

For the people of Hewlett-Packard

November-December 1989

MEASURE

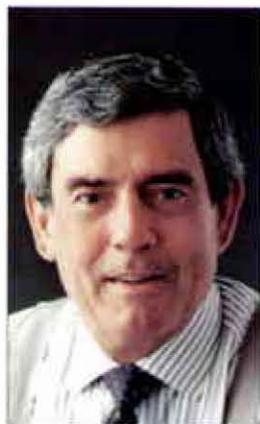
An amazing look
into HP's future



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MEASURE

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Hewlett-Packard Company is an international manufacturer of measurement and computation products and systems recognized for excellence in quality and support. The company's products and services are used in industry, business, engineering, science, medicine and education in approximately 100 countries. Founded in 1939, HP is celebrating its 50th anniversary this year. HP employs more than 95,000 people worldwide.



HP's vision of computing: making cooperation between people and computers as easy as child's play.

SCOTT TRACY

THE FUTURE

Cooperation: the future of HP computers

Imagine if computers could make all the world's knowledge available for the asking:

- Doctors could test their theories for curing diseases by sorting through the world's medical records.
- Environmental experts would be better able to understand the effects of pollution on the world's weather.
- Shopping for the best deals from a worldwide array of products could be done at home from the window of your TV screen.
- You could receive up-to-date information on any topic—in electronically transmitted forms of print, video or audio.

Imagine if computers were as easy to use and as common as telephones or television sets:

Cooperation

- Everyone from children to grandparents would use computers daily.
- No one would be afraid of them.

This is the kind of world many of HP's computer developers are imagining as they work toward the company's vision of computing in the future—a vision called a cooperative computing environment (CCE). Throughout HP, people are talking about CCE.

What would a cooperative computing environment look like? A CCE is a network of computers that would perform in two key ways:

- First, work done on one computer could be combined with work done on others, regardless of manufacturer, location or operating system, so that the machines could perform together to solve a single problem.
- Second, the computers would be extremely easy to use. Even people most fearful of technology would find these systems a snap.

Anyone who uses HPDesk today knows it's possible to share information over a network, so how is CCE different from what we now have?

"This is not a new idea," says Joel Birnbaum, vice president and general manager of the Information Architecture Group (IAG)—the organization coordinating HP's CCE strategy. "It's a question of degree. The notion of a distributed computing environment—several computers working on a network—has been practiced for the last 10 years or so. We're looking to solve the problem in a more thorough way."

A more thorough solution for making different types of computers work cooperatively would bring a host of benefits to customers, Joel asserts:

- Customers could choose the best components available from any manufacturer.



CHARLES FOX

IAG's Alain Couder (left) and Michael Mahon discuss CCE architecture.

- Users on a network could share resources, including "servers"—machines fine-tuned to provide a specialized function (see related story on page 5).
- Customers could grow their systems modularly—replacing individual elements one by one, rather than overhauling an entire system.
- Work groups in different locations could work together more easily.

What are the challenges of bringing about CCE? An important one, according to CCE developers, has to do with how computers share information, a problem called "interoperability."

Computers physically can transmit information bits over a network—achieving "connectivity." But, most developers agree, it's more difficult to make a logical connection—interoperability—to pass bits back and forth in a form each computer can understand.

The Apollo Systems Division's Network Computing System (NCS) is one product that addresses interoperability by enabling users to transfer data among different machine formats.

CCE developers cite another key challenge to realizing a cooperative computing environment—achieving ease of use.

How many times have you been frustrated because you couldn't figure out how to make your computer do what you needed it to? The CCE vision is based on the premise that until computers are easy to work with, they won't be widely used.

Achieving ease of use means having a consistent interface so that users won't have to relearn how to interact with a computer every time they use a different one. It means having "transparent" access to data so users simply can request the information they want without worrying if it comes from machines close by, or far away, or from different manufacturers. It means hiding all aspects of the computer's complexity.

"The phone is a good example," says Joel. "It's a very complicated system, and yet we don't have to think about how it works at all when we use it." HP's NewWave office environment is one way the company is working on increasing ease of use. Based on Microsoft* Windows, NewWave allows users to integrate PC-based applications through an interface that's consistent and intuitive.

But there's a further challenge to realizing a cooperative computing environment, according to Joel.

"You can't do it without standards," he says. "All this implies we agree upon a set of rules by which computers are developed, networks cooperate, applications are written and so on."



Icons like this "agent" help HP's NewWave software make computers easier to use.

Any form of sharing requires a set of rules—standards: European trains can travel throughout the continent because their cars conform to the same width of track. American electrical appliances can make use of the same electrical system because they are set to the same voltage.

To achieve CCE, HP is taking a high profile in standards bodies. For example, the company is one of the founding members of the Open Software Foundation, and HP is one of the first companies to introduce a personal computer based on EISA—the extended industry standard architecture.

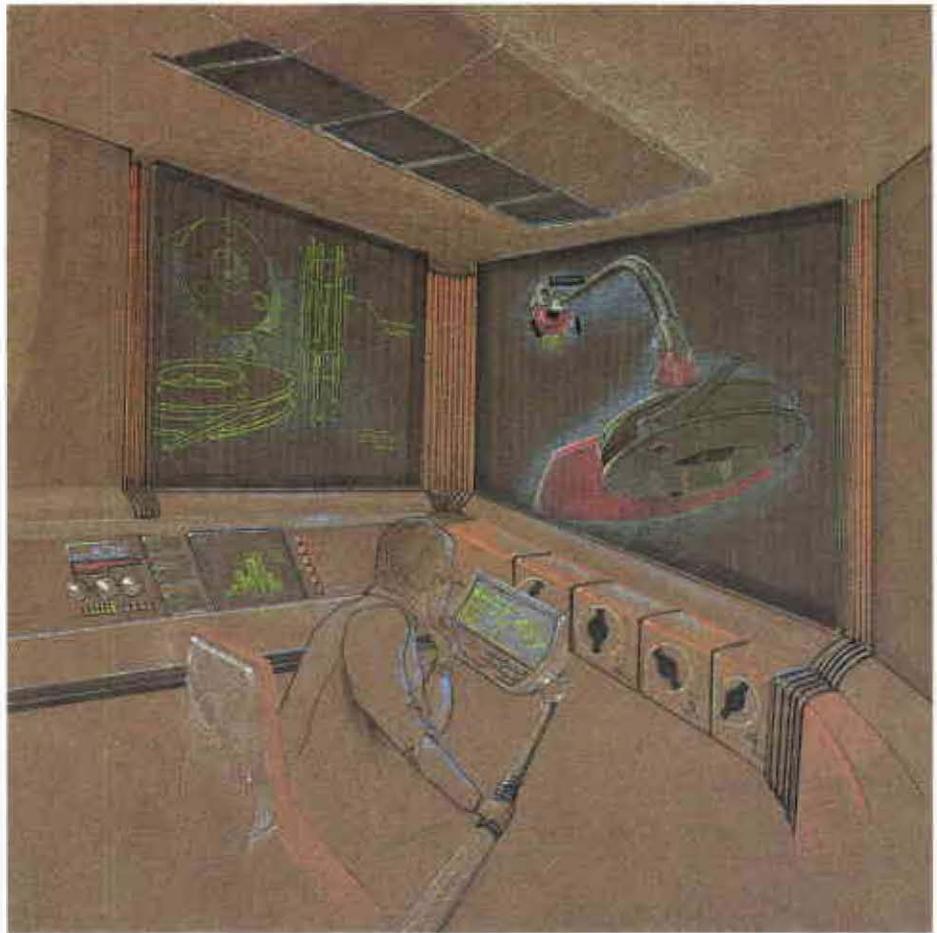
Standards form the basis of HP's architectural framework for CCE—a critical project recently completed by members of IAG, HP product groups and researchers at HP Labs. The framework defines how elements at different levels in a cooperative computing environment will work together as an integrated whole.

"Basing our framework on standards helps us create an environment where machines can cooperate," says Alain Couder, IAG's general manager of CCE architecture. "But adhering to standards doesn't mean we can't be innovative, too. Within our framework, there's plenty of room for new ideas. We'll continue to make technical contributions, and we'll make them in an open way so that our work can even set standards as they evolve."

While CCE presents many technical hurdles, perhaps its most formidable challenges have to do with people, says Dan Warmenhoven, general manager of the Information Networks Group.

"More than ever, it's imperative that we work together well," Dan says. "To make cooperating systems, we need consistency in the way we design systems and define their interfaces, as well as consistent ways of integrating them and testing them. No one group can act independently."

CCE experts agree that making this vision a reality will take a lot of cooperation, not only among computers, but HP people, too. —Rhea Feldman



In the CCE lab of the future, an engineer could model an idea using a powerful graphics server, and instantly transmit his creation to co-workers around the world.

Serving the client

"Client/server" computing is the hot topic of the year among industry analysts, and many believe it will dominate computing in the next decade. The notion of sharing resources on a network—a concept integral to HP's CCE vision—is also at the center of client/server computing.

"Client/server" refers to different roles computers play on a network. The "client" most often is a PC or workstation—a desktop computer. It's the window from which users access services on a network. "Servers" are the computers that provide those services.

For example, one service you might need is more number-crunching power than your workstation alone can handle. So from your workstation, you'd request the help of a computation server—a computer that's been specifically designed to calculate complex sums.

Among the benefits of client/server computing: users can share and leverage the cost of high-end machines; users get the convenience of computing on their desktops along with access to powerful servers; and high-end machines are optimized to meet users' specific needs.

(Rhea Feldman, a speech writer in HP's executive communications department, last wrote for Measure in the March-April 1989 issue on "Thinking globally."—Ed.)

* Microsoft is a U.S. registered trademark of Microsoft Corp.



Some day that person across the meeting table might be a holographic image beamed from halfway around the world.

THE FUTURE

T&M will play an instrumental role in the future

It sounds like scenes from "Star Trek":

- Everyone carries a pocket-sized telephone almost like the communicators Capt. Kirk and Mr. Spock used.
- Instruments from a half-dozen companies are linked together, talking to each other and performing custom procedures to meet customer needs.
- People attending a joint teleconference joining North America, Europe and Asia, for example, will feel like they're all in the same room, thanks to high-definition TV, real-time sound... even three-dimensional holographic images which make you think you could reach out and touch them.

But these aren't "Star Trek"-era examples. In fact, some of these exam-

ples are as close as five or 10 years away. And one—pocket-sized telephones—exists today.

These innovations mean a wealth of opportunity in the not-so-distant future for HP—the world's largest manufacturer of test and measurement (T&M) equipment.

"The business of test and measurement is to build the tools that move the electronics industry forward," says Dick Anderson, vice president and general manager of the Microwave and Communications Group. "Good instruments are the key to increasing productivity. You have to make a good measurement before you can make improvements."

HP has been an important force in the T&M market since its birth in 1939. As the IBM of the T&M market, HP established a dominant position in the instrument business during the 1950s and '60s. In the early 1970s, the company revolutionized automated testing when it developed the HP Interface Bus (HP-IB)—a cable assembly which links hardware.

"That significantly altered buying patterns and allowed customers to build systems," says Larry Potter, T&M marketing manager. "It was rapidly accepted throughout the industry and became the *de facto* standard."

Today the VXIbus and Modular Measurement System (MMS)—modular architectures which HP helped establish as industry standards—pave the way for open architectures and modular instruments. "That's the next piece of the puzzle — products with instruments on a printed-circuit card," Larry notes. "You could have cards from HP, Tektronix and Wavetek beside each other inside of a customer's product."

Larry says 20 percent of T&M business will shift to modular instruments in the next five years. "And that's about an \$8 billion market worldwide," he says. "Five years from now we'll be in businesses we never thought about before."

One increasingly important trend is networking. The spread of computers means that more and more instruments will be part of a larger system in which a computer is used as a controller. "This is our Measurement Systems Architecture (MSA) of the 1990s, and it could change the industry just as HP-IB did nearly 20 years ago," says Ned Barnholt, vice president and general manager of the Electronic Instruments Group.

Instead of "islands of automation" performing separate functions, test systems can be configured in a network which could perform a whole series of tests in an automated factory, Ned says.

Advanced software development will expand the capabilities of instruments, Ned adds. For example, an instrument with a built-in computer and memory could download a special set of instruc-



Telecommunications should be a key growth area for HP in the test and measurement (T&M) industry. HP is the world's largest manufacturer of T&M equipment.

tions to enable it to take on different personalities.

Optics and lightwave are emerging fields in which HP can play a major part, too, adds Dick. For example, aircraft will be designed with noise-free fiber-optic strands instead of heavy, electronically noisy copper cables.

Communications is another booming field. "Thieves steal about 35,000 tractor-trailer trucks filled with millions of dollars worth of goods each year," Dick explains. "But the technology is there to outfit the trucks with identification transmitters to track the trucks with a communications satellite. So at any moment you'd know that truck No. 475 is traveling on Route 116 at 60 miles per hour and headed for the swamp, for example."

Consumer demands constantly drive the need for new products—and convenience, Dick notes. In London, people can carry pocket telephones and communicate on a small-scale cellular network throughout the city.

The T&M industry truly reflects what's happening in the electronics industry at large, Ned says. HP has a

long history of being quick on its feet to respond to customers.

"There will be an explosion of change in the information-processing and communications markets in the next five to 10 years," he says. "It means we'll have to shorten our time to market if we're going to continue to be the first with the best T&M equipment."

Integrating computers within instruments will produce a number of new products, Ned says.

"New instruments actually will calibrate themselves during their warm-up periods to give customers the best possible accuracy in measurements all of the time," he says.

HP will have a "measurable" advantage in the future, Larry Potter says.

"Bill Hewlett and Dave Packard instilled a single concept in HP 50 years ago: Each product has to make a technical contribution. As we shift and work in a world of standardization, that concept will be just as true in the future as it has been the past half-century."

— Jay Coleman

THE FUTURE

The sky's the limit

For the future of HP's analytical, medical and component products, the sky's the limit—literally.

From unified health-care information systems to fiber optics, HP will be a viable player in linking diverse computer systems.

The driving force behind HP's Analytical Group is to provide customers with tools to improve the quality of life through a cleaner environment, safer foods and newer, more effective pharmaceuticals.

"Our products will integrate instrument control, data analysis and office systems into one station," says Deiter Hoehn, vice president and group general manager.

"These 'unified labs' will link sample preparation systems and lab information-management systems to provide information quickly and easily," adds Don Schoeny, Analytical Group marketing manager. "Through use of these systems, customers can improve productivity, from the R&D to the process-control stages."

"Analytical labs are evolving from single workstation-measurement systems to cooperative computer environments (CCE)," says Deiter.

Because HP is the only major supplier of both analytical and computer products, it is uniquely positioned in the analytical market to provide this concept of a unified lab.

"Computers are becoming more and more significant to the lab because they will be able to take a tremendous amount of data, analyze it, simplify it and report it," says Deiter.

"Analytical products will continue to be the basic tools used in the development and quality control in pharmaceutical, food and biotechnology applications," he adds. "These are areas that affect people around the world every day."

Improving the quality of life is also a driving force behind HP's Medical Products Group.

"The focus of our products will be on what they do not only to improve a patient's outcome, but on how they'll help hospitals lower costs," says Ben Holmes, vice president and group general manager.

"Fifteen years ago patient-monitor-



In the future, HP analytical products will be linked into a unified lab system which could provide integrated analysis of minute particles, like a caffeine molecule (above).

ing units were isolated. In the future, through a CCE, we'll link these various components into an overall information-management system," says Ed McDonald, general manager of marketing and distribution.

"CCE will enable hospitals to integrate their heterogeneous systems—combining support departments such as the lab and pharmacy, with the medical units—into an on-line information system," adds Ben.

Medical products will be more integrated and smarter. They'll combine data and advise on patient care.

"We'll continue to focus on patient-monitoring systems as well as diagnostics," says Ed. "Keeping people healthy is just as important as taking care of them once they're sick."

In their individual markets, HP's Analytical and Medical groups are working to link diverse systems. Doing this at great speeds is the Component Group's goal.

"The biggest challenge of the global marketplace will be to provide information faster and faster through systems linked on a worldwide basis," says Milt Liebhaber, group marketing manager.

In a CCE, fiber optics will link these systems and provide immediate information without limits on volume. In addition to fiber optics, the use of light-emitting diodes (LEDs) will explode.

"You'll see them used in outdoor information signs, like those seen in stadiums, with the quality reaching that of television," says Milt.

"HP's Component Group will become more involved with its competitors in setting standards and with its customers in cooperative research and development," adds Milt.

Because customers want to become more efficient, they'll move toward involving HP earlier in their product design, says Milt. Through this, HP can better plan its own products and manufacturing to meet their needs.

"Customers will become even more demanding and will not only expect perfect products, but perfect service as well," says Milt.

"Who knows? CCE may one day even link our planets together."

— Donna Jones



Heinz Mueller, Wolfgang Dalber and Markus Zeeb (from left), members of one of the self-directed groups in the printed-circuit shop in Böblingen, West Germany, talk over work assignments. Comments on employee surveys helped lead to the groups' formation.

THE FUTURE

Rethinking work at HP in the 1990s

How about the Hewlett-Packard people who will turn the dreams of future products into reality during the next decade?

In printed-circuit (PC) assembly at the Lake Stevens Instrument Division (LSID), you can glimpse the factory of the future.

The 150 people in the manufacturing area make up 17 self-regulated work teams, each owning its own process and handling decisions formerly made for them. They're kept informed about new LSID products coming up and they know which areas will be impacted. They determine how to spend their own expense dollars for overhead, both materials and labor. They help hire new employees and decide when to bring in temporary workers.

Then, using business data formerly given only to supervisors, they analyze the team's performance.

Teams have done such a good job of running their own show, in fact, that PC assembly has eliminated one layer of supervision and no longer has section managers.

For production manager Jim Martin, the flattened management structure

means a broader span of control and a changed function.

"I'm becoming more and more of a resource-getter rather than someone who gives directions," Jim says. If a team needs help from another group or special training, he sees that it is provided.

Despite occasional rough spots, he's sold on the work-team concept. Why? "People doing the work have the best answers."

Work teams began in 1987 when Rich Plante (then LSID manufacturing manager and now in the same role at the San Diego Division), production manager John Schneider and others spent six months researching self-regulated work teams. LSID's first work teams were formed that November.

"People began to really own the process, solving problems and taking care of material flow," Rich recalls. He sees broadened responsibilities for production people as the only way to thin management ranks. "It's the way effective organizations are going to be run in the future."

John Schneider recalls that not everyone was sold on the work-team

Rethinking work

idea at first. It meant learning how to back up other people's jobs, working together to make major decisions and getting up in front of management to make the team's case.

But in general, people accepted the work-team concept as a good chance for personal growth. To support this, LSID has made a heavy investment in training with a large learning-resource center right on the production floor.

To present data effectively, a team member might first want to learn computing from the keyboard up, study statistics and master a graphics package to make bar-graph charts, and finally bone up on making a presentation. The center is in use all day and after hours.

The teams' first experience with targeting last year was stressful, however. "What if we don't ask for enough money?" they worried. Admits Jim Martin, "They actually did a far more thorough job than I could."

Work teams are now being formed in assembly and test, materials and elsewhere. When LSID work teams held an open house last year, 22 HP divisions sent people to take a look.

At the Boise, Idaho, site, the startup of a state-of-the-art formatter operation for the HP LaserJet printer has offered a

"It's the only way effective organizations are going to be run in the future."

chance to involve a representative team in work redesign. A dozen people, chosen by their co-workers, are looking at everything from business factors to employees' need for more variety in a job that is now highly automated. They'll make their recommendation this November.

Employees spearheaded a new work structure at the Printed Circuit Division's shop in Böblingen, West Germany. The Open Line employee attitude survey had brought out interest in hav-



In Lake Stevens Instrument Division's learning resource center in the production area, Roque Williams uses one of the computer stations while a work team meets.

ing more say in decisions about material flow and work scheduling. After a pilot run, the division implemented three self-directed groups made up of 120 people in May.

Gerhard Wartenberg, the process center manager who serves as a coach, says, "From the very first moment, we were sure we were starting an exciting new experiment. But it was still a surprise to see such a lot of activity by the teams and so many realistic and constructive ideas."

Corporate Manufacturing has been exploring the "factory of the future" since 1986. Vice President Hal Edmondson, who set the study in motion, sees a complete redefinition of the manufacturing task ahead as operations excellence becomes a necessity.

"Nothing we do today is going to be good enough," Hal says. With the 1990s so close, he wants to accelerate a tight linkage between R&D and manufacturing that will begin at the investigation-to-laboratory stage so manufacturing can offer process suggestions up front.

By next year, new bonding will exist between the corporate departments of

manufacturing, engineering and quality as permanent cross-functional teams go after better teamwork on product definition, hardware and software.

"To get a proper partnership, we have to have a dramatic cultural change," Hal says. "We must realize that we're in the same foxhole shooting at the same enemy."

Stu Winby, who now manages the "factory-of-the-future" program, consults with HP divisions using new organization design. He believes all jobs will change, but the role of the supervisor will change the most in the next decade.

It will be important to break down what he calls the "functional silos" that separate R&D, manufacturing and marketing.

An emphasis on teamwork and the delegation of decision-making will also require HP to take a good look at its

present evaluation and pay policies, he predicts.

Rethinking job requirements to get ready for the 1990s means looking ahead to what functions HP will need to be competitive, the range of jobs needed to do them, the skills required and how to get them.

In the U.S., several task forces have just finished analyzing their functions and come up with a set of forward-looking jobs and their requirements.

One of the most dynamic areas is information systems, with the thrust of such new demands as networking. It will take flexibility and the ability to

"It's not good enough for us to say, 'Trust us, we'll let you know what you'll need to learn.'"

apply knowledge across many systems and technologies—perhaps taking more coursework in the theoretical underpinning of systems.

Another challenging area is materials procurement, where more than half of HP's manufacturing costs lie. Buyers have to know the implications of changing technology: what it means to vendors on long-term contracts and to the criss-cross of HP entities that supply parts internally.

For the distribution task force under Bill Bertetta, customs and distribution programs manager, defining logical job groupings was the final step in a four-year program.

"We started by identifying emerging issues, inside and outside HP, that affect distribution," Bill says. That led to a formal training section under Miguel Trujillo, which has set up a year-long intern and placement program for new college hires. New measurements are in place to see how well the complex shuttling of parts and products around the HP world is getting done. The last step has been to sort out evolving jobs.

"We've expanded our attitude from 'Get the box on the truck' to a total logistics concept," Bill says. "In



At Loveland, Colorado, Dennis Faerber helped establish self-managed work groups, such as Jean Carsten's team, which designed the work station used to make VXI instruments.

expecting a greater contribution from managers, we created a void on the operational side of the function. That's where the new specialist position comes in." Specialists are expected to understand what's needed for HP's business success so they can keep improving processes.

Continuous self-improvement will be a key to the 1990s. It's easy to say that the individual must assume responsibility for his or her own development, but Neil Johnston, manager of Corporate Training and Development, believes the company also must deliver training in a more systematic and convenient fashion.

"It's not good enough for us to say, 'Trust us, we'll let you know what you'll need to learn,'" Neil says. To build an integrated framework for development, his department's "Horizon" project under Jim Taylor is profiling pivotal jobs and what goes into doing them successfully. (Among the first prototypes completed are R&D software-development engineers and Test and Measurement district managers.)

Eventually HP will have a map of what is needed for top performance in many jobs, and people will be able to use a computer program to identify their own gaps and know the right training tools.

Neil wants to break HP's in-house courses into smaller segments and get them right to where people work. "We need a cabinet that we can roll anywhere," he says. "It will have TV, voice, VCR, interactive video, a computer with graphics capability, a CD ROM player and a training library of tapes and discs. We now have all the elements for such a learners' workbench somewhere in the company."

If you get learning close to where people need it, he suggests, the difference between work and learning begins to go away.

A year ago, manufacturing management at the Loveland Instrument Division (LID) came to the conclusion that while success in the '80s came from TQC, just-in-time and automation,

Rethinking work



Training at HP will become more systematic and convenient in the '90s, in the view of Corporate Training's Neil Johnston.

significant improvements in the '90s must come from better use of people's abilities.

For Dennis Faerber, manufacturing manager, the way to do that is through self-managed teams. It's not that easy, he admits. "The struggle in setting them up is to give team members perspective and skills while you're giving them control and responsibility."

LID manufacturing started the process by taking everyone off site for a

"We're embarking on a fundamental cultural change—and we're novices in making changes to this extent."

three-day retreat to go through the Process of Management (POM) course. It opened people's eyes to how they could play a greater role. Employees became involved in designing a new career resource center.

To begin to break down "functional silos," an integrated team from R&D,

The numbers are in

If Hewlett-Packard's hiring in the 1990s follows worldwide trends, the company will be scrambling for its share of highly skilled workers—and heavily involved in training and continuously developing the employees it has today.

Academic preparation is weaker—especially in the U.S.—with fewer people attracted to studying in the scientific and technical fields.

Yet for the first time in history, more than one-half of all new jobs created in the next decade will require some college education.

Where will those HP people come from? In many countries, birthrates are down, with population and work-force growth slower than at any time since the 1930s.

In the U.S., a new mix of employees will emerge. Among new hires, the traditional young white male will be largely replaced in the next decade by more women, non-whites and immigrants. They will make up 85 percent of all new workers.

Many countries in Western Europe, with fewer students of their own, are braced to compete harder for skilled workers as national barriers to migration fall in 1992.

Japan and Asia, Canada, Mexico and Australia also project a demand for skilled workers that will outstrip their supply.

The numbers for available employees in the next decade are now fixed: everyone who will make up the workforce in 2000 has now been born.

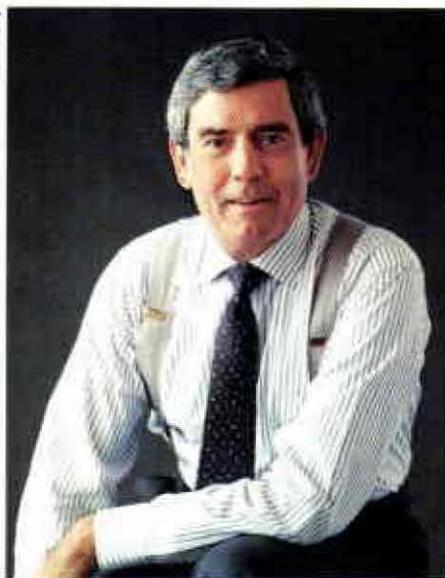
manufacturing and marketing was housed together in a separate building to come up with a breakthrough product. Cross-functional business teams were also created with far more focus on overall success of the business.

Old concepts of management and organizational structure are undergoing major changes, Dennis believes. "We're embarking on a fundamental cultural change — and we're all novices in making changes to this extent."

"If we are really going to achieve our fullest potential, we must establish an environment where our people can contribute at their fullest potential," he says.

"We must develop employees so they can take responsibility and run with it."

—Betty Gerard



Dan Rather

Measure has spent a good deal of 1989 celebrating HP's 50th anniversary by focusing on the company's past and present. In this issue, we set our sights on the future.

In the July-August issue, we asked employees to submit their visions of the future—and we heard from people all over the world. We also asked a few HP executives to predict what the future holds for HP and society at large.

To get a broader perspective, we invited more than 125 well known people in all walks of life to peer into the future and make predictions. On the next 10 pages you'll see a sampling of replies from famous people, as well as from various HP leaders and employees. We hope you enjoy their visions of the future.—Ed.

Especially now, in the post-technological era, overnight can be a long time. A week can seem an eternity, things are changing so quickly. So, never has the old editor's adage been more timely: "He who lives by the crystal ball must learn to eat broken glass." With all of this in mind and with a smile, here's my best guess:

By the third decade of the 21st Century, earthlings probably will be much deeper into exploration of the cosmos than most people now imagine. The problems of population growth, caused partially by the population explosion of the Twentieth Century, may well be worse, but they will be recognized more widely and better efforts to deal with them will be well under way.

Environmental concerns, especially those such as ozone and oceanic pollution, also will have grown, but again, my expectation is that better understanding of such problems will have fostered much more worldwide cooperation toward arresting, if not solving, them.

DAN RATHER
Broadcaster, CBS Evening News

Faster, faster, faster. More memory, more memory, more memory.
STEVE MARTIN
Comedian/author/director/entertainer

THE FUTURE

Viewing the future celebrity style

First of all, greetings to everyone at HP—and especially to my old friend Barney Oliver, who sent me my very first computer—an HP 9000A—as a Christmas present back in 1969. It was on HAL Jr.'s keyboard that I learnt the rudiments of programming, until eventually I was able to write 10 lines of BASIC without a single bug (although I must admit that I only managed this once). And I'll never forget a NASA weekend symposium in 1970 when Barney stunned everybody by producing the first "electronic slide rule"—the historic HP-35.

Now that's a very good example of the impossibility of predicting future technology. Although I attempted this in *Profiles of the Future* (1962), I made the point that the really interesting developments are precisely those which not even the crazy science-fiction writers have thought of—and they're better at this game than anyone else. (See Clarke's Third Law: "Any sufficiently advanced technology is indistinguishable from magic.")

So before we try to imagine the world in 2039, just look back the same distance and pretend we're in 1939, trying to anticipate the present day. Some things might have been forecast, e.g., artificial satellites (though certainly not a Moon landing!), colour TV, faster airplanes—though not the explosion

of cheap jet transportation, or commercial supersonic flight.

But no one, repeat no one, could have anticipated lasers, the microchip, the breaking of the genetic code, flybys of all the major planets, video cameras and recorders, personal computers—or the mere handful of electronic wizardry to which I'm dictating these words. I suspect, therefore, that the most exciting technology 50 years from now will be based on something that hasn't even been discovered yet.

Nevertheless, I'll hazard a guess at one development which may transform our society, and whose beginnings we can see today. (I'll ignore the biological sciences, specifically gene-splicing and so forth, because their awesome potential has already been discussed in great detail—and possibly even exaggerated.)

I suspect that the frontier of technology during the next few decades will move from micro-electronics to micro-mechanics, sometimes referred to as nanotechnology. This will make it possible to build bacteria-sized machines that can perform all sorts of repair functions inside the human body, and will have countless other applications, some of them quite terrifying (e.g., surveillance on a scale no intelligence service has ever imagined). For details, I refer you to Eric Drexler's *Engines of Creation* and Hans Moravec's *Mind Children*.

You'll notice that I haven't said anything about space exploration. That's because its future depends largely on political, not technological, considerations. Almost everything we want to do in space, we already know how to do—though not cheaply enough, by a factor of at least 10. When we achieve that goal, space will indeed be the final frontier. By 2039, the action will be on the Moon and Mars.

And the giant satellites of Jupiter will be beckoning.

ARTHUR C. CLARKE
Author, *2001: A Space Odyssey*

As I work, at my restricted level, with my handheld Hewlett-Packard computer, I reflect on the wild changes that will operate in A.D. 2039, and I focus on the ability of researchers in all fields to obtain almost instantaneous correlations between and among a huge variety of apparently unrelated data. Thus, if 19 disparate laboratory tests are potentially causative of heart attack, doctors will be able to investigate all possible permutations and combinations: items 3, 9, 14 and 17 elevated while 6, 8 and 12 remain normal, or any other bizarre groupings. Findings may be sensationally more complex than we anticipate.

Comparable correlations will be possible with economic data, weather reports from varied centers, patterns of study, cholesterol accumulation, and in whatever areas human beings function. Only the imagination of researchers will limit the application of this new intellectual tool.

I am especially interested in this potential as it applies to aircraft design and the flow of air over the leading edge of the wing as it pushes its way through the atmosphere. At present we design by applying intricate formulas requiring vast studies to a handful of critical points along the wing. With the capacity of the supercomputer, the values of all points along the wing can be so analyzed and computed.

I would therefore expect computers 50 years from now to have vastly expanded capacities and applications undreamed of.

JAMES A. MICHENER
Author, *Hawaii*

I feel by the year 2039 we will place a higher value on the Human Being. We will realize that people are more important than systems and technology, and that, in fact, it takes whole people to make systems work and create technology.

We will be more understanding, more patient and sensitive to the needs



Wally "Famous" Amos

of our neighbors on Planet Earth. We will begin to see beyond our man-made boundaries and accept the truth that we all have a responsibility in preserving this beautiful planet for those who will come after we have passed on.

By the year 2039, I believe we will be focusing more on our similarities and less on our differences. We will be seeing more and more through the eyes of LOVE.

Hewlett-Packard is a great company that will help my vision become a reality. Have a visionary day!

WALLY "Famous" AMOS
Cookie mogul

The rise of Unieurope—the United European State—in the decade of 2000-2010 radically shifted the world balance of power away from the United States, despite its close partnership with Japan.

The decisive factor in the rise of Unieurope was the adherence of the federal Republic of Russia, successor state to the divided Soviet Union, which was the end product of the Gorbachev reforms.

In Asia, the "tigers"—Korea, still-independent Taiwan, the Free State of Hong Kong and Singapore—set the pace to a sluggish China, still plagued by regionalism.

The United States headed the coalition of Japan and the "tigers," but came second to Unieurope's technological and political superiority.

HARRISON E. SALISBURY
1955 Pulitzer Prize winner
International Reporting
The New York Times

Desk calendar digital display:
15. 1. 2039

"Konichi-wa," my receptionist says as I walk into the office. Although American, he speaks Japanese and Chinese fluently. In fact, all the staff is multilingual to better communicate with branch offices, clients and suppliers.

I look forward to the day. My associate returns after a six-month parental leave even though we have communicated frequently by our home phone/computers. Two other employees are on leave to care for ailing parents. But they will return. They are committed to the company because of flexible management practices and technology that still keeps them involved.

At lunch, I transport past the employee day-care center where I see many of the research staff watching the kids at play. Employees without children long ago realized that this calmed frayed nerves and got creative juices flowing. That was a benefit few foresaw years ago when the company agreed, only to keep up with the competition, to create the day-care center.

And to think this was such a controversial issue in the 1980s.

PATRICIA SCHROEDER
U.S. Representative
Denver, Colorado/Washington, D.C.



Rep. Patricia Schroeder

JIM RICHARDSON/DENVER POST

The year 2039. What will it be like? We will be streaking from city to city in airplanes that cruise at Mach 3 plus. There will be an area code for the moon, where a small detachment of engineers will be working a launch station for manned deep-space probes.

There will be many more nuclear power plants, plus new sources of energy. Houses and work places—as well as lifestyles—won't change much. People will still appreciate America and the freedom it stands for.

CHARLES E. "CHUCK" YEAGER
Brigadier General
United States Air Force (Retired)

European by passion, profession and birth, the year 2039 offers me a tempting vision for Europe. Finally, we will share a common culture based on an international kind of "kindergarten."

This is the right image to show a pattern of cultural understanding and tolerance to bring Europe together.

In my bilingual home—Luxembourg—kindergartens are international by nature. Children speak different languages, and yet, they understand each other in a jiffy.

These children have a big step ahead of their elders. We just have to look at the European parliament's translation services to see how high is the language barrier in Europe. For example, have you ever seen a kindergarten equipped with earphones?

Europe in the year 2039 will be a multilingual continent where languages will be as intermixed as cultures. It will be one colossal kindergarten.

GASTON THORN
Former President of the European
Community



JAMIE TANAKA

Tom Peters

I'm no futurist. I have a devil of a time keeping up with yesterday. Given that, let me leave you with two thoughts:

First, there is no doubt that the pace of change will continue to accelerate. Therefore, there is also no doubt about the look of the survivor—individual or firm: They will cherish flexibility, glory in taking risks and be obsessed by learning and education throughout their adult lives (or mature years in the case of HP). Competitor #1—in 1989 or 2039—is not the Japans or Germans or Sun or DEC. Competitor #1 is "we've tried that already," an unwillingness to constantly embrace the untried, scary as it may be.

Second, everything will be different—but what counts will be the same. People will still make all the difference, even if "we" are genetically engineered—after all, if we're "designed" to run 1:00-minute miles by 2039, then the race will be to see who can first do it in 0:59.

TOM PETERS
Author *In Search of Excellence*

With global temperatures up by an average of 3° C, Russia is becoming a net grain exporter and the U.S. a net importer, while the warmer Canadian northland is being pioneered by greenhouse-effect drowned-Pacific-island refugees. Hypermedia in advanced-world classrooms now teaches only information science (literacy is by now a specialist archive skill), so the U.S. is a major exporter of (semi-intelligent) information-based services to the United States

of Russia (America's chief trading partner after the United States of Europe).

Planetary management has become an issue serious enough for draconian environmental regulation by a special UN force. The severed global restrictions on smokestack industrial production is causing increased tension in Northern Hemisphere relations with the underdeveloped nations, as the possibility of conflict exacerbates thanks to the recent success with fusion energy sources and the consequent drastic fall in demand for Third World resources.

JAMES BURKE
British TV personality



Malcolm S. Forbes, Jr.

The standard of living will be infinitely higher than it is today, but the cares and problems of everyday living won't seem any less pressing.

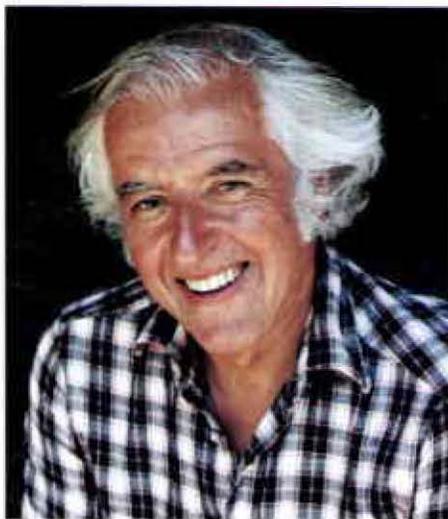
Forbes magazine and Hewlett-Packard, still motivated by the values of their respected founders, will continue to be major factors in their fields. Their vitality and consequence will remain undiminished.

MALCOLM S. FORBES, JR.
President, CEO & Deputy Editor-in-Chief
Forbes Magazine

Those who peer into the future predict what they hope will happen or what they fear will happen. My hope is that the world of 2039 will be a more caring place where differences among people will be celebrated and where life inside a big corporation like Hewlett-Packard will be so open that a typical employee might choose to spend her first five years in Palo Alto, the next five in Singapore, the next five in Budapest.

My fear is that differences among people will become exacerbated, leaving a trail of destruction, touching off mean struggles for dwindling natural resources and yielding corporations where depersonalization reigns. I expect that in either scenario, Hewlett-Packard will be bigger than IBM by 2039.

MILTON MOSKOWITZ
Syndicated business columnist



Milton Moskowitz



Katharine Graham

Looking back 50 years humbles anyone foolish enough to look ahead the same distance. The past makes two things abundantly clear: you can't tell what the future will be, and the changes might be even more dramatic than you would have believed.

Still, through the fog of the future, the direction of change can be discerned. In the world of communications, the current trend toward instantaneous global transmission of information will accelerate.

In 2039, even more than today, whatever happens anywhere will be known immediately everywhere. The impact on businesses and governments will be enormous—and possibly salutary. The grip of autocratic governments may loosen further as the people they rule learn more of what is going on around them. The recognition that we share one world with interlocking problems, responsibilities and opportunities will grow.

Will the global village then be a reality? Will cultural, linguistic and even political barriers fall? I doubt it. Neither Sky Channels, worldwide computer hook-ups nor the global reach of Madonna's grandchildren will turn Americans into Japanese, or French into English.

KATHARINE GRAHAM
Chairman of the Board
The Washington Post Company



George P. Shultz

The message of our time is that change is large, rapid and pervasive, so I don't have a clue as to what it will be like in the year 2039.

GEORGE P. SHULTZ
Former U.S. Secretary of State

We're in a dynamic industry where it's difficult to look too far into the future. Take HP, for example. Fully half our orders come from products that are less than three years old. So we're literally inventing our own future every day.

That's one reason I believe that preparing for the future is really a matter of positioning . . . of getting the ingredients in place that help us respond quickly to changes in technology, in customer needs and in the business environment.

We have a project under way whose goal is to identify those companywide capabilities that will position us well for the 1990s, and we'll be discussing this subject at our general managers' meeting in January 1990. But here again, we're not seeking a road map for the future. Rather, we intend to identify those skills and capabilities that will position us to take advantage of the many opportunities the future holds.

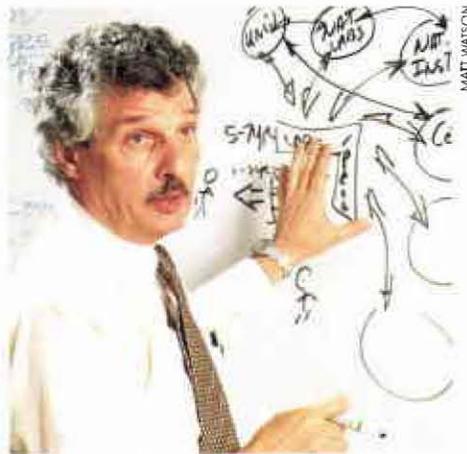
I have every confidence that the next half century will be just as exciting as our first 50 years, and that HP people will feel personally rewarded and recognized for their role in making the future happen.

JOHN YOUNG
President & CEO
Hewlett-Packard Company

I believe that in the next 50 years there will be another revolution comparable to the industrial and computer revolutions.

Superconductivity has that potential. There is still a great deal of research to be done, but if we can develop techniques for consistent, reliable production of "warm" (-170°C) superconducting materials, we can make a measurable difference to our quality of life. Ultra-sensitive measurement devices, extremely fast computers and near-frictionless transportation are just three of the applications we may enjoy.

I am even more excited about the potential of nanotechnology—molecular-scale machines. Researchers have already created micro-scale devices in silicon with technologies used to fabri-



Frank Carrubba

THE FUTURE

What HP execs have to say

cate integrated circuits. Now they are working at the molecular level. At Syracuse University scientists have built a molecular NAND gate that is 0.004 microns long and operates at less than a femtosecond.

Compared to today's PCs, a molecular computer would be more than 100,000 times faster and so small a *trillion* would fit in a teaspoon. To create these structures, scientists are combining the disciplines of physics, chemistry and biology, and using the new scanning tunneling microscopes to actually see the molecules.

These are exciting times.

FRANK CARRUBBA
Director, HP Laboratories

As we look ahead to the next 50 years of computing, it is relatively easy to project more intuitive interfaces tailored to specialized usage and connected to a rich international information infrastructure. It is less easy to guess what people will do with this capability.

I don't feel too badly about this. HP is not so much characterized by a grand, long-term product strategy as by what Bill Hewlett once called inventions of opportunity. Our challenge is to continue to insist on fundamental contributions in the products and technologies we produce, and that should continue undiminished.

I think the next 20 years will be more exciting than any period we have ever seen, because so many more people will participate in the invention process. We have at last arrived at an understand-

ing of the real potential of computer technology. We are finally concentrating on the right problem—making computers usable by everyone. Computers, long pilloried as a dehumanizing force, will become the most powerful means of personal creative expression and communication ever known.

JOEL BIRNBAUM
Vice President and General Manager
Information Architecture Group

HP is celebrating its first century. We at HP-Europe are proud to represent over 60 percent of the global company revenue.

The European Unified Market is now expanding from Portugal to the Urals and from the greenbelt of the Sahara countries to the newly developed Forming States in the North Pole Region.

The European Government in Brussels has acknowledged the 100th European official language, overwhelming the British opposition. Implantable computerised 100-channel translators, developed by HP-Europe SA, allow a simultaneous understanding and synthesized speaking of each language. The only exception is the English language, where the 30-year quarrel between Shakespeareans and modernists has prevented agreement on a standard version.

Italy set an example as the most homogeneous and organized among the 100 European Member States. It recently adopted its 25th official language, a tradition dating back to the pre-Renaissance age. Among the official Italian languages we find are Turkish, Arabic, Swahili and Urdu, to meet the requirements of the local workforce.

Official statistics published from Brussels this week were automatically entered into HP's holographic pocket super-computers. All European citizens carry them in the pockets of their ad hoc bathing suits. (There's no more need for complex, old-fashioned dress

in today's globally controlled terrestrial atmosphere.)

Statistics indicate that, fortunately, abundant production of 20-pound chickens, one-pound eggs and excellent crops of bio-engineered macaroni plants complies with the eight-meals-per-day requirement of our youngsters who are now, on an average, about seven feet tall.

As for our beloved company, this year marks the return of Corporate Headquarters to Palo Alto, California, after several years in Osaka, Japan, and then in Pyongyang, Korea.

Mr. David Packard and Mr. Bill Hewlett participated last month in the celebration of the return to California. The ceremony took place at Stanford Stadium. It can seat 300,000 people and is entirely built with silicon scraps of chip production from the early decades of this century. The last production of silicon chips was discontinued earlier this year, and fully replaced by genetically engineered mega-logic circuits grown in pig hair. Pig farms all along the El Camino Real assure world supply.

The anti-gerocell-regenerating food, based on NTGR (Negative Time Gerocell Regenerator), which is a Bell Lab invention from 2009 achieved in cooperation with HP-Waldbronn, seems to work according to plan.

Mr. John Young, now 105, has announced his intention to retire from the Presidency of the United States, after winning a decisive tie-break last week at the final of the year's Davis Cup.

For myself, I am again planning to retire six years from now at 110 to pursue my dream of professional recycling at the Florence Kindergarten.

Congratulations to all of our 500,000 employees around the world for having reached our trillion dollar "take the offensive" goal by 2039.

FRANCO MARIOTTI
Senior Vice President and Director
Europe/Middle East/Africa Operations



Alan Bickell

Hewlett-Packard in the year 2039 will be a truly global enterprise. Its Board of Directors and Executive Committee will be multinational, representing a broad spectrum of ethnic background and culture. HP's largest regional market will be Asia Pacific, with the U.S. accounting for less than 30 percent of annual revenue. Hewlett-Packard will rank in the top 25 on the Fortune Global 500.

Corporate headquarters will be decentralized, with major elements of presence located in Asia and Europe. The broad geographic distribution of corporate and operational activities will be transparent to management and the knowledge workers within the company, as they will be linked by highly sophisticated real-time voice, holographic-image and data services.

The development and manufacture of hardware will represent a small part of the company's business. Software development, consulting, systems integration, and management services and support of sophisticated measurement, computation and communications systems and services will be the principal revenue generators for the company.

Strategic alliances, joint ventures and project collaboration will represent

extremely important elements of activity within the company, and will occupy a very significant portion of what will be the equivalent of today's R&D, marketing and manufacturing activity. The profit centers of the company will be located at the customer interface, as the principal drivers of profitability will be services provided there.

The HP way will be alive and well. It will still be a great company to work for. I wish I could be there.

ALAN BICKELL
Vice President and Director
Intercontinental Operations

What will HP and life be like 50 years from today? It all depends on whether we use our bloody heads or not. Further development in technology will continue to improve home music reproduction, TV quality and definition. But, unless we thoroughly revamp our schools, there won't be anything worth hearing or looking at. There is no limit to how low the lowest common denominator can be. We probably won't have anticipated the real end of fossil fuels, and will be suffering an energy crunch that will flatten us. We'll have spent our substance pursuing a false egalitarianism and end up at great expense keeping the unfit alive to breed.

Of course, we could avoid all of this. We could establish contact with extraterrestrial intelligence (the only kind, I'm beginning to think) and find out how they, the truly fit, survive.

BARNEY OLIVER
HP Vice President of Research (retired)

"My dad says when he was young, computers used to have keyboards and screens like an antique TV set."

"Really? What for?"

"He says there were special languages to talk to such computers, they were very difficult to learn and you had to key every letter by hand."

"You mean you couldn't just stand beside the machine and converse with it the same way I tell the TV which programs or news I want it to record?"

"Right. You had to write everything precisely and without doubts."

"Wow. You had to think for the computer. If I need some help today I just grab the computer from my briefcase and tell it what I want to do. The computer speaks, tells me how it understands what I said and will eventually find me solutions to the problem."

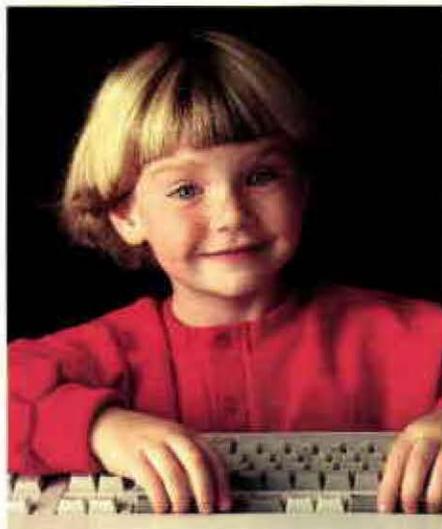
PATRICIO PAEZ SERRATO
Guadalajara, Mexico

It is 2039 and the business landscape has shifted dramatically in the past 50 years. The petroleum industry, having literally run out of gas, shifted its focus to waste-treatment and recycling. Although this originated as a cross-eyed response to urging from the federal courts to clean up its act, it turned out to be highly profitable. Now the industry supplies 90 percent of the world's renewed materials. But its biggest money-making coup was commercializing the water-treatment and distribution networks. This ensured its position as the second-largest industry.

The largest industry is health-care delivery, accounting for 70 percent of the Gross World Product and 30 percent of employment. HP's Medical Support Division, which resulted from the consolidation of the old Medical Products, Worldwide Customer Support and Supercomputing Networks divisions, is HP's largest division and has made HP into the world's most profitable and responsible company.

Happy Centennial!

TED MITA
Corporate Headquarters
Palo Alto-by-the-Sea
Earth



Perhaps this moppet will grow up to be HP's chief executive officer in 2039.

THE FUTURE

Employees share their visions

The Chairman of the Board of Directors of the One World Corporate Socialist State gave the annual report to planetary stockholders today. The HP OOX (Executive Decision Maker computer) presented a rosy picture.

Reorganization of the rebel subsidiaries with divisions formed before the Great Corporate Wars has proven successful. Satellite Ozone Generators appear to be slowing the Green House Effect; trends suggest a full reversal by the middle of the next century.

Enviro Labs reports bumper crops in the genetically engineered wheat fields of Northern Canada and Siberia, and varieties able to grow in the Greater American Desert are due for release. Rainforest restoration, using genetic stocks from the World Plasma Bank, is up by 20 percent. Another healthy indicator is that the world population decline has stabilized at 1.3 billion.

On the down side, toxic cleanup of the oceans has been largely unsuccessful, and efforts to stabilize the San Andreas Fault are proving futile, making the abandonment of California likely.

A dividend to stockholders will take the form of a 7 percent increase in the protein level of algae bars on coffee stands worldwide.

STEVE KLAUSNER
Rohnert Park, California

I see a work environment where most employees work in many small sites, broadly dispersed around the peripheries of residential communities, or individually from their homes. This is done to optimize efficient working hours and reduce wasteful commutes.

All employees have a complete, full-duplex design and communications station at their finger tips, even those working out of their homes. All stations are networked together on a worldwide basis, allowing instant two-way communications, including video. "Meetings" can be held without actually having to meet. Paper is virtually nonexistent.

Manufacturing sites are highly automated with abundant robots. People will only "manage" the shop floor and the manufacturing process.

Sales are handled remotely via video links or third parties, with an occasional customer visit only to establish rapport. No time is wasted.

Thinking is emphasized and leisure time is more readily available.

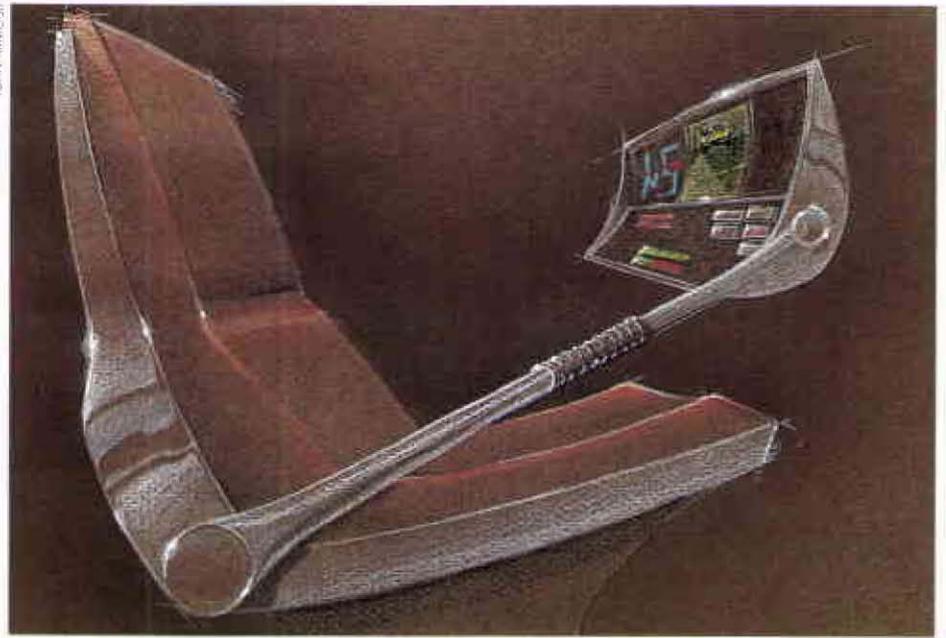
BOB CAPRILES
Mountain View, California

The Bible, the word of God, says that one day this world will no longer be in existence, and perhaps the year 2039 may never arrive in the "now-known" condition. Perhaps the lord Jesus Christ will have returned before then.

Each of us needs to consider (that) we have all sinned and come short of the glory of God. Acknowledge sin, ask God's forgiveness and He will come into our lives in the person of Jesus.

Ask Him into your life, then He will come and live within us and change us. Then know that we will spend eternity with God in heaven.

EDITH YOUNG
Loveland, Colorado



Individual work stations in the future may be comfortable chairs with an attached arm and panel containing personal display screens and built-in computer systems.

I see many fundamental changes in the way we think by the year 2039, due mostly to the virtually unlimited supply of electric power. As we advanced from vacuum tubes to four-megabit DRAMs between 1939 and 1989, electrical-power generation, distribution and storage will see a comparable change in the cost per kilowatt hour after we have technological breakthroughs in nuclear fusion and room-temperature superconductivity.

De-urbanization will begin as high-speed public transportation and low-cost communication allow workers to move further away from their jobs. The environment will be much cleaner and the threat of global war will be nearly extinct as energy will be cheap enough for everyone to produce what they want and need.

Ion engines will allow us to explore planets beyond Mars, and society will consume very little animal tissue as we question what more advanced life forms would do with humans when they "discover" us.

KIRK LINDSTROM
San Jose, California

I want to see a future where snow leopards climb in the mountains, tigers roam the jungles, cheetahs chase gazelles across the plains and condors spread their wings in the wild. In my future, there is still blue in the sky, green in thousands of varieties of grasses, brown and white of owls living in old-growth forests and the pink and yellow of lady slippers in the undergrowth.

But as I watch the drivers in the car-pool lane—whose only passengers are cellular phones and fax machines—I wonder. Ask yourselves: Do you bundle newspapers? Do you walk the extra distance to recycle that can? Do you introduce children to nature and teach them to "take only pictures, leave only foot-prints?" Do you realize that we are rapidly living in one global village?

The louder the yeses, the more likely 2039 will be a decent vision.

ESTHER HELLER
Sunnyvale, California

The next 10 to 20 years are going to be earthshakingly dynamic. It is the base for these predictions for 2039:

Health is being regarded and practiced mainly as one's own domain and not the doctor's, which leads to profound changes in the health-care and insurance business.

Energy will be discovered that makes today's (utility companies) obsolete.

Travel will take 20 minutes (from California) to New York.

I will no longer dwell on the Earth plane.

Industry will only exist for the benefit of people, earth and the universe.

If HP fits the above, it will have its place.

This is about as accurate as any of our marketing forecasts.

GEORGE PFUND
San Jose, California

12 Benjamin, M29 (29th year of the Millennium)—From its corporate offices along the seashore in New Denver, Hewlett-Packard Company announced its 100th anniversary celebration, to be held on 30 Judah at Academy Resort Center near Colorado Springs.

HP was started 100 years ago in 1939 A.D. (Old Calendar) in Northern California. Its former headquarters, along with many of its divisions, were destroyed in the Great Tribulation and now lie at the bottom of Pacific IV. Although much HP electronic equipment was employed by the Enemy's

troops at Armageddon, it was to no avail when King Jesus appeared.

During the Great Reconstruction, HP was one of a few American electronics firms granted a continuation permit by the Holy City. With the help of a team of immortals, it consolidated its activities around existing sites in Colorado and has steadily produced significant products used in the Earth Redemption programs.

It is hoped that many immortals who were employed by Hewlett-Packard before the rapture, and perhaps even William and David, will beam in for the grand occasion.

ARNOLD JOSLIN
Loveland, Colorado

I envision a world that isn't hampered by:

Handling money. (All business will be conducted using "electronic" money.)

Software to operate computers. (Computers will be voice activated and understand any language.)

Vesting to determine retirement. (The government will keep track of retirement benefits from every place you ever worked, regardless of length of service.)

Having to water the lawn. (Water will be so precious that none will be used for lawns.)

Over-population. (Due to an invention that produces worldwide birth

control, you will need to have a permit to have a child.)

Life will be different, but good, in 2039, mainly because there will be a good foundation of memories of 1989 for the world to build on.

PATRICIA JOHNSON
Fort Collins, Colorado

With the availability and low cost of global transportation, Yogurtu Unghe, marketing manager for Networked Systems, has returned to his home town—Swahiland—in Africa, while still working for HP's Southern Hemisphere Marketing Center (headquartered in Buenos Aires, Argentina).

He regularly visits customers with local SRs in his cryogenic car. To travel to another continent, he relays for a tractor beam from one of HP's orbiting satellites. In his car he has full datacom facilities and can link to HP Desk-Manager XV via his pocket PC with MS-DOS 20.5 using Hyper-Wave Software and 20 Terabytes of regenerating biomolecular memory. He is responsible for an annual quota of \$100 billion.

Yogurtu manages English, Spanish, French and German, as well as his native Swahili, but can easily interact with customers throughout the world with the voice-activated universal tie-bar translator. He can easily communicate with his office at any time using any of the company's satellites. On his free time, Yogurtu likes to go on safari hunting rhinoceros with his fellow countrymen.

ENRIQUE SETARO
Mexico City, Mexico

Well, folks, this is the first week in a while I have found myself working at my home base of Queensferry Microwave Operation here in Scotland. With the new product-development times down to 50 hours, you have to be moving between divisions pretty quickly.

I've just spent five weeks at the Moscow Division working on the up-graded expansion unit for the galactical transporter PALO ALTO I. You'll recall



Sketches by John Armour, HP's visionary futurist, are sprinkled throughout this issue.

this was our first transporter project following the purchase of an ailing NASA at the turn of the century. Boy, what a difference that made to the company. Who could have predicted that happening, especially just after Moscow had become the 51st state in the wake of Gorbie's reforms?

I remember in the old days having to work at least 40 hours every week. It makes the modern five-hour week seem trivial. However, that's one of the advantages of competition. Those days were finally gone when IBM went to the wall in the early nineties.

Anyhow, I am off to the Spokane Division after lunch, but I told the wife I'll be back for tea. There's modern transportation for you, eh? "Beam me up, Scotty (popular phrase from an old movie)."

By the way, did you know that John Young Jr. has just been elected president—of Mars!!!

STEVEN McCracken
Queensferry, Scotland

I read a recent story in the *New York Times* that stated 25 million Americans work from home full time. The article anticipates that in three years, 30 million or 14 percent of the labor force will work from home. If this trend continues, you don't have to be a professional soothsayer to know that

more and more cubicles at HP will become less and less occupied.

If you get a lot of mileage out of HPDesk and voice mail today, these tools will become indispensable to you as a home worker in 2039. And if your manager can't live without seeing your smiling face in the morning, a video-conference should be possible over lap-top-size computers within the next half-century.

As for flex time at HP, a special noon starting time for the Giants vs. Astros certainly doesn't pose a problem for the home worker of 2039.

MIKE CARL
Sunnyvale, California

Thursday, June 23rd, 2039
I was busy recharging the battery of my EID (Encephalic Input Device), an electronic headphone that enables you to give inputs to your workstation just by mind power. (HP produced its last keyboard 12 years ago in 2027.) Suddenly, the videophone beeped. I pressed the green answer button and my wife, Laura, appeared on the screen.

"Hi, darling. Sorry I'm not properly dressed yet, but your mom just called from Australia. She'll be here in two hours. Could you manage to pick her up from L.A. Astro-Port at twelve o'clock?"

"Sure, no problem, but you'll have to get some real pork chops for lunch. You know mom isn't used to that soja meat."

"Okay, I'll go and see this old butcher on South End. He still has these kinds of food."

"Fine, honey. See you for lunch. And this afternoon I'll take mom and the kids to Hewlett-Packard World. They've finished their latest attraction—the 3-dimensional time converter. I promised the kids to take them for a walk in 1939 and watch Bill and Dave at work in their garage."

HANS-GEORG STRAUB
Böblingen, West Germany

HP prepared to celebrate its 100th year by reviewing statistics from 1989:

The population of the U.S. stands at 421 million—up from 240 million. World population stands at 10 billion vs. 6.5 billion in '89.

The most dramatic increase in gross national product was registered in Europe with a GNP of 13 trillion vs. 2.5 trillion in '89.

With over 65 percent of its sales in Europe (up from 49 percent in '89), HP saw its first European-born CEO report HP sales of 52 billion vs. 11 billion.

CEO Klaus von Falkenburgh attributed world growth to the formation of WBUs (World Business Units) that took a more global view of the world than SBUs and ABUs did at the close of the last century.

In the last three decades, HP has discovered more than 100 viruses and their remedies by using its vast resources to prevent disease and prolong life, as well as improving the social order by genetically improving the productivity of new strains of staple foodstuffs. Average life expectancy for men and women has increased by 25 years, and there are many "century-club members" who are still actively engaged in daily tasks.

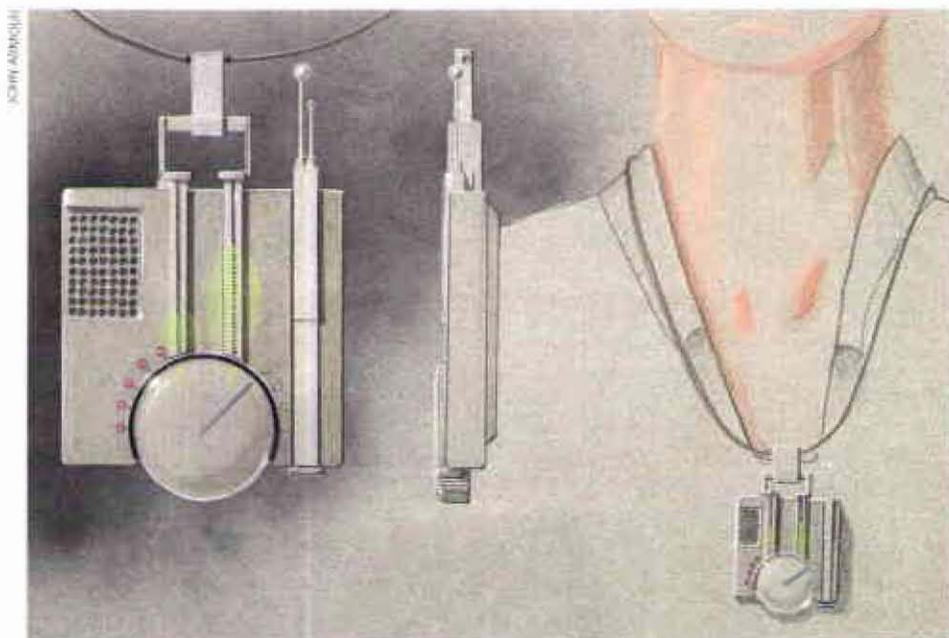
Mr. Falkenburgh noted that the HP work force totals 276,000 persons, with 30,000 on loan to institutions such as the National Institute of Health and the Atlanta Disease Research Center, as well as universities throughout the world.

HP is a manufacturer of computer, measurement and micro-genetic analyzers and technology-application data for automation, cybernetics, and biochemistry. It maintains a world molecular genetic center in Canada.

HP is listed on the world exchange in Zurich, Switzerland, and its listed price on 2/31/2039 is \$75 per share. The stock has split 10 times since 1989.

JOHN OLIVIERI
Waltham, Massachusetts

We will truly be making measurements "from dc to daylight." "Electronics" will be a subset of a larger range of activities that will include "photonics," the extension



Computing in the future may take many different forms, according to HP visionary futurist John Armour. Voice-activated computer jewelry could be functional and stylish.

of what we're doing now into the frequency range that includes light.

To assure that HP has enough people with the skills it needs, when and where it needs them, HP will become a major factor in the educational field, setting up a training institute of its own or joining with one or more compatible partners in such a venture.

HP sites will become more self-contained, providing most of the amenities expected of small towns. Partly this will be done in recognition of the need to protect HP's investment in its employees as the dangers of the world become greater.

HP, a small-but-powerful fish in a large pond, will be eyed as a takeover target and may be taken private. One rumor will have HP being sought by Parking Corporation of America, with the idea of turning its plants into garages.

World crises will provide several tests of nations and of corporate cultures. The crises will be the usual ones (see Revelations plus economics texts).

JOHN BUCK
Santa Clara, California

Hewlett-Packard Company announced this week that it had hired its one millionth employee—an expense-reduction specialist. HP flew 250 business correspondents and stock analysts to the corporate retreat on the moon for the announcement. HP, which last month announced that it had reduced its total manufacturing workforce to only 20 part-time people, also announced the

formation of a full-time 250-member council to look for ways to reduce expenses. Results of the council's work will be available free via a daily 24-page newsletter, which is produced by a full-time staff of 120.

HP's Corporate Personnel manager told the gathering that his 40,000-member department will be expanding by at least 50 percent so they can train everyone in the company about expense control. Initial plans call for the company to recruit at least 8,000 graduates with advanced degrees in Expense Control Administration, and also one or two more engineers.

In other news of interest to the HP community, the editors of *Measure* flew Max Flapjack and his entire family to Palo Alto for a two-week, all-expense-paid trip to collect his T-shirt for having written the 10,000th letter congratulating *Measure* for the great job they were doing. Max is an expense-reduction specialist in the Personnel Group in the Finance Section of the MIS Department of the Aleutian Islands Division which, after last year's earthquake, is located southeast of Palo Alto.

Looking toward the future, the Havana Division is really excited about sales prospects for its new Model 200C, which, although it contains almost \$2 worth of parts, has a retail price of only \$14,995. Keep up the good work!

And finally, HP announced its results for fiscal year 2039: a profit of \$5.86 on sales of close to 300 quadrapizillion dollars.

GEORGE SCHROLL
Rockaway, New Jersey

YOUR TURN

Measure readers share their views on matters of importance with employees

Call for champions

The "No more HP way?" letter and response in the September-October issue was an interesting exchange in points of view.

It was between a genuinely concerned HP employee and a rather measured response from one of HP's top Corporate Personnel managers.

On the one hand, Joel Nevison's letter suggests that perhaps the HP way is in jeopardy, and yet Pete Peterson's response never once mentioned the HP way. Pete seemed more interested in defending HP's Apollo actions than addressing the larger issue: Is the HP way dead or wounded?

We all need to champion the HP way or it will escape us and we will turn into just another \$10 billion company.

STEVE SINN
Colorado Springs, Colorado

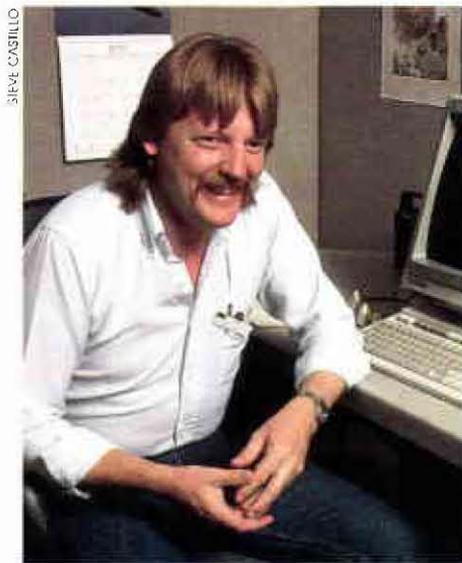
Where were we?

Those of us who are part of the Apollo family were gratified by the coverage the takeover was given in the September-October issue. On the other hand, those of us in the technical-support organization felt somewhat slighted by another article in the same issue.

After the takeover, we officially became part of the North American Response Center Organization as a new outpost of HP support in the Northeast. Yet, somehow this fact was overlooked in your article on customer support and the accompanying world map showing response center locations.

RICK CONTI
Chelmsford, Massachusetts

As you know, there are 32 HP response centers worldwide. Space limitations prevented us from mentioning them all in the article, just as the map showed a representative sample of worldwide locations and not every site.—Ed.



Earl Norwood

Applause for Earl

I would like to thank Shirley Gilbert for her article about Earl Norwood (September-October 1989).

It was so refreshing to read about someone who, despite a handicap and having people tell him he'd never make it, went ahead to finish in the top of his class, get a rewarding career and still have time for music.

I think everyone who read about Earl feels as good about him as he does about himself.

DEB HADLEY
Colorado Springs, Colorado

What an inspiring article on Earl Norwood! So often the disabled are limited more by others' perceptions of their abilities, rather than by their own limitations. Disabled people deserve the chance to be productive members of society and I'm proud to work for a company that promotes this philosophy. Disabled individuals can "perform" just as well as the "abled," and Earl Norwood is an excellent example.

BETH WEBER
Cupertino, California

Stop the flood

Ever since the story on worldwide customer support (September-October), the switchboard at Worldwide Customer Support Operations (WCSO) has been flooded with calls requesting the 24-hour support phone number. Could you please print that in *Measure*?

JOYCE SOARES
Mountain View, California

The number is 800-545-3600.—Ed.

Editor's treat

Congratulations! You did a wonderful job of editing the July-August issue. I learned much from your report of "A yen for success" and enjoyed a sweet article of "Sweet taste of success." People stability should be one of the important factors to YHP's success. The article of "Sweet taste of success" makes *Measure* more warm and friendly to us.

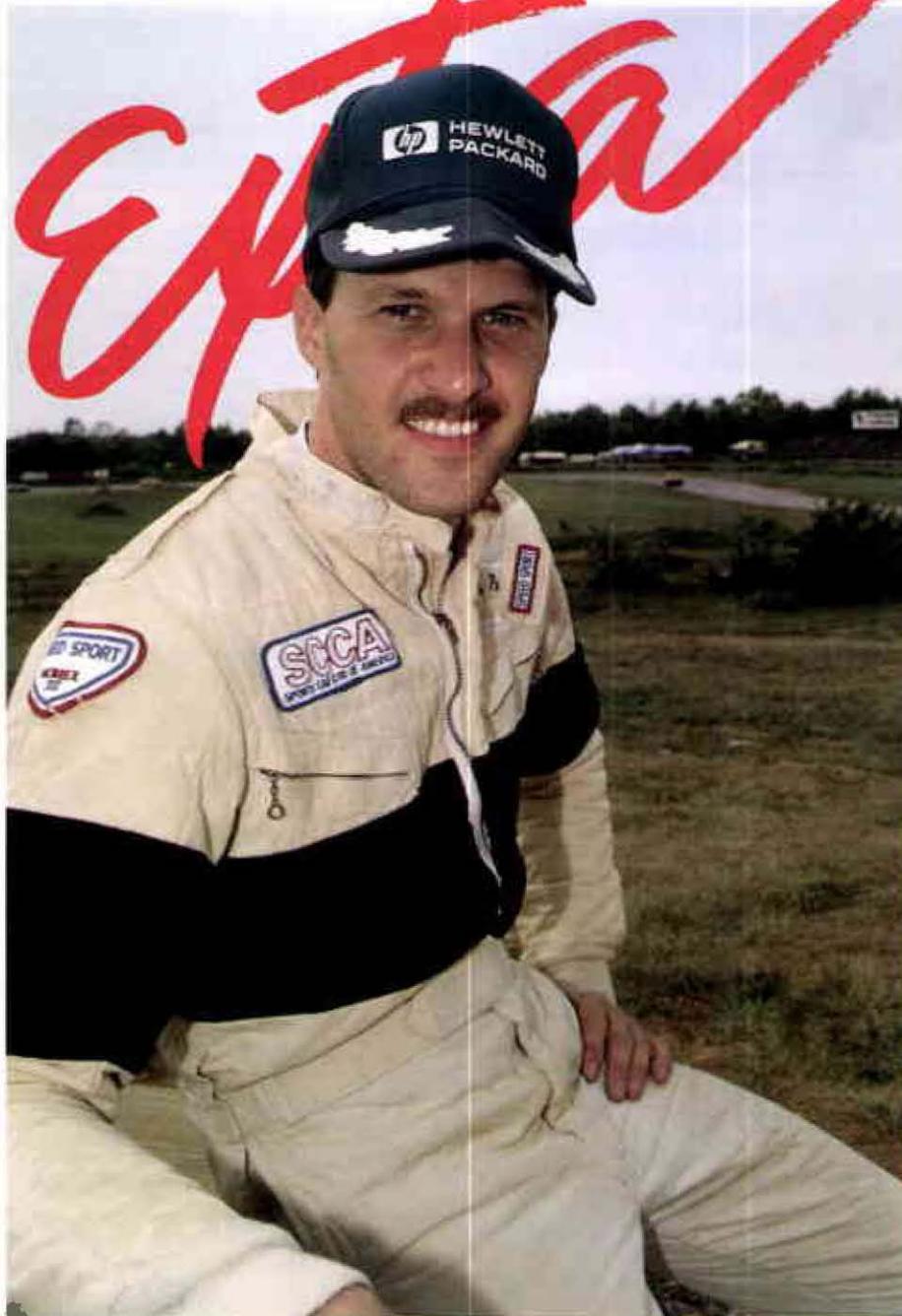
LAURA LIU
Taipei, Taiwan

Please send mail

Do you have comments about something you've read in *Measure*? Send us your thoughts. We want to share them with more than 95,000 other employees.

If your letter is selected for publication, you'll receive a special *Measure* T-shirt with the 50th-anniversary symbol. Be sure to send us a return mailing address, and indicate your T-shirt size—unisex medium, large or X-large.

Address letters via company mail or HP Desk to Editor, *Measure*, Public Relations Department, Building 20BR, Palo Alto. Via regular postal services, the address is *Measure*, Hewlett-Packard Company 20BR, P.O. Box 10301, Palo Alto, CA 94303-0890 USA. Try to limit your letter to 150 words. We reserve the right to edit letters. Please sign your name and give your location. Names will be withheld on request.



When he isn't at his job as a district manager at HP's Baltimore, Maryland, sales office, Pete Cage lives life in the fast lane as a 140-mile-per-hour driver of Club Ford race cars.

Cogito ergo zoom*
 *Loosely translated:
 "I think, therefore
 I go fast."

ORDINARY PEOPLE

Pete Cage stands by The Chute, a particularly hair-raising portion of the track at Summit Point Raceway in West Virginia. He's offering insight into why some drivers sweep through Turn Four without losing speed while others squander precious parts of a second by committing one of the many errors—either dramatic or minute—that can thrust a car off the ideal line.

One after another the Club Ford cars hurtle down The Chute at more than 100 miles per hour, their drivers preparing for the shock of the hard left-hand turn that awaits them at the bottom. As Pete points out a driver who seems to be coaxing the most out of his car, the scream of hot tires splits the heavy summer air. A royal blue car with vivid yellow trim spins violently off the track, spewing a cloud of throat-clogging dust. The driver pauses for a second or so, slams the car into gear and fishtails back onto the track.

The student's eyes return to Pete and he waits for the detailed, precise explanation he's come to expect. Pete turns slowly to the student, smiles ever-so-slightly and delivers the line in perfect deadpan style. "Try not to do that," he says.

That's Pete Cage for you—auto racer, driving instructor, CE district manager from the Eastern Sales Region's Baltimore, Maryland, office, and possessor of a wit that's both dry as the Gobi desert and quicker than a hummingbird in a wind tunnel.

For the past four years he's been consumed with a passion for navigating a finely tuned, powerful machine around undulating ribbons of asphalt. His choice of vehicles is the Club Ford, a subclass of the Formula Ford racing cars. A Club Ford is a single-seat, open-cockpit machine capable of propelling Pete around the race tracks of the Mid-Atlantic United States at speeds up to 140 miles per hour.

Why does an intelligent, thoughtful individual risk life, limb and any disposable income in such a bone-rattling, high-intensity sport?

"There's an immediacy to it," says Pete. "When the race starts it's time to deliver—right here, right now. There's

no hiding and there aren't any excuses, even though there's about 25,000 of them. You either did it or you didn't."

Putting your abilities on the line at 140 miles per hour takes you places you'd otherwise never go. Pete compares his inauguration into the fleeting world of road racing with parachuting.

"When the guy pops the door open and you're sitting two inches from half a mile of nothing, it sounds like they've opened the gates of hell," he says. "That's how I felt just before they threw the green flag."

There are pictures of Pete as he rolls off the track after his first race.

"Through the face mask of my helmet you see this smear of crimson," he laughs. "My blood pressure must have been in four digits—there's just this red glow, little slits for eyes and a grin because I'd survived it."

Four years later, the unbridled fear of the novice has given way to the steely composure of a veteran. Eight week-ends of racing comprise a Club Ford

"When the race starts, it's time to deliver—right here, right now."

season. With one race to go, Pete is perched atop the overall standings, coming off a wildly successful three-race stint at Summit Point, where he finished first, first and second in three attempts.

His steady ascent to the top rank of amateur Club Ford drivers can be attributed to three factors: experience, continual (some might say obsessive) commitment to improvement and the faithful support of his two-person crew.

Experience has come through trial and error, observation and discerning which of the other drivers will give him room to run and which would rather drive into him than let him pass. He's also learned what personality traits are necessary to succeed at a sport where the scenery whizzes by at breathtaking speed while another driver, inches from your tailpipe, tries anything he can to get where you are.



Sometimes "you have to put on the get-out-of-my-way hat and wear it for the race," says Pete, who powers his white 00 car around the track at Summit Point Raceway.

"The people who do well consistently are almost obnoxiously aggressive and cocky," he says. "You at least have to slip comfortably into that mindset. You have to put the get-out-of-my-way hat on and wear it for the race. But sometimes you go for it and come walking back with the steering wheel in your hand."

In road racing, there's no room for distracting, disabling emotions. A successful driver is one who achieves a Zen-like state of calm and concentration while the chaos of the race swirls by.

"When you get mad or anxious, the finesse goes out of your driving," Pete explains. "Then you start tossing the car around and you slow down. It may feel faster, but you're being choppy with the vehicle and that doesn't work."

The trick is "to get as completely right-brained as possible." If something happens, you try to get your left brain to observe and say, "Oh, that happened." Then put it behind you. If someone gets around you, the mission becomes to get him back."

Once the emotions are harnessed, the goal of road racing is simply to drive a high-powered car around a twisting piece of asphalt in the least possible amount of time. There are physical forces at work, ones that can be discerned, analyzed and put to use in the search for the ultimate performance. These dispassionate truths are an endless source of joy to Pete, a self-professed "datahead."

Two years ago, he began using a measuring device called a g.analyst, which is a small, two-axis accelerometer that attaches to the floor of his car's cockpit.

"It looks at the longitudinal and lateral axes of the car and measures g forces in those two directions," Pete explains. "Then it records against time in tenth-of-a-second intervals. By analyzing the results, you can understand better how you're operating the car."

After each session on the track, Pete hooks up the g.analyst to a portable HP Vectra computer and downloads the information that's been captured. A custom software package plots the results and a printer spits out a chart that indicates on paper precisely what happened on the track.

Then Pete goes to work, reliving the session in his mind and comparing his memory to the emotionless data on

"Sometimes you go for it and come walking back with the steering wheel in your hand."

the paper. Dana Phelps, his pal and volunteer crew chief, calls the g.analyst "a great toy."

"It provides an unbiased judgment of what Pete's done—right or wrong," says Dana, who doubles as a data communi-

Extra

ORDINARY PEOPLE

cations specialist within ESR. "Looking at the data from the g.analyst, you can tell if he bobbed in the turn or if he hit the brakes too early. It'll show whether his transitions—braking, acceleration, left and right turns—are smooth. And the smoother you get, the faster you go."

After digesting this impartial critique, Pete returns to the track to fine tune his driving. During the year that he's used the g.analyst for road racing, he's shaved several seconds off his lap times and improved his mental performance considerably.

"One example is The Chute, which can be horribly frightening," he says. "I discovered that I'm just turning slightly over a g and a quarter, and the car is not near its limit. So I know I can go faster without it scaring me."

The final ingredient in Pete's racing success is provided by two faithful cohorts who give up eight weekends a year to get filthy, sunburned and bone-weary in support of his efforts. Dana is the technical wizard, charged with ensuring that Pete's car is ready for the road. Lori Redmond, marketing support rep in ESR's Rockville, Maryland, office, handles the emotional side, eliminating many of the external distractions so Pete can focus on the task at hand.

"He's very intense before a race," says Lori. "I take some of the responsibilities away so he doesn't have to worry about them. It can be something as simple as waxing and polishing the car."

"I always tease him that he has a better chance of winning when I do the waxing," she laughs. "Every time he does it himself, he's a good two seconds slower."

"I absolutely couldn't do it without them," agrees Pete. "Each of us has tasks that we do—from timing to communications to some of the strategy."



Pete, a self-professed "datahead," uses an HP Vectra portable computer at the track to analyze his driving performance and determine precisely what happened during a race.

And there's someone to share the little victories with, whatever they might be."

As the season winds its way to a conclusion, the victories are becoming larger and more frequent. No matter where Pete's name appears in the final standings, it's been a staggeringly successful year. Road racing is a difficult

"There's probably a 99-to-1 struggle-to-satisfaction ratio, but the satisfaction more than makes up for the struggle."

beast to master and it's fitting to an analytical sort like Pete that the amount of effort he expends is proportional to the success he achieves.

"There's probably about a 99-to-1 struggle-to-satisfaction ratio," says Pete. "But the satisfaction is pure and almost too much to handle. It more than makes up for the struggle."

Before long, the snows of winter will give way to the blossoms of spring. With a fresh, unsullied season lying before him, Pete will return to Summit Point, fire up Club Ford 00 and begin an annual ritual.

"During that first practice session, I do about four easy laps to make sure the car's okay," he says. "Then I come through the last turn before the straight-away. As soon as I get straightened out, I plant my foot on the accelerator."

"The car goes rrrrrrRRRRRRR," roars Pete, an ear-to-ear grin spreading across his face. "And I go, 'Yeah! I remember this.'" —David Price

(This is the first Measure story by David Price, senior communications specialist for the Eastern Sales Region. Known in some circles as a lead-foot driver, David is a clutch performer in our view.—Ed.)

LETTER FROM JOHN YOUNG

President John Young discusses one key to HP's future: cooperation



MANUEL ZIMMERMANN

Cooperation will be a major theme in the future, says President and CEO John Young (center) during a European stock listings meeting.

In this issue of *Measure*, as you read what's ahead for HP products and people, I think you'll see an important theme running throughout our visions of the future. It's one that can be summed up in a single word: cooperation.

Many of our goals have to do with making machines cooperate. That's because most of our customers share the same need: to acquire and combine data from different sources in ways that makes their information more meaningful and useful.

So we're aiming to knit diverse computers together through a cooperative computing environment (CCE); we plan to do the same for instruments with the Measurement System Architecture and the Lab Information-Management System. We're working to bring about the hospital of the future, where information flows easily between patient-monitoring units, doctors' offices, labs, pharmacies and administration.

Like the cooperating systems we wish to create, our visions are inter-related, too. Computers will play an integral role in future instruments and medical equipment, controlling them and helping manage the data they acquire. Conversely, instruments will have a critical part in the future of computers, advancing computer technology by measuring and monitoring the performance of different systems and networks.

Our unique position as both a measurement and a computation company always has been one of HP's great strengths. In the future, the synergy we gain from instruments and computers working together will be greater still.

Developing increased cooperation among products presents a similar challenge to HP people: We must become increasingly cooperative, too.

We need to work together—within departments and across functions and groups—to design systems in coordinated ways, to integrate them and to market them together where appropriate.

Cooperation among ourselves also is important because of the increasing competition we face today and in the future. To stay ahead, we need every part of our organization working at peak performance. There's no room for waste. TQC has taught us one of the keys to streamlining processes is teamwork.

Cooperation is something on which we've always prided ourselves at HP, but that doesn't mean we can stop working on it. One way we're encouraging teamwork across the organization is through the break-even time (BET) metric. It uses cross-functional measures to determine a product's success. We also call out teamwork on our performance evaluations. And as you can read in this issue, several divisions are experimenting with new kinds of work groups, such as self-directed teams.

Organizational incentives like BET can help develop cooperation, but really our success boils down to how we treat each other. There's a lot we can do on an individual level to help make HP a cooperative environment.

Practices as simple as taking the time to really listen to the people we work with, exercising the courtesy of

promptly returning phone calls, or being open to compromise—all these can be powerful means of developing cooperation.

I also encourage you to take a broad view of your job. How does what you do relate to other groups in HP? How is it important to the company? By learning all you can, you'll be better able to understand the needs and priorities of other HP people. That's what leads to cooperation and enables you and your co-workers to make decisions together that are best for the company as a whole.

So while our systems of the future will be cooperating in technologically advanced ways, one key to making them possible is something very human—the kind of cooperation people do.

Extra MEASURE



Voyager 2's mission near Neptune was special for Bill Garber.

Bill's experience was out of this world

No HP employee was more excited watching the Voyager 2 spacecraft fly by the planet Neptune recently than Bill Garber, a material quality engineer at the Corvallis (Oregon) Division.

Nineteen years ago, Bill was a technician at the Jet Propulsion Laboratory (JPL) as scientists there were talking about a "grand tour" into deep space—the project that ultimately became Voyager.

"We set up a special test lab in Florida to test a problem with digital ICs, and I hand-carried a box of test parts from California to Florida," Bill says. "JPL paid for two seats on the plane: one for me and one for the box because the parts were in special containers for quality control."

HP equipment, mainly measurement instruments,

played significant roles in Voyager 2's mission nearly 2.8 billion miles from Earth. HP synthesizers, voltmeters, data-acquisition systems, signal analyzers and other monitor devices were among the mission's hardware systems.

Bill says it was a special feeling to watch historic television coverage of the Voyager 2 flight and know that he had a hand in various mission developments.

"My wife, Sharon—who I met at JPL—and I signed two microdots that were mounted on the Viking lander mission to Mars," Bill says. "So we were among the first people to have our names on another planet."

An avid reader, Bill says he enjoys researching just about any publication dealing with space and science. But not science fiction.

"Science fiction today is dwarfed by reality," he laughs.

Winning awards by design

When *International Design* magazine announced its 1989 Annual Design Review awards there was one surprise in the equipment category: the magazine awarded an honorable mention award in the equipment category to a *software* product—the HP 3D Graphical Interface. The HP product is a computer window system designed to look and behave like the images they represent.

"The winners have always been physical products," says Barry Mathis, manager of design and human factors in software engineering systems. "But I made an

appeal that they expand their concept, since so much equipment today is controlled through software."

Judges in the country's most prestigious industrial design competition agreed. "It's a multidisciplinary area taking on major significance in a number of products," one judge remarked. "I am pleased to see an interface design explored so thoroughly here. This should be encouraged."

The HP 3D Graphical Interface was one of 163 awards in the competition, which drew nearly 1,300 entries. It also was chosen to be part of a traveling design exhibit to museums in the U.S.



The HP 3D graphical interface was a surprise winner.



Lois, Lynn, Garrett and Laurie Matson all get involved when the Creative Creations Company makes Midwest Roadkill Bingo sets.

Business is flat and that's good

How do you pass the time on a monotonous 700-mile drive from Colorado to Iowa?

Lynn Matson, programmer analyst at HP's Loveland, Colorado, site, pondered that question during a car trip, then invented a car game called Midwest Roadkill Bingo.

It works much like regular bingo: there are 25 squares on four yellow plastic cards. But instead of numbers such as "B-12" and "O-72," the squares feature images of skunks, rabbits, raccoons and URKs—unidentified road kills. Each time you see one of the figures on the highway, you cover the space with a white piece of plastic out of respect for the deceased, Lynn says.

"The game is a way to increase people's observation skills and awareness of

the poor, unfortunate animals along the road," Lynn explains. "I respect the fact that not everyone sees the humor in Roadkill Bingo. But we stress in bold letters that if you hit an animal, the game is over."

Lynn's basement company—Creative Creations Co.—has sold more than 1,100 of the \$3.50 to \$4 games since May. He's been interviewed by *The Wall Street Journal* newspaper, and "The Tonight Show" may feature Roadkill Bingo on a future show.

A "Tonight Show" employee told Lynn that host Johnny Carson "got quite a hoot" out of the game.

"Business has been flat," Lynn says with tongue firmly in cheek, "but I believe the game will become a smash hit."

CHART CHANGES

The Disk Memory Division has split into two divisions: the Disk Mechanisms Division (disk platforms for OEMs) under **Don Curtis** as general manager, and the Disk Storage Systems Division (plug-compatible storage solutions with proprietary interfaces) under GM **Doug Clifford**.

The Personal Computer Group has formed a division to focus on marketing and manufacturing of PCs for North America under **Mike Naggiar** as GM. A separate worldwide product-development division for PCG was also formed under **Bill Toney** as GM. **Larry Mitchell** becomes the site GM of the multi-entity Roseville, California, site.

The Workstation Group now has two systems divisions. The newly created Fort Collins Systems Division is located in Colorado. The Apollo Division has been renamed the Apollo Systems Division.

NEW HATS

Fred Schwettmann, general manager of the Circuit Technology Group, has been elected a vice president of the company.

Irene Pecenco to GM, Printed Circuit Division ... **Gil Merme** to GM, Direct Marketing Division ...

Antonio Perez to operations manager, Barcelona Peripherals Operation ...

Arne Arvidsson to GM of HP Sweden ... **Paul Chan** to GM, HP Singapore sales

... **Kean-Huat Cheah** to GM, HP Malaysia sales.

HURRICANE HUGO

Hurricane Hugo, with heavy rain and 125-mile winds, hit San Juan, Puerto Rico, with full force on September 18—disrupting operations of the HP sales office and damaging many employees' homes. Relief efforts were quickly mounted by HP's Florida offices and the Aguadilla, Puerto Rico, plant, which was missed by the storm.

The company's Charlotte, North Carolina, office was also closed for four days from the impact of the hurricane on that city.

GETTING TOGETHER

Hewlett-Packard and Oki Electric Industry Company of Japan have announced a tentative agreement for a joint venture to build and operate a printed-circuit-board facility at the HP site in Aguadilla, Puerto Rico. **John Fischer** heads the Circuit Technology Group team working on the project.

HP and Siemens have agreed to jointly develop and source a new surface-mount LED indicator which would create an industry standard.

HP has released its test-and-measurement systems language (TMSL) for use by other manufacturers.

NEW PRODUCTS

HP OpenMail from the Pinewood Information Systems Division is HP's first electronic-mail product for a UNIX* operating system. . . . The General Systems Division has introduced HP's first server, the **HP 9000 Model 635SV**. From the same division comes the **HP 9000 Model 808S**, a low-priced multiuser minicomputer.

Compressing information on CD ROMs, the Application Support Division (ASD) has several new support offerings. **LHP LaserROM/UX** provides on-line access to operation information for the HP 9000 Series 800 and Series 300 HP-UX computers. **HP Laser-RELEASE** distributes operating-system and subsystem software for HP 3000s. ASD also offers a stand-alone CD-ROM drive that can be connected directly to HP-IB systems without a special controller card.



HP 75000 Series B&C

Loveland Instrument Division's new **HP 75000** family of compatible VXIbus products, both firmware and software, markedly reduces test-system development time.

The **HP 3000 Series 960** is a top-of-the-line minicomputer from the Commercial Systems Division. With an enhanced release of the HP MPE/XL operating system, it offers a performance increase of up to 40 percent over the Series 955. . . . The Apollo Systems Division's **Apollo Series 2500** is the first workstation under (U.S.) \$4,000 offering high performance of 4 million instructions per second (MIPS).

Newest member of the Boise Printer Division's printer family is the **HP LaserJet IIP**. It produces four pages per minute and is priced at (U.S.) \$1,495. . . . Panacom Automation Division's **HP 700/X** family of X Window System graphics terminals operate in multivendor networked environments.

The Medical Products Group has an ultrasound-imaging system configured specially for transesophageal echocardiography (TEE): monitoring the heart's performance during surgery. . . . A new gas chromatograph/mass spectrometer system from the Scientific Instruments Division is PC-controlled and priced under (U.S.) \$50,000. It includes a new low-priced PC-based HP MS ChemStation (DOS series).

**UNIX is a registered trademark of AT&T in the U.S. and other countries.*



Bed racers from HP Canada prove that if you snooze, you lose.

Canadians catch competition napping

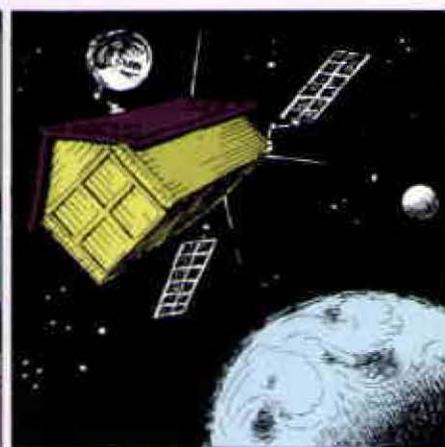
Employees at HP Canada aren't ones to take things lying down—unless, of course, it's for The Great M.D.A. Bed Race in New York City in September.

Eight employees on the All-Canadian Bed Race Team helped raise more than \$2,000 for the Muscular Dystrophy Association (M.D.A.) during the event.

The team, coached by Canadian track star Ben

Johnson, reclined its way to a third-place finish—a mere one-tenth of a second behind the winners—in the 17-team field.

Darren Jack, HP team organizer, said credit for the high finish goes in part to HP employees in Vancouver, Washington, who loaned the Canadians their high-tech racing bed. "Most racing beds weigh between 60 and 120 pounds, while the Vancouver bed weighs an incredibly light 19 pounds," Jack says. "It gave us a 'leg up' on the competition."





A year of 50th fun

A year-long celebration of a half-century in business comes to a close in December for 95,000 Hewlett-Packard employees worldwide.

It's been a year of joy, conviviality, excitement and fun. At times, it's been exhausting. And for many HP employees it's a year they'll remember for years to come.

Most of all, it's been an opportunity for HP people to show their creativity. Here are a few examples of 50th fun.

ROSE ROBERSON



left

Employees from HP's Roseville, California, site celebrated the company anniversary with a series of community activities, including visits to a local hospital and nursing home where unicorn Wendy Lowe entertained elderly residents.



left

HP Taiwan dreamed up one of the more innovative 50th anniversary ideas: a "hand-held garage" filled with plastic paper clips and given as a souvenir to employees and customers.

right

At the Waldbronn (West Germany) Analytical Division, employees and family members chartered a train to the Swiss border, then a boat to cruise Lake Constance as part of the 50th anniversary festivities.



PARTING SHOT

Anniversary excitement peaks

Hewlett-Packard employees worldwide have spent the better part of 1989 trying to out-do one another in their celebration of HP's 50th anniversary.

But eight employees from the Spokane (Washington) Division took that challenge to new heights this summer when they conquered 14,410-foot Mt. Rainier.

In addition to marking HP's half-century in business, the climb honored the Spokane Division's 10th anniversary and Washington state's centennial.

The climbers reached the summit after a grueling 15-hour climb, only to be greeted by sub-freezing temperatures and bone-chilling 30-mile-per-hour winds.

After fifteen minutes at the top—long enough to snap a few photos with the 50th anniversary flag and the front panel from a division-made new HP performance signal generator—the group trudged home.

And what did the climbers say after the lofty trek? "It was a peak experience for a peak signal generator," said organizer Jim Doudna.



Eight employees from the Spokane (Washington) Division took their HP 50th anniversary celebration to new heights this summer when they scaled 14,410-foot Mt. Rainier—a freezing 15-hour hike.

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