep but amazingly hard to understand. Using the program feels like asking someone what time it is and getting instructions on how to build a clock."

Corel's multitude of options includes some innovative textured patterns, such as the gingham used in the brim of the fisherman's hat (**A**)—allowing great flexibility for complex illustrations.

And CorelDraw lets you apply several effects from a single dialog box. In this case, Bleck has highlighted a fish and can apply a combination of extrude, rotation, lighting, and color effects relatively easily (**B**).

But Bleck's frustration came out using the fountain fill tool (**C**). Even though CorelDraw supports an extremely wide range of blends, he explained, "I had to create a separate fountain fill for each shape, as opposed to setting the program to autofill as you can do in Illustrator."

—CHARLES PILLER



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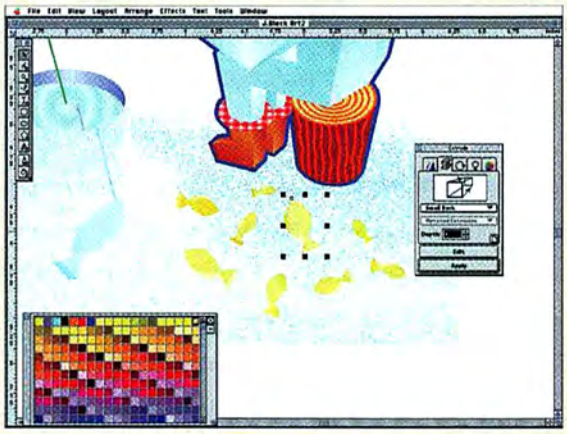

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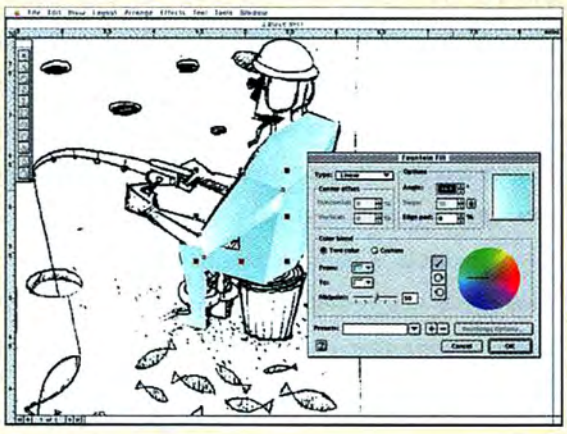

C

the path, so you have to reactivate it manually before continuing to draw. Second, you can't close a shape with a cusp (in which two curved segments meet to form a corner), so you frequently have to go back and fix the shape after drawing it.

And editing is where things really break down for CorelDraw. You have to use a special reshaping tool, which adds a step on every edit. Then you have to bring up a palette that contains a whopping 15 buttons, each of which seems designed to confuse the uninitiated. Only one button does something you can't do in either FreeHand or Illustrator (create symmetrical handles around a smooth point). But both Illustrator and FreeHand let you perform the remaining operations—and more—with half the effort.

Drawing Champs: *tie, Illustrator 6.0.1 and FreeHand 5.5.*

Working with Type

In terms of basic features, the four drawing programs are comparable text editors. All four let you fit type to a path, flow a story into multiple text blocks, divvy text blocks into multiple columns, wrap text around graphics, and check your spelling.

Each program also offers its share of extras. FreeHand lets you insert in-line graphics into a text block, very useful for aligning objects to a curve. (Illustrator more than matches this feature with its detailed path pattern filter.) Illustrator offers an option that automatically adjusts the company's Multiple Master fonts to fit a column width. Canvas offers automatic drop caps and the largest collection of free fonts. And CorelDraw offers a helpful Symbols palette for locating characters within specialty fonts. While none of these features are critical day-to-day, they come in handy every once in a while.

While generally a stalwart text editor, Canvas loses points for its occasional oddities. It offers both character and paragraph styles, and its Type palette is comprehensive and well organized. But you have to click on the Apply button to apply any palette settings; you can't simply press the return key. And the linking tool can't do the only thing you need it to do—modify the order of text blocks.

The good news about CorelDraw is that when you first launch the program, it caches your font collection, cutting future launch times in half. If you have a few hundred fonts loaded in your system, CorelDraw boasts the fastest start-up of the bunch. But otherwise, the news is not good. It lacks a font menu. The text palette is hard to find and exasperatingly slow. The keyboard shortcut that increases type size in every other program changes the kerning in CorelDraw; meanwhile, there's no way to adjust type size incrementally. And CorelDraw came out the clear loser in our efficiency tests, demanding more than three times as many steps as Canvas and Illustrator.

Illustrator and FreeHand are pretty evenly matched. Illustrator gets a higher efficiency rating, and its formatting options are better organized and easier to find. (To its credit, FreeHand has reorganized its formatting options in version 7.) But Illustrator is the only program that lacks custom style sheets. And FreeHand offers more formatting options—including control over the orientation of characters on a path (a feature shared by CorelDraw)—and better page control.

Type Champs: *tie, Illustrator 6.0.1 and FreeHand 5.5.*

Fills and Strokes

Fills and strokes are another area in which every program's features list looks pretty similar. They all support the Pantone and Trumatch color libraries, and PostScript strokes with join and cap control. They all offer lots of goofy pattern options that wreak havoc with printers. All four programs also permit gradient fills with three or more colors.

So it boils down to efficiency. For fast access, both Illustrator and FreeHand get high marks. FreeHand provides an excellent global color filter that lets you adjust hues and brightness levels for all selected objects. You can even desaturate objects to convert a color illustration to gray scale. Illustrator lets you share the saved colors in one open illustration with all other open illustrations, and it offers superior mask capabilities.

Both programs let you lift and apply colors with ease. Illustrator provides convenient eyedropper and paint-bucket tools (with a keyboard toggle between the two). And FreeHand lets you drag and drop color swatches with unprecedented flexibility. It's easier to establish a gradient fill in FreeHand than in Illustrator. And you may add steps to a FreeHand operation if you're not careful to name your colors. But these are minor complaints.

Both CorelDraw and Canvas bury their best options. It's easy enough to access predefined colors in both programs, but if you prefer to define your own colors and specify stroke weights

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PRETTY, BUT CAN THEY PRINT?

All times in minutes:seconds. Products are listed in alphabetical order by company name.

	Illustrator Image	Photoshop Image	Photo-Illustration
Adobe Illustrator 6.0.1	6:15	4:30	4:50
Corel CorelDraw 6	*	8:13	**
Deneba Canvas 5.0	*	5:12	4:20
Macromedia FreeHand 5.5	4:36	4:49	4:45

**Printed only portions of the image. **Cannot be previewed on screen; crashed when attempting to print.*

Behind Our Tests

Macworld Lab tested print times for typical documents to determine which illustration program offers the best hard-copy effeciency. The Illustrator test shows print speed for a complex PostScript document created in the Mac's effective graphic standard. The Adobe Photoshop image, a 4.7MB document, shows print speed for large file sizes. The photo-illustration test used a PostScript document with embedded bitmapped images.

Overall, FreeHand was fastest, with Illustrator close behind—except, ironically, on printing the Illustrator image, which FreeHand handled more than a minute more quickly. Canvas and CorelDraw were big disappointments. Canvas failed to print the Illustrator image correctly (a problem Deneba expects to fix by the time you read this), as did CorelDraw—which also choked on the photo-illustration test. Macworld Lab used a Power Macintosh 7500/100 with 32MB of RAM and a Tektronix 480X printer for all tests.—**Macworld Lab testing supervised by Mark Hurlow**

numerically, you have to dig for it. CorelDraw scatters its options throughout a host of palettes and dialog boxes. And the program initially requires you to specify line weight in inches, even after you've changed the rulers to picas or points. Canvas makes you expand its multipaneled fill and stroke palettes to access essential options, and the simple act of adding a custom color to a gradient fill is at best a five-step operation. Canvas also lacks an automated method for copying the fill and stroke from one object and applying them to another.

Color Champs: *tie, Illustrator 6.0.1 and FreeHand 5.5.*

Transformations and Blends

The tables turn when it comes time to transform objects and apply special effects. Illustrator fares worst in this category. It's the only program that makes you scale any object—path, group, or text block—with a special tool. You have to click to specify the center of a rotation, a step you can bypass in FreeHand without any sacrifice in control. The special-effects filters are downright silly, with the majority devoted to the rarely desirable task of wiggling path outlines. And Illus-

MW LAB WHICH APPLICATION SAVES YOUR TIME?

	Canvas 5.0	CorelDraw 6	Editors' Choice FreeHand 5.5	Illustrator 6.0.1	Minimum Steps, Any Product
Star Rating *	★★★/5.7	★★/4.6	★★★★/8.1	★★★★/7.1	
Company	Deneba	Corel	Macromedia	Adobe Systems	
List price	$599.95	$595 (for Suite)	$595	$595	
Phone number	305/596-5644	613/728-8200	415/252-2000	415/961-4400	
Zooming and scrolling	5	8	3	3	3
Zoom to 100 percent	1	2	1	1	1
Magnify with zoom tool; return to previous tool	3	2	1	1	1
Scroll with hand tool; return to previous tool	1	4	1	1	1
Drawing and reshaping	19	24	11	12	10
Draw crescent (closed path with two cusps)	7	6	3	4	3
Insert point immediately after drawing path	2	3	1	1	1
Bend straight segment	2	4	1	2	1
Clip segment from closed shape, drag it away	5	8	5	4	4
Unite two selected paths	3	3	1	1	1
Working with type	4	14	8	4	4
Increase size of selected characters 1 to 2 points	1	4	1	1	1
Tweak leading of selected paragraph	1	2	1	1	1
Reverse direction of type on path	1	3	3	1	1
Wrap selected text around multiple objects	1	5	3	1	1
Fills and strokes	34	25	17	13	10
Copy fill and stroke from one object to another	10	5	4	3	3
Modify tint of selected object	7	6	5	1	1
Lift color from one object, copy to gradient fill of another	11	8	2	5	2
Apply colored stroke with specific numerical weight	6	6	6	4	4
Transformations and blends	10	10	8	16	7
Scale selected group disproportionately	1	2	1	2	1
Rotate selected object around specific point	3	3	2	3	2
Apply default blend between two selected shapes	2	2	1	4	1
Change number of steps in selected blend	4	3	4	7	3
Total steps	72	81	47	48	34
Efficiency index (based on minimum steps for any program)	47 percent	42 percent	72 percent	71 percent	100 percent

*All numbers represent mouse-clicks or drags starting from default settings. * Based on features, implementation, innovation, performance, reliability, ease of use, and value. (See Star Ratings section for full explanation.)*

Behind Our Tests We tested the number of steps it takes to accomplish a handful of common operations to gauge the overall efficiency of each product. The most efficient method—taking the fewest steps—in any program appears in the column at right.

In each case, we worked from default settings and assumed worst-case scenarios. (For example, it sometimes saves FreeHand a step that its color palettes are available on screen by default, but it might cost the program a step if you neglect to name a color. A user shouldn't be penalized for lack of planning.) Each program offers several ways to accomplish many operations, so we chose the most efficient means possible within our constraints. Any mouse or keyboard action counted as a step. Therefore, keyboard equivalents (the leading shortcuts in Illustrator and Canvas) counted the same as mouse movements (such as dragging a text handle to adjust leading in FreeHand). Drag and drop counted as a single action.

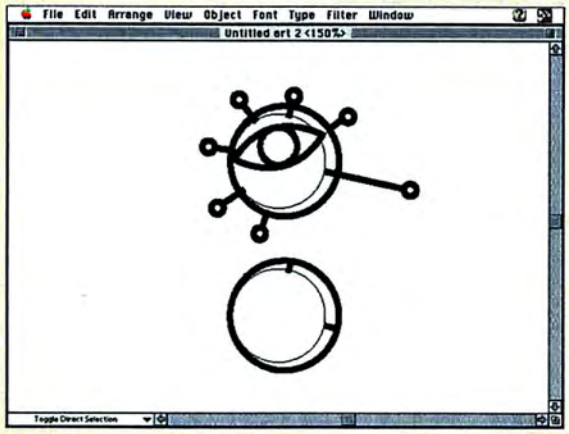
Illustrator and FreeHand were the clear efficiency winners, running neck and neck overall. Canvas did an acceptable job in most departments; the big exception was fills and strokes, where its complex network of multipaneled palettes slowed it down. CorelDraw performed worst in three categories, making you jump through hoops to complete even simple operations like scrolling with the hand tool and wrapping text around graphics.—**Macworld Lab testing supervised by Deke McClelland**

ILLUSTRATOR'S EXOTIC TEXTURE TOUCH

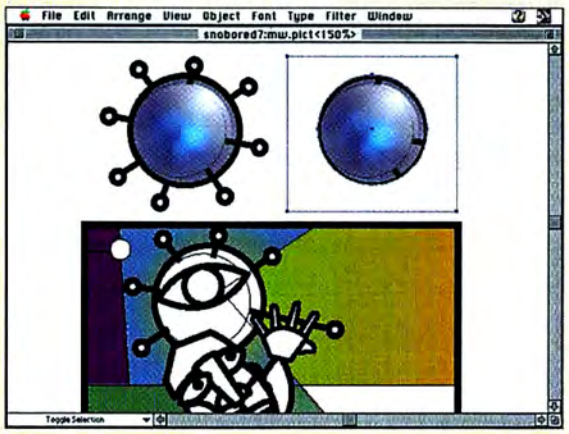
Illustrator connoisseur **TROY VISS** had one of his fondest long-held hopes realized in the new version of Illustrator. "I've always wished for some way to apply some other texture than a ramped blend or process fill—the typical Illustrator options—onto an object," he said. "Now you can select any object, export it, and then edit it in another application to give it a new texture."

Viss accomplished this by creating a simple piece of line art in Illustrator (**A**). He saved the image as a TIFF file, then exported it to Adobe Photoshop, where he rendered the special effects—in this case a cloudlike purple-blue look. He then imported the altered drawings back into Illustrator (as seen at the top of image **B**). After fine-tuning, Viss dropped the images back into his original image (**C**).

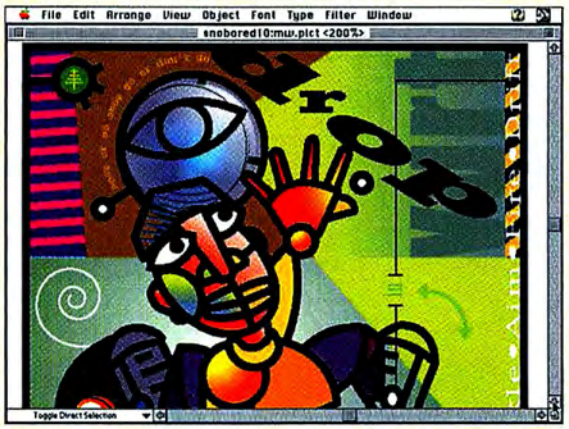
The new Illustrator makes such effects possible for the first time, and just as important, Viss says, it works efficiently. "The thing that means a lot to me is that I can eliminate a lot of handwork, a lot of point-and-click."—CHARLES PILLER



A

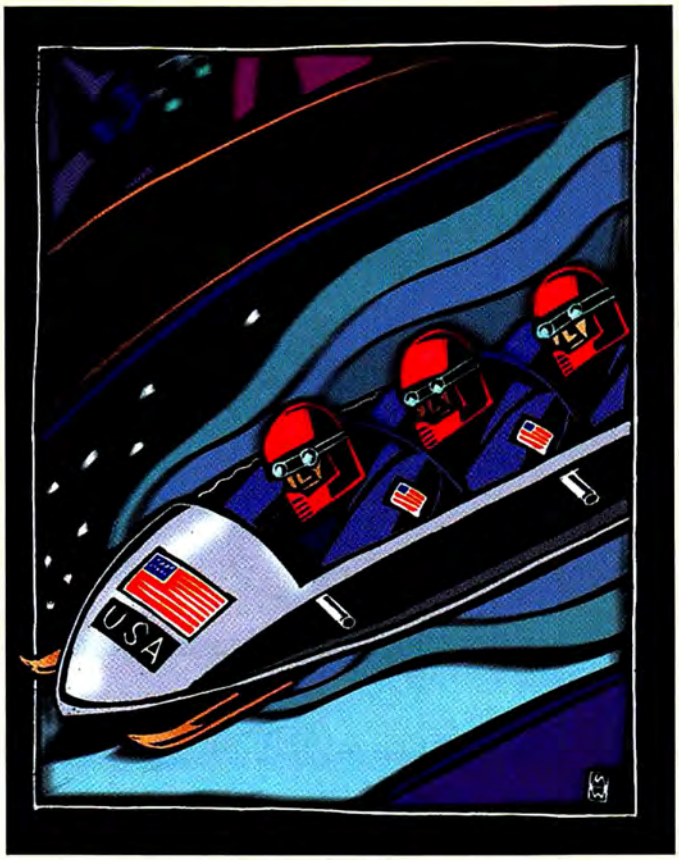


B



C

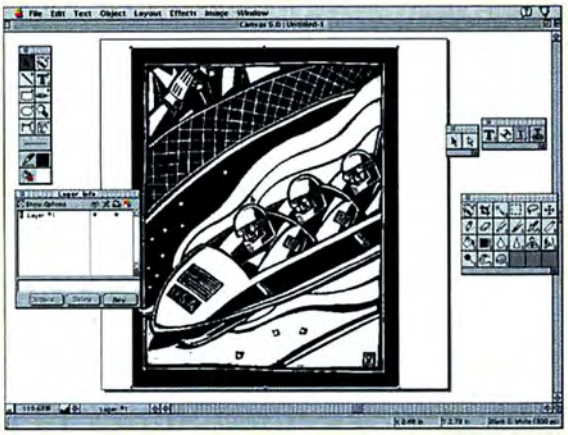
FIGHTING SLUGGISH BLURS IN CANVAS



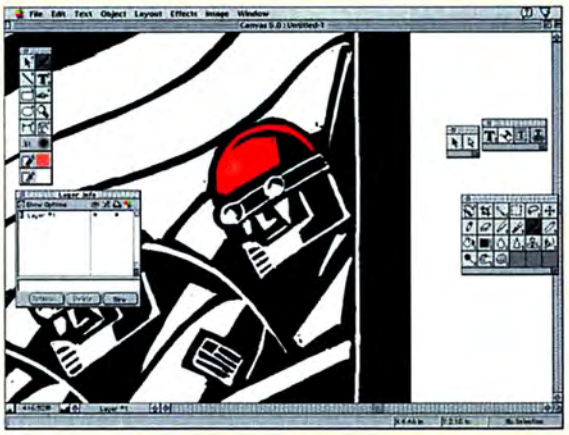
How slow is Deneba's Canvas? "I allotted 30MB of RAM to this program, and it was still dogging," says artist **MATT WALTON**, who would normally create an image like this one in Photoshop in about 20 minutes. It took nearly two hours using Canvas—primarily waiting for the screen to redraw. Canvas also lacks some special effects offered by its competitors, so Walton doesn't recommend it for professional commercial artists.

Slow though it may be, as shown here Canvas does fine with many standard effects such as creating reflective surfaces and motion blurs. First Walton scanned his sketch into Photoshop, then imported the image into Canvas (**A**). After pouring a flat color onto the bobsledder's helmet, he created a reflection with the airbrush tool (**B**). After repeating this process in the other part of the drawing, Walton created differential blurs in various sections of the illustration to create a sense of speed and drama (**C**).

—CHARLES PILLER



A



B

C

trator's blend tool lags severely behind the competition's. In the nine years since Illustrator 88 introduced the tool, the only modification Adobe has made was to an error message. No kidding.

CorelDraw lets you transform and blend objects more skillfully than in Illustrator. You can drag any handle on a selected object to scale it (though to scale disproportionately, you have to drag two handles). Click a second time on an object to access rotate handles, terrific for new users. The program's enveloping feature lets you distort objects by tugging at handles. You can also extrude objects into 3-D space and create a blend that follows the twists and turns of a path.

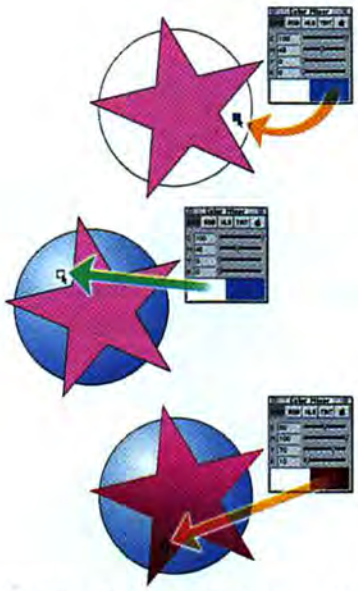
While CorelDraw is good, Canvas is better. Deneba has obviously invested considerable time and effort in lifting features from the competition and improving upon them. Its enveloping feature is more straightforward and efficient than Corel's. The extrusion feature offers more options, and it takes advantage of QuickDraw 3D (although Deneba neglects to bundle the QuickDraw 3D system extension). Best of all, Canvas takes blending about as far as you can go. As in CorelDraw, you can blend along a path. But you can also edit any point in the blend and have Canvas automatically update the blend to reflect your changes. My only complaint is that you have to use one tool to edit paths and colors in the blend, and another to modify the number of steps.

FreeHand 7 will let you blend between multiple shapes and fit the steps to a curve. But in the meantime, FreeHand 5.5 is limited to two-point blends that update whenever you edit the first or last shape. FreeHand 7 will also include an enveloping feature, but for the present you just get a fish-eye lens tool that wraps the selection onto a sphere. Still, FreeHand transforms shapes most efficiently, permitting you to scale text blocks and groups by dragging a corner handle, as well as transform shapes and assign a center point with a single drag. And it's the only program other than Illustrator that supports standard plug-in filters, such as KPT Vector Effects from MetaTools.

Effects Champs: *tie, Canvas 5.0 and FreeHand 5.5.*

The Last Word

The best program is the one that's a champ in all of our five categories, FreeHand 5.5. FreeHand is also better at handling imported images (although its image-printing capabilities could stand improvement). And with the promise of better gradients, an upgraded blend feature, envelope distortion options, and sophisticated autotracing, it looks as if FreeHand 7 may well rule the roost.



Gradients in a Jiffy In FreeHand you can drag a swatch from one of the color palettes and drop it into a shape to fill it (top). Press option when dropping the swatch to fill the shape with a radial gradation (middle). Press the control key when dropping to create a linear gradation (bottom). To return a gradient fill to a flat fill, press shift when dropping the color. No other drawing program makes basic fills so easy.

Illustrator is a close second behind FreeHand 5.5. While it's generally an efficient and well-organized program, its blend, trace, and knife tools are the worst of the bunch. Illustrator 6.0.1 is also the only program in this article that is not available for Windows, which means Illustrator users are cut off from their cross-platform friends. Adobe has big plans for a cross-platform update to Illustrator, due out sometime early in 1997.

Canvas ranks third among drawing programs. I wouldn't recommend it to anyone who spends a lot of time drawing free-form curves, and you have to be willing to put up with some periodic screen-display problems. But Canvas is unique in combining drawing and image-editing tools under one roof. In fact, Canvas fares a little better as an image editor than it does as a drawing program, going so far as to support multiprocessing. However, the lion's share of the documentation, palettes, and keyboard shortcuts continue to revolve around vector-based functions, making this a drawing program first and a painting program second.

I can't recommend CorelDraw. The badly organized program came in last in efficiency, and you can lose work if you're not careful (an unforgivable sin in this day and age). CorelDraw 6 is sold as part of a suite, which may attract those with an eye for value. But beware—the second most important program in the suite, the altogether inept image editor Artisan, makes CorelDraw look like a pinnacle of engineering excellence. Better to part with a few dollars more and purchase FreeHand Studio. This suite includes the image editor xRes, which, although imperfect, sometimes outperforms Adobe Photoshop.

The politics of 1996 are behind us, but it's still worth asking, Are we as illustrators better off now than we were ten years ago? The answer is a resounding yes. Even the worst of the new drawing breed offers gradations, layers, text on a curve, multiple undos, blends, image support, masks, and colors, all of which the first Illustrator lacked. But I have to say, the changes have all been evolutionary since that first Bézier pen tool came out in 1987. That evolution has so far favored FreeHand. **m**

DEKE McCLELLAND was the first author to write a book on FreeHand (1988) and on Canvas (1991), and the only person to have written books about all four of the applications in this article. Current titles include *The Illustrator 6 Book* (Peachpit Press, 1996), *Macworld FreeHand 7 Bible* (IDG Books Worldwide, 1997), and *CorelDraw 6 for Dummies* (IDG Books Worldwide, 1996).

ILLUSTRATION PROGRAMS

MW EDITORS' CHOICE We looked for flexibility, efficiency, and creative features to select the top draw package.

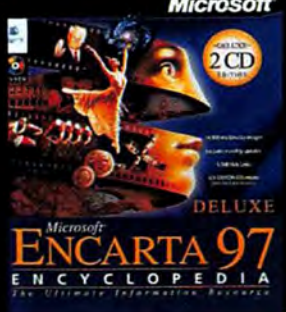
★★★★/8.1 **FreeHand 5.5** No other drawing program does such a splendid job of making essential features readily available to sophisticated and novice users alike. **Company:** Macromedia (415/252-2000, *http://www.macromedia.com*). **List price:** $595.

REAL PRODUCTS REAL RATINGS Reviews you can trust: Unlike other publications, *Macworld* rates only final shipping products, not prototypes. What we review is what you can actually buy.

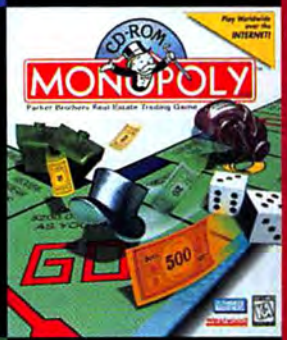
Join everyone's favorite monkey as he takes your kids on a lively exploration of alphabet sounds, shapes and pronunciations, as well as playing letter games at the zoo. Curious George ABC Adventure is great for a head start on learning. From Houghton Mifflin Interactive.

This new interactive animated storybook from Living Books brings Dr. Seuss's most memorable characters to life, enabling your child to learn to love reading in an entirely new way. Green Eggs and Ham will help build your child's memory and observation skills and more.

Encarta 97 Encyclopedia is everything you'd expect from a multimedia encyclopedia. Rich with articles, photos, animation sequences, video clips and a dictionary containing over 65,000 words, this 2-CD-ROM program from Microsoft will teach your kids something new every day.



Westwood Studios' CD-ROM version of the MONOPOLY game will entertain you like never before. Rich Uncle Pennybags is your animated Master of Ceremonies as Depression-era Atlantic City comes to life with state-of-the-art 3-D graphics, animation and digital sound.



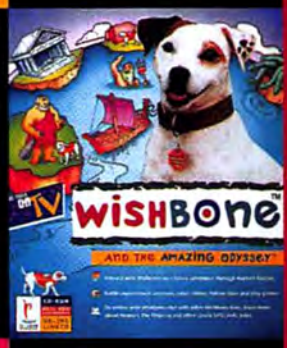
This holiday

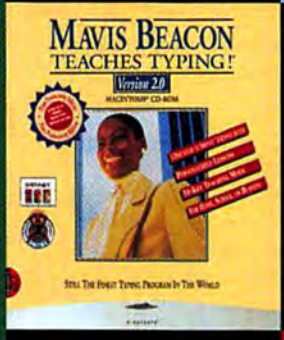
With 4 practice tests and 300 of the most commonly tested words, Inside the SAT and ACT '97 Edition will have your kids mastering these tests and raising their scores faster than you can decide what to do with their rooms when they move out. From The Princeton Review.

Theatrix brings you Hollywood High, the latest CD-ROM program in the Hollywood series. An animated multimedia program that lets you and your kids write and produce your own movies about your family, friends and favorite places. And people say getting into movies is hard!

This learning program by GT Interactive is a great way for your kids to explore and discover. Follow along as Critter and his mom's journey to the Big Apple comes alive right before their eyes. Just Me and My Mom will have them playing again and again.

Wishbone™ and the Amazing Odyssey from Palladium Interactive features Wishbone™ in his first CD-ROM adventure. Wishbone™ has been zapped into the animated world of Homer's Odyssey and is trapped in the world of ancient Greece. He needs your help to get home.





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Adventure lurks everywhere in Amazon Trail™ II. This interactive program from MECC will have your kids learning about the ecology and history of the Amazon. Interacting with explorers, scientists and indigenous people. And fending off hungry animals and reptiles.

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season, wouldn't it be nice to hear the words "cool" and "parent" used in the same sentence?

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After a hard day, it's nice to sit back, relax and smoke a few butts.

Those #°₀*@! guerrillas are at it again. This time they've invaded Cuba, and it's up to you to blast 'em off the face of the earth. Meanwhile, they're attacking Guantanamo Bay with a savage swarm of tanks & MiGs. Luckily, the A-10 Warthog is armed with the most extreme airborne arsenal known to humankind. The newest game in the A-10 trilogy, A-10 Cuba! for Macintosh is a fully-featured flight simulator with intense realism that's more awesome than last year's award-winning A-10 Attack! Developed by Eric 'Hellcats' Parker, A-10 Cuba! features network play, interactive instrumentation & real-time graphic action that looks, acts and feels like flying a real A-10 Warthog. As a stand-alone game, A-10 Attack! is not required for play. Download a demo today at www.parsoft.com. Then strap on your helmet and blow the suckers away until the only thing left is a smoldering butt.

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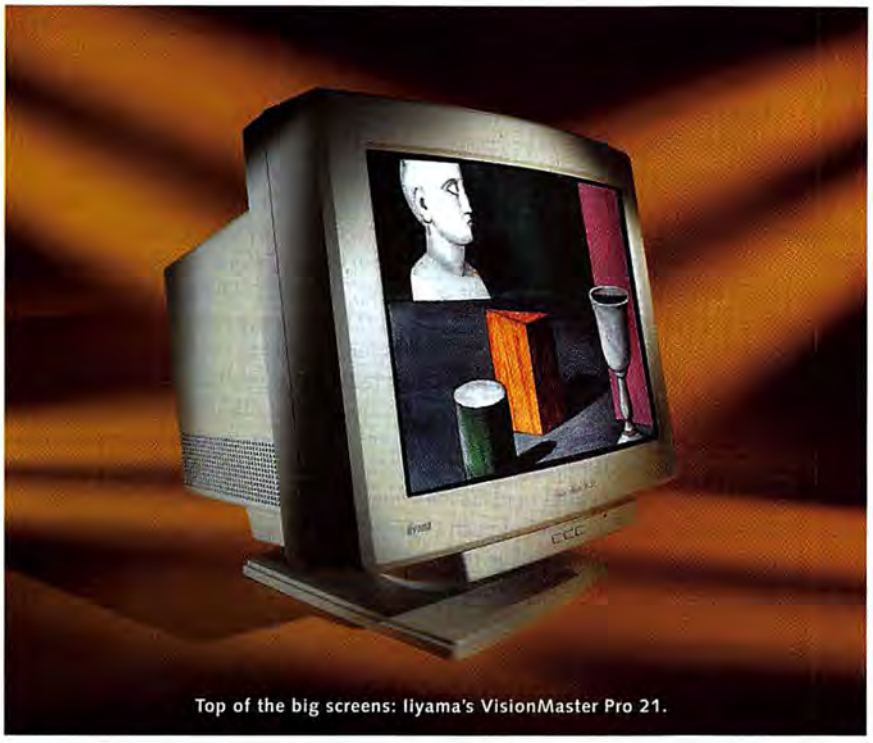
DISPLAYS FOR THE BIG PICTURE



Top of the big screens: Iiyama's VisionMaster Pro 21.

BY DEAN ANDREWS

Macworld Lab Puts 16 Two-Page Monitors to the Test

MW LAB

DO YOU THINK LARGE SCREENS ARE ONLY for graphics professionals? With prices of most full-size monitors dropping well below $2000, anyone who works on large spreadsheets, page layouts, or multimedia applications should consider a 19-inch to 21-inch display. Why? No matter what your specialty, you'll work faster and smarter when you can see more of your desktop without squinting or scrolling.

These big screens can display two letter-size pages side by side at almost actual size—hence the name. But what price comfort and convenience? You'll pay around 50 percent more for big displays over a 17-inch monitor. Still, for many of us, comfort and convenience are worth it.

In this review, our expert panel of editors, lab analysts, and designers evaluated two key areas: image quality and ease of use. For image quality we examined each monitor's brightness and contrast with gray-scale images and its color accuracy with a color photograph in Adobe Photoshop. For ease of use our panel performed common actions on the displays, such as adjusting brightness, contrast, screen size, screen position, and color temperature. Depending on your needs, you'll want to look first at either our performance winner or our top choice for smaller budgets.

Good-Looks Quotient

In several past monitor reviews, we performed both objective and subjective tests. Macworld Lab used sophisticated color analyzers and miscovergence meters to check the specifications of the displays. Then our panel subjectively rated each unit by viewing text and graphics.

Over a decade of reviewing monitors, we've confirmed that objective and subjective results rarely correlate closely. A monitor that displays great-looking images may boast only mediocre specs, and vice versa. The solution was obvious: throw out the objective tests. The specifications are better left to the manual—*you* need to judge what you see on screen.

Focus on the Details

The quality of a display can mean the difference between a successful work session and a headache. If a screen lacks clarity, suffers distortion effects, or flickers, it will strain your eyes and make any job a chore. So our panel checked for fine focus at several points on the screen, not just the center. Due to screen curvature and the angle of the electron guns, if focus is off, it will likely be at the edges of the screen.

A few monitors, such as the Multiple

ARNOLD TIOSELIO

Scan 20 from Apple (*http://www.apple.com*), offer focus adjustments, but most don't, as they assume such adjustments are not necessary after tuning during manufacturing—so look before you buy. Check for image consistency, as our panel did; if you see any distortion or pincushioning, the electron guns may be misaligned. Displays such as the PrecisonView 21 from Radius (*http://www.radius.com*) provide a series of antidistortion adjustments, but even after tuning, the PrecisionView 21 couldn't match the clarity of the VisionMaster Pro 21, made by Iiyama (*http://www.iiyama.com*).

Also, watch carefully for the "disco" effect of flicker. A quality monitor should run the resolution you want at a 66Hz or higher refresh rate so that you won't be able to see the display blinking. You can trust the vendor specifications on refresh, and keep in mind that most monitors outperform the refresh rate supported by video adapter cards that drive them.

Brightness and contrast determine whether an image will jump off the screen or blend in with your office wall. Look for black blacks, white whites, and a rich in-between range when viewing a gray-scale image. Again, the VisionMasterPro 21 scored at the top in our tests. At the very bottom is Princeton Graphic Systems' Ultra 20-M (*http://www.prgr.com*).

Vibrant should be the word that comes to mind when evaluating the color of a display. A good monitor allows you to adjust the levels of red, green, and blue. Oversaturation of one color can cause blending in areas that shouldn't blend.

On a quality full-size monitor—running 24-bit color with at least 4MB of VRAM on an adapter card—the realism should be stunning. We found the Apple Multiple Scan 20, the Nokia Multigraph 445Xi (*http://www.nokia-americas.com*), and ViewSonic's Pro G810 (*http://www.viewsonic.com*) tops in color accuracy.

Viewer Friendly

High-tech isn't always better when it comes to controls for adjusting brightness, contrast, color temperature, screen position, and screen size.

Old-style physical controls, like those on Apple's Multiple Scan 20 and the RasterOps SuperScan Mc20 from Hitachi NSA (*http://www.nsa-hitachi.com*), have many buttons on the front panel that simply increase or decrease the value of each setting. On-screen controls, carried by the Radius PrecisionView 21 and others, offer only a few buttons that guide you through on-screen menus to adjust the same settings. Neither style is inherently superior—it's a matter of clarity and simplicity.

The Panasonic PanaSync S21 (*http://www.panasonic.com*) and the ViewSonic G810 won honors for ease of use, due to their straightforward controls and clearly labeled menus. Ironically, those same offerings, plus the otherwise superb VisionMaster Pro, fell down in adjusting brightness and contrast. They require you to press buttons four or more times to reset these values—way too much effort. The IBM P201 (*http://www.pc.ibm.com*) and the Ultra 20-M both confused our panel with obscure, unlabeled icons.

Understanding Tube Variations

Monitor vendors, attempting to stay competitive, keep tweaking tube technology, so you'll hear references to Invar shadow mask, Trinitron, DiamondTron, and the like. These simply refer to different methods for aligning the internal electron guns to create the pixels you see on screen.

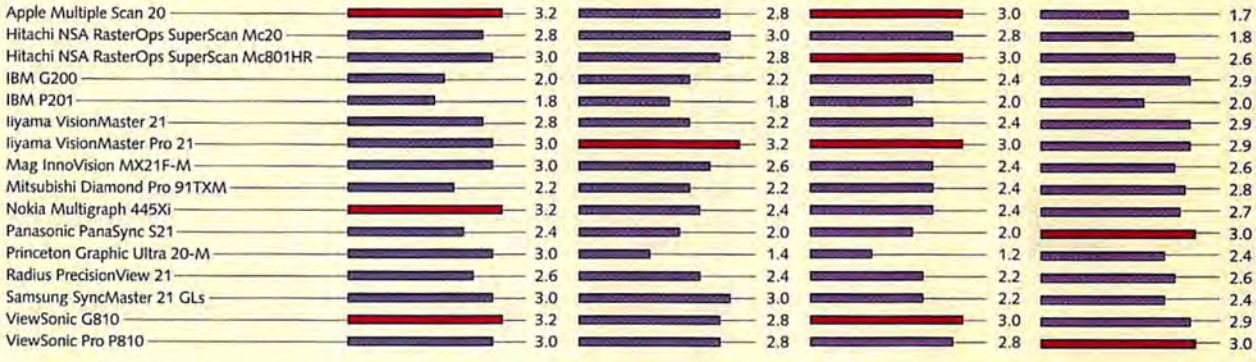
In general, the Trinitron and DiamondTron tubes, used by such contenders as the VisionMaster Pro 21, the PrecisionView 21, and Mitsubishi's (*http://www.mitsubishi-display.com*) Diamond Pro 91TXM, offer more saturated colors and smoother imaging vertically (but with slight banding horizontally). The shadow mask (or tridot) tubes, used in the RasterOps SuperScan Mc20, Samsung's (*http://www.sosimple.com*) SyncMaster 21 GLs, and Nokia's Multigraph 445Xi, provide more vivid (but

MW LAB

Room for a View

Past testing has proved that objective measures of brightness, contrast, or distortion do not reliably indicate image quality, so we conducted only subjective testing. The Iiyama VisionMaster Pro 21 scored at or near the top among tested units on all measures.

Best result in test. Longer bars are better. Products are listed alphabetically by company name.



Behind Our Tests

A panel of *Macworld* editors and designers gave each product a subjective score from 1 to 5 (with 5 representing a perfect score) in the following critical areas: color quality and accuracy, contrast, brightness, and controls. The latter was divided into usability tests for adjusting brightness, color temperature, size of viewing area, and red-gun intensity; resetting the monitor to factory settings; plus an appraisal of menus and an assessment of buttons and icons (whether on screen or on the display itself). The seven controls tests were averaged to produce a single score.—**Macworld Lab testing supervised by Matt Clark**

Big Screens: A Closer Look

Company	Product	Star Rating *	List Price	Company's Estimated Price **	Phone	Maximum Image Size
Apple Computer	Multiple Scan 20	★★★/6.7	$2149	$2149	408/996-1010	15¼ x 11⁷⁄₁₆
Hitachi NSA	RasterOps SuperScan Mc20	★★★★/7.4	$1599	$1399	617/461-8300	15¼ x 11¼
	RasterOps SuperScan Mc801HR	★★★/6.6	$2199	$1999	617/461-8300	16 x 12
IBM	G200	★★★/6.1	$1469	$1175	914/766-1900	15¼ x 11
	P201	★★/4.7	$2635	$2108	914/766-1900	15¼ x 11⁷⁄₁₆
Iiyama North America	VisionMaster 21	★★★/6.4	$1945	$1645	215/957-6543	15⁹⁄₁₆ x 11⁹⁄₁₆
	Editors' Choice					
	VisionMaster Pro 21	★★★★/8.3	$1995	$1750	215/957-6543	15⁹⁄₁₆ x 11⁹⁄₁₆
Mag InnoVision	MX21F-M	★★★/6.6	$1699	$1499	714/751-2008	15⅞ x 11⅞
Mitsubishi Electronics America	Diamond Pro 91TXM	★★★/6.3	$1699	NP	714/220-2500	15¹⁵⁄₁₆ x 11¹⁵⁄₁₆
Nokia Display Products	Multigraph 445Xi	★★★/6.7	$1899	NP	415/331-4244	15¹¹⁄₁₆ x 11¾
Panasonic	PanaSync S21	★★★/6.2	$1899	$1649	201/348-7000	16¹⁄₁₆ x 12
Princeton Graphic Systems	Ultra 20-M	★★★/5.6	$1249	$1050	714/751-8405	15¼ x 11⁷⁄₁₆
Radius	PrecisionView 21	★★★/5.8	$2749	$2500	408/541-6100	15¹⁵⁄₁₆ x 11¹⁵⁄₁₆
Samsung Electronic America	SyncMaster 21 GLs	★★★/6.4	$1959	$1779	201/971-0400	15¾ x 11¼
	Editors' Choice					
ViewSonic	G810	★★★★/7.6	$1595	$1495	909/869-7976	16 x 12
	Pro P810	★★★/6.9	$1745	$1625	909/869-7976	16 x 12

*NP = Not provided. * Based on features, implementation, innovation, performance, reliability, ease of use, and value. (See Star Ratings section for full explanation.) ** Actual prices could be higher or lower than the estimated street price provided by the company.*

flatter) colors and more consistent imaging in all axes (but with slight pixelation).

NEC claims its new CromaClear CRT technology, using elliptical-shaped phosphors, adds depth and dimension to images, but none of these tubes were available for this review. Finally, to maximize energy savings, look for support for the stringent VESA DPMS power-saving standard.

When You Shop

Try to examine a monitor before you buy it, using our tests as a guide—if you can find a vendor setting suitable for a thorough exam. If you can't arrange a look-see (particularly for a monitor not rated here), try a mail-order purchase that offers a return policy with no restocking fee.

Check for included extras, such as color-calibration software and Mac adapters if needed. All the vendors in this review include Mac adapters, and all the vendors except Apple, Radius, and Panasonic include calibration software.

These oversize products may overwhelm even a large work area. If space is a concern, measure the footprint, but keep a close eye on the cabling setup in the back. Some monitors have a cutout section below that tube in back, allowing you to tuck cables underneath. Most of the monitors attempt a space-saving design—led by the ViewSonic Pro P810, ViewSonic G810, and Nokia Multigraph 445Xi.

You should also try to verify image quality. The same image displayed on two identical monitors can appear very different to the naked eye. By the same token, image quality can decay over time, so always check for the standard three-year warranty. Fortunately, most monitors in this review include a three-year warranty on the tube, parts, and labor. Panasonic and Samsung add on-site service for a year, a blessing given the weight of these monsters.

The Last Word

Iiyama's VisionMaster Pro 21 stood out as the best of the big. Its crisp image quality was rated highest by our panel, and its controls were among the easiest to use. The VisionMaster Pro 21 comes worry-free with a three-year warranty. If you can afford the $1750 price tag, you won't be disappointed. Nearly as good was our other top pick—and great bargain at $1495—the ViewSonic G810.

If every penny counts, consider the G810 or the RasterOps SuperScan Mc20. This display scored high in image quality, though the maximum displayable area is slightly smaller than the Iiyama's. It fell down in usability, but that was mostly due to complicated button combinations to adjust seldom-used controls. The Mc20 is a steal at its $1399 street price. With any of the top three choice, your eyes will thank you. m

DEAN ANDREWS, former usability manager for the PC World Test Center, has evaluated and written about Macs and PCs for six years.

TWO-PAGE MONITORS

MW EDITORS' CHOICE We looked for a combination of sharp, vivid image quality and easy-to-use controls for two types of buyers.

Graphic Arts Monitor

★★★★/8.3 **VisionMaster Pro 21** Top overall image quality combined with clear on-screen controls yield a superior product. **Company:** Iiyama North America (215/957-6543, *http://www.iiyama.com*). **List price:** $1995.

Economy Monitor

★★★★/7.6 **G810** Near the top in image quality and ease of use, this unit is a great buy and includes a three-year warranty. **Company:** ViewSonic 909/869-7976, *http://www.viewsonic.com*). **List price:** $1595.

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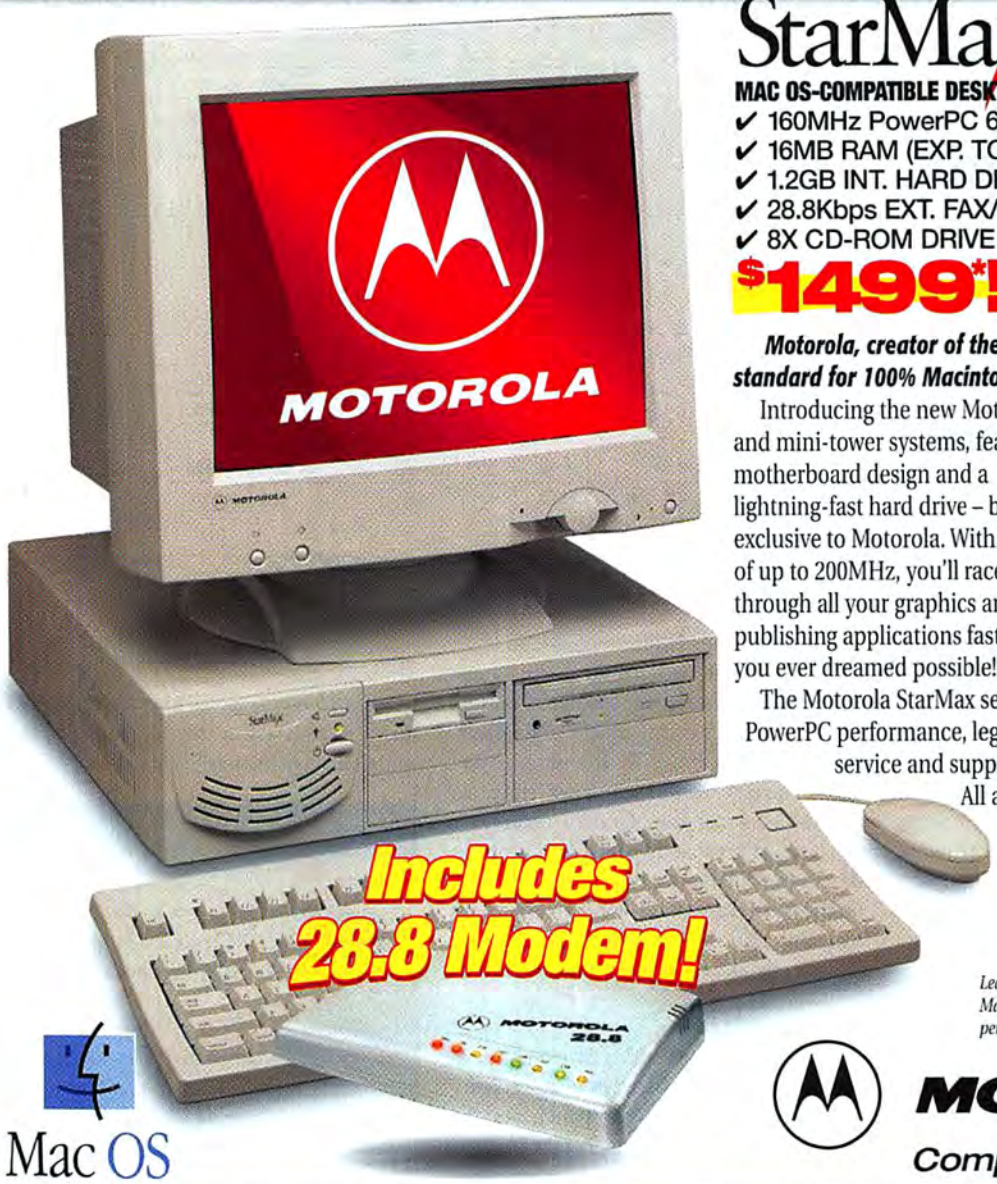

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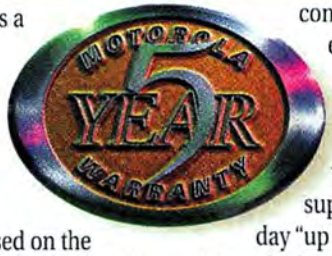

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•Stereo 16-Bit Sound I/O
•External 28.8Kbps Fax/Modem
•3 PCI Expansion Slots
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1997 MACINTOSH GAME HALL of FAME

BY STEVEN LEVY

It's midnight in the Garden of Good versus Evil, one of the new displays at the Macintosh Game Hall of Fame in plucky downtown Pittsfield, Massachusetts. We've been here since 10 this morning, trying to pick our new class of inductees. The floor is littered with joysticks, Wendy's wrappers, CD jewel boxes, and paper airplanes made from yesterday's *Berkshire Eagle*. We're still arguing about the difference between role-playing games and adventure games.

It's almost time for me to make my annual "let's forget about the categories and just pick the best ones" speech. Who am I, you ask? Merely the Hall's curator and the ultimate arbiter of who gets in and who doesn't—a job that's taken its toll on my mouse finger, my joystick wrist, and my pacifist inclinations. But the job has its dividends, every year when dozens of games come tumbling into the Hall and once again I'm acquainted with an awesome range of creative fireworks, a brain-teasing set of puzzles, an eye-popping mélange of graphics, and some really cool means of blowing apart inanimate objects.

But something weird has happened this year. I don't have to make the speech, because sometime, just after the stroke of midnight, everything becomes clear. The fog has lifted, or else everyone just wants to play another round of You Don't Know Jack. In any case, the winners seem obvious to us. Not that there aren't plenty of wonderful runners-up. It's just that this year's great games are, well, great.

So crank up your Power Macs and let off steam with the steamy, dreamy class of '97, the newest Macintosh Game Hall of Fame honorees. And if you're in the neighborhood, you can check out the games in person. Just be sure to call first.

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BEST MULTIMEDIA GAME

Spycraft: The Great Game
★★★★/8.1
Activision
310/479-5644
http://www.activision.com
List price: $45

When former CIA director William Colby disappeared on his boat earlier this year and then was found dead of "natural causes," those familiar with Spycraft: The Great Game suspected foul play. Why? Because Colby, along with his former rival General Oleg Kalugin of the KGB, added their expertise to this superb live-action CD-ROM thriller, which teaches that in the world of espionage nothing is as it seems.

Spycraft is better than a le Carré novel conveying the dirty tricks and covert actions necessary to be a spook, because it makes you the operative, immersing you in back-channel communications and high-tech intelligence tools. You'll spend many happy hours doing image and voice analysis, engaging in semilegal surveillance, and crawling through bushes with night-vision glasses looking for hard targets—all while trying to unravel a mystery of international proportions.

Perhaps because of the famous consultants, there's a degree of complexity that keeps you going past some of the inevitable boring patches in this three-CD marathon. Also, unlike in many other products of its ilk, Spycraft's live-action segments do not produce the impulse to spacebar ahead to the actions—you really have to listen to what's going on so you can play on. Finally, Spycraft breaks some important ground in linking players to a special site on the World Wide Web.

Makes you wonder: if a former CIA head could help produce a game of such intricacy and playability, how come he couldn't find Aldrich Ames?

BEST PARTY GAME

You Don't Know Jack (XL version)
★★★★/8.9
Berkeley Systems
510/540-5535
http://www.berksys.com
List price: $40

When it comes to creating a great party game that works on the computer, many have tried, and most have failed. Finally, fueled by MTV energy and Generation X cultural radar, there's You Don't Know Jack. This is a gloriously irreverent, borderline-tasteless send-up of every bad game show you've ever seen, with a shameless nod to Trivial Pursuit.

You know something special is afoot when the opening credits roll, a hilarious parody of a real TV game-show warm-up that cleverly evokes the contestants' names and explains the rules. This is basically a question-and-answer session, distinguished mainly by the cosmically goofy questions and the host's cheeky attitude.

Those questions, by the way, can be tough, since they often mix pop culture and mild profanity with highfalutin queries involving scientific or literary knowledge. A question might marry Voltaire with Martha Stewart, or ask you to name the historical figure who died "while getting some action" (no, not Catherine the Great—Attila the Hun!).

The graphics are of the eye-popping variety familiar to Ritalin-drenched channel surfers, and the humor is low and abundant. Yes, it is true that the ideal audience for this game is the cast of *Friends*, drunk. But no matter who you are, after playing a few rounds of You Don't Know Jack, your mind will be sufficiently melted to place you squarely in that strange demographic. So next time you party, bring the Power Mac and a six-pack of Jacks.

BEST ROLE-PLAYING GAME

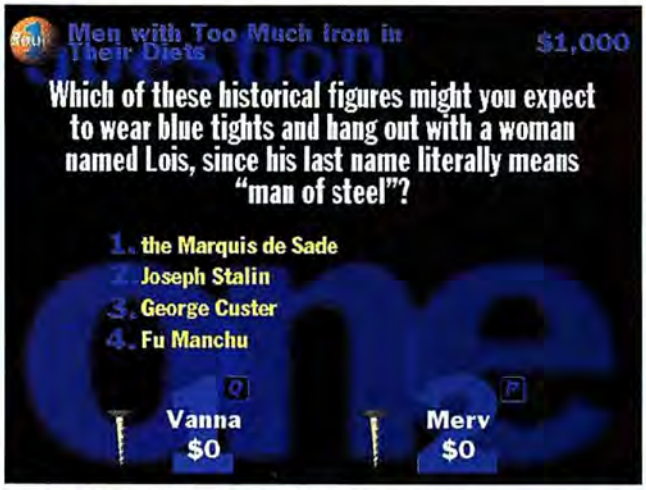
Bad Mojo
★★★★/8.8
Pulse Entertainment
800/264-0325
http://www.badmojo.com
List price: $40

If Franz Kafka were alive today, living in a South of Market garret, hacking out adventure games instead of *The Metamorphosis* he might have produced Bad Mojo, an amazing experience in which the game player is transformed into the body of a scummy little cockroach. It's sort of a stretch, being a *cucaracha*, but the most delightful—and at times disgusting—thing about Bad Mojo is that it really takes the task seriously.

Believe me, some of the sights you'll see are among the most nauseating ever digitally presented—early on in the game a rat caught in a trap is portrayed much more realistically than I wished to see it. Things got worse when the rat ate me.

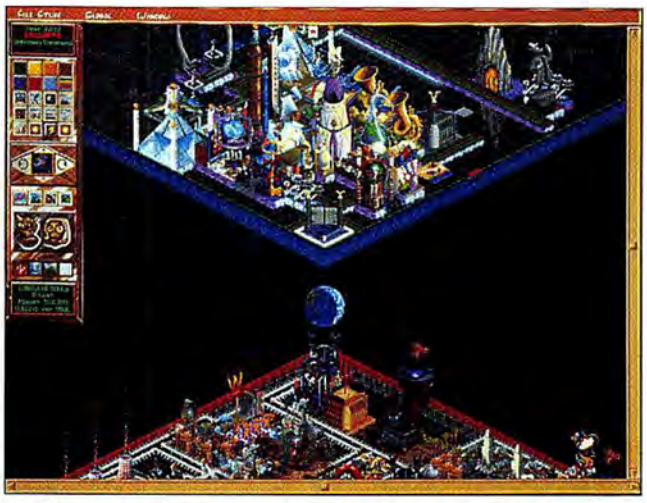
The animation, adopted from the work of genuinely serious artificial-life scientists, is amazing, and the puzzles are all appropriately cockroachish. Ultimately, though, it's the point of view that gets to you, the experience of seeing the world from a six-legged, ground-

Spycraft: The Great Game Shooting at spooks in the shadows with night-vision glasses is just part of the fun in Spycraft.



You Don't Know Jack XL One of the stupid yet amusing questions put to the contestants in this cheeky Gen X quiz-show game. Hint: The answer isn't Custer.

Bad Mojo Prepare to be disgusted—and fully enthralled—as you live the life of a cockroach. It's too weird—and simply too much fun.



Afterlife SimCity it's not, despite the look. Instead, you get to play God for real, creating both heaven and hell in wild incarnations à la Dante.

level perspective. When you finish Bad Mojo, I guarantee that the next time you see a roach, you won't be so quick to stomp.

BEST ADVENTURE GAME

Amber: Journeys Beyond
★★★★/8.7
Changeling
512/419-7085
http://www.changeling.com
List price: $70

Strip Myst of its fantasy-genre trappings and replace them with a dollop of Stephen King, and you can begin to understand what it feels like to play Amber: Journeys Beyond—a gorgeous, absorbing supernatural adventure.

In Amber, you are the intrepid rescuer who has to figure out what happened to Roxy, a type-A experimenter in the paranormal who has gotten herself in a deadly fix. In the process, you explore an exquisitely designed Victorian house in rural North Carolina, encounter some unexpected visitors, and ultimately "cross over" some sort of dimensional divide to visit with the unhappy souls whose eternal fate is dramatically intertwined with this haunted mansion. Amber has a wonderful novelistic quality.

Amber's pace is rather serene, but Ouija-like breakthroughs arrive with sudden and memorable force. And when you enter the worlds of the three lost ones, you get almost a magical, otherworldly—call it spooky—rush. At its best, Amber fulfills some of the almost-never-realized ambitions of interactive fiction.

BEST SIMULATION GAME

Afterlife
★★★★/8.2
LucasArts
415/507-4545
http://www.lucasarts.com
List price: $45

It was once said that a simulation game made by a company other than Maxis (SimCity, SimEarth, SimEverything) would be inducted into the Hall of Fame's Simulation wing about the time that hell freezes over. Guess what happens in Afterlife, the witty simulation that involves building up the places you go to when you die? Hint: Maybe the devil should buy a muffler.

That's actually only one of the cosmically wacky things that can occur in Afterlife, a computer simulation that mixes Dante, Milton, and P. T. Barnum in an imaginative if not seriously twisted look at heaven and hell. If truth be told, this game owes a lot to the Maxis classics SimCity and L-Train, particularly in the way that zoned areas generate activity. But what a crazy difference. You are the Demiurge, directing a population of, uh, postliving beings to your personally crafted Hades or your designer version of paradise.

You'll want to pay attention to the tutorial before you play, and listen to your online helpers (demonic Jason and angelic Aria) once you get going, because Afterlife is easily as complex as Dante's trilogy. There are all sorts of complications such as Karma Structures, Fate Populations, and Belief Graphs. In fact, this thing gets downright liturgical at times. But a refreshingly heretical sense of humor keeps things upbeat, down to the monastic soundtrack and the Boschian graphics.

Most enjoyable of all are the Bad Things you can unleash on your SOUL creatures (made of the Stuff Of Unending Life, of course)—postnatural disasters like Bats Out of Hell; Birds of Paradise; and Disco Inferno, where the Stygian domain is terrorized by Vinnie, a demon who dresses like John Travolta and talks like Barry White. Talk about hell!

Amber: Journeys Beyond As you wander through a Victorian mansion in North Carolina, you see weird devices. Use them to find that the truth is Out There.

Step On It Its look-and-feel is classic arcade game, but Step On It goes beyond the run of the mill with its bedeviling puzzles and levels.

IndyCar II By yourself or against other players, you really feel the road in all its glory. Great tracks and great competition await you.

BEST ARCADE GAME

Step On It
★★★★★/9.0
Casady & Greene
408/484-9228
http://www.casadyg.com
List price: $40

In the tradition of Lode Runner and Lemmings, Step On It is a multiple-level game that combines puzzle skills and manual dexterity—and will drive you to the madhouse until you master it. You are Ted, rather sparsely armed with an arrow and a magic ball—insufficient material to wipe out the various nasties (ant, piggy, ostrich, hippo, and the dreaded Beenie) that kill on contact. A more important aid are blocks you can evoke out of thin air: you use them to climb, thwart the nasties, and uncover treasures.

Your main tool is your wit, which determines how you negotiate your way through perilous scaffolding, infuriating obstacles, and annoyingly colorful foes to accumulate goodies and get to the door that moves you to the next level. Oh yes, there are more than 100 levels, and some of them, I swear, *don't have solutions.* At least I haven't figured them out.

All this is classic stuff for this genre, but the Game Hall of Fame welcomes fascinating variations on the tried and true. Step On It not only provides an addictive single-player experience but allows for multiple-player action, both in cooperative and—best of all—a mess-up-your-neighbor mode.

BEST SPORTS GAME

IndyCar II
★★★★/8.4
Sierra On-Line
800/757-7707
http://www.sierra.com
List price: $55

The bad news: the Indianapolis Brickyard, home of the Indy 500, is *not* among the tracks where you can air out the high-performance machines in IndyCar II. The good news: this champion of race games has just about everything else.

We're talking about a choice of racers and a feature letting you customize them yourself, painting them your favorite color and even adjusting tire pressure. We're talking races on 15 different tracks.

We're talking about controlling arcane details like tire temperature, barometric conditions, and the amount of dirt kicked up by a spinout. We're also talking single-player, multiplayer-network, or modem competition. And finally, we're talking on the radio—in a Mac-only feature, IndyCar drivers can bark orders to the crew.

The real test of a racing game, though, is the feel of the road itself. That's where IndyCar II gets its checkered flag. Although you'll have to run plenty of practice heats before you can keep up with the pros, once you get the hang of it you'll be riding in the slipstream for many hours. Start your engines!

BEST FLIGHT SIMULATOR

Flight Unlimited
★★★★/8.5
Looking Glass Technologies
617/576-3310
http://www.lglass.com
List price: $50

Imagine a flight simulator that takes you up in a plane without jets, heads-up displays, or even missiles and guns. That's right—no zipping smart bombs at desert saltboxes. Are you stifling a yawn? Don't.

Flight Unlimited does something even more special that those macho sims do: it puts you in touch with what makes flying special. Your runway is at a small rural airfield. Your craft is one of several lithe single-engine prop planes, like the German-made Extra or American Champion Decathlon—or even a smooth glider, the Sailplane Grob 103A. You fill out the logbook and take off—and suddenly, magic. Instead of the normally mundane, blocky graphics common in these things, there is the complexity and beauty of real life.

Compared with those of other flight sims, Flight Unlimited's controls are alarmingly low on bells and whistles, particularly in the cockpit. You hold the throttle, press down the rudders, and that's about it. Less really is more: with joystick in hand (don't even think about using the mouse), the realistic responses give the illusion that you're actually in control of your machine.

The meat of this simulator is small-plane acrobatics, and you'll have lots of fun flying through midair hoops. Of course, the dazzling view makes you feel, well, airborne.

But the crowning moment of Flight Unlimited comes while piloting the Grob, the engineless glider. You are silently, majestically soaring over Virginia hills, over Arizona desert, over Alaskan mountains. Lifted by the wind, blinded by the sun, spinning through the sky. Free at last.

BEST NETWORK GAME

Spaceward Ho 4.0
★★★★/8.7
Delta Tao Software
408/730-9336
http://www.outland.com/deltatao/)
List price: $59

Avid would-be interstellar empire builders have been fixated on various versions of Spaceward Ho for some time now, but version 4.0 manages to push the envelope of complexity while providing an utterly clear path to pursuing the mechanics of taking over the universe.

The idea here isn't to increase your pulse rate to near-coronary levels, but to get involved in methodical, strategic initiatives as you attempt to dominate galaxies by mining helpless virgin planets, using the metals to build spaceships, and then taking over more planets, all while using some of your ships to fight off the evil forces represented by the dweebs on your AppleTalk network. If no one will play with you, there are some pretty-tough-to-beat computer opponents itching for a game, as well as an active community of Honuts on the Internet, who play by E-mail, and in real-time on the Outland network.

In short, Spaceward Ho is not an exercise to blow off steam after a hard day's work but more of a thinking person's way to obliterate your friends with a Dreadnought spaceship called *Mass Murder*, all while claiming cerebral, not muscle-twitching, superiority.

As befits such an enterprise, Spaceward Ho's graphics, while impeccably done, do not scream for resources—you can actually participate in a reasonable fashion with a monochrome PowerBook.

Spaceward Ho Dominate the universe by capturing planets and turning them into profitable enterprises—all while dodging your evil friends.

BEST STRATEGY GAME

Warcraft II: Tides of Darkness
★★★★/7.7
Blizzard
714/955-1382
http://www.blizzard.com
List price: $55

If you're a strategy gamer hooked on all that faux *Lord of the Rings* folderol—serfs and footmen booming "At your command, Sir" and all that—you will go absolutely bananas for Warcraft II. No Hobbits here, but an impressive elaboration on the first version, which was a wonderful clash between humans and Orcs. As in the original, you assume either side and carry on the fight in increasingly challenging scenarios; most require you to build up your forces—footmen, archers, spell-spewing clerics, and so on—and then take the fight to the foes.

If you're into carnage, you still have plenty of chances to shoot arrows or slice up your opponents. But the new model, set in a stunning polar landscape, offers much more elaborate graphics, including a "fog of war" feature that cleverly limits what you can see. The cast of characters includes mages, griffin riders, goblin sappers, and juggernauts. The encampments you can build are much more elaborate—whole towns with foundries, stables, castles, and shipyards that send tankers to offshore oil platforms you build. And there's a scenario editor so you can create your own challenges.

The friendly game play in Warcraft II (which can accommodate eight players) even includes well-documented cheat codes for those too impatient to learn the best ways to build up forces and kick Orc (or human) butt. Most amazing, you can even enter the cheat codes via speech recognition. ■

Contributing editor STEVEN LEVY, when he's not reporting for *Newsweek*, curates the Macintosh Game Hall of Fame.

Flight Unlimited No guns, no missiles, no problems. Instead of combat, the sheer beauty of flight—in an acrobatic prop plane or glider—is center stage.

Warcraft II: Tides of Darkness As humans and Orcs resume their classic dispute, the battle moves to the sea, in a rather chilly climate.

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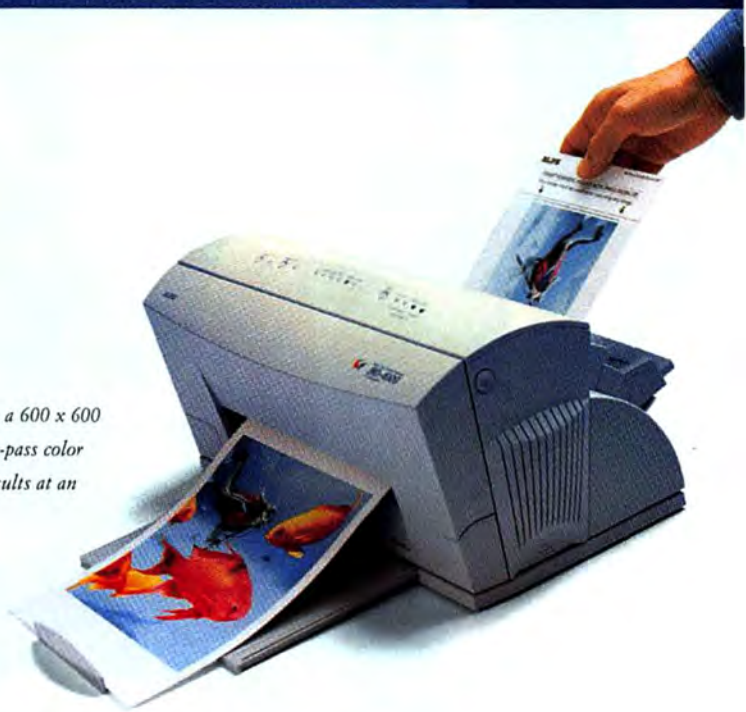

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Future Web

Apple's grand plan to marry Mac technology with the Internet—will it succeed?

by Lon Poole

Apple Computer is at a crossroads today, fighting for its life against the juggernaut of Microsoft Windows. Yet there's a bigger juggernaut out there, one that dwarfs all computing platforms—the Internet. The more people use the Internet, the less it matters which computing platform dominates. Each platform can participate in the Internet according to its strengths.

What a stroke of luck for Apple! The Mac's great strengths in graphics and publishing make it a natural for creating content for the media-rich World Wide Web. Those strengths, together with Apple's long-standing goal to make technology easy, form the foundation of its strategy for the Internet. But there's more at stake than just simplifying complexity. If Apple miscalculates this golden opportunity, it cannot survive.

As laid out by chief scientist Larry Tesler at last spring's Worldwide Developers Conference, Apple is addressing the three ways it sees people using the Internet—accessing, creating, and delivering content. For those who access the Internet, Apple's plans call for beefing up Macintosh hardware, bundling access software, making the Internet more plug-and-play compatible, seamlessly integrating a hodgepodge of Internet software components into the Mac OS, and bringing the Internet to the Pippin and Newton platforms. For content creators, Apple plans to improve QuickTime across several platforms, adopting new standards such as the nascent OpenType font standard for the Web and integrating the ability to run Java software components directly into the Mac OS, Pippin, and Newton. For people who deliver content on the Internet, Apple plans to introduce more-powerful Internet servers and bundle more software to increase their versatility.

In this overview, *Macworld* closely examines what Apple has said it will do, what it has done, and what else it should do with the Internet. In addition, we peer into Apple's crystal ball at some technologies that may show up on the desktop of the future. In companion articles in this issue, we also look at software robots and virtual gatherings on the Internet.

GEOFF SPEAR

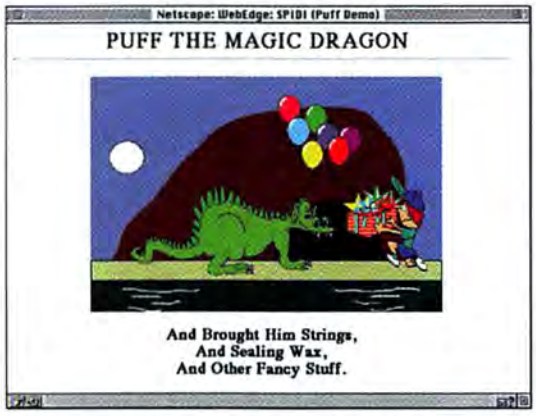
Simplifying Internet Access

Making accessing the Internet as easy as turning on a television isn't going to happen overnight, but Apple has begun what promises to be an ongoing effort to simplify Internet access with hardware, software, and search tools. In 1997, every Mac that Apple sells will get you to the Internet with a few mouse-clicks. You won't immediately require a hardware upgrade because every Mac will come with at least 12MB of RAM and a high-speed network connection (a 28.8-Kbps modem or ISDN for home computers or mobile systems and an Ethernet port for business models). And while any new Mac will be fully equipped for the Internet, the same isn't true for the average Windows computer.

Bundled Software The software you need for accessing the Internet also comes preinstalled on new desktop Macs and the latest PowerBook models. At the OS level, the Internet's TCP/IP networking protocol became a full peer of AppleTalk in System 7.5.3, bringing Internet networking a step closer to plug-and-play simplicity. (The Mac OS has included TCP/IP networking since 1994, the year before Microsoft added it to Windows 95.) At the application level, you have two choices. America Online software—still the most popular way individuals access the Web—is bundled, as well as the Apple Internet Connection Kit (AICK) for accessing the Internet through a dial-up Internet service provider (ISP) or a local network connection.

The value of AICK is not so much in its complete collection of Internet applications for E-mail, newsgroups, the Web, FTP, and so forth—all of which you could collect from other sources—but in what Apple adds to make it all easier to use. Apple throws in a dialer program that simplifies registering with an ISP and subsequently connecting to the Internet. In addition, an Apple Guide coaches you interactively through accessing the various Internet services with the AICK software. Owners of older Macs can get all that application and OS software for Internet access with the System 7.5.3 CD, sold separately for $99.

Alternative Platforms The Mac OS and all other personal computer platforms put together still don't equal the potential Internet audience. Like radio, the Internet can be accessible from almost anywhere—assuming Apple's Pippin and Newton platforms can tap the broader Internet audience of people who will never own a personal computer. The danger lies in Apple's spreading itself too thin, trying to produce too many products. The company is smart to license Pippin and let other companies prove the market. The first simplified Internet appliance based on the Pippin platform, @World, is expected to be available now from Bandai Digital Entertainment (310/404-1600, *http://www.bdec.com/m-fst.html*) for people who would rather surf the Web on a TV. Although competing products from Sony and Philips will cost half as much as the @World ($300 versus $600) when they ship (about the time you read this), they won't play multimedia software titles and don't include Apple technologies such as QuickTime.



Jackie Paper Goes Digital Apple's new SPIDI technology, still in development, will let Web sites talk or, in this instance, even sing. While songs and stories might be better suited to a CD, getting them over the Web will undoubtedly be cheaper. Distribution may work along the same lines as a library.

On the Newton front, Apple first gave the MessagePad Internet access last summer. With its handwriting recognition and inherent mobility, a low-cost Newton could be a killer E-mail machine. It needs good E-mail software, and fortunately Qualcomm (619/587-1121, *http://www.qualcomm.com*), developer of Eudora E-mail software, is one of the many companies working on Newton applications. The Newton and Pippin have made Apple the first personal computer company with platforms for the broader Internet audience.

Personal Web Service Alternative platforms, bundled software, and beefier hardware do not resolve what for many people is the number one frustration with the Internet: finding and managing information on the Web. To address this problem, Apple introduced its free Personalized Internet Launcher (PIL) service in August. When you register your profile at the PIL Web site (*http://myhome.apple.com*), you're guided to other Web sites you may find interesting. The service presents daily recommendations to you as categorized links on a personalized Web page. The sites are reviewed, categorized, and rated by Excite (415/943-1200, *http://www.excite.com*), creator of its eponymous search engine for the Internet. If several people share a Mac, each can have a personalized launcher page. In fact, even Windows users can take advantage of the PIL because it is an Internet service, not a Mac OS application. (Microsoft doesn't provide anything like it.)

Unorthodox Methods In addition to bundling conventional Internet applications, Apple will integrate its unconventional Cyberdog software (*http://cyberdog.apple.com*) into the Harmony version of the Mac OS, due in January 1997. Of all the companies that make personal computers and their operating systems, Apple is the only one thinking this far outside orthodoxy. Cyberdog lets you not only access the Internet, but also create Cyberdog-based documents that include Web pages, E-mail, and other content from the Internet, as well as text, graphics, video, and so forth from your hard disk. You can extend the kinds of content that Cyberdog can work with by adding software components. For example, Netscape is developing a Navigator component as the standard Web browser for Cyberdog.

Component Technology Cyberdog is so versatile because it's based on Apple's OpenDoc component software—not that component software per se makes Cyberdog unusual. Components have been around for years, and several companies have different component technologies for the Internet. Netscape plug-ins, Microsoft's ActiveX components (an enhancement of Microsoft's older OLE technology), and Java applets all enrich Web pages with new kinds of content such as streaming audio and interactive animation. People who access Web pages enjoy the rich content, and they may copy

and paste some Internet content to their own documents, but ordinary Internet users don't create documents that contain Netscape plug-ins, ActiveX components, or Java applets. Web authors use those components to create Web pages.

OpenDoc is different. Users can easily mix and match OpenDoc components in documents they create with Cyberdog or OpenDoc-compatible applications such as the forthcoming versions of ClarisWorks and Corel WordPerfect. Users can mix in Netscape plug-ins as if they were regular OpenDoc components. Apple has demonstrated the same capability for Java applets, and expects to deliver it in 1997. Web authors can also wire OpenDoc components into their Web pages, just like other components.

While analysts agree that OpenDoc outclasses other component technologies with its capabilities, some knock it for being too hard to use. To stand a chance against ActiveX, OpenDoc must establish a strong Windows presence. Originally WordPerfect was developing OpenDoc for Windows, but when Novell chewed up WordPerfect and spat it out, OpenDoc for Windows bounced to IBM.

Fair Exchange *Chief scientist Larry Tesler told Apple's developers, "We're taking the best multiplatform standards from the Internet community and building them into our products. We're also taking some of our best technologies and know-how and contributing those to the Internet."*

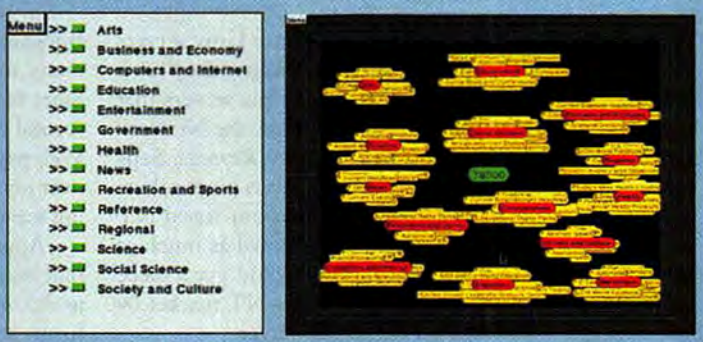
IBM promises a final version before 1997. These delays have given ActiveX time to gain the upper hand—far more components are available for ActiveX than for OpenDoc. In addition, ActiveX versions for the Macintosh and Unix are planned for year-end.

Nonetheless, OpenDoc has lots of support from small firms that can't realistically compete head-to-head against entrenched monolithic applications. Apple says hundreds of developers are working on OpenDoc, and CI Labs, the independent association that oversees OpenDoc, has more than 2500 members. The trouble is that two of the major application developers for the Macintosh Operating System, Adobe Systems and Microsoft, have not embraced OpenDoc. Adobe belongs to CI Labs, but has committed only to making OpenDoc viewers for Photoshop, Illustrator, and Premiere. Although Adobe claims to be neutral, it is developing Acrobat 3.0 as an ActiveX component and as a Netscape plug-in but not as an OpenDoc part. Acrobat 3.0 will be available for Cyberdog, but Apple has the responsibility of implementing it.

Cruising X Space

Finding your way through the overwhelming amount of content on the Web, not to mention the stuff on your own hard drive and local network, can be a daunting task. Apple researchers think what's needed is some way to represent information about content, a concept they call *metacontent*. You can see an example of metacontent by looking in the Get Info window for any Finder item. You can use meta information to sort the contents of a Finder window, and you can find items having similar metacontent by using today's Find File utility. Apple envisions being able to do much more with it, and has devised an open standard it calls MCF (metacontent format) for describing how and where content is stored.

To demonstrate how MCF might help you seek out new content (to boldly go where no one has gone before—hum the *Star Trek* theme now), Apple researchers created Project X, officially dubbed HotSauce. It's a 3-D viewer for flying through a space populated by visual representations of MCF information. HotSauce could show you a 3-D representation of the stuff on your hard drive or the pages on a Web site. You can cruise some 160 sample Web sites in your browser by downloading the prototype plug-in from the HotSauce Web site (*http://mcf.research.apple.com/hs/download.html*).



Making the Finder 3-D HotSauce (code name Project X) takes information that would normally appear linearly (left) and clusters it appropriately (right). When you move the mouse toward a cluster of "bubbles," they move apart and become more easily visible—kind of like going into hyperspace in *Star Wars*.

You can move in all directions with HotSauce at several rates of speed. At first you can make out only the major containers (or "bubbles") in the space, but as you move toward a container, the items in it (actually behind it) become large enough to identify. Those items may be additional containers or actual content such as a document, application, or Web site. When you see an item you want to open, you double-click it.

In its current incarnation, this method might make you dizzy or tense as you cope with scads of unidentified objects whizzing toward you. Imagine looking for a street address while driving through a neighborhood of identical houses distinguished only by names on the walls. One way Apple could help you identify HotSauce items would be to represent them with meaningful 3-D icons. Items could even speak their names or emit identifying sounds as you approach them. Apple has made this kind of interface transformation before. One prototype of the Finder had only text buttons—strikingly similar to the current HotSauce prototype. To visualize where HotSauce could go, try mentally morphing today's icon-enriched Finder with the prototype.

Creating Internet Content

Where Apple can succeed is in Internet content creation, as graphics professionals move from print publishing to electronic publishing. No matter what browser or OS people use to access the Web, much of the content they get is created on Macs. Apple estimates it has about 40 percent of the Web authoring market, even though Macs account for less than 10 percent of all personal computers. The Mac platform earned that disproportionately large share of Web content creation by dint of its long history as the leader in other areas of content creation such as graphics, desktop publishing, and multimedia. Apple fostered the Mac's lofty position among content creators by advancing richer forms of media, ranging from graphics and styled text to audio and video. When the Web zoomed in popularity, a corps of experienced graphic artists, desktop publishers, and multimedia producers were able to apply their Mac skills to creating Web content.

Authoring Tools Prior to the advent of Web authoring, Apple did not get very involved in developing applications for creating content. That strategy may change regarding Web authoring tools, since Apple does not own the Internet as it does the Mac OS. Apple's Claris subsidiary ships a program for creating Web pages. Apple is working on an authoring tool for kids, called Cocoa (*http://www.atg.apple.com/research/tech/Cocoa/default.html*). Will these moves step on other developers' sensitive toes? So far they seem undaunted by Apple's entries; there are at least 15 other Web authoring tools available from companies large and small (see the sidebar "Tools for Building Web Spaces," in "Face-to-Face Online" in this issue, and "Web Authoring's New Tools," *Macworld*, October 1996).

Delivering Content

Many Macintosh-using content creators naturally turn to Apple computers to deliver their Web pages. Apple sells several Mac OS products specifically as Web servers—they're called Apple Internet Server Solutions (AISS)—and people use all kinds of other Mac OS computers to host Web sites as well. Mac servers are easier to set up and maintain than Web servers based on Unix and Windows NT, the other two prevailing Web-server platforms, for the simple reason that Mac computers are easier to use.

Apple makes the AISS products easiest of all by bundling Quarterdeck's popular WebStar server software and all the other third-party software necessary for a typical Web site.

Unix and Windows NT Ease of use isn't enough to get everyone using Macs as Web servers. Unix servers are more popular, and Windows NT servers are coming on strong for a couple of reasons: performance and reliability. Unix and Windows NT servers allow more users to connect simultaneously to general-purpose Web-server software comparable to WebStar on a Mac. That kind of performance is vital for busy Web sites. Companies will continue to use Unix servers for critical Web sites because they're so robust. Apple sells two Unix servers that are easier to use than most, the Network Servers 500 and 700 (see *Reviews*, September 1996). While Unix is more robust than Windows NT, Pentium-based NT servers cost less than a third as much as Unix hardware. Apple could get a piece of the growing Windows NT market by selling a CHRP-based server.

Personal Preference Apple's Personalized Internet Launcher not only lets you choose the topics of interest you want to see on your personal Web page, but it also lets you choose one of three artistic styles.

Mac OS Performance Tricks While acknowledging the performance advantage of Unix and Windows NT, many advanced Webmasters argue that a Mac OS computer is more than adequate to handle the vast majority of Web sites. Even a Power Mac 6100/60 can keep a T1 circuit completely busy, they contend. Their tricks for overcoming the Mac OS bottlenecks and delivering top-notch Web-site performance from a Mac include using Open Transport (which comes with System 7.5.3) for TCP/IP networking, file caching with Rush Hour from Maxum Development (630/830-1113, *http://www.maxum.com*), and serving files directly from an object database such as UserLand Frontier (*http://www.scripting.com/frontier*). Apple ought to make techniques like these better known.

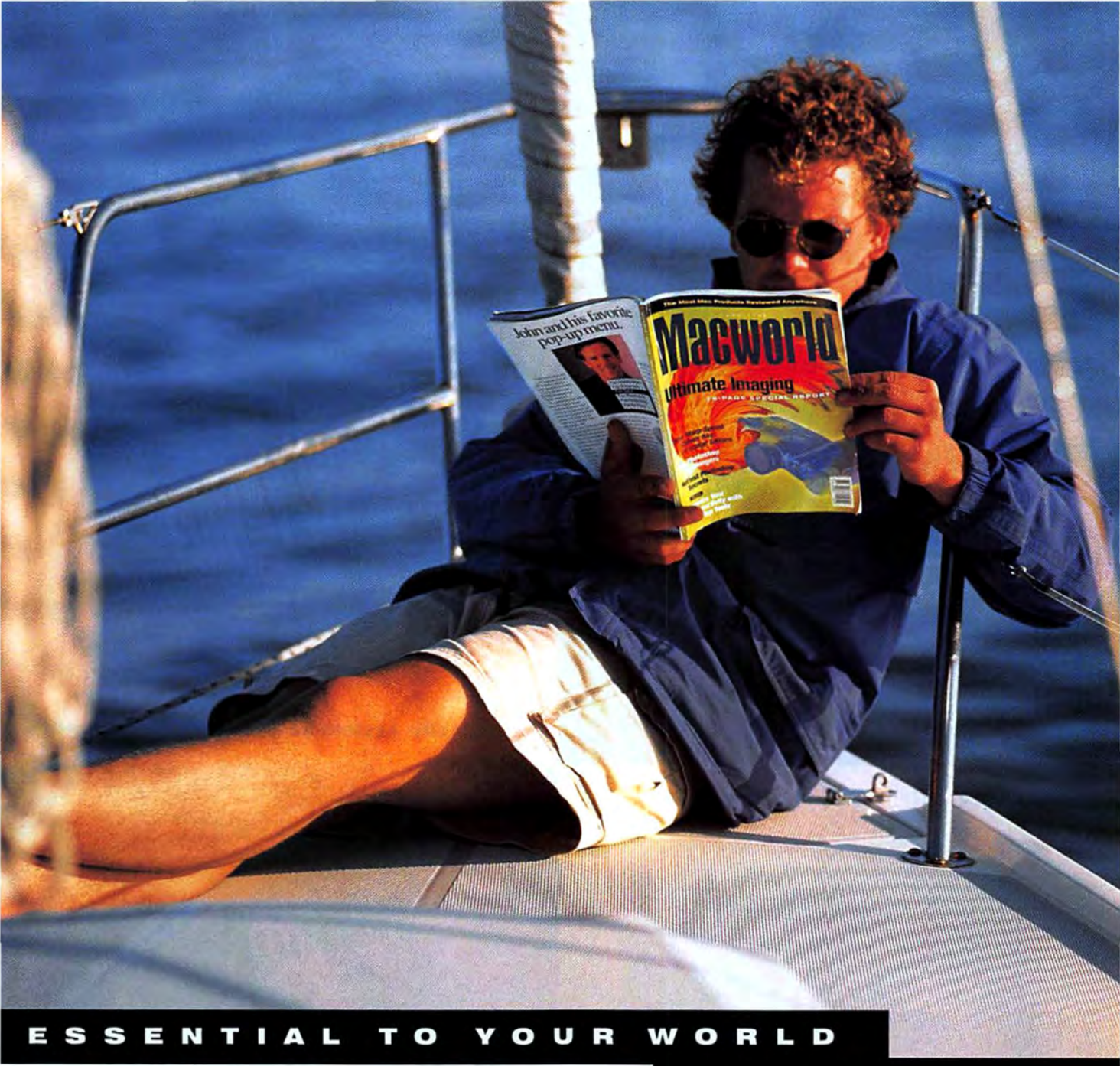
The Last Word

The Internet gives Apple a tremendous opportunity to keep what market share it still has and even gain some back. The company has taken some steps, but needs to follow through to make Mac OS computers, and Apple Macs in particular, attractive to people who believe that the Internet is the future of technology. Since announcing its Internet strategy at the Worldwide Developers Conference last May, Apple has made some progress, but much, much more lies ahead.

For instance, software that ships with new Macs simplifies accessing the Internet, but your average couch potato would still go nuts configuring a dial-up Internet connection. The latest QuickTime adds cool new media potential to Web movies, and Apple now concurrently updates QuickTime for the Mac OS, Windows, and other operating systems. Too bad movies take so long to get rolling over the dial-up Internet connections used in homes and many small businesses. Despite the Fast Start feature for streaming video, a 30-second video clip embedded in an Apple Web page took 13 minutes to get started over my 56-Kbps ISDN connection, giving me ample time to memorize the page.

Apple should promote technologies that may be less glamorous but are more useful, such as providing easy cross-platform access to Macintosh databases. Apple also needs to address the need for more-powerful servers for the burgeoning intranet market. None of this will be easy, but it's necessary if Apple intends the Internet to reinvent the company for the next 20 years. **m**

Contributing editor and *Quick Tips* columnist LON POOLE writes about new technology and operating systems for *Macworld*.



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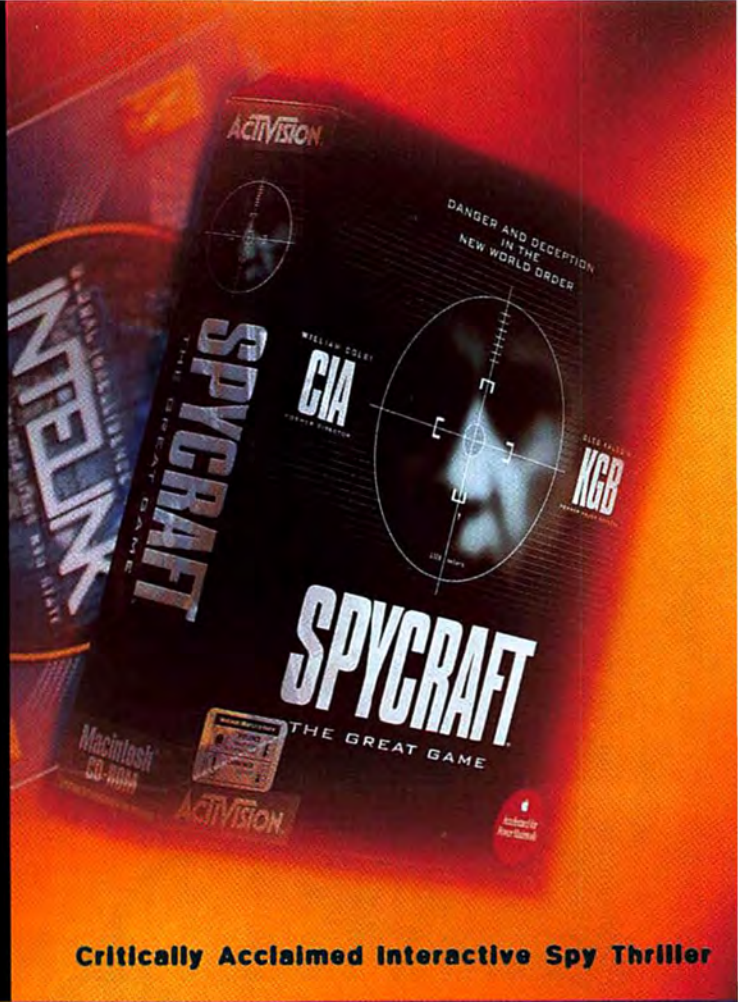

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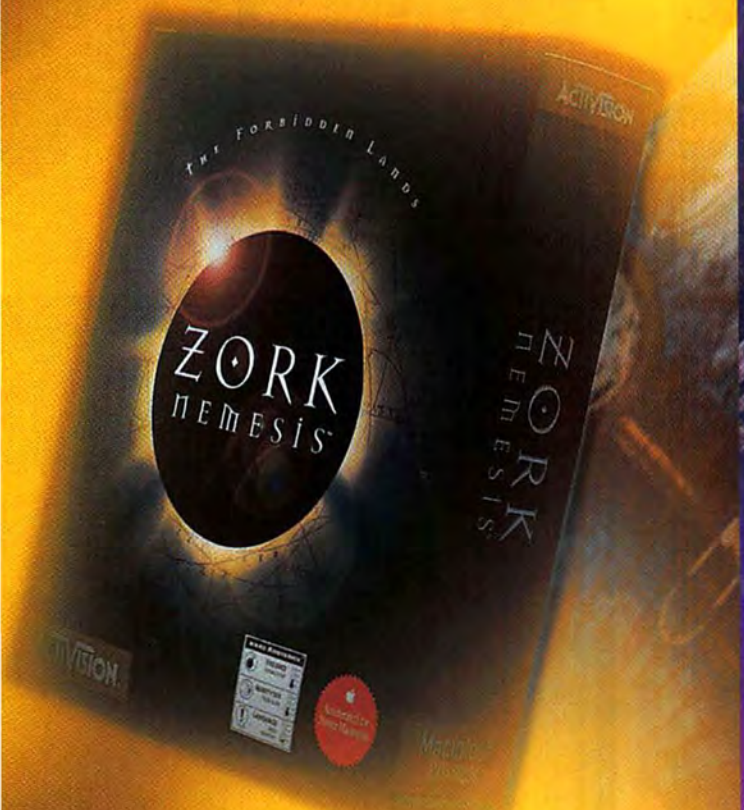

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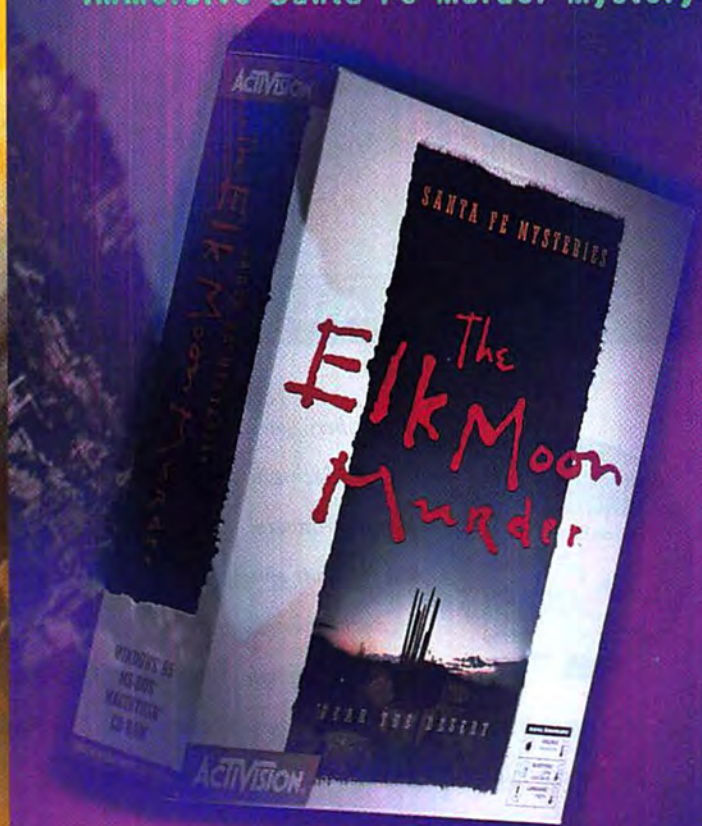

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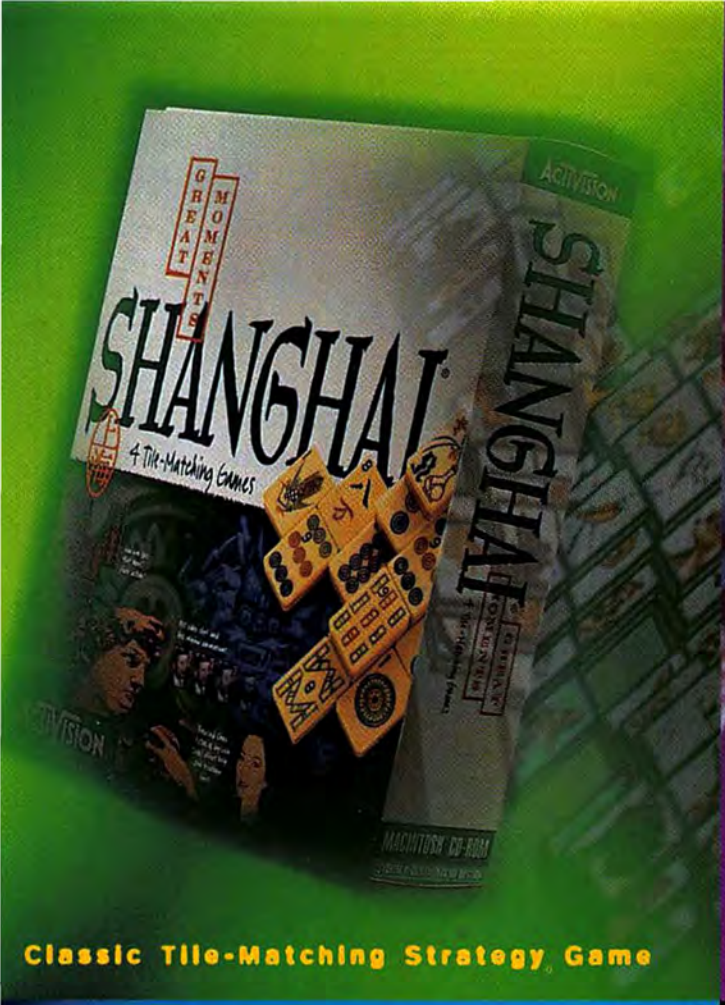

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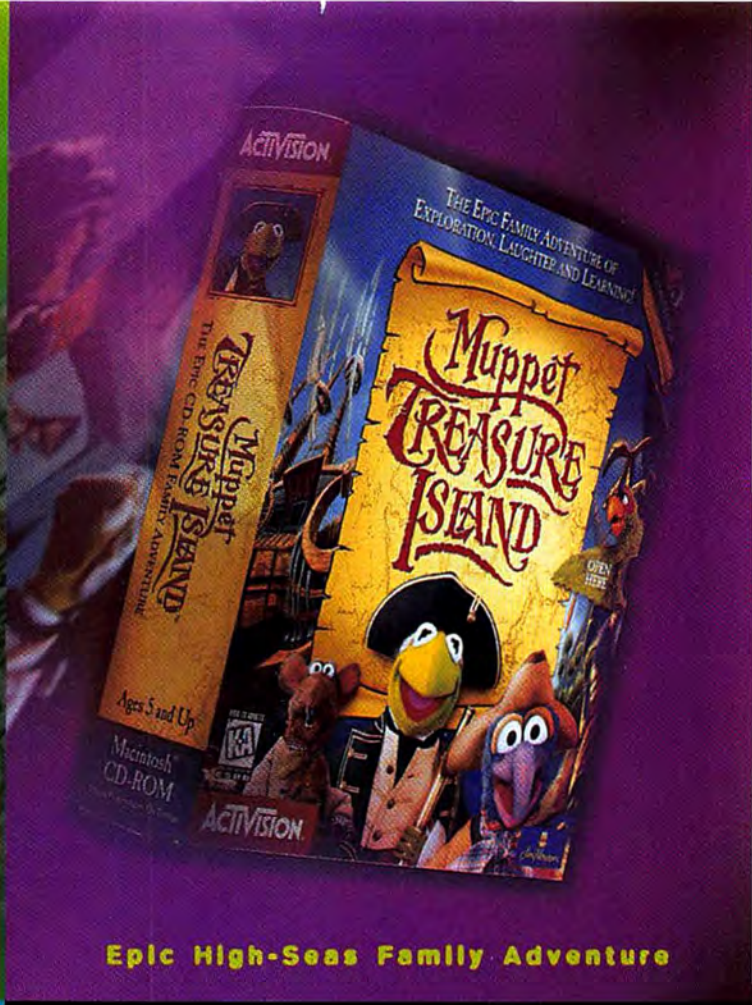

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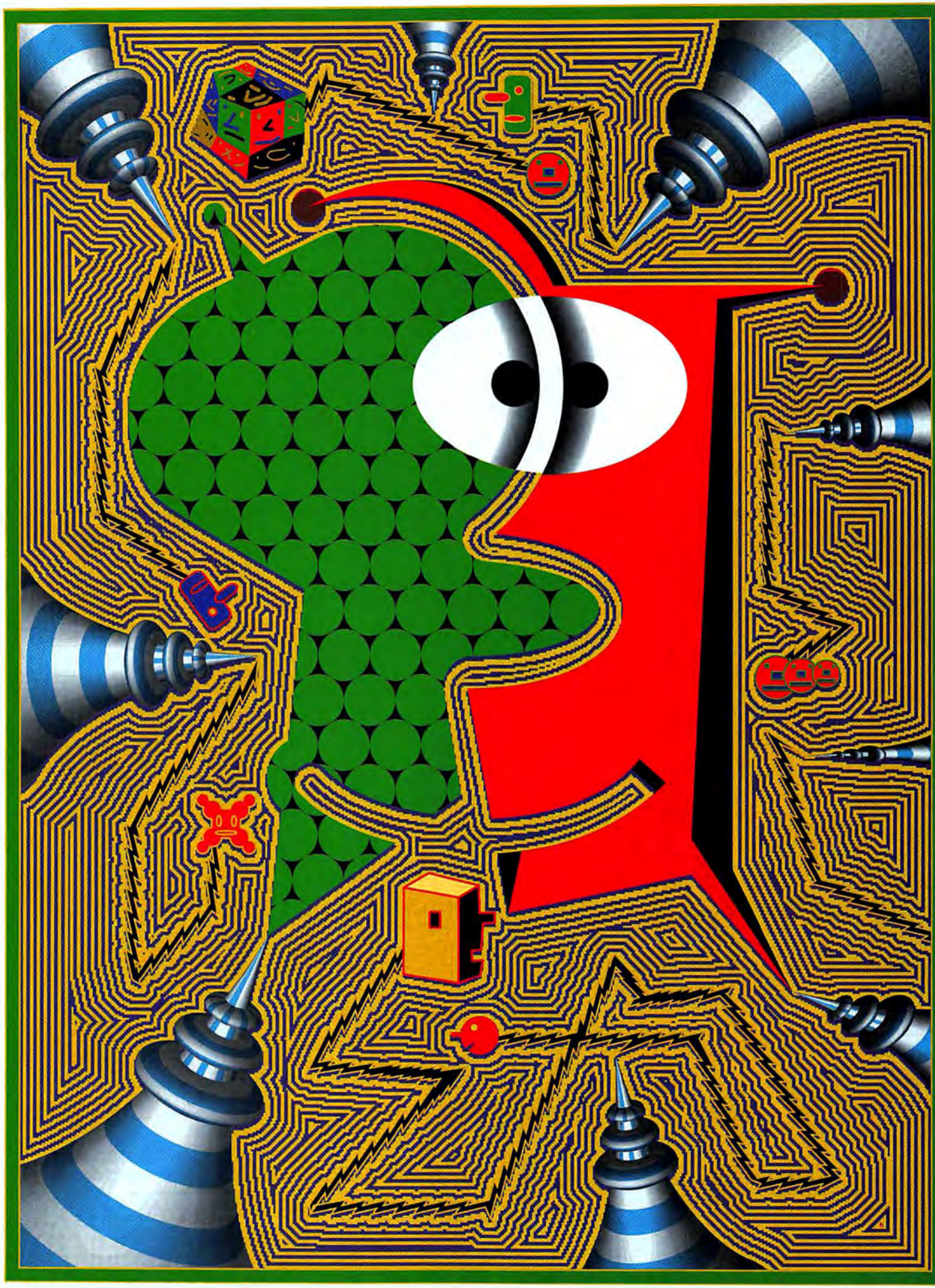


Face-to-Face Online

From chat rooms to virtual reality: the next wave of Internet interactivity

by Jim Heid

We humans were interacting with each other and exploring new places for thousands of years before we started writing or even drawing pictures. Our need to interact and explore is just as strong today: we gather to share interests, we travel to exotic places, we wander at the mall.

The Internet and the World Wide Web are evolving to accommodate these activities—in fact, the online world's ability to span the globe and eliminate physical barriers enhances these interactions and explorations in unique ways. A growing number of real-time chat technologies enable you to have teleconversations, interacting by typing instantly transmitted messages or, with some forthcoming technologies, using a PlainTalk microphone to talk with the digital representations of others.

As for exploration, the online world is slowly but steadily moving toward virtual reality—not goggles-and-gloves VR, but on-screen scenes you can navigate by clicking and dragging. Some forward-looking Web developers are creating everything from virtual cities you can tour to virtual stores you can browse.

The most exotic of the new communications media combine interaction and exploration by providing chat features within VR spaces. Several companies have developed 3-D chat technologies that create virtual meeting places: you can enter a representation of a 3-D space, navigate toward a group of people, and start typing or even talking. This is not your father's online world; it's George Jetson's.

Like many aspects of the Internet and World Wide Web, some chat and VR tools are a bit rough around the edges, but both the tools and the technologies are evolving faster than a time-lapse movie. And as is often the case, the coolest tools can have discouragingly stiff connection-speed or hardware requirements.

Still, we're on the cusp of a brave new online world, one where pages are being joined by places. We'll look at the evolution from text-only chats to virtual reality to the combination of the two—discussions between users in cyberspace. Plus there are a couple of sidebars for in-depth looks: "Meet Me in Cyberspace" lists

JOHN HERSEY

some sites where you can see these technologies in action, and "Tools for Building Web Spaces" spotlights what you need if you're a Web developer interested in creating your own Web worlds.

Type to Me: Text-Only Chat

To appreciate what's ahead, it helps to know where we're coming from. The oldest and most basic form of Internet interaction is text-only chatting. A scheme called Internet Relay Chat (IRC) has been in widespread use since 1988. Apple uses IRC-based chat software for the text-based chats it conducts in conjunction with its live-event Webcasts (for schedules, visit *http://www.live.apple.com*). IRC lacks the Buck Rogers qualities of the newest chat technologies, but because it doesn't demand a fast connection or a fast computer, it's an ideal entry point to the world of online interaction.

To participate in IRC chats, you need a client program, which connects to an IRC server and enables you to type messages and read responses. Several free IRC clients are available. Netscape Chat 2.0, from Netscape Communications (415/937-2555, *http://home.netscape.com*), and Global Chat, from Quarterdeck (310/309-3700, *http://www.globalchat.com*), are two solid choices for beginners (see the screen shot "IRC Chatterbox"). Both graft friendly graphical interfaces onto IRC, which was designed around often-arcane typed commands. If you become an IRC fiend, you may want to graduate to Blue Cow Software's $25 Homer (shareware, available through *http://www.blue-cow.com*), which lets you get into IRC's nooks and crannies, albeit through a somewhat funky interface.

The problem with conversing through the keyboard is that you're conversing through the keyboard. The pace of text-based chat isn't exactly brisk, and long pauses tend to separate each conversant's contribution. I find text-based chat most interesting when it's used for auditorium-style applications, where a speaker addresses a group and takes questions. The vast number of simple meeting places where people stare at each other's words and occasionally peck out a point proves that not every IRC chat user shares my preferences. But then, I have a life.

VR via VRML

IRC may be a text-only world, but the World Wide Web isn't much better. Most

Meet Me in Cyberspace

Feeling the need to reach out and chat with someone? Bitten by a case of digital wanderlust? This chat and VRML travel guide will get you started.

Internet Relay Chat The two most popular IRC networks are Dalnet (*http://www.dal.net*) and Undernet (*http://www.undernet.org*). Visit either of these networks' Web sites for details on connecting to their servers and downloading client software. Once your IRC client is running, you might want to join channel #newbies or #macintosh to swap notes with fellow IRC newcomers. Or, use the IRC command /list to get a list of current channels. Parents should note that although there are many wholesome IRC channels, there are at least as many that are populated by people whose drives would humiliate a rabbit on shore leave. Adult supervision may be in order.

Travel Guide (*http://ww3.blacksun.com/cool/guide*) Maintained by VRML vendor Black Sun, Travel Guide is an index of VRML sites in numerous categories, from entertainment to virtual trade shows.

Planet 9 Studios (*http://www.planet9.com*) This pioneering VRML design studio has VRML-ized numerous cities, including San Francisco; San Diego; and Austin, Texas. Worlds in VRML 1.0, 1.0 with Live3D extensions, and 2.0 are available.

Moving Worlds (*http://vrml.sgi.com/worlds*) Silicon Graphics has been instrumental in promoting VRML and contributing to its evolution. The company's VRML Web site contains hundreds of VRML worlds, including some in VRML 2.0.

SteelStudio's VWorld (*http://www.marketcentral.com/vrml/vrml.html*) This VRML developer's site contains numerous worlds. My favorite of these is Virtual Overdrive, which puts you behind the wheel of a 1957 Chevy. Clicking on the radio's buttons lets you listen to any of ten radio stations via Progressive Networks' RealAudio technology.

VRMLSite Magazine (*http://www.vrmlsite.com*) This e-zine covers the VRML world—and uses a VRML navigation bar to do it.

ZD3D (*http://www.zdnet.com/zdi/vrml*) This Ziff-Davis Interactive site contains VRML-related news and reviews, links to VRML sites, and a slick VRML world called Terminal Reality, developed by Intervista.

Turn It Up Crank the volume and put the mouse to the metal in Steel Studio's Virtual Overdrive, where you can click on the radio's buttons in the virtual convertible to listen to music clips and radio stations based on Progressive Networks' RealAudio streaming technology.

Art Walk Planet 9 Studio's Virtual SOMA encompasses San Francisco's South of Market (SOMA) district, home of *Macworld* and South Park (shown here). Clicking on the Art Show sign visible here takes you to a VRML-based art gallery featuring the works of SOMA artists.

Web pages are text heavy, seasoned occasionally with graphics, and even more rarely with video and audio. This mix isn't surprising when you consider that print and broadcast technologies dominate the way we get our information. But if a group of cyberpioneers gets its way, virtual reality and navigable 3-D spaces will join those venerable media to become the newest players in the information revolution.

These pioneers are the guiding forces behind the Virtual Reality Modeling Language (VRML). Often pronounced to rhyme with *thermal*, VRML is a standard command set for describing navigable spaces—just as HTML describes the appearance of pages, VRML describes the appearance of places.

IRC Chatterbox Internet Relay Chat isn't pretty, but it doesn't require a fast Mac-Internet connection. This screen shows a chat session on the #macintosh channel as viewed through IRCle, a popular IRC client among IRC gurus. IRCle is one of several IRC clients that support *faces*—small icons that represent the users.

When you click on a Web site's hyperlink for a VRML space, the site's server downloads a VRML file to your Mac. Your Web browser then launches a helper application or plug-in, which reads the VRML file and then works with a 3-D rendering engine to translate and render the scene described by the file. Cosmetically speaking, a plug-in delivers a better trip than a helper application, since a plug-in enables the scene to appear directly within the browser window or even within a frame—it doesn't force you to switch between programs to browse pages and places.

VRML Versions

There are two versions of the VRML standard, and the VRML sites you'll encounter may use either—or they may provide both and let you choose the one to download.

Currently, most VRML worlds are built around the original VRML 1.0 specification, which doesn't allow much beyond simple navigation. VRML 1.0 worlds can provide object URLs that enable you to jump to other scenes or pages by clicking on objects, but VRML 1.0 doesn't allow for animated objects within scenes, it doesn't enable you to pick up an object and examine it, and it doesn't support background sound. In short, VRML 1.0 isn't very real.

Many of these limitations disappeared last August when the VRML 2.0 standard appeared. VRML 2.0 does allow the features I just described—and then some. For example, VRML 2.0 allows directional sound: if a sound source is to your right, you hear it from your right-hand speaker, and as you move toward the source, it becomes louder. VRML 2.0 also supports animation and something called object behaviors: developers can specify the characteristics of the objects in a scene, to create, for example, balls that bounce like Super Balls—or like bowling balls, if that's what the developer wants.

The VRML Experience

Regardless of which version a VRML world uses, when you enter it, you navigate—move forward and backward, left and right, up and down—by click-dragging the mouse.

As I've mentioned, objects within a VRML world can contain links to other VRML worlds, to HTML pages, or to audio and video clips. It's this object-linking capability that can make a VRML site more than just a 3-D walk-through. Some scenarios might include a gallery (click on paintings to learn about their creators), a store (click on products to buy them), a music tutorial (click on instruments to hear them), or a city tour (click on buildings to enter them).

Because VRML scenes are 3-D renderings, your Mac's performance has a major bearing on how quickly you can journey through cyberspace. While even a low-end Mac can deliver satisfying HTML-browsing performance if it has a speedy modem, VRML benefits from not only a fast Internet connection, but also a fast Mac, ideally a PowerPC 604–based machine. In many ways, a 604-based Mac with a 28.8-Kbps modem is a better VRML platform than a 603- or 601-based machine with an ISDN connection.

As with any computer-generated 3-D scene, the realism and performance of a VRML scene depend in part on the effort that goes into creating it. For example, VRML objects can contain texture maps—bitmapped graphics of surfaces, such as bricks and stucco, that are applied like decals to objects. Texture maps add realism, but also increase downloading and rendering times.

The objects in a VRML world are composed of polygons. When creating worlds, smart VRML authors take steps to minimize download times and maximize navigation performance—for example, by reducing the number of polygons used to describe shapes and by optimizing the scene so that each area's details aren't rendered until you navigate close to them.

If you've been following our coverage of the Apple QuickDraw 3D software (see "The Mac's 3-D Edge," *Macworld*, August 1996), you might be wondering if a QuickDraw 3D accelerator card or a 3-D–accelerated video card delivers a faster VRML journey. The answer depends on whether your VRML viewer relies on QuickDraw 3D for rendering. If it does, a 3-D accelerator does indeed boost rendering (but it won't suck those 3-D worlds through the pipe and into your machine any faster). Unfortunately, the most popular VRML viewers don't use QuickDraw 3D, and thus don't benefit from 3-D acceleration.

VRML Traveler's Equipment

The word *unfortunately* surfaces often in the Mac VRML world. The Mac has long been a second-class virtual citizen, as the vast majority of VRML browsers and plug-ins are available for Windows 95 and NT. But there are at least four Mac offerings under development, and more on the way. Netscape's Live3D is a VRML plug-in that runs under Navigator 3.0. Live3D's extensions to VRML 1.0 add, among other things, animation and audio support. Alas, the Live3D version I tested was a memory hog—it demands at least a 24MB Power Mac, with about 18MB allocated to Navigator 3.0. Nonetheless, it's worthwhile. It works as well as its first-rate Windows counterpart, and some of the most interesting VRML sites

take advantage of Live3D extensions.

Virtus's (919/467-9700, *http://www.virtus.com*) Voyager is a freeware browser available for both Power Macs and 680X0 Macs. Currently available in beta form from the Virtus Web site, Voyager supports VRML 1.0 only. Virtus says it doesn't plan to offer VRML 2.0 support, preferring to devote its development efforts to its 3-D authoring tools. Voyager is a good way to test the VRML waters, particularly if you have a 680X0 machine, but Netscape's Live3D plug-in is a much better tool for serious VRML explorers.

Apple's QuickDraw 3D group (*http://www.quickdraw3d.apple.com*) distributes Whurlwind, a free helper application that supports VRML files and QuickDraw 3D's native format, 3DMF. Whurlwind is a better 3DMF viewer than it is a VRML viewer, though. Whurlwind requires QuickDraw 3D, which means you need a Power Mac.

Finally, there's ExpressVR, a Netscape plug-in created by Brad Anderson, who released the first preliminary version before graduating from high school. ExpressVR is available for 680X0 and Power Macs—and how. Anderson's site (*http://www.cis.upenn.edu/~brada/VRML/ExpressVR.html*) contains versions specific to the 601, 603, and 604 processor, and to 680X0 machines with or without a floating-point coprocessor. ExpressVR is very much a work in progress; the version I tested didn't support texture maps or other rudimentary VRML features. But it's worth keeping an eye on this plug-in to see how it evolves.

There's the grim picture: four VRML tools, only one of them in final-release form and none of them supporting VRML 2.0. But that's just a snapshot—the picture is far from complete. By the the time you read this, Intervista (*http://www.intervista.com*) should be shipping its WorldView 2.0 browser and plug-in, both of which will support VRML 2.0.

Tools for Building Web Spaces

There may be a relative dearth of VRML viewers for the Mac, but there is no shortage of VRML authoring tools. In the world of VRML tools, there are programs designed specifically for VRML authoring, and there are conventional 3-D modeling and rendering packages that have had VRML export or conversion features grafted onto them.

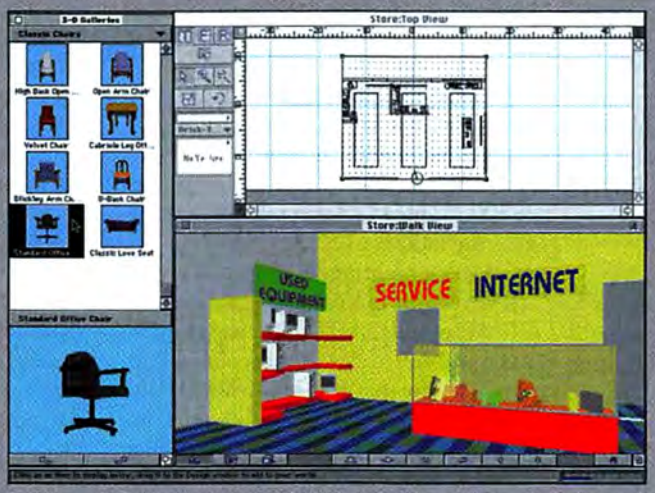
If you're a first-time world builder, you might find a VRML-specific tool easier to learn and use. These tools provide VRML-specific features ranging from the ability to attach URLs to objects to implementing VRML's time-saving *level of detail* feature, in which details aren't rendered until a viewer navigates close to an object.

In a general-purpose 3-D program, accomplishing these tasks is often more cumbersome. Also, many 3-D programs provide shapes and geometries that aren't supported in VRML. You'll need to train yourself to use only those features that VRML can handle. Still, if you've already invested time and money in a conventional 3-D package, you can leverage your investment into the VRML world.

VRML Authoring Tools The only currently shipping VRML authoring tool is Virtus's $159 3D Website Builder. This straightforward program takes a drag-and-drop approach to VRML authoring. The program includes a huge selection of prebuilt shapes and models—everything from cubes to furniture to space stations to alphabets—all living in a variety of gallery files. To add a shape to your world, simply drag it from the gallery window into a design window (see the screen shot "Building a 3-D World").

You can resize, reposition, and reshape objects as well as apply textures. Adding an URL link to an object involves selecting the object, choosing a command, and then typing the URL into a dialog box. When you've finished, you can export the world as a VRML 1.0 file, a JPEG or PICT image, or a QuickTime movie. A VRML 2.0 version of 3D Website Builder is scheduled for release early in 1997.

By the time you read this, ParaGraph (408/364-7700, *http://www.paragraph.com*) should be shipping its $49.95 Virtual Home Space Builder 2.0, which will support numerous VRML 2.0 features.



Building a 3-D World Virtus's 3D Website Builder enables you to drag and drop your way into VRML. The program includes a large library of prebuilt models, such as the gallery of chairs shown here. To add a model to a scene, drag it from the gallery into the construction window at the upper right of the screen. The Walk View window previews the world and lets you navigate through it.

VRML Converters Several mainstream Mac 3-D programs now export VRML files directly or include a converter application.

Fractal Design's (408/688-5300, *http://www.fractal.com*) $499 Ray Dream Studio 4.1 can export VRML 1.0 files. VRML 2.0 support is planned for a future release. Strata (801/628-5218, *http://www.strata3d.com*) is adding VRML 2.0 support to its Strata Studio Pro 2.0. The new version should be shipping by the time you read this.

Macromedia (415/252-2000, *http://www.macromedia.com*) recently shipped a free VRML 2.0 converter for its Extreme 3D package. The converter, created for Macromedia by VRML pioneer Intervista, is available for downloading from Macromedia's Web site.

Several freeware and shareware VRML converters are also available. A good source of information on this and other VRML authoring matters is the San Diego Supercomputing Center's VRML site, at *http://www.sdsc.edu/vrml*.

(Intervista has a long VRML history: its Windows-based WorldView 1.0 was one of the first VRML browsers, and company founder Tony Parisi is one of the creators of VRML.) And Apple is working hard to develop tighter links between VRML and its QuickDraw 3D technology (see "VRML to Become a Mac Reality," *News*, in this issue).

Chat Meets VRML

Combine the interaction potential of chat with the exploration potential of VRML, and you have the current state of the art in Web communications: VRML chat.

But before I fire you up about VRML chat, I'll hose you down with more bad news: no VRML chat clients are currently available for the Mac. All of the products I tested are available for Windows only, and even the Windows versions are still in prerelease form. But Mac support is promised sometime in 1997, so here's a preview of coming attractions.

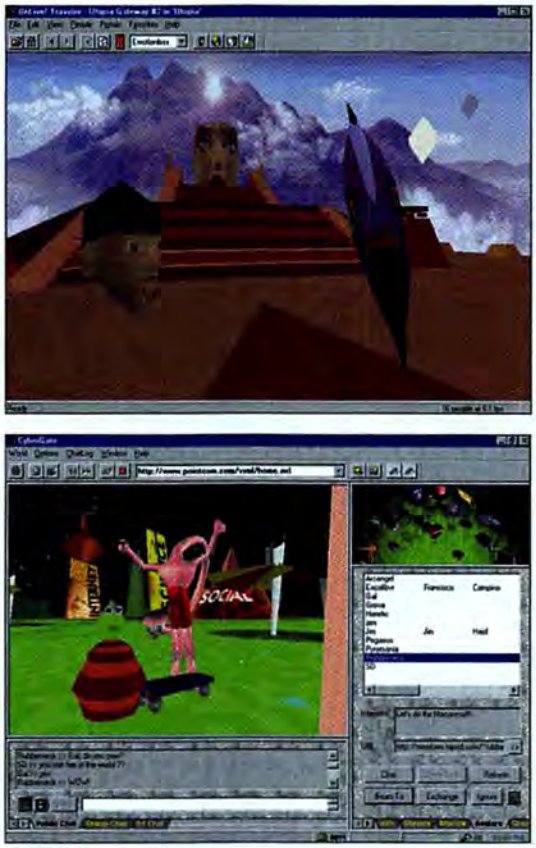
From its terminology to its implementation, VRML chat is delightfully futuristic. Before entering a VRML space, you choose an *avatar*, an on-screen character whose image represents you in cyberspace. When you enter a VRML chat space, you see the avatars for other people in that space. Approach them, and you can begin chatting (see the screen shot "Face to . . . Face?").

The most drop-dead impressive VRML chat browser is OnLive Technologies' (408/366-6000, *http://www.onlive.com*) OnLive Traveler, the only currently shipping product that supports voice-based chat: no typing, just talking—and as you speak, your avatar's mouth moves. OnLive Traveler provides dimensional stereo sound: if a group of avatars are chatting to your left, their voices come from your left-hand speaker. As you approach the group, their voices get louder.

OnLive spaces also make great use of graphics and background sound to create dangerously addictive virtual worlds. When working on this story, I used OnLive Traveler to conduct some virtual interviews with OnLive support technicians. I knew a new era had arrived when I heard myself saying in a follow-up call, "I just wanted to confirm some things that a tech-support avatar told me."

(A technical aside: Strictly speaking, OnLive Traveler isn't VRML-based, relying instead on a proprietary VR modeling language. But now that the VRML 2.0 specification is final, OnLive has announced that OnLive Traveler 2.0 will use VRML 2.0.)

Other VRML chat clients include Black Sun Interactive's (415/273-7000, *http://www.blacksun.com*) CyberGate and Oz Interactive's (415/536-0500, *http://www.oz-inc.com*) Oz Virtual. Neither product currently supports voice chat—you let your fingers do the chatting—but both companies plan to add it to future versions.



Face to . . . Face? VRML chat, currently available only on the Windows platform, redefines the concept of chat rooms. Top: OnLive Technologies' stunning OnLive Traveler browser enables you to chat by talking. Bottom: Black Sun's CyberGate combines VRML spaces with chat-based text; voice chatting is in the works.

And what of Macintosh versions? Oz Interactive told *Macworld* it has no announced plan to create a Mac version of Oz Virtual. OnLive does plan to do a Mac version of OnLive Traveler but hasn't announced a timetable. (A Mac-owning company representative told me that E-mail from interested Macintosh users might help turn up the heat.) Black Sun isn't bringing CyberGate to the Mac, but it is working with third-party companies, including Netscape, to develop Mac plug-ins that support the company's multiuser chat extensions.

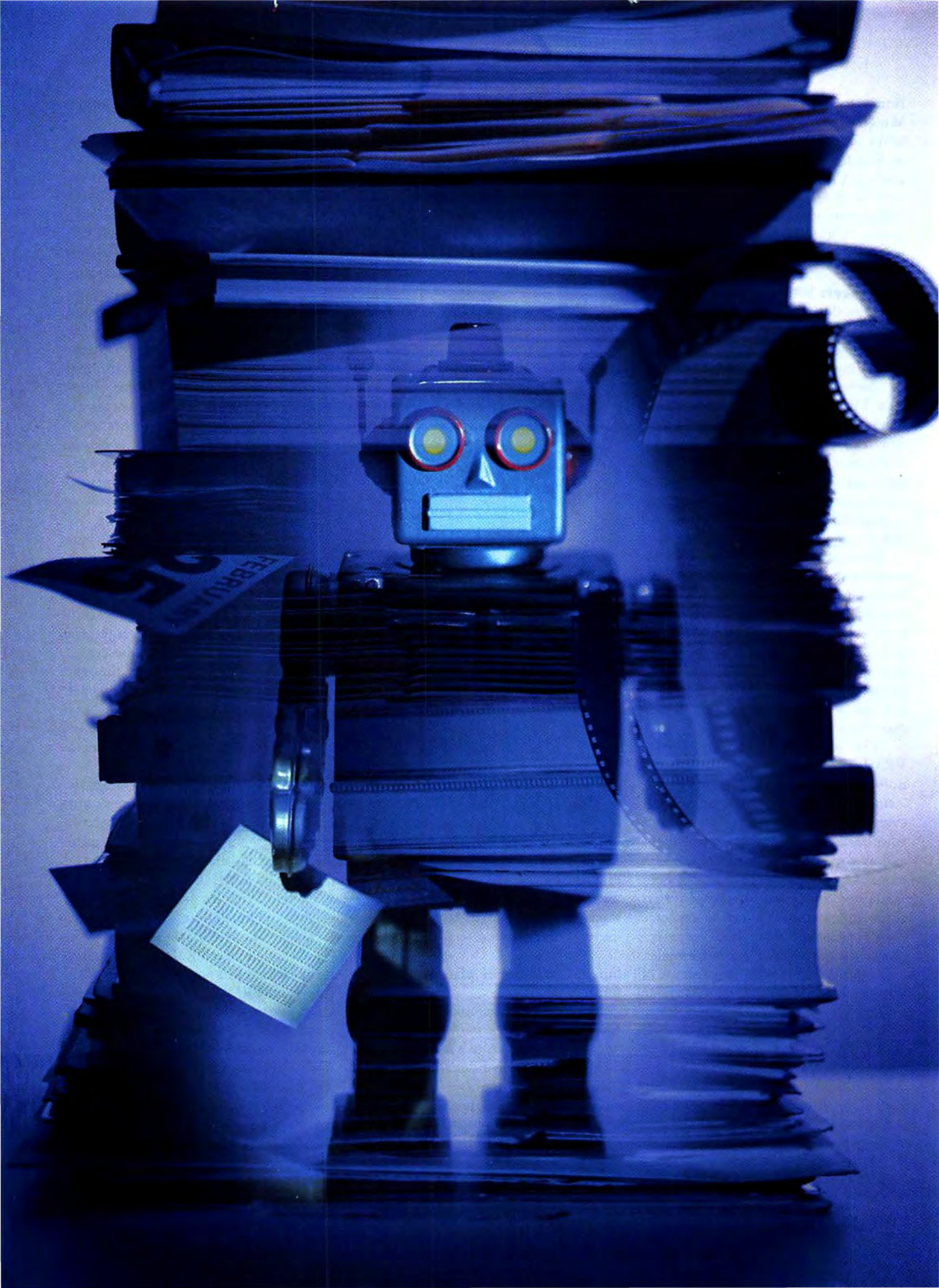
The Last Word

What kind of impact are the new Web-space technologies going to have? VRML's most ardent proponents claim it's easier to navigate and browse in 3-D space than it is to click on text and graphics links. I'm not convinced. There's no question that 3-D spaces can add an appealing dimension to Web sites, but wandering within a space isn't as efficient as navigating conventional hyperlinks. Consider shopping in the real world: although there are times when you want to wander aimlessly through a store, you also want a store map and directory nearby when you're looking for a specific department.

Chat programs, particularly VR-based products such as OnLive Traveler, are an encouraging sign that conversation isn't dead yet—indeed, it may be on the verge of a digital rebirth. (Some cynics might dispute this, though: when I showed VRML chat products to my wife, she joked that they won't be truly realistic until they enable avatars to watch TV together.)

But the most futuristic Web technologies aren't going to have much impact in the Macintosh world until the selection and quality of VRML browsers improve. With its great graphics and QuickDraw 3D technology, the Mac has the potential to be an ideal VRML platform. But this potential will not be realized until a first-rate VRML browser or plug-in ships, one that's fast and reliable and supports VRML 2.0. As for VRML chat, until developers create Macintosh versions of their wares, the doors to the most amazing meeting places on the Web will bear a sign proclaiming digital discrimination: No Macs Allowed. **m**

Contributing editor and *Media* columnist JIM HEID's latest book is *Web Publishing Secrets* (IDG Books Worldwide, 1995). His Web place is at *http://www.heidsite.com*.



Send In the Robot

Automated search tools can tame the overwhelming Web

by Geoff Duncan

As the number of things we want to do with the Internet expands, the number of things we need to do with the Internet increases as well. How can anyone keep up with the Web sites, news sources, archives, and software products appearing every moment? You can bookmark a site, but you never know when it moves or changes its URL. If a software update is released, you can't get to the server where it sits. The more you rely on the Internet, the more things you miss, lose, or fail to find.

Something's wrong—aren't computers supposed to make it *easier* to manage information? You don't have to be a rocket scientist to see the advantages of having your computer surf the Internet for you, rather than clicking your way through uncharted waters. With a little perseverance on your part, software tools—robots, assistants, agents, and automation—can help you keep track of the Internet.

In this article I take a look at a few offline and site-monitoring applications meant to make the Net more manageable, then turn to scripting and automation tools designed to bring you the information you need. My hands-on use revealed that some applications are long on promises and short on intelligence, but there are compelling tools to help users solve Internet problems.

GEOFF SPEAR

Offline Options

One major focus of these assistance products is offline browsing—access to Web sites or Usenet newsgroups when you're not connected to the Internet and either incurring charges or tying up the phone. An offline news reader enables you to browse news articles and compose replies to mail offline, while the primary appeal of offline Web browsing is speed (since accessing a Web site from your hard disk is faster than downloading it—especially over a modem connection). Though some of these programs are powerful, none is a fully standalone assistant, and so far, Web-centered products lack well-defined purposes.

Offline News Readers These Usenet tools were a necessity before the Web became an Internet darling, so it's no surprise they're

mature. SW15 Software's NewsHopper 1.2 and Stefan Kurth's MacSOUP 2.1 (which stands for Simple Offline Usenet Protocol) are the leading tools for reading Usenet news offline (MacSOUP can handle E-mail, too). Both programs allow users to subscribe to newsgroups, download articles or summaries, and compose replies to be sent the next time you're online. Additionally, both can filter incoming messages based on author, subject, or other criteria, so users can "kill" unwanted posts. Both programs have strong points: I like NewsHopper's basic scriptability and more sophisticated filtering, which lets me highlight mail or postings from specific senders; others prefer MacSOUP's news-reading interface and E-mail features. Choose according to your needs—it's hard to go wrong with either program.

Offline Web Tools Conversely, this product group shows anything but maturity, and programs often lack a cohesive design. ForeFront Group's (*http://www.ffg.com*) WebWhacker 1.0.8 is the simplest and best-established of these tools—simply define a group of Web sites (with their respective URLs), then "whack" each site by downloading its text and/or images to your hard drive. WebWhacker comes with a system extension that makes WebWhacker's functions available from many current Web browsers, and when I tested WebWhacker within my private firewall and at a corporate site, it operated smoothly and appropriately, using proxy servers to access outside sites.

Start Here Running a robot in Phantom is easy: you just give it a set of starting URLs, and Phantom gets the pages, looks for hyperlinks, and creates a searchable index according to your specifications.

But that's about it: WebWhacker has no scheduling facilities (so it won't run automatically in the middle of the night), and there's no way to define the depth of material downloaded—WebWhacker grabs either one page or an entire site.

Web Buddy 1.0, from DataViz (*http://www.dataviz.com*), has a slightly more advanced take on offline browsing, offering detailed download scheduling and bookmark management, as well as enabling you to specify how deep Web Buddy burrows. Web Buddy has a separate tool-bar application to make its functions accessible from a selected Web browser, and (as you would expect from DataViz) features document-translation tools to convert online text and images to common file formats.

However, Web Buddy suffers from distinct drawbacks and a lack of focus. Web Buddy is clearly a port of a Windows product and is currently available only for Power Macs. Further, Web Buddy consists of a background application and three RAM-hungry foreground programs (demanding more than 3MB of memory), making it impractical for average users.

Though Web Buddy's translation features might sound appealing (and DataViz is well regarded for its translation software), most graphics programs handle the Web's GIFs and JPEGs, and translating Web pages to a word processing format is a gamble at best. Though mostly textual documents come through well, Web pages that use HTML frames, plug-ins, CGIs, or nonstandard HTML tags often can't be translated meaningfully

How Robots Tick

The term *robot* is commonly used to refer to a wide range of programs, sometimes called walkers or crawlers, that automatically visit all or part of the Internet. Technically, a Web robot recursively traverses the Web: it starts by retrieving a Web page, then gets every Web page linked from that page, and so on, until it has accessed every available link.

The WebCrawler and AltaVista search engines are mammoth examples of Web robots: their software constantly visits sites in an effort to compile a searchable index of the Internet—an impossible task, but they keep trying. Other robots serve different purposes: some compile statistical information, and others verify databases of known Internet sites—there's no reason a Web robot has to belong to a search engine.

The problem with robots is that because they don't have a human behind them, they can access files or perform actions that (hopefully) a human would never do, like downloading mammoth log files, sending thousands of CGI queries, or tying up a Web server with an unreasonable number of requests. These out-of-control robots annoy both server administrators and users.

If you maintain a Web site, learn about the robot-exclusion standard, which controls how well-behaved Web robots access your site. The major Internet search engines all conform to the exclusion standard; it's often a good idea to exclude URLs generated by CGIs, test areas, and sites with multiple links to identical pages.

Out-of-control robots annoy administrators and users

If you're thinking about creating an Internet robot (or using a commercial robot, such as Maxum's Phantom), learn about designing and running "ethical" Web-walking programs.

Taming the Internet

Company	Product	Star Rating*	List Price	Contact Info	Comments
OFFLINE OPTIONS					
CE Software	WebArranger 2.0	★★★/5.8	$79	515/221-1801	Good site-monitoring and bookmark capabilities, though not originally designed as an Internet tool.
DataViz	Web Buddy 1.0	★/2.6	$50	203/268-0030	Makes it easy to set up a schedule, but it's a memory hog that's only for PowerPC and the Web.
Forefront Group	WebWhacker 1.0.8	★★/4.4	$70	713/961-1101	Clean, simple interface, but lacks scripting and scheduling.
Stefan Kurth	MacSOUP 2.1	★★★/6.8	$20	*stk@kagi.com*	Strong offline E-mail and news reader; that's all it handles, though.
SW15 Software	NewsHopper 1.2	★★★★/7.1	$59	*http://www.demon.co.uk/sw15/*	Powerful, scriptable reader, but can't be scheduled and handles only Usenet news.
SCRIPTING AND SEARCH TOOLS					
Allegiant Technologies	Marionet 1.1.1	★★★/6.7	$149	619/587-0500	Flexible for authoring environments; however, it requires significant programming knowledge.
Mango Tree Software	TCP/IP Scripting Addition	★★★/6.9	$49	617/327-8663	Offers access to TCP/IP commands for scripting, but requires significant programming knowledge.
Maxum Development	Phantom 1.1	★★★/6.9	$395	708/830-1262	A wonderful Web robot for the Mac that's server-friendly; it's expensive and useful primarily for Webmasters, though.
UserLand Software	Editors' Choice Frontier 4.1	★★★★/7.5	free	*http://www.scripting.com/frontier/*	Fast and powerful scripting environment, but requires advanced programming knowledge.

** Based on features, implementation, innovation, performance, reliability, ease of use, and value. (See* Star Ratings *section for full explanation.)*

because all the database and application connections are lost.

Though offline news readers can be useful, the same cannot be said for offline Web browsing. Both WebWhacker and Web Buddy are limited to downloading Web sites, ignoring FTP, Gopher, Usenet news, and other Internet resources. As significant, both products ignore robot-exclusion protocols designed to block off areas of Web sites from automated tools, which can place heavy loads on Web servers (see the sidebar "How Robots Tick"). By ignoring exclusion protocols, WebWhacker or Web Buddy could blithely download 100MB (or more!) of server log files to your hard disk; similarly, these products could tie up your Internet connection by repeatedly triggering a Web page that regularly changes (for instance, a random-riddle page, where the question and answer constantly update).

Also, since both products send download requests in rapid-fire fashion, they often produce a higher server load than a human would. Sometimes it only takes one or two robots hammering a Web site to prevent people from connecting—being a good netizen means avoiding these robots.

Furthermore, since offline Web tools don't make intelligent downloading decisions, they often fail to retrieve the information you're looking for, leaving you to schedule another session or (more likely) give up. At the moment, programs like Web Buddy and WebWhacker are practical only if you need to download a site (or portion of a site) for backup or a presentation.

Though it's not an offline Web tool, CE Software's (*http://www.cesoft.com*) WebArranger 2.0 can be more useful than current offline products. To create WebArranger, CE Software adapted Common Knowledge's Arrange to the Internet by including plug-in modules. Although its interface can be hard to learn, WebArranger is good at organizing large quantities of information, making it a powerful bookmark manager. WebArranger uses your Netscape Navigator bookmarks and history file, follows you through the Web, and lets you organize sites as you like. Most interesting, WebArranger's URL Agent can notify you when Web sites have changed, and enables you to schedule checks of sites you monitor or visit often.

WebArranger can retry busy Internet sites, and provides advanced searching, sorting, and organizational features. It is a great choice for people who keep track of a large number of Web sites or pages, but it suffers from its awkward interface and inability to act on its own while you're asleep or away from your computer.

Roll Your Own Bots

If consumer-oriented Internet assistants are off to a slow start, tools for advanced Macintosh users, Webmasters, and programmers are strong and getting better. Although these tools require some technical knowledge, they provide more flexibility than do mainstream applications because they don't shield users from the guts of the Internet.

Allegiant Technologies' (*http://www.allegiant.com*) Marionet 1.1.1 is a background application that provides a variety of Internet services—HTTP, FTP, News, SMTP/POP E-mail, Usenet news, and more—via Apple events; via an XCMD (external command) for use with HyperCard, SuperCard, or other programs; or via Macromedia Director 5's add-ons. Using Marionet, applications can connect to Web sites, download files, read newsgroups, and send and manage E-mail. Although Marionet is best suited

In the Background WebWhacker will happily download in the background while you do other things; however, you can't schedule WebWhacker sessions for times when you're away from your computer.

Central Casting Web Buddy Central functions like a bookmark manager, maintaining lists of URLs in categories you define.

to environments like SuperCard, with some perseverance you can build a scriptable application that can use Marionet, so it's a good choice for including Internet features in multimedia applications, as well as for building robots, bookmark managers, and site-maintenance tools.

Another option is Mango Tree Software's (*http://www.mangotree.com*) TCP/IP Scripting Addition, a long-standing tool for AppleScript enthusiasts that provides low-level access to TCP/IP streams. If that's over your head, don't worry: TCP/IP Scripting Addition comes with good documentation and examples; in fact, if you're experienced with AppleScript you'll spend more time puzzling over Internet protocols than over TCP/IP Scripting Addition. Available for both 680X0 and PowerPC-based Macs, it's great for implementing both simple tools (such as site monitors) and sophisticated solutions for Claris's FileMaker Pro and other scriptable applications.

UserLand Software's Frontier is currently the king of Macintosh Internet automation. Frontier was the first scripting system for the Mac—predating AppleScript—and features a robust scripting language, UserTalk; fast, PowerPC-native performance; and a host of suites and tools that do everything from manage a Web site to render HTML pages on the fly. With the addition of some freeware scripting tools (*http://www.erols.com/asg/ root/system/extensions/tcpcmd.html*), which provide low-level access to TCP/IP functions, Frontier becomes the preeminent tool for Internet scripting or building and administering complex Macintosh Web sites, and the best part is the price—Frontier 4.1 is free. The main drawbacks are its high learning curve and prerequisite knowledge; using Frontier demands significant programming experience, and Frontier doesn't go far to hold users' hands.

All these tools enable users with a little authoring or programming savvy to automate Internet functions and create tools to solve specific problems, and—better yet—all these tools can be tied together. You can have a HyperCard stack that surfs the Web using Marionet; monitors a set of sites using TCP/IP Scripting Addition; and uses Frontier to maintain, update, and back up your Web site.

Marionet is the best choice if you plan to use an authoring environment like HyperCard, while Frontier and TCP/IP Scripting Addition provide better low-level access to the Internet, with Frontier best suited to truly ambitious projects.

If your goal is to create a searchable Web index—to keep an up-to-date index of your company's internal Web servers, for instance—and you don't want to write one yourself, Maxum Development's (*http://www.maxum.com*) Phantom 1.1 is for you. Phantom is a sophisticated Web crawler that conforms to robot-exclusion standards: just point Phantom at a Web site and it politely indexes the contents. Phantom is also a CGI application for your Web server, enabling users to perform text queries. Phantom features fast performance, configurable "noise word" filtering, and a customizable HTML interface. Phantom is intended for dedicated Webmasters and administrators, not casual users, but Phantom's about the only game in town for searchable text indexes.

The Last Word

When it comes to taming the Internet, Macintosh power users have a flexible set of tools—it's easy for scripters and programmers to take advantage of the Internet and bend it to their will. However, average users looking for something more than a bookmark manager for their Web browsers mostly face thin and unexceptional pickings.

NewsHopper and MacSOUP are both strong offline news readers, but unless you have specific, limited needs, stay away from offline Web tools. If you need to manage a collection of resources, WebArranger is your best choice—if you can find the power behind the interface.

If you need to create Internet tools, seriously examine Frontier: it's not for the faint of heart, but it's the most powerful Internet automation tool available. If you're more comfortable with authoring environments or AppleScript, then Marionet and TCP/IP Scripting Addition, respectively, are your best choices. If you're a Macintosh Webmaster who needs searchable Web indexes, investigate Phantom before you start building your own site with tools like Frontier. **m**

GEOFF DUNCAN is the managing editor of TidBITS (*http://www.tidbits.com/*), the online Macintosh weekly, and designs Macintosh Internet automation tools for a variety of clients.

INTERNET TOOLS

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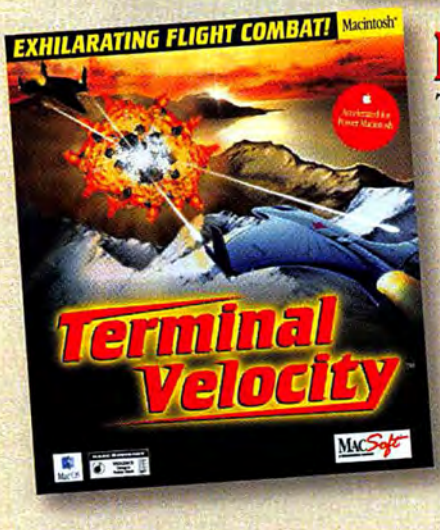

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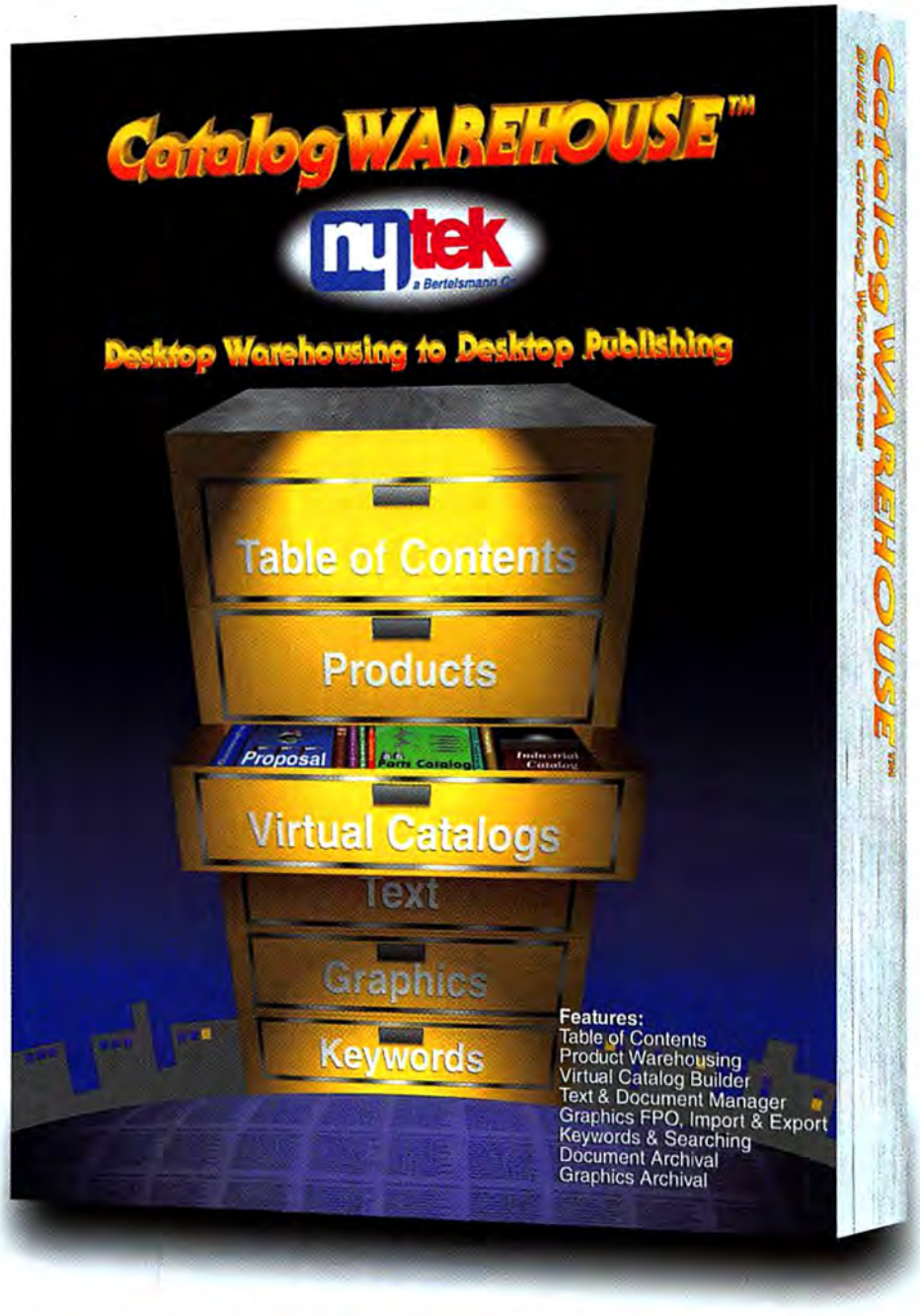

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Secrets

Good-bye, Chooser

DRAG YOURSELF INTO THE WORLD OF DESKTOP PRINTING

by Joseph Schorr

Let's face it, nobody likes the Chooser. A rickety leftover from the Mac's early days, the Chooser is awkward and clunky, and it hasn't changed substantially since the release of System 3.0—in 1986. Fortunately, visits to the Chooser are becoming less and less necessary, thanks to Desktop Printing 2.0, a suite of system extensions from Apple that put printing controls right on the desktop. (Apple's earlier Desktop Printing software was somewhat lame; version 2.0 is much better. You can get it at *http://www.support.apple.com*.)

Of course, Desktop Printing 2.0 doesn't *replace* the Chooser; you still have to crack open the aging desk accessory to handle certain tasks (such as *creating* a desktop printer icon, turning background printing on, or connecting to a network file server), but once you've set up desktop printers, you can switch between printers, stop and start print queues, and monitor your print jobs without so much as a glance at the Chooser (or its equally archaic cousin, PrintMonitor).

Using Desktop Printing is pretty easy; you just drag files to the appropriate printer icon to print them. (For the basics of how it works, check out Desktop Printing's Read Me file.) But if you want to get the most out of those little icons, study this collection of speed tips and undocumented printing secrets.

MICHAEL WERTZ

Printer Icons Show Their Stuff

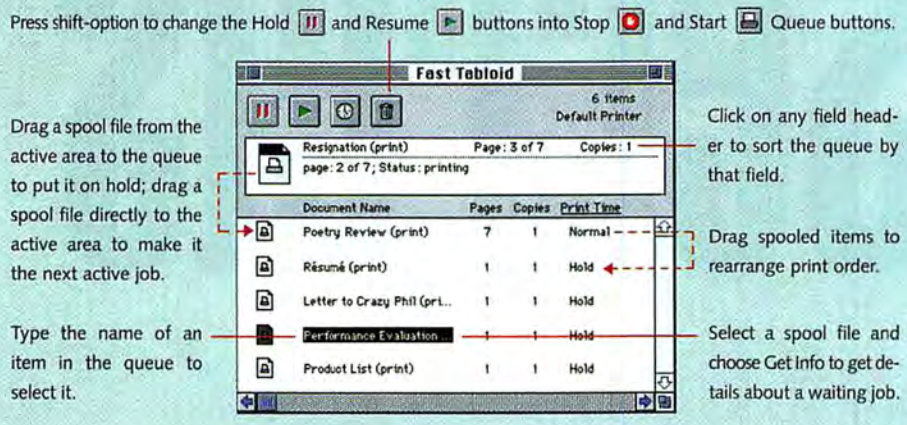
• They're called desktop printers, but you don't have to keep them on the desktop. You can store the printer icons in any folder and create as many aliases of them as you want. The aliases work just like the printer icons themselves; you can drag files to them to print, and double-click on them to view the print queue. Put aliases in all the folders you use the most—then you're never more than a quick drag away from a print job.

• You can rename desktop printer icons whatever you want, regardless of how the corresponding printers are named in the Chooser. This means you no longer have to remember which printer is the HP LaserJet 4V and which is the HP LaserJet 5M. You can call them Laser Printer Near Elevator and Big Printer Next to Wayne. Drag a file to the appropriate icon to print it.

• To choose the default printer on your Mac, just select its icon and press ⌘-L; it automatically becomes the target-

continues

Inside the Desktop PrintMonitor



ed printer in all your applications—no need to open the desktop printer icon. Of course, you can also choose the printer from the printer menu (the printer icon that appears next to the Help menu), which gets installed when you use Desktop Printing 2.0 (see "A Menu Is Born").

• You named your three office printers Clinton, Dole, and Perot—but now you can't remember if Perot is the color ink-jet on the second floor or the 600-dpi monochrome laser printer on the third floor. How can you find out? Select the printer icon and choose Get Info from the File menu (⌘-I). The Get Info box will tell you the printer driver you're using as well as the printer's real name as it appears in the Chooser.

• Background printing is convenient, but if you're doing other processor-intensive work, having the Mac feed pages to the printer can slow you down. Instead, schedule jobs to print during your lunch hour—or even after you leave for the day. To do this, put a job on hold (by clicking on the Hold button in the print queue window), then click on the Timer button. In the Set Print Time dialog box, click on the At Time radio button, then set the date and time you want the job to print and press return.

• Instead of dragging files to a printer icon one at a time, drag several at the same time. You only have to confirm your request *once* in the Print dialog box, and *all* your jobs print. Better yet, don't even bother with dragging: just select the icons of all the files you need to print, then choose the Finder's Print command. Again, one Print dialog box will trigger every job in the queue.

• To print multiple copies of a file, you can select it in a print queue and choose the Duplicate command from the File menu. The file will print as many times as you dupe it.

• You can use the WindowShade control panel to collapse your Desktop PrintMonitor windows. Amazingly, you can still drag and drop items on the collapsed windows to print them. (In some ways, these work better than desktop icons; you arrange the collapsed title bars across the top or bottom of your screen without taking up much space.)

A Menu Is Born Installing Desktop Printing adds a printer menu to your menu bar that lets you change printers without using the Chooser.

Desktop Printing Bermuda Triangle

Be forewarned: Desktop printer icons appear on your desktop as cute tiny pictures of LaserWriters or StyleWriters, but in Open or Save dialog boxes, they appear as plain old ordinary *folders*. So, what happens if you unwittingly open one of these folders and save a file into it? That file becomes embedded in the desktop printer itself and vanishes from sight. The file won't be visible in any Finder windows, nor will it appear in the print queue if you double-click on the desktop printer icon. How can you retrieve the otherwise hidden file? Launch the program you used to create the file, choose the Open command, and open the desktop printer icon folder again; your hidden file will still be there. **m**

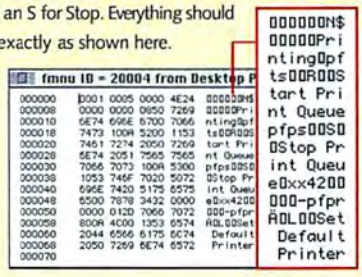
Queue Control

APPLE'S DESKTOP PRINTING software lets you choose a default printer from the keyboard (⌘-L), but you still have to use the Printing menu (which appears in the Finder whenever you select a desktop printer) to stop and start a print queue. You can, however, use ResEdit to add keyboard shortcuts so you can control the queue on any printer with a single keystroke.

1. Open a copy of the Desktop Printing Extension with ResEdit; double-click on the fmnu resource icon; and then open resource 20004, the first one listed.

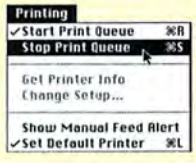
2. In the narrow right-hand column of the resource window, you'll see a string of code containing all the commands that normally appear in the Printing menu. Find the word Start, then count back three hex bits (those little boxlike characters). Change the third hex bit before the word Start to an R (for Resume).

3. Find the word Stop in the list. Again, count backward three hex bits and change the third hex bit to an S for Stop. Everything should look exactly as shown here.



4. Close the window and repeat exactly the same steps in resource 20005.

5. Close and save the file. When you swap in the doctored Desktop Printing Extension and restart your Mac, the Printing menu will have ⌘-R listed next to the Start Print Queue command and ⌘-S next to Stop Print Queue. To stop a print queue, select the appropriate desktop printer icon (either with the mouse or from the keyboard) and press ⌘-S. To resume printing, press ⌘-R.



Contributing editor JOSEPH SCHORR is coauthor of *Macworld Mac and Power Mac Secrets*, third edition (IDG Books Worldwide, 1996).

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Quick Tips

Tips, Tricks, and Shortcuts

by Lon Poole

You might think you can remove the WorldScript Power Adapter from your Extensions folder unless you're using an Apple Language Kit or using WorldScript in some other way. Guess again. That extension actually contains the PowerPC-native version of many Mac OS text-handling routines used with English and other Roman-alphabet languages, as well as languages that use a non-Roman alphabet. The head technician for the Mac OS International group says, "For the U.S. English user . . . [the WorldScript Power Adapter script utilities code handles] basically most anything that has to do with laying out and drawing text in QuickDraw, or doing hit testing on it. Without the WorldScript Power Adapter, this code is always emulated." Emulated means slower, and who wants a slower Mac? If you remove the WorldScript Power Adapter from a PowerPC-based Mac, you will slow down your applications.

Open Transport Whereabouts

Q After installing System 7.5.3 on my Performa 6220, I could not find any Open Transport extensions or the TCP/IP control panel. It was as if they were never installed with System 7.5.3. I looked in the Apple Extras folder for TCP/IP, but it wasn't there. Do you have any suggestions?

STEVEN ROSS
Las Vegas, Nevada

A You looked in the right place, but for the wrong item. Look for the Network Software Selector application, which allows you to select Open Transport networking or classic (MacTCP) networking. After selecting Open Transport and restarting, you'll find that the MacTCP and Network control panels and related system files are gone, replaced by the AppleTalk and TCP/IP control panels. Network Software Selector doesn't actually remove any files; it just makes the control panels, extensions, and related system files visible for the type of networking you select, and makes the files for the other type of networking invisible. If you can't find the Network Software Selector, run the system software installer again, choose Custom Install from its pop-up menu, select Networking Software from the list of installable items, and click the Install button. Then look again in the Apple Extras folder.

JOHN BLECK

Mac and Windows Networking

Q I am an avid Macintosh user, but my job just forced me to get a Windows computer. Rather than buying two modems, two sets of all my software, and two sets of everything else besides the computer, I am using the programs that work best on each platform and then just copying the data when needed. Sometimes these files get rather large, and I would like to start a network between the two computers. Is there any decent way to network a Macintosh and a PC in order to share hard drives? I was going to buy Insignia Solutions' SoftWindows 95 but that seems like overkill just for networking.

MATT PENNER
Pomona, California

A You need software that adds AppleTalk protocols to Windows. Miramar Systems' PC MacLAN 6.0 for Windows 95 lets a PC access a Mac's drives and printers, and lets a Mac access a PC's drives and printers ($199 per user; 805/966-2432, *http://www.miramarsys.com*). COPSTalk 2.0 for Windows 95, from CoOperative Printing Solutions, lets a PC see and access Mac devices but not vice versa ($159 per user; 770/840-0810, *http://www.copstalk.com*). Both products are reviewed in the November 1996 issue.

For the network connection between the machines, Ethernet works great. Many Macs have built-in Ethernet capability and need only a transceiver for a particular type of Ethernet cable, with 10BaseT cable the most popular by far. The newest Macs have built-in 10BaseT ports. Macs without built-in Ethernet need an Ethernet adapter: these are widely available from many manufacturers. Most PCs need an Ethernet network interface card. You have several options for connecting the computers.

continues

Trouble Printing Quicken Checks

Q When I replaced my ancient Macintosh and laser printer with a Performa 6320CD and an Editors' Choice HP LaserJet 5MP, I lost the ability to print single Quicken checks without placing each check in a special carrier sheet called a forms leader (a real pain). Also, right after I specify which checks I want printed, but before they start printing, a message appears saying Quicken attempted to print the checks and asking if they printed satisfactorily. Since nothing has printed yet, I answer No. Then the checks print, but Quicken does not enter the check numbers in the checkbook register. Do you have a solution to these problems?

JOHN CREEDON
Scottsdale, Arizona

A You're seeing the message out of sync with the printing process because background printing is turned on for your printer. With background printing on, an application running in the background intercepts print jobs on the way to the printer and stores them in disk files. Then the application sends the print jobs to the printer at a rate the printer can accept. As far as Intuit's Quicken or any other application is concerned, it has finished printing as soon as its print job is safely stored on disk. The first thing Quicken does when it finishes printing your checks is ask you if they printed OK. You see that query before the background application has had a chance to send the check-printing job to the printer.

You can deal with this situation by not responding to Quicken's query until the checks have actually printed and you have inspected them. Alternatively, you can answer Yes to the query on faith, knowing that if the check printing goes awry you can always reset the check numbers of bad checks to print in the checkbook register by selecting each number and typing an asterisk (*) or the word **print**. A third possibility is to turn off background printing in the Chooser, although with background printing off you have to wait for every printing job to finish before you can go on working on your computer.

Quicken offers several orientations for check printing, but none yield satisfactory results with the Hewlett-Packard LaserJet 5MP. Sorry—you'll have to live with the forms leader.

Power in Crowded Places

TIP Sometimes it's a real hassle finding an outlet with enough space around it to plug in a PowerBook, Zip drive, or anything else with a brick-type AC adapter. You don't need to plug in yet another power strip. Instead, take two grounding outlet "cheaters" and plug them into each other. Then plug the AC-adapter brick into the cheaters, and plug that into the outlet. The extra height from the cheaters allows a plug to be in the outlet next to the brick.

COLIN WIRTH
North Mankato, Minnesota

Custom Netscape Buttons

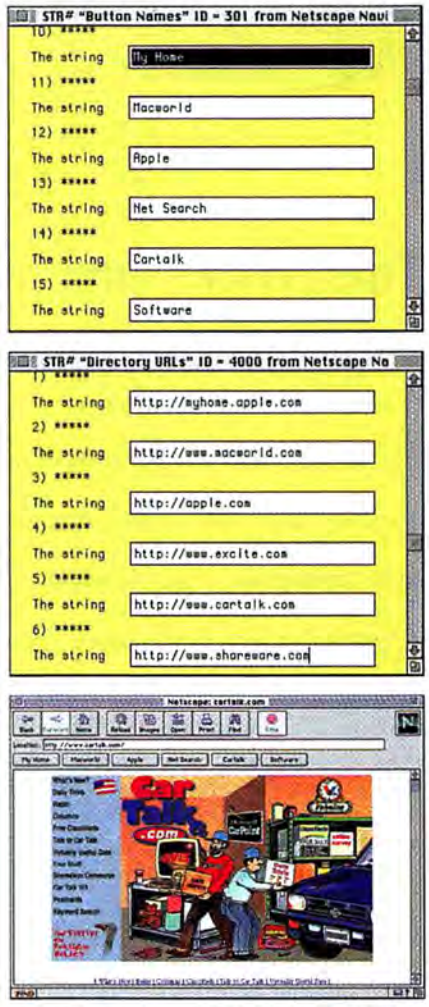
TIP I never had much use for Netscape Navigator's six directory buttons, although I often find myself traversing the Bookmarks menu just to get to my favorite search engine. Then I discovered how easy it is to use Apple's ResEdit resource-editing program (available from Macworld Online) to turn those buttons into one-click "bookmarks" that appear every time I use Navigator (see "Resetting Netscape Navigator Buttons").

First make a copy of Netscape Navigator 3.0, and open the copy with ResEdit. You'll see an array of icons representing the different types of resources included in Netscape. Double-click on the icon named STR# to open a list of Netscape's STR# resources. In that list, open STR# resource 301, named Button Names. Strings 10 through 15 label Netscape's six directory buttons (from left to right). Change each string to identify the replacement URLs, which you enter next.

Close the Button Names resource, and open STR# resource 4000, named Directory URLs. Enter the URLs that correspond to the button names you just entered in the Button Names resource. Save your changes, and quit ResEdit. You now have six one-click bookmarks.

MIKE WAKERLY
Mountain View, California

Netscape Navigator 2.02 also uses STR# resource 301 strings 10 through 15 for the directory button names, but the URLs in STR# resource 4000 strings (2, 3, 10, 7, 6, and 11) correspond to the directory buttons from left to right.—L.P.



Resetting Netscape Navigator Buttons You can change the names and links for the six directory buttons that Netscape Navigator displays at the top of a browser window. The buttons' names and URL links are stored in Netscape Navigator STR# resources 301 (top) and 4000 (middle), which you can edit with ResEdit. The result: six one-click buttons (bottom).

Silent Sound

TIP I'm not much for system beeps. If I do something wrong on my computer, I'd rather not have it make a foul noise. I might be listening to an audio CD through headphones, for example. Yes, I could install the system extension named SquelchSysBeep, which as its name implies stops the computer from playing the system alert sound. But I prefer the following method for reasons I'll explain later:

1. If possible, disconnect any microphone or other sound source from the Mac sound-input port.

continues

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Bugs and Turkeys

Mark Birong of Long Beach, California, reports that if you use the Check HTML option in BBEdit 4.0.1 on grouped HTML documents, you'll crash your Mac. According to Bare Bones Software's tech support, the problem lies in the current version of HTML Tools, which tries to perform Check HTML on the group file itself, not the individual files within the group. Bare Bones (617/676-0650, *http://www.barebones.com*) says the problem will be addressed in the next maintenance release of BBEdit.

Reader Chris Wood of Nepean, Ontario, Canada, earns a *Macworld* Bug Report T-shirt for finding a flaw in Strata's Videoshop 3.0.2. If you enter a title into the title track and then subsequently decide you would like to change it, you cannot—you have to delete the title and redo it. Strata (801/628-5218, *http://www.strata3d.com*) confirms that the edit capability was not implemented in version 3.0.2 (despite what the manual says) and says that future versions of the product will include a fix.

Macworld will send you a Bug Report or Turkey Shoot T-shirt if you are the first to inform us of a turkey or a serious, reproducible bug that we report in this column. See How to Contact Macworld.

2. In the Alert Sounds part of the Sound control panel, click the Add button to bring up a set of buttons for creating a new sound. Click the Record button, and then immediately click the Stop button. Name the new sound something like No Sound and close the Sound control panel. (If you have a Power Mac with PCI slots, the Sound control panel may not be in your Control Panels folder. Look for it in the Apple Extras folder on your start-up drive, or use System 7.5.3's SimpleSound application or System 7.5.2's Sound & Displays control panel.)

Now, instead of emitting a rude system alert sound, the Mac plays nothing at all. Ahhhh, sweet silence.

This method is better than installing SquelchSysBeep in two ways. It doesn't require a system extension, and the fewer extensions the better. In addition, you can use the same nonsound in other programs and utilities that don't otherwise allow muting of their own alert sounds. For example, I have Casady & Greene's Spell Catcher play No Sound when it finds a spelling error.

STEFAN ANTHONY
Yellow Springs, Ohio

Quick Bits

• The method described in October 1996's *Quick Tips* for automating an E-mail schedule using Claris Emailer and AppleScript didn't work for Sam M. Hunter of Sikeston, Missouri, because after MacPPP or FreePPP made a connection, an alert box popped up with a status message, stalling the AppleScript and causing the modem to time out and hang up. If that happens to you, look at the setting of the "Show alerts during connect and disconnect" option in the General panel of the FreePPP Setup utility. That option should be disabled (unchecked) if you're controlling PPP connections with AppleScript or UserLand Frontier. If you use MacPPP or a version of FreePPP older than 2.5, the option to disable is labeled Quiet Mode.

• If you'd like small icons on your desktop but don't want to muck with ResEdit and custom icons as described in October's *Quick Tips*, Mihail-Laurian Barbu of Rochester, New York, suggests you use ASD Software's $49.95 utility software PopupFolder (909/624-2594; a demo version is available from *http://www.asdsoft.com*). In addition to its main trick of popping up hierarchical menus from any disk or folder icon in the Finder, it also allows you to view all desktop items by small icon.

• Although you may be perfectly capable of installing SIMMs or DIMMs in your Mac (as I suggested in October's *Quick Tips*), Apple recommends that only an Apple-certified technician install them. Apple's warranty does not cover any damage that you or a noncertified technician may cause when installing or removing SIMMs and DIMMs. Proceed with caution, but know that many Mac owners install their own memory boards. The more paranoid owners may also remove what they install before taking their computers in for warranty service. Most technicians won't bother to ask unless they see damage or oddball parts, such as composite SIMMs or DIMMs.

Steer clear of those parts. They may work on one Mac, but not on another of the same model, and they may cause sporadic start-up failures, system errors, or mysterious crashes. You may have no trouble with one composite SIMM or DIMM, but install another and watch your Mac have fits. You can spot a composite SIMM by the large number of chips on it. For example, a regular 16MB SIMM uses 8, 16-megabit chips, but a composite SIMM might use 32, 4-megabit chips. Since it's possible to find 32 chips on a noncomposite DIMM, visually checking the DIMM won't help much. The best way to avoid composite SIMMs and DIMMs is to buy from a reputable source.

• Whenever you're making any changes to a file with ResEdit—even if you don't plan to save the changes—be sure to work on a copy of the file. You might think ResEdit keeps your changes only in the computer's volatile memory until you save them, since the program asks whether you want to save changes before closing a file or quitting the program. That alert is some kind of a cruel joke, says Eyal Arie of Givataym, Israel. He points out that as you make changes to a file, ResEdit actually updates the file on disk. If you get the alert and answer no, ResEdit reverses the changes and your file is safe. But if your Mac crashes (does anyone have a Mac that does not crash?) or ResEdit quits unexpectedly before you have that opportunity to reverse your ResEdit changes, you'll find the changes in place when you restart your Mac and reopen the file with ResEdit. Be aware, and may the power of ResEdit be with you. m

LON POOLE answers readers' questions and selects reader-submitted tips for this monthly column. His latest book is *Macworld System 7.5 Bible*, third edition (IDG Books Worldwide, 1994).

We pay from $25 to $100 for tips published here. Send questions or tips on how to use Macs, peripherals, or software (by mail or electronically) to *Quick Tips*, Lon Poole, at the address listed in *How to Contact Macworld* at the front of the magazine (include your address and phone number). All published submissions become the property of *Macworld*. Due to the high volume of mail received, we're unable to provide personal responses.

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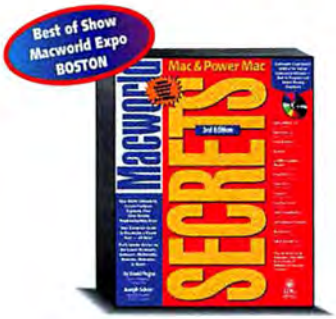

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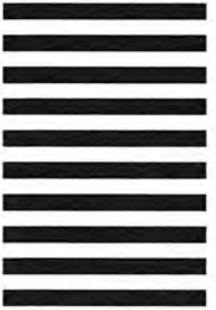

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NetSmart

Speeding Up the World Wide Wait

by James A. Martin

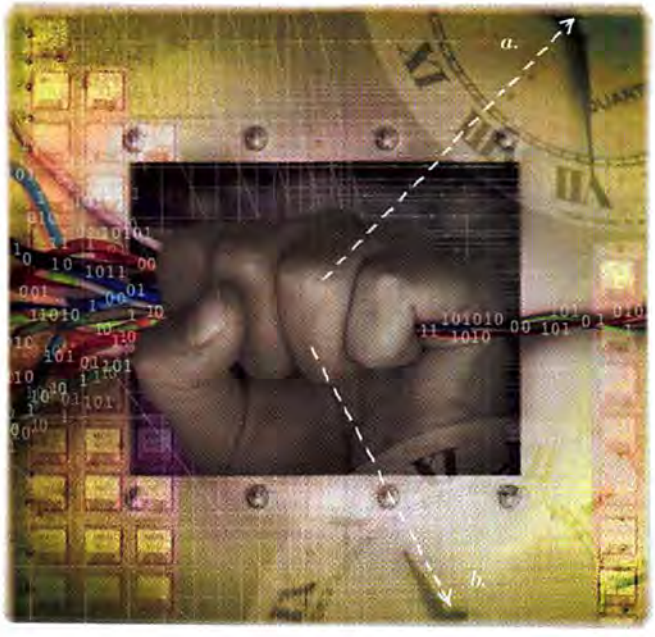
I was in a coffeehouse recently, reading the morning paper. At the table to my right were two women, one of whom had her 12-year-old son with her.

After a lively conversation, the women rose, hugged, and said good-bye. As the mother stayed behind with her son to gather their belongings, her friend, already out the front door, suddenly paused, then turned around. "Oh, Mark, I almost forgot to tell you," she called to the boy through the door. "Love your Web site."

The kid cracked a snaggletoothed smile, and at that moment my deepest, darkest suspicions about the Internet were confirmed. Everyone in the world—with the possible exception of Mother Teresa—has his or her own Web site; works for a company or attends a school that has a Web site; or is at least acquainted with someone who has an URL listed on his or her business card.

This fact of life is one big reason why the World Wide Web has been dubbed the "World Wide Wait" by increasingly frustrated Internet users—even those who have ISDN connections. The problem is that the volume of Web sites and the number of people surfing them continues to grow faster than the networking infrastructure designed to support them.

Consider this: MIT estimates that 230,000 Web sites existed in June 1996, compared with only 100,000 six months earlier and 23,500 in June 1995. Explosive growth is expected to continue. The number of Internet users will jump from 40 million in 1995 to nearly 200 million by 1999, according to International Data Group (*Macworld*'s parent company). Web sites are becoming more graphics-intensive and more time-consuming to visit. Meanwhile, Internet service providers (ISPs), networking vendors, and others are waging a costly, uphill battle to upgrade equipment and increase bandwidth to satisfy demand. The result: cyberspace travel often slows to a crawl.



STUART BRADFORD

There is good news, however. A number of technological and other improvements are in the works to make the Internet much more efficient. In the meantime, here are shortcuts you can take to reduce the time spent cooling your heels on the Web.

Win the Waiting Game

Make sure your browser is in fighting shape before you go online. Give the program the biggest memory cache you can. Otherwise, each time you go to a new Web site, you must wait while the browser disposes of the Web pages it automatically cached to make room for new ones. In Netscape Navigator, cache settings are under Network Preferences under Options.

Allocate as much memory to the browser (using the Get Info box under the Finder's File menu) as you can to make it run smoothly—particularly if you're going to view pages with multimedia content. You can also save time by deselecting Navigator's Autoload Images control, under the Options menu. This tells Navigator to display placeholders for each Web page's graphics, rather than the graphics themselves, which can seemingly take forever to load on screen. Should you want to view the images, hit the Image button in the Navigator tool bar.

Consider an ISDN or T1 connection if you or your company is well-heeled enough to afford it. ISDN (Integrated Services Digital Network) lines can provide dial-up or direct connection to the Internet at speeds up to 128 Kbps. A T1 line is a private, leased line that provides a direct connection to the Internet at speeds up to about 1.5 megabits per second—and at considerably higher cost than ISDN lines. If you're stuck with a more pedestrian connection, take a close look at your ISP. If you're paying $15 or $20 a month for unlimited Net access from a mom-and-pop operation, you're probably getting what you pay for. It's a harrowingly competitive business, and smaller ISPs that charge low monthly rates often don't get

continues

Shareware PICKS

There are lots of ways to make your Web browser run more smoothly and the "World Wide Wait" less painfully slow to navigate.

With Web sites becoming increasingly rich in multimedia, you've got to add more and more plug-ins, such as Macromedia's RealAudio and Shockwave, to get the full impact. Most of the time, though, you don't need to have those plug-ins running, and turning them off makes your browser work faster, take up less memory, and (with luck) crash a little less often. **Plug Master 1.6.3**, a $5 shareware utility from Macworld Online's Web site (*http://www.macworld.com/cgibin/softads.pl/software/index.shtml*), is among the inexpensive programs that can help streamline your browser. Like Extensions Manager, Plug Master lets you easily turn on or off your Netscape Navigator or Microsoft Internet Explorer plug-ins from one dialog box.

Making the best use of your Mac's memory also takes some of the bite out of Web browsing—and everything else you do. Sometimes applications hold on to at least some of their allocated RAM even after you've closed them. MetroLive's **Mac OS Purge 1.0.1**, a freeware utility, quickly scans your Mac's system memory and, as its name suggests, purges it of those pesky hangers-on, freeing up all available memory. Meanwhile, Charles Marlowe's $10 shareware program **FreeRam 1.3.3 UR** keeps a running memory gauge on your Mac's desktop so you can see how much system memory is available at a glance. You can download both Mac OS Purge and FreeRam from Macworld Online.

Web Worthy

Not surprisingly, there are lots of places you can go for data, charts, graphs—even animations—chronicling the explosive growth of the Internet.

Forget about hurricanes and thunderstorms; the **MIDS Internet Weather Report** (*http://www2.mids.org/weather/index.html*) shows you where the clouds are brewing in cyberspace. Regularly updated geographical maps, in MPEG format, illustrate congestion and activity on the Internet in various areas around the world (see "Internet Meteorology"). At least you can't say you've seen that before.

InsWeb maintains a good one-stop collection of links for sites reporting on Internet growth; it's at *http://risknet.com/scc/whitepaper/growth.htm*.

Matthew Gray, a student at MIT and the author of **Web Growth Summary**, has been following the Web's growth for several years. Check out the stats he's compiled at *http://www.mit.edu/people/mkgray/net/web-growth-summary.html*.

One of the oldest and biggest ISPs, **CERFnet**, features a graphical map of the major Internet interconnect and exchange points in the United States. The map is at *http://www.cerf.net/cerfnet/about/interconnects.html*.

enough revenue to adequately upgrade their bandwidth. As a result, their customers may frequently experience unreliable, sluggish connections. When shopping for an ISP, ask providers to fax you a map of their network. See how they are connected to the major Internet backbones—such as MCI, Sprint, and CERFnet (see "Web Worthy"). The more indirectly connected, the more chances for delay.

Schedule your Net surfing wisely. You wouldn't go out for a leisurely drive at 5:30 p.m. on a weekday in Manhattan. Peak traffic periods for the Net vary depending upon where you live, but as a rule, late afternoon and early to mid-evening during the week seem to be the most congested times.

Automate your Web cruising whenever possible. Navigator 3.0 includes a new, free service called In-Box Direct (*http://www.netscape.com*), which lets you automatically receive the updated Web pages of your choice via Navigator E-mail. Currently, about a dozen Web content providers, among them the *New York Times*, participate in In-Box Direct.

Another option: Give a list of URLs to WebWhacker, by the ForeFront Group (713/961-1101, *http://www.ffg.com*), and it will download those pages for offline viewing in your browser. A trial version of the Internet utility is available at *http://www.ffg.com.download/all.html*; the software costs $69.95.

Better yet, surf while you sleep. Another Internet utility, Web Buddy 1.0, from DataViz ($50 street price; 203/268-0030, *http://www.dataviz.com*), can download specified Web pages at, say, 1 a.m., and save them on your hard drive for viewing when you wake up. A trial version of Web Buddy is available for downloading. FreeLoader 2.0, from FreeLoader, Inc. (202/686-0660, *http://www.freeloader.com*), also lets you download pages automatically. FreeLoader is free, but it's currently a Windows-only program. FreeLoader says a Mac version should be available by early 1997.

Help on the Horizon

There's money to be made from the Net, and companies with a stake in cyberspace aren't about to watch their market share dwindle because of Internet traffic jams. Many of the major ISPs (such as MCI and Sprint), for instance, are spending big bucks for asynchronous transfer mode switches, upgraded network servers and routers, and other technologies to keep data flowing through their pipes as smoothly as possible. MCI recently spent $60 million tripling its backbone capacity from 45 megabits per second to 155 Mbps, and will

The Boom in World Wide Web Sites

	June '93	Dec.'93	June '94	Dec.'94	June '95	Jan.'96
Total Web Sites	130	623	2738	10,022	23,500	100,000
Percent That Are Commercial Sites	1.5	4.6	13.5	18.3	31.3	50.0
Hosts Per Web Server	13,000	3475	1095	451	270	94

MIT student Matthew Gray has been collecting information about Web growth since 1993 (see "Web Worthy"). Since January 1996 the Web has grown to more than 225,000 sites, according to InsWeb.

INTERNET METEOROLOGY

Matrix Information and Directory Services (MIDS), of Austin, Texas, tracks Internet traffic by transmitting electronic probes to 4000 sites worldwide, then creating MPEG-based maps available through MIDS's Web site. Larger circles indicate slower response times, or Internet "storms." Early risers in Warsaw, for example, ran into more roadblocks the morning of October 15 than they did at 11 p.m., while residents of Berlin had the opposite experience.

MIDS Internet Weather Report for Europe, October 15, 1996, 7 a.m.

MIDS Internet Weather Report for Europe, October 15, 1996, 11 p.m.

soon upgrade to 622 Mbps.

In addition to technology upgrades, changes in how we pay for Internet access could help alleviate traffic jams in several ways. Some of the bigger ISPs may introduce pay-per-use fees in the next few years, phasing out the flat monthly rates of $15 to $30 for unlimited surfing that are common today. It's a supply-and-demand thing: if revenues are generated from actual Internet usage, then the more the Net is used, the more revenue ISPs receive and, consequently, the more money they have to upgrade equipment. Thereotically, a pay-per-use structure could also reduce some frivolous Web surfing, thereby inadvertently easing some of the traffic jams. The downside: it could also cause cash-strapped colleges and small businesses to place restrictions on Internet access.

In addition to pay-per-play pricing structures, watch for bandwidth on demand. The Internet Engineering Task Force has been developing a new networking protocol, called Resources Reservation Protocol (RSVP), that effectively lets you reserve an express lane on the info superhighway. With RSVP, you could ask your ISP to set aside the best available bandwidth—say, 384 kilobits per second—from 3 to 5 p.m. every Friday for a weekly videoconference call to the Hong Kong office. You'd be billed according to the bandwidth used and the amount of time online. BBN Planet (617/873-3000, *http://www.bbn.com*) is expected to be one of the first RSVP providers in mid-1997.

A few private networks under construction, such as @Home Network (415/944-7200, *http://www.home.net*), promise to deliver multimedia-rich Web sites at speeds up to 10 Mbps—nearly 400 times faster than what 28.8-Kbps modems can handle. You'll pay a monthly fee of about $35 and hook up a cable modem to your Mac; the high-bandwidth data is transmitted to the modem over hybrid fiber-coaxial cable. Cable-modem networks are still primarily in the testing phase but will begin to be rolled out nationwide in 1997.

Yet another technology promises to strap roller skates onto your Web browser. By the end of 1997, you should be able to get an Asymmetrix Digital Subscriber Line (ADSL) from your ISP or local telephone-service provider. ADSL promises speeds of 6 to 10 Mbps over standard phone lines by modulating the amount of traffic heading in each direction. Bell Atlantic, BellSouth, and GTE are among those testing ADSL-based Internet services.

Gaining Perspective

If fine-tuning your browser and scheduling your surfing aren't enough to ease your Internet traffic woes, then you've still got alternatives. For instance, the next time you need some background on a company, don't go to its Web site. Instead, find the company's phone number and call to ask its investor-relations department to mail you an annual report and other materials. In about five business days, maybe more, you'll get a big brown envelope in your mailbox. Here's another option: Get in your car, drive to the library, find a place to park, feed the meter, trudge inside, try to find someone who can tell you where the company reports are kept, and have at it. Until you have to run out and feed the meter again, of course.

Given those choices, the Web's traffic jams don't look so bad after all. It's important to keep a sense of perspective. In just a few years the Net has grown from being a network for the government and academics into the most globally accessible, awesomely democratic, limitless new medium ever devised. On the Net, you can communicate with associates across the globe, order products around the clock, even post a video of a business trip to China on your home page. It's entirely up to you.

Oh, and that reminds me: Love your Web site. **m**

Former *Macworld* editor JAMES A. MARTIN writes frequently about the Internet; he has no Web site.

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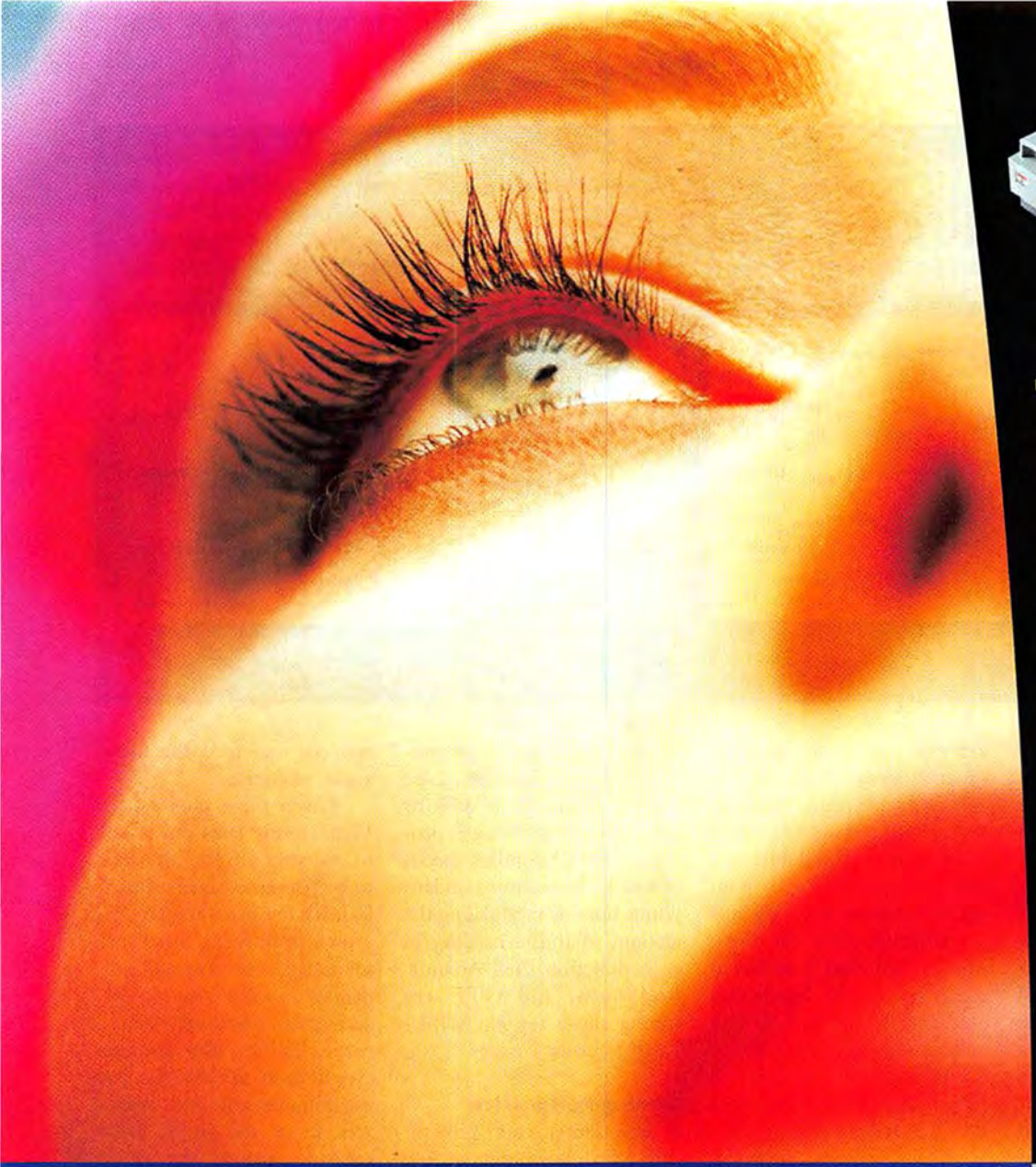

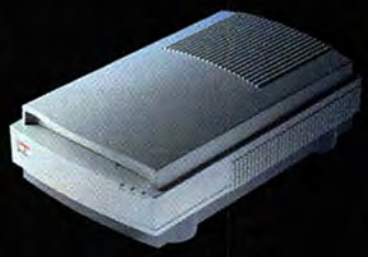

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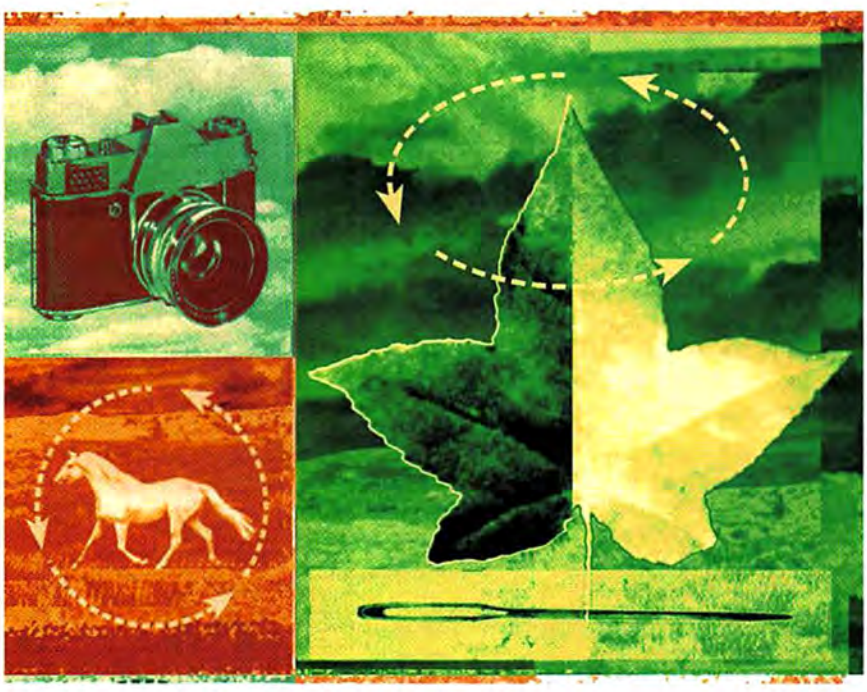
Media

QuickTime VR Clinic, Part 1: Panoramic

MAKING QUICKTIME VR MOVIES IS GETTING EASIER

by Jim Heid



Reality is hard, and virtual reality isn't much easier. Historically, making movies with Apple's QuickTime VR technology has been a black art requiring photographic expertise, a trunk's worth of equipment, and cumbersome software. But in the two years since QuickTime VR debuted, the tools *have* improved some. Making top-quality panoramic movies that incorporate several locations (nodes) is still hard, but lots of folks just want to create good-looking, single-node panoramics to post on a Web site, use in a presentation, or impress a friend.

Happily, the phrase "casual QuickTime VR author" is no longer an oxymoron. Apple has released some free utilities that streamline the process of combining images into a panoramic movie. Getting the best results still means buying Apple's QuickTime VR Authoring Tools package ($495; 716/871-6555, *http://qtvr.quicktime.apple.com*), but if you're willing to tolerate some visible artifacts where the images meet, you can make panoramics by combining one of these free utilities with any image editor.

Prefer your panoramics seamless? Another free Apple utility grafts a friendlier face onto the QuickTime VR Authoring Tools. And special tripod adapters make it easier to position and rotate the camera correctly for each shot.

I've assembled a gadget bag of products that deliver great results with few tears. For an introduction to QuickTime VR, see "VR: QuickTime's New Edge," *Macworld*, July 1995. And be sure to visit my Web site (*http://www.heidsite.com*) for examples and more information.

Camera Considerations

Apple recommends using a Nikon N90 with a 15mm lens for your photography, and then transferring the shots to Kodak Photo CD format. That's fine if you're wearing Bill Gates's money belt, but there are cheaper routes. I've used a Kodak single-use panoramic camera; it yields 3.5-by-10-inch prints (about six shots capture a full 360 degrees). But you can use any 35mm camera, even an auto-everything model. Consider taking the photos in vertical (portrait) orientation, especially if you have a wide-angle lens. You must take more images to capture 360 degrees, but the resulting panoramic allows users to pan up and down more.

Be sure that images overlap—at least

continues

JENNIFER JESSEE

ECONOMY-CLASS VR

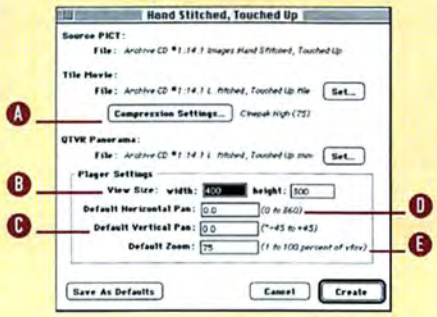
If you can tolerate the visual flaws caused by hand-stitching—or if you're fortunate enough to have a four-figure panoramic camera, which captures a full 360 degrees in one shot—you can make QuickTime VR panoramic movies with a free Apple utility called Make QTVR Panorama.

HAND-STITCHING Use Photoshop or another image-editing program to combine your images. Exposure and lighting conditions vary with each shot, so you'll get seams between images. You're also likely to have gaps where the tops or bottoms of adjacent shots don't line up because the camera level varied.

TOUCH UP YOUR SEAMS Use Photoshop's smudge, clone, and dodge/burn tools to minimize seams and make them less jarring. To remove gaps after you've combined all the images, make a selection that crops out the gaps; copy it to the Clipboard; open a new, untitled document; and paste. Save this new image as a PICT file.

ROTATE MENU The Make QuickTime VR Panorama utility requires that the final PICT file be rotated so that the bottom of the image is to the right. In Photoshop, choose 90° CCW from the Effects menu's Rotate submenu. Save the image.

MAKE PANO MOVIE Start the Make QuickTime VR Panorama utility and choose the image you created. The dialog box shown here appears. The default settings are good starting points, but here are some guidelines for fine-tuning them.



A. You can change the compression settings for the final movie. Cinepak yields the best panning performance and smallest file size.

B. For a wide-screen, Panavision look, try a more dramatic aspect ratio, such as 150 pixels high by 400 pixels wide.

C. With the default settings, the movie opens centered on the middle of the original image. To change that—say, to start with a view that looks up at the sky—enter a value between –1 and –45 (to look down) or +1 and +45 (to look up).

D. With the default settings, the movie opens centered on the left edge of the original image. To change the opening scene, enter a value between 1 and 360.

E. To change the degree of default zooming, enter a value between 1 (maximum) and 100 (none).

CLICK ON CREATE If you want the image to be playable by QuickTime for Windows, its horizontal dimension must be an even multiple of 4, and its vertical dimension, an even multiple of 96. If they're not, a dialog box appears suggesting alternate dimensions and asking if you want to continue. If you don't need Windows compatibility, click on Yes to make the movie. Otherwise, write down the values, click on Cancel, and return to Photoshop and resize the image appropriately.

30 percent—to make assembly easier. Scan your finished prints at 144 dpi and save the images as PICT files.

The easiest way to generate images is with a digital camera such as Apple's $739 QuickTake 150 (408/996-1010, *http://www.apple.com*) or Kodak's $699 DC-40 or $999 DC-50 (716/726-7260, *http://www.kodak.com*). A digital camera eliminates the expenses of film, processing, and scanning, and also saves time.

I was impressed with Kaidan's (215/364-1778, *http://www.kaidan.com*) WideTake lens, a $94.95 adapter that gives a QuickTake the equivalent of a 28mm lens on a 35mm camera. I did find it prone to lens flare, but you can avoid flare by taking outdoor panoramics when the sun is directly overhead or behind clouds.

If you don't mind grainy panoramas, you can even use a camcorder: capture images on videotape and then digitize them using an AV Mac; a Power Mac 7500, 7600, or 8500; or any Mac equipped with a digitizing card.

The Truth about Tripods

You often hear that QuickTime VR requires a camera mounted on a tripod so that the lens, not the camera body, is at the center of rotation. The truth is, for outdoor panoramics in which everything is distant, camera alignment isn't that critical. I've obtained good results by hand-holding the camera and turning in a circle as I shoot. While Apple's QuickTime VR Authoring Tools benefits from precise camera positioning, the handheld approach is practical if you're combining the photos in an image-editing program.

A Stitch in QuickTime

Stitching combines images into a single PICT file, which is then processed into a panoramic movie. You can hand-stitch images, using Adobe Photoshop or a similar program, and retouch the image seams, or leave them in for a funky effect. When you're done, you can create a panoramic using Apple's free Make QTVR Panorama utility, which you can download from *http://qtvr.quicktime.apple.com* (see "Economy-Class VR").

To get seamless panoramics you need Apple's QuickTime VR Authoring Tools

I took this panoramic with a QuickTake 150 with a Kaidan WideTake lens (note the WideTake's lens flare, those red dots) and a Kaidan QP-1T pan head, stitching it with Apple's QuickTime VR Authoring Tools and Sanity SaVR. You can see the real thing at *http://www.heidsite.com*.

software. Its marvelous Stitcher program locates the overlap between shots, combines images, and blends them so that each melds with its neighbor. Normally, you control Stitcher by writing arcane scripts for Apple's MPW (Macintosh Programmer's Workshop), which comes with the Authoring Tools. There's now an easier way. Two Apple employees have created a free utility, called Sanity SaVR (get it?), that provides a graphical interface to Stitcher (see "Stitching Steps"). You can download Sanity SaVR from *http://www.QuickTimeFAQ.org*.

Precision Panning

For indoor panoramas—or outdoor scenes with subjects close to the camera—it's essential that the camera stay level and rotate around the lens. If it doesn't, the images combine imperfectly. Kaidan sells a family of panoramic tripod heads designed for QuickTime VR photography. For my QuickTake 150 research, I used the $279.95 QuickPan QP-1T, which comprises a panoramic head, a base containing a bubble level and level-adjustment screws, and a wheel calibrated in degrees and notched to make it easy to rotate the camera the same amount for each shot. The QP-1T is well built and a pleasure to work with.

Putting It All Together

Combine a QuickTake 150, a Kaidan WideTake lens, a Kaidan QP-1T panoramic head, and a tripod, and you have Heid's QuickTime VR Camera Bag.

Using the software and procedures described in "Stitching Steps," I got consistently excellent results—with no torturous field-of-view calculations, no MPW, and no trial-and-error. I don't attribute my success to any special skill on my part, but to the slight maturation of QuickTime VR software and hardware tools. The casual snapshooter may not be able to make instant panoramics, but an amateur photographer willing to experiment can get fine results and have some fun. Take it from someone who's been covering QuickTime VR since the beginning: that's a huge step forward. **m**

Contributing editor JIM HEID's latest book, a collection of tips for Web developers, will be published in January by IDG Books Worldwide.

STITCHING STEPS

You can get great QuickTime VR panoramas using the Apple QuickTake 150; Kaidan WideTake lens; Kaidan QP-1T tripod head; Apple's QuickTime VR Authoring Tools; and two free Apple utilities, QuickNumber and Sanity SaVR, both available from *http://solutions.apple.com/pub/quicktime-vr/jcannon/Workbook.html*. (This unofficial QuickTime VR developer's page is maintained by Apple's Joel Cannon. He and Apple's Chuck Wiltgen have been the major forces in the slow but steady march toward easier QuickTime VR development.)

1. Shoot 16 images, rotating the camera 22.5 degrees clockwise between each shot.

The Kaidan QP-1T head's wheel makes it very easy to position the camera—you set the wheel to the number of shots you want, and as you turn the pan head, it clicks into position for each shot. Use the QuickTake 150's high-resolution setting. In this mode, the camera holds only 16 images, so if you need to capture multiple scenes in one outing, tote along a PowerBook and transfer the images after shooting each scene.

2. Transfer the images to your Mac and store them in a new folder.

3. Drag the images' folder to the icon of the QuickNumber utility. It renames the image files (01 through 16) to conform to Stitcher's requirements.

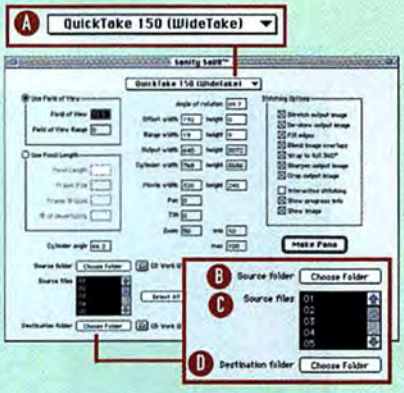
4. Open Sanity SaVR and configure its dialog box as shown. Stitching QuickTake images takes 80MB of memory or more. You may need to use virtual memory. Set it to 130MB or so, then restart. Select the MPW Shell icon and use Get Info to boost its memory allocation to 100,000K or so. Stitching will be slow, but it's a small price to pay.

A. Choose a camera-rig preset (or enter your own values). Sanity SaVR 1.0b2, the version available at press time, has presets for the QuickTake 150 (with and without WideTake lens), the 150 in landscape orientation, and the Nikon N90 with 15mm lens.

B. To specify the folder containing the source images, click on Choose Folder (or drag a folder icon from the Finder to the Source Files box).

C. The names of the files to be stitched appear here. If your folder happens to contain a nonimage file, remove it from the list by ⌘-clicking on its name.

D. To specify the folder where the stitched PICT file and the final movie will be stored, click on Choose Folder.



5. Click on Make Pano.

AFTER THE STITCH

You can slim down the stitched image to reduce download times, and you can print a panoramic to make a dramatic poster.

Panoramas on the Web This panoramic now uses about 550K of disk space. For the Web, you may want a slimmer version. In Photoshop, open the source PICT (its name ends in scrPICT) and reduce it by 50 percent using the Image command. Save the smaller PICT under a new name; then create a movie from it in Make QTVR Panorama. I was able to reduce 550K movies to 156K. The downside: details break up sooner when a user zooms in.

Panoramas in Print PICT files generated by Stitcher yield dramatic hard copy when printed on large-format printers such as Encad's NovaJet series, which are popular in service bureaus. Broomall, Pennsylvania–based Visual Sound (610/690-1456, *http://www.visualsound.com*) printed some beautiful posters for me. The PICT files generated by the rig described here are roughly 7 inches by 42 inches.

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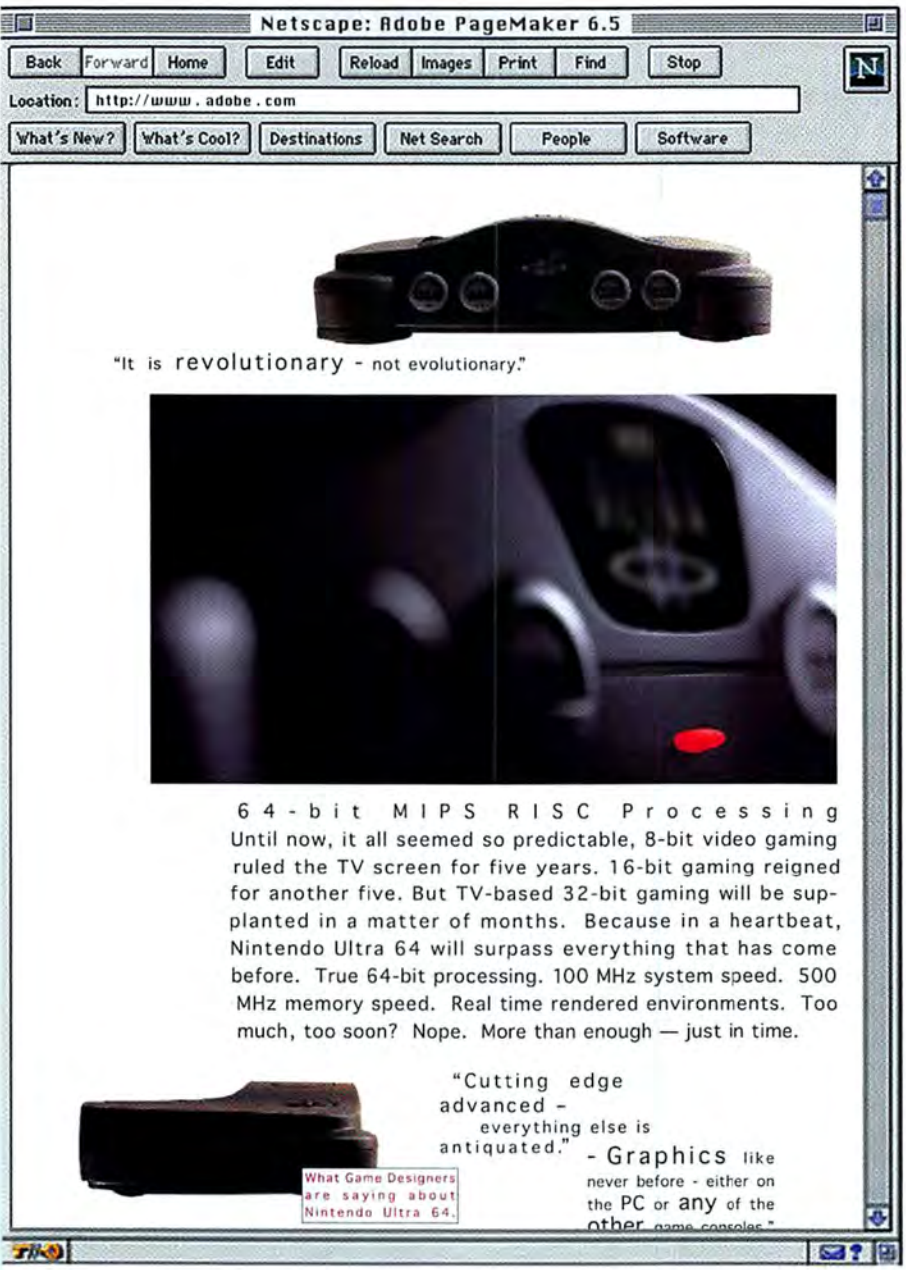

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Publishing Workshop

Dropping In on Drop Shadows

by David Blatner

Creating a drop shadow is a rite of passage in desktop publishing. There's no *right* way to do it—there are a hundred good methods, and most use the same basic features: Gaussian Blur, channels, and layers. Here, I concentrate on a few techniques for making drop shadows more effective, not on creating the shadow itself. I'll focus on Adobe Photoshop, but many of these methods work in other image-editing programs, too.

Making Shadows Separate

There are two ways to deal with drop shadows: combine the object and its shadow in one image, or create the shadow as a separate image. Most people build the shadow into the object image, but breaking the shadow out has benefits. For one, you can quickly reposition it. Also, you can create interesting effects by mingling the shadow with other page items (like text or other graphics).

Note that shadows in a separate gray-scale file usually need much lower resolution than the original image; they're just a blur, so you can get away with 120 or 150 ppi. This saves disk space and printing time.

The problem with breaking shadows into a separate image is that you almost always need a clipping path around the foreground object (the thing that's casting the shadow). Otherwise the picture box of the foreground image may block part of the shadow (see "Breaking the Shadow Out").

Adding Noise

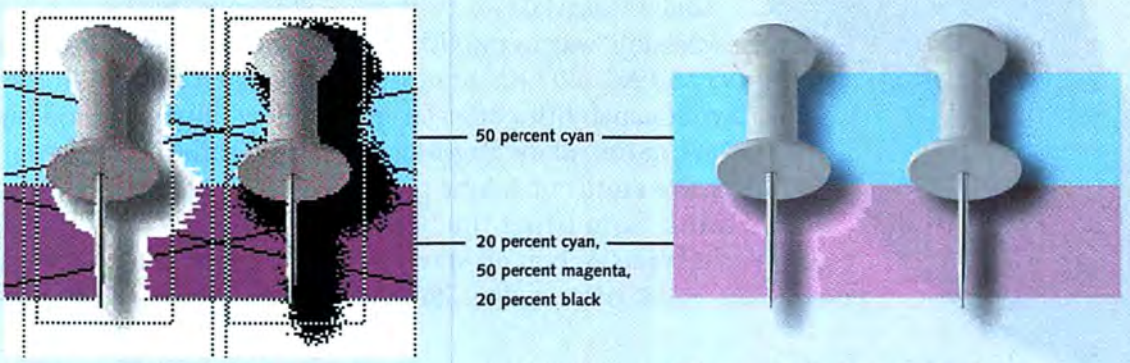
It's not often that one little step can make the difference between an OK design and a professional-looking one, but try this: add noise to your drop shadows. Computer-generated shadows often look too regular (a dead giveaway). Adding noise makes the shadow gritty, which looks more natural. In Photoshop, use the Add Noise filter when you build the shadow. You don't have to add much, perhaps only four or five levels of noise, to get a more realistic shadow.

Integrating Shadows

One question I hear all the time is, "How can I make my drop shadows transparent in QuarkXPress or Adobe PageMaker, so that I can see the

OVERPRINTING SHADOWS

Place a separate gray-scale TIFF shadow image on top of a color background that has no black in it (like the cyan bar below) and set the shadow to overprint the color (this is a trapping feature in QuarkXPress and PageMaker). It looks wrong on screen but prints properly from color separations. This trick won't work if there's black in the background color because the black of the drop shadow *can't* overprint the black in the background (it's that opaque thing). A second trick is to convert the gray-scale shadow into a 1-bit, black-and-white diffusion-dither image (Bitmap mode in Photoshop). The image contains only black and white (no grays); PageMaker and XPress can overprint these over any background. The result looks less clean, but it's gotten many folks out of a jam.



On screen, the gray-scale shadow set to overprint (left) looks as if it'll knock out the entire background. On the right is the shadow set to Bitmap mode in Photoshop.

The gray-scale shadow overprints the colors correctly, but it knocks out the black plate. The bitmap shadow has no gray values; it overprints everything.

DROP SHADOWS FROM PAGE ITEMS

Making a drop shadow of an object such as type or a box in PageMaker or QuarkXPress is always a pain (unless you've got a QuarkXTension to do it for you). Here's one technique I often use.

1. Hide all guides on your PageMaker or QuarkXPress page and set the view scale to 100 percent (Actual Size).

2. Take a screen shot: press ⌘-shift-3 to capture the whole screen, or use a screen-capture utility to capture just the area you want (A).

3. Open the screen shot in Photoshop (it'll probably be called Picture0 on your start-up drive) and convert it to Grayscale mode.

4. If there isn't very much white space around the selection, use Canvas Size, from the Image menu, to make more. If you wound up with too much space (for example, if you captured the whole screen), crop it down (B).

5. Select Image Size from the Image menu and resample this image to 120 ppi. Note that you must leave the Height and Width the same, so they must be set to Inches or Picas. The Constrain: File Size checkbox must be turned off (C).

6. Apply a Gaussian Blur of at least 5 pixels; use the Add Noise filter to add 4 or 5 levels of noise (D).

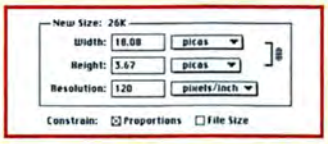
7. Use Output in the Levels dialog box to lighten up the drop shadow—move the black triangle in the bottom slider over to about 130 or so (E).

8. Save the image as a TIFF (if you want to overprint it) or as an EPS and bring it back into XPress or PageMaker. Now play around with the image's placement to create the most pleasing shadow (F).

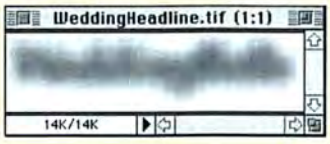
A.

B.

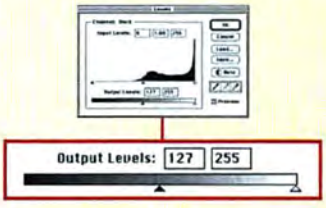
C.



D.



E.



F.

background through them?" Unfortunately, you can't. PostScript—the language XPress and PageMaker are based on—is an opaque imaging model, which means that whatever is on top wins. If you put a 20 percent gray box on top of a 50 percent gray box, there's no way PageMaker or XPress can blend them together—only the 20 percent box will show.

However, there are a few tricks for faking the effect of a shadow sitting on top of a background. For instance, you can use overprinting (if it's a color document) or black-and-white bitmap images (see "Overprinting Shadows").

Made in the Shade: XTensions and Plug-ins

It took software developers a while to figure out that we need drop shadows, but now there are several plug-ins that let you create drop shadows automatically. For Photoshop, check out The Black Box from Alien Skin Software ($119; 919/832-4124, *http://www.alienskin.com*) and PhotoTools from Extensis (street price $99.95; 503/274-2020, *http://www.extensis.com*). If you want to make shadows without leaving QuarkXPress, check out ShadowCaster from A Lowly Apprentice Production ($129; 619/438-5790, *http://www.alap.com*) or QX-Tools from Extensis (street price $99.95).

However you choose to make a drop shadow, remember that shadows are as much an art as a science. And as an art, they require some degree of design smarts, like making sure the opacity, direction, and color of the shadow make sense. If you're interested in learning more about how to make drop shadows, check out one of the many Photoshop books on the market, such as *The Photoshop 3 Wow! Book*, by Linnea Dayton and Jack Davis ($39.95; Peachpit Press, 1995). **m**

DAVID BLATNER has authored and coauthored several books about desktop publishing, including *Real World Photoshop 3* (Peachpit Press, 1995). He can be reached at *david@moo.com*.

Breaking the Shadow Out

When your drop shadow and foreground image are in separate files, you need a clipping path around the foreground image (unless, of course, it's a rectangle that fills the picture box).

Without a clipping path the image area around the object hides some of the shadow.

With a clipping path you can see all of the shadow you need to see.

Graphics Workshop

Creating Realistic-Looking Metallic Textures

by Cathy Abes

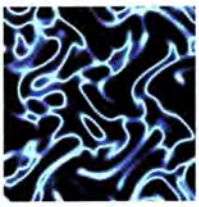
ARTIST A native of Madrid, Spain, Javier Roca has been creating digital imagery for almost eight years and has been a 3-D artist since 1990. He has taught electronic graphic art in both Spain and the United States. His work has been exhibited in galleries and has appeared in numerous magazines, and on the covers of *Macworld*, *Publish*, and *MacUser Spain*.

HOW IT WAS DONE One of the most difficult effects to achieve is realistic-looking metallic surfaces for 3-D objects; they often end up looking too shiny and too bright, and the colors seem too saturated.

To create believable-looking metals, Roca begins by making texture maps in Adobe Photoshop, which he then manipulates and applies in Specular Infini-D. He often starts with a scanned photo or a small section of an existing image and applies various filters to it. The surfaces in this image began as random white brush strokes on a black background, to which he applied various Photoshop filters to generate unusual textures.

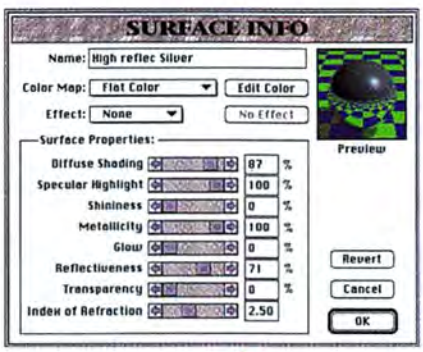
Before applying the maps to their respective objects, Roca altered various surface properties, such as color, diffuse shading, and metallicity, in Infini-D. Once he applied the maps to the objects, he created an environment map from a rendered version of the entire scene and applied that to the whole image. He completed the effect by adding various lighting effects to the scene.

THE TOOLS **Hardware:** Power Macintosh 7100 with 40MB of RAM and a 500MB internal hard drive; a 2GB external hard drive; an Apple Multiple Scan 17 Display. **Software:** Adobe Photoshop 3.0, Specular Infini-D 3.5.



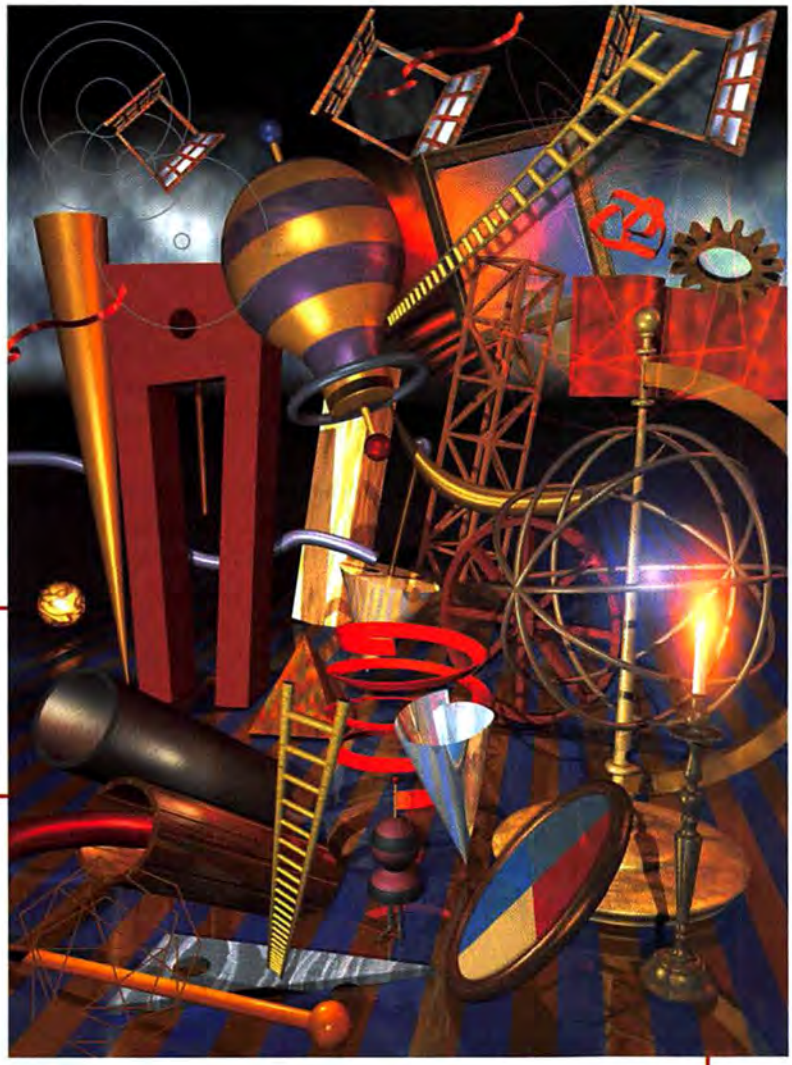
❶ To create a texture for the small sphere, Roca began by painting random white brush strokes on a black background in Photoshop. Then, after applying Gaussian Blur and the Wave filter to create a swirling pattern, he adjusted Color Balance to make the swirls blue.

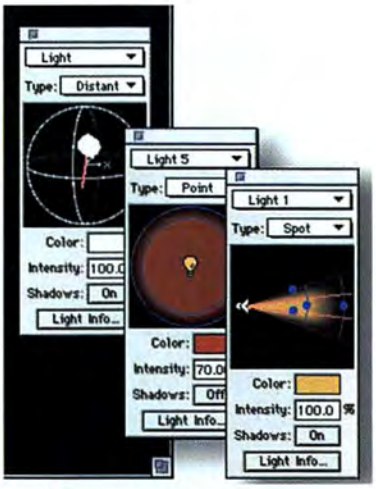
❷ Roca applied the texture as a transparency map to the sphere, to which he'd previously applied a gold material map. Setting the transparency map's black areas to be completely transparent and the blue areas to have partial transparency resulted in alternating areas of bright and dark gold.



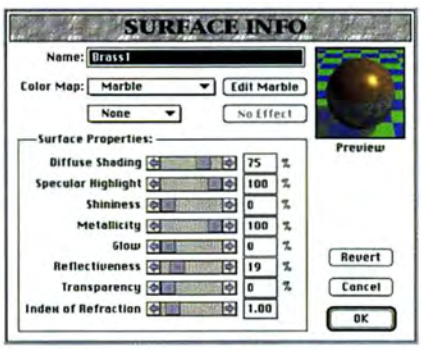
❸ To create a silver chrome surface for the small cone, Roca started with a blue-gray color map. He increased Reflectiveness, Specular Highlight, and Metallicity to create a highly reflective, silvery effect. He also increased Diffuse Shading on each texture to tone down the brightness.

❹ The cone with the silver texture map applied. Unlike many of the other textures, this was a flat color texture with no bump maps or filters applied.





8 Setting the correct lighting was a critical factor in achieving a realistic effect. The Distant light affects the whole scene; the Point light warms the objects' colors, enhances their depth, and makes the reflections look more realistic; and the Spot light brightens and sharpens the objects in the foreground.



5 For what would become a candlestick holder, he used a marble texture as a color map, with 100 percent Specular Highlight and Metallicity. To give it an antique brass effect, he reduced Reflectiveness and eliminated Glow and Shininess.

6 In the Color Map editing window, Roca further adjusted the texture's properties, increasing Turbulence to randomize the pattern, which subdued the gold color to give it a more antique look.

7 The candlestick holder has the same marble texture as the object behind it, but with different color and Turbulence settings.

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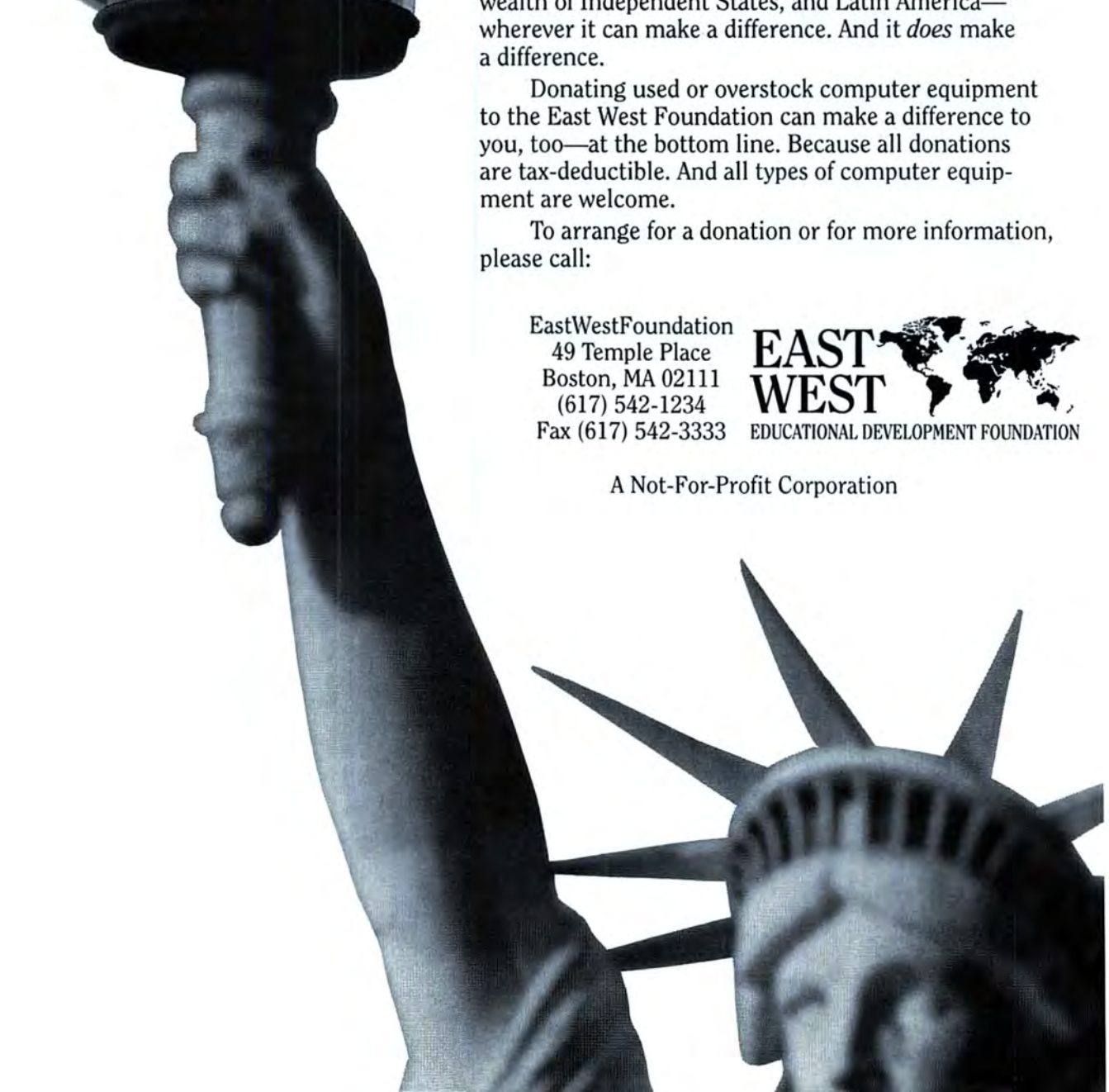

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Desktops/PowerBooks	◯ 1	◯
Monitors	◯ 2	◯
Printers	◯ 3	◯
Storage Devices	◯ 4	◯
Networking/Data Communications	◯ 5	◯
Internet/Intranet products/services	◯ 6	◯
Software: business/productivity	◯ 7	◯
graphics/design	◯ 8	◯
interactive publishing/ multimedia	◯ 9	◯
entertainment	◯ 10	◯
education	◯ 11	◯
other software	◯ 12	◯
Any other products	◯ 13	◯

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- ◯ 5. Unclear needs
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- ◯ 7. Other (please specify) _____

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953 Scanner & Digital Cameras
954 Online/Internet
955 Storage Devices
956 Monitors & Graphics Boards
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959 Memory
960 Draw/Paint/DTP Software
961 Image-Editing Software
962 Other Graphics Software

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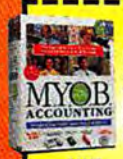

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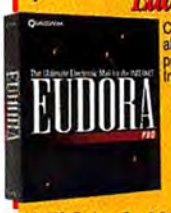

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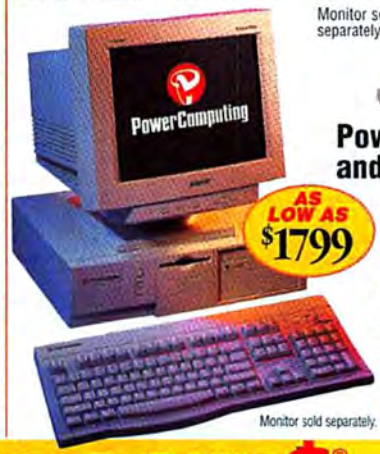

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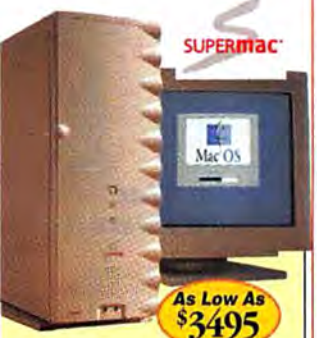

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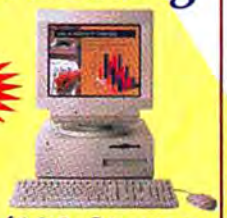

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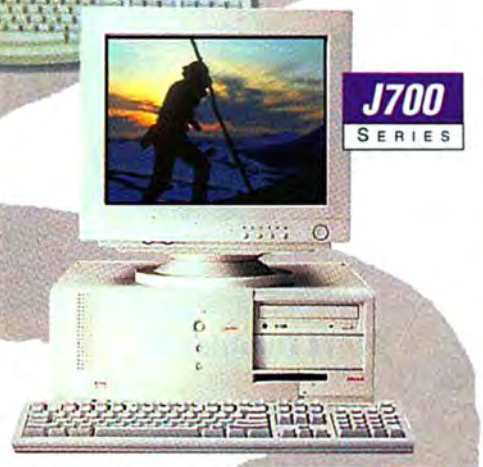

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STORAGE SYSTEMS

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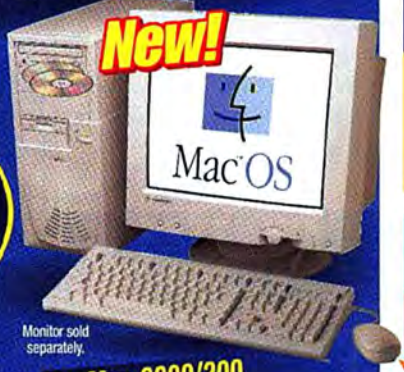

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- Modem Port
- ADB Port
- SVGA Monitor Port
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- SCSI Port
- 16-bit Sound Output Port
- Rear Headphone Jack
- Microphone Jack

INCLUDES:

- 8X CD-ROM
- 16MB RAM
- 1.2GB HD
- Floppy Drive
- 1MB VRAM
- ADB Keyboard & Mouse
- One-Year Limited Warranty
- Desktop Case

COMPARISON

	5.25" Intl. Bays	3.5" Intl. Bays	PCI Expansion Slots	Printer Port	Modem Port	ADB Port	ADB Keyboard	ADB Mouse	PS/2 Port	SVGA Monitor Port	Supports 14", 15", 17" & 21"	SCSI Bus	IDE Bus	16-bit Sound Output Port	Rear Headphone Jack	Microphone Jack	8X CD ROM	Hard Drive (GB)	RAM	L2 Cache	VRAM (MB)	Floppy Drive	Price
APS 604e200 Tower System	3	5	5	✓	✓	✓	✓	✓	✓	✓	✓	1	✓	✓	✓	✓	✓	2.5	24	512K	2	✓	$2599
POWERTOWER 200e Tower System	3	2	3	✓	✓	✓	✓	✓	-	✓	✓	1	-	✓	✓	✓	✓	2	16	1MB	2	✓	$3595
PowerMac 9500/200 Tower System	1	3	6	✓	✓	✓	-	✓	-	✓	✓	2	-	✓	✓	✓	✓	2	32	256K	2	✓	$4899

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- 5-PCI Expansion Slots

INTERFACES

- Printer Port
- Modem Port
- ADB Port
- Supports 14", 15", 17" & 21" Monitors
- SVGA Monitor Port
- SCSI Port
- 16-bit Sound Output Port
- Rear Headphone Jack
- Microphone Jack

INCLUDES:

- 8X CD-ROM
- 24MB RAM
- 2.5GB HD
- Floppy Drive
- 2MB VRAM
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603e200

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INTERFACES

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INCLUDES:

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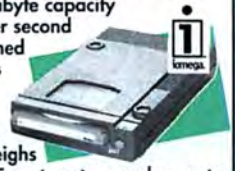

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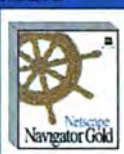

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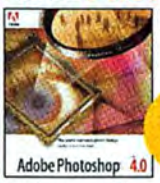

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Wide SCSI A/V			
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Seagate

SCSI	Model	Internal	External
1050MB	**ST31055N**	**$349**	**$409**
2147MB	**ST32550N**	**$729**	**$789**
2150MB	**ST32155N**	**$485**	**$545**
4290MB	**ST15230N**	**$885**	**$945**
4350MB	**ST34371N**	**$1155**	**$1215**
9080MB	**ST410800N**	**$1779**	**$1879**
9100MB	**ST19171N**	**$2095**	**$2195**
Wide SCSI			
1050MB	**ST31055W**	**$389**	**$519**
2147MB	**ST32550W**	**$789**	**$919**
2150MB	**ST32155W**	**$559**	**$689**
4290MB	**ST15150W**	**$1029**	**$1159**
4350MB	**ST34371W**	**$1199**	**$1389**
9100MB	**ST410800W**	**$2029**	**$2219**
9100MB	**ST19171W**	**$2179**	**$2369**

IDE HARD DRIVES

2167MB	**Seagate**	**ST32140A $269**
2500MB	**Fujitsu**	**M1638T $295**
3254MB	**Quantum**	**TM33840A $395**

CD ROM DRIVES

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NEC	**8X**	**145ms**	**$195**	**$265**
Pioneer	**10X**	**65/140ms**	**$199**	**$289**

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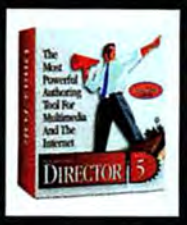

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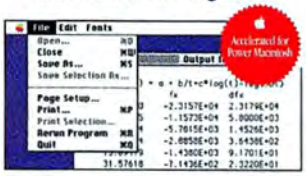

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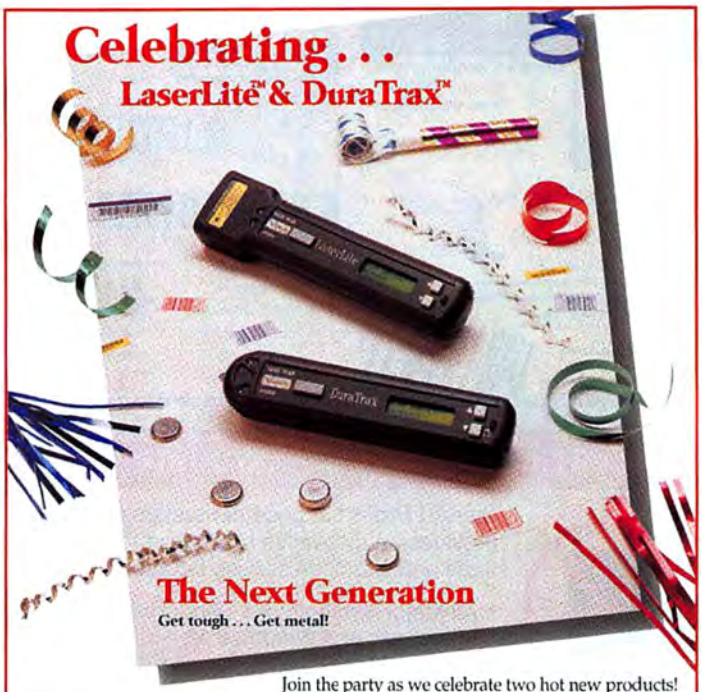

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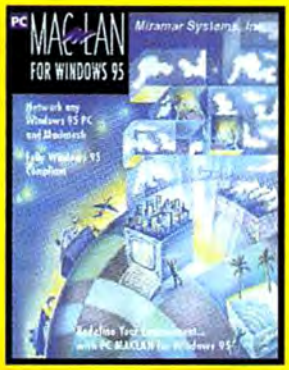

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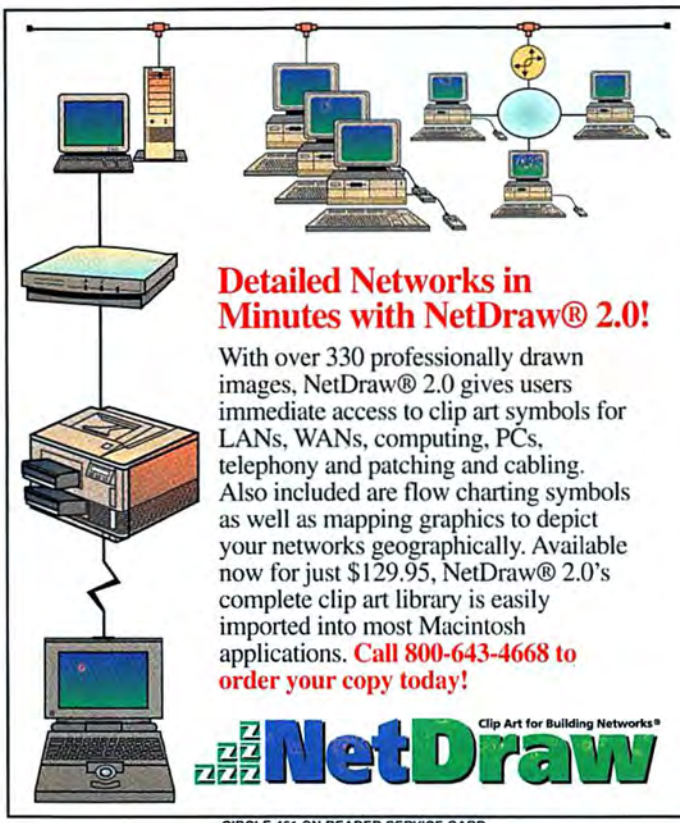

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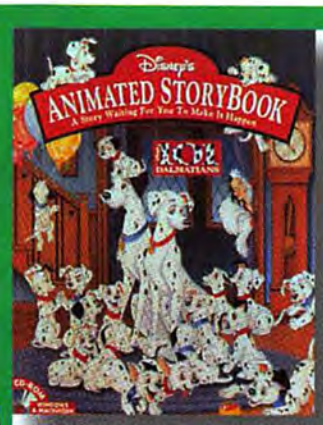

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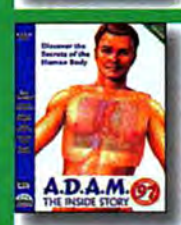

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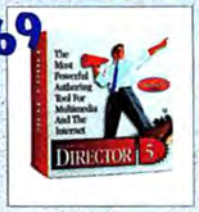

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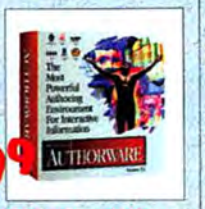

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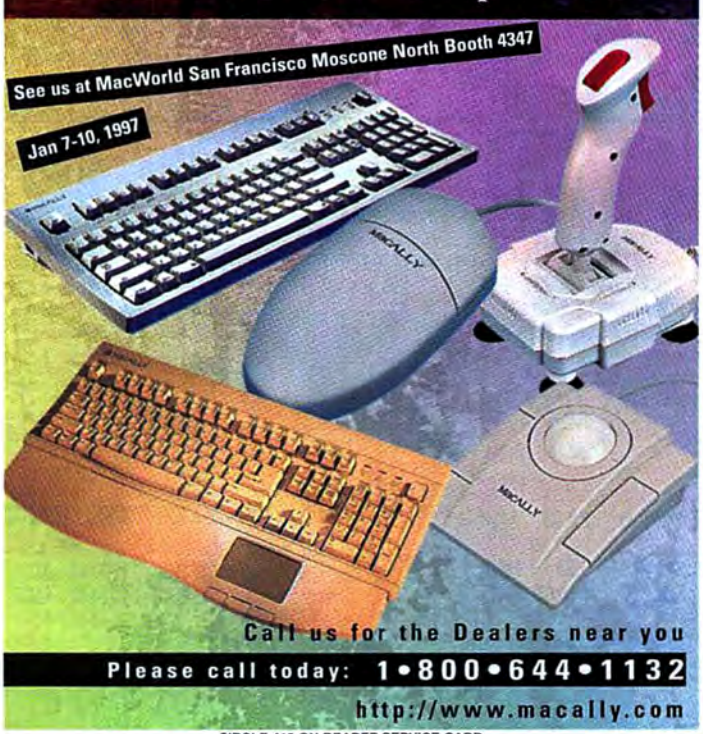

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Epson	Stylus Pro XL (11X17)	1715
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HP	LaserJet 5MP	999
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HP	LaserJet 4MV (11x17)	2765

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AGFA	Duo Scan	4925
Epson	ES-1200C LE	Call
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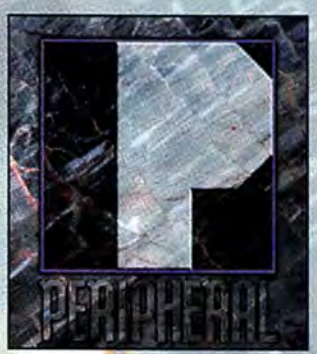

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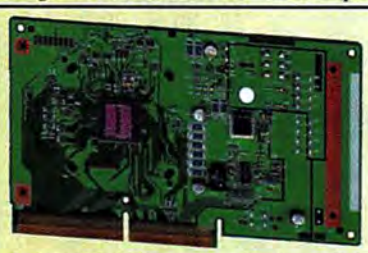

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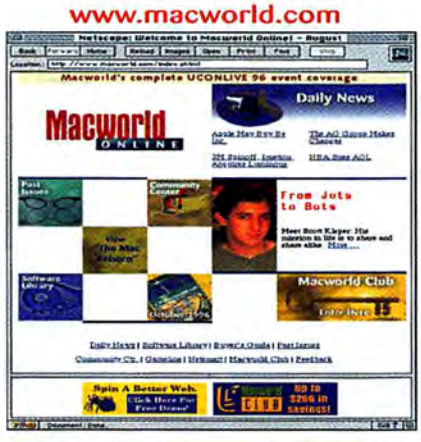

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either they clam up or they open up completely. Apple takes the former route, doing the corporate equivalent of clamping its hands over its ears and singing "Tomorrow" at the top of its lungs. Contrast that with Microsoft, the All-Time Intergalactic Deity of Media Relations; when times are tough there, Markoff says, "you can't *stop* VPs from calling you. Apple could learn from that."

Fortunately, finally, a small light dawned. Christopher Escher took over PR at Apple and sent a startling fax to everyone in the Apple National Rolodex. "We owe you one big apology," it said. "You're tired of voice mail. You're tired of people not getting back to you. And you're tired of what appears to be a bunker, adversarial attitude at Apple regarding the press." Could such words really come from Apple? Has *humble* actually entered the vocabulary over in Cupertino?

I interviewed several national technology writers. Almost everyone agreed that, at least in the PR department, Apple's aura of arrogance is evaporating.

On the other hand, the *Wall Street Journal*'s Apple watcher, Lee Gomes, doesn't think Apple's treatment of the press affects business writers' objectivity one way or the other. He offers a different theory to explain the harshness of the Apple coverage in 1996. "There are cycles to media coverage of anything," he says, "the president, companies, whatever." For years, he points out, the national press "bought into the Jobs thing, the Sculley thing, the Newton thing," giving Apple the benefit of every doubt. Then, he says, "it was Apple's year to be dirt."

In the end, no matter which theory of the Great Apple PR Train Wreck you subscribe to, things are looking up. If Apple somehow invited media venom through corporate arrogance, then maybe its newly chastened approach will have some effect on future coverage. "The press was saying that many of the company's strategies weren't working," says Apple's Escher. "And that was fundamentally true. What we didn't do was communicate what our strategy was for getting out of that. We're much looser than we used to be about discussing our directions, product ideas, and road maps—and the press coverage has calmed down."

If, on the other hand, Apple is simply experiencing the natural tides of business writing, then the bashing must mercifully end sooner or later.

The Challenge

In the meantime, Apple has its public-perception work cut out for it. There are lots of messages to get out—that the Mac is still easier to set up, learn, and use than the alternative; that new technologies appear first on the Mac; that the Mac OS guarantees a smoother, more consistent ride on Mac clones than any you get from PC clones; that the PowerPC's got more future than the Pentium; and that people tend to *love* their Macs in a way that mystifies owners of ordinary computers. Apple's Infiniti car-commercial–reject ads miss all of these messages.

How can we inspire Apple to seize the media bull by the horns? I've got it—let's fill in the blanks in Apple's latest ad and mail it back to the company: "Your company is 20 years old. Your dream is to survive the next 10." **m**

Contributing editor DAVID POGUE is coauthor of the soon-to-be-released *Macworld Mac Secrets*, fourth edition (IDG Books Worldwide, 1997).

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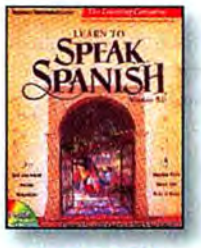

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The Desktop Critic

by David Pogue

Earth to Apple: Advertise!

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APPLE, THANK GOODness, seems to be waking from the Mother of All Bad Dreams that gripped the company in 1996. Consider all the mini-nightmares that Apple can leave behind with the dawn of the new year: huge quarterly losses, a merry-go-round of system-software updates, the 5300 PowerBooks. As I write this, even Apple's stock price is crawling out of its ditch and dusting itself off.

What *happened*, anyway?

What can account for a year that bad? Bad product forecasting? At first, sure. Product quality gaffes? OK, but Apple addressed them. Yet, much to the dismay of Mac fans everywhere, the tidal wave of harsh anti-Apple press just kept rolling and rolling a full year later, leading potential buyers to lose confidence and therefore eating away at market share. Clearly, something more profound has been amiss.

I mean, Apple wasn't the first company in history to have freak bad luck. Remember when some moron put poison into a bottle of Tylenol? Or when they found trace amounts of benzene in some Perrier? Or when the all-seeing, all-knowing Pentium chip flubbed a simple math test? Yet the media didn't schedule memorial services for *those* companies.

I'll tell you the difference between those companies' crises and Apple's: advertising and PR. The makers of Tylenol and Perrier went public with their problems, making a big show of recalling millions of bottles. And after being kicked around a little in the press, even Intel came to its senses and offered to replace everyone's Pentium chips.

But for months Apple did nothing, cowering in the corner while the bullies kicked it in the ribs. Its executives avoided the press; the company's internal reorganization made it tough for reporters to get access; and we waited in vain for the killer ad blitz Apple would unleash to shut up the doubters.

Ads? What Ads?

It's not that Apple doesn't advertise at all. The company's recent ads feature a blurry black-and-white photo and a headline in Bad Typewriter Grunge font: "You are ____ years old. Your dream is to _____."

It's bad enough that these ads don't picture the product and look as if they've been through the fax machine a couple of times. (Yo, Apple: is this the way to promote a computer famous for great graphics and type?) But the real problem is that these ads are touchy-feely when specificity is needed. The message is abstract when Apple should have confidence and hard facts tattooed across its forehead.

Compaq's TV ads show its computers responding to voice commands; IBM shows off a PC with a built-in answering machine—features the Mac has had for years. What's Apple showing? A profile of the 1-800-FLOWERS guy. And this "You are ____ years old" thing.

Microsoft's ads also feature misty messages with terrible typography: "Where do you want to go today?" (Who wrote that slogan, anyway—a cab driver?) Maybe Apple's trying to be like Microsoft. If so, Apple the gosling has imprinted itself on the wrong mommy. Apple shouldn't model itself on a software company, but on computer companies. We're not buying dreams and toll-free flowers; we're buying computers.

Don't Say It with Flowers

Apple's failure to communicate the Mac's strengths is all the more disappointing because there are so many of them—the Mac has enough sexy features to last through *Mission: Impossible VIII*. Let's see ads showing someone playing a music CD in the background while retouching in Adobe Photoshop. Show a woman with a QuickCam videoconferencing long distance, smiling to see and hear her newborn first grandchild. Show a snowbound, airport-stranded traveler dialing in to the home Mac (with Apple Remote Access) to retrieve an important spreadsheet and save the big business deal.

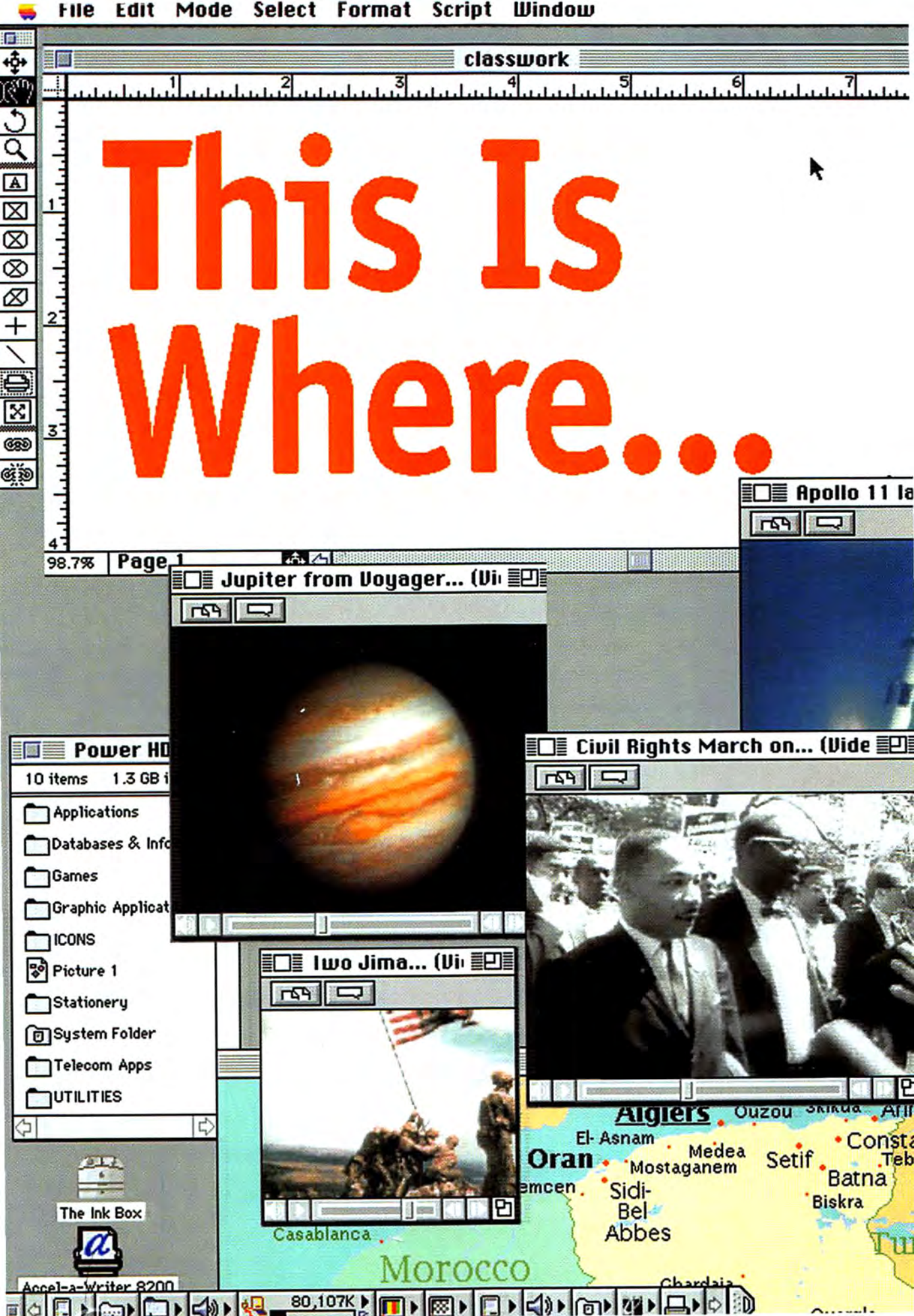
How Do You Spell PR?

But as 1996 showed, even advertising is only the warm-up act. The main event is *PR*—also known as "corporate communications," "press relations," or "not ticking off the national media." Unfortunately, Apple pretty much flunked this subject, too. Apple's PR department developed a reputation for arrogance, failing to return calls and treating reporters like gnats.

John Markoff, who covers the computer industry for the *New York Times*, told me that technology companies take one of two tacks when things go wrong:

continues on page 264

CHRIS CHING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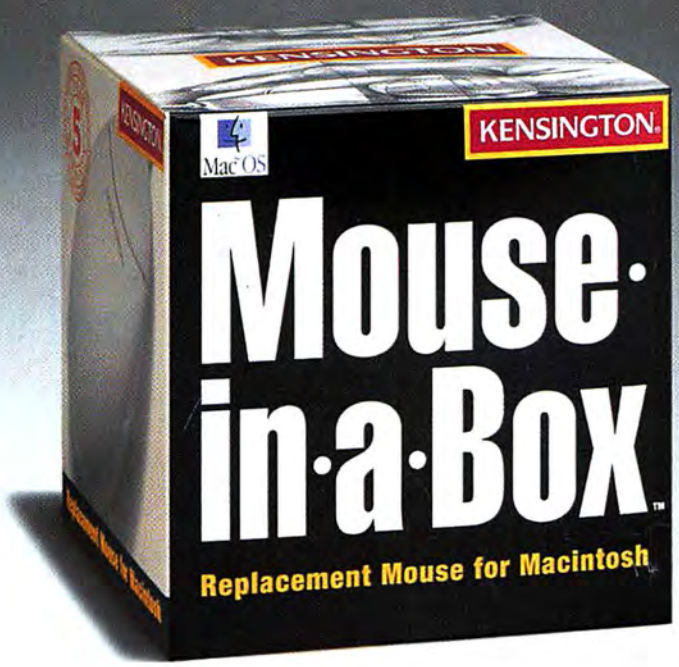

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