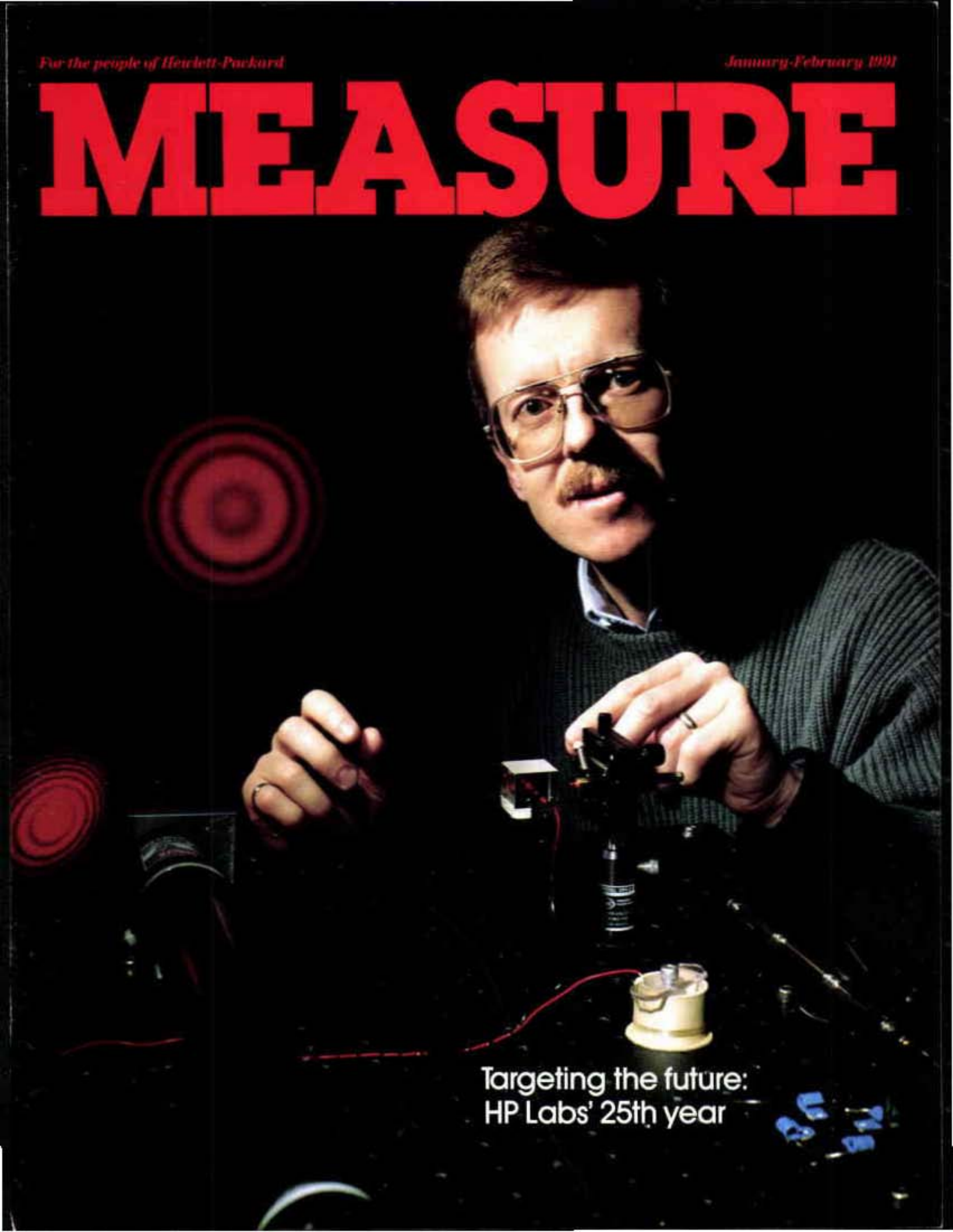
For the people of Hewlett-Packard

January-February 1991

MEASURE



Targeting the future:
HP Labs' 25th year

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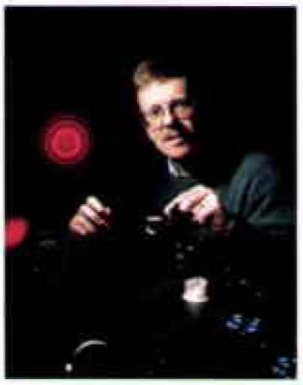

On the cover: Red and black "bullseyes" show how light waves create interference patterns. HP Labs' Wayne Sorin uses fiber optics to demonstrate how "coherent interferometry" could be used to form the basis for future light-wave instruments. Photo by Andy Freeberg.

MEASURE

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Measure is published six times a year for employees and associates of Hewlett-Packard Company. Produced by Corporate Public Relations, Employee Communications Department. Brad Whitworth, manager. Address correspondence to *Measure*, Hewlett-Packard Company, 20BR, PO Box 10301, Palo Alto, California 94303-0890 USA (415) 857-4144. Report changes of address to your local personnel department.

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. HP employs more than 92,000 people worldwide and had revenue of $13.2 billion in its 1990 fiscal year.

HP Labs: SINGULAR!

MATT WARGO

HP Labs researcher Alice Fischer-Colbrie uses a molecular-beam epitaxy machine to deposit gallium arsenide—atomic layer by atomic layer—to develop transistors, integrated circuits and optical devices.

By Gordon Brown

A funny thing happened on the way to the formation of HP Laboratories in 1966. Instead of referring to it with plural nouns and verbs (i.e., "they" and "are"), people began to use singular forms ("it" and "is"). While the gurus of grammar might disapprove, HP people did it anyway—because it made a lot of sense.

For one thing—particularly at that time—it helped to identify the new corporate R&D entity in relation to the existing labs within the various divisions. It was an important distinction: HP Labs was created to conduct the long-range research needed to foster the product-oriented research of the divisions.

Today, 25 years later, singular references to HP Labs make even more sense. Here's how Frank Carrubba, director of HP Laboratories since 1987, views that position: "HP Labs has a very clear and central mission, one that emphasizes long-range technological exploration and advanced development in close collaboration with the product organizations.

"In that sense, we have a mission similar to *Star Trek's* Enter-

prise—in our case, to boldly seek out those new frontiers of science and knowledge that can then be applied in new and improved products. That concept suggests a great deal of teamwork, both inside HP Labs and with the product labs, and that is what we strive for."

The result is a process known to industry as "technology transfer." At HP, it's a true team effort, with the Labs and the divisions working closely together to bring the best of successful new technologies into action in the form of new or improved products and systems.

Fortune magazine portrayed the transfer process in July 1990, saying, "If any company holds the key to technology transfer, it is Carrubba's HP. The $12-billion-a-year maker of computers and instruments maintains a stunningly high rate of innovation: More than 50 percent of sales derive from products developed within the past three years."

The article adds that HP "estimates that fully 60 percent of the research conducted in its labs finds its way into product applications."

That transfer rate adds up to a very long and impressive list of successful new products and technologies (see list on page 7).

New products based on transfers (from HP Labs) continue to account for the bulk of HP sales.

The fact is that a great many HP divisions have been formed around HP Labs' contributions, and new products based on transfers continue to account for the bulk of HP sales.

One of the key factors in HPL's effec-

HP PHOTO

Engineers at HP Labs helped develop the HP CareVue 9000 clinical information system, which is used in hospital intensive-care units. Sixty percent of Labs' research results in HP products.

Satisfied customers

Roland Haitz, R&D manager for the Components Group, notes that one of the very early successes of HP Labs was the development of LEDs—light-emitting diodes—that are still a major business for that group.

Another, in which Roland was directly involved around 1975, was HP's first fiber-optic link. It was a collaborative effort among Labs researchers. After experimenting on it for almost 18 months, they were joined by a division engineer to help conduct feasibility studies. The engineer took it back with him, and one year later it was unveiled—and resulted in the formation of the Optical Communication Division.

"Neither of these were sure things," Roland says. "Labs should be working on the edge—taking risks—providing there are reasonable arguments for pursuing them."

HP Labs also has had a long and fruitful working relationship with the Medical Group, adds Ben Holmes, Group V.P. and G.M. The most successful joint project produced an entire new business area for HP—ultrasonic imaging.

"Medical is one of the disciplines where the next-bench syndrome doesn't work because none of us are practicing physicians," Ben says. "The conventional wisdom of putting physicians on staff isn't the right thing to do because then they stop practicing medicine and their experience is frozen in time.

"The close working relationship of HP Labs and its outside medical advisory board truly results in a continuing flow of clinical ideas which get turned into products. That interchange of ideas is a great strength for us."

JIM KARAGEORGE

Labs researchers (from left) Keith Moore, Greg Gibbons and Julie Wilker discuss a measurement and manufacturing systems lab project.

tiveness is, as Frank explains it, "an environment that fosters innovation and creativity, and accepts 'intelligent failure' as an integral part of the process."

Given the success of the HP transfer process, why was Labs formed as late as 1966 when the company was already on a 27-year roll? Co-founder Bill Hewlett provided the answers three years ago:

"In 1957—to preserve the intimacy we had enjoyed as a smaller company—we decided to form four divisions, each with its own R&D lab. However, after several years we found that division engineers were so concerned with day-to-day problems that they didn't have time to develop longer-range plans. We realized that the only way to get that work done was to establish a central research facility, and we asked Barney Oliver to head it."

That charter still holds. The original facility has grown to include nine labs—six in Palo Alto, California, two in Bristol, England, and one in Tokyo, Japan.

Together, they function as a hub in a complex wheel whose spokes connect directly with every HP organization.

The function of the hub, of course, is to support those spokes with advanced research. That includes basic research undertaken by HP Labs as well as explorations and adaptations of research emerging from university and industrial laboratories.

There's a lot of pressure on that hub. Even while they're looking five to seven years down some new and unexplored road, Labs researchers have to begin thinking in terms of ultimate destinations.

The Bristol Labs was a key contributor to the early HP NewWave architecture...

The basic structure of HP Labs is just that—nine laboratories, each with a distinctive set of disciplines. Its annual budget averages close to 10 percent of HP's total R&D spending.

During the past year, the 1,000-person organization, which includes about 600 researchers, formalized the practice of interaction among those units by adding a new framework—"strategic portfolios" and "programs."

Each of four portfolios supports a common business strategy: materials and microstructures, manufacturing, measurement, computation. Programs are the means by which the portfolio teams, each headed by a lab director, now will undertake the rapid integration of new technologies into the product divisions. They will do this with multidisciplinary teams of people with specialized skills from the various labs.

A new initiative which began in 1989 is the HPL Research Board. Its 18 distinguished members come from universities, institutes and industries (five from HP) around the world. The board's charter is to contribute technical forecasts and vision related to HP's businesses; to help identify emerging technologies; and to consult in their application.

HP Labs

Stephen Gale and Colin Baker (on screen) can see and hear each other while they share data on this prototype system developed at HP Labs Bristol.

The international makeup of the board reflects a strong new emphasis by Labs on globalization. This actually got under way in 1984 with the establishment of HPL's first applied research lab outside the U.S., in Bristol, England. In seven years, the European Labs in Bristol has grown to more than 200 people, representing more than 10 nationalities.

The Bristol Labs was a key contributor to the early HP NewWave architecture, and now is exploring the next stage—distributed NewWave. Researchers have built a prototype that allows people in different locations to work together on a document even if one person has a UNIX* system workstation and the other a DOS-based personal computer. Both screens would show the same document, which either person can modify.

Labs established a second offshore laboratory in Tokyo in 1990.

In the past six years Labs launched a major program of formal, strategic alliances with universities, beginning with Stanford University and the University of Pisa (Italy). In addition to these science centers, Labs also is expanding important relationships with other companies, national laboratories and outstanding academic and technology institutions around the world.

Labs (has) launched a major program of formal, strategic alliances with universities...

Obviously, as HP Labs celebrates its 25th anniversary in 1991, it won't be with a lot of nostalgia. Its mission, as always, will continue to be the future. ■

**UNIX is a registered trademark of UNIX System Laboratories Inc. in the U.S.A. and other countries.*

Two great ideas: HP-35 and HP PA-RISC

Barney Oliver, director of HP Labs from its inception in 1966 until his retirement in 1981, recalls the advent of the world's first scientific calculator: "We hit upon the idea of a small scientific calculator, a product that literally would fit in your shirt pocket. Nobody had anything like that...

"Our two worries were how to make a keyboard that would hold up in a corrosive atmosphere and still be inexpensive, and how to make a display that was practical.

"A marketing study requested by Bill Hewlett suggested that we were making a toy: 'Make it much larger, then you'll have a real machine.' Well, we had already ordered the dies for the case so we couldn't go back and remake it.

"The original design was put into limited production and circulated among members of the scientific and engineering communities—who put away their slide rules and welcomed it with enthusiastic applause."

The development of HP's precision architecture (HP PA-RISC) was another major HP Labs success story. The goal was to unify HP's three computer architectures into a single family that would be more efficient, easier to build and offer customers benefits for many years.

"RISC (reduced-instruction-set computing) works on the model that less is more, so we made numerous measurements to understand what computers actually did," explains Joel Birnbaum, former HP Labs director and now V.P. and G.M. of HP's Information Architecture Group.

Through many iterations, the Labs team reduced the complexity of the architecture and circulated each new version throughout the company, making more measurements at controversial points to determine and evaluate whether new ideas had enough merit to change the basic architecture.

"The result," Joel says, "led to a prototype machine that performed many functions about five times as fast as the fastest existing HP machine, and was much simpler to manufacture. This, in turn, led to the decision to create an organization within the company that would make HP Precision Architecture the basis for all the company's next-generation computer products."

ANDY FREEBERG

Vision scientist Joyce Farrell and color scientist Ricardo Motta investigate the effect of eye movements on various media.

High-impact contributions...

HP Labs has generated a number of significant technological contributions to HP's business during the past 25 years, among them:

- COMPONENTS
  - Gallium-arsenide microwave devices
  - Light-emitting diodes
  - Fiber optics
- MEDICAL
  - Ultrasonic imaging
  - Cardiac ultrasound imaging
  - Portable arrythmia monitor
  - Quartz blood-pressure transducer
- ANALYTICAL
  - Mass spectrometer
  - UV/visible spectrometer
  - Liquid chromatograph pumps
- INSTRUMENTS
  - Laser interferometer
  - Cesium frequency standard
  - Smart oscilloscope
- COMPUTATIONAL
  - Handheld calculator
  - HP PA-RISC
  - Moving-paper plotter
  - Thermal inkjet printer
  - Computer (HP 2116)
  - Programmable desktop calculator

FUTURE

What about the coming years? Where will HP's "Enterprise" venture?

In Frank Carrubba's view, there are two closely related answers to those questions: What do our customers need from us? And how do we see our role in response to those needs? Here is a snapshot of his vision of that future:

Two broad areas will be of particular importance to HP—not just as a company but also as a member of the world community. Both focus on major "quality-of-life" issues: one related to health and medical needs; the other seeking new approaches to the environment.

HP will search for ways to help people reduce their needs for hospitalization and surgery.

In the health and medical area, for example, HP will search for ways to help people reduce their needs for hospitalization and surgery.

One way would be a system that generates and evaluates a person's medical and genetic profile early in life, perhaps using "gene probes," which would serve as early-warning systems to help prevent or delay future problems. This would help determine whether any medications, diets or other treatments are needed.

Overall, the R&D goal will be oriented to health maintenance and well-being.

Frank says that the environment—both global and personal—represents a very large challenge for researchers, and a major opportunity for creative contributions. One big task will be to put together a system that could literally span the globe. It would monitor changing conditions in forests, oceans, waterways and deserts, enabling public and private agencies to really understand what's happening in the biosphere.

This system would incorporate globally distributed sensors connected to knowledge-based reasoning systems to analyze and evaluate the data on a real-time basis. Out of the great mass of data collected, only pertinent information would be transmitted, allowing agencies to take proper action. There also would be handheld instruments that a forest ranger, for example, could use to analyze a stream's water quality instantly.

Environmental concerns HP will attempt to address include air quality, "greenhouse" effects.

Long term, Frank says, this vision foresees the need for a global agency charged with responsibility for both the collection and evaluation of environmental information.

Other environmental concerns that HP will attempt to address are a bit closer to home. These include drug testing, air quality, "greenhouse" effects and "home and workplace" issues. HP technology has some clear opportunities to provide solutions in these and other areas.

Expect to see "micromotors" and other tiny devices based on micromachined silicon.

Some of that technology is just now coming into view, particularly expert systems. These aim at scanning huge volumes of data to provide knowledge—prescriptions rather than descriptions, if you will. With "artificial intelligence" as their core, expert systems will be major players in our future. Such things as optical- and neural-computation architecture will enhance that prospect. With optical computation, hundreds of thousands of decision-making paths can be dealt with simultaneously. The neural architecture mimics the pathways of the human brain, is fast and "recursive"—that is, it improves its

FOCUS

grasp of things each time it repeats a computation.

Other technologies which HP Labs continues to work in or explore include superconductivity, measurement systems, mass storage, user interfaces, manufacturing processes, compound semiconductors and photonics. Peripheral devices and systems are high on the agenda. Expect to see "micromotors" and other tiny devices based on micromachined silicon.

Bridging all of these efforts will be concern and involvement in key aspects of the business HP is in. A primary Labs focus is to create real business solutions. For example, how can Labs help advance HP efforts in the interconnectivity and interoperability of distributed systems via standards — the agreement between manufacturers to adhere to common standards, allowing a mix of products in a system to play together.

Don't be surprised if someday our home, work and entertainment center are all one!

Another interest—"vision" is more the word—is integration of products and their functions. In the same way that bits and bytes became data, future products will represent a merging of functions as the elements of technology become smaller and more efficient.

HP Labs Director Frank Carrubba (center) confers with R&D engineers Paul Tang (left) and Charles Young. Says Frank, Labs' success springs from "an environment that fosters innovation and creativity. . ."

Don't be surprised, then, if someday you discover that your home, workplace and entertainment center are all one! Yet each could be a distinct environment, summoned up by a simple voice command. And all operated, perhaps, by one small system—certainly many fewer devices than we now employ in our daily lives.

The significance of such an advancement would go far beyond the technology involved, Frank says. With more and more people able to work in their homes, many would find their employment opportunities greatly enhanced. Family life would be reinforced. At the same time, it would help to ease highway gridlock, conserve energy and reduce air pollution.

It remains to be seen whether HP's logo would appear on the kind of system suggested above. But it does represent the nature of the vision that's going to make a big difference in our future products and our lives. ■

(HP retiree Gordon Brown was Measure *editor from 1968 to 1982. He wrote on HP's redeployment program in* Measure's *March-April 1990 issue.—Editor)*

Driving up quality at Ford

By Tom Ulrich

DEARBORN, Michigan—When U.S. automakers harnessed the computer to the internal-combustion engine in 1976, they promised the world automobiles with cleaner-burning engines, better gas mileage and smoother performance.

These microprocessors, they predicted, could even lead a mechanic to the source of a problem.

"Sounded too good to be true," recalls Ike Williams, service manager for Krug Lincoln-Mercury in Dearborn. And it was—until 40 Ford and Lincoln-Mercury dealerships received the early release of a new generation of diagnostic equipment designed, built and supported by the Ford Motor Company and HP's Advanced Manufacturing Systems Operation (AMSO).

Before this electronic toolbox, with its guided diagnostics and on-line service information, arrived at Krug Lincoln-Mercury, service technicians across the U.S. struggled to maintain all the computer technology that Big Three automakers were placing in their automobiles. Last year, nearly one-third of all

engine-control computers returned by dealers to Ford, GM and Chrysler factories worked flawlessly.

"Fifteen years ago, service technicians could inspect a carburetor for a clogged fuel jet," Williams explains. "Today, with electronic fuel injection a standard feature on U.S.-made cars, there is no carburetor to inspect.

"How can a technician spot a short circuit on a microprocessor?" he asks.

Ford Parts and Service Division and AMSO's Automotive Diagnostic Systems team answered that question when they delivered Job One—the Service Bay Diagnostic System (SBDS®)—to Krug Lincoln-Mercury in the summer of 1990. Ford Parts and Service and AMSO will begin shipping and installing SBDS carts for an additional 2,000 Ford and Lincoln-Mercury dealerships this spring.

"SBDS signals a major change in the vehicle-repair process," says Lee Miskowski, vice president and general manager of Ford Parts and Service. "Come-back repairs have plagued our industry," says Lee. "Such hard-to-find and intermittent problems are typically electronic in nature and are the primary cause of dissatisfied customers."

Diagnosing hard-to-find electrical faults, such as a clogged fuel injector or an intermittent sensor, are among the greatest challenges facing service departments in the 1990s. Industrywide, they amount to nearly 15 percent of a dealership's repair log and are the major reason for repeat repairs.

Engineers at Ford Parts and Service estimate that the SBDS will reduce repeat repairs substantially.

SBDS, perhaps the most powerful automotive diagnostic system ever built, combines computer-driven service tools and diagnostic strategies with on-line service information to guide a service technician to the source of trouble and suggest a repair.

MARK PRESTON

AMSO helped Ford develop the Service Bay Diagnostic System—a new generation of diagnostic equipment which is faster and more accurate than previous methods.

The system contains 29 electronic testers, meters and measurement tools on four printed-circuit boards. These on-line tools find answers to complex electrical problems that technicians with handheld tools often miss.

With touchscreen technology and a direct link to the engine-control computer, service technicians can use SBDS to identify and solve electrical problems in the base-engine ignition, electronic-engine control and the fuel systems.

"One of SBDS's great advantages is its speed," says Gordy Kujawski, a service product-development engineer for Ford. "The old method for testing injector flow, for example, took about 45 minutes and left some data interpretation to the technician. The new method takes two minutes to hook up and one minute to run.

"Diagnostic tests such as spark duration are easy to read," he adds. "The misfiring cylinder will stand out in red on

the display screen. SBDS also specifies whether the problem is an open wire or a short circuit."

Because technicians must identify some engine problems on the road, the Service Bay Diagnostic System includes a Portable Vehicle Analyzer (PVA). This battery- or vehicle-powered computer gathers information from road tests and then transfers data directly to the SBDS.

For elusive problems that occur on the road, the technician uses a Customer Flight Recorder (CFR) that is plugged into the automobile's data-communication link and sends home with the customer. When trouble occurs, the driver presses a button and the flight recorder gathers diagnostic information.

After the recorder captures the data three times, the customer returns to the dealership where the technician uploads the information into the SBDS computer and completes the diagnosis.

"We're very satisfied with Hewlett-Packard hardware," Lee Miskowski says.

Besides Ford and HP, three other companies have developed software for SBDS. Computer Methods Corporation and Carnegie Group, Inc. created the electronic tools and strategies for testing and diagnosing the automobile. Hickok Instrument wrote the powertrain diagnostics.

When trouble occurs, the driver presses a button and the flight recorder gathers diagnostic data.

"The partnership we've forged is unique to the history of Ford," says Pete Salamon, the manager of SBDS hardware and software development for Ford. "Team members range from the most advanced automotive researchers to the people who work with the production and manufacturing of parts—and a blend of suppliers in between."

MARK PRESTON

HP's on-site R&D team, including AMSO engineers Rick Longo (left) and Ben Heilbronn, has provided Ford customers with timely answers during product development at the tech center.

"The partnership is unique in AMSO history," adds Mike Hurwitch, HP support engineer. "Twenty marketing and R&D people work on site with Ford and other vendors to provide timely answers as the product develops."

Pete notes that HP capabilities with software, hardware and test equipment —and Ford's capability with automobiles—makes this one of the best synergistic relationships he's seen.

"As a result," says Teresa Savage, HP R&D engineer, "the product that Ford and the SBDS team has produced is right on the leading edge of personal computing—state-of-the-art computer technology which skilled automotive technicians find easy to use."

While Ford and HP developed SDBS for the likes of Ike Williams at Krug Lincoln-Mercury in Dearborn, the call for additional SBDS technology could come from Europe.

"With reunification in 1992, suddenly we have new emission standards in Europe," says Emil Pulick, manager of service systems design for Ford of Europe. "We could build a carbureted engine to meet those standards, but it is not an automobile you would want to drive."

For cleaner-burning engines, better gas mileage and smoother performance, the European auto makers are turning to electronic fuel injection, just as U.S. auto makers did in the late 1970s.

They are also turning to a computer-controlled diagnostic system.

Fiat S.p.A. has designed an automotive diagnostic cart for its evolving line of Fiat, Lancia and Alfa-Romeo automobiles. The Rover Group is designing an

Technicians can detect some automotive problems by using a Portable Vehicle Analyzer during road tests. Information from the unit can be transferred directly to an SBDS computer.

How SBDS works

Here is how a visit to a Ford or Lincoln-Mercury dealership could change during the next 1½ years.

A customer, for example, reports to a Lincoln-Mercury service technician that her car won't start. Without SBDS, the technician would look through the 1991 shop manual for information on any of the 12 electronic and 17 mechanical parts that can prevent the car from starting.

He then would inspect each part or assembly, link the electronic-engine-control module to a handheld diagnostic computer and run a self-test. If no fault is found with the electronic-engine control, the technician would check the ignition or fuel system following the same procedure.

With the Service Bay Diagnostic System, the service technician hooks the Town Car up to SBDS with a cable and a data-communication link. He then types a serial number and symptom code into the computer.

SBDS steps through the diagnosis, selecting the appropriate tools, until the prognosis is made. It then specifies the procedure the technician should follow to fix the car.

With SBDS, a service technician can diagnose an ignition problem in 10 minutes. Without it, he could spend up to three-quarters of an hour finding a faulty ignition switch.

equally sophisticated handheld tester for its Rover, Range Rover and Land Rover vehicles.

"No doubt about it, Ford of Europe is geared to go with an SBDS equivalent in the latter part of the decade, if not sooner," says Len Tedesco, manager of Service Systems Design for Ford. "We

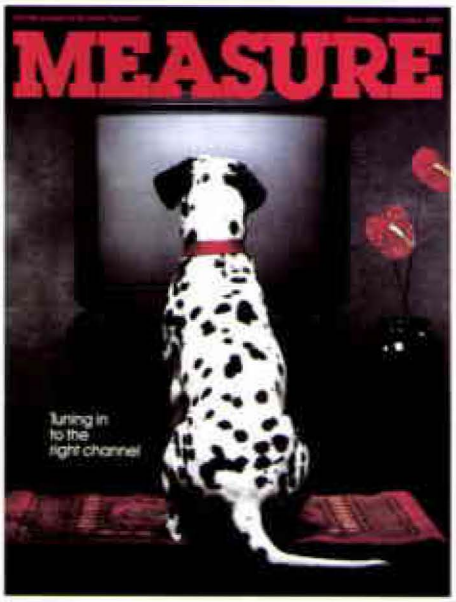
"With reunification in 1992, suddenly we have new emission standards in Europe."

see the same thing happening in Australia and other portions of the Ford community."

"Currently, we are defining a range of SBDS products with Ford of Europe and working with Ford and other companies to develop in-line assembly plant testing," says Bob Brennan, HP SBDS program manager.

"Our goal," says John Weidert, AMSO operations manager, "is to provide Ford with leading-edge solutions that are a key part of their long-term strategy." ■

(Tom Ulrich writes for the Advanced Manufacturing Systems Operation in Sunnyvale, California. He last wrote for Measure *in the January-February 1990 issue on how Ferrari uses AMSO test equipment in Italy.—Editor)*



Dalmatian part numbers?

What's the dog's part number? My wife has fallen madly in love with *Measure's* Dalmatian puppy (dogs are ageless; they are all puppies). I've checked but can't find a part number anywhere. PAL's closest match is "Danish HP-HIL Keyboard."

Please help or I'll be the one living in the dog house.

LARRY JOHNSON
Andover, Massachusetts

Spotting an error

I really liked the cover of the November-December 1990 issue. Dalmatians are very striking dogs. I've been collecting the HP ads featuring Dals since the company first started the series. You misspelled Dalmatian, though, by putting an "o" after the "i" instead of an "a."

I've raised Dalmatians for almost 18 years and have been the editor of *Spots Illustrated*, the newsletter of the Dalmatian Club of Northern California for about six years. The HP ads seem to be mentioned at every meeting, whenever someone has spotted a new ad.

I don't know how the rest of the public has reacted to the ads, but HP has sure caught the attention of the Dalmatian club members. I receive newsletters from Dal clubs all across the country and the HP ads are mentioned in them as well.

KIM HILL
Cupertino, California

Another win for Al Minter

Since my years on the *Measure* staff (1980–85), I've observed "our" magazine evolve into one of the most professional ones published in the corporate world today. The photos are truly outstanding. The writing, too, has gotten better; it's both understandable and—even more important— interesting to read.

One of the "fun" parts of my current marketing-communications position at Finance and Remarketing Division is announcing our annual awards for the top sales reps for remanufactured products. The November-December *Measure* arrived one day after we announced those awards. Guess who won "honorable mention" in the Southern Sales Region? The same Al Minter you spotlighted in ExtraOrdinary People. Not only is Al a top rep for new products, he also knows when and how to save a sale for HP by offering HP's refurbished equipment.

Keep up the great job!

JOANNE ENGELHARDT
Mountain View, California

Hollywood at its worst

Congratulations on an excellent article. Portraying positive black role models *is* important, as well as open discussion on the racism that still is prevalent, both within HP and society at large.

Measure, unfortunately, shows just how tough the road Al Minter is traveling really is. If the article ExtraOrdinary People takes us one step forward, the cartoon on page 30 takes us two or three steps backwards. This insidious depiction (Hollywood at its worst) of crazed, spear-carrying natives parboiling whites is a sad commentary on the true sensitivities of the editors and the company.

ERIC SHROPSHIRE
Fort Collins, Colorado

The cartoon was meant to illustrate that seemingly everywhere you go—even in the most remote corners of the Earth—you run into other HP employees. Measure's *experience is that "crazed, spear-carrying natives" come in all colors. No offense was intended.—Editor*

Please send mail

Do you have comments about something you've read in *Measure?* Send us your thoughts. If your letter is published, you'll receive a free *Measure* T-shirt (large or X-large).

Address HP Desk letters to Jay Coleman; by company to *Measure* editor, Corporate Public Relations, Building 20BR, Palo Alto. Via regular postal service the address is *Measure*, 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.

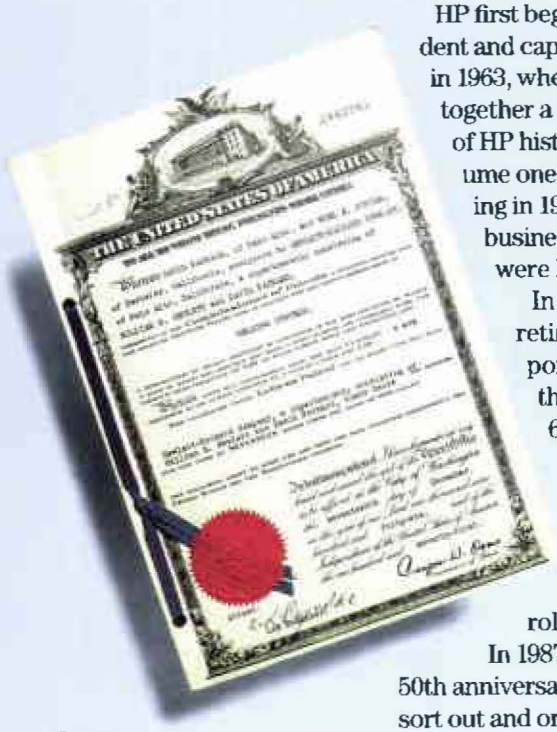
History in a box

Neatly boxed and catalogued, the records of company history are now preserved in the HP Archives in the Corporate Offices.

Rows of gray acid-free boxes line the shelves of the main room. They're filled with publications, photographs, transcriptions of interviews with more than 80 HP pioneers, and the collected papers of a few key executives. A special cabinet contains working drawings for products going back to 1939.

More than 100 actual products, including the first audio oscillator, are stored in a separate room nearby. They are often loaned out for company, museum and regional exhibits.

HP first began documenting precedent and capturing its early memories in 1963, when Lu Packard put together a chronological scrapbook of HP history. The first item in volume one is the minutes of a meeting in 1937 during which the first business plans for a company were laid.



above

Original patents such as this one for welding systems (granted to David Packard and Noel Porter on December 17, 1946) are among the materials preserved in the HP Archives.

In 1977 George Climo (now retired) was appointed corporate historian. He taped the reminiscences of some 60 early employees and others—such as Francis Moseley, owner of the company which was HP's first acquisition—who played a special role in HP's development.

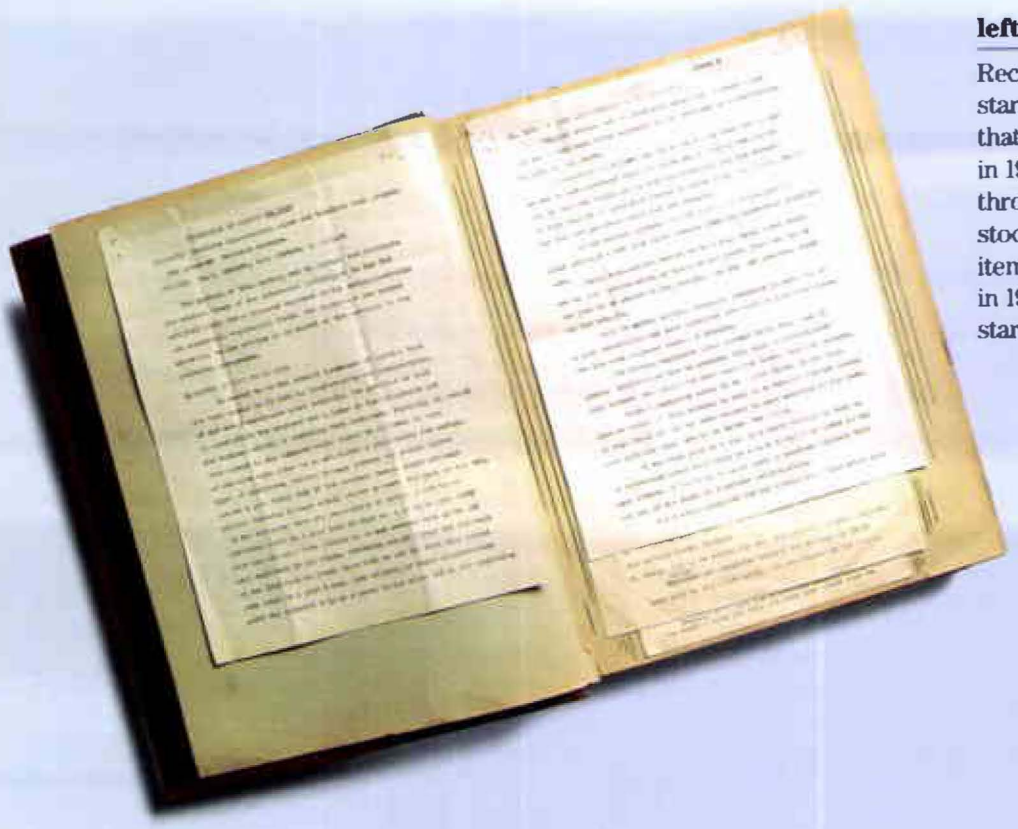
In 1987, the approach of HP's 50th anniversary was the impetus to sort out and organize a mass of some 250,000 photographs for easier access. "We knew there would be interest in historical documents and old photos for a variety of purposes," says Mary Anne Easley, who manages the archives for Corporate Public Relations.

To do the job right, she hired archival consultants Karen Lewis and Lynn Bonfield, and space was found for HP's first archives room. By the time of the 1989 celebration, the collection was shipshape and items could be found easily through a computerized database. The 1938-39 financial ledger and photographs from five decades which illustrated the "Test of Time" section in *Measure's* March-April 1989 issue came from the archives.

Because history is not static, the archives continues to add significant materials. Karen now has become HP's part-time archivist. In addition to providing reference services to a wide variety of corporate users, she has been cataloging the papers of Barney Oliver, former vice president of R&D, and the late Tom Christiansen, prominent in international trade relations for three decades. Papers of Bill Hewlett, Dave Packard and John Young will come to the archives.

A committee of retirees advises on policy and helps guide the selection of materials to be preserved. Several retirees also have been trained as interviewers to build the growing collection of oral histories.

For those who want to understand the beginnings and growth of Hewlett-Packard as part of the dynamic electronics industry, the HP Archives has become a popular stop. The professionally administered collection won high praise from Dr. John Kotter of Harvard Business School, a recent visitor, as a valuable resource for scholars as well as business decision-makers. ■



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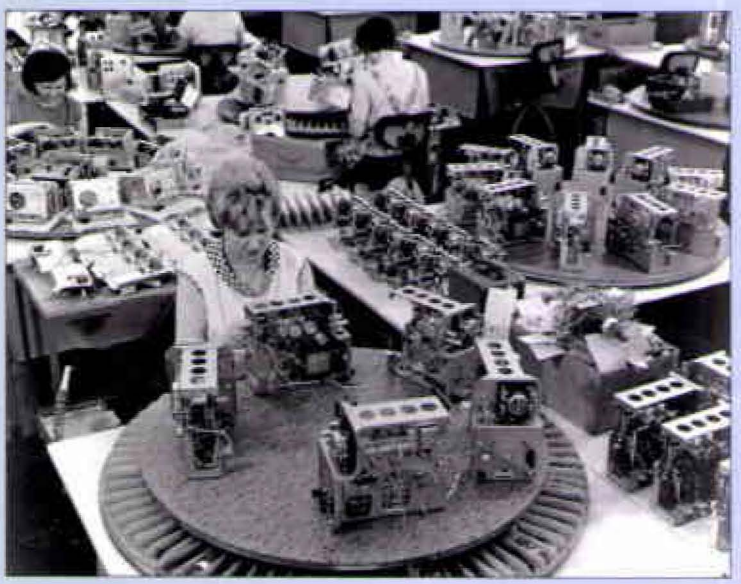
Recording HP history started with two scrapbooks that Lu Packard assembled in 1963, covering the period through HP's first public stock offering in 1957. First item: notes from a meeting in 1937 to explore the idea of starting a company.

below

Stored in the archives are three "E" flags that Hewlett-Packard received during World War II for excellence in war production. The company made signal generators and other instruments for the armed services.

below

In the collection are photos of plant locations and processes (such as this 1967 photo of instrument assembly in Böblingen, Germany), products, events and people through the years. The *Measure* files are one source of images.



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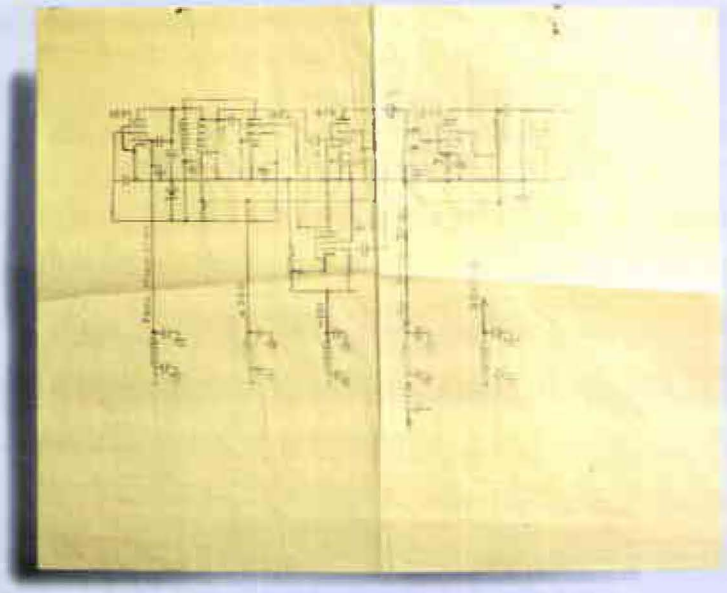
In a 1947 photo, Art Fong (center right) demonstrates the Doppler effect to fellow HP engineers. Onlookers include Bill Hewlett, who is drinking coffee. Such original photos in the collection are copied when used for display or print purposes.

above

In addition to HP's own corporate records, the archives has historical materials from other companies that have been acquired. These two annual reports—Sanborn Company (1953) and Apollo Computer (1983)—are a contrast in graphics.

right

In the HP Archives, Al Bagley interviews fellow retiree Art Fong about his 40-year career as an HP engineer. Al, who developed HP's first electronic counter in 1951 and later served as Frequency & Time Division general manager, already has given his own oral history.



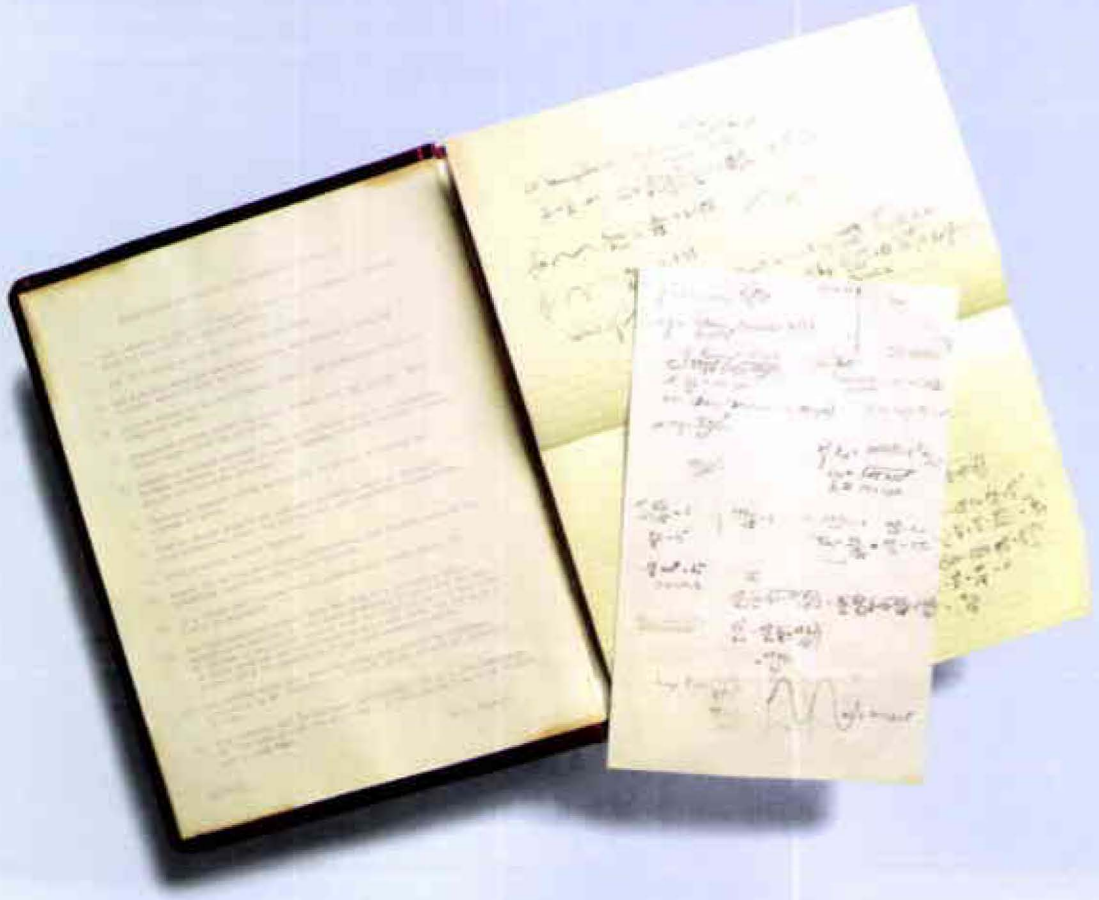
above

Working drawings from the company's early years —such as this one from around 1940 for a circuit diagram, with lightly scribbled notes on the margin—are kept in an oversize cabinet.

STEVE CASTILLO

above

Eiju Matsumoto, historian for Yokogawa Electric Corporation in Japan, talks with HP archivist Karen Lewis about his plans for an historical museum. Some 100 HP instruments are kept in this storage room and loaned out for exhibits.



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From the first, Dave Packard believed strongly in documenting the R&D process in lab notebooks like this early one. In 1945, he listed 14 criteria for keeping a scientific diary—including the choice of completeness over neatness when necessary.

OPEN FOR BUSINESS:

Silicon Valley's new Garage

By John Fisher

A biking enthusiast reflects The Garage's main purpose—a hands-on approach to learning about science.

You can't help looking over your shoulder as you enter The Garage. The entrance is dominated by a 15-foot-tall audio-kinetic sculpture. It's mesmerizing. It whirs and plunks and chimes with the charm of a Rube Goldberg fantasy.

Once inside The Garage, the effort to tear yourself away from the sculpture is rewarded with an inside look at Silicon Valley never before seen by anyone. This is not Silicon Valley in a geographical sense. It's more like a real-life Land of Oz. A magical place of imagination and creativity. It's the Silicon Valley, that, when mentioned in some remote location across the globe, causes people's eyes to light up.

Few could place it any more precisely than somewhere in the United States (it's actually in the southern portion of the San Francisco Bay area), but they know it's the midwife of innovation and invention. And no one, including those who live and work there, has ever seen all the technology of this near-mystical place collected in one building. Not merely collected, but arranged in interactive exhibits designed for understanding.

The Junior League of Palo Alto, California, originally proposed this innovative idea. Several cities competed to host the Technology Center of Silicon Valley (the official name of The Garage's parent organization) eventually won by San Jose. The undertaking was so vast and new, planners decided to begin the same way many of the companies whose technologies are represented started—on a small scale in garages.

And, yes, it's named after the California historical landmark where Bill Hewlett and Dave Packard began.

The Garage's scale is small only in terms of what it will be eventually. The five-year plan calls for a 170,000-square-foot facility a block away. The present

Garage

10,000 square feet is modest by comparison. But there is nothing modest about the exhibits or energy permeating here.

"First, we want to create an institution that furthers the knowledge and understanding of science and technology, and gets young people excited about pursuing careers in those fields," says Callie Gregory, director of marketing and public affairs. "Second, we want to let the young and curious of all ages know about the latest technological advances and how they influence the lives of us all."

In addition to Bill Hewlett's substantial personal contribution, HP has been actively involved in developing The Garage. Among the nearly 30 HP volunteers helping are Don Higgins and retiree Bob Grimm, lending their managerial and technical expertise.

Visitors entering the exhibit hall immediately see HP's High Tech Bike display. The popular exhibit walks you through the process of understanding the aerodynamics involved, selecting bicycle parts for your own design, and sending that design to manufacturing where you receive a take-home pen plot. It presents the intricacies of computer-aided design and computer-aided manufacturing in an understandable, hands-on way. As with every exhibit, there is a knowledgeable, trained volunteer to help you through the process.

> ***"The idea ... is to make big things little and little things big ... so you can get closer and understand them."***

Volunteer James Shaw, an HP scholarship winner, explains HP's High Tech Bicycle exhibit to visitors.

Next to the bikes is the Materials Technology exhibit. It emphasizes the importance of elements in the periodic chart. Information about each element is presented in puzzle form, and visitors move from one element to another to solve each puzzle. There's also an elements "cocktail bar" where, after ordering from a menu, you receive a little box containing material and either an experiment to perform or other material to compare it with. It also tells you what the material is and why it was invented.

Jan Berman, programs and exhibits director, says a common idea runs throughout all exhibits. "We try to present the information and organize it in such a way that it will lead to the basic science principles being taught," she says. "The idea prevalent throughout the room is to make big things little and little things big, so you can get closer and understand them."

Movie buffs can see clips from such films as *Forbidden Planet* and *Short Circuit*, among others, showing how robots have been depicted by Hollywood during the years. Right under the viewing screen for these tinsel-town fantasies are several actual robots. Some follow typed instructions and some you can control directly—or try to. One will cook food, answer the phone, pour coffee and perform other tasks on voice command. Another will draw your picture and give it to you to take home with your bicycle pen plot.

Perhaps the most eye-catching exhibit in the hall is the double-helix spiral representing a DNA molecule. A volunteer explains that the DNA molecule contains enough instructions to fill 500 telephone books. If you stacked those books atop one another in a double helix, they would rise 23 feet above the floor. And that's exactly what has been done. The books are authentic and from all over the U.S. They provide an irresistible introduction to the biotechnology exhibit.

> ***... there is nothing modest about the exhibits or energy permeating this place.***

Along one wall is a complete walk-through clean room. It begins with large chunks of silicon and proceeds through the process of building an integrated circuit. Just beyond the clean room is a pool-table-sized model of Intel's 486 chip. Visitors can issue commands to the chip and see the instructions being executed in slow motion through a variety of fiber-optic treatments and sounds.

Each exhibit is kept up to date. There is a "Frontiers Wall" with easily updated electronic signs and articles describing

A casino table-sized model of a chip and a 23-foot-high double helix in the background fascinated attendees at The Garage's grand opening.

the absolute state of the art.

High overhead hangs a one-fifth scale model of the Hubble Space Telescope. Lest you be deceived by the scale, there is a full-size replica of the eight-foot-diameter mirror used in the telescope. The problems that the mirror has had are explained clearly. Next to the mirror, a half-scale model of the Mars Rover hugs the floor. The proposed Mars mission is described in detail. In fact, designers have processed all the fly-by pictures of Mars through a Cray computer, changed the perspective so you can see different levels of elevation and transferred the images to a laser disc. You actually can get a sense of flying over the surface of Mars.

Many corporate experts are involved with the center. It's supported by major corporations, all local universities, other science centers, various consultants and designers, and the city of San Jose. A huge corps of volunteers supplements the small full-time staff. Financial support comes from private and corporate donations, memberships and city funds.

It takes about an hour and a half to tour the hall—longer if you get involved with all the exhibits. Organizers expect about 170,000 visitors a year to The Garage. Five-year estimates for the completed facility are about a million people a year. That's about the same as the highly popular Monterey Bay Aquarium.

If you live in the San Francisco Bay area, or are going to visit, don't miss this attraction. You can always say you want to go for the kids' sake. ■

(John Fisher is a writer in design systems marketing for the Circuit Technology Group in Santa Clara, California. He last wrote for Measure *about HP engineer and magician Joe Oliverio in the March-April 1990 issue.—Editor)*

The man behind the mask

By Jeff Herrington

HONG KONG—As product marketing manager for Hewlett-Packard's Asia Pacific Workstation Group in Hong Kong, Jim Hanley works amid cutting-edge technology.

Then, in his spare time, he immerses himself in a cutting-edge technology of an entirely different nature. It's then that he pursues his hobby of collecting carvings from New Guinea.

Jim's appreciation for the primitive art form arose almost spontaneously five years ago when he stepped into an art gallery in Sydney, Australia.

"The location of the gallery was somewhat dreary," he says, "but when I stepped inside, I found myself overwhelmed by this huge array of carvings, ranging from spirit masks to ceremonial spears that possessed a heroic quality.

"These pieces projected such a strong sense of the culture's spiritual dimensions, I found myself being ushered out of the gallery at closing time after four hours of viewing the collection."

DANA DOWNIE

Jim (center) discusses workstation strategy with (from left) Roger Parmenter, Logic Systems Division program manager, and Fred Waters, Asia Pacific product marketing manager.

"Each village has its own style of carving affected by local traditions and spiritual beliefs."

Jim returned the next day to purchase a mask and spear. However, "being the type of person who, once I'm involved with something, hates to do it superficially," he soon began planning an expedition. After three more years of buying pieces from various galleries, he completed details of a trip to the Sepik River region of Papua New Guinea where the bulk of his collection originated.

That dream, which became reality in October 1989, netted Jim a trove of treasures that probably would make many museum curators a tad envious. During the two-week trek through the remote river villages of Govermas, Tungabit, Mameri, Kandangai, Mindimbit and others, Jim and his companions traded shorts, knives, T-shirts and local currency for more than 130 carvings, some more than five feet tall.

"I got carried away," Jim says matter-of-factly. "Each village has its own style of carving affected by local traditions and spiritual beliefs. Available materials, such as local clays, also contribute to the differences. I've found it extremely difficult to decide what to bring back and what to leave behind."

Since Jim's group navigated its way into the villages by canoe, "carrying away" the new acquisitions presented a real logistical challenge. "Imagine 30 to 40 large pieces in a 50-foot dugout canoe that also is filled with camping gear, food and water, four people and a 55-gallon drum of gasoline," Jim says. "On top of this, you have to ensure the carvings don't get wet or sustain enough pressure to break them."

Ultimately, the group established a central staging area in a river village where the pieces could be trucked 100 miles to the port city of Wewak. On the coast, the group built shipping containers for the ocean trip to Hong Kong. It was only *after* the artwork had been packed that the group learned its collection had to be inventoried by the National Museum of Papua New Guinea to obtain an export permit.

About two months later, Jim finally could stroll into the back room of his

DANA DOWNIE

Mask

JEFF HERRINGTON

Jim relaxes at his apartment, which overlooks Repulse Bay. Says Jim, "I typically try to give (my carvings) some time in the evening when I'm not traveling."

apartment in Hong Kong to recreate the sensation he first experienced in the Sydney gallery. It's a unique and valuable collection, but house guests often leave Jim's home with a memento of Papua New Guinea under their arms.

"I see some business opportunities with my art, but I consider myself primarily a collector," Jim says. "I've had a lot of fun pulling it together and I've developed some great personal relationships in turn."

Woodworking plays a big part in another of Jim's interests—wildlife bird carvings. Three years ago he went to a Hong Kong gift exhibition and met Chinese artists who produce amazingly realistic wood carvings. The carvings contrasted sharply with the exaggerated, abstract features of his New Guinea art.

"We worked closely together designing a line of ducks that I felt were better than anything I could buy without mortgaging my house," Jim says. "Along the way, I introduced them to advanced techniques, incorporating burning tools and the use of mounted specimens for study models. The results far exceeded my expectations."

"I see some business opportunities with my art, but (I'm)... primarily a collector."

Today, a beautiful collection of carved birds graces Jim's home, and his carvers have developed a new business opportunity. "I've helped them set up distribution in the U.S. and Australia," Jim says, "and they presented me a chance to share these 'sculptures' with my friends. In the long term, this might be an excellent retirement opportunity."

These activities, along with very strong interests in golf and fly fishing, provide Jim an excellent release from the rigors of the highly competitive workstation business in the Pacific Rim. "The carvings definitely fill my weekends, and I typically try to give them some time in the evening when I'm not traveling," Jim says.

The varied activities also help fill a gap created by his commuter relationship with his wife, who recently was transferred to Tokyo by her company.

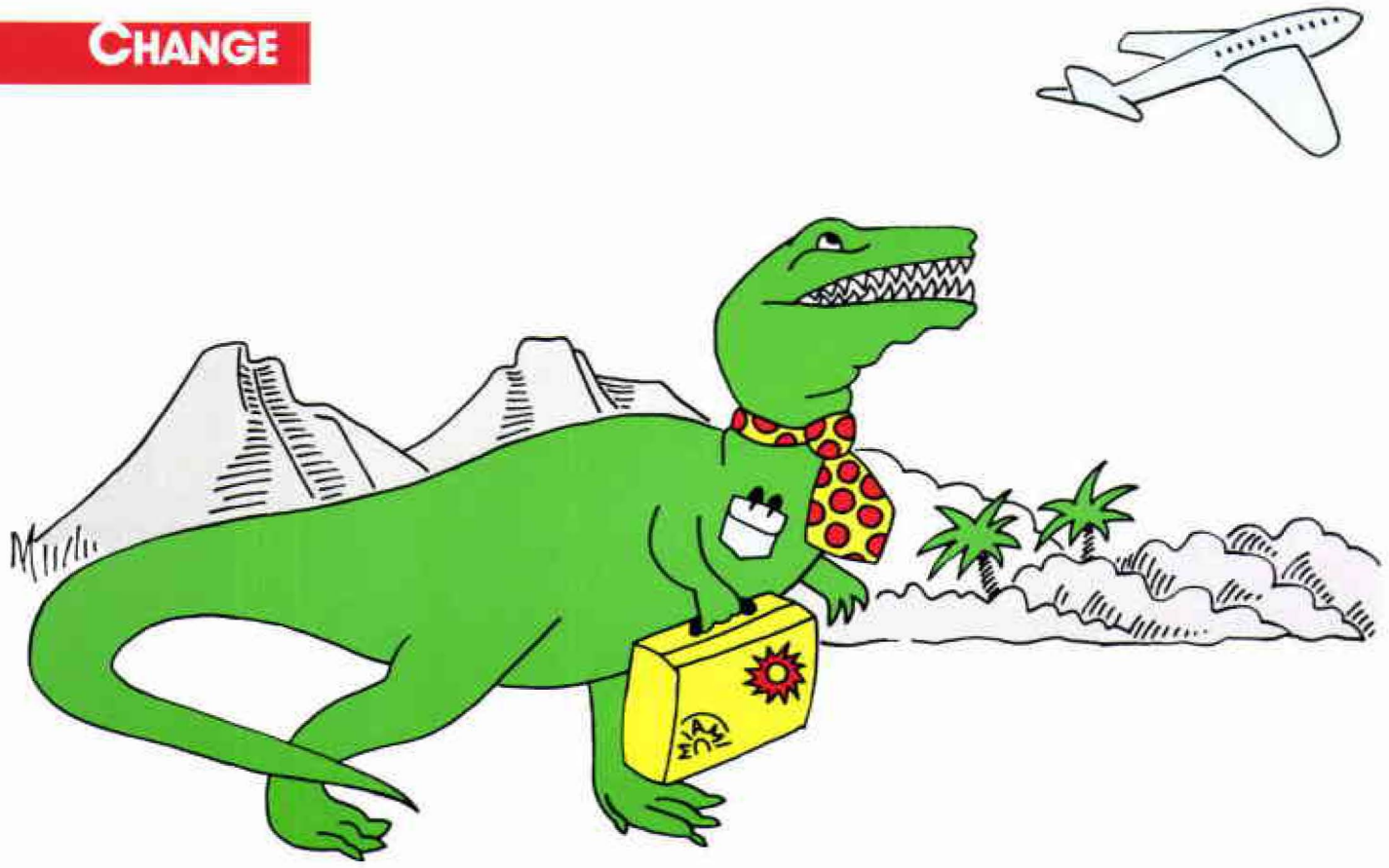
"We've been chasing each other around the globe for five of the last eight years, due to respective career moves," Jim says, "so pursuing art in New Guinea or developing wildlife carvings in China seems consistent."

Jim will continue his Papua New Guinea pursuits in the next few months when he makes a return trip to the Sepik River.

"I'll be going to some villages we didn't get to on the first trip and visiting friends I made on the river," he says. "I've established a barter arrangement with one village in which I'll outfit the local soccer team in exchange for carvings. I plan to bring them more sophisticated carving tools."

It's a task not too far removed from his job of introducing cutting-edge tools to the desktop environments of the Pacific Rim. ■

(Jeff Herrington is a Dallas, Texas-based free-lance writer who last wrote for Measure *in 1986 about HP's business in Italy—Editor)*



No room for dinosaurs

By Jay Coleman

Dinosaurs—we know from our natural history books—once ruled the Earth. They were everywhere you looked. Dinosaurs on land. Dinosaurs in the air. Dinosaurs in the sea. They were thicker than unwanted relatives.

Then a funny thing happened. The world began to change and the dinosaurs didn't. They couldn't adapt to their environment.

Survival of the fittest has been the rule ever since. Things—dinosaurs, people, plants, even organizations—must change with the times.

Talking about—and adapting to change—is nothing new for HP people. Consider these thoughts from Bill:

"Change is an everyday happening throughout this company," he said. "If you were to define life as a series of experiences involving change, then working for HP is a series of 'adventures' because of the great emphasis on change.

"Just coming to work in the morning is an adventure for me because I can always look forward to finding something new, something being done differently," Bill continued. "Come to think of it, if a process or procedure has been standing still for, say, a couple of years without changing, then we ought to look at it closer."

"Bill" is HP Executive Vice President Bill Terry. His quote comes from a special 1969 *Measure* issue celebrating HP's 30th anniversary. *Measure*'s theme in that special issue: change.

No, the concept of "change" wasn't invented in 1990, although at times it seemed that way. Nothing seemed constant at HP. Organizations changed and sometimes evolved into new and unfamiliar forms. Division names changed. Sales areas changed. Reporting relationships changed. Even HP's executive-level management organization changed.

Some people would argue that the word "turmoil" describes 1990 better than "change."

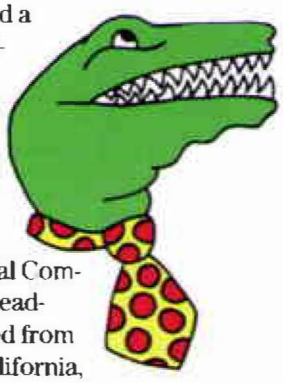
Change, of course, isn't necessarily bad—or bad at all. Says Carol Kinsey Goman, a U.S.-based nationally recognized expert on the topics of change, creativity and organizational loyalty, "Change is the most pervasive influence in today's work place." (See related story on page 26.)

Here are some of the things which made 1990 a year of change for HP:

- The Berlin Wall came down, the two Germanys unified, Soviet tensions eased and new markets opened for HP in East Central Europe and the USSR.

Dinosaurs

- Nearly 800 employees left the company under an Enhanced Early Retirement program.
- Company earnings decreased in all four quarters compared with 1989 earnings, and HP stock hit a five-year low.
- HP closed the former Apollo board-repair and workstation manufacturing plant in Livingston, Scotland.
- The European sales organization realigned while U.S. Field Operations consolidated its sales areas.
- HP launched a plan to consolidate its 46 U.S. general ledgers into one in Colorado Springs, Colorado.



- The Personal Computer Group headquarters moved from Sunnyvale, California, to Grenoble, France.
- President and CEO John Young realigned HP's computer-business activities, creating the Computer Systems and Computer Products organizations.
- Intercontinental announced plans to restructure.
- The company announced plans to relocate its Avondale, Pennsylvania, manufacturing site to Wilmington, Delaware, and broke ground there.
- HP's board of directors formed a committee to develop a management succession plan.
- All sales forces now report directly to their own product management teams.

What lies ahead for HP in 1991? More division name changes? New reporting relationships? Yes, of course, there will be any number of changes in 1991. And almost no dinosaurs. ■

5 Cs of change-adept professionals*

Carol Kinsey Goman, a Berkeley, California, consultant on organizational change, has surveyed hundreds of people and found these common traits of effective change-adept professionals:

Confidence. Change-adept people are aware of their strengths. They have the competence to do a job well *and* the confidence to know how well they're performing.

Challenge. Instead of seeing change as a danger, professionals who handle change well see it as an opportunity. They are highly optimistic, and this powerful attitude lets them pull out the positives of change.

Coping and flexibility. People can accept and adjust to change, even if they don't necessarily like the change. They're able to keep things in perspective.

Counterbalance. People handle change best when their business life is balanced by other aspects in their life. For example, most change-adept professionals took good care of themselves—diet, exercise and no smoking—and had outside interests such as family, religion, sports, etc.

Creativity. Change-adept people see themselves as creative problem solvers. They value diverse opinions and experiences. They are proactive and *own* change by taking control and making it serve them.

Overall, change-adept people not only survive but actually thrive in changing times. And, Carol stresses, these characteristics and strategies to deal with change are not innate—they can be learned and developed in others.

*(*Reprinted courtesy of Carol Kinsey Goman and* Together *magazine.)*

LETTER FROM JOHN YOUNG

How is HP's top-level reorganization plan progressing? John gives an update on the "renewal" plan.

MATT WATSON

Says John, "...my focus will be operations—making sure our product programs are in place and that we are improving our financial performance while building for the longer term."

Usually at this time of year HP general managers from around the world come to Northern California for the annual general managers meeting. At the two-day event we exchange ideas, talk about our past performance and discuss the challenges facing us in the year ahead.

But this year, we've canceled the gathering...in part to keep a lid on expenses. More importantly, we want to give managers throughout HP the time they need to get their new management teams and programs in place following the October 5th reorganization announcement. We felt a mid-January meeting would divert too much attention away from the more important business and organizational issues "back home."

In this message, I'd like to give you a progress report on what's happened since our October broadcast. The top-level reorganization I described was not the only important part of that announcement. Equally significant is the renewal process we started to prepare Hewlett-Packard for the '90s.

Our renewal agenda has three goals:

- To give managers more control over the essentials they need to succeed in their business...including people, technology, sales and distribution channels.
- To create a simpler, flatter organization with less bureaucracy and fewer layers...an organization that empowers its people.
- To make a more responsive organization...one that can move quickly to take advantage of changes in the business environment and satisfy customers.

As to our progress so far, we're off to a good start. Let me describe some of the specifics, starting close to home.

In November I eliminated HP's Executive Committee. Many managers had come to believe that the committee should make all the tough decisions for the company—and in so doing, they abdicated to some extent their own management responsibility. By eliminating the Exec Committee, we removed even the perception that any groups other than the major business units themselves are responsible and accountable for running their businesses.

I'll continue to hold biweekly management staff meetings for purposes of information and coordination. But my staff won't be making decisions on issues that are better handled by business units.

In addition, I'll hold a biweekly meeting for the computer managers—Lew Platt, Dick Hackborn, Dick Alberding, Dean Morton and me. We will focus on issues such as targets, teamwork, sales policies and performance. We won't micromanage the organization

or debate the kind of UNIX* system strategy we ought to have.

The Management Council—the 40 or so most senior group and general managers—will change its meeting date to just after the close of each quarter. We will focus on performance: How we did and what we need to do to stay on track in the future.

Decisions are, in fact, being made at lower levels. Some of the most critical issues of the reorganization are how to develop a shared vision and a structure to carry forward our business in the Computer Systems Organization. I don't have room here in *Measure* to give you the details of their new mission or their organization, but the process Lew Platt and his team used is worth describing.

Their first step was developing a mission statement for the organization—a statement of the business HP will compete in and the way we will win in that business.

Their next step was describing the work program and the critical success factors that will be needed to accomplish the mission. It's a careful delineation of the things that are critical to our success. Lew and his people reached out to a broad section of employee groups to get their ideas, their feedback and their agreement. For example, they held long discussions on where we need to rely on third parties to augment internal skills and where we have clear strengths in the marketplace.

Lew and his people reached out to a broad section of employee groups to get their ideas...and their agreement.

Their final step has been defining how the business should be organized, a process that should be nearly complete by the time you read this. Lew set as a goal to put in place an organization that allows people to get satisfaction from having completed a project they started working on. They're shooting for organizational stability—not easy in the fast-changing computer business. But I know how important it is to HP people to have a clear view of what we're doing and what's expected.

While Dean looks at process improvement, my focus will be on operations...

As Lew and his team worked through this renewal process, they've kept employees in the Computer Systems Organization informed of and involved in the details to the maximum extent possible. In a future issue of *Measure*, you'll read about their accomplishments.

I'm pleased with the progress others have made in rethinking the way their organizations work. Our country organizations have changed their structure to align with the new product organization. In the process, we have eliminated one entire organizational level. Another great example, already on its way to becoming reality, is the new financial services center (FSC) in Colorado Springs.

Our finance community looked at the way we handle such day-to-day processes as accounts payable, travel expense reports and intracorporate billings. They asked why our transaction costs have been two to three times higher than other companies our size, especially given the computing systems at our disposal. This is a very important illustration of the use of benchmarking—something we all should be doing. They're now working on a multiyear program to move general-ledger processing from 46 U.S. sites to one spot—saving us up to $30 million a year while improving our service.

The renewal process I've described—looking at the way we conduct our business—will be led by Dean Morton. He will be our high-level champion to make sure these internal processes are improved. While Dean looks at process improvement, my focus will be operations—making sure our product programs are in place and that we are aggressively improving our financial performance while building for the longer term.

The year ahead looks as if it could be a tough one. All signs point to weakening economic times through 1991. But as we all re-examine and improve the way we work, I know we'll continue to be one of the strongest performers in the industry. I look to you to help develop the great ideas that will make HP an even better company in the years ahead.

MICKEY IFFA

Ed Stevens, his wife, Chic, and G.M. Jim Barton celebrate Ed's 50th.

Ed grabbed a golden opportunity

Ed Stevens was an energetic 17-year-old and Franklin Roosevelt was president of the U.S. when Ed came to Boonton Radio Company to work in the metal fabrication shop.

"I was the 16th employee," Ed remembers of his November 2, 1940, first work day, "and a $300 milling machine was a major capital expense."

Because HP acquired Boonton in 1959 and credited all Boonton and military service as HP experience, in November 1990 Ed became HP's third 50-year employee—after co-founders Bill Hewlett and Dave Packard.

"I'm a strange duck," says Ed, who has spent his entire career in the fab shop at HP's New Jersey Division. "I've always enjoyed coming to work. This company is my life."

Ed never has been one to shy away from a challenge, says Yong Park, who was Ed's boss for six years. "He was always willing to learn and relearn all over again as the technology changed."

Says Ed, "I was scared of computers at first, but it's really not hard to change if you want to. You can't live in the old days; you have to keep up with technology or you're a dead pigeon."

Ed takes great pride in achieving major goals in his life, including flying 1,000 combat hours during World War II, working 50 years for one company and donating 200 pints of blood. He's 15 pints short of the latter goal.

"I donate every 56 days," says the active 68-year-old. "During the war, they performed direct transfusions, so you could actually see the color come back into a guy's cheek. I figure there's still a need to help."

To honor Ed's service anniversary, the New Jersey Division presented Ed with a trip for two to anywhere in the world.

Giving hugs for the holidays

There's Ninja Bear and Scarlett O'Beara, and Sheriff Bill Bear, too. There's a Bookworm Bear with a fanny pack full of story books, and Pele Bear, the soccer player who brings his own rubber ball.

All of these bear characters, 60 total in the Bear Clan, found their way to needy children during the holidays in Colorado Springs, Colorado, thanks to HP employees at the Colorado Springs Division (COL).

"There's just something about putting your own imagination and creativity into a gift that's going to get a lot of hugs," says Kay Jackson, COL financial analyst, who started the annual bear-decorating program two years ago. "The idea is spreading so quickly, we have more volunteers than bears."

The COL employees donate the gifts to the Salvation Army, which distributes the gift-wrapped bears to children from referrals by social-service agencies and local school districts in Colorado Springs.

JIM SCHEER

Barely visible, Kay Jackson gathers 60 friends for the Salvation Army.

THE WINNER'S CIRCLE

It's an honor

Hewlett-Packard closed 1990 with a handful of awards from around the globe for HP products and people.

In Japan, the HP DeskWriter and HP LaserJet III printers were selected as 1990 G-Mark Products by the Ministry of International Trade and Industry.

The Good Design Products Selection System evaluates only products currently available in Japan. Selection criteria includes appearance, function, safety, value or cost and after-sale service. Selected products can attach the G-Mark emblem.

The HP 48SX scientific expandable calculator reaped a bounty of honors, including *EDN* magazine's Innovation of the Year Award in the computers and peripherals category. *EDN* award winners appear in the January 1991 edition.

Popular Science magazine also named the HP 48SX as one of 100 award winners in the Best of What's New for 1990 list.

In November, Prime Minister Dato' Seri Dr. Mahathir Mohamad of Malaysia awarded Hewlett-Packard Sales Malaysia with the National Award for Industry Excellence in Quality Management.

NEW HATS

In action by the HP board of directors on November 16, **Dick Hackborn,** head of the Computer Products Organization, was promoted from vice president to executive vice president, and **Bob Frankenberg,** general manager of the Information Networks Group, was elected a vice president.

Test and Measurement organization changes: **Tom Vos** to G.M., Electronic Instruments Group; **Byron Anderson** to G.M., Communications Test Business Unit; and **Jim Rundle** to G.M., Spokane Division.

In region management changes in Europe, **David Baldwin** to G.M., European Multicountry Region, and **John Golding** to managing director, U.K. Region.

Bruce Spenner to G.M., Disk Mechanisms Division.

BOTTOM LINE

For the fourth quarter of fiscal year 1990, ended October 31, Hewlett-Packard reported a 6 percent increase in net revenue and an 18 percent decline in net earnings. Orders grew 10 percent, reaching a record total.

Net revenue for the fourth quarter totaled $3.6 billion, compared with $3.4 billion in the very strong fourth quarter of fiscal 1989 (which had chalked up a 25 percent gain).

Net earnings totaled $202 million or $.83 per share on approximately 244 million shares of common stock outstanding—a decline from comparative numbers of $246 million or $1.04 per share on approximately 238 million shares in the year-ago quarter.

Orders for the quarter totaled $3.5 billion, up from $3.1 billion in the same period in 1989.

For FY90, net revenue rose 11 percent to $13.2 billion (up from $11.9 billion in FY89); net earnings were $739 million (down 11 percent from $829 million); and net earnings per share were $3.06 (down 13 percent from $3.52).

CHART CHANGES

New in Europe: the Bergamo Hardcopy Operation near Milan, Italy, and a new subsidiary in Portugal under G.M. **Jean Gosselin.**

Entity name changes to better reflect multiple sites: the former Santa Clara Information Systems Division is now the Cooperative Object Computing Division; the former Sunnyvale Personal Computer Division is now the California Personal Computer Division.

Kyoichi Miura spends his free time coaching university football.

Kyoichi gets a kick from Ame-fu

Football may never replace baseball or sumo wrestling as the most popular sport in Japan, but it's still No. 1 with Yokogawa-Hewlett-Packard's Kyoichi Miura.

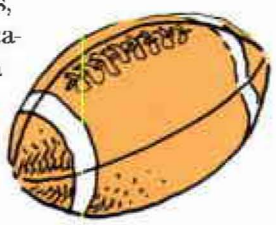
Kyoichi, a Tokyo sales office district manager for HP 9000 systems, has been an unpaid, part-time "Ame-fu" (American football) coach at Sophia University for nine years.

During the season he spends hundreds of hours coaching week-night practices and weekend games, and gives up summer vacation time to help during a 10-day training camp.

"University days are the best period in one's life," Kyoichi says, "and I enjoy sharing my time with students to help them grow in ability."

Kyoichi, who played quarterback while attending Sophia University, says football is increasing in popularity in Japan.

And what first attracted him to the sport? "I thought football players were popular among young girls," he says with a smile.



COMPUTER SALES

Key managers have been named within the Computer Systems Organization (CSO) and the Computer Products Organization (CPO):

Within CSO, Vice President **Franz Nawratil** has become worldwide sales and marketing manager, **Laszlo Szegedi** is sales and marketing manager for CSO Europe, and **Klaus-Dieter Laidig** is G.M., CSO marketing Europe.

Within CPO, **Dick Watts** has been named worldwide sales and distribution manager.

NEW PRODUCTS

From the Optoelectronics Division and Siemens AG: a **surface-mount light-emitting diode** that's a breakthrough in LED technology—so bright it competes with through-hole LEDs....The **HBCR-2210 programmable decoder IC** from the Optical Communication Division has superior barcode-reading capabilities.

HP 5373A

New instrument stars: the **HP 5373A modulation-domain pulse analyzer** from the Santa Clara Division for the design and development of pulsed RF systems used for such advanced applications as weather satellites and air-traffic control....the **HP 3073 advanced in-circuit board-test system** from the Manufacturing Test Division allows easy upgrading....The Network Measurement Division's **HP 85109B network-analyzer system** extends on-wafer measurements to 62.5 GHz with a single coaxial connection.

Easy to carry: the lunch-box-sized **HP 27701A T1 portable tester** from the Queensferry Telecom Division has comprehensive test features but weighs only 10 pounds....The Lake Stevens Instrument Division's portable **HP 3560A dynamic signal analyzer** weighs seven pounds but performs measurement functions of a larger bench-top analyzer....Two **portable spectrum analyzers,** the **HP 8594A** and **8595A,** from the Signal Analysis Division extend the frequency ranges covered by the HP 8590 series.

From the Analytical Products Group comes an improved **PC-controlled GC/MS system** with Microsoft ® Windows 3.0. It performs more simultaneous tasks faster.

PARTING SHOT

The ultimate rideshare

Lee Boswell, a software engineer at HP Labs, and 14 of her friends gave new meaning to the concept of ridesharing in October when they successfully attempted a 15-woman parachute stack in the skies above Madera, California.

In the space of 10 minutes and 10,000 feet, the team jumped its way into the *Guiness Book of World Records* for the biggest stack ever completed by women. Rod, Lee's husband, was part of the record 24-person men's team in 1986.

Canopy Relative Work—or CREW as it is known to those who have "fallen" for the sport—isn't for everyone. Fitness is key, according to Lee, who took up the sport in 1982 when she was a Ph.D. candidate at Oxford. She lifts weights to strengthen her arms and legs, and spends most weekends practicing jumps at a parachute center in Lodi.

For the October jump, Lee trained for three months with 10 team members, but the full team wasn't together until the day of the jump.

Lee Boswell (third from top) and 14 friends float to a record with their 15-woman parachute stack.

"We began at 7 a.m.," she says, "but it was our sixth jump and nearly sunset before we succeeded.

"As we descended, our friends and family who'd waited patiently all day for that moment started cheering and applauding. It was a great end to a great day!"

But the story doesn't end here. The next morning, the team broke its own record with a 16-woman stack on the day's first jump.

—Cheryl Ritchie

(Cheryl Ritchie is the communications specialist for HP Labs. —Editor)

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