apple

The Personal Computer Magazine and Catalog.

Volume 1, Number 4. $2.00

A New Star is Born - The Story of Apple III

Apple on Wall Street

Professionally Speaking

Keeping Up With Medicine

Apple, the personal computer magazine and catalog, is published quarterly by Apple Computer Inc., 10260 Bandley Drive, Cupertino, CA 95014.

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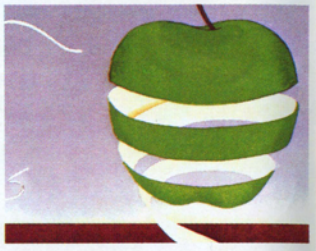
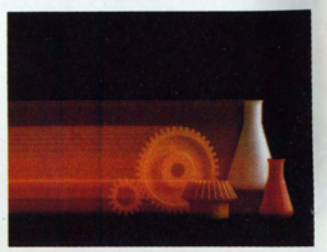
Table of Contents





EDITORIAL

Putting Knowledge to Work

When we set out to research and write an issue of APPLE devoted to "professional" users of personal computers, the first challenge was to define the word "professional." Ask most people and they'll respond quickly, "Doctors, lawyers, engineers..." and then stop to think what comes next.

The dictionary defines "profession" as "a vocation requiring knowledge of some department of learning or science," which could mean virtually any vocation requiring special knowledge as compared to acquired skills.

We have interpreted the word broadly, including in this issue professionals from science and industry, the financial community, medicine, the arts, banking, education, and so on. All are educated for their professions; all require specialized knowledge which must be constantly revised and updated if they are to be successful at their professions.

Which brings us to the lead story in this issue: the introduction of Apple III. Its appearance in an issue devoted to professionals is not a coincidence. Apple III's capabilities will extend the usefulness of the small computer to users needing to control and utilize information in performing their occupational skills.

Webster may still define "profession" as a "vocation requiring knowledge," but today's professionals know success often depends on having the right tools to help put that knowledge to work.

apple

Table of Contents

A NEW STAR IS BORN

APPLE III

THE STORY OF APPLE III

by Barry Yarkoni
Apple III
Product Manager

Enthusiastic comments floated up from a group of professionals gathered around the new display. As I stood back watching their reactions, I felt more than a bit like a proud parent. Through many long months, our dedicated product team had worked to bring Apple III to life. I couldn't help but reflect on the events that led up to this moment.

HOW STARS ARE BORN

Hobby computers made their appearance in the early '70s. But the personal computer explosion really began in June, 1977—when Apple Computer Inc. delivered the first

system that could be unboxed, plugged in, and used immediately: the Apple II.

The Apple II Personal Computer System is self-contained in a single case, provides color graphics and sound, and looks like a typewriter (instead of a laboratory console). Its appeal brought a new class of users into the personal computer marketplace, and established Apple as an innovative leader.

But as the market evolved, people wanted more than computer hardware. They looked for solutions to real-world problems. Apple recognized this and began providing users with the software tools they needed. Over the next two years, Apples were put to work editing text, helping with investment portfolios, handling accounting chores, assisting in education, providing entertainment, and, well ... the list goes on and on.

As Apple's star rose, other companies jumped on the bandwagon to provide users with an even greater variety of application software. They liked the Apple II because it was built to last, offered a choice of languages to suit the tasks at hand, and provided floppy disk storage (and a powerful disk operating system to control it). Better still, it came packaged with thorough documentation which answered their questions about the system itself. Thus, they gained a leading edge in producing quality software. Today, more than 170 firms offer software and accessories for the Apple II—and the list just keeps on growing.

So why had Apple designed a new product when the Apple II was so successful? Simple. No one device can answer everyone's needs. For many, the Apple II remains the ideal personal computer—well supported, inexpensive, and easily expandable. But for those whose complex computing needs exceed the Apple II's capabilities, Apple III provides the answer. Let me tell you a little about our newest star and the markets it's been designed for.

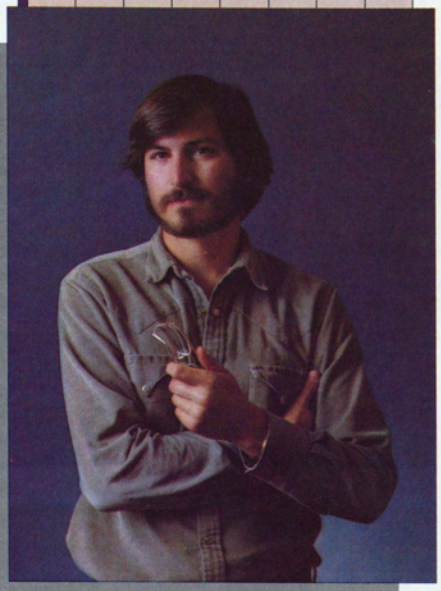
A TOOL FOR MANAGERS AND PROFESSIONALS

In today's fast-paced world, we're all striving to increase our personal productivity. Apple III was created with this goal in mind. Toward that end, one of the most important programs available for the Apple III is a new version of an award-winning modeling program—VisiCalc III. The ways it can increase a user's productivity are practically endless.

Anything that can be organized into rows and columns can be manipulated using VisiCalc III. Budgets, financial models, schedules, calendars—you can create them all, without becoming a programmer! You can define complex operations easily using this sophisticated modeling tool. For many applications, you can use an existing VisiCalc III model from our library of "tool kits." General purpose business, real estate, and financial models are already available. Simply choose one, enter data on its "worksheet," and let your Apple III provide the answers instantly!

"Apple III is the newest member of the Apple product family. It takes up where the Apple II leaves off, providing the user with the capabilities he needs to solve serious problems. Because the Apple II and Apple III fully complement each other, we can offer the user a choice, rather an intelligent *choice."*

STEVE JOBS
Apple Co-Founder and
Product Marketing Vice President



The VisiCalc III models provide you with a powerful "What if..." capability. For example, the Loan Payment model displays a principal amount, interest rate, and loan duration. Changing the number entered for interest rate automatically directs the Apple III to recalculate the monthly payment. You can keep trying different possibilities until you have the answer you're looking for.

Data generated by VisiCalc III can also be displayed graphically by the Apple III. Multi-color bar charts or X-Y plots can be displayed on the screen with titles and full annotation. And they can quickly become hardcopy with either the Apple Silentype™ Thermal Printer or a letter-quality printer.

WORD PROCESSING AT THE TOUCH OF A KEY

Another exciting, new application of the Apple III is word processing. The Apple III Word Processor offers users the professional editing capabilities of systems costing almost twice as much. And its 80-column display eliminates guesswork. What you see is what you get. Letters, memos, reports, manuals, even books may be quickly entered and edited. Normally cumbersome typing operations—centering, indenting paragraphs, searching for and replacing text—all are automatic.

Ready to print? Letter-perfect printing is built right in. And some special capabilities make the printing process easier than it's ever been. You can print single pages of a document. Print on your letterhead. Leave space for diagrams. And more. You can use the Apple Silentype Thermal Printer for draft copies, or a daisy-wheel printer for letter-quality copies. It's that easy.

LANGUAGES—A WIDE SELECTION

Programming the Apple III is just as easy and exciting as programming the Apple II. Whatever the application, the Apple III offers a wide choice of programming languages—including an extended version of the microcomputer industry standard, UCSD Pascal™. Apple Pascal adds graphics capability and many other special features. And, because the system includes a Compiler, Editor, Filer, Debug Program, Library, and Runtime Support Package, it offers programmers a complete program development facility.

Scientists and engineers will enjoy using the ANSI standard FORTRAN 77 on the Apple III. This FORTRAN compiler and runtime library allows them to take advantage of the extensive scientific program libraries that complement one of the most widely used computer languages in the world.

Apple III also supports an easy-to-learn BASIC language. Apple Business BASIC is an upgraded version of the industry standard, with flexible formatting, improved numerics, and a number of new extensions that make programming simple.

Finally, the Apple III is provided with a Sophisticated Operating System (SOS) to

IN THE TRADITION OF ALL APPLE PRODUCTS, THE APPLE III IS EASY TO USE AND FULLY DOCUMENTED.

control the system hardware for you. SOS updates and reads the date from the system clock, handles interrupts, manages the Apple III's memory, provides the foundation for graphics, and performs comprehensive file management.

THE RIGHT HARDWARE FOR THE RIGHT SOLUTIONS

Apple III's software solutions rest on a foundation of outstanding hardware. At the heart of the system is the 6502A microprocessor (a faster version of the one used in the Apple II). The 6502A provides high performance, while still allowing it to run the millions of lines of software already written for the Apple II. So, if you're an Apple II user considering a step up, your software investment is fully protected.

Sophisticated programs require larger amounts of memory. So we surrounded the 6502A with circuitry to control up to twice the memory available on other personal computers—128K bytes of RAM. (This circuitry is turned off, however, when the Apple III is running Apple II software.)

This enormous memory capacity gave our designers the opportunity to add some dazzling human interface capabilities to the Apple III. Colored text can be placed on a colored background. Both character and background colors can be changed for each character entered. And the Apple III also features an Ultra-High Resolution black and white mode. It's perfect for showing fine detail on charts, drawings, graphs, and artwork.

For 80-column black and white displays, an optional, 12-inch, high-resolution monitor is available. This sculptured monitor has been designed to fit directly on top of the Apple III.

For color, best results can be obtained by adding an "RGB" monitor, although a good quality "NTSC" color monitor will provide adequate resolution.

A SYSTEM DESIGNED WITH THE USER IN MIND

In the tradition of all Apple products, the Apple III is easy to use and fully documented. Because it's been designed for heavy use, the Apple III also boasts some special hardware features.

Key tops on the professional keyboard have been shaped to the ideal typing angle and contoured for maximum accuracy. And their surfaces are textured to minimize glare and guard against finger slips, too.

A built-in floppy disk drive makes the system compact and efficient, allowing you to store and retrieve data in just seconds. And it's expandable, so you can add up to three external disk drives without purchasing additional control hardware or software.

For fast numeric data entry, the Apple III has a built-in numeric key pad. It's a bonus for anyone who's used to working with a calculator. And it's perfect for the applications provided by VisiCalc III.

The integrated clock/calendar is another plus. It conveniently places the date on all files, so there's no doubt which revision of a document is the most current. Powered by its own long-life batteries, the clock/calendar keeps perfect time even when the Apple III is unplugged.

Because the demands placed on a professional's time grow daily, the Apple III has been designed to grow. Two built-in interfaces—one for letter-quality printer or telephone attachment, the other for an Apple Silentype Thermal printer—make your first system expansion quick and economical. There's no need for additional hardware or software. Other accessories simply plug into slots inside the system.

COOL, SILENT, AND SAFE

Apple III meets all UL, FCC, VC, VDE, and CSA standards. Its electronics are completely shielded, and an efficient power supply provides ample energy without generating a lot of heat. To keep the Apple III cool without a fan—as well as to protect the circuitry—an aluminum chassis surrounds the electronics.

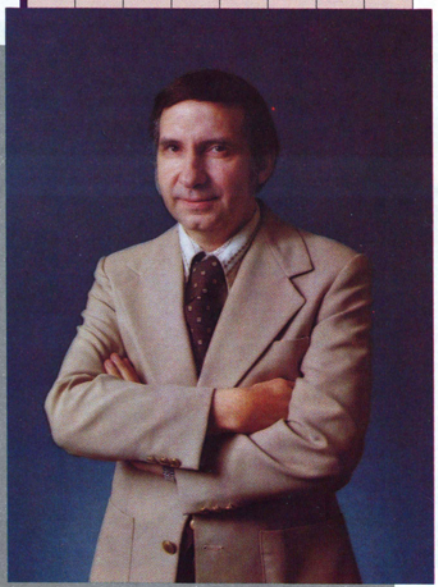
APPLE'S INVITATION TO YOU

The Apple III design team set out to create a powerful desktop computer that would solve some complex problems and increase personal productivity. I think we've succeeded beautifully. If you're a manager, engineer, financial analyst, accountant, or other professional—and you're looking for an affordable answer to your computing needs—you owe it to yourself to take a close look at the Apple III. On behalf of everyone at Apple, I'd like to personally invite you to pay a visit to your local Apple dealer. He'll answer your questions and demonstrate the solutions Apple III has to offer.

While you're there, take a quick look around the store. I may just be there—watching you discover Apple III out of the corner of my eye.

"We designed the Apple III to allow a user to present information more effectively—and more understandably. The system's outstanding display and sound capabilities, along with its increased memory capacity and other hardware enhancements, make it the most powerful, versatile, and professional personal computer available."

DR. WENDELL SANDER
Apple III Designer



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APPLE ON WALL STREET

Nowhere is the data processing explosion more in evidence than on Wall Street. This is the world capital of capital, where everyone's business is to "buy" or "sell" interest in America's thousands of publicly owned companies.

Because information management is one of the most highly praised applications of computer technology, it's not surprising that Wall Street's citizens long ago learned to rely upon computers. Ever since large systems first appeared, brokerage houses have used them for detailed recordkeeping.

For the individual broker or analyst, however, it was extremely difficult to access the vital, decision-making information stored within those systems. This was an unfortunate situation, since the ability to react quickly to financial news often makes the difference between a gain or a loss.

Enter the personal computer, which can make vital information available to brokers

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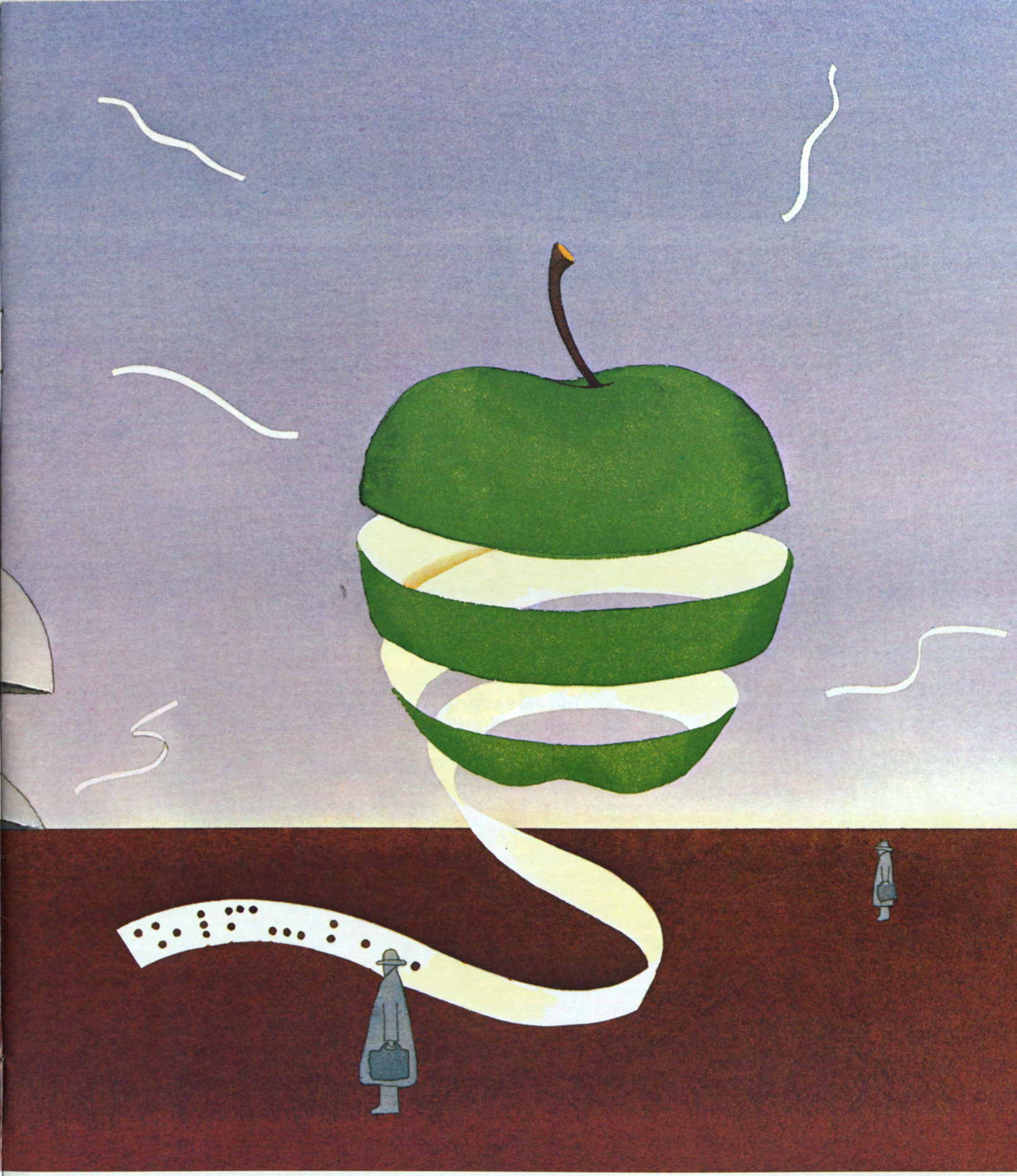
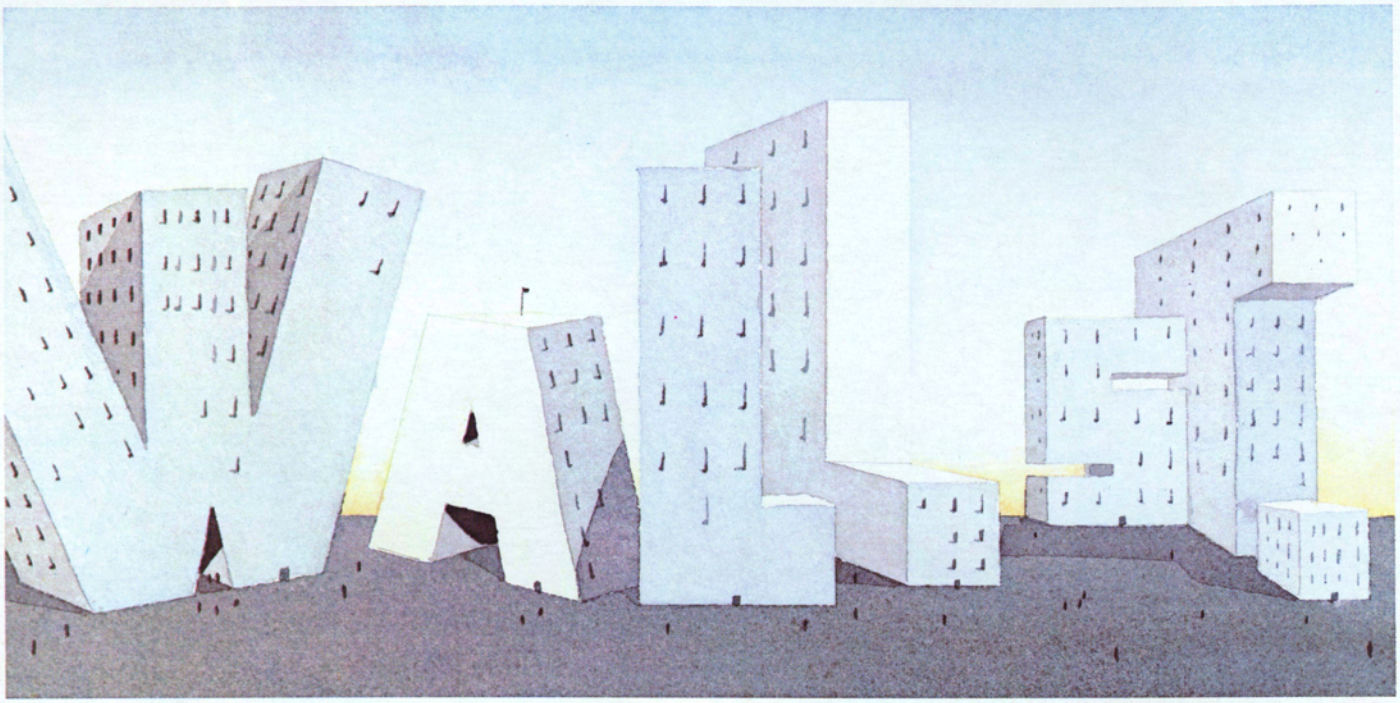




and analysts on a moment's notice. One of the first "market-watchers" to take immediate advantage of the microcomputer's capabilities was Ben Rosen.

A former engineer turned financial analyst, Rosen began his Wall Street career as a stockbroker, specializing in high technology companies few others understood in the 1960s. Today, Rosen owns his own company—Rosen Research—and publishes the highly-acclaimed *Electronics Letter.*

Rosen has been a champion of microcomputers from the beginning, touting them as one of the most effective tools a professional can use.

"My own personal computers, both Apple IIs, have been invaluable to me. I have such a great need for information processing, I ended up with two of them—one at the office and one at home. All I have to do is carry the software back and forth."

"Of course, when personal computers first arrived on the scene, there wasn't much software available. I was one step ahead of other analysts because I could program," says Rosen.

Today, several companies—including Apple—offer software specifically designed for the stockbroker, market analyst or investor. Apple's program, Portfolio Evaluator, allows a user to track investment portfolios on a daily basis, simply by calling a number and turning the telephone over to the computer.

Today, several companies—including Apple—offer software specifically designed for the stockbroker, market analyst, or investor.

Portfolio Evaluator has been developed in cooperation with Dow Jones. It's so easy to use that you can instruct the computer to telephone Dow Jones automatically and fetch the morning's new stock prices, while you relax and sip your morning coffee.

All well and good for portfolio evaluation, says Rosen. But the analyst needs detailed information from financial reports and news stories, too, before he makes recommendations to buy or sell stocks. To accommodate his own needs for this information, Rosen used Personal Software's VisiCalc program to build detailed company models from the information he gathered.

"VisiCalc comes alive visually," Rosen stated. "In minutes, people who have never used a computer are creating and using models. I think VisiCalc is one of the programs that will lead to the personal computer breakthrough on Wall Street."

Another exciting program which will spark this breakthrough is the second in the Dow Jones Series offered by Apple. Available in the third quarter of this year, News & Quotes will bridge the gap between Portfolio Evaluator and Rosen's use of VisiCalc. It will allow a user to retrieve, over telephone lines, past and current news stories and headlines from the *Wall Street Journal, Barron's,* and the Dow Jones News Service, as well as quotations for more than 6,000 securities traded on the major exchanges.

Rosen believes that any software package that extends the personal computer's usefulness is a bargain, regardless of price. For that matter, he also believes that the cost of the computer system itself is a real incentive for widespread use on Wall Street. "After all," he says, "having the most current information at your fingertips can be worth thousands—or even millions—of dollars in one day of active trading."

VENTURING OUT

African safaris offer excitement, challenge, and a certain amount of risk. But why travel all the way to Africa for adventure when you can find it in your own backyard?

That's the way a group in San Francisco feels. They regularly go on their own kind of safaris—seeking "big game" for their venture capital investments.

Technology Funding, Inc., headed by Charles R. Kokesh, is a four-man operation which provides funding, through limited partnerships, for new, high technology companies.

Kokesh and his colleagues require no native guide, no tents, and no deadly weapons for their adventures. Armed only with data developed on their Apple II computer system, they attack and reduce risks for their investors, increasing "big game" profits.

Desktop/Plan is the primary software program used by Technology Funding to prequalify prospective projects, develop five-year plans for client companies, prepare detailed sales and cash flow forecasts, and test the viability of certain financial structures (for example, monthly payment amounts, duration, and rate of return). "In the past ten months, we have received almost 100 proposals," reports Kokesh. "We've investigated 27 of them and completed investments on five."

It is Desktop/Plan's exceptional modeling capability which has led Kokesh and his group to develop detailed project profiles before committing funds.

Technology Funding's standards are stiff. Each proposal is reviewed qualitatively and quantitatively. "Our first cut is made on judgment of the people involved in the project," says Kokesh. "Our experience has shown that a great idea—and the appropriate numbers—just aren't enough for success. There's got to be a dynamic management team in place to carry it off.

"There have been times when a proposal we've received has been poorly written," Kokesh continues, "but the potential of both the project and its people has been so great that we've helped rework and further develop the plan."

These qualitative judgments are not made lightly. The credentials of Technology Funding's management team boast a broad experience base, providing the right combination of financial, tax, and legal expertise necessary to manage sophisticated investment programs.

For example, before founding Technology Funding, Kokesh was a vice president at Bank of America, where he was responsible for the bank's Global Treasury Management Department. Kokesh had also held management positions with other financial organizations, notably Arthur Young & Co. and Citibank.

Nicholas L. Feakins, a general partner in the firm, is also treasurer and chief financial officer of Solfan Systems, Inc., in Mountain View, California. Technology Funding's other executives both have advanced degrees and add substantial business experience in the tax and financial areas as well.

In the company's downtown San Francisco office, the hub of its activities is an Apple II, its two disk drives, and a high-speed printer. With this computer system, Technology Funding is in an enviable position when it comes to performing detailed quantitative analyses.

"We put our Apple system to work for us the day we bought it," says Kokesh. "Within eight hours, it had completely paid for itself. In fact, we use our Apple more than the larger, costlier system we had installed to handle client recordkeeping and accounting.

"The Apple and Desktop/Plan have helped us with the entire investigative process." We take raw data from proposals and feed it into the Apple to develop comprehensive projections on a project's viability.

"We have a responsibility to insure prospective investors that their capital investments will yield both the tax advantages they're seeking, and our targeted 40-50% after-tax, internal rate of return.

Kokesh feels that there's another, equally exciting aspect to the business. "Meeting the people involved in a project, actually seeing what they're doing, and listening to their plans for the future, is really what makes our work an adventure."

Technology Funding does not invest in consumer products. Their primary interest is in developing industrial and medical devices, which will either lower the cost or raise the efficiency of existing technologies. For example, they're currently funding companies which manufacture a signal processing device; a pulsed, infrared photo-electric beam used in security systems; a hand-held medical diagnostic machine; and a microwave communication device. They've also recently evaluated a revolutionary technique that may have an application in the oil and gas drilling industries.

Kokesh and his colleagues are usually working on at least two projects at any given time. Once a project prospectus and the necessary legal documents have been finalized, one or two of the men are assigned to monitor the project's progress. In certain situations, these men actually become part of the project's management team. Their expertise often moves the endeavor over some serious hurdles.

What are Technology Funding's payoffs in qualifying prospects and securing investors? "Our firm usually serves as a general partner, with our payoff secondary to the successful return of the investors' capital," Kokesh replies. "Once the initial investment is returned, we receive 20-25% of the future cash flow.

"But there's a little more to it than just profit," Kokesh says with a smile. "I know that, for all of us, the fun is really in the chase."

"We put our Apple system to work for us the day we bought it," said Kokesh. "Within eight hours, it had completely paid for itself. In fact, we use our Apple more than the larger, costlier system we had installed to handle client recordkeeping and accounting."

SOFTWARE AND THE PROFESSIONAL

Desktop/Plan and VisiCalc—Programs Designed with the User in Mind

For most professionals, preparing business plans is a part of the job. Efforts range from simple computations for individual goods or services, to highly complex calculations based on "models" (more widely used in large organizations).

Computer-assisted planning systems have existed since the early 1960s for those who could afford them. By the late 60s, time sharing had emerged to help lower individual costs. Even so, most timesharing users had to spend thousands of dollars per month for time, disk space, and terminal rental.

The advent of the pocket calculator provided professionals with the first, inexpensive way to speed the business planning and analysis process. And now, the personal computer is providing an even better way.

The Apple II personal computer and some special software, Desktop/Plan and VisiCalc, make it practical for a professional to develop and execute customized planning and analysis systems—without any knowledge of computer programming at all!

To handle very large planning tasks, Desktop/Plan should be used. For smaller ones, VisiCalc is ideal. The major difference between the two programs is how they approach answering the common business question, "What if...?"

Desktop/Plan, The "Model" Program

Desktop/Plan is highly structured—that is, the user develops each portion of a "model" independent of other portions. Desktop/Plan is specifically designed to provide comprehensive printed reports for use by many individuals within an organization. Calculations are specified in a manner that's easily understood by any business person. A Desktop/Plan user never has to think of formulas or program statements.

Because of its menu-driven operation, the program is simple to learn and use. Desktop/Plan expands and simplifies the work that is usually accomplished using a columnar pad, a calculator, and a typewriter. Additionally, it gives the professional a great deal of flexibility in formatting printed reports. Column headings, report titles, data descriptions, and pagination are defined by the user; normally, printed reports will not have to be retyped. The ability to incorporate user written sub-programs also allows a professional to add any computational and logical functions which can be expressed in BASIC.

Desktop/Plan does require planning of the model or analysis before entry, however, because the size of the model cannot be changed after definition. In addition, if data is moved within the model, calculation rules must be re-specified.

There are nine basic steps in the use of Desktop/Plan. They're noted here to give insight into the flexibility and scope of this professional software package:

STEP ONE: Write report heading, column headings, line descriptions, line numbers, and format codes on a worksheet.

STEP TWO: Desktop/Plan "prompts" user for information from worksheet. After the specifications are entered, a "blank" Planning Values Input Worksheet may be printed.

STEP THREE: The planning values are written on the input worksheet.

STEP FOUR: Desktop/Plan "prompts" for planning values. After user input, a report may be printed to visually verify the accuracy of entered data.

STEP FIVE: Calculation rules are written on a blank sheet of paper.

STEP SIX: Calculation rules are entered by selecting the appropriate rules from a "menu" and responding to "prompts" from Desktop/Plan.

STEP SEVEN: Desktop/Plan executes the calculations on the planning values.

STEP EIGHT: Desktop/Plan prints user specified reports.

STEP NINE: The model may be re-executed by changing the planning values as many times as necessary to test varying assumptions.

VisiCalc—The Electronic Worksheet

VisiCalc is an outstanding software tool that virtually eliminates calculator, paper, and pencil in developing plans and analyzing possible results. Take virtually any problem you would explore working in rows and columns, and apply VisiCalc. Instantly, you'll have an electronic worksheet of up to 63 columns and 254 rows. At the juncture of any column and row, you can type in words or numbers.

To put VisiCalc to work, use one of the existing VisiCalc models, or create your own by entering the appropriate information. (Creating a customized VisiCalc model is just like writing column headings across the top and down the left side of a columnar pad.) When your model is ready, type a formula where you want VisiCalc to perform a calculation. VisiCalc automatically performs all arithmetic functions, net present value, and transcendental functions. The results are displayed instantly on the screen. If you change any of the numerical data, the electronic worksheet automatically displays a new result. The user can play "What if...?" as often as necessary to solve thousands of different problems.

When the calculations are finished, a hard copy of all the information on your worksheet may be printed, without the need for any programming.

Visualize a huge columnar pad. The computer screen is a "window" which allows the VisiCalc user to view a section of the larger "electronic worksheet." The window can be moved, or "scrolled," in all four directions for viewing every section. Or the computer screen can be split into two "windows" for viewing any two parts of the sheet simultaneously.

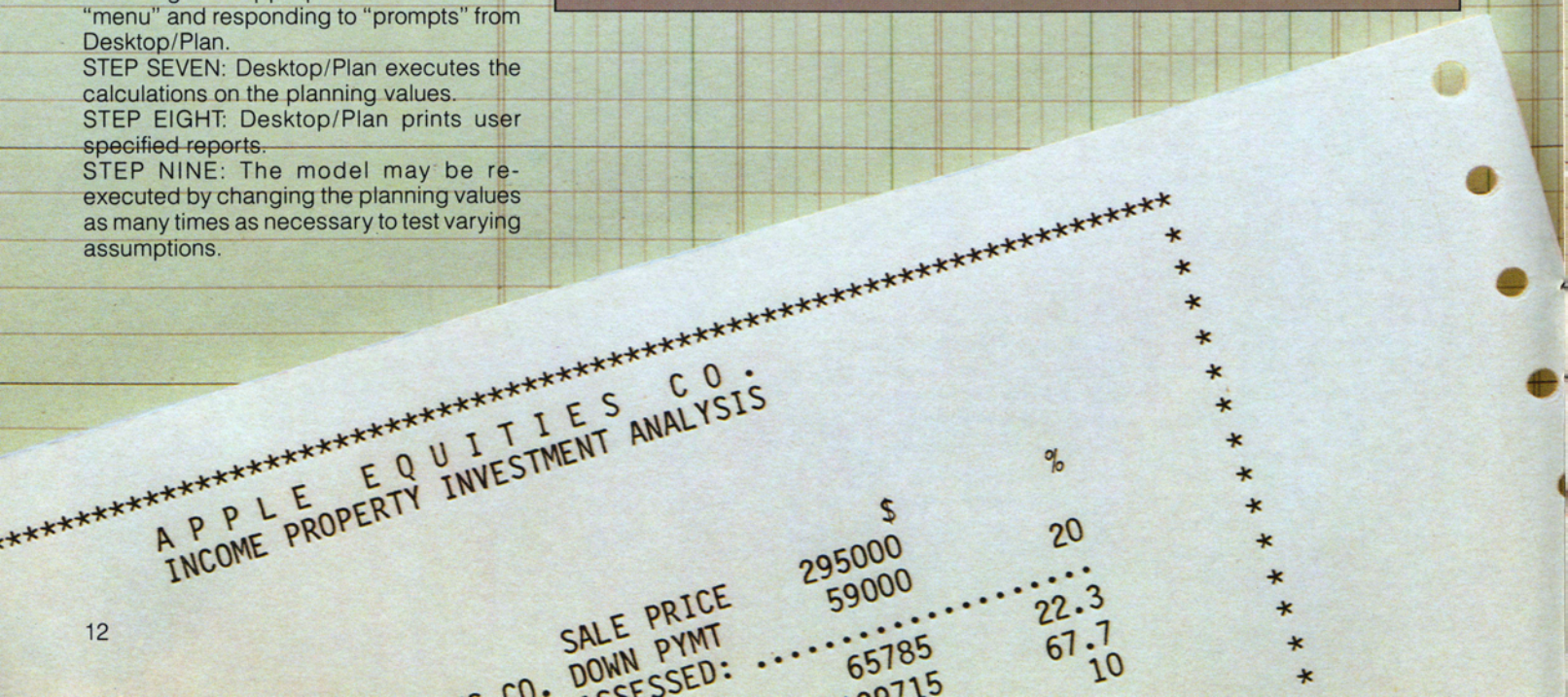
The appearance of each entry, row, or column can be individualized by formatting commands with VisiCalc. The computer remembers the formulas and calculations which have been used; any recalculation automatically changes all of the relevant formulas. Recordkeeping, recalculating, planning, and forecasting are just a few of the important applications of VisiCalc.

Because of VisiCalc's unstructured model development, templates are easily changed, rearranged, and expanded, with little preplanning by the user. All commands are executed with a single keystroke, calculator-style. The VisiCalc pro-

DESKTOP/PLAN OR VISICALC?

Select DESKTOP/PLAN when—
- —formatted reports are required
- —very large models or department consolidation of identical operating entities is called for
- —calculations are complex ("if...then"logic)
- —the "model developer" is not oriented to formulas

Select VISICALC when—
- —it is a single-use model
- —the model will only be used by the developer
- —the model is moderately-sized
- —the "model developer" is oriented toward formulas



gram is geared to someone who is "formula oriented," because algebraic statements corresponding to the calculations desired must be provided by the user.

Seeing is Believing

If you are a professional looking for software to assist in planning, analysis, and recordkeeping, see your Apple dealer for a demonstration of Desktop/Plan and VisiCalc. You'll be amazed at how quickly and easily you can put them to work.

Desktop/Plan is currently available for $100, and VisiCalc for $150. Each is packaged in a handsome, brown, leatherette binder, with an excellent step-by-step guidebook.

PROFESSIONAL PROBLEM-SOLVING WITH AN APPLE AND DESKTOP/PLAN AND/OR VISICALC

Strategic Plan Analysis
Budget Planning System
Capital Budget Planning
Cashflow Planning
Product Pricing Analysis
Job Development Estimating
Job Cost Estimating
Profit & Loss Projections
Manpower Requirements Planning
Salary/Labor Cost Planning
Balance Sheet Projections
Financial Report Preparation
Make/Buy Analysis
Sales Forecasting

VisiCalc and the Birth of a Business

There's a small start-up operation in the heart of California's "Silicon Valley." Its employees are using an APPLE II and VisiCalc software to perform analyses, develop plans, and ask a lot of "what if...???" questions.

Allen Michels, president of Convergent Technologies, has had over 15 years marketing experience in the computer industry. Although he's worked for Intel and DEC, using a computer for planning a new business venture was not his idea.

Bob Garrow, Convergent's vice president of engineering, really started it all. He recognized the benefit of using VisiCalc to develop product configurations, produce time management studies, perform cost projections, and write material specifications for Convergent's proposed product line.

VisiCalc's "what if...?" capability saved Garrow dozens of pencils, reams of paper, and—most importantly—hours of time in those initial planning stages. "I could arrange, rearrange, add, or subtract costs, parts, production time—any of my variables—and instantly be able to see the impact of any change," says Garrow.

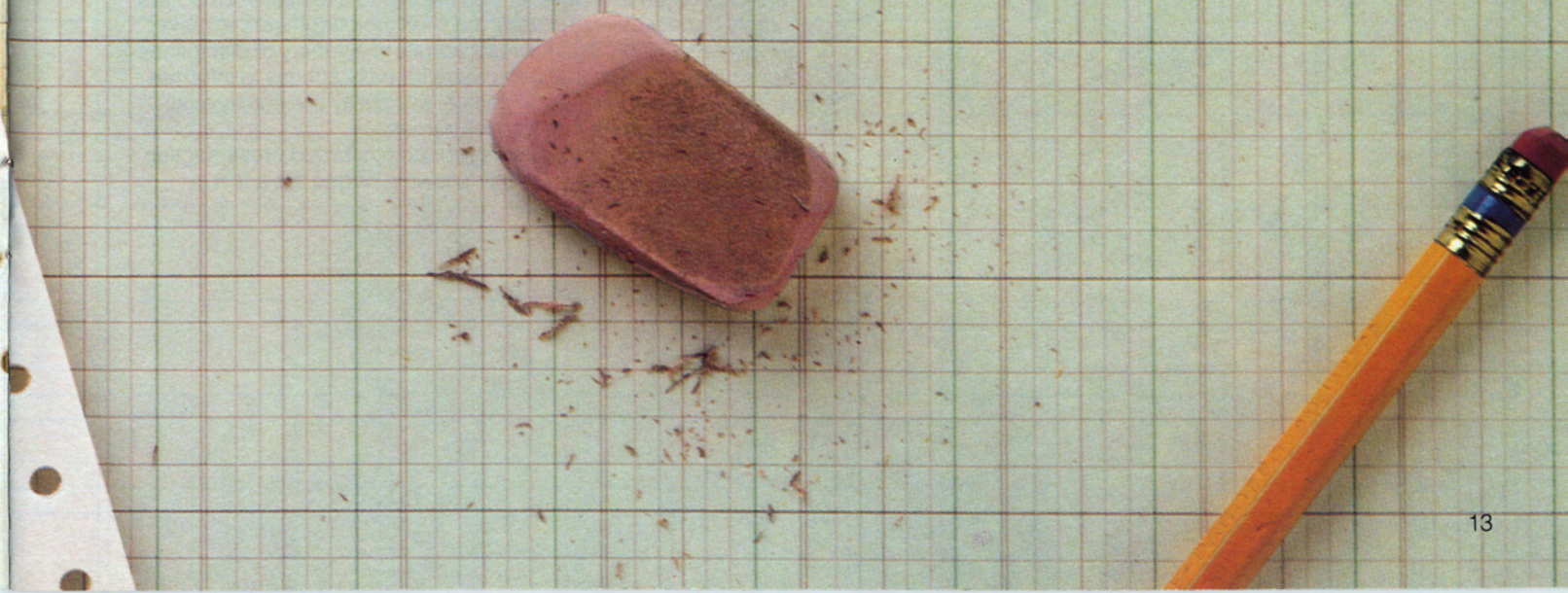
Convergent Technologies, Inc. is the brainchild of Michels, who is deeply involved with the latest developments in large scale integration (LSI) technology. Convergent Technologies' products will be microcomputer systems. These computers will be marketed internationally exclusively to OEMs (Original Equipment Manufacturers), for use in "office of the future" applications. Michels has surrounded himself with a team of highly experienced microcomputer specialists who are gearing up for first production in July of this year. The company's 38 employees recently moved to a 50,000 square foot facility in Santa Clara, California, a space ten times their original quarters.

"Our Apple computers were the first pieces we moved," says Michels. "They've proven vital in every aspect of this new operation. We have four Apple IIs now—one for general business and sales planning, one for engineering, one for manufacturing, and one for accounting.

"I must admit, I fought the whole idea until my paperwork became unbearable. I asked Bob Garrow in engineering to show me how to use the VisiCalc program, and three hours later I was doing my overall business planning on the Apple. It's been a tremendous recordkeeping tool for us, too. We keep printouts in binders, and they serve as key documents for the bank, our investors, and internal communications.

Four Apples, two high-speed printers, VisiCalc, and many disk drives have enabled Convergent Technologies to develop overall business plans and forecasts from which sales projections are made; efficiently handle sales planning, modeling, and analysis; perform engineering activities; streamline manufacturing functions including purchasing, purchase orders, inventory, expense projections, and analysis; and generate accounting procedures.

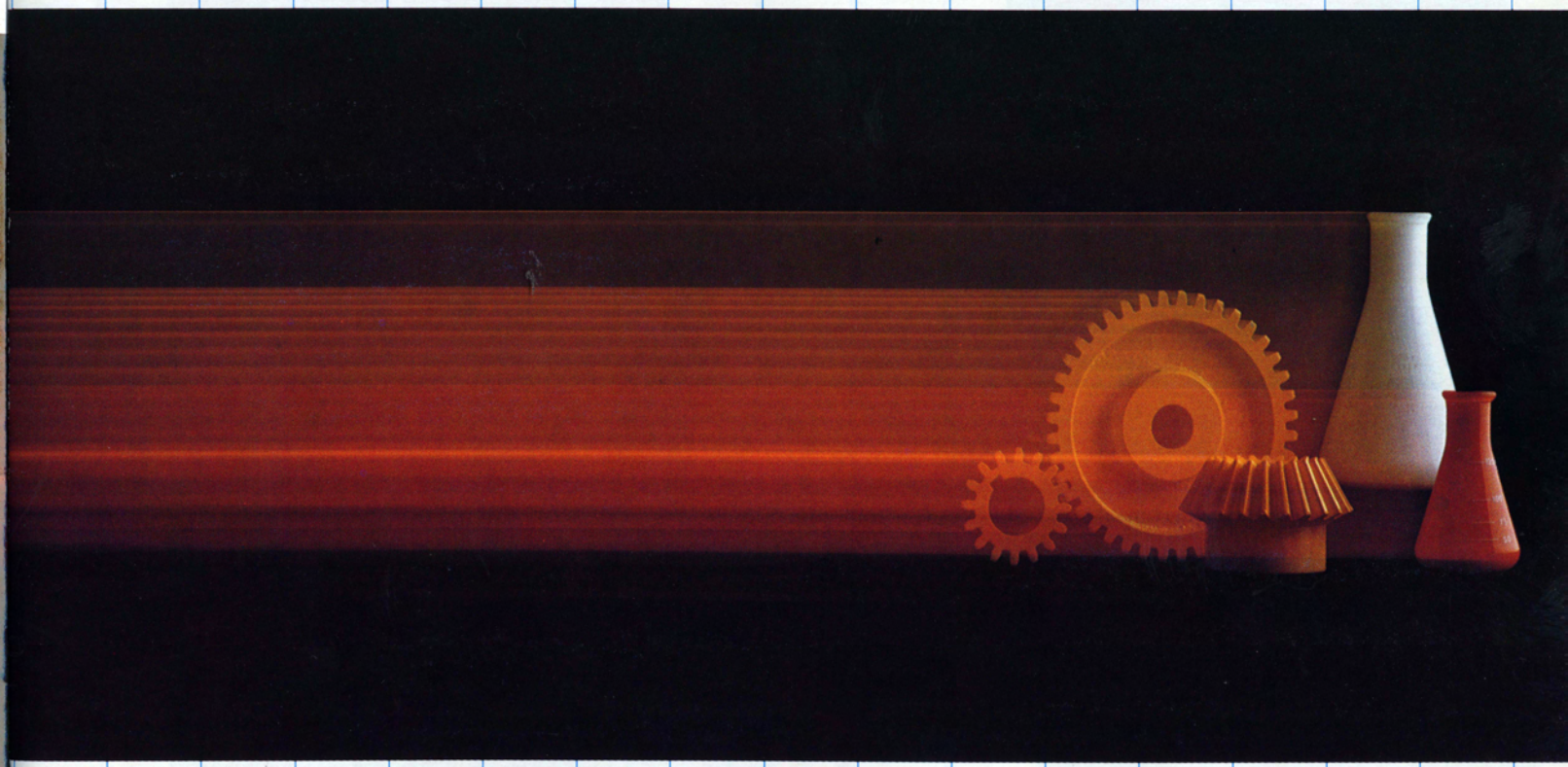
"We've paid for our Apples in time-savings alone," says Michels. "And in today's world, time is everything."



THE MICROCOMPUTER IN SCIENCE AND INDUSTRY

Electronic engineers were among the first to use microcomputers, simply because—in the early days—it took engineers to make the systems work. Today, professionals in a variety of disciplines have turned to personal computers for easy access to information; and they've found a new analytical capability previously available only with large (and costly) mainframes.

These new microcomputer users represent a broad cross-section within science and industry. On the following pages are a few examples.



Adam Reed, an electrical engineer in New York City, is dedicated to the scientific study of how man thinks. He uses an Apple computer to analyze the way a human brain controls muscle, emotion, memory, and imagination.

Reed, who teaches at the New School for Social Research in Greenwich Village, feels his investigation will lead to the discovery and definition of brain "codes."

Does his research have a practical application? Reed says it does. He suggests, for example, that teachers could use these brain codes to communicate "head to head" with students. The possibility also exists, according to Reed, that someday a computer user might be able to interact directly with the computer, simply by feeding coded messages into the system via a headset.

"THE USE OF SMALL COMPUTERS IN MEDICAL RESEARCH IS ONLY IN ITS INFANCY AT THIS POINT; AS A RESEARCH TOOL, IT IS COMING INTO ITS OWN AND WILL TAKE A BACK SEAT TO NONE."

Dale Loveridge, an engineer and Salt Lake City machine shop owner, bought an Apple computer for help with complicated trigonometry formulas that slowed his design work. After a time, he realized that his Apple could also tackle some other problems, including helping to plan tooling for new products.

The Apple, Loveridge says, has replaced an armful of calculators, papers, pencils, and charts. His engineers supply the Apple with information about a certain part from a new or old design. After performing the required math, the Apple prints out coordinates which enable a tool to follow the correct path in creating the part. Loveridge estimates this application speeds up required planning by two-thirds.

"Because of the excellent graphic capability of the Apple," Loveridge explains, "I can use a digitizer to input coordinates. The Apple then connects the points into a usable tool path. We have increased both our design efficiency and capability."

Dick Smith, an Illinois civil engineer and Apple II owner, has developed a program which computes the most effective use of subdivided land. He uses the Apple's graphics capability to lay out individual homesites, adjusting each until the total parcel is optimally utilized. In this way, he's also able to retain the land's natural contours and vegetation. Smith also uses his Apple to determine the amount of land fill or earth removal required to make an otherwise unusable site suitable for a home.

Smith has been so successful with these microcomputer applications that his company, Progressive Engineering, now sells this service to contractors throughout the state. He's also considering marketing the programs he's developed to other civil engineers.

A close follower of all this engineering interest in microcomputers is Kent Johnson of Englewood, Colorado. He edits the Engineering Computer Applications Newsletter, a publication dedicated to discussing important engineering uses of microcomputers throughout the world. These include design calculations, job and trend estimates, computer-aided design, data reduction, and inventory control.

Through his newsletter, Johnson also alerts the engineering community to the additional benefits of owning a microcomputer. "Examples that come immediately to mind are shorter job cycles, improved cash flow, and the ability to standardize engineering jobs," said Johnson. "Together with the computer's rapid problem-solving capability, that spells value to any engineer."

The scientific community, while slower to adopt the personal computer than was the engineering profession, now has a number of strong computer advocates and the list of applications grows almost daily. Medical research in particular has benefited from the ability to put easily accessed computer power at the hands of the researcher.

Dr. Patrick J. Connelly, a pathology resident at the University of Louisville, is one such enthusiast, having put his Apple computer to good use in research on endometrial cancer, a type of cancer of the uterus.

Utilizing a data base collected from 1953 to 1976 by the Uterine Cancer Registry in Louisville, Kentucky, and including all known cases of this type of cancer during that period, Dr. Connelly has used his personal computer to subclassify the data into 15 separate criteria. Out of this research is expected to come greater awareness of the factors contributing to survival, an important step in dealing with any form of cancer.

While the large data base is stored in a minicomputer, Dr. Connelly said his own system was "more than adequate for my research project." Transfer of the data, he said, was accomplished through a modem and a communications card, utilizing Applesoft BASIC.

Dr. Connelly said he believes the use of small computers in medicine is only "in its infancy" at this point and that as a research tool "it is coming into its own and will take a backseat to none."

So committed is he to the Apple that he plans to use it, with the Pascal text editor, to complete the final step of his research project: the writing of a scientific paper on his work.

"BENEFITS TO ENGINEERS IN OWNING A MICROCOMPUTER...ARE SHORTER JOB CYCLES, IMPROVED CASH FLOW, AND THE ABILITY TO STANDARDIZE ENGINEERING JOBS. TOGETHER WITH THE COMPUTER'S RAPID PROBLEM-SOLVING CAPABILITY, THAT SPELLS VALUE TO ANY ENGINEER."

While science and engineering contribute some of the more dramatic case histories to the growing number of personal computer applications, the industrial world also is finding many very practical day-to-day uses.

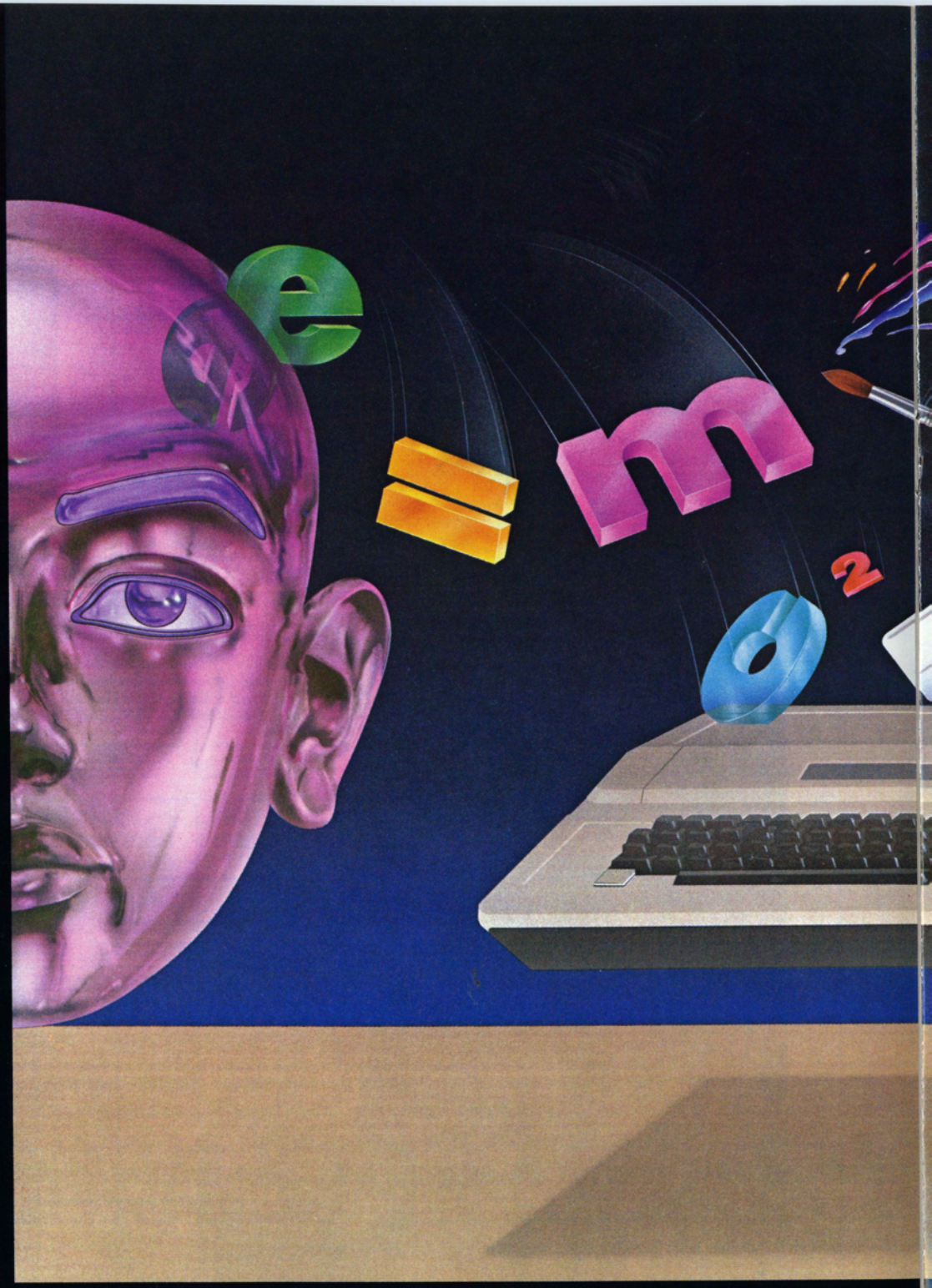
One good example is the Waterheater Division of A.O. Smith in Aurora, Illinois, which last year acquired two Apple computers for the purpose of providing daily production data inputs to a larger corporate mainframe computer. The result, according to the company, was increased efficiency and firmer inventory control.

Having bought the computers for one application, however, the company soon found other uses for it, which is a typical experience among users in science and industry. Coupling the two Apples to six dot-matrix printers, the company found it was able to generate on the order of 18,000 labels at a batch, all with sequential serial numbers for placement on the waterheaters.

Dan Roach, vice president of marketing for CONAT, the Chicago dealer who sold the Apples to A.O. Smith, said the computers are programmed as well to generate a required Federal Energy Guide, measuring about 8½ x 11 inches, which must be affixed to each new waterheater.

This application shows the cost advantage gained through the use of personal computers, since the company estimates it is saving over $800 per day on these labels, which previously were printed outside at a cost of 50 cents each.

And that's the language industry understands best.

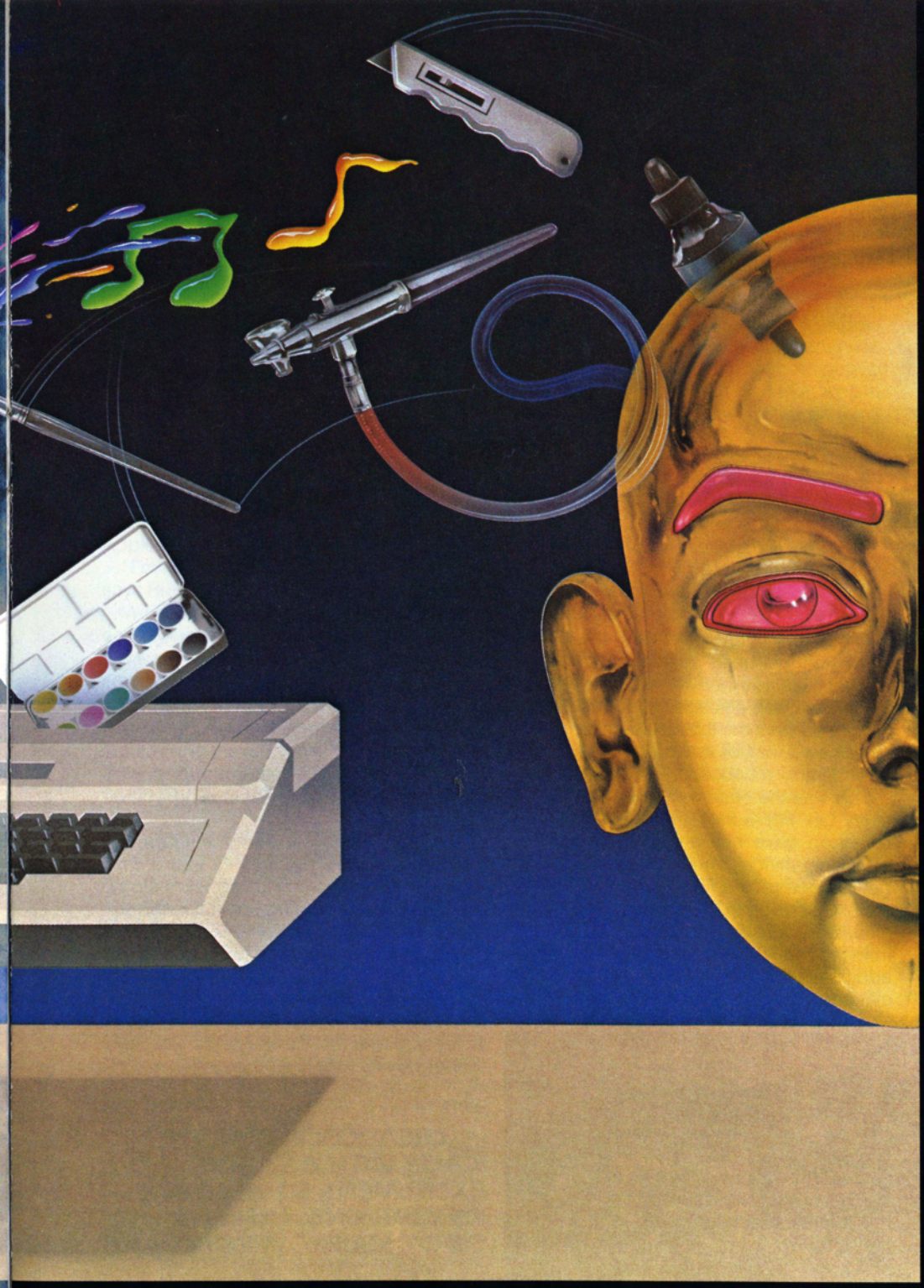


APPLE IN

BY BEV RINDFLEISCH

Considerable research has been devoted in recent years to understanding the relationship between logic and creativity in the human brain. It is generally agreed that the left side of the brain controls our logical thought processes, while the right side of the brain concerns itself with our creative processes.

The three subjects of this article draw from both sides of the brain, producing a beautiful union of creativity and logic, using their logical processes to program the Apple computer



"THE CREATIVE PROCESS IS THE PROCESS OF CHANGE, OF DEVELOPMENT, OF EVOLUTION, IN THE ORGANIZATION OF SUBJECTIVE LIFE."

—Brewster Ghiselin in
The Creative Process

THE ARTS

and their creative processes for artistic expression. While their areas of expertise differ, their creativity in each case finds expression through the Apple computer. Todd Rundgren—a popular rock music writer, performer and producer—is developing a graphics software program for the novice. Saul Bernstein, a Southern California artist, "draws into the Apple" to generate portions of record album covers, commercials, posters, and feature films. Laurie Spiegel, who has specialized in computer music for years, is now using an Apple.

"...EVERY CREATIVE ACT OVERPASSES THE ESTABLISHED ORDER IN SOME WAY AND IN SOME DEGREE. IT IS LIKELY AT FIRST TO APPEAR ECCENTRIC TO MOST MEN. A (CREATOR) ORDINARILY MUST BEGIN IN ISOLATION AND DRAW THE GROUP TO HIMSELF ONLY AS IT IS DISCOVERED THAT HE HAS INVENTED SOME PART OF WHAT THEY ARE IN NEED OF."

Ghiselin's observations certainly apply to the creative efforts of Rundgren, Bernstein, and Spiegel. Todd Rundgren is one of rock's most respected practitioners. He is a musical craftsman capable of writing, playing, performing, and producing—all successfully. Rundgren has an unflinching confidence in his own abilities—a confidence often mistaken for blind arrogance. But his attitude is a reflection of hours, days, and years of creative effort, now paying off in high-visibility, audience acceptance, and personal fulfillment.

When Rundgren was about 12, he considered becoming a computer programmer. "I was caught up with the popularity of space travel, robots, and such. But I guess my rebellious nature got the best of me, and I took off in the direction of music."

Rundgren is considered one of the best producers in the business. His clients include Grand Funk Railroad, Meatloaf, and Patti Smith. He recently completed the soundtrack for the movie *Roadie*. His progression represents a transition from early pop solo albums to progressive rock with his group, *Utopia,* to his current blend of aggressive gloss/rock.

Rundgren's latest passion is video. He's near completion of his first video production, recorded in his own state-of-the-art studio.

"It's a story with a thread of plot running through it, but there's no narrative explaining what's going on—it's all music," he says. "In the first 25 minutes, I've got 133 different scenes, all of which involve some degree of animation or synthesis."

Most people don't realize, explains Rundgren, that working in video is similar to working in audio. Both require a lot of planning, pre-production, and composition before entering the recording studio.

These pre-studio activities are where Rundgren has been putting computers to greatest use. His innovative nature and his fascination with electronics led him to find advanced systems that could help him explore new areas of audio and video composition and production.

This was the case with artist Saul Bernstein, too. His work with video tapes and television gave him an "appreciation for electronic things" and a growing "itch" to get into computers.

Bernstein began art classes at the age of nine, then went on to a Master's in Fine Art from the Otis Art Institute in Los Angeles, in addition to extensive training in commercial art.

For the past eight years, Bernstein has worked extensively with video tapes. Using an Apple computer, he has designed record album covers for Capitol Records, commercials for the National Football League, Westways Magazine, and Adidas, and worked on a feature film. Most recently, he finished a series of posters and is working on a television special with Classic guitarist Laurindo Almeida.

For the past two years, Bernstein has been working with his Apple computer and other "secret boxes" which he designed himself, to give greater dimension and more subtle innovations to his unique art style.

Laurie Spiegel has been working with a microcomputer-assisted approach to musical composition for only a short time. Like Todd Rundgren, her initial exposure was to much larger computer music systems. Spiegel had no musical training as a young child, so when she became serious about composing she was "way behind in technique, relative to those who were reading notation before they could read words." While studying conventional composition at the Juilliard School, she began also composing electronic music—first with an analog synthesizer and later with computer systems. She is currently working on the *AlphaSyntauri*™ keyboard synthesizer being developed for use with the Apple II as a performing and composing instrument.

"For many, musical instruments are intimidating," says Speigel. "I found that learning with my mind, using technology, was easier than learning conventional musical techniques where one has to work on physical reflexes for long periods of time. This has been a major attraction for me." Nonetheless, she feels a strong knowledge of traditional music is an advantage. Spiegel plays the Renaissance lute, the modern guitar and is studying piano.

"CREATION BEGINS TYPICALLY WITH A VAGUE EXCITEMENT, SOME SORT OF YEARNING, HUNCH, OR OTHER PROVERBIAL INTIMATION OF APPROACHING OR POTENTIAL RESOLUTION."

Rundgren, Bernstein, and Spiegel all share the excitement of being in the midst of creative innovation—of evolution in their fields—the end result of which probably won't occur in their lifetimes. Like the medical scientist who devotes his life to the synthesization of DNA, he may never see the results or the applications of his years of research and experimentation.

How are each of these creative in-

Alpha Syntauri is a Registered Trademark of Syntauri Ltd., Palo Alto, CA.

novators currently using their Apple computers?

Todd Rundgren bought his Apple in San Francisco while he was on tour last October. He was interested in the Apple II, mainly for its graphics capability. He was acquainted with graphics software used on the more expensive, complex systems, but wanted to explore the potential of the Apple, in light of its low cost.

When Rundgren received the Apple Graphics Tablet he worked 14 hours a day developing a program to enable the uneducated user to get the most out of the graphics screen. The program, written in Applesoft, is nearly complete.

"I'm working on final documentation," says Rundgren, "then it will be ready to go."

With the complex audio/video production taking place in Rundgren's New York studio, one wonders why he has devoted so much energy to writing this particular program for the Apple. "It's good for me to reduce my thinking to basics—and at the same time be creative. It recharges my battery and many of my production ideas come to me while I'm working on a program."

Roger Powell, the "synthesizer" for Rundgren's band, has also been using the Apple to write music.

Rundgren has interesting opinions about the future of video: "I feel the whole idea of video is constricted by certain ideas people have about it. They think it's going to resemble promo films they've seen on TV. The planning and pre-production stages need to be thought out very completely. People doing video disc now come up with ideas like, 'What if you run down a corridor of silver paper?' That's their idea for the visual of a whole song!"

Rundgren believes the video disc has already been outmoded by cable television possibilities.

"The idea of the video disc fascinates everybody so much that we talk as if it's here. But the smartest way to get the idea across is to use a medium which already exists. Cable television will offer much more accessibility to the public.

In Rundgren's constant search for new modes of self-expression, one has to guess he'll find many more uses for his Apple than even he can foresee.

When Saul Bernstein realized he had a growing urge to "draw into a computer" he started talking to friends about his dream. Most engineers he talked to said it wouldn't work. The computer scientists told him to take all the math courses he could. He tried to operate a small computer (not an Apple) with little success. But Bernstein wouldn't give up until he had achieved his goal.

"It was on one of my many visits to the computer stores that I saw color on the screen of an Apple II. I got so excited that, for Christmas, I treated myself to an Apple computer and began reading the manual. It was tough going at first, but when I got my first good drawing using the Apple Graphics Tablet, I literally started dancing around."

That was two years ago and since that time Bernstein has developed three additional "boxes" which interface to his Apple, giving him a much greater latitude for artistic expression. He especially likes "drawing" people on his Apple—and has made guest appearances for Apple, and Programma International, a software company, at the National Computer Shows in Holland, New York and San Francisco. Large crowds gather around the booth as he generates remarkable computerized likenesses of famous people as well as show attendees. His subtle blendings of color have produced beautiful likenesses of people from Einstein to singer Wayne Newton. Each image takes about two hours to generate.

What's ahead for Bernstein as he continues to mix his creative and logical processes? "I have another dream. I'm working with Pacific Video and Apple Computer people right now on using the Apple with videotape. Then, watch me take off!"

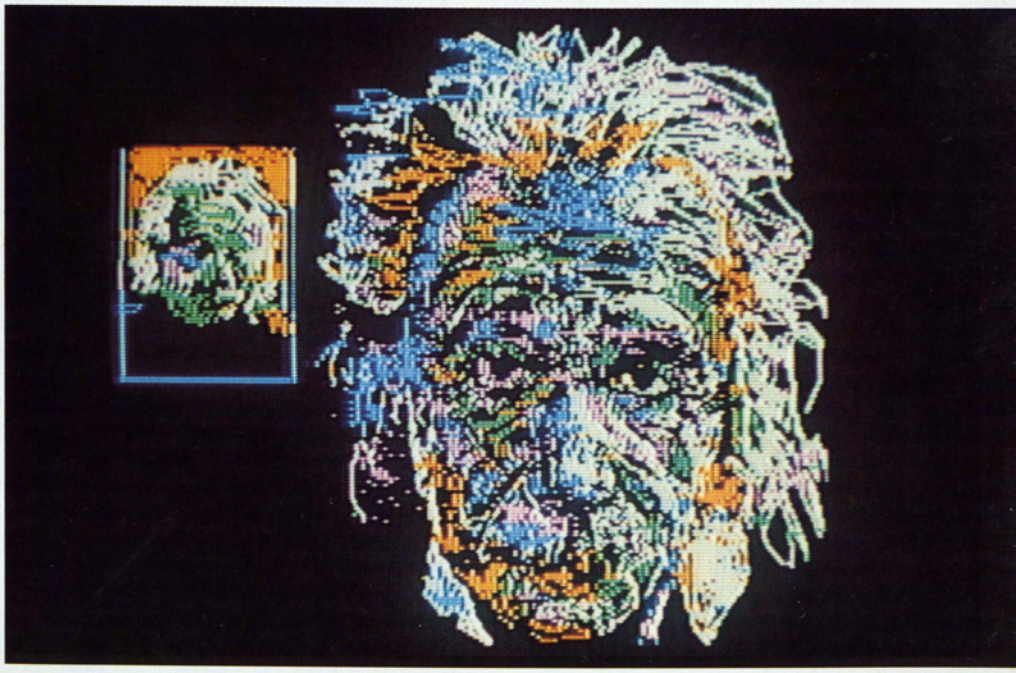
Laurie Spiegel got her Apple II last July and is using it to program complicated musical compositions. Interfaced to her synthesizer and a piano-like keyboard, the Apple gives Spiegel immediate feedback on how her composition sounds. Additionally, she can store, retrieve and edit her compositions with ease—tasks not possible with conventional musical instruments.

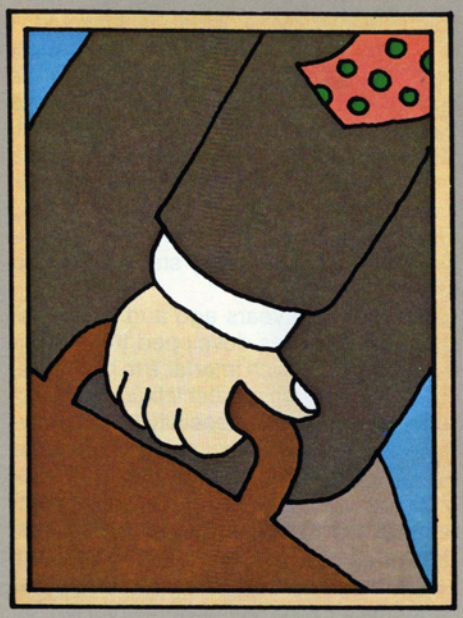
"It's a hands-on approach which allows me to enlarge, expand and refine. The creation of a complex and useful computer program relates to the writing of a complex and meaningful piece of music.

"I am using my Apple for composing and performing music and for video synthesis and generating video art, but in terms of this technology and what I'd really like to do with the Apple, it's still in the primitive stages. As long as the technology is expanding, I don't imagine its creative potential will ever be fully accomplished."

Spiegel also uses her Apple to generate images. "Since the Apple has the capability of creating images and music simultaneously, I hope to work on integrating these two art forms. I would like to be able to play and compose with images."

Our three creators share a common dream, best summed up by Laurie Spiegel: "As the microcomputer becomes increasingly available to more and more people, instead of just playing games, they will want to use machines like the Apple as a means of artistic expression. It's tremendous potential for artistic expression is just beginning to be explored."





PRO-FESSION-ALLY SPEAKING

Doctors, lawyers, accountants and other professionals have been big boosters of the personal computer and its ability to improve customer service, increase cash flow, and expedite other routine financial and administrative chores. While these tasks are still important, professional users have progressed far beyond the routine in putting microcomputers to work. In some cases, they've actually transformed personal computers into tools for their professions.

You'll read here how an ophthamologist has converted his Apple II into a diagnostic instrument for the treatment of glaucoma. Then there's the clinical psychologist, whose Apple II is "talking" to patients as part of a treatment for stress and tension.

The major significance of these new applications is that each is a further reminder of the personal computer's potential. More new markets are being developed, as microcomputer wizards continue to amaze those who, early on, viewed the personal computer only as a sophisticated toy for the computer hobbyist.

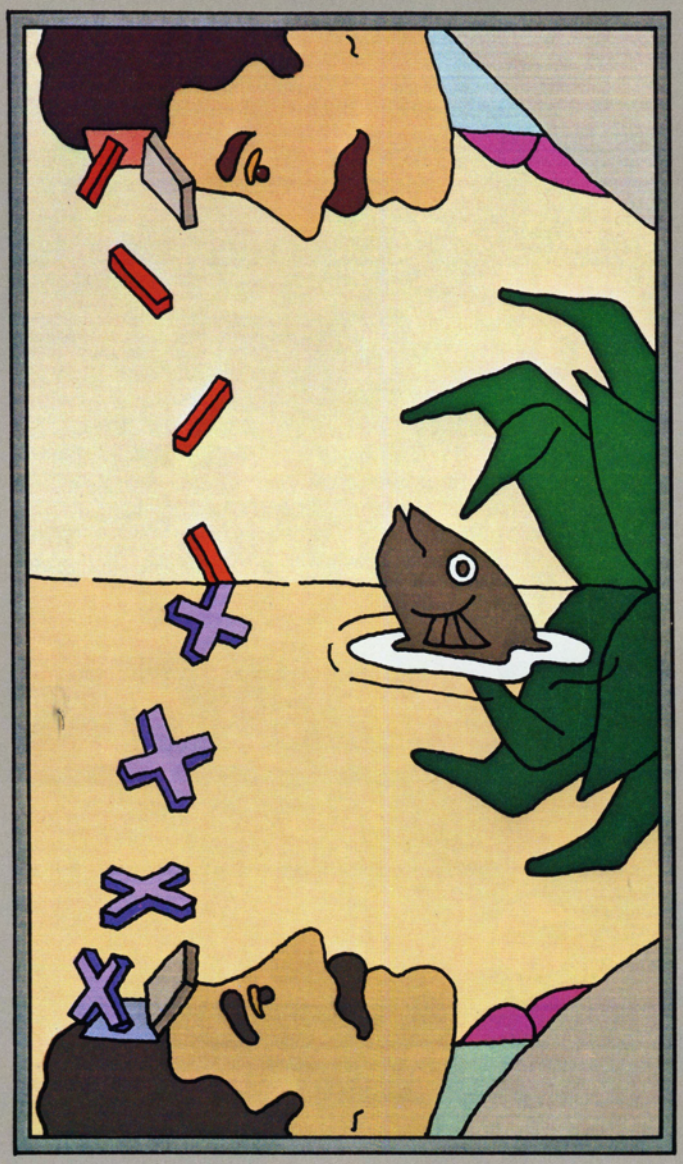
The quickest way to cure stress is to eliminate the cause. Because that's not always possible, people often turn within themselves for ways to cope with stress-related illnesses such as tension and migraine headaches.

Biofeedback has become an important clinical tool for patients who want to heal themselves. And Apple II has joined in their efforts.

The patients of Dr. Michael Rothburd, a clinical psychologist and president of the Peninsular Counseling Center in Tampa, Florida, are using biofeedback—and an Apple II—to discover how to cope with stress.

In a closely controlled clinical environment, patients use the Apple II's audio and video signals (instead of an oscillator) to determine the skin temperature of their fingertips—a reliable measure of tension. An increasingly loud beeping noise indicates a drop in fingertip temperature and an accompanying rise in tension. Patients are trained to lower the intensity of the beeping noise, increasing the skin temperature and reducing tension.

Exactly how patients are able to alter the signals by "thinking" them louder and softer isn't known. "We don't have the slightest idea how it works," Rothburd says, "but we liken it to a car's speedometer. A driver can control a car much better watching the speedometer than by relying on other things to tell him how fast he's going. The speedometer doesn't control speed, but it offers a rapid feedback to judge it.



"Biofeedback works the same way for the human mind and body. It's a rapid feedback loop which is much more sensitive than any other system we could use on an everyday basis."

The Apple's contribution to this stress reducing process is twofold. First, using a Mountain Hardware Supertalker™ and the 12-bit A/D converter he developed, Rothburd replaced the "simple, boring, and repetitive oscillator noises" with a human-like voice. A patient may hear the Supertalker report "93.6 degrees and rising", for example, instead of a beeping noise. The information is just as accurate, but much more natural.

Once the patient's session is complete, the Apple is used for data base management. Results of the session are drawn out in high-resolution graphics for review in the debriefing meeting which follows each treatment. Both doctor and patient can see the results of the most recent session and how it compared to previous ones.

After six to eight clinical sessions, Rothburd explained, most patients are able to transfer what they have learned into a tension-reducing technique for use at home or work. Rothburd's success rate is about 80 percent.

The Apple has proven a worthy assistant for treating the stress-related problems so common in today's fast-paced world.

THE MAJOR SIGNIFICANCE OF THESE NEW APPLICATIONS IS THAT EACH IS A FURTHER REMINDER OF THE PERSONAL COMPUTER'S POTENTIAL.

BIOFEEDBACK TECHNIQUES

FIGHTING GLAUCOMA

Glaucoma, the crippling eye disease that causes atrophy of the optic nerve, strikes in a slow, insidious way. For a glaucoma victim, minute changes in the structure of the optic nerve can serve as a prelude to blindness.

Dr. Michael Rumelt, an opthamologist in the St. Louis suburb of Creve Coeur, Missouri, is using an Apple II with the Apple Graphics Tablet as a diagnostic tool for monitoring the progress of his glaucoma patients. According to Rumelt, the microcomputer is an exciting new resource for measuring small changes in the structure of the eye. The Apple II Personal Computer System was his particular choice because of his need for crystal clear resolution.

"When glaucoma strikes," Rumelt explained, "the pathological changes in the optic nerve are small, yet extremely significant. If changes aren't adequately monitored and treated, total blindness may be the result.

"To begin the monitoring process, a photograph of the eye is taken and enlarged. Over a period of time, readings are made of the horizontal and vertical diameters of the optic nerve and its cup, the central area of the nerve," Rumelt said. "Normally, the cup should be less than half the diameter of the nerve. When a vertically oval elongation, called 'cupping', is detected, it's evidence of possible glaucoma.

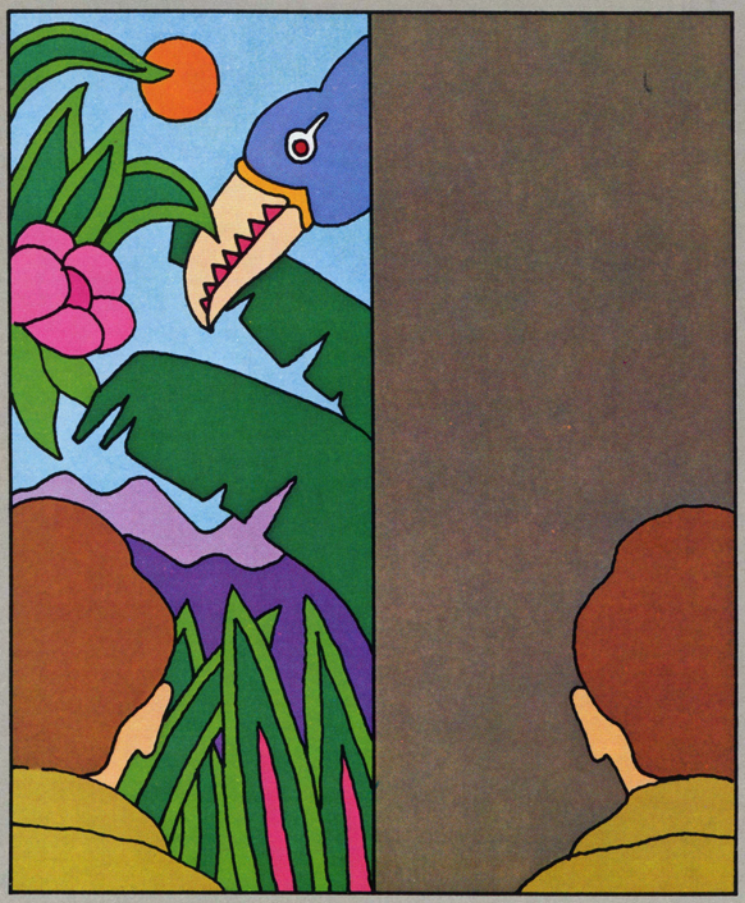
"With my Apple II and Graphics Tablet," Rumelt continued, "I'm able to save a high resolution picture of the eye on a diskette and detail any changes in the optic nerve. This gives me an invaluable record of visual field measurements."

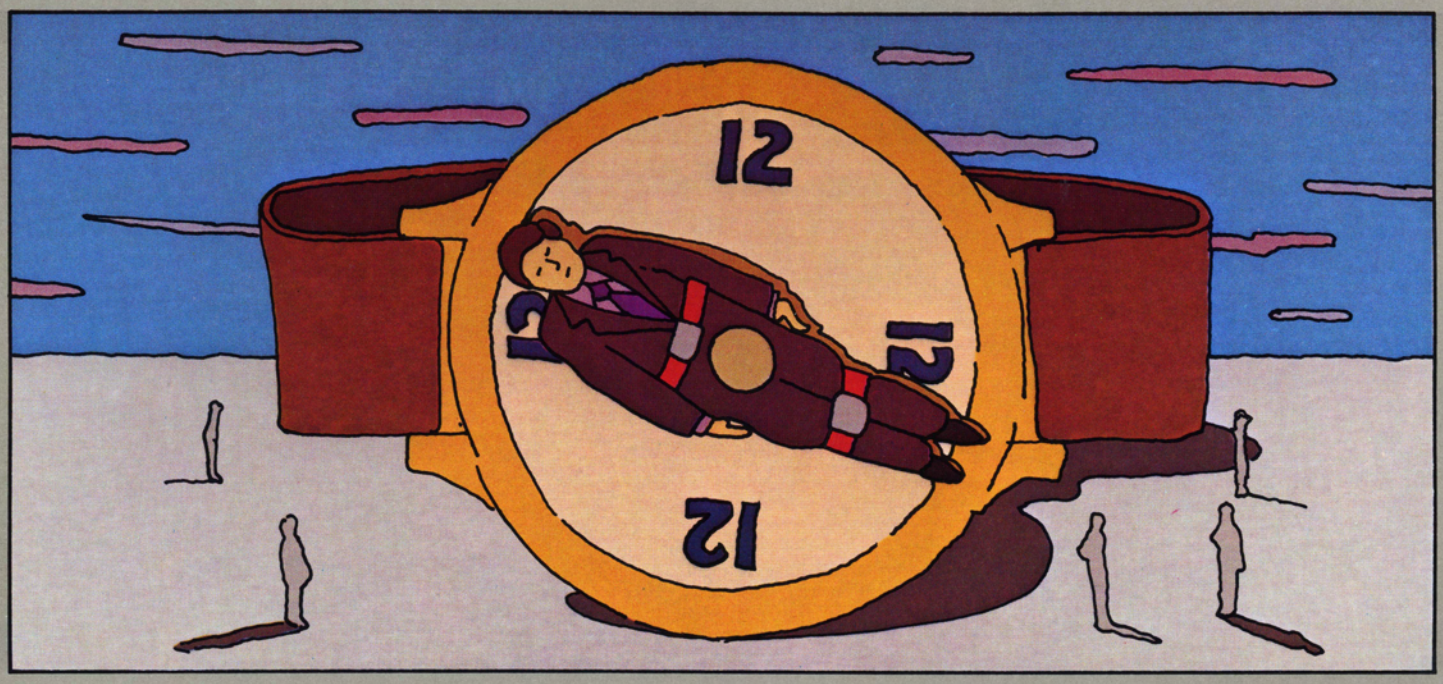
From initial examination through diagnosis and treatment, Rumelt's Apple II system has provided him with an upper hand against glaucoma. It's also enabled him to perform "endothelial analyses" of the cornea's inner layer. This work is critical in selecting candidates for an intraocular lens, the plastic lens surgically implanted in the eyes of some cataract patients.

Rumelt believes that, in the near future, microcomputers will be used to monitor other eye disorders, including tumors of the retina and iris. "The possibilities are endless," he remarked. "We'll be limited only by our own imaginations."

A strong advocate of computer technology, Rumelt is quick to share his thoughts on how to obtain the most value from a microcomputer. "Have a system in your home, read the computer magazines, and learn to program hands on," he stated.

Rumelt's accomplishments bear testimony to his words. Many of his patients now have a fighting chance against one of the nation's most serious eye diseases.





PUNCHING LIFE'S TIMECLOCK

The lowly marine organism that causes "red tide" may help solve the problem of jet lag—thanks to Dr. Robert Presswood and an Apple computer.

Presswood is a biologist and researcher at Harvard University. There, in the school's biological laboratories, he and his colleagues are focusing on understanding what causes the phenomenon of "circadium rhythms"—cycles of the biological time clocks that exist in all forms of life.

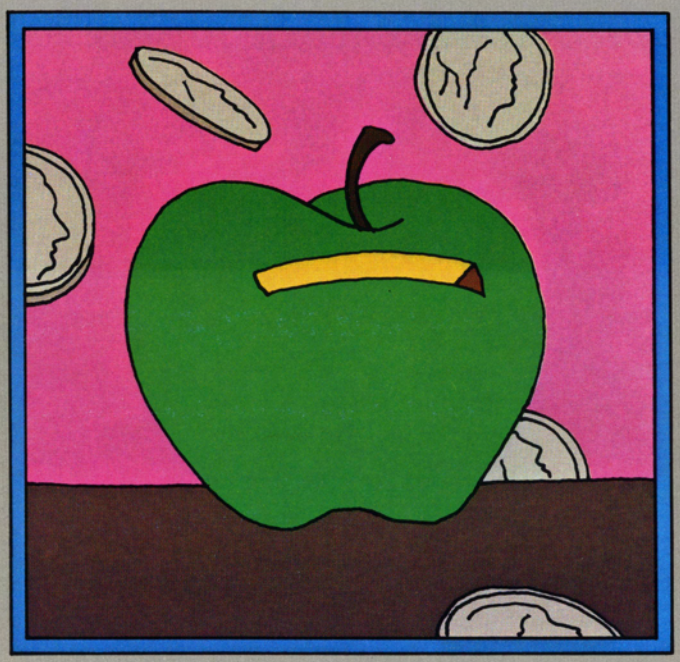
With the aid of an Apple II, Presswood's team is studying how the application of various drugs, given at different intervals, affect the organism's 24-hour rhythm of luminosity (an aspect that is easily measured). According to Presswood, once the causes of circadian rhythms are understood, perhaps they can be modified by drug therapy or other means. Using jet lag as an example, it might be possible for international travelers to find relief from "that dragged-out feeling" simply by taking a prescribed pill.

Explaining the Apple computer's role in the experiments, Presswood said that a clock in the Apple controls a mechanical apparatus that simultaneously adds different dosages of drugs, at varied intervals, to 30 samples of the organism. The Apple measures the effect these drugs have on the organism's cycle of luminosity, taking 5,000 readings per second during the 5-7 days of each experiment. The computer then examines each sample, picks the value of the luminescence, produces a histogram, and records the sample number, the time, and the value of the luminosity. The results of these experiments, which are planned to continue for a number of years, will be reported in medical journals, Presswood said.

The Apple computer system replaced the laboratory's minicomputer in March, 1979. "We are saving an enormous amount of money by using a microcomputer rather than a minicomputer — perhaps as much as a factor of five. And what's even better, we continue to find more uses for the Apple. In our study of enzymes, for example, we use a stop-flow instrument controlled by the computer, mix two substances together, and start observing the reaction a mere two-thousandths of a second later—which is how fast enzyme catalyst reactions can occur."

Presswood and his group share a far-reaching vision of the microcomputer's value to the professional biologist. "Our lab," he said, "along with one or two others in the country, is one of the leaders in laboratory computerization. The advent of the microcomputer, with its ability to perform many simple and well-defined functions, as well as to analyze and correlate data, opens up even more possibilities. In fact, we envision in the future a network of about 20 laboratories sharing access to one or two big computers. Dispersed among them would be an army of smaller peripheral microcomputers to acquire data that would be fed into the large systems. Indeed, we are already helping other labs duplicate the system we have now, both for circadian rhythm and stop-flow experiments."

"That," he said, "is only the beginning."



"BANKING" ON APPLE

John Starke, vice president of systems and planning at the Bank of Louisville, first saw an Apple computer a few years ago at a large microcomputer conference. At the time, the bank was looking for a computer system to serve its main office and 25 branches in the surrounding county.

What evolved from that conference is, today, the most extensive Apple network at work in a business environment.

Fifty-five Apples are currently installed in the bank's headquarters and its branches, to help expedite and simplify a number of vital banking activities.

"We had four main objectives in mind when we chose Apples," Starke explained. "The first was to replace programmable calculators, which we were using for computing loan figures and other related jobs. Because government regulations change so rapidly, we were constantly re-programming each calculator. It was a laborious and expensive chore."

That task became much easier with the network of Apples, Starke continued, because only those Apples at the main branch had to be re-programmed. "We gave up the more expensive calculators for the less expensive Apples," said Starke, "and we got powerful computers in the bargain."

The bank's second and third objectives for using Apples focused around further utilizing the typewriters located in each office. "By connecting them to the Apples, we instantly had another powerful capability.

"Documents such as mortgages and security agreements used to be typed at headquarters," Starke explained, "and then sent to the appropriate branch through the office mail. This often took two or three days. When corrections were necessary, the branch had to return it to the main office for revision.

"Now, using our Apples, we can transmit legal documents over the telephone lines and correct them, if necessary, in a matter of minutes. Not only is our paperwork processed more efficiently and economically, it's also more accurate."

Faster communications between its branches and the main office was the bank's fourth objective in selecting Apples. "Because many other banks in the Louisville area offer 'while-you-wait' loan approval, we turned to our Apples to expedite loan papers and speed the approval process," said Starke.

"The Apples also help our branch loan officers locate an application, determine its status, and advise the customer when final approval might be expected. Instead of communicating with people at the headquarters office, loan officers now communicate with the Apples. It's a much quicker process."

"To sum it all up," said Starke, "our Apple systems have made our operations more efficient and more competitive. As a result, our customers receive better—and faster—service."

OPERATION "GREEN THUMB"

IN SOME CASES, PROFESSIONALS HAVE ACTUALLY TRANSFORMED PERSONAL COMPUTERS INTO TOOLS FOR THEIR PROFESSIONS.

A University of Wisconsin researcher has recently completed a federally sponsored project which could lead to regional and national communication networks providing valuable information to American farmers.

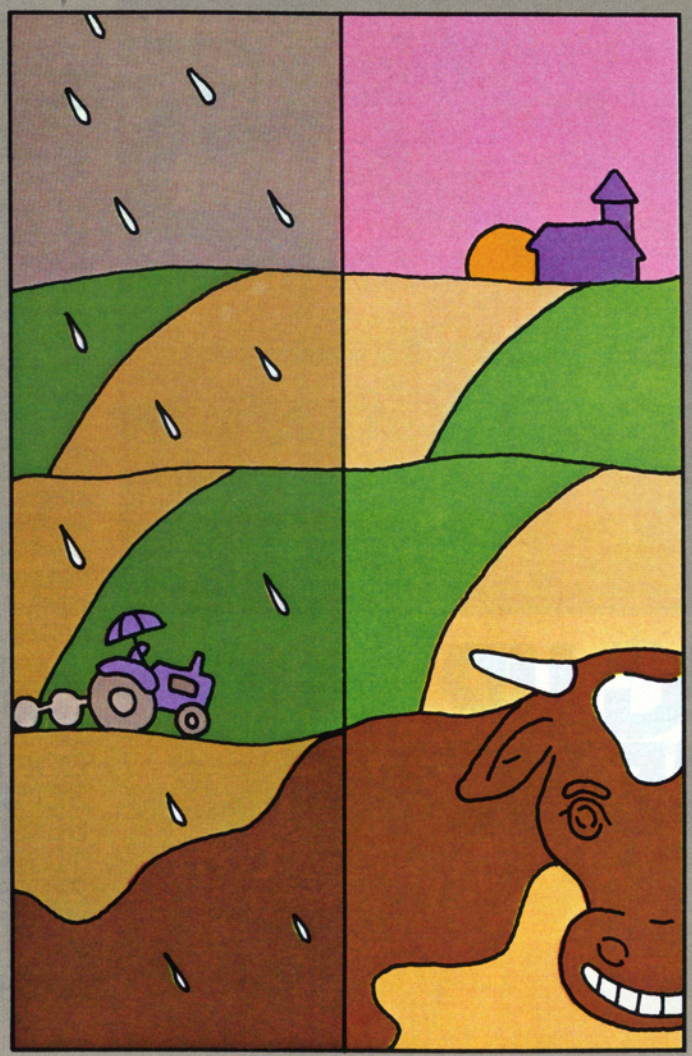
Dr. David Suchman, of the University's Space Science and Engineering Center, used two Apple IIs to test the workability of such a system and gathered indications of the local farmers' interest for such a network. The network would give farmers immediate access to such vital information as local weather (including graphic satellite displays of incoming weather systems), agricultural forecasts, market and futures reports, instructions on weed and pest management, and more.

The pilot project, dubbed "Green Thumb," was made possible by a grant from the Departments of Agriculture and Commerce. Under evaluation was the interest of the farmers in a communication network, the kinds of information most readily adaptable to such a system, and alternatives for implementing "Green Thumb" which would be economically attractive to the farmer.

The interest certainly seems to be there. The prototype system Dr. Suchman tested in Wisconsin got rave reviews from farmers. The Apple II was used to transmit and display the information.

Over 90% of those who saw the "Green Thumb" prototype in action, using an Apple, said they would be willing to pay for such a service if it were offered.

In the ideal, nationwide network, Dr. Suchman explained, "a hierarchy of computers would compile all the information of interest to the farmer from the national level down to computers located in every agricultural county in the nation. Communications from the computers would come to the farmer over the telephone line."

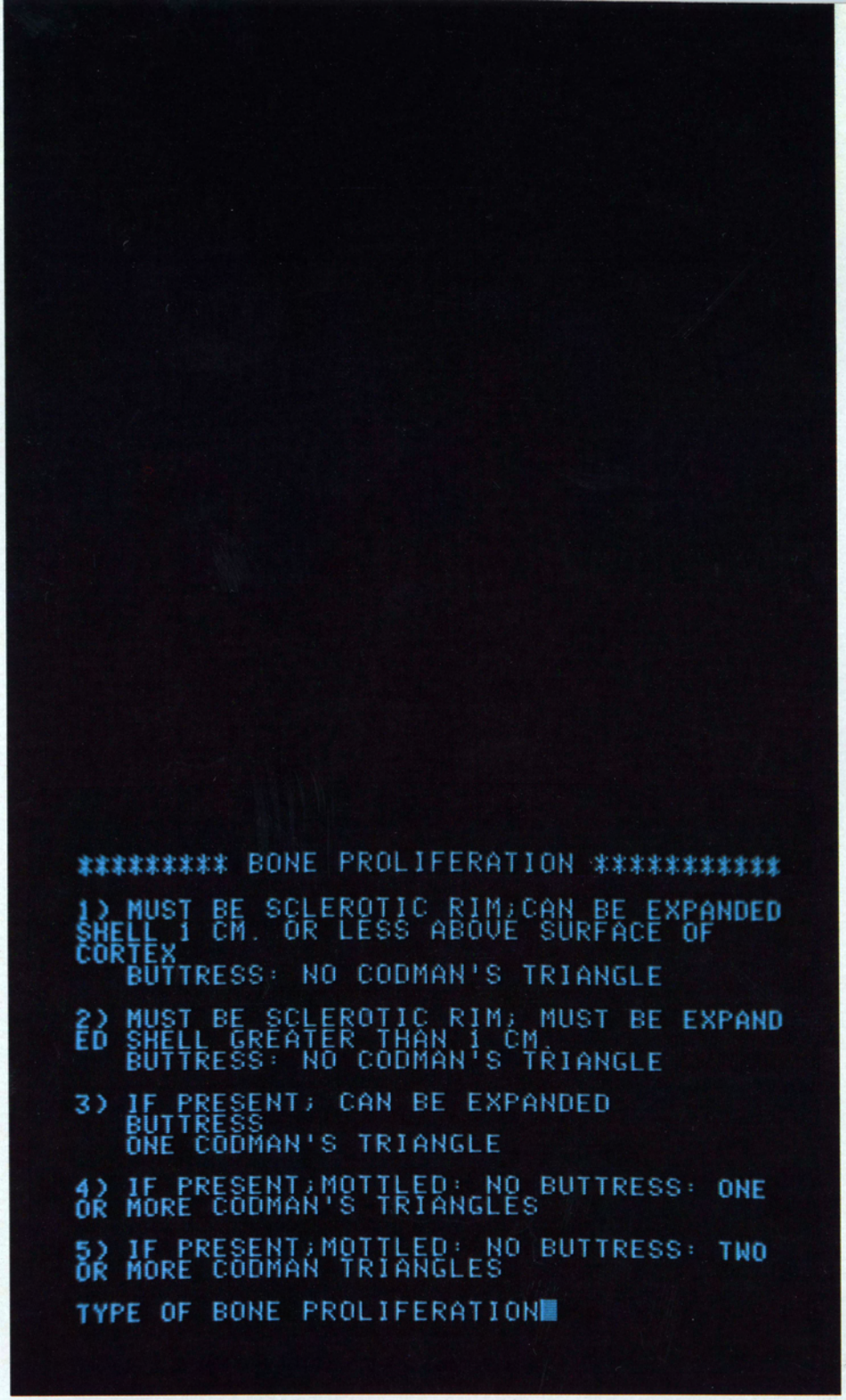


Farmers who join the network would use their computers to call up a table of contents on their home television screen or similar video display. From this listing, they could select the information most needed for that day's farming decisions. The information would be updated daily.

The Apple computer could be the type of machine used by the farmer if the network becomes operational. A less expensive "box" might be designed but, Dr. Suchman said, "we wanted to find the easiest way of transmitting the information and getting it displayed. Because the government contract called for color graphics, the Apple seemed the best way to go."

Suchman said the Green Thumb network is currently being tested by the government in Kentucky. There is also an independent network being run through Chico State University in Northern California. There, the network is partially funded by local farm cooperatives.

In addition to providing farmers with much needed weather and market information, Dr. Suchman said the Green Thumb network could eventually provide general news information in rural areas which are served only by local weekly newspapers. Another benefit to farmers, if an Apple were used, could be their ability to do their overall farming plans, scheduling, and record keeping. Farming today, after all, is big business.



KEEPING UP... WITH MEDICINE

A busy surgeon finds himself with 30 minutes to spare. He wanders down the hospital corridor to the audio-visual library, requests a diskette on surgical infection, and makes himself comfortable in front of an Apple II.

In 30 minutes—without ever leaving the hospital—this surgeon can complete a portion of his Category I requirement for continuing education.

Milliken Communications Corporation of St. Louis, Missouri, has developed an in-depth series of programs to help doctors keep up with medical developments and, at the same time, satisfy specific continuing education requirements. Currently, 37 states and several national specialty boards demand "Category I" credit, which physicians can satisfy by attending conferences and post-graduate courses, taking written tests—or interacting with the Milliken software.

Available under the general headings of surgery, medicine, psychiatry, and urology, each Milliken program offers approximately 30 minutes of Category I credit from the Department of Continuing Medical Education, Washington University School of Medicine, or the American Urological Association.

Milliken's software consists of a series of computer-based seminars which simulate conversations between the physician and a noted expert in each specialized area. During the conversation, the doctor is asked instructive questions and responds using the keyboard. After accepting the answer, the computer delivers a specific message and leads the physician through the appropriate instructional path. If the doctor demonstrates a familiarity with the concept under discussion, the computer moves on to new information.

The Milliken programs also provide a special feature. Because medical emergencies won't wait, the physician may leave the seminar at any point and return to that point (or any other one previously covered) at a later date.

MILLIKEN'S SOFTWARE CONSISTS OF A SERIES OF COMPUTER-BASED SEMINARS WHICH SIMULATE CONVERSATIONS BETWEEN THE PHYSICIAN AND A NOTED EXPERT IN EACH SPECIALIZED AREA.

More than 80 physicians from 30 medical schools have contributed to Milliken's library of 140 programs. Their material is reviewed and tested by editorial boards composed of faculty members from several medical schools.

"The dedication of our contributing physicians to this continuing education project certainly confirms the commitment to professionalism of doctors throughout our country," says Bodie Marx, vice president of Milliken.

Although hospitals are a major market for the Milliken/Apple II programs, medical schools and clinics have also welcomed this learning approach. With minimum effort by the physicians and students, programs can be ordered and scheduled—a tremendous boon to doctors with limited time to devote to the mechanics of continuing education.

Physicians in private practice are using both Milliken's software and other Apple programs. Their Apple computers not only assist them with their continuing education, but help plan their schedules, maintain patient records, and handle billing as well.

Milliken Communications, a division of Milliken Publishing Corporation, is probably best known for elementary education programs. With its new market in continuing medical education, however, Milliken is looking forward to significant growth in the software market.

"Apple II is an ideal piece of hardware for us," says Marx. "It's affordable, versatile, and sells itself once the potential user is aware of the possible applications."

The Milliken library of medical programs is so extensive that physicians can earn several Category I credits for continuing education. In the area of medicine alone, for example, Milliken offers 25 separate seminar subjects—many with two or three diskettes covering each. To earn credit, the physician must receive a completion code generated by the Apple. This code is written on a personal completion card and mailed to Milliken. The company verifies the code and has the accrediting agency send the physician a certificate of the number of hours completed.

Milliken software and Apple computers are doing their part to help physicians make room for continuing education in their demanding schedules.

RX FOR THE DOCTORS

Patient's Name: Any doctor, USA

Symptoms: Fatigued
Over-scheduled
Under-staffed
Lacking required Category credits for annual state requirement

Prescription: One Apple computer and Milliken Continuing Education software. Take as needed, anytime, any place.

Prognosis: Excellent

Two doctors have taken the "cure" and are now believers spreading the word about the Milliken software designed both to teach physicians and fulfill their continuing education requirements.

Dr. Sid Katz, a Ph.D. in Physiology and a professor at the Medical College of South Carolina, has been using Milliken software for about a year. (This was the first four-year medical school to use the Apple-Milliken package). The college's junior medical students in a surgery notations class have been divided into two groups. "Both groups receive the normal didactic work," explains Katz, "but one can also use an Apple and the Milliken material. It's too early to have any hard data, but indications are that the students using the Apple will do better overall."

Katz and two other surgeons chose appropriate programs from the large numbers of Milliken diskettes available. "The material is well written, the content is good—and the students are using it. A significant advantage is the ease with which a program can be used. With no programming experience required, a student can simply turn the equipment on and start to work. Frustrations are minimal. This type of learning is certainly a 'shot in the arm' for both the medical students and the educator."

Dr. Larry Stoneburner is an OB/GYN residing in southern California. In addition to maintaining a private practice, he is also on the clinical faculty of the University of California at Irvine. He has Apples at home and in his office, and is a faithful Milliken software user himself.

"The Milliken program is perfect for computer-assisted education," says Stoneburner. With the applications that are possible, this kind of learning can revitalize our medical community."

Stoneburner points out three outstanding benefits of the Apple-Milliken program for medical students and practicing physicians alike: 1) the ability to make better use of short segments of time; 2) the easy interaction between the user and the program; and 3) the instant reward given to the user at the completion of each diskette. A prescription for doctors? Milliken and Apple.

JEF RASKIN'S BRIEF DICTIONARY OF COMPUTERESE

By Jef Raskin

JEF RASKIN'S BRIEF DICTIONARY OF COMPUTERESE, CONDENSED

In a world electrified by repeated future shock, words refuse to stand still. This dictionary should make reading magazines, books and manuals about computers a bit easier to the newcomer. Experienced computer users will enjoy quibbling with my definitions.

The meanings given here are rarely older than a decade, even though the words themselves may have been around far longer. The normal dictionary definitions can be found, as you might expect, in a normal dictionary.

This dictionary has been expanded from my previous ones, with an emphasis on brevity. To that end, some rarely used terms and the humorous portions of previous definitions have been left out. In spite of my best efforts, however, many new words and a few strange definitions seem to have crept in. I apologize for all of these in advance, but regret none of them.

Acoustic Coupler
A device that allows electronic devices to communicate by making and listening to sounds over an ordinary telephone.

Acronym
A word made from the initial letters of a phrase. BASIC, for example, stands for "Beginners All-purpose Symbolic Instruction Code."

A/D
Analog to digital.

Address
That which designates the location of an item of information in a computer's memory.

Alphanumeric
1. Having the ability to use both numerals and letters. 2. Consisting of both numerals and letters.

Analog to Digital Converter
An interface that converts a physical measurement into a form usable to a computer.

Applesoft
A proprietary version of the BASIC language.

Array
Items of information arranged so that each one has a unique number.

ASCII
Acronym for "American Standard Code for Information Interchange." The most common form for representing characters used by computers.

Assembler
A program that translates Assembly language into machine language.

Assembly language
A relatively convenient form of machine language.

BASIC
A popular computer language, relatively easy to use.

Baud
In common use, a measure of the amount of information transmitted in a given amount of time. 1000 baud usually corresponds to about 100 characters per second.

Board
A sheet of material onto which electronic components are attached. Most computers contain a number of boards.

Bi-directional
Said of devices that send information in both directions, like a telephone. A television is not bi-directional since a viewer cannot use it to send messages to the TV station—a fact which is very lucky for the TV stations.

Binary
Numbers in base two. Instead of the ten digits we normally use, binary numbers are represented by combinations of just two digits, 0 and 1.

Bit
The smallest amount of information that can exist: a choice between two alternatives.

Branch
A computer instruction that causes the computer to depart from the normal order in which a program is executed.

Bug
An error in a program or the design or construction of a computer.

Burned-in
Tested for a considerable period of time, often at elevated temperatures. A burned-in product is less likely to fail than one that is not burned-in.

Bus (also "Buss")
The physical electrical connections and related protocols that a computer uses to communicate among its various parts.

Byte
1. A collection of bits, usually eight of them. 2. The name of a popular personal computer magazine.

Card
1. A small board (see board). 2. A punched card.

Central Processing Unit
The part of a computer that executes instructions, as distinguished, for example, from memory which stores them. Often abbreviated CPU.

Character
1. Any letter, digit, or special character (see special character).
2. The writer of this dictionary.

Chip (slang)
An integrated circuit and its package. Technically, just the active portion of the device.

Code (slang)
Anything written in a computer language.

Code (straight)
An alternate representation of a set of characters or commands. For example, ASCII code.

Command
An instruction to a computer that is executed as soon as it is given.

Compatible
Being able to work together, usually mythical when said of differing computer systems.

Compiler
A program that translates a higher level language into a lower level language.

Concatentation
Putting two things together end to end. "For" and "tune", concatenated, make a fortune.

Control Characters
Special codes typed by pressing one key while holding down another key marked "CONTROL" or "CTRL" (on most keyboards).

CPU
See Central Processing Unit.

CRT
Abbreviation for "Cathode Ray Tube." In practice, it means a TV set, or any television screen display.

Crash
To fail suddenly.

Crunch
To make information fit into a smaller space.

Cursor
A symbol placed on the screen to mark your place.

D/A
Digital to analog.
Data
Information, often with the connotation of being in numeric form.
Debugging
The process of finding and fixing errors in hardware or software.
Digital
A representation of information in terms of whole numbers or integers.
Digital to Analog Converter
An interface that converts a number into a physical quantity.
DIP
Acronym for "Dual In-line Package", the most common physical form for an integrated circuit. It looks a bit like a caterpillar.
Disassembler
A program that converts machine language into assembly language.
Disk (Disc)
A circular device on which information can be stored. This term is often (and confusingly) also used to refer to a disk drive.
Diskette
A small floppy disk.
Disk Drive
A peripheral which can store information on and retrieve information from a disk.
Display
That portion of a computer system where information is temporarily shown.
Document
(n.) A written description of a piece of hardware or software. (v.) to produce such a description.
DOS
Abbreviation for "Disk Operating System" —a collection of programs which facilitate use of a disk drive. When pronounced "doss", DOS is an acronym.
Dynamic memory
Computer memory that retains its contents only as long as the associated circuitry is active.
Edit
To make corrections or changes in a program or document.
English
An obsolescent and unclear means of signalling between two or more organisms.
EPROM
A form of ROM, the contents of which can be set by the user.
Execute
To follow the instructions given in a program.
Expression
A combination of symbols that can be reduced to a value—3+(8/2) can be reduced to 7. Expressions can deal with non-numeric items as well.
FIFO
Acronym for "First In, First Out". The way a check-out stand at a supermarket works.
Firmware
Software entombed in a ROM.
Floppy disk
A small inexpensive disk that is thin and flexible.
Flush (computer slang)
To erase information.
Format
(n.) A specification of the form in which something is to appear. (v.) To put information into such a form.
FORTRAN
A very widely used computer language. Derived from "FORmula TRANslator".
Garbage Collection
A special kind of crunch.
GIGO
Acronym for "Garbage In, Garbage Out". A computerese shrug of the shoulders.
Glitch
An intermittent bug.
Hacker
A programmer who habitually leaves projects incomplete or sloppily done. It is hard to tell a hacker from a programmer when hiring them, but very easy when the deadline arrives.
Handshaking
A kind of protocol (see protocol) in which two devices alternately send signals whose receipt triggers the next transmission.
Hard Copy
Information printed on paper or other durable surface.
Hardware
The physical parts of a computer system.
Hertz
Cycles or items per second.
Hex
Numbers in base 16. See any child who has learned "new math" for an explanation. These numbers use the digits 0 through 9, as well as the letters A, B, C, D, E, and F.
High Level Language
A computer language designed for the human's convenience independent of the computer's own language. (See Low Level Language.)
Hz
Hertz. Cycles or items per second.
IBM Card
See Punched Card.
IBM Machine
A computer. The term, like Kleenex or Scotch Tape, came to be a generic due to IBM's early dominance of the market.
IC
Abbreviation for Integrated Circuit.
Increment
To add one. Occasionally it means to add some other quantity.
Information
Data, facts, programs, ideas, music, any conceptual material whose worth resides in the arrangement of things (such as letters, electrical signals, spoken words) but not in those things themselves.
Initialize
To set up things at the beginning of a program or process.
Input
Information arriving at a device. From a cow's point of view, milk is output while from the calf's point of view it is input.
Instruction
The smallest portion of a program that a computer can execute.
Integrated Circuit
An electronic component, usually packaged as a DIP, which contains dozens to tens of thousands of microscopic electronic elements.
Interactive
Applies to computer systems that react rapidly to the user.
Interface
1. The electronic components that allow two different devices to communicate. 2. The part of a program that the user sees.
Interpreter
A program that allows a computer to directly run a program written in a higher level language, without compiling it.
Interrupt
A signal that suspends ordinary operation of a computer so that some immediate need can be handled.
I/O
Abbreviation for "Input and/or Output."
Iterate
To repeatedly execute a set of instructions.

LETTERS TO APPLE

MORE OF APPLE NO. 1 AND 2

I would like to congratulate you on your publications "Computers in Education" (Vol. 1, No. 1) and "Computers in Business" (Vol. 1, No. 2). These are two very fine magazines which cover Apple's numerous capabilities, give excellent examples, and explain applications in a clear, concise manner.

I was extremely disappointed when I learned that you were no longer printing "Computers in Education." First, because it shows Apple's interest and support in the educational market, and secondly, it has made school administrators realize the various capabilities and uses of the Apple computer in their curriculum.

"Computers in Business"...made skeptical businesses realize the many ways in which they could utilize an Apple computer. Your literature enlightened many large and small companies as to how an Apple could save them time, money and operate their businesses more efficiently ... I would appreciate hearing from you concerning Apple's future plans for these two magazines.

Susan S. Bramley
President
The Computer Store
Windsor Locks, Connecticut

Apple Answers:

Ms. Bramley was only one of many who were concerned that we quickly ran out of the first two very popular issues of APPLE. We now have reprints of each issue, which should be available from your Apple dealer.

REPRINTS?...PERMISSION, PLEASE

We are planning an educational session for our school textbook editors on the basics and uses of microcomputers. We own an Apple and will be using it for demonstrations in this sesson and for follow up workshops in which the editors will sit down at the computer and try it for themselves.

I would like to provide each participant with copies of the enclosed pages reproduced from APPLE, Volume 1, No. 1. May we have your permission to reproduce 60 copies? Thank you.

Norma Markson
Director of Editorial Training
Houghton Mifflin Company
Boston, MA

Editor's Note:

We are pleased when permission to reprint sections of APPLE Magazine are requested. It is necessary for permission to be requested in writing, giving sufficient time for us to respond. Please indicate the volume and page numbers you wish to reproduce, the quantity to be copied, and the use for which the reprints will be distributed. Address your request to: MARKETING COMMUNICATIONS, Apple Computer Inc., 10260 Bandley Drive, Cupertino, CA, 95014.

SOFTWARE ANYONE?

The directors of our Company, together with qualified personnel, are involved with the formation of a company which will formulate and market software.

It is our intention to produce programs in both Pascal and BASIC and being already part of the Building Contracting Industry, we are aware of the great potential within this sphere for specifically designed systems [for] this industry.

We have also considered the obvious potential in the sale of Apple computers, which could be marketed at the same time as the software.

Should you consider this proposal acceptable, we would welcome the opportunity of visiting your Cupertino works where we could discuss our proposals....

P.S. Ingram
Director
Stuart Henry & Co.,
Flooring Associates Limited
Birmingham, England

As Medical Director of a public health district with 77 nurses in the field, I have been active for some time preparing decision support algorithms to assist them.

Most of these programs are written on paper, but with the recent purchase of Apple computers, I am converting them rapidly to the BASIC language.

I would be willing to sign a ... disclosure for you if your group would be interested in examining some of this material for its marketing appeal.

Galen B. Cook MD FACS
Sumter, South Carolina

Apple Answers:

Apple receives hundreds of letters from people wishing to have their software programs or ideas for software evaluated for possible acquisition by Apple. We are flattered. We acknowledge the energy which has gone into most of these efforts.

When these letters are received, each one is reviewed by our SOFTWARE ACQUISITION GROUP. Most often, a letter is sent by Apple requesting that the writer send the program, along with any documentation available which will help in the evaluation process. Upon completion of Apple's extensive evaluation, the writer is sent a follow-up letter as to the status of the program. If the program is not accepted for publication, all materials are returned.

Two critical areas of evaluation are considered: the technical stature of the program, and the marketing viability of the program.

To insure a prospective program will be valuable to users, and that the software can be implemented, it must meet Apple's standards. These standards are based on the criteria demanded by Apple users, based on past experience in the marketplace.

From a marketing standpoint, each program is evaluated in the areas of market impact, user interface, and the additional cost to Apple to bring the program up to Apple's standards for publication.

All inquiries are held in the strictest of confidence. Apple has a non-disclosure form they will sign and mail to the company or person whose program is being evaluated. We are especially interested in reviewing programs in the three areas of our main marketing thrusts: 1) education 2) business and 3) science and industry.

Please address your letters requesting software review to: APPLE COMPUTER INC., Product Marketing, Software Acquisition Group, 10260 Bandley Dr., Cupertino, CA, 95014.

APPLE AT A GLANCE

A Summary of Apple Products

TABLE OF CONTENTS

The following is a mini-catalog of Apple products. For more detailed product information and specifications, visit your local Apple dealer. Ask him for the latest copy of Apple In Depth, a complete reference guide to Apple products. Suggested retail price is $3.00.

APPLE AT A GLANCE

PERSONAL COMPUTER SYSTEMS

APPLE II

Apple IIs are typewriter-sized tools that can make working more productive, learning more exciting, and leisure time more creative. Their built-in BASIC language (Applesoft Floating-Point BASIC in the Apple II Plus, Integer BASIC in the Apple II), makes it easy to create programs that do things for you. Color and sound capabilities keep your interest (and the kids', too); and 48K bytes internal memory capacity means your Apple can handle sophisticated business and scientific tasks. Eight accessory slots let the system grow with your needs.

APPLE II SOFTWARE BANK

Apple and more than 170 other companies offer programs for use with your system. Whether you're looking for help with accounts receivable records or a new type of entertainment, you'll find it in the Apple Software Bank. And just as important—you'll find the documentation you need to get started quickly, even if you've never used a computer before!

THE CONTROLLER
Small Business Management and Accounting

The Controller helps a business manager handle his General Ledger, Accounts Receivable, and Accounts Payable computer software. Designed for non-technical people, it easily maintains the ledger, and customer and vendor accounts of many small businesses. The Controller helps control cash flow, reduces paperwork, eliminates "catch-up" accounting, and provides concise summary reports that allow managers to make better decisions.

The Controller is packaged in an attractive 3-ring binder with a manual and diskettes. It requires 48K RAM, dual disk drives, Applesoft BASIC language, and Printer IIA.

THE CASHIER
A New Concept in Store Management

The Cashier simplifies a retailer's job by monitoring inventory levels and creating sales documents. It processes backorders, down payments, and refunds, and can manage an inventory of more than 800 stock numbers. Transaction and customer account information is automatically used to generate sales receipts, billing records, mailing lists, and accounting summaries. The result is better control of inventory, resulting in reduced shrinkage.

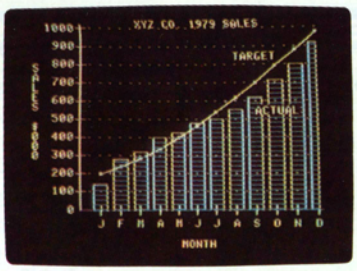
The system is packaged in a binder with a manual and diskettes. It requires 48K RAM, dual disk drives, Applesoft BASIC language, and Printer IIA.

APPLE WRITER
Text Editing Made Simple

Apple Writer helps you create and edit memos, letters, even a novel. You can enter text, save and insert segments from a diskette, and search the document to replace letters, words, or phrases automatically. An optional printer puts your thoughts on paper, letter-perfect every time.

Apple Writer is packaged with a manual and program diskette. It requires 48K RAM and one disk drive. For printing documents, a printer and interface are necessary.

APPLE AT A GLANCE



APPLE PLOT
"Charting" the Way

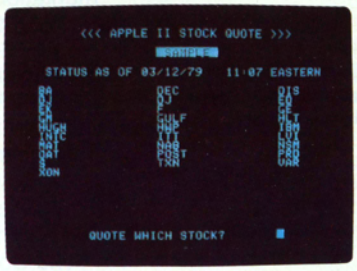
Apple Plot helps you turn any information (from sales and stock activities to caloric intake and miles per gallon), into dramatic, comprehensive bar, line or scatter charts. The program allows you to update and change information as needed, and to label the charts exactly as you wish. Add a printer, and you can put your graphs on paper for presentations or later analysis.

Apple Plot is packaged with a manual and program diskette. It requires 48K RAM, Applesoft BASIC language, and one disk drive. For printing charts, a printer and interface are required.

APPLE POST
Mailing List Maintenance the Apple Way

Apple Post helps you create and use mailing lists of up to 500 names and addresses per diskette. It allows for easy entry and editing, and can print customer lists or actual labels by name or zip code. Apple Post even lets you locate names and phone numbers quickly, and uses a unique "phonetic search" feature when correct spelling is not known.

Apple Post is packaged including a manual and program diskette. It requires 48K RAM, 2-6 disk drives, Applesoft BASIC language, and Printer IIA.



DOW JONES SERIES: PORTFOLIO EVALUATOR
The Stockmarket at Your Fingertips

Get the most from your stock investments. Use Portfolio Evaluator to maintain up to 50 stock portfolios per diskette, analyzing each for short and long term gains and losses, and current values.

The Portfolio Evaluator is packaged including a manual, program diskette, and Dow Jones News Retrieval Directory. It requires 32K RAM, Applesoft BASIC language, and one disk drive. For printing portfolios, a printer and interface are required.

SHELL GAMES
An Entertaining Approach to Learning

The Shell Games is a library of teaching aides for the home or classroom. Starting with an introductory color cartoon called "The Animated Apple", selection expands to include matching, multiple choice, and true/false quizzes on a variety of subjects. The Shell Games also contains an editor, so you can create your own quiz problems to place in each "shell." (You don't have to be a programmer.) In a few short minutes, you can enter a complete set of questions into any one of the three quiz programs; revisions can be made just as quickly.

The Shell Games is packaged with a manual and program diskette. It requires 48K RAM, the Integer BASIC language, and one disk drive.

APPLE II LANGUAGE LIBRARY

APPLE PILOT
The Teacher's Aide (available early third quarter 1980)

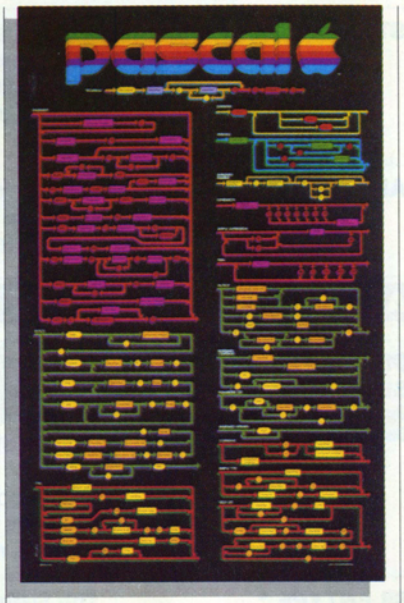
Apple PILOT is a powerful system for the courseware author. Without becoming a programming expert, you'll quickly become proficient in developing courseware for your particular classroom needs. And your student users will learn more, too, because Apple PILOT lets you offer much more than simple language capabilities. Color graphics, sound effects, and a character set editor encourage you to build around words, pictures, and sounds.

Apple PILOT is packaged with a manual and program diskettes. It requires 48K RAM, DOS 3.3 or the Apple Language System, and one or two disk drives. For printing lessons, a printer and interface are required.

APPLE PASCAL
The Powerful, Flexible Language

Apple Pascal, is one of the most sophisticated, structured programming languages available on a small computer. Its advanced capabilities boost program performance and cut software development time for large business, scientific, and educational applications.

Apple Pascal is packaged with the Apple Language System. It requires 48K RAM (giving the Apple system 64K after Language Card installation), and one disk drive (up to six drives are supported).



APPLE FORTRAN
For the FORTRAN Programmer
(available early third quarter 1980)

FORTRAN is a powerful programming language for mathematics, engineering, and scientific applications. Apple FORTRAN is the ANSI Standard Subset of the recently-defined FORTRAN 77, with many enhanced features and capabilities. The package is supplied and documented for those who are already familiar with the FORTRAN language, so that they may develop, modify, and use FORTRAN programs on an Apple II.

Apple FORTRAN is packaged with a manual and program diskettes. Apple FORTRAN requires 48K RAM, the Apple Language System (which increases RAM to 64K), and one disk drive (although two drives are recommended).

APPLESOFT AND INTEGER BASIC
How to Program an Apple Without Really Trying

When you purchase an Apple II, you buy more than hardware—you receive a built-in programming system as well. This "firmware" makes it easy to create interesting and useful software, even if you've never programmed before. In the Apple II computer, the resident firmware is Integer BASIC; in the Apple II Plus, it is Applesoft Extended Floating-Point BASIC. Both are versions of the very popular BASIC programming language.

OPERATING SYSTEM

DOS 3.3
The Apple Disk II "Housekeeper"
(available third quarter 1980)

DOS 3.3 helps you take advantage of your Disk II Floppy Disk Subsystem by keeping track of files, saving and retrieving information, and performing a variety of other "housekeeping" chores. If you are using a previous version of DOS (e.g., DOS 3.2.1), you'll need the DOS Update Kit (available third quarter 1980), which boosts the capacity of older disks to 143K bytes to accommodate the new software.

DOS 3.3 will be packaged with all Disk IIs with controller card and includes a manual and appropriate diskettes. (Your system must have at least 32K RAM to support a Disk II drive and DOS 3.3.)

PERSONAL AND ENTERTAINMENT SOFTWARE

CHECKBOOK

Maintains check records, including the date, amount, recipient, and classification code for each check. It allows records to be saved, sorted, searched, and displayed. Trial balances can be run and the account can be reconciled against a bank statement. Requires 16K RAM and Integer BASIC; available in cassette tape only.

MICROCHESS

Try your skill at this ancient game of strategy. Plays at eight levels of skill, so you're always evenly matched. Requires 16K RAM and Integer BASIC for tape; 32K RAM and Integer BASIC for diskette.

STELLAR INVADERS

You're being attacked by alien invaders! All that stands between you and them is your "tank." While the aliens are dropping bombs, you must fire at their ranks and destroy them before they destroy you. Requires 48K RAM, either Applesoft or Integer BASIC, and one disk drive.

APPLE BOWL

Enjoy this realistic simulation of a bowling alley. You control the ball; Apple keeps the score. Requires 16K RAM and Integer BASIC for cassette tape; 32K RAM and Integer BASIC for diskette.

ACCESSORIES

DISK II FLOPPY DISK SUBSYSTEM
Dynamic and Versatile Data Storage

Disk II expands the capability of your Apple II through the use of flexible, or "floppy," disks for data storage. Extended data storage capacity, fast data retrieval speed, and random access to stored data—all of these, and more, are available through the Disk II Subsystem.

Disk II comes with or without controller card. It is packaged with the current version of DOS (Disk Operating System) and a complete manual. A minimum of 32K RAM is required to support Disk II.

SILENTYPE™ THERMAL PRINTER

The Silentype is a quiet, versatile, and compact thermal graphics printer. It offers increased flexibility over other printers in its class because it receives both its power and intelligence from your Apple computer. With a few simple keystrokes, you can change margins and line spacing, specify printing intensity, even print finely detailed charts and graphs. It's the right choice for clear, readable, draft-quality hardcopy.

The Silentype is packaged with its own interface card, a roll of heat-sensitive paper, and manual. A minimum of 16K RAM is required to support the Silentype.

INTERFACE CARDS
Intelligent Interfaces to Expand Your Apple System

Apple provides four intelligent interface cards to expand your Apple system.

The Serial Card allows an Apple computer to exchange data with computers, printers, and other devices in serial format (one bit at a time). It is intended for use (in place of the Communications Interface Card) in applications that use data rates other than 110 or 300 baud, and that involve serial printers that don't require "handshake

The Communications Card allows you to connect an Apple to modems, CRT terminals, and other devices employing a serial RS-232C interface. The card's built-in intelligence lets you control these devices easily, in BASIC.

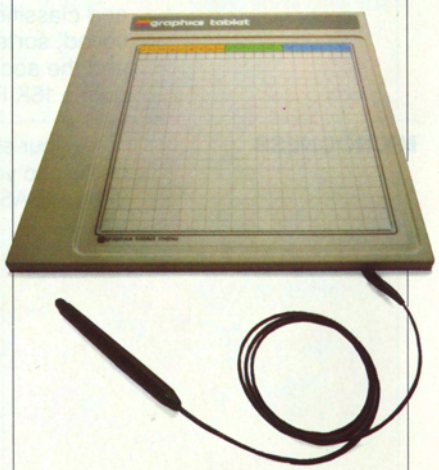
The Parallel Card lets you generate reports, listings, labels, and letters with your Apple, using a variety of parallel-interfaced printers.

The Centronics Card, a special version of the Parallel Interface Card, is available for use specifically with the Centronics 779 printer.

GRAPHICS TABLET
Creative Electronics for the 80s

The Graphics Tablet is an image input device that allows you to enter pictorial information directly (by sketching or tracing). Powerful software provides a comprehensive set of menu-selectable functions.

The Graphics Tablet is packaged with its own interface card, connecting cable and stylus, control firmware in ROM, and software programs on diskette. It requires 48K RAM, Applesoft BASIC, and one disk drive.



EXPANSION OPTIONS—GROWING YOUR APPLE SYSTEM

THE APPLE LANGUAGE SYSTEM

This system provides Apple users with the powerful Pascal language, as well as the Integer and Applesoft BASIC interpreters. It does this by means of the Language Card, which provides 16K of RAM memory that electrically replace the ROM firmware built into each Apple. This technique gives Apple II owners access to all available languages, as well as the hardware needed to run future language processors as they appear.

The Apple Language System is packaged with the Language Card, Pascal and BASICS diskettes, and manuals. It requires 48K RAM and one disk drive.

APPLESOFT FIRMWARE CARD

This card provides access to a library of programs written in this extended BASIC language. It contains hardware and software controls that allow it to electrically replace the existing Integer BASIC firmware in Apple II computers.

INTEGER BASIC FIRMWARE CARD

This card provides access to a library of programs written in the Integer BASIC language. It contains hardware and software controls that allow it to electrically replace the existing Applesoft BASIC firmware in Apple II Plus computers.

16K BYTE EXPANSION MEMORY MODULE (RAM)

This module allows user memory expansion in 16K byte increments for any 16K or 32K Apple II computer. The module contains eight RAM devices, installation instructions, and a test program to insure that installation was done properly.

EXPANSION OPTIONS ADDENDUM

Many companies offer both hardware and software products compatible with Apple II computer systems. The products listed below are manufactured by others, but may be ordered from Apple through Apple Authorized Dealers.

MODEM IIB
(Novation CAT)

Modem IIB extends the power of your Apple II by allowing it to tap the resources of timesharing services, computerized bulletin boards, or your office computer from the comfort of your home. The Modem IIB package consists of an acoustic coupler (modem) and the Apple Communications Interface Card.

PRINTER IIA
(Centronics 779)

Printer IIA is a medium-speed impact printer for home and business applications. It prints 80 to 132 (5x7) dot-matrix characters per line, at 60 characters per second. Printer IIA is supplied with the Centronics Printer Interface Card, cable and connector, operating documentation, and warranty.

CLOCK/CALENDAR CARD
(Mountain Hardware)

This plug-in card provides a 388-day calendar and clock, with resolution to 1/1000 second. A built-in rechargeable battery keeps the clock on time up to four days without system power, and external batteries may be used for longer periods. Supplied with complete operating instructions and rechargeable battery.

MONITOR II
(A variety of 9″ monitors will be supplied)

This 9-inch (diagonal) video monitor is the ideal display for the Apple when color output is not required. It sits neatly on top of the computer, and provides a very clean and sharp picture. It accepts direct video input from the computer. Supplied with cable adapter and documentation.

APPLE AT A GLANCE

APPLE III PROFESSIONAL COMPUTER SYSTEM

Apple III is a professional, desk-top computer system designed for sophisticated business application needs. Its outstanding, built-in hardware includes a 143K byte Disk III drive; a calculator-style numeric key pad; a clock/calendar card; and two interfaces—serial and Silentype Thermal Printer—for easy, economical system expansion. Additionally, an optional 12", black and white, high resolution video monitor is available to complete the system.

The Apple III is offered in specific configurations to meet your requirements.

THE APPLE III INFORMATION ANALYST

The Apple III Information Analyst tackles the time-consuming tasks of budget development, forecasting, scheduling, pricing, return-on-investment, projections, time value of money calculations, and other activities. You can ask "What if...?" as often as you wish, to solve thousands of different problems. The Apple III Information Analyst offers work saving features that make it the most powerful, easy to use timesaver available.

THE APPLE III WORD PROCESSOR

The Apple III Word Processor has been human-engineered from the ground up for full function word processing. Its state-of-the-art features rival those of systems selling for $10,000 and more. With its extensive editing, formatting, and printing capabilities, the Apple III Word Processor is the last word in personal computer word processing.

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035-0010-00

Printed in USA