MEASURE

The road to 1989

MEASURE

"Man is the measure of all things."—*Protagoras (circa 481-411 B.C.)*

Hewlett-Packard Company designs and manufactures computers, electronic test equipment, handheld calculators, electronic components, medical electronic equipment and instrumentation for chemical analysis. Manufacturing facilities are located in 22 U.S. cities in seven states and in 10 cities in nine countries in the rest of the world. HP sales and service offices can be found in more than 80 U.S. cities and (including distributorships) in approximately 200 cities in 70 countries around the world.

ON THE COVER:

What's likely to happen as HP travels the road to 1989 (the year the company celebrates 50 years in business)? Staffer Gordon Brown guides us through the special report, starting on page 9. Cover photo by Brad Whitworth.

UPFRONT

HP earns state award for handicapped employment, movie's "star" in new role.

There's nothing like recognition for a job well done. Individuals thrive on it, and even large corporations enjoy basking in the honor occasionally.

HP received a very special award in October from the California Governor's Committee for the Employment of the Handicapped. Hewlett-Packard was named "employer of the year" among the state's large companies (more than 200 employees) for its positive actions to "actively recruit, hire and provide employment opportunities for disabled people." (By earning the state award, HP is automatically nominated for the national award to be given by the President's Committee on Employment of the Handicapped in March.)

HP's efforts already have received some national attention through an HP-produced film. *Just Three People* chronicles the on-the-job and private lives of three HP employees with disabilities (see November-December 1980 *Measure*). Released late in 1980, the show has played on Public Broadcasting System television stations throughout the U.S.

"I saw the movie a few months ago, and I barely recognized myself," says Barbara Claubes, one of the movie's "stars." A lot has changed in the two and one half years since Barbara's life was recorded on film.

Barbara joined the manufacturing specifications department in 1979 as a clerk, zipping along corridors in her electric wheelchair to deliver paperwork throughout the facility.

She was promoted in July and now puts her knowledge of the division to work tracking purchase change orders (PCOs) through various departments. She meets regularly with production engineers, service engineers, purchasing people and controllers. "I feel I'm contributing more in my new job," she says.

Barbara remembers in vivid detail the day in 1979 when she approached HP about a job.

"It was very scary. I took three buses to get to the HP plant in Rancho Ber-nardo. It was very foggy that day, so I had a tough time getting across the street from the bus stop.

"It's not easy to walk in and tell a big company like Hewlett-Packard, 'I want a job,'" says Barbara.

"It's tough to turn anyone down who has that kind of determination and courage," says Marshall Hiner, division personnel manager at the time. "Barbara's husband had been one of the first employees with cerebral palsy hired at the division. When he died in 1978, we all told Barbara that if there was anything we could do for her, she should call. Little did we know that she'd come and ask for a job."

"My main dream was to make myself useful," says Barbara. "Watching the movie I can see what I've accomplished since joining HP, and I can see how I've really grown." **M**

San Diego's **Barbara Claubes, a star in the HP-produced film "Just Three People," now tracks division purchase change orders.**

Turning Disney's dreams into reality

Real-life HP products work behind the scenes in the wondrous, make-believe world of Walt Disney.

When the sound engineer at Walt Disney Studios saw HP's first audio oscillator, he realized it would be useful in producing movie soundtracks. So he bought eight of them for the movie *Fantasia*. That large order convinced Bill Hewlett and Dave Packard that their young company had a good chance to survive in the electronics world.

Those original eight oscillators were part of the racks of

sound equipment used to produce the 1940 Disney hit *Fantasia*. The movie was then on the cutting edge of sound technology and featured music performed by the Philadelphia Orchestra, under the direction of Leopold Stokowski.

More recently, HP's computer equipment helped produce another Disney motion picture, *TRON*, that explored new animation techniques. (See related stories on the next pages.)

In the 42 years between those two movies, both HP and Disney have grown and diversified, yet their paths still cross on a regular basis.

At Disney's original amusement park, Disneyland, in Anaheim, California, there's HP instrumentation working behind the scenes to check and calibrate sound systems throughout the park. That means that the 10 million people who visit the park each year can enjoy virtually glitch-free entertainment.

At the second "Magic Kingdom," Walt Disney World in Orlando, Florida, six HP 85 computers are used in the accounting department to count each day's incoming paper money. After the bills have been separated into piles of ones, fives, tens, etc., the piles are placed on super-sensitive electronic scales hooked to the 85s.

In the 42 years between "Fantasia" and "TRON," both HP and Disney have grown and diversified.

The computer tells, in dollars, how much the pile of bills is worth. The equipment is recalibrated daily to compensate for changing atmospheric conditions that can affect how much the bills weigh. The application is considered "the most sophisticated money-counting system in the country," according to HP computer field engineer Doug Lyda of the Orlando sales office. "Bank officials from throughout the U.S. are coming to Florida to see how Disney counts its money."

When Disney started working on its most recent venture, a 260-acre site

An 18-story geosphere dominates the entrance to Disney's EPCOT Center. HP products are on display in two of the park's pavilions.

just "down the road" from the Magic Kingdom for the new EPCOT (Experimental Prototype Community of Tomorrow) Center, the survey team made extensive use of HP 9845 computers. The boundaries and land contours were stored and manipulated electronically before any of the 54 million tons of earth were moved or the 40-acre, man-made lagoon was filled.

The futuristic EPCOT is not just a flashier version of the other amusement parks. Instead, the park, which opened last October at a cost of nearly $1 billion, is more like a permanent world's fair. Visitors are treated to large-scale demonstrations of state-of-the-art information systems, computer monitoring and control, fiber optics, energy and transportation.

Although HP isn't a sponsoring corporation (companies such as General Motors, Exxon, AT&T and Sperry Univac will pay $300 million over a 10-year period for the right to display their logos and products in their own pavil-

ions), there are HP products on display.

In GM's World of Motion pavilion, visitors can see a wide variety of HP's personal computer products including an 86 and an 87 computer (the 87 even talks to visitors via an HP-developed voice module), a 75, a 41CV handheld computer and a pair of calculators, a 15 and a 16. There's also a good sampling of HP plotters, printers and instruments linked to the computers.

In the Exxon-sponsored Universe of Energy, a 9845 desktop computer and a 3497 data acquisition and control unit track a chemical process for wide-eyed onlookers.

Even behind the scenes, two HP 1000 computers form the hub of the power distribution center for EPCOT and Disney World through the Reedy Creek Utilities Company. Reedy Creek is a Disney-owned-and-operated utility that provides energy for the 43-square-mile stretch of Florida swamp and scrub pine that comprises the Disney empire. The computers (much like the System-

safe/1000 mentioned under New Products on the back cover) can monitor for power outages and handle switching between a wide variety of power sources. Disney's utility buys some electric power from outside sources, adds more energy from a massive solar electric array atop the Universe of Energy pavilion, and then adds even more from traditional generators at the complex.

With an expected nine million guests headed for EPCOT, and another 13.2 million visiting the Magic Kingdom this year, the HP 1000s help Reedy Creek meet a sizable energy demand.

To cut energy costs in the years ahead, engineers at Disney are readying a new solid-waste energy conversion (SWEC) plant to turn the park's discarded paper cups and hot dogs into energy. "Here at Disney we have the best garbage in the world," says Willard Smith, manager of engineering and construction for Reedy Creek. "It's high in paper content and low in discarded bicycles and other things you find in municipal garbage."

When fully operational, the plant will consume 100 tons of garbage a day—generating enough steam to cook food for EPCOT, Disney World and two Disney hotels, as well as to heat and air-condition 15 percent of the Disney buildings and provide three hot showers a day for all the hotel guests. Steam will also create additional electricity, which will be added to the utility's total power supply under the control of HP computers.

Leave it to Disney to discover a way to handle all the garbage for SWEC in a discreet manner. A network of underground pipes, arranged in a Christmas-tree pattern, head into a central compactor. A vacuum is maintained in the pipes so that any half-eaten hot dog thrown down a trash chute goes zipping through the pipes at 60 miles per hour toward the compactor.

It's imagination like space-age garbage chutes and TRON warriors that has helped make Disney the innovative company that it is today. Behind the scenes, HP has had a part in that innovation since 1939. **M**
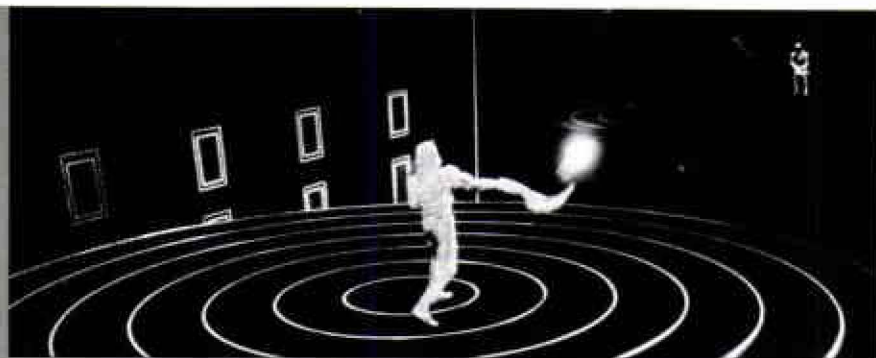
THE NEW DISNEY

The plot of Walt Disney Productions' $21 million TRON is age-old: good versus evil. But the setting is strictly up-to-date: a video-game grid inside a large computer. Perhaps more important than the adventure epic's simplistic story line (computer programmer discovers his software is being pirated and enters the system to discover why) are the revolutionary computer animation effects in the movie. HP's 9826A desktop computer helped fill the screen with pulsating, glowing figures that chase each other through the movie's computer innards.

What HP's computers did for TRON was to speed up the painstakingly slow process of animation. "It is very time consuming," says John Scheele, technical consultant to Disney Productions. "What used to take several weeks can now be accomplished in a few days with the new camera-computer."

For TRON, the camera was connected to a controller which, in turn, "talked" to the HP computer. Under a camera operator's guidance, the computer determined camera angle, shutter speed and exposure, then took a shot. Twenty-four such shots (or frames) make up one second of on-screen time.

After comparing several other brands of computers, Disney picked the HP 9826. "We have camera operators, not computer programmers, shooting TRON," says Dave Inglish, chief electronics engineer for Disney Productions. "The HP computer is easy to use. The operator enters a few numbers and the computer and the camera do the rest."

THE 'NEW,' OLD DISNEY

Even a Disney classic like Fantasia is a likely candidate for a facelift as technology marches on.

Over the years the original soundtrack, produced with the help of HP audio oscillators, has been changed three times as recording techniques have improved.

At the film's premiere in New York in 1940, the Broadway Theater was equipped with $85,000 worth of special equipment, including 36 speakers behind the screen and another 54 scattered throughout the hall. The soundtrack, originally recorded using nine sound cameras, didn't get such royal treatment again for 16 years since few theaters could afford the expense of all that sound equipment.

In 1956 the movie was re-released with the soundtrack rechanneled on magnetic film. In 1977 Disney issued a version produced in simulated stereo, one that drew a new generation of viewers.

The most drastic revision of all occurred early in 1982 when the studio
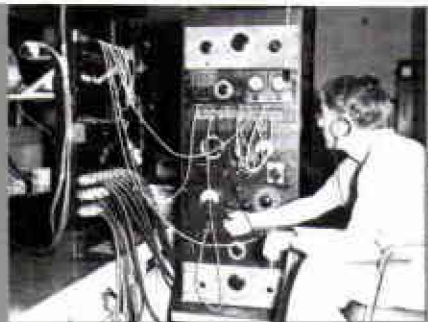
HP audio oscillators (top and bottom) are part of the equipment used at the Disney studios in 1939.

again released the classic with an entirely new soundtrack. Instead of the Philadelphia Orchestra, a 127-piece Hollywood ensemble gathered on a soundstage for the recording sessions.

So the next time you see Fantasia, remember that although the original soundtrack has been digitized, Dolbyized and stereo-ized, the images of dancing mushrooms and frolicking hippos are the same ones which pranced in front of HP's eight audio oscillators 44 years ago.

YHP TEAMWORK TAKES THE PRIZE

If you'd been in Yokogawa-Hewlett-Packard's Hachioji cafeteria on the afternoon of October 19, you'd have seen a smiling YHP executive tossed exuberantly aloft like the winning coach after a hard-fought game.

The man in the air was Kenzo Sasaoka. YHP's president, who in 1977 set in motion a campaign for total quality control that has spread throughout the Japanese company and influenced Hewlett-Packard as well.

The joyous news being celebrated was the official notification that YHP had just been awarded one of Japanese industry's highest awards: the Deming Prize. By the following day it was headline news throughout Japan.

The official presentation of a gold medal to the 1982 Deming Prize recipients was a more formal event held in Tokyo on November 15 under auspices of the Union of Japanese Scientists and Engineers (JUSE), which sponsors the annual award.

Present for the ceremony was Dr. W. Edwards Deming, the 82-year-old American statistician for whom the prize is named. More than 30 years ago his lectures in Japan on statistical quality control techniques and concepts led to a revolution in that country's product quality—and establishment of the Deming Prize in his honor in 1951. It is given each year to corporations and plants which have made marked improvements in the application of statistical quality control and to an individual for research and education in the field.

Japanese companies compete fiercely to win a Deming Prize. Members of a management team typically work several hundred extra hours each month to organize the statistical

News that YHP had won a Deming Prize was the signal for employees to give their president, Kenzo Sasaoka, a triumphant toss. Mitsutoshi Mori (right) was next.

charts, reports and exhibits for judging.

GOING FOR THE GOLD

From the time in early 1982 that YHP decided to go for a Deming Prize, the entire company—management, manufacturing, sales, service and administration—became involved in documenting YHP's story of Total Quality Control (TQC).

Formal reports (totaling some 360 pages) were submitted by YHP in June, followed by on-site visits from Deming Prize committee members. One-day audits were held at the Takaido sales headquarters in Tokyo and the western sales zone headquarters in Osaka during August, with a one-and-one-half day audit at the Hachioji manufacturing and headquarters facility in September.

Audits had all the tension of a championship sports event.

First, local YHP management went on the offensive with formal presentations of the company's TQC story, illustrated by wall-sized charts. The talks covered

company policy and organization to promote quality control, education and training, and the use of nearly 300 quality circles throughout YHP.

The listening auditors could scribble a request for supporting data. At the Hachioji audit, the management portion was carried by close-circuit TV to a nearby document room staffed with dozens of YHP people ready to supply an immediate answer to questions rushed in by messenger.

The audit committee was then taken to demonstration areas which illustrated the successful use of statistics in solving particular problems. At Hachioji, for instance, one of the story charts explained a new "foolproof" method for analyzing and perfecting every step in hand-mounting components on printed circuit boards. At another stop, a quality circle of part-time employees described their activities.

Next, YHP was on the defensive. The audit committee chose a number of departments to visit for proof of management statements. Sharp questions were thrown at employees, with de-

mands for evidence of statistical methodology and results. During the audits at the three sites, 33 departments were put on the spot.

Yokogawa-Hewlett-Packard, a joint-venture company of HP and Japan's Yokogawa Electric Works, is only the third Japanese company with American ties to emerge from this tough judging process as the winner of a Deming Prize.

It is the first to be commended by the examining committee for influencing the quality efforts of its parent American company, including close cooperation with a number of individual HP divisions whose products YHP manufactures or imports for sale.

TOWARD TQC

While YHP is elated to have received a Deming Prize, that considerable accomplishment is seen as "a milestone, not the ultimate," in pursuit of quality, according to Katsuto Kohtani, YHP Computer Division general manager. "This gives us a baseline for how we compare with outside companies," he explains. "Our quality activities will go on forever."

The importance of focusing on quality had become obvious to YHP management in the mid-'70s. YHP was then one of the least profitable entities in HP. It had problems in both its own proprietary component measurement product line and the transferred products which it manufactured as a licensee for a number of HP divisions.

One trigger for doing things differently came from learning in 1977 that Japanese competitors enjoyed low failure rates measured in parts per million in the dip-soldering process for printed circuit boards. YHP, which had considered its own failure rate of 4,000 ppm quite good, was astonished.

Total Quality Control began in manufacturing in 1977 and was expanded the following year to R&D and marketing. Sales and administrative areas were added in 1981.

In basic terms, the key to TQC is to start with the customer's real requirement rather than with a product. "In the past, quality control was focused on manufacturing the product to meet the

designer's specifications," explains Kenzo Sasaoka.

Work processes are analyzed by first collecting data, using statistical techniques to identify problem areas, and then taking action to fix the problem permanently. The goal is to do the job right the first time, resulting in savings in labor, material and space.

From the beginning, TQC has been a top-down effort with Kenzo directly involved. An office which coordinates TQC promotion activities reports directly to him. Every level of YHP, down to each individual worker, has several clear goals of its own with performance measures. There is room for individual initiative: In preparing the Deming materials, YHP managers came up with 370 "improvement stories" of successful quality projects they had initiated.

For its own component measurement product line, YHP was able to apply TQC across the board. New product planning was improved through cooperation between marketing, which gathered data on customer needs and satisfaction, and R&D. A direct relationship was made between customer requirements noted on the planning sheet and the performance of the function block of electronic circuitry. Design reviews became more rigorous, including 20 hours of sub-design reviews for marketability, serviceability, safety and four other features. Thoroughness at the front end paid off in shortening the entire new-product cycle.

In his report to Deming Prize auditors, Mitsutoshi Mori, general manager of the YHP Instrument Division, gave some dramatic figures on improvement. Production costs have dropped 33 percent and component measurement is now HP's most profitable line. Failure rates are down by 50 percent, and R&D development cycles are down from more than 30 months to 22 months. Between FY79 and FY81, orders grew 38 percent per year.

Failure rate in the dip-soldering process for P.C. boards—which first riveted YHP's attention on the possibilities for quality improvement—had dropped from 4,000 ppm in 1978 to 3 ppm in 1982. At the same time, labor hours and lead time were reduced. "We realized that improving our failure rate

led to high quality and lower cost at the same time," says Mitsutoshi.

The application of TQC to those products (computers, instruments, and personal computers) which YHP makes as a licensee for HP divisions was a different challenge. Since YHP has no responsibility for initial product design, it first bore down on improving the quality of its own workmanship through training and other efforts.

To make it easier for older workers and part-time people to understand the production process, YHP developed its own assembly notes using pictures and drawings. A management system of working standards for tooling and equipment use was put in place.

In the sales organization, almost every employee was in a quality circle. The focus was on determining the best method for getting customer orders. All steps in the sales and service process were analyzed: meeting customers, the factor of timing in closing a sale, why each sale was made or lost, systems support and admin. Nothing was overlooked, including a study of how waiting time in the reception room could be shortened.

New procedures and forms were also set up to gather information on cus-

Shigeki Mori, marketing manager for YHP Instrument Division, uses illustrated wall chart for his formal presentation to Deming Prize auditors.

YHP TEAMWORK

tomer needs, analyze the data and send it to R&D or to HP divisions.

TQC ACROSS THE PACIFIC

While YHP could take giant steps in improving quality in its own house, it became increasingly clear that help was needed from HP divisions as well.

Even before TQC was introduced, YHP set up a unique customer assurance function to inspect all incoming shipments of HP products for sale in Japan—since Japanese customers won't accept imperfection. Any products "dead on arrival," incorrect accessories or missing documentation are routinely reported back to the source.

Another form of feedback is the "corrective action report" to licensor divisions. The one-sheet form has sections for the problem found in a technical design or process, alternate solutions, and a fill-out section to let YHP know if the recipient agrees with the analysis and what action will be taken. In the past, YHP people have sometimes been frustrated by the lack of response to their inquiries. By making the form more specific, YHP has been able to get prompt attention from other divisions that have now become more quality conscious.

The Loveland Instrument Division, which ships more products to Japan than any other HP entity, has been working closely with YHP to improve turn-on rate and to double-check all shipments.

"TQC across the Pacific Ocean" was a term Katsuto Kohtani used in his Deming presentation.

Two of his "sparkling points" involved direct cooperation between the YHP Computer Division (YCD) and U.S. divisions:

• As part of a long-range YHP project to improve the foreign-language capability of HP computers, YCD's R&D department and the Computer Systems Division have formed a native-language task force to develop a Kanji (Chinese character) subsystem.

• Since 1980 both YHP divisions have worked closely with U.S. licensor divisions to reduce the warranty failure rate of products. For the Deming effort, YCD selected the 9845B from the Desk-

top Computer Division as a model to improve. A joint quality control circle of YHP and DCD managers determined the 10 worst assemblies and the order of priority in which to improve them.

DCD team members visited Japan in 1982 and YHP engineer Masumi Muto spent six months in Fort Collins. DCD made changes in its environmental lab to simulate Japan's high temperature and humidity and lower voltage and frequency. Result: The annual warranty failure rate was reduced from two failures per year (200 percent) to less than one (73-74 percent).

"Everything we learned to help YHP we implemented ourselves," says Dave Cole, DCD product assurance manager. "We cut our own costs and failure rates and learned how to attack a problem tenaciously."

A similar joint quality control circle of managers was established with the Data Systems Division in late 1981 to improve reliability of the HP 1000.

YHP's intense and disciplined TQC program has had an impact throughout HP, a fact that was noted favorably by the Deming Prize committee.

No one is more gratified that YHP's activity is driving HP's quality efforts than Ray Deméré, vice president—Manufacturing Services, who first visited YHP in 1974. Today YHP is a working model of the Deming principles that the Corporate Quality department in Ray's organization has been promoting for a number of years.

Visiting YHP again last month, Ray admired what he saw. "Compared with 1977, YHP is producing four times the volume of output in the same facility—with very little automation," he says.

"Most of YHP's improvements are the result of simple, elegant solutions which allow people to work more efficiently and eliminate defects."

Dr. Deming himself had a chance to see YHP's application of statistical quality control when he visited the Hachioji facility on November 19. "YHP is a dream," he commented. "It would do anyone good to follow their procedures but there is only one Mr. Sasaoka."

For the YHP team, it was a memorable opportunity to meet a man who helped write the rules for the game. **M**

OFFENSIVE: In the document room, YHP people follow management presentations over closed-circuit TV while waiting to fill requests for supporting data.

DEFENSIVE: A JUSE examiner (right) asks for back-up materials during a visit to YHP Instrument Division's manufacturing engineering department.

THE ROAD TO 1989

Sometime in January, 1989, Hewlett-Packard will celebrate its
50th anniversary. No specific date is set for the event, mainly
because the partnership of Dave Packard and Bill Hewlett was
an evolutionary one, with no particular date to mark its beginning.
Moreover, with their country in a depression and the world
starting to blaze with war, it was hardly a time to think about
making corporate history. Their hope was to survive in
business on their own. Yet six years later their company had
grown beyond anything they might have imagined at the outset.

   Who can tell what surprises await us over the next half-dozen
years? But we do know something about the issues and
trends—in the work place, the work force, and the
marketplace—that will be influencing our
progress as we travel down that road. The
following is an attempt to distill a wide
range of observations by HP people
on those matters as a way of
sketching a kind of road
map for our journey.

THE WORK PLACE

What do the signs and signals tell us about the HP work-place in 1989? What will the changes be? Can we become a showplace of productivity?

In 1776, Adam Smith took note of a basic dilemma confronting nations in the pursuit of wealth: Efficiency requires specialization of labor which, in turn, calls for routine work tasks to be performed on a repetitious basis, turning people into machines.

If you accept the views of a great many people both inside and outside of Hewlett-Packard, we are now witnessing the further and perhaps final resolution of that dilemma: Machines will be taking over almost all of those repetitious jobs from people—and much, much more—while creating a need for new higher skills and more interesting work opportunities.

The name of the game is productivity. Hewlett-Packard is in it up to the hilt.

Said Franco Mariotti, vice president—Europe, "During the decade of the '80s, HP has a great opportunity to become a showcase of industry, bringing together highly motivated people, advanced technology and management philosophy to create a model 'third wave' company of the future." Franco is quite specific about one approach to this opportunity—establish a network of showcase divisions and sales offices in Europe as demonstrations of the productivity of HP people, plants and products. "This can set an example and establish a contribution to an improved working environment within the various countries in which we operate."

Ray Demére, vice president—Manufacturing Services, put part of HP's productivity efforts into perspective: "Historically, we provided whatever processes were needed in manufacturing. We obtained quality products by fixing built-in defects before shipment. Because our products had high functional quality designed in and were given detailed attention during production, as well as strong field sales and service support, they gained a reputation for high quality and reliability.

"More recently, however, customer expectations have been changing. They not only want higher quality and reli-

ability, but also lower cost with better delivery.

"This has meant a new manufacturing strategy, one that is linked more closely with product development and marketing.

"The key is to emphasize the quality of our processes, starting with the design of products and procurement of materials on through the support and delivery systems. As processes come into control they can be refined and become candidates for automation. With increased automation and improved information systems, virtually every aspect of our workplace will be linked in a large network—a Manufacturers' Productivity Network. Machines will take on more and more of the repetitive tasks. HP automation will need to be flexible, allowing us to produce low- and medium-volume products on a high-volume line. Besides automating, we will be subcontracting more of our fabrication where quality sources are available."

"HP has a great opportunity to become...a model 'third wave' company of the future."

One result will be a shrinkage in the manufacturing portion of floor space relative to other operations. Higher skills will be called for in the tending and maintenance of machines and systems.

Serious and systematic efforts are now underway to exploit our own technology more fully in our own activities. Bob Boniface, executive vice president–Administration, last August prepared a memo that emphasized this strategy.

In summary, he said that while HP's computer organization is among the leaders in introducing a broad range of office-automation products, to date

Computer systems will link virtually every aspect of our work place in one vast network.

our own applications have been limited.

Now, John Young has asked for a formal program with three objectives: Increase office productivity, provide a showcase of HP products, and generate application feedback for further development.

The upshot has been a new charter for an office-systems team focusing on product promotion and awareness, selection of equipment and software, trainer training, support for coordinators at HP entities, and developing interfaces for office products. Ultimately, HP's automated offices will be fully integrated with the company's voice, data and video communications network.

For these things to happen, HP will be looking at the design of the work place to be sure that we won't trip over our own wiring. Eric Woods, Corporate Construction manager, said floor and partition designs could be affected—although fiber-optic connections and flat-wiring systems may facilitate the change.

The work place of the future will be greatly influenced by the major advancements in office equipment. There is much speculation as to people working out of their computerized homes. The challenge to us, according to Eric, is to design our buildings and offices to be attractive, convenient and efficient so that employees will prefer a work place that provides face-to-face meetings and personal interaction—important to most business communications, especially in a company such as HP.

We will also see more decentralization of some corporate functions such as legal, public relations and government affairs as locations become clusters of

facilities, and geographic regions require more intense local representation.

Internationally, we will develop a stronger presence in our traditional markets and expect to become more of a factor in many lesser developed countries. Decentralization will be emphasized, said Alan Bickell, Intercontinental managing director, giving remotely located HP area headquarters a strong local character. "This will allow us to manage these territories more effectively, broaden our employment base,

We will see more decentralization of functions as geographic regions require more intense local representation.

and gain us access to technical and managerial talents not otherwise available." As in the U.S., we will be looking for people with engineering, computer science and advanced business training, will adopt more vigorous university recruiting programs, and continue with aggressive affirmative action programs addressing local problems.

Seen as a whole, HP will increasingly take on the look of a true multinational company, but one with strong local ties in each community.

THE WORK FORCE

How will we deal with larger size? With increasing organizational complexity? With changes in work-force composition? With greater competition for talent? With more exposure to public issues?

One commonly used estimate, based on a straight-line projection, would put about 124,000 people on HP's payroll in 1989, or almost twice the present number. There would, of course, need to be comparable increases in facilities for R&D, manufacturing and sales, many of them at locations entirely new to the company. Product lines will have been affected by the broadening of markets and more interactive strategies that we are already embarked on in product development, manufacturing and marketing. On all counts, we will be working in a larger and more complex environment.

As company veterans can tell you, that kind of picture has been drawn time and time again throughout HP's history as a source of concern.

The concern is not really how big the company will become by a certain date but rather what effect larger size and added complexity will have on the style and philosophy of the organization—the HP way.

Over the years, the responses to this concern have been remarkably consistent: We must make every effort to maintain the identity, human scale and benefits of the individual HP organizations while dealing with change in ways that require much more cooperative effort.

Dean Morton, executive vice president, said those are clearly our objectives today as in the past. "The goal is to have people—both factory and field—work together in teams that are of comprehensible size and with a clear purpose to which they can relate. The challenge comes in finding ways to link these basic units into the larger teams and alliances we need to perform more complex tasks as we grow.

"Common objectives, management philosophy and standardized procedures provide a necessary base. Beyond these, it's mainly a matter of creating networks or overlays—informal groups, councils or task forces—to bridge whatever gaps exist as a result of the basic structure.

"It's this kind of interrelationship—competitive in terms of divisional performance and goals of excellence, but cooperative in terms of corporate spirit and overall objectives—that enables the HP organization to deal with complex-

ity. One great advantage is that division people can think in terms of providing customers with a very broad range of products without having to reinvent the wheel every time. It adds real strength to a division and, so far, no one has devised any good substitute for the divisional organization."

As a number of observers have noted, Hewlett-Packard could locate plants almost anywhere to its liking, because it is not tied to natural resources—*other than people.* In fact, the question of people—attracting and maintaining the levels of talent we will need in the years ahead—is one of HP's central concerns today. We are far from being "home free" on this question, because supply and demand factors are not expected to be in a neat or necessarily favorable balance.

Take the question of R&D engineers. Chuck House, Corporate Engineering director at HP Labs, notes that we will need double their number within five years. Our competitors will also be in the hunt on a similar scale. But the future supply is already in engineering school, and there isn't enough for everyone. The same can generally be said for the engineering and scientific talents—especially in computer science—that will be needed in the manufacturing, marketing and sale of our products.

Jack Grout, educational relations manager, identified the problem as a product of shortages of faculty, equipment and facilities within the university system, plus increasing demand for engineering and computer science graduates. On the other hand, there's no shortage of talent waiting for campuses to open their doors wider.

In the years ahead, therefore, you'll see Hewlett-Packard (and others) making major efforts to encourage the growth and retention of engineering and science faculty, equip and expand facilities, foster pre-university technical education, and help bring more women and minority people into the

technical professions. Late last year, for example, HP announced a program to invest some $6 million over the next eight years in university fellowships that would encourage selected graduate students to go on to their Ph.D.s and become full-time faculty members in engineering.

The HP work force will continue to change in composition, as it has in the past. Under the impact of technology and automation, the employment of professionals will rise relative to the company as a whole, and will probably reach the 50 percent mark in the next few years (up from 22 percent in 1966).

"So far no one has devised any good substitute for the HP division..."

In spite of large infusions of new young people, the average age of the HP workforce will rise somewhat during the coming decade. Several influences are at work here. One is the growing number of people approaching retirement age who will elect, as they now can, to continue working. (See story on page 20.) The other is the passage of the so-called "big generation," resulting from the post-war baby boom in the Western nations, into relative maturity. It soon will represent almost 50 percent of the work force and, because the following generation is much smaller, will tend to dominate statistics—if not other things—for years to come.

With its increasing visibility and size, HP will have to deal with more and greater issues, both public and work related. Bob Kirkwood, Government Affairs director, summarized a number of issues—in addition to those raised elsewhere in this report—which he said would occupy a lot of HP attention:
● *Questions of high-tech security.* We recognize the need to secure our technology in our own interest as well as the national interest, but will strive for approaches that are compatible with the HP way of doing things and avoid unneeded restraints on international

activities including the flow of data across international borders.
● *Human resources.* This is a very broad front embracing the needs of many people for opportunities to participate fully in society. HP's approach will continue to be one of problem solving, through emphasis on education, training and development. Both HP and society need the full talents of all available people, so it's a matter of good business and citizenship to provide opportunities for their development.
● *International trade and competition.* The interest of Hewlett-Packard and any country in which we operate will be best served by building on our own strengths, and by insisting on fair trading rules. We will need to resist efforts to construct protectionist trade barriers that would limit or reduce our access to international markets.
● *Environment.* We will be taking many steps to safeguard the work place and the community. For one, we will be seeking alternate materials and processes to minimize hazardous wastes.

We'll also be seeing much more evidence of HP involvement in two well-known pocketbook-citizenship issues—energy conservation and philanthropy.
● HP organizations have done a very good job of "fixit"-type energy conservation. The new emphasis will be on long-term solutions built in to our facilities (products also will be designed for lower consumption of power). With our energy bill forecast at $150 to $200 million by 1989, we have lots of room for savings.
● HP philanthropic activities, now more clearly defined in terms of policies and programs of giving, will be linked directly to our interest in education, science and the human needs of the communities in which we work.

Obviously, the list goes on and on; we will be concerned with immensely complex issues of international development, with the need to stimulate basic scientific research, with the question of local versus centralized government decision making, and trying to make sense of the tax system. But there's nothing new about that.

THE MARKETPLACE

With the '80s seen as the "golden age of electronics," what particular avenues in technology and marketing should HP follow in seeking its goals?

There is a strong consensus within Hewlett-Packard that the company is in the "right" businesses for the next decade and beyond. Indeed, with that agreement comes a general belief that we have special opportunities—keys to the Golden Age as it were.

Opportunities, said John Doyle, vice president—R&D, are almost too abundant. Given the limitation of resources available to us and the strong competition that we face, we need to be very selective about the targets we pick. "They must be products that customers need, that someone in HP really wants to produce, and with which we can make really competitive contributions."

John said our technology is driven by the need in all of our businesses for products that do more things more quickly and at lower cost. "For these reasons, VLSI technology, with the great benefits it offers in terms of power, small size and low cost, is clearly the technology of our future."

He added that we will see computers and computer technology "across the board" in all of our non-computer lines, coupled with unique technology of their own.

Joel Birnbaum, director of HP Labs' Computer Research Center, said he believes the biggest challenge HP faces is organizational rather than technical. "We have moved from being a company with excellent products that could exist on their own to products that now have many interconnections and interdependencies with other products—both HP's and other people's products. We now compete in a systems world where instruments must co-exist with computers, and computers must be elements in networks.

"Technically, our product people must continue to be independent and inventive but must work with the assurance that their efforts are part of a larger whole. To do this we may need

someone—a programs manager or systems manager—to coordinate a consistent technical direction."

More and more HP projects will be of a software nature. Just about half of HP's computer-related R&D projects presently are in software, with the software share due to rise quite steadily through the years. In addition, we'll be

Having solidly entered the computer marketplace, HP is matching itself against many large companies with great resources and good people.

seeing substantial and widespread growth of software centers devoted to adapting application packages to local needs around the world.

There is unanimous agreement among HP technical and marketing people that competition is going to become what several described as "fierce." Having solidly entered the computer marketplace, HP is matching itself against many large companies with great resources and good people. Products will have to be highly accessible, easily interfaced to the user's specific needs, and extremely reliable. In this environment, the cost of production will become increasingly important in more of our product lines. But by themselves, better products or product features will not be enough.

Carl Cottrell, Corporate Marketing Operations manager, described one path we must certainly pursue. "In effect, we must become partners with our customers, providing them with the best long-term solutions, and selling

them on the basis that things go better with HP.

"It's a great responsibility, because the solutions we provide will have major impact on the organization, culture and methods of operation of our customers. So they have every right to expect the best."

HP's Major Accounts program, for one, has been designed to meet just such customer expectations. In addition to sales and service personnel, it provides special expertise in the form of software, applications and technical specialists for HP's largest customer organizations. Also important will be greatly enhanced demo centers with a growing stream of customers in training. The program is also seen as a powerful means of resolving interdisciplinary questions in the field.

HP will be in the leasing business in a big way by 1989. We'll be in it directly— not through third-party arrangements —and it can be expected to enhance our profitability as well as our flexibility in accommodating the needs of customers.

"Our product people must continue to be independent and inventive but working with the assurance that their work is part of a whole."

Besides competition, we also face economic uncertainties. President John Young noted this in a recent speech: "High-technology businesses have discovered that they're not immune to the business cycle, no matter how much we would like them to be. Today's world is a complex, interactive whole that is quite different from the

Today's world is a complex, interactive whole that is quite different from the marketplace of five or six years ago.

marketplace of five or six years ago. We're dealing with new sets of economic variables, and are operating our economy in uncharted territory."

What impact will the challenges and opportunities that are seen have on the way HP is perceived in the marketplace —or as it sees itself—by 1989?

More than ever, observers agree, we will be a "solutions" company. However, the solutions that we offer will increasingly involve communication networks. At some point, sooner or later, we may well want to bill ourselves as a "measurement, computation and communications company." The specific shape of that new image remains to be seen.

THE STARTING LINE

The road to 1989 starts today, and HP is in an "excellent position" to continue the success we achieved in the 1982 fiscal year, according to President John Young.

Hewlett-Packard had net sales of $4.25 billion in its 1982 fiscal year (November 1, 1981 to October 31, 1982). Here's where the sales came from and where the sales dollar was spent.
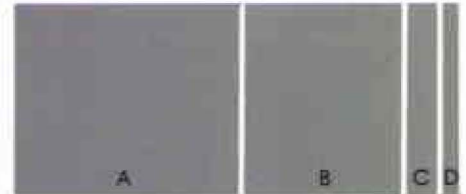
HOW WE MADE IT

A.	Electronic data products	51 cents
B.	Electronic test and measurement	37 cents
C.	Medical electronic equipment	8 cents
D.	Analytical instrumentation	4 cents
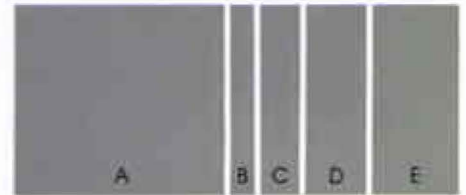
HOW WE SPENT IT

A.	Cost of manufacturing products	48 cents
B.	Cost of managing and operating business	7 cents
C.	Cost of developing new products	10 cents
D.	Cost of marketing and selling products	15 cents
E.	Profit from operations, as follows:	20 cents
	Pension and profit-sharing to employees	4 cents
	Income taxes to federal, state and foreign governments	7 cents
	Dividend to shareholders	1 cent
	Reinvested in company to finance growth	8 cents

YOUR TURN

"Getting the order" is the lifeblood for Hewlett-Packard, according to John Minck, advertising and sales promotion manager for Stanford Park Division in Palo Alto.

The persistent business recession the world has been going through has caused much personal suffering and stress outside HP. We see it every night on TV and read it in the newspapers, and most of us feel lucky and relatively secure working at HP.

If there is a good effect from the world recession, it is the growing awareness of the public, from politician to union member, of the critical importance of jobs. The mayor of Fremont, California, describing his city's attitude toward welcoming industry to the area said, "The quality of life starts with a job."

The important thing to remember in a manufacturing company the size of HP is that all our paychecks are dependent on a continuous stream of orders. I hope no one at HP is naive enough to think that we deserve these orders or that customers order from us automatically. We have to earn them one at a time. And in an economic time like this, each order is extremely important.

A customer order becomes a product shipment. That brings in the money to pay for the parts we buy, provides wages for all our people, buys new buildings and equipment and pays for R&D for new products for our future. It also gives HP about 10 percent profit: fulfilling our No. 1 corporate objective. But note that a customer order starts the entire process.

I think it was an advertising man who observed that "Nothing happens until somebody sells something."

Direct responsibility for getting orders at HP, of course, rests on our hundreds of worldwide field sales people. But just like a fighting army, only about 5 percent of our "troops" are out in front selling; the other 95 percent of our "army" is crucially important to supporting the front lines and winning the war.

Each field sales person depends directly on dozens of other functional people to be effective: order processing, fleet, training, regional sales engineers in each factory, shipping, etc. Every additional minute that a field person can spend with customers due to more help by support people brings more orders.

In a company with 67,000 people, there may be 50,000 who don't even *know* a field salesperson. What I would like to propose is that every one of us look at our attitude towards sales and orders. A customer order is pretty remote to a librarian stocking the book shelves, or an instrument assembly worker in a factory and even more so to a records retention person in the document archives.

R&D engineers affect orders well in the future. Quality assurance affects orders almost immediately since a customer who receives a defective product might stop his next order.

We need lawyers to be sure HP meets laws and regulations. And we need financial people to write accounting procedures. Personnel training people teach us how to deal with people. (Did I leave anyone out?)

Important as all these thousands of functional jobs are, I assert that each of us should adopt a positive attitude towards getting orders. If you are writing a computer program to assist field sales people, the program should leverage the sales person's time to the maximum. If you are an accountant writing cost control systems for field sales, try to minimize hassling the sales rep's time. If a factory marketing person runs down to you in the shipping department late on a Friday afternoon to plead for shipping a sales demo that day, recognize that you'd be helping orders by having the positive attitude and shipping the demo.

Let's all take the attitude that we help, not hinder. In World War II, when the legendary General George Patton and his American Third Army were racing through France, he was pretty specific about his expectations from his support troops. When he sent his tanks 50 miles out in front, he expected his logistics and administrative people to figure out how to get behind the front lines with supplies and help. Can you imagine an accountant on Patton's staff telling him that some accounting rules would prevent getting fuel to his tanks?

While I can't speak for our field people, I know them to be serious about their great responsibility in these tough times to keep orders flowing month after month. Not only should we let them know we appreciate their work, but we should also give them as much positive support as we possibly can, no matter how far "behind the lines" we are.

<div style="text-align: right">

JOHN MINCK
Stanford Park Division
Palo Alto

</div>

CLOSEUP

Zooms in on the ever-
changing world of HP people,
products and places.

HONOLULU: A PERFECT "10"

For the numerology crowd, "10" has a special significance in HP's Honolulu sales office. It was 10 years ago that Lois Penaroza and Dennis Terazawa (pictured) left their mainland jobs for HP's as-yet-uncharted business waters of Hawaii. Since then the office has changed "from a bunch of guys with surfboards to a growing business," according to Phil Scalzo, general manager of Neely Sales Region. To commemorate the office's 10th anniversary (and the 10-year service anniversaries of field engineer Ralph Okada and customer engineers Bob Sada and Roy Higa), Phil staged a modest celebration in the new office building that houses the 21-person sales office. Clearly the affair was a perfect "10."

UP, UP AND AWAY

Take an open field, some 1,700 HP employees and 10,000 helium-filled balloons. Add a sunny California day and you have all the ingredients for a celebration.

The focus of all this attention was the shipment of the 10,000th HP 3000 computer. The 3000 is now the fifth most widely used business computer in the U.S. At the receiving end of No. 10,000 was a Houston, Texas, Volkswagen-Audi dealer.

The computer is the 29th in a nationwide network that can quickly unite a customer with the exact Volkswagen, Audi or Porsche desired.

After "The Great BCG Balloon Release" employees were treated to lunch, music, dancing, socializing and an old-fashioned HP beer bust.

BUT IS IT ART?

When Gary Locklair, a software quality assurance engineer, saw the call for entries in the Corvallis newspaper, he decided to whip up some computer art for the juried show.

"I wanted a plot that depicted both order and disorder in the same confines," explained the engineer-artist. Feeling a snappy name would help in the competition, he called the work "Systematized Stochastic Shapes."
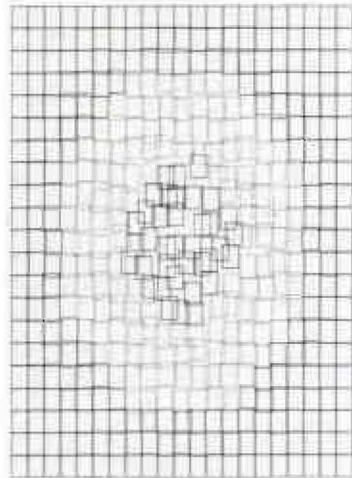
Of the 150 entries for the show, 50 were picked for the exhibit at the Corvallis Arts Center, including Gary's brown, gold and orange plot.

For those who'd like a Locklair original hanging in their office, Gary supplied this program for an HP 87 and a 9872 plotter:

```
100 ! Program ART      Gary Locklair      (C) 1982 GHL
110 !
120 ! Purpose is to plot a work of art of the 9872C
130 ! (requires the plotter ROM).
140 !
150 DISP "Input plotter address";
160 INPUT Plott@ PLOTTER IS Plott
170 PRINTER IS Plott @ PRINT "VS25;" !        Slow down plotter
180 LIMIT 5,255,10,190 !                      Set up paper dimensions
190 SCALE 0,10.5,0,10.5
200 !
210 ! MAIN: Divide plot into a 21 x 21 matrix, produce a random
220 !       'Factor' based on where box should be located, change
230 !       pen color based on the magnitude of the 'Factor'.
240 !
250    FOR I=0 TO 10 STEP .5
260       FOR J=0 TO 10 STEP .5
270          Factor=ABS(10*(I)5)-I)*ABS(10*(J>5)-j)/100
280          IF Factor(=.05 THEN PEN 1
290          IF Factor).05 and Factor(=.15 THEN PEN 2 ! 3 pen change
300          IF Factor).15 THEN PEN 3
310          SignI=1 @ IF RND(.5 THEN SignI=-1
320          SignJ=1 @ IF RND(.5 THEN SignJ=-1
330          MOVE I+RND *Factor*SignI,J+RND *Factor*SignJ
340          GOSUB Draw_box !                 Call subrouting
350       NEXT J
360    NEXT I
370 PEN 0 !                                   Replace pen in stall
380 STOP
390 !
400 Draw_box:
410 !
420 ! SUBROUTINE: Use incremental draw (IDRAW) to draw a box. The
430 !             starting location is already set by main routine.
440 !
450 IDRAW .5,0
460 IDRAW 0,.5
470 IDRAW -.5,0
480 IDRAW 0,-.5
490 RETURN
500 END
```

IN GOOD HANDS

HP retiree Frank Nolan doesn't get paid by the company or the Red Cross for his efforts during blood-donor drives at the Waltham Division. But his labor of love provides needed volunteer help for the Red Cross staff and offers current HP employees, like Donna Garvin, a bit of "tender loving care from a familiar face," according to HP coordinator Claire Fournier.

Frank and nine other retirees received special training from Red Cross staffers before the Waltham Division event. Several of the retirees have since volunteered to work at other Red Cross collecting locations. "It was a pleasure to be asked to come out and help with the blood drive," said retiree Roz Weagle. "And it was good to see my HP friends."

ON THE BALL

When Bob O'Donnell shoots a few hoops these days, it's to teach his sons the rudiments of basketball. But for many years Bob was a high-scoring player, first in high school, then college, then for 11 years with the Oakland Silents (part of a league of deaf basketball players).

The 6-foot, 6-inch Santa Clara Division technical illustrator recently received a special honor to cap his career. He was named to the Hall of Fame of the Northwest Athletic Association of the Deaf. While with the Silents, Bob scored 415 points in 30 games, making him the fourth highest scorer in the league. In 1969 he also played on the team which won the gold medal at the 11th International Games for the Deaf in Belgrade, Yugoslavia.

A new look at those 'retirement years'

After nearly 36 years with HP, Dick Were says he still looks forward to coming to work every day. "When that feeling wanes," he adds, "it'll be time to call it a day."

Dick considers himself a most fortunate man. He has a job that he loves with a company that has his unending loyalty. Lately, though, he's had a few concerns about his ability to "produce"—to continue to do a good job as materials manager at Stanford Park Division.

"There will come a day when it'll be best to replace me with someone who is more qualified," he acknowledges. "I hope I'll know when that time comes."

Dick is one of many employees over age 55 who are pondering the question of when to retire. Federal law no longer requires mandatory retirement at age 65 (the limit is now 70 but that, too, may be lifted if legislation drafted by U.S. Representative Claude Pepper, age 81, is passed).

Yet the number of employees who choose to stay on beyond their 65th birthday is quite low. According to *U.S. News and World Report*, the most recent government figures show that less than 12½ percent of workers remain in the labor force after reaching age 65. This came as a surprise to many experts who had predicted that thousands of older workers would postpone retirement if given the chance.

The percentage is even lower at HP. Of the 49,000 U.S. employees, only 148 (0.3 percent) are age 65 and older. One probable reason is that recent improvements in HP's retirement plan and Social Security benefits are helping the elderly actually stay ahead of inflation. A recent survey showed that while Social Security benefits and private pension payouts have increased 141 percent since 1971, consumer prices have "only" climbed 129 percent. "It seems that older people are the least hardest hit by inflation," concludes *U.S. News*.

However, Sylvia Gerst, HP's Affirmative Action programs manager, feels that most people no longer retire to "retirement." Instead, they go into something else. Most opt for some kind of part-time employment, whether paid or volunteer work.

With the uncertain future of Social Security and the lifting of mandatory retirement at 65, many U.S. seniors choose to put their experience to work through fulfilling alternatives to full-time employment.
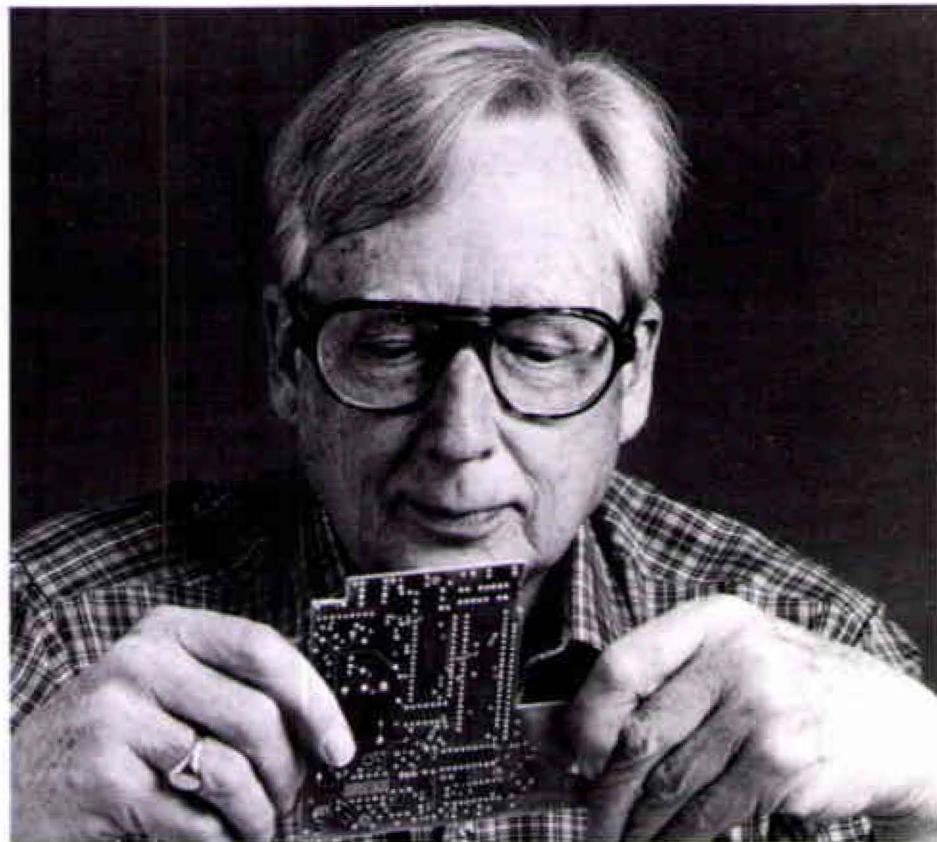
Bob Tabke is one of nine seniors who worked in a special Corvallis Division program last year (see page 22).

"Part of it is the economic reality of living on Social Security," says Sylvia, "but it's also well documented that people live longer when linked to society."

The thought of retiring "scares me to death," admits Dick. Though some of his co-workers have accused him of being a "workaholic," Dick feels he is not. Yet, HP has been such a major part of his life that "for me it's going to be one hell of a change to retire. Oh, sure, I like to play golf and sometimes I'd like to have more free time... but you can only do so much yardwork."

Sylvia considers people like Dick a "very valuable asset for HP. The knowledge they have built up over the years can't be had any other way. For instance, some of HP's veteran employees are the only ones who know how to repair our obsolete products."

Hewlett-Packard takes advantage of such expertise by encouraging good people like Dick to stay on the job as long as they feel they are producing.

"I've been told that I'd be crazy to think of leaving materials now," says Dick. "The thought has crossed my mind, but I'll stay as long as I feel I can still compete."

It may come as a surprise that HP hires a number of people over age 55. In the last fiscal year, 33 people between the ages of 55 and 67 joined the company, mostly in manufacturing and administrative areas.

Sixty-three-year-old Bill Barker is an interesting example. On a year's sabbatical from the University of Santa Clara where he is a physics professor, Bill says that because of the depressed economy, few companies showed any interest in hiring him for the current academic year.

HP was interested. Since September he's been doing research into integrated optics in the Applied Physics Lab of HP Labs. He feels he'll be able to make a contribution to the company while learning information that will be useful when he returns to teaching next year.

Despite his age, Bill says he intends to continue teaching "until my health fails. I really love to work. It's been an important part of my life."

Other seniors joined the company this past year as circuit designers, material handlers, secretaries and in building services.

One of these new hires says she is appreciated by her co-workers "for my expertise and my experience," but because she feels there is a "slant toward young people" in the company, she preferred not to be identified. "It's been good coming here," she says. "But let's face it, there are a lot more young people than old folks here."

(She's right. Although the average age of HP's U.S. employees is slowly climbing as the company matures, the mean stands at just under 35. The total number of domestic employees age 55 and over now stands at 2,754—or 5.6 percent. This is almost double the number employed in 1978. At that time there were 1,420 people 55 and older—and only 21 who were 65 and above.)

Early in 1981, two HP locations experimented with a program of hiring local people—not HP retirees but other retired people from the community—to work on a part-time basis in production areas.

"The theory was that such employees could help smooth out the 'peaks and valleys' that sometimes occur in a manufacturing plant," explains Sylvia.

Both the Corvallis, Oregon, and Avondale, Pennsylvania, sites had to give up using retired people this year due to the poor economy. But Don Strom, Corvallis' personnel section manager, says he'd call back the nine

MAKING MATERIAL CONTRIBUTIONS

If you rounded up all of HP's materials managers in one room, you'd find that most have attended the "Dick Were Materials Training School" at one time or another.

"I guess I've hired several hundred people," says Dick, who has been involved in the company's materials function since joining HP in 1947.

Now, toward the end of a satisfying career, Dick feels he can best make a contribution by giving his guidance and advice to new people going into the materials field. "I've unofficially become a pretty good personnel counselor," he jokes.

Lately Dick has been considering alternatives to the five-day-week, 8-to-5 (or later) work schedule he's been following for many years.

"I might try a three-day work week," he muses, "but I don't want a part-time job just for the sake of working. I have to feel I am still making a contribution."

Even when he "retires," Dick says he intends to get involved in helping other retirees who need assistance.

"The important thing is not to cut yourself off just like that," he believes. "You still want to feel you are part of a group.

"In fact, it's the people I work with who make working so enjoyable. Zella Williamson, Tom Dooley and I have worked together for more than 30 years. They mean an awful lot to me. They are both so capable that I could leave tomorrow and wouldn't be missed.

"At this point I feel I still have a lot of enthusiasm. But the day I find I can't cut the mustard is the day you'll see me walking out the door."

people who worked there "in a minute if we had work for them."

"After giving them one week of training, they did jobs in half the time that supervisors had allotted for the tasks. They caught errors and were very conscientious.

"Probably the best benefit of all was the interaction between these people and our younger employees. It was wonderful. Everyone liked having the seniors around and they, in turn, enjoyed being with younger people."

Corvallis' contingent of older workers inspected incoming parts, reworked software packs, sorted print heads and capacitors and worked on preformed production parts.

Some worked 12 to 14 hours a week while others worked as little as 40 hours a month.

Kathy Kopp, Avondale's training and compensation supervisor, echoes Don's enthusiasm for the program, though her division employed senior citizens for only about nine months.

To find people for the Avondale program, Kathy contacted the local senior center. Interested people came to HP for a tour and information about the kinds of work they would be doing. Then, after a short training course, about a dozen people began working in production and as telephone and data-entry operators.

Recalls Kathy, "Two older women were so excited about learning to use a computer. They said now they could keep up with their grandchildren!"

At Avondale, most people in the program worked a six- or eight-week schedule, then were off for awhile. One

A new look

woman worked as infrequently as two days a month.

Don hopes the program can start again when the economy improves. Remembering how his own parents wanted to keep busy after retirement, Don says, "We need these people. They are an often-overlooked resource."

HP retirees, on the other hand, tend to forgo paid work for the voluntary kind. In a number of HP locations, retirees return to give tours to outside groups and to help with blood drives and open houses.

A few, though, have found they can enjoy retirement and still work at HP on an occasional basis. Charlie Wiecks, for example, retired from the Stanford Park Division in 1979 at age 63 after 16 years in the purchasing department. He found the San Francisco Bay Area a bit too pricey for living comfortably on his Social Security benefits alone, so he agreed to return to HP on an occasional basis. He usually worked in the purchasing area, although he sometimes took a temporary assignment in another department.

Last October Charlie and his wife moved to Fort Collins, Colorado, where he again found part-time employment at HP. "Right now I'm in the security department but I hope to move back into the materials area," he says.

Charlie says he originally decided to leave full-time employment two years early because it would make little difference in the amount of his Social Security benefit. Now, at age 66, he feels a half-time job would be "ideal."

Experts predict that by the year 2000, 40 million Americans will be over age 50. Another way to look at the aging issue is that soon there will be only three workers for every retiree.

Such statistics aren't news to Sylvia, who recently participated in a conference on careers for older Americans.

"There are some commonly held misconceptions about older people that need to be addressed," she points out. "For one, it just isn't true any longer that 62-year-olds are in poor health. Many people in their 60s enjoy vigorous health and are very capable of continuing in their jobs.

"It's to the company's benefit to keep

A WORKING ALTERNATIVE

"I wish I were still there," says 71-year-old Bob Tabke, one of the nine seniors who worked at HP's Corvallis Division for 18 months.

A retired chemical engineer, Bob lent his expertise to several production areas including reworking thermal printer heads and inspecting incoming parts. What surprised him, he says, is that people listened to his ideas and suggestions.

"One day my supervisor asked me to gather data on a vendor because he felt HP was rejecting too many parts. I was able to document how the quality had gradually deteriorated, which explained why we had to spend so much time doing rework."

The result was that when Dave visited the vendor to discuss the problem, he asked Bob to go along. "I was very flattered," Bob says.

Bob appreciated the HP pay and the short hours (usually two or three days a week, six hours a day), but says that having young co-workers was what he liked best.

"It was very stimulating to be around young people," he adds.

Though he hopes one day to return to the company, Bob is certainly not rocking on the front porch in the meantime. "This is a university town", he explains, "so I decided to audit a class." The course? Second-year German. "It keeps my mind active," Bob says with a wink.

such people around because of the vast knowledge they have."

Some companies are experimenting with alternatives to the tradition of full-time work followed by full-time retirement. Options include part-time work, phased retirement, flexible work hours, periodic sabbaticals and job sharing.

Such options may prove critical in the years ahead as life expectancy figures continue to climb. Thanks to an increased concern about nutrition and keeping fit, the average male born today can expect to live approximately 70 years, and a female, for about 78 years.

Dr. Leslie Libow, a geriatric specialist in a New York hospital, says that, as important as good nutrition and moderate exercise are, the most important

factor in living a fuller life in retirement is variety. "The more stimulating one's routine, the better. Studies have shown that people with the most varied and complex days tend to live longer than their peers whose routines are duller."

At this point no one at HP seems willing to predict how the lifting of a mandatory retirement age will affect work patterns in the company. "It's really too soon to tell," says Sylvia. "Maybe in a few years we'll have a better idea of whether people will choose to stay in their jobs longer. I think it's great to have the choice." **M**

JOHN YOUNG

HP's president evaluates
operating results for 1982
fiscal year.

**HP-TV director Ken Codeglia watches John
Young introduce a new product teleconfer-
ence for the Computer Groups.**

The cover is closed on 1982, and it will certainly go into the records as one of the most challenging management years in a long time. Almost all of the world's developed countries (our major markets) found themselves with serious economic problems. Falling currency values in these countries relative to U.S. dollars have seen our prices increased outside the U.S. by an average of 50 percent since 1980. In the U.S. a serious recession persisted—the longest since World War II.

Given this environment, our order growth of 19 percent in the U.S. was very good. International orders grew by only 10 percent, but by more than 20 percent in local currencies. Some countries struggled to show any growth at all. The order total for the year was $4.24 billion for an increase of 15 percent above 1981.

On the product side, orders for computing products had the greatest strength, and increased by 23 percent. With a total of $2.2 billion, this area accounted for more than half of our total. Electronic instruments and medical both had gains in the 11 to 12 percent range, and analytical actually decreased by 8 percent, since the chemical industry was particularly hard hit. As a company, we were able to pull down our backlog, so shipments at $4.25 billion slightly exceeded orders.

A big part of the management challenge came from the very uneven order growth, between countries and between product divisions. It takes exceptional teamwork and day-to-day attention to the details of running a business to keep shipments and expenses in balance, and to insure employment continuity. Yet, viewing the year in total, we did a great job. We actually improved our pre-tax margins in the second, third and fourth quarters. The payoff was a big improvement in second-half profit sharing, to 8.12 percent from 7.03 percent in the first half.

Not only did we manage expenses well, we continued to make significant progress in better use of our assets. The most dramatic example was in inventory. With shipments growing 19 percent, inventory grew only 2 percent. Accounts receivable also improved, with only a 12 percent growth. It's espe-

cially gratifying to see these improvements happen regularly, and it is clear that throughout the company we've made permanent gains in the way we manage these areas.

The effect of a little slower growth and better asset management shows up in our cash position. We ended the year with more than $500 million. This certainly gives us the resources to take advantage of future opportunities.

All in all, it was an outstanding result in a very difficult period. I'm very proud of the performance of our whole team.

Time has gone by so quickly that it hardly seems possible that I've been president of HP for five years. In reviewing 1982's results, I looked back to see how it compared with 1977. Revenues have increased by a little more than three times, with profits growing just a little faster. Said another way, we have had a compound growth rate of 25.5 percent per year over this period (considering the last two recessionary years have slowed us down, that's not bad). Meanwhile, our employment grew at a rate of 14.2 percent, and improvement in productivity was very important in assuring the competitive strength of the company.

This period has seen the growth and development of HP on a wide front. We have improved a great deal in our quality performance as well as in our skills in low-cost manufacturing. We also have made a good start at raising our engineering effectiveness to a new level. I feel we are in an excellent position to continue this kind of peformance in the years ahead.

John

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NEWSCLIPS

Recaps the newsworthy
events, changes and
achievements within HP.

FY82 YEAR-END RESULTS

Hewlett-Packard reported a 19 percent increase in sales and a 25 percent increase in net earnings for its fiscal year ended October 31, based on unaudited results. Sales for FY82 totaled $4.25 billion, up from $3.58 billion in FY81. Net earnings amounted to $383 million, or $3.05 per share, on approximately 125 million shares of common stock outstanding. This compares with net earnings last year of $305 million, equal to $2.49 per share on approximately 123 million shares (after restatement for accrual of employees' compensated absences).

Incoming orders for the year totaled $4.24 billion, up 15 percent over orders of $3.71 billion in FY81. Domestic orders totaled $2.28 billion, up 19 percent over last year with international orders gaining 10 percent to $1.96 billion.

Fourth-quarter sales were $1.14 billion, up from $1 billion in the year-ago quarter, an increase of 14 percent. FY82 fourth-quarter net earnings were $111 million, up 19 percent from $93 million in the FY81 fourth quarter.

Incoming orders during the fourth quarter of FY82 were $1.04 billion, up 18 percent from $877 million in the same quarter last year. Domestic orders were $594 million, up 25 percent, and international orders were $445 million, up 10 percent.

On a per share basis, 1982 net earnings for the fourth quarter amounted to 87 cents, compared to 75 cents in the same quarter of 1981. (The latter figure, however, was increased six cents per share due to a change in

funding assumptions for the U.S. Supplemental Pension Plan which increased FY81 fourth-quarter net earnings by $7 million.)

NEW VICE PRESIDENTS

The Board of Directors elected three new HP vice presidents on September 24: Jim Arthur, general manager, Computer Marketing Group; Jack Brigham, corporate secretary and general counsel; and Doug Chance, GM, Technical Computer Group. All continue to serve in their present capacities.

CHART CHANGES

Bob Brunner is GM of a newly formed Instrument Marketing Group within the Instrument Groups.... The Business Computer Group has formed a new Manufacturing Productivity Division which incorporates the Financial Systems Operation and the former Manufacturing Systems Operation, Manufacturing Application Program and SMC Operation. GM is Gaylan Larson; Franz Nawratil succeeds Larson as GM, Data Systems Division.... A new Semiconductor Device Laboratory headed by Fred Schwettmann and a new Materials Research Laboratory headed by Bob Burmeister were created in an October reorganization of HP Labs' Technology Research Center. SDL comprises the former IC Lab and part of the former Solid State Lab.... A new Engineering Physics Laboratory headed by Garry Garrettson was formed within the Physical Research Center of HP Labs in October.... Jack Beckett has retired as Corporate Government Relations director; Bob Kirkwood becomes director of a new Corporate Government Affairs department.

NOTEWORTHY

Yokogawa-Hewlett-Packard has been awarded a 1982 Deming Prize for outstanding merit in the statistical control of quality (see pages 6-8 in this issue). ... To help ease the critical shortage of

electrical engineering and computer science faculty in U.S. universities, HP will provide financial incentives to selected Ph.D. candidates across the country to encourage them to teach after receiving their doctorates. The company will invest about $6 million over the next eight years, including related equipment grants, to assist some 50 students.... A special program for the 1982-83 academic year will provide up to 75 U.S. colleges and universities with 5880A gas chromatographs for use in research or research training.... Four HP-41CV handheld computers were aboard the fifth space shuttle Columbia flight in November.

NEW PRODUCTS

The HP 9000 line of 32-bit technical computers for the Engineering Systems Division was introduced in a transatlantic press teleconference held in six cities. It uses a set of five "superchips" developed by the Systems Technology Operation, making possible mainframe computing power in a desktop-sized computer.... Two compact new personal computers each occupy about the same space on a desk as an in-basket: The HP 120 from the Personal Office Computer Division delivers the power of the HP 125 in a much smaller package while the Series 200 Model 16 from the Desktop Computer Division contains more power than anything in its class. Fitting beneath them are 3 1/2-inch micro-floppy disc drives from the Greeley Division which combine Sony's 3 1/2-inch technology with HP electronics and packaging.

HP's first stand-alone mass-selective detector, the HP 5970A from the Scientific Instruments Division, allows the chemist to detect a wide range of sample components using one detector unit.... Systemsafe/1000 is the first in a series of products from Data Systems Division's new HP 1000 High Availability Program. Two processors are tightly synchronized so that if one should fail, the other takes over.