BIO

William Gates III

At 34, the software satrap
### is working on his third billion

By Ed Zuckerman

Bill Gates doesn't like to waste time. He has posted a map of Africa on the wall of his garage so his eyes can sweep over it while he's getting in and out of the car. "Your mind has a lot of bandwidth that's very unused when your eyes are wandering around," he explains. For a while, a couple of years ago, in an effort to improve the fine-muscle coordination in his wrist—and thus his tennis game— Gates practiced writing nonsense words with his right hand (he's a lefty) as he sat in meetings. "There are lots of times during the day when I can do it without wasting any mind-cycles," he explained.

In 1974, when the world's first commercial microcomputer was unveiled in a hobbyists' magazine, Gates and his boyhood friend Paul Allen immediately saw the potential of the thing, and Gates dropped out of Harvard at age 19 to co-found the world's first microcomputer software company.

All these efforts have paid off. Gates's tennis game improved. He is mastering African geography. And his stock in the Microsoft Corp., of which he is chairman and chief executive officer, is worth $2.5 billion. A phenomenal burst of growth has taken the company from 38 employees in 1980 to some 5,000 today, and due to Gates's generous stock option program, a number of his workers are paper millionaires.

Few of them put in longer hours than the boss. Gates has happily devoted his life—in year after year of seven-day weeks and 15-hour days—to building Microsoft from a shaky student venture into a billion-dollar-a-year giant. A brilliant programmer, he wrote key portions of early Microsoft software and still spends much of his time with company programmers, critiquing their work and contributing his own ideas. But unlike such other computer whiz kids as Apple's Steve Jobs and Mitch Kapor of Lotus, who were not entirely comfortable in the corporate world, Gates is also a masterful business strategist. In the early days of the PC industry, when companies were opening and folding daily (12 of his initial clients went bust), Gates's conservative administration kept Microsoft solvent, with enough surplus cash to finance its own growth. Gates also forged a series of alliances with computer hardware manufacturers, most notably IBM, that gave him a powerful role in shaping—and getting a big share of—the microcomputer software industry.

Today Microsoft's MS-DOS ("disk operating system"—the program that controls a computer's basic functions) is used with 50 million IBM-compatible desktop com-
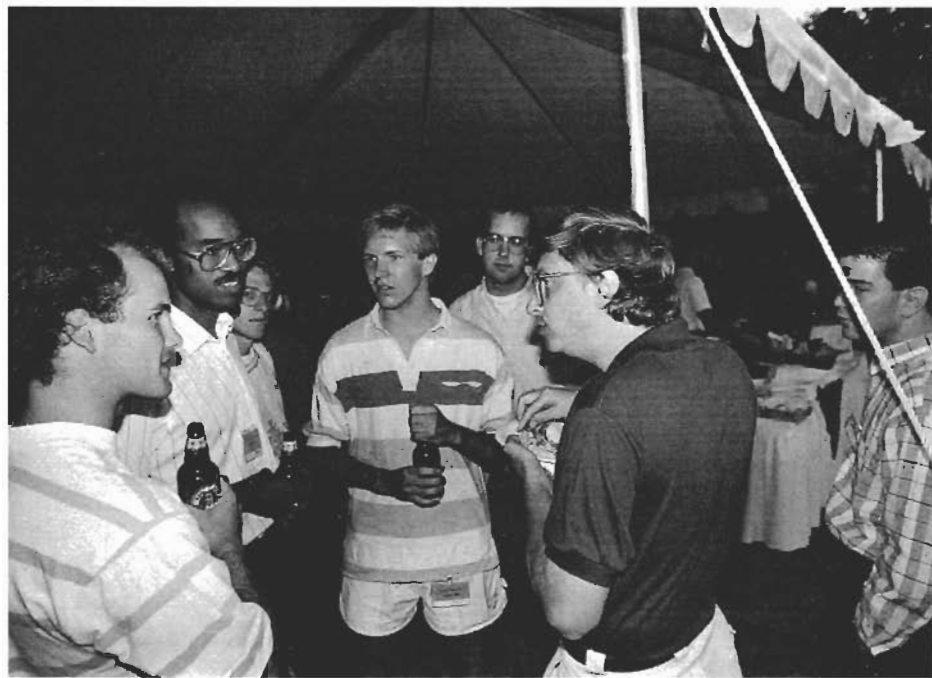
▲ "There's nothing more fun than working with smart people," says Gates (with Microsoft summer interns).

▶ Like founders Gates (lower left) and Allen (lower right), most of Microsoft's original staffers were well under 30.

puters. The company is also a leader in applications software, with such entries as Microsoft Word, a word-processing program, and Excel, a spreadsheet. In May, after earlier versions faltered, it brought to market Windows 3.0, a wildly successful program that gives IBM-compatible machines the ease of use of the (generally more expensive) Apple Macintosh. "One of our big problems," says recently retired Microsoft president Jon Shirley, "is what to do with all the cash we generate."

Success, or perhaps advancing age— Gates is, after all, now pushing 35—has slowed him down a little. He rarely pulls all-nighters at the office anymore. He takes weekend evenings and most Sundays off. Last winter he even took a Caribbean vacation, although he takes pains to point out that the trip involved only five days away from work. "There were nine days," he concedes, "[but] with weekends on the ends."
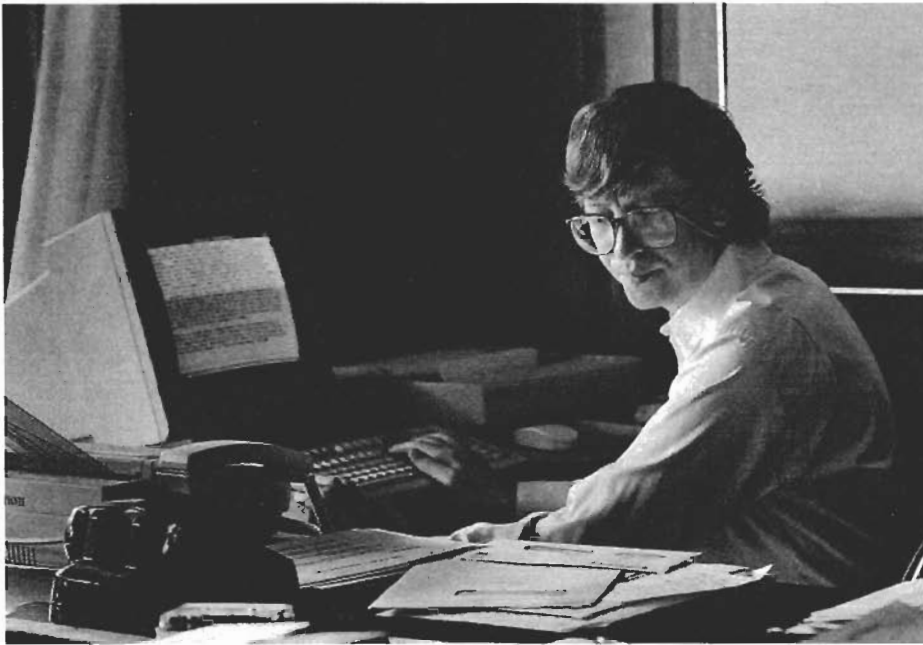
For Gates, nothing is as much fun as running Microsoft. "It's a pretty neat job," he says in his typically youthful lingo. His enthusiasm for computers and software is still that of a bright 13-year-old—which is what Gates was when the Mothers' Club at his private school in Seattle bought time on a mainframe computer for the students. Intrigued, Gates, a math whiz, could soon

write a program to play ticktacktoe.

He and like-minded friends, including Paul Allen, began hanging out at a local computer company, where they were so eager to learn how the machines worked that they would root around for scraps of paper left by programmers. "Paul would hoist me up on the garbage cans, and I'd get the notes out with the coffee grounds on them and study the operating system," Gates recalls. "We were total addicts," Allen says.

But unlike his hacker friends, Gates— whose father is a prominent Seattle attorney and whose mother sits on the boards of the University of Washington and several corporations—had a head for business too. "I was the mover," Gates says. "I was the guy who said, 'Let's call the real world and try to sell something to it.' " He and his friends wrote a payroll program for a computer time-sharing company, then started a com-

▲ When he isn't at work, Gates can send and receive electronic mail at all hours in his well-equipped home office.

◄ A fan of spicy Thai food, Gates (stopping for take-out with a co-worker) hasn't let wealth alter his culinary tastes.

BIO

manufacturer, MITS, in Albuquerque, N. Mex., and told the president they had written a version of BASIC, a popular computer language, for the Altair. When he said he'd like to see it, Gates and Allen, who had written nothing, started working night and day in Gates's dormitory room. Making the program fit in the Altair's tiny memory was a major challenge, but Gates, who wrote most of it, succeeded. "That's the coolest program I ever did," he says. "We just had this book that described the machine. If we had read the book wrong, or the book was wrong, we were hosed."

Instead, the program worked perfectly. Allen moved to Albuquerque, and Gates soon dropped out of Harvard and followed. Together they founded Microsoft. But it was hard to sell microcomputer software in a world with few microcomputers, so Gates set about lobbying major electronics firms to manufacture the new devices. Executives who came to Albuquerque were surprised to walk into meetings and be confronted by a bunch of long-haired youths. "You could see it on their faces," recalls Steve Wood, an early Microsoft employee. "Their first reaction was, 'Who are all these kids? Where's the leader?' Then Bill would take charge of the meeting and, within 10 minutes, that wouldn't be an issue anymore."

Gates lost no opportunity to corner a market. In 1980, when he learned that IBM was having trouble obtaining an operating system for its new PC, Gates bought some software from a small Seattle company for a reported $50,000, developed it into the MS-DOS program and provided it to IBM on a royalty basis. IBM's clout made MS-DOS the world standard, and royalties from the program still bring Gates some $200 million a year. Next, Gates expanded into applications software until Microsoft led the PC software industry in sales. "We have a maniacal work ethic here," says Scott Oki, a Microsoft senior vice president. "Everyone has a sense of participating in a crusade."

Gates is their natural leader. It is only fitting for a company filled with software engineers to be headed by a man who has twice been described on the front page of the *Wall Street Journal* as a "nerd." And Gates does fit that bill. For years a favorite Saturday night pastime was watching videotapes of university physics lectures on his VCR. But Gates also has a quick sense of humor—asked how the prosperity of Microsoft has affected his personality, he replies, "I smile when I tell people to work harder"—and an engaging personality. "A nerd couldn't be a good manager and a good leader of a company," he says. His peers agree. Gates is treated like an elder statesman in the com-

pany called Traf-O-Data, which analyzed traffic patterns for city and county governments. Traf-O-Data hired seventh graders to transcribe the information from those black hoses laid across highways. Then Traf-O-Data executives (including Gates, age 14) fed the data into a computer.

During the last half of his senior year in high school, Gates got permission to forgo classes in favor of working 170 miles away as a full-time, $30,000-a-year computer programmer at TRW. He drove home for graduation and then, two months later, set off for Harvard, where he went into a bit of a funk. "At my high school I was kind of unique," he says. At Harvard he wasn't; there were lots of very bright kids around. Gates had thought he might become a math professor—until he met other students who were better at math than he was.

Gates passed his time playing pinball,

bridge and poker in all-night games where players could win or lose $2,000. He speaks gleefully of the economics exam he aced, through a last-minute burst of studying, without ever going to class—and can even remember the questions. He also earned a reputation as an eccentric. "I heard about this crazy guy," recalls Steve Ballmer, a dormitory neighbor who is now a senior Microsoft executive. "He never put sheets on his bed. He went home for Christmas vacation with the door to his room open, the lights on, money on the desk, the windows open, and it was raining, and Bill was in Seattle."

In December 1974 Paul Allen, who was working near Boston, spotted an article about the world's first home computer, the Altair 8800, in *Popular Electronics.* By today's standards it was laughably primitive, with only 256 bytes of memory (most computers today come with at least 640,000). It also had no software—programs that would enable it to *do* something. Seeing an opportunity, Gates and Allen called the

"I still own the Mustang I drove to high school," says Gates, checking its tires in the driveway of his Seattle home.

puter industry, his pronouncements pored over for keys to the future.

Gates has made his employees comfortable on the four-year-old Microsoft office campus, a cluster of low-rise buildings around a pond (dubbed Lake Gates) in a woodsy suburb of Seattle, and he looks and lives like one of the guys. He buys his suits off the rack, flies coach and, for late-night snacks, calls out for pizza or opens a can of SpaghettiOs (as a "random test of discipline," Gates hasn't eaten meat for three years). He employs a part-time housekeeper who replenishes the larder. He could, of course, have pâté flown in nightly from Paris if he cared to. His wealth, he acknowledges, is "effectively infinite in terms of 'what do I decide to do.' " Paul Allen, who left Microsoft during a bout with cancer in 1982 but still owns more than $1 billion in stock, has founded his own software company and purchased the Portland Trail Blazers basketball team with some of his discretionary cash. Gates's main indulgence in the past has been cars; he owns two Porsches (one a million-dollar limited edition), a classic Mustang and a Lexus. Now he's doing a little catching up by building a new house.

"I'd like a home that's more interesting than most homes," he says. So Gates is building it into the side of a hill on five adjacent lots on the shore of Lake Washington. Its 37,000 square feet of living space will include a swimming pool, a trampoline, a library for 14,000 books, a game room, a movie theater, a beach, underground parking for 26 cars and a pavilion that will comfortably seat 100 for dinner.

Planning ahead, Gates has included bedrooms for five children. He has said in the past that he would like to marry and have a family. He occasionally takes a couple of days off—usually at Thanksgiving—to walk on the beach and think about his personal life, although he admits that business does cross his mind. At those times, he says. "I've had mixed-mode thinking." His competitors in the software business can't wait for him to settle down. Willard Peterson, executive vice president of the WordPerfect Corp., recently told the *Wall Street Journal,* "We'd love to see Bill get married and have a few kids. We'd love to see him mellow out."

Neither mellowness nor children appear imminent, although Gates does have a girlfriend, whom he declines to name. "She's

someone in the industry I met because of work," he says. She accompanied him to the Caribbean last winter. So did several books on scientific topics, which Gates reads for fun. (He is especially interested in biotechnology, which he describes as his hobby.)

Gates's new house will have high-definition TV monitors in most rooms, but not for watching Geraldo ("Who's Geraldo?" Gates asks) or even science lectures. Instead they will display images from a collection of several hundred thousand stored in a computer. "We'll have images of most of the famous art, cars, planes, maps, boats," says Gates. "So if you type in 'French sculpture,' you'll see French sculpture. If you type in 'snow resorts,' you'll see snow resorts. . . . You're sitting at a table and someone says, 'Russia's bleak.' So you say, 'I don't think it's so bleak,' type 'Russia' and take a look."

Pushing a button on a penlike pointer will superimpose explanatory captions on the screens. "Say I was going to Brazil," Gates says. "I could type 'things that relate to Brazil.' And the week before I go, whenever I'm walking around, I'm seeing pictures and maps and people and art from Brazil." Which would, of course, be a very efficient use of his time. ❑

COMPUTER HOBBYISTS

To me, the most critical thing in the hobby market right now is the lack of good software courses, books and software itself. Without good software and an owner who understands programming, a hobby computer is wasted. Will quality software be written for the hobby market?

Almost a year ago, Paul Allen and myself, expecting the hobby market to expand, hired Monte Davidoff and developed Altair BASIC. Though the initial work took only two months, the three of us have spent most of the last year documenting, improving and adding features to BASIC. Now we have 4K, 8K, EXTENDED, ROM and DISK BASIC. The value of the computer time we have used exceeds $40,000.

The feedback we have gotten from the hundreds of people who say they are using BASIC has all been positive. Two surprising things are apparent, however. 1) Most of these "users" never bought BASIC (less than 10% of all Altair owners have bought BASIC), and 2) The amount of royalties we have received from sales to hobbyists makes the time spent of Altair BASIC worth less than $2 an hour.

Why is this? As the majority of hobbyists must be aware, most of you steal

LETTERS

your software. Hardware must be paid for, but software is something to share. Who cares if the people who worked on it get paid?

Is this fair? One thing you don't do by stealing software is get back at MITS for some problem you may have had. MITS doesn't make money selling software. The royalty paid to us, the manual, the tape and the overhead make it a break-even operation. One thing you do do is prevent good software from being written. Who can afford to do professional work for nothing? What hobbyist can put 3-man years into programming, finding all bugs, documenting his product and distribute for free? The fact is, no one besides us has invested a lot of money in hobby software. We have written 6800 BASIC, and are writing 8080 APL and 6800 APL, but there is very little incentive to make this software available to hobbyists. Most directly, the thing you do is theft.

What about the guys who re-sell Altair BASIC, aren't they making money on hobby software? Yes, but those who have been reported to us may lose in the end. They are the ones who give hobbyists a bad name, and should be kicked out of any club meeting they show up at.

I would appreciate letters from any one who wants to pay up, or has a suggestion or comment. Just write me at 1180 Alvarado, SE, #114, Albuquerque, New Mexico 87108. Nothing would please me more than being able to hire ten programmers and deluge the hobby market with good software.

BILL GATES
General Partner, Micro-Soft
Albuquerque, NM

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What Next, Bill?

by John McCormick

WASHINGTON, D.C., OCT 4 (NB)—We are living through a most amazing time in the computer industry, one every bit as momentous as the one that started just ten years ago when IBM introduced the PC.

Apple and IBM are being buddy-buddy, while Microsoft and Big Blue are feuding in an unprecedented way that could leave one or the other with a big hole in its bottom line by this time next year.

Let's review briefly.

With the massive success of Windows, Microsoft has essentially dumped its OS/2 effort and, faced with the situation that Microsoft would probably compete directly against OS/2 with its NT operating environment, IBM started to cozy up to long-time foe Apple and that company wisely came in from the cold. But Big Blue is also talking with perennial also-ran Microsoft competitor Digital Research.

Is even Microsoft big enough to stand against Big Blue's army of loyal users and marketers, especially with an inferior product such as MS-DOS, in what is to most users a commodity market?

Putting aside the question of whether Microsoft has a better vision of the future, we need only look to the history of the microcomputer to learn that, while IBM has had notable failures, it is clear that IBM has created most standards that exist in the microcomputer world today.

Every other computer company loves to bash IBM as being slow to innovate, but if you check closely you will notice that, except for Apple (which has a small portion of the total PC market share), all of them use graphics, operating system, and bus standards chosen or even invented long ago by IBM.

While you may not like 5.25-inch or 3.5-inch floppy drives as a standard, you would be burying your head in the sand if you don't admit that we have them because IBM wanted them.

Likewise for CGA, VGA, and other graphics standards developed at IBM. Sure, I know about Hercules, but how often do people buy Hercules-only graphics boards these days?

Even the architecture of today's computers was determined by IBM, first with the PC bus, now significantly known as "industry standard architecture," then with Micro Channel. Even the EISA or Extended Industry Standard Architecture bus is based on the original PC bus.

Now we come to the question of whether it is a good idea to buck IBM. Quick—name three companies that have gotten rich by going against the Big Blue tide.

Did you slow down after Apple?

The question before us now is whether Microsoft is making a wise decision by goading IBM into looking to Microsoft's only real competitor at a time when basic operating systems are widely recognized by most users as being commodity items.

It isn't difficult to understand why, despite its obvious advantages, DR DOS never made it really big in the market. IBM chose MS-DOS, and that was all most users needed to know.

Skip ahead 10 years.

Has Bill Gates decided that this is the time for Redmond to secede? And, if he has, is it a wise move?

Or did IBM make a major error by insisting that its version of OS/2 be the first to market because of the installed AT base?

We all know that Microsoft's vision of OS/2 as an operating system that would perform wonders on 32-bit machines had it all over IBM's 286-compatible OS/2 which finally hit the market, but IBM practically made Microsoft when it struck a deal with Mr. Gates to supply the operating system for its PC.

EDITORIAL

At the same time IBM nearly destroyed Digital Research's chance to make it big because, although DR had brought the previously standard CP/M (Control Program/ Microcomputers) to the grand breakfast of the PC world, IBM struck a deal for its PC operating system with Bill Gates instead of Gary Kildall.

Big Blue didn't do it maliciously; it is just the sort of thing that can happen to you when you live in a small room with a 600-pound gorilla.

Now IBM is apparently pretty upset with Microsoft, and, most significantly, has a clear alternative to MS-DOS. What happens over the next year should prove very interesting.

Today Monterey, California-based DR, with a better operating system than Microsoft, and a fully compatible one to boot, now has about 300 employees and grosses less than $50 million a year.

Founded at about the same time, Microsoft pulls in well over $1 billion each year and has more than 20 times as many employees.

Mr. Gates' renowned marketing ability might account for the entire difference, but is anyone willing to say that teaming up with IBM 10 years ago had nothing to do with his company's growth?

But all elephants appear the same size to us mice and, just to keep things in perspective, it is important to remember that, while the two software companies have been around for as long as the personal computer industry, about 16 years, and Big Blue didn't enter that field until 10 years ago, Microsoft, for all its size, is not in IBM's league.

A billion-dollar gross is very impressive, but IBM's yearly income is nearly 70 times Microsoft's.

Despite the odds stacked in favor of Big Blue, I am not interested in betting against Mr. Gates becoming the CEO of IBM before the decade is finished.

Bill Gates has been the true *wunderkind* of the computer industry for many years now, and I just want to sit back and watch how he arranges to buy IBM. ❏

PAUL SOMERSON

My name's Rip. I own a small Volkswagen dealership a few hours up the Hudson River from New York.

Our books had always been done by a little old Dutch lady with a ledger pad, but when she retired in 1981 I decided to move the accounts to a computer. I hopped into my VW bus and headed over to Catskill Computing, where I plunked down a few thousand bucks and ordered the just-unveiled top-of-the-line IBM PC.

My dealer promised it wouldn't take more than six to eight weeks to arrive, and when it finally did, two months later, I put it in the front window to show what a high-tech dealership we were. The thing was a honey, too. It came with a really sharp-looking one-color screen and was crammed to the gills with memory chips. While these machines were normally delivered with 16 kilobytes of RAM, I stuffed in the maximum 64,000. It sported a disk drive that held a whopping 160,000 characters of information—enough for 80 pages of text, they told me. I also popped for a sleek little printer that could crank out dozens of characters per second. You have to admit that technology is a bit awesome sometimes.

This dream system was dazzlingly fast and capable, but unfortunately, I couldn't actually do much with it. "Hey, it's brand new," the salesman said to me with a wink. "Right now the hardware's a little more advanced than the software. It'll catch up. Just a few years. You'll see."

I bought his only accounting package, but it was so full of glitches I had to return it. He told me to trade it up for a spreadsheet program that was more flexible. "Look, Rip, I know it sounds crazy to use a spreadsheet for something it wasn't intended to do, but that's going to change. Just you watch."

Trying to turn that spreadsheet into a double-entry bookkeeping system that could also generate automobile price stickers wasn't easy. In fact, it wasn't possible. Actually, working on the PC wasn't easy in general. It was hard to do even simple things like name my files intelligently with the few characters allowed or figure out which versions of the files were the most recent. The initial version of DOS that came with my computer did have two little files called DATE.COM and TIME.COM, but they worked on a 24-hour clock.

I was down at Catskill Computing one evening trying to get some help on clearing the screen, which DOS 1.0 didn't allow. One very knowledgeable technician whispered to me that he had heard there would be a clear-screen command in a future version called 2.0. "I'll tell you what, Rip. We're closing now; it's bowling night. If you come along and roll a few frames, I'll tell you some of the other hot DOS rumors."

We took a detour on our way to the lanes, picked up a keg, then spent the night knocking over pins. At closing time I was too intoxicated to drive home and figured I'd better sleep it off. I parked in a deserted field behind the lanes and fell into a deep sleep.

When I awoke I knew something was wrong. The bus seemed rustier, and I had to roll it down the hill to start it. I was stiff from sleeping in the front seat, and to my astonishment, when I scratched my chin I discovered a beard that went all the way to my belt.

> **When I awoke, I knew something was wrong. I glanced at the computer, but it didn't seem much different.**

The bowling alley was gone. Ugly condominiums stretched as far as I could see. I managed to thread my way through unfamiliar streets to the dealership and was shocked to see a showroom of tiny Korean cars. I stumbled inside, but I didn't recognize a single face. An armed guard was about to give me the heave-ho when someone operating a sleek-looking, full-color computer spotted me. "Rip? Rip? Is that you?"

He was the college student who had helped me with the bookkeeping during summers—although he looked much older than I remembered. He took me into the back and handed me a towel and a razor. I emerged feeling better but still very confused.

"Rip, where have you been? You disappeared eight or nine years ago."

My jaw dropped. "You mean it's almost 1990?" I swallowed hard and rubbed my head in disbelief.

He sat me down and told me what I'd missed. I looked at his computer. While the screen was in color, it didn't seem much different. "Funny, the same ugly characters. The same 25 rows and 80 columns. You'd think they would have changed all that."

"Well, Rip, they did change a few things. This computer is now the top of the line."

"Where's the IBM logo?"

"IBM? Rip, old man, they lost the lead long ago. This one's a Taiwanese 386 clone that handles information in 32-bit chunks—four times more efficient than your old system. And it runs at 33MHz, nearly seven times faster than the one you bought. It's 28 times more powerful than yours was."

"Did DOS 2.0 ever come out?"

"2.0 and then some. We're working with the bug-fix versions of DOS 4 right now."

"That means they must have figured out solutions to all the problems I used to have. Like filenames that were too short. And long lists of thorny commands that were too hard to remember. And no easy system for making backup copies. And commands that made it too easy to erase files. And no online help."

"Not exactly. Those things are still problems. Actually, IBM released a program called the DOS Shell to handle some of 'em, but it was so klutzy that nobody bothered with it. And even it didn't address the most irritating limitations, such as short filenames."

"Well, how about your accounting package? Back then I had to use a spreadsheet for my bookkeeping."

"Gee, Rip, I rely on 1-2-3 for everything. It's a lot like the spreadsheet you were using except it works in color, and it costs a lot more."

"The real problem I had then was software. There wasn't very much of it, and none of it was smart or easy."

"Oh, that's all changed. Now there's tons of software on the market that's not smart or easy. Virtually no software of *any* type is the least bit friendly or intuitive, except on the Mac."

"The what?"

"Skip it."

"But what's the point of having that super-powerful system if the software's no good?"

"Look, right now the hardware's a little more advanced than the software. It'll catch up. Wait just a few years. You'll see." ◼

1990

ON THE LEFT, APPLE'S CORPORATE
HEADQUARTERS CIRCA 1978: THE JOBS'
FAMILY GARAGE. ON THE RIGHT, APPLE
COMPUTER'S HEADQUARTERS TODAY.

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Suddenly everyone is talking about personal computers. Are you ready for one? The best way to find out is to read Apple Computer's "Consumer Guide to Personal Computing." It will answer your unanswered questions and show you how useful and how much fun personal computers can be. And it will help you choose a computer that meets your personal needs.

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The quickest way is to get a free copy of the Consumer Guide to Personal Computing. Get yours by calling 800/538-9696. Or by writing us. Then visit your local Apple dealer. We'll give you his name and address when you call.

*Apple II plugs into any standard TV using an inexpensive modulator (not included).


apple computer™

April 1979

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A lot of people needing computers are stopped cold by the price. But here's a start-up computer that's easy to warm up to. Digital's mini-processor. The PDP-8/A. It's 1.5 microseconds fast. Has 1024 words of memory included in the basic processor. And is expandable to 32K.

The OEM Factory rolls out this minicomputer at micro-processor prices—just $572 in quantities of 100 for the two-board version. And in quantities of 100, you can get the packaged system for only $1117.

Suddenly there's a lot more you can do with a computer economically.

Whether you use it as a control module, or the brain behind an intelligent terminal, or the computer power for a host of new applications, the PDP-8/A has a lot to offer.
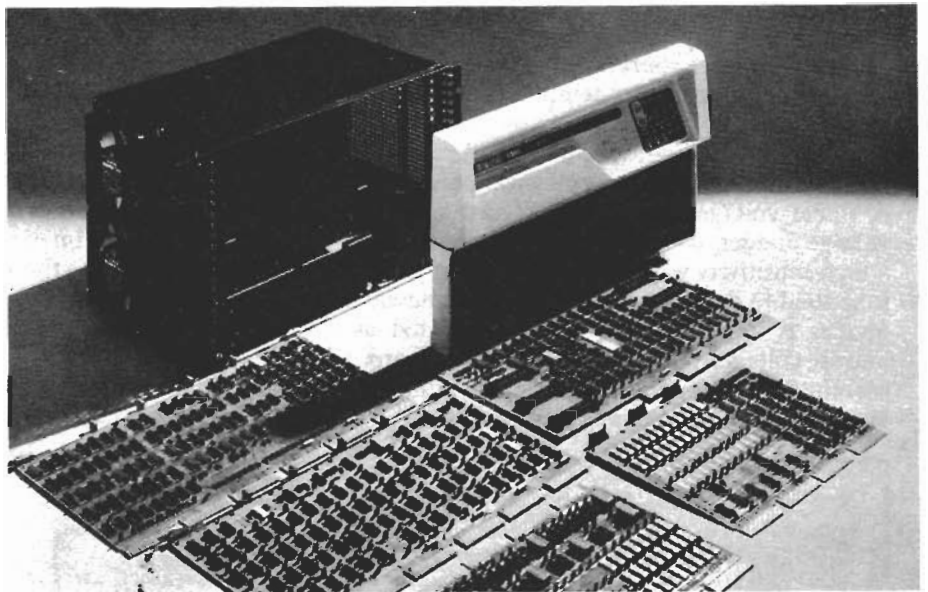
It's completely compatible with all the software and peripherals of the famous PDP-8 family encompassing over 25,000 installations.

And for systems planning, integration, and maintenance, there's Digital's unsurpassed support and service.

Just what you'd expect from the world's largest supplier of minicomputers and

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digital

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This month, we conclude last month's survey of fifty lower-cost microcomputers by presenting sixty higher-cost machines. As usual, we apologise for any inaccuracies, and we point out that prices may vary from store to store. Happy drooling.

System:	Associate
Operating System:	CP/M
Processors:	Z80A
RAM:	65K
Printer I/O:	2 S
Disk Drives Inc:	2 DS DD 5¼" floppy
Screen Format:	80x25
Graphics:	32 Graphics Characters
Sound:	N
Colour:	N
Keyboard:	Integrated
Software Included:	Microplan, Spellbinder, acc pak
Software Available:	Extensive
Primary Market:	Business or Personal
Manufacturer:	Associate
Available From:	Datacalc Technology Ind Corp.
Price:	$4495.00
Other:	

System:	BASIS 108
Operating System:	BASIC
Processors:	6502 & Z80A
RAM:	64K
Printer I/O:	P, S & 6 Exp
Disk Drives Inc:	Mounting for two 5¼" floppy
Screen Format:	80(40)x24
Graphics:	280x192
Sound:	Y
Colour:	Y
Keyboard:	Detachable
Software Included:	BASIC
Software Available:	Extensive
Primary Market:	Business
Manufacturer:	BASIS Inc.
Available From:	Computer Systems Design
Price:	$4000.00
Other:	Apple compatible

System:	Orion 1 A
Operating System:	CP/M
Processors:	Z80A
RAM:	64K
Printer I/O:	S & 2 Exp
Disk Drives Inc:	Two 5¼" floppy
Screen Format:	80x24
Graphics:	N/A
Sound:	N
Colour:	N
Keyboard:	Detachable
Software Included:	CP/M
Software Available:	Extensive
Primary Market:	Business
Manufacturer:	DY-4 Systems Inc.
Available From:	Prelco Electronics
Price:	$4500.00
Other:	Multi-user capabilities

System:	Columbia VP
Operating System:	CP/M-86, MSDOS
Processors:	8088
RAM:	128K
Printer I/O:	S & P
Disk Drives Inc:	Two ½ height DSDD floppy
Screen Format:	80(40)x25
Graphics:	640x200
Sound:	Y
Colour:	N
Keyboard:	Detachable
Software Included:	Perfect Series Fast Graphics, BASIC A
Software Available:	Extensive
Primary Market:	Business
Manufacturer:	Columbia Data Systems
Available From:	Hamax Data Systems
Price:	$4495.00
Other:	Portable, IBM PC software compatible

System:	Xerox 16/8 Prof. Comp
Operating System:	Supports CP/M-80, CP/M-86 & MS DOS
Processors:	8086 & Z80A
RAM:	128K
Printer I/O:	S & P
Disk Drives Inc:	Opt 2 floppy or 1 hard, 1 floppy
Screen Format:	80x24
Graphics:	Opt
Sound:	N
Colour:	N
Keyboard:	Detachable
Software Included:	BASIC
Software Available:	Extensive, supports CP/M-80, CP/M-86, MSDOS
Primary Market:	Business
Manufacturer:	Xerox
Available From:	Xerox Stores
Price:	Announced in Sept.
Other:	Stand-alone or workstation capabilities

System:	AJILE (portable)
Operating System:	MS DOS
Processors:	8088
RAM:	256K
Printer I/O:	S & P Exp Module
Disk Drives Inc:	One 5¼" DS DD floppy
Screen Format:	80x25
Graphics:	640x250
Sound:	Programmable
Colour:	N
Keyboard:	Detachable
Software Included:	Basic, In:Scribe, Multiplan and Communications
Software Available:	Extensive, IBM Comp at BIOS
Primary Market:	Business
Manufacturer:	BYTEC Management Corp.
Available From:	Anderson Jacobson Ltd.
Price:	$4285.00
Other:	

System:	Canon AS-100
Operating System:	CP/M or DOS
Processors:	8088
RAM:	128K
Printer I/O:	Opt S or P
Disk Drives Inc:	Opt 5" or 8" floppy or 5" hard
Screen Format:	80x25
Graphics:	640x400
Sound:	N
Colour:	Opt
Keyboard:	Detachable
Software Included:	2 BASICs
Software Available:	Extensive
Primary Market:	Business
Manufacturer:	Canon
Available From:	Canon Canada Inc.
Price:	$3200.00
Other:	

System:	Heath HZ-89
Manufacturer:	Heathkit
Available From:	Heathkit
Price:	$2295.00
Other:	Kit version of Zenith Z-89

System:	Heath HZ-100
Manufacturer:	Heathkit
Available From:	Heathkit
Price:	$3499.99
Other:	Kit version of Zenith Z-100