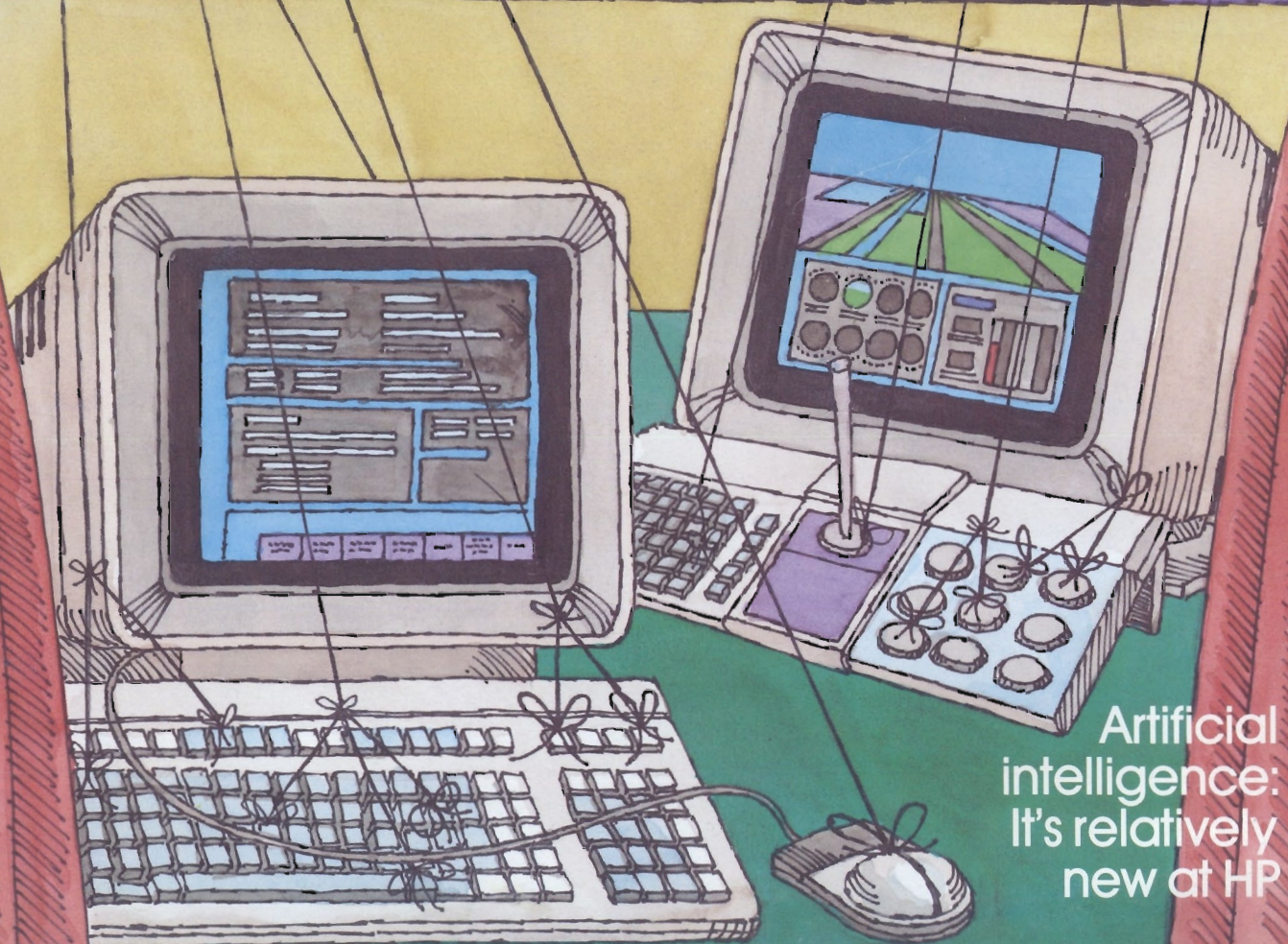


MEASURE

For the people of Hewlett-Packard

September-October 1986



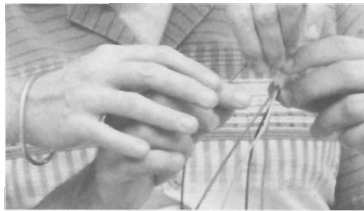
Artificial
intelligence:
It's relatively
new at HP

Stephen Osborn

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MEASURE

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Cramming computers with common sense



For the past 20 years, scientists have been trying to make computers reason the way humans do. Today, artificial intelligence, or AI, is a hot topic for lots of companies, including Hewlett-Packard.

Artificial intelligence had been a slumbering science for a long time. AI conferences in the early 1960s routinely attracted 200 or 300 computer-philosophers, most from university research programs and a few from corporate America. These were people fascinated by the concept that a computer might be able to recreate human thought.

Today AI is hot. That same conference—the International Joint Conference on Artificial Intelligence (IJCAI)—drew 6,000 participants to Los Angeles in 1985. The computer scientists were still there, but so were corporate executives and marketing representatives looking for AI solutions to their problems. AI today is riding a high-tech wave that's swept up corporations, universities, government, the media and Wall Street.

Part of the attraction is money. Sales of AI products in 1985 topped \$700 million and analysts say sales should grow about 43 percent a year. Analysts at Arthur D. Little, Inc. predict U.S. corporations and government will be spending between \$5 and \$10 billion a year on AI hardware, software and services by 1990. As growth in traditional computing markets cools, many companies will move toward AI to increase revenues.

Few companies today have earned much of a profit from AI products, although some suppliers of expert systems should be in the black for the first time this year. Most recognize that advances in AI come slowly. For example, in Austin, Texas, 21 U.S. companies have joined forces to fund a long-range R&D venture. The Microelectron-

An intelligent approach to research

Artificial intelligence research today focuses on five major fields:

Expert systems to diagnose problems and draw conclusions.

Machine vision to help robots see and understand the world around them.

Speech synthesis and voice recognition to allow users and computers to talk out loud to one another.

Natural languages to give computers the ability to understand a string of words in English or another language.

Computer hardware to make the other four endeavors possible.

ics and Computer Technology Corp. is tackling a 10-year program using AI to achieve a quantum leap in computer performance.

Japan's highly publicized fifth-generation computer project, managed by the government and funded by eight industrial companies, also sees AI as a method to improve productivity. Observers estimate the level of Japanese AI investment at \$1 to \$1.5 billion during the next eight to 10 years.

Putting money aside for the moment, the common goal of all AI researchers is still to solve the original notion of harnessing the computer to achieve intelli-

gent behavior. Most AI research falls into five broad categories (see box on this page).

HP got started in AI in 1980 at HP Labs. The focus at HPL has been on expert systems, natural language and programming productivity.

One of Hewlett-Packard's showcase AI applications—developed for internal use—is an expert system called the Photolithography Advisor that troubleshoots problems in an integrated circuit fab shop. The technical knowledge of several photolithography engineers has been captured in software that runs on an HP 9000 computer. A process technician can diagnose wafer-processing defects by answering the computer's straightforward questions.

The advisor "probably represents a greater knowledge base than that held by any single person in our company," says Vice President Joel Birnbaum, head of the Information Technology Group and former director of HP Labs, who helped explain the expert system at last year's IJCAI program.

The expert system proved it could help reduce wafer quality problems and offer two advantages over its human counterparts. It is always available, even during the night shift when there is no engineering support. It also keeps the clean room cleaner since it doesn't wear makeup or sport a beard.

But the expert system didn't go together without a hitch: photolithographic experts haggled over several points during development at HP Labs' Deer Creek facility. Once those differences were ironed out and incorporated in the system, a few new problems

Cramming computers

popped up when it was installed in the workaday world at the Santa Clara Tech Center.

An advanced user interface was added to eliminate keyboard typing and a new history logging feature provided recorded transcripts of each session. An attached video disc player provided a useful enhancement. The disc player displayed still images of wafer defects on a high-resolution monitor and solved a problem of different terminology between the fab operations. Technicians could compare the color and pattern on the screen with the actual defect on the wafer and answer questions like, "Did it look like this?" instead of answering a question that merely described what the defect looked like. When the system diagnosed the likely problem, it would suggest a remedy and also play a "movie" of the corrective procedure from its video disc.

There've been other HP AI experiments, too. A flight planner (see photo on page 5) presents the seat-of-the-pants pilot with a map of California from San Francisco to Los Angeles. You are asked for an originating airport, a final destination and any

stops in between. Then you add specific constraints, such as "avoid oceans and mountain ranges."

The system's knowledge base includes data on airports, the terrain and the capabilities of your Cessna 172 airplane. Within the constraints specified, the system finds the best flight plan. That route is passed off to the flight simulator which then flies the plan on autopilot.

There's a prototype expert system which helps determine what's in an unknown organic compound, based on data from mass and infrared spectra. Another system for sale today helps physicians diagnose heart problems based on electrocardiogram data.

Expert systems in general are made up of two parts: a knowledge base and an inference engine. A knowledge base is a data base that stores declarative and procedural information about the problem domain. This information is typically organized hierarchically, allowing data structures in the lower level of the hierarchy to inherit information from their higher-level parents.

The inference engine works with the knowledge base using the if-then principle: *if* such a condition exists, *then*

you can draw certain conclusions. By posing a number of such questions, the system creates a world of possibilities and then combines facts, goals and rules to reach a conclusion.

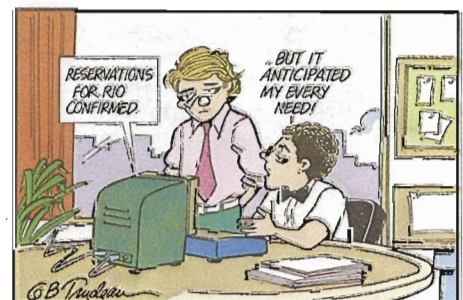
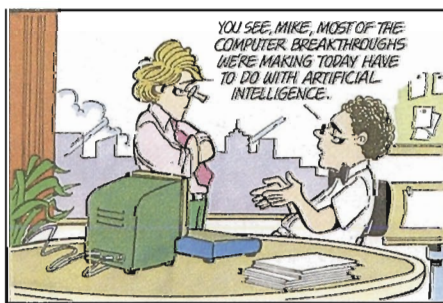
Two features that set an expert system apart from its traditional software counterpart are its ability to explain how it reaches solutions and the relative ease with which it can be modified as new rules and facts are added.

But if you've got an expert system, where do you turn for the computing hardware to make it run?

Computers that are built solely to run AI software tend to be expensive, special-purpose machines. Several companies have such machines on the market today. Most were built specifically to run Lisp—the standard programming language for AI scientists in the U.S.

A second path has been to use conventional number-crunching machines that have added AI language compilers—options that improve the machines' performance drastically as they move from numeric to symbolic processing. (Although a few AI tools have been developed for the personal computer, most PCs are considered by many experts to be best suited to run-

DOONESBURY, by G. B. Trudeau



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ning small tools to solve small problems. They're seen as too weak to run major AI applications).

Conventional number-crunching computer hardware and software process data by following algorithms—step-by-step procedures to solve cut-and-dried numeric problems. By contrast, expert systems use logic to come to conclusions, much as humans do. The need to move from simpler numeric to more complex symbolic processing is similar to a mathematician's need for algebra to explain abstract puzzles that simple mathematics can not solve.

Unlike their number-crunching counterparts, symbolic processors do not employ separate programming languages, tools and operating system software. Instead, they employ "programming environments" that are all of these types of software rolled into one. These environments typically support programming in Lisp—which stands for List Processing. Lisp is the language of choice in the U.S. AI research community. There are various dialects of Lisp available around the world; however, Common Lisp is becoming the *de facto* standard.

Perhaps HP's biggest contribution to the AI field is the HP 9000 Series 300 family of computers. This AI workstation runs a programming environment based on Common Lisp.

In addition to Common Lisp, HP's now added HP Prolog to its AI software menu. While Lisp environments are popular in the U.S., Prolog is a favorite with Japanese and European AI programmers.

HP Prolog resides on top of Common Lisp, which allows the user to combine the best qualities of both languages. HP Prolog is at its best for expert systems, data base applications, natural language and symbolic processing.

The future of HP's AI hardware looks bright, too. One of HP's greatest strengths may be the new Spectrum program's family of computers. The new computers will be able to support hybrid computing—smoothly blending symbolic processing chores into their conventional software repertoire of crunching numbers.

"You want machines that can do symbolic computing, but not at the



Ira Goldstein, who heads HP Labs' AI research efforts, used to fly old biplanes as a hobby. This HP-developed expert system "pilots" a plane from San Francisco to Los Angeles and can understand and obey requests like "Plan a lunch stop in Santa Barbara," "Avoid oceans and mountain ranges" and "Ensure no longer than three hours between stops."

expense of conventional computing," says Ira Goldstein, director of the Distributed Computing Center at HP Labs.

Hewlett-Packard is not alone in supplying AI work stations, languages and applications. There are lots of companies applying AI solutions to their own business problems. Many of the firms are familiar to HP employees, either as customers or competitors.

Digital Equipment Corp., for example, has an expert system running on its own equipment that configures orders for its VAX superminicomputers, making decisions about how to combine the more than 10,000 options available to a customer.

AT&T uses an automated cable expert for inspecting and advising about repair of telephone cables.

Hughes' Hi Class system helps determine the proper sequence of steps in printed-circuit-board assembly.

IBM listens to a system's advice on moving mainframe computers from one site to another.

In addition to some of those major U.S. corporations developing and applying AI solutions, there's a whole raft of AI specialists out there—firms

with such exotic names as Quintus, Intellicorp, ExperTelligence and Radian. Some, like Symbolics Corp. and Lisp Machine Inc., specialize in dedicated AI hardware. Still others, like Inference Corp. and Teknowledge, are software-only houses that focus on AI tools.

HP has joined forces with various AI specialty houses for joint marketing efforts. Together with these third-party affiliates, HP is putting together hardware, programming environments and software tools which will allow HP's customers to build expert systems more efficiently.

HP's software engineering program is presenting a number of courses on AI for employees—covering everything from the structure of computer programs to expert systems fundamentals. Some of the graduates have gone on to begin AI projects in their own divisions. In August, two courses geared for managers were added to the software engineering group's curriculum.

Despite the flurry of activity in AI development both inside and outside of HP, the emergence of new companies and the keen interest by Wall Street in

this new field, AI is still not a mature, well-defined market.

"It's beginning to dawn on everyone that AI is a set of technologies, not a distinct product," says computer industry observer Esther Dyson. Her newsletter, *Release 1.0*, now devotes an increasing amount of space to practical applications of artificial intelligence.

But growing numbers of AI experts feel the technologies shouldn't be labeled "intelligent" until they learn to learn. It shouldn't take a programmer to rewrite a system when the problem changes or when something goes awry. "Learning is still a third dimension," says Ira Goldstein. "We haven't really approached that yet.

"I don't think it will be common to see machines that learn in industrial settings until the 1990s. But by the end of the century you won't need a computer guru to program a machine. The computer will be able to learn from the past—not as well as people do, but still in a substantial way," says Ira.

So, for the foreseeable future, artificial intelligence is unlikely to make many inroads in areas that require learning or creativity. Although today's silicon circuits can outperform a brain's neurons, the human brain still outperforms even the most sophisticated computers of today. Not until we better understand the thought processes of human beings can we incorporate this knowledge in the design of a superior computer.

The popular image of a thinking computer—the smooth-talking HAL in "2001: A Space Odyssey"—is still far from reality. In fact, there's still a country mile today between computers that *think* like humans and those that *perform tasks* like humans. In the final analysis, the human brain is probably the best thinking machine we'll ever see. **M**—Brad Whitworth



LARRY MURPHY, UNIVERSITY OF TEXAS

Graduate student Ken Murray and Dr. Gordon Novak, director of the University of Texas at Austin's artificial intelligence lab, use an HP 9000 Series 320 computer given to the school under HP's \$50 million, nationwide grants program.

A yearning for AI learning

Some of the best AI research taking place today is on the college campus—but professors know it takes state-of-the-art equipment and software to do the job.

That's why many schools were glad to hear about HP's \$50 million, three-year program to supply selected universities with grants of up to \$5 million of AI equipment and software. Nearly 90 schools with established AI programs asked about HP's grants, and more than 50 submitted proposals.

In the end, 21 universities were selected (see list in this box). Each school will receive 20 to 60 HP 9000 engineering workstations, HP research and product software, including HP-UX, TCP/IP and Common Lisp, and a free year of hardware and software support. Currently there are 340 systems installed at the grant schools, representing half of the AI grants program's commitment.

Some schools will use the grants to develop new approaches for instruction in computer science and electrical engineering. Other schools are conducting research in graphics, natural language, knowledge representation, symbolic mathematics and programmer-productivity tools.

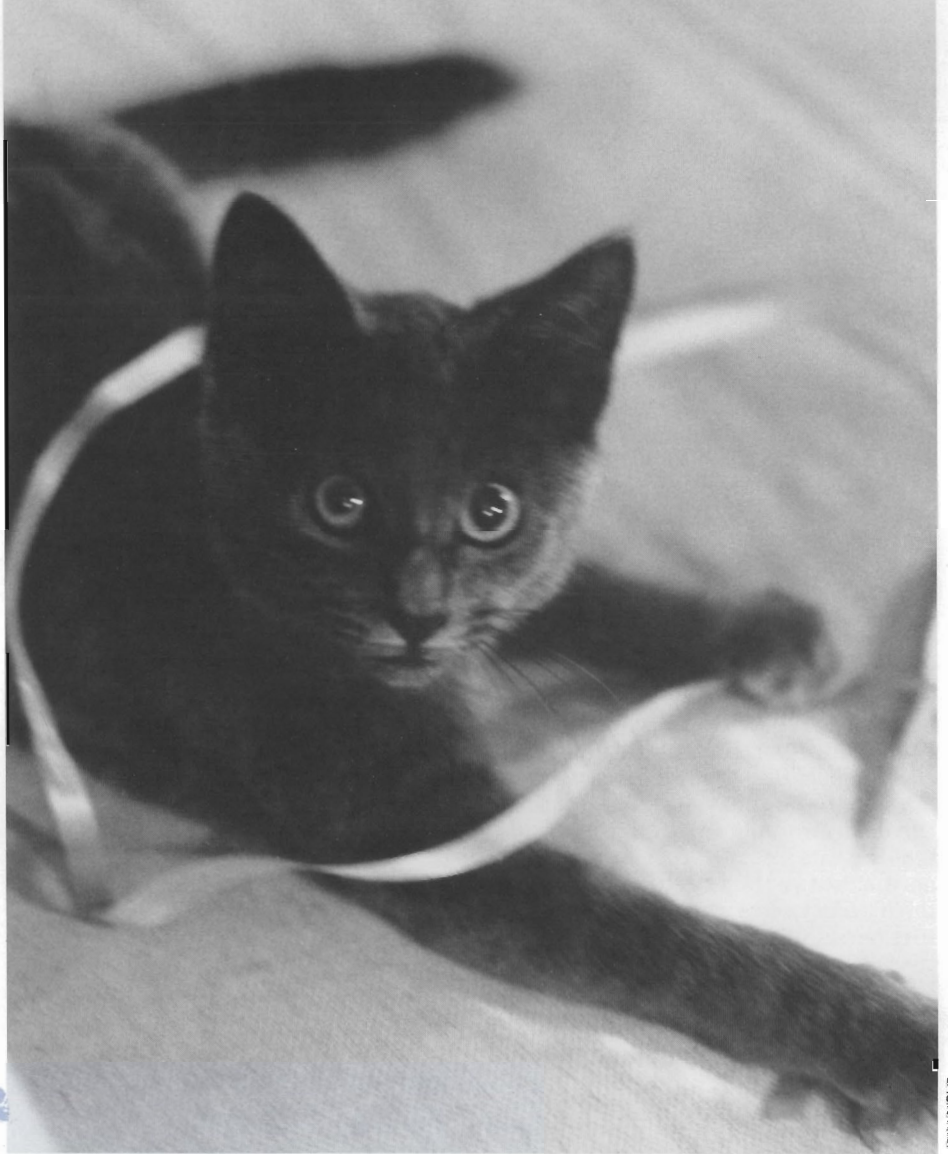
"One of the key elements of this program is the technical exchange we're developing with the universities," says Ralph Hyver, technical

marketing manager for HP Labs' Distributed Computing Center and manager of the AI grants program. "Advances in AI technology are still being driven strongly by the universities, and this pool of knowledge is a highly-leveragable resource. The grants program provides an efficient way to tap this pool.

"Of course, the AI research work occurring here at HP is of great interest to the schools. By providing these schools with better insight into this work we can help them advance their own AI research. Thus, the nature of the relationship is reciprocal," says Ralph.

The 21 universities selected for the HP grants program include:

- Brown University
- California Institute of Technology
- Carnegie-Mellon University
- Columbia University
- Cornell University
- Kent State University
- Massachusetts Institute of Technology
- Mills College
- San Francisco State University
- San Jose State University
- Stanford University
- University of California, Berkeley
- University of California, Los Angeles
- University of Colorado, Boulder
- University of Hawaii
- University of Massachusetts, Amherst
- University of Pennsylvania
- University of Texas, Austin
- University of Southern California
- University of Utah
- Yale University



JEAN BURKE

Keeping tabs on the tabbies

Dr. Ed Kane spends his work days bustling around the two long, narrow buildings that make up Carnation Farm's Feline Research Center. There, with the help of HP equipment, he keeps tabs on the eating habits and nutritional requirements of more than 500 cats. As though that isn't enough, he and his wife have six more at home. He's allergic to every one of the felines in his life except the Cheshire cat tie pin he wears.

He puts up with the sniffles and watery eyes because he's serious about these animals. "I love every one of them. Each one is special." He seems to have

a special spot in his heart for a pudgy mixed-breed named Cranston, whose purr sounds like a cross between a pigeon and a dirt bike with mechanical problems.

Cranston, Frosty, Ginger, Bingo—these are just a few of the animals whose discriminating palates make decisions that steer a large part of Carnation's business decisions.

Cat food is big business in the U.S. where Dr. Ed says dotting cat owners spend nearly \$2.2 billion a year to feed their pets, a significant portion of the whole \$5.1 billion pet-food industry.

Despite their aloof nature and supe-

rior attitude, cats have become the pet of choice in the United States with 50 million of them ruling households. This multitude of felines might even appreciate the effort and precision Carnation devotes to studying recipe varieties for their consumption.

Cat lovers will understand and appreciate it, too. They thrive on the persistent rubbing around the calves cats bestow upon their owners at the first sound of a can opener.

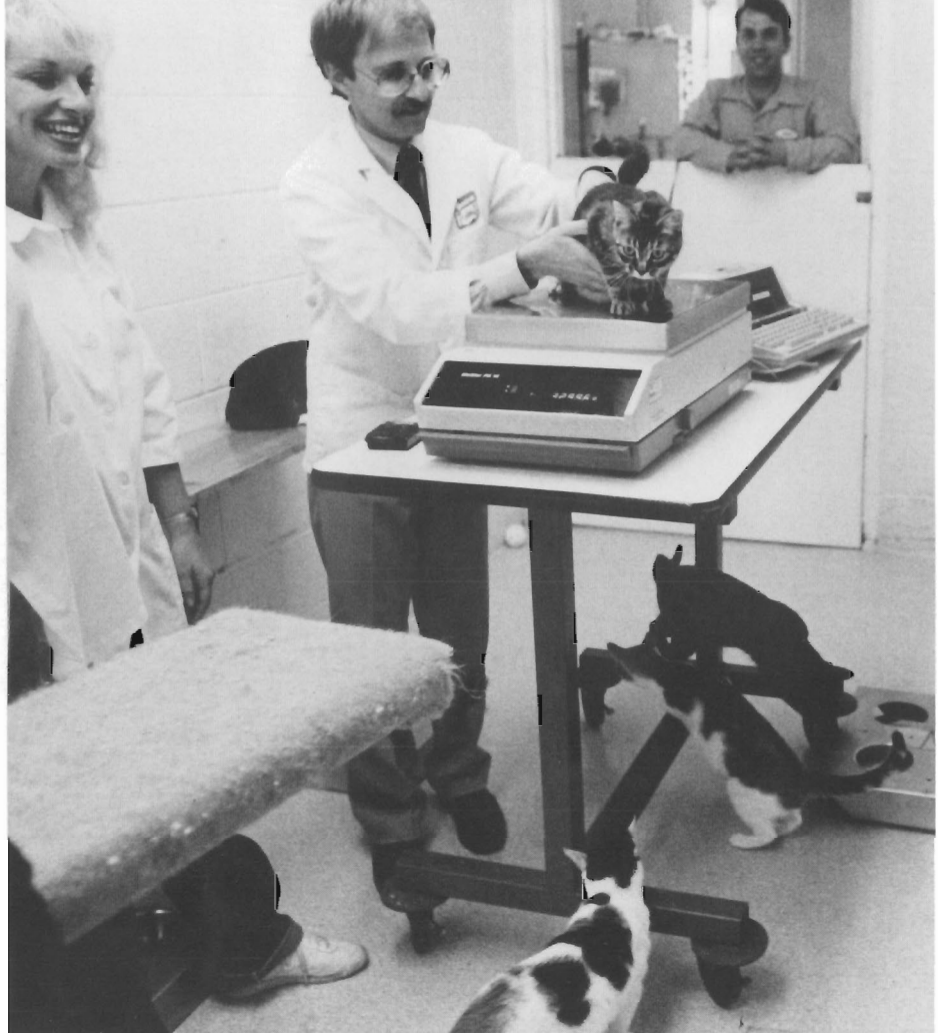
Carnation's Research Farm spreads across 1,200 acres in Washington's Snoqualmie Valley, about 30 miles northeast of Seattle. The cattery is not open to the 50,000 visitors who tour the farm annually, in an effort to protect the cats from dangerous airborne germs. But visitors get to look over the farm's dairy cows, including the maternity barn, milking carousel, calf research barn and the recovery room. Visitors can continue to the kennels where dog food studies, similar to the cat studies, are performed by an extremely vocal group of canines.

Dr. Ed manages the Feline Research Center at the farm in Carnation, Washington. For years, he has used an HP-85 in his work, and has recently upgraded to HP Touchscreen personal computers and several HP Portable PLUS computers.

Production at Carnation pet food plants can "litter-ally" be placed on hold while panels of the cattery residents make weighty decisions about food offered to them. These can sometimes be rush decisions, says Dr. Ed, driven by price and availability of cat-food ingredients in the marketplace.

"A plant will often air-express us a batch of cat food they want to market, the regular recipe except for maybe one ingredient substitution," he says. "But before the product goes to the market, the company needs to be sure cats will go for it. So an emergency panel of cats tests the product for two or three days. The plant waits for the word from us that the new recipe is a 'go.' And the product can be whipped up and sold. These cats are the experts here—the company listens to what they say."

And sometimes, says Dr. Ed, the cats give a paw down on a product being tested, occasionally going so far as to



Cattery employees Patty Griffith and Bill Runolfson stand by as Dr. Ed Kane convinces Mae to perch atop the Mettler electronic scale long enough to get a good reading.

show a preference for the competition's product. All is forgiven in the name of research. "We want them to tell us exactly how it is. Luckily, for the most part, we win."

"The worst thing in the world," says Ron Stapley, director of research for the entire farm and former cattery manager, "is to put two bowls of food out for the cats, watch them walk over to them, sniff both, sniff them both again, and then just walk away. They can detect the slightest differences in recipes."

Because speed is of the essence in the forever-changing and highly competitive cat-food business, the Carnation cattery relies on HP equipment to compile and analyze data about the cats' choices, behavior and health. HP gear helps researchers analyze data to make business decisions based on the 250,000 cans of cat food and 70,000 pounds of dry food the well-fed Carnation cats are offered each year.

For years, the cattery has been the electronic leader at the farm, relying on an HP-85 hooked to a Mettler electronic scale to record the weights of the cats and their food bowls—both before and after meal time. Data from the HP-85

are used to analyze nutrition and palatability. The final data goes to an HP 3000 computer at Carnation's Research & Development group, Calreco, in Van Nuys, California. The data are then evaluated and interpreted for final reports, as well as routine palatability and nutrition testing.

The Carnation Kennel at the farm has used an HP-75 in its research, and the farm has also used two HP Touchscreen personal computers and ThinkJet printers for a couple of years.

But Ron Stapley is a man with a vision and the recent equipment upgrade will change how things are done at the farm. Within three years, he wants Portable PLUS computers and HP Touchscreen PCs in place throughout the farm—at the cattery, kennel and dairy, as well as in the research laboratories—and all tied into a minicomputer (probably an HP 3000, he says) right on the farm. "All the HP Touchscreen and Portable PLUS computers will become 'smart terminals.' That's where we need to be. The system will allow everyone access to more information than ever before. That will give us the ability to make better judgments

JEAN BURKE

and decisions.”

Ron says his plan has been to move the farm gradually into computerization. “You need to learn how to crawl before you walk, and how to walk before you run. With the HP-85s, we were crawling; with the Touchscreen and Portable PCs, we’re walking and when we get the HP 3000 here on the farm, we’ll be running.”

The cattery staff plans to start using the recently purchased HP Portable and Touchscreen PCs as soon as they arrived, cutting down the amount of paperwork formerly needed for the volume of statistics and amount of number-crunching generated by the cats’ behavior.

All 500 Carnation cats are weighed once a week. The process is routine for them, as they patiently perch atop the scale that feeds their bulk weight directly into an HP-85 computer. It takes about 30 seconds for each cat. The cats’ weights are measured against the amount of food they consume, which is also measured before and after it is offered to them. The amount and type of food each cat eats is recorded. How much each cat eats in relation to its body weight is important information for veterinary medical research, as well as routine palatability and nutrition testing.

Every day, Carnation cats take the “Friskies Challenge.” Two products are repeatedly placed before them to be tested over several 24-hour periods. Cats in one room might be given Fancy Feast Beef and Liver in one bowl and Buffet Picnic Chicken in another. In another room, cats might be debating and sniffing over Friskies’ tuna recipe and Purina’s tuna recipe. The two products are rotated daily from the left to the right side as well to further enhance scientific accuracy.

Dr. Ed says cats have a hierarchy of taste preferences just as humans do, though it’s safe to say the vast majority prefer canned food over dry food. Just as a human might prefer salmon to lamb, individual cats might prefer the taste of ocean whitefish over beef liver. But through the maze of individual palate preferences, Dr. Ed says the panels clearly indicate what the majority prefers. Certain cat panels are tested



Carnation’s test cats lead a pampered life. Their daily food intake is monitored along with changes in their weight.

with dry foods only and some get only canned food.

It’s a bit of a problem to switch a cat over from either dry or canned food once it gets used to its diet. “They know what they like and stick with it,” says Dr. Ed. “A switch might be like the difference for humans between the taste of filet mignon and nachos. It also tends to upset their digestive process.”

One thing is for sure. They like meat and that’s what they’ll eat if left to their own devices. “Cats are one of the true carnivorous animals,” he says. “They evolved as meat-eaters and they need animal tissue to survive. When they hunt and eat a mouse, they eat the whole thing. They like the texture of each part and each part—the bone, the fat, the meat—provides essentials the cats need to survive.”

But a Canadian study shows, he says, that cats prefer prepared cat food over mice. Presumably, cats catch mice simply because they can. In the unlikely event of a fresh tuna invading their territory, they’d go for it before the mouse.

Along with the palatability tests, nutrition tests are also conducted. Carnation cats will spend their whole lives

at the cattery. Female cats are fed the same kind of food from the time they’re bred through gestation and lactation. Their kittens will get the same food, too. The body weights of kittens show how products are performing during critical growth periods, says Dr. Ed. Blood samples are drawn as well, and veterinarians watch muscle development in case any nutritional deficiencies should appear.

Adult cats are also given similar six-month tests to determine that nutritional requirements are being met.

“Our animals are changing every day. They’re growing, aging, always telling us new things about their lives,” says Ron Stapley. He looks forward to having his HP network in place throughout the farm, and is confident it will open new doors for researchers and allow a more natural flow of information for each of them. “This will help us capture what they’re telling us. It will make their lives better in the long run.” **M**

—Jean Burke

PAUL BUTLER, CARNATION COMPANY

Extra

ORDINARY PEOPLE



WYNNE WHITE

Trish Borden, general manager of Olympus Electronics in Seattle, uses a series of 20-minute training sessions to teach employee Roy Thornquist cable assembly.

Marie rolls into work at Vangard Northwest in Ferndale, Washington, at 9 a. m., right on time.

She is going to spend her day helping to assemble cable management kits that HP's Direct Marketing Division needs on a tight deadline. There are 250 to complete and it's going to keep Marie and her 15 co-workers busy.

Marie's part in the assembly process is coiling the six-foot plastic tube, which holds cables together behind computer terminals, and placing it in a large plastic bag. She concentrates as she maneuvers the grey tube through a circular route of nails in front of her at her work station. A wooden, V-shaped device hanging on the side of her work station allows her to open the plastic bag to place the tubing in it.

She learned each step of that process through a training process that broke the whole job down into individual steps. It took several months for her

employers to teach her the job through 20-minute training sessions several times a week until she repeatedly did the whole process 100 percent right.

She needs the adaptive fixtures and intensive training because Marie was born with cerebral palsy, a central nervous system disorder that results from brain damage at birth. Because of this, she can use only her left hand—and its movements are unpredictable and jerky. She is restricted to a wheelchair.

She still lives in a nursing home, the place she spent all of her life before she went to work for Vangard. She now earns wages for each piece of tubing she places in a bag for HP. It's enough money that she can choose her own clothes, get her hair done in a beauty parlor and buy herself a pastry and a cup of coffee at the bakery across the street from Vangard. Before she came to work, those weren't even options. Her life was dictated by the regimented,

non-varying routine of institutional life.

But hold the tea and sympathy.

Vangard's general manager Marcia De Lorme says her employees don't need it. University studies and research indicate, says Marcia, that our expectations about what profoundly handicapped people can accomplish have been much too low. "If we can't teach someone to do a job, we haven't given them access to it. It's our problem, our failure—not theirs. We need to find the way that will help them learn it. They're capable of it."

Trish Borden subscribes to the same belief. She is general manager of Olympus Electronics in Seattle, Washington, another company that hires the developmentally disabled.

Together they make a living blasting myths that most of us believe about people with profound mental retardation. Misconceptions crumble and fall away as one watches what goes on at these electronic assembly companies.

Trish Borden explains: "It seems every story written about our employees starts by describing how Tom seemed so innocent, so happy as he ate his peanut butter sandwich and cookies out of his Kermit the Frog lunch box."

The problem with that?

An attitude problem

"Tom" might be a middle-aged man who earns enough money to furnish his own apartment. Chances are excellent he didn't choose the Kermit the Frog lunch box and that he has never been taught that most middle-aged men don't carry *Sesame Street* lunch boxes. These decisions are made by well-meaning parents or by institutional staff members where people such as Tom often live. They are responding to early messages—when they were told Tom will "always be a child," that he will "always have the capabilities of a first-grader."

This kind of attitude is one that Trish Borden and Marcia De Lorme would like to change. They assert that society's expectations of people who are different are extremely low and that these people have been undertaught. Things are different in their companies.

Trish says, "One of my employees came to work the weekend after the



WYNN WHITE

Using a cable gun, Olympus' Shelley Williams tightens cable assemblies that will be used in Lake Stevens products.



WYNN WHITE

Olympus Electronics' Allen Cowell inserts cables for LSI, guided by the finished product before him at his work station.

Special Olympics wearing the ribbons he'd won pinned to his T-shirt. He'd taken a bus to work through downtown Seattle. The first thing we did was ask him to take them off and explained why. It's like an emblem that says, "I'm different" and it just reinforces beliefs I know aren't accurate. These are people with dignity. There was no reason to make him stand out in the crowd."

Vanguard and Olympus are two of 10 member companies of the Association of Supported Work Organizations (ASWO) that in 1985 provided HP with \$1.5 million in parts and service. All of the 17 ASWO companies are "sheltered workshops" that hire and train people with profound mental retardation—IQs less than 30 in many cases—to do skilled paid jobs, mostly electronic assembly work.

HP does business with several similar companies as well, not all of whom are part of this organization, such as San Jose's Hope Rehabilitation Services and Placer Rehabilitation Industries in Auburn, California.

Olympus Electronics and Vanguard Northwest, the companies Marcia and Trish run, provided Hewlett-Packard

with more than \$40,000 in service and parts in 1985. Trish also serves as president of ASWO, the network that governs the objectives and goals of each member company. Marcia serves as ASWO's vice president, in addition to her duties at Vanguard.

Replica of Oregon program

The businesses are modeled after an employment-training program developed more than 10 years ago at the University of Oregon by Dr. G. Thomas Bellamy. Until just last year, the ASWO members were still tied to the university program. The Oregon program was one of the first to clearly demonstrate that people with profound mental retardation could learn skills needed to do wage-earning jobs.

All ASWO member companies are private, non-profit organizations. The Department of Labor monitors and establishes employee wages. While many sheltered workshops exist to provide training to move people into traditional job markets, ASWO member companies are not such "flow-through" models. The majority of employees of Vanguard and Olympus, as well as the

other ASWO programs, will always need the intensive daily training and support they now receive.

But the important element of this story is beyond networks, university studies and umbrella organizations. This is about human dignity, changing lives for the better and the wonders of the human brain.

Trish Borden likes to tell the story of Olympus Electronics in Seattle, Washington, through the life story of one of their best employees. Joe lived in an institution from age one to age 26. He never learned to talk or to take care of himself. When he was 17, a psychologist wrote that Joe "continues to need the protective custody of an institutional setting to survive within his immediate environment." Trish says people liked to refer to him as having the mind of a three-year-old.

When he went to work for Olympus, he was understandably withdrawn, ill-kempt and spent most of his time rocking and looking at his hand.

The first job he learned was how to assemble a cable harness. In a sheltered workshop, tasks such as these are broken down into maybe 14 or 15 separate steps, each practiced one at a time until the employee recognizes and remembers the pattern. Visual aids, such as a completed cable harness, are set up at a work station. It might take 35 to 40 hours of training in 20-minute increments before someone like Joe completes a task with 100 percent quality, but it happens eventually, and it never takes as long again to teach a similar task. After learning one job, such as cable assembly, Joe begins to amass generalized skills that he will relate to other assembly work.

Joe doesn't look at his hand much anymore. He's too busy exploring the world around him, learning and growing. This man, who could not even bathe himself before he started working at Olympus, now lives in his own apartment with a roommate—a nice apartment with a swimming pool that he likes to sit by while he looks at his magazines. He takes a bus to work every day, a skill that involved four-hour training sessions and many mishaps before Joe mastered the system.

He still doesn't talk and still needs



JEAN BURKE

Marcia De Lorme, general manager of Vanguard Northwest, supervises Bob Alseth as he masters packaging pieces for an HP cable management kit destined for DMK in Sunnyvale.

some support to get through the days, but now he shops and pays for his own furnishings. "He has a choice now," says Trish, "about what clothes to wear, what hobbies to pursue and what to spend his money on." This would never have been part of his life if still at the institution, where only three-year-old behavior was expected of him.

Joe keeps himself well-groomed. He makes his own breakfast and lunch and is learning to make a few dinner entrees from a cookbook designed for people who do not read. He shops for his own groceries, taking along photos of items from each of the four food groups to help him make his selections. He goes out to dinner or for a beer after work with friends. He has a passion for music and bought himself a stereo. "His favorite," says Trish, "is country-and-western. If I get a phone call and hear country-and-western blaring in the background, I know it's either Joe or my dad." (Joe calls with assistance from someone who can talk, but it's important he learns to issue invitations and use the telephone.)

His latest adventure was skiing lessons, which he took with two of his co-

workers. "He might be the only person I know who goes skiing just so he can ride the chair lift. I think he'd rather be doing anything in the world than skiing, but his friends want to go, so he goes with them," says Trish.

What happens, says Trish, is that as soon as people adjust their expectations, her employees begin to shine. "We used to feel sorry for people like Joe and his 20 co-workers and think they were a burden to society. There is no reason to feel that way. With money from their jobs at Olympus, they become good consumers. They're contributing members of society."

At Vanguard Northwest, in a small Washington town close to the Canadian border, Marcia De Lorme faces perhaps the greatest challenge of all the ASWO member companies. Vanguard is unique in ASWO in that each of its 16 employees is physically handicapped as well as profoundly retarded. Most were born with cerebral palsy. Six are in wheelchairs and two use mechanical devices to walk. Several do not communicate verbally at all. Thirteen of Vanguard's 16 employees live in a nursing home, two live in a group home and one of them

still lives with his parents.

Much effort goes into providing community access for the employees of Vanguard, since so many of them still live in an institutional setting. "We try very hard to make the connection between money and the work they do here," says Marcia. "We'll reward a good job or appropriate behavior with money, for example, and then give them a short break so they can buy a soda from the machine outside with their money. When they go to deposit their paychecks, we'll make sure they get some spending money to keep."

Going out on the town

Gene, placing the six polycarbonate strips into a small bag for the cable management kit, is one employee who quickly grasped the money connection. Part of that, says Marcia, is because he loves to go out on the town and loves pie. He knows that if he's working, he's going to be able to buy himself a piece of pie. That's what works for him.

Another employee bought a stereo with his money and likes to go to the library to check out records. Bruce, who likes anything mechanical, loves to pore over catalogs. The staff thinks that's where he might have found out about CB radios, one of which he recently purchased and listens to constantly. Two of the women arrange to have their hair done during the lunch break at a beauty parlor down the street from Vanguard. And the bakery across the street is a favorite spot for everyone who works at Vanguard.

Lake Stevens Instrument Division purchasing supervisor Jan Hegstad says the procedure for doing business with companies such as Olympus and Vanguard is no different than for any others. Purchasing and engineering teams make site visits to qualify the companies as vendors. They ask the typical questions about their purchasing capabilities, technologies, shipping and receiving. "We find out if they can respond to our needs the way we want any supplier to respond to our needs."

Chris Luongo, of Corporate Materials, says, "The benevolent attitude we had originally about doing business with these companies quickly turned to pure business. They're good sup-



WYNNE WHITE

Through ASWO, Jessie Goode has learned the skills to work and the independence to live in his own Seattle apartment.

pliers. They build quality in up front because they're doing intensive training as they build."

Besides Olympus, LSID does business with similar companies—Work Opportunities, Skagitron, Provident Industries, and Sherwood Learning Center. Typical HP needs, Jan says, are cable assemblies, electro-mechanical assemblies, jumpers and having electrostatic bags sorted.

"The thing I really want to emphasize is that we don't treat these companies any differently. We expect 100 percent quality from everyone. These companies seem to take that extra step—the quality is extra-important to them. They're some of our best suppliers."

Other HP divisions that contract work from ASWO members include the Direct Marketing Division in California, the Vancouver Division in Washington and the Avondale Division in Pennsylvania. Orders range from opto-sensor cables to cable-control LED boards to micro-switch assemblies.

When selling her company to buyers, Trish Borden doesn't even mention that

her employees are disabled. "We have an excellent track record, good quality and we're competitive with other companies. We show samples of our work, give references and talk business. To do it any other way would be a disservice to the employees."

Even at trade-show displays, the photographs show only hands working doing cable assemblies or loading boards—nothing that signifies disabilities.

"When we invite buyers or representatives here from companies, the disabilities of our employees don't even come up 95 percent of the time, even though they're right here and can obviously see it. We don't bring it up, and so they don't usually either. One man, after a tour of the whole facility and many hard-hitting questions, said to me, 'I see you've got some good incentive programs going here.' I loved that. He saw exactly what was going on and that was a perfect way to capture it. As long as we're doing a good job, nothing else really matters." **M** —Jean Burke

The bosses learn a few things, too

Paula Johnson, director of marketing for Northwest Assembly, helps ease the burden on some ASWO general managers, who are sometimes expected to wear too many different hats all at once—general manager, social worker, trainer, friend, salesperson, financial wizard, electronics specialist and marketing wizard. "We can help these companies share leads, do some direct sales and even share contracts if we get one that's too big for one of the companies to do by itself."

Northwest Assembly provides marketing and advertising assistance to five of the ASWO member companies in the Northwest, as well

as trade-show support.

Most general managers, such as Trish Borden and Marcia De Lorme, entered the fast-paced world of high-tech business and financing from social work and mental health care backgrounds. They've had to pick up many skills along the way. The first step was understanding the products their employees were manufacturing.

Says Paula Johnson of Northwest Assembly, who was previously manager of Olympus: "I remember before I started working at Olympus when someone told me the employees were putting together cable harnesses for oscilloscopes, and I thought 'What's an oscilloscope?'"

Since those early days, these general managers have become fluent in the jargon of the electronics indus-

try. They've learned business, management and financial skills. They've become skilled sales people and marketers. They've learned productive manufacturing techniques and the ins and outs of purchasing supplies and equipment.

But through it all, the most important hat they wear is that of trainer, still involved in direct service with employees. "That's one of the major objectives of ASWO," says Trish, "and what makes us different from other companies. All general managers continue to have contact in the work area and supervise employees. That direct service is the reason we got into this field in the first place. We stay in touch with what's going on so we can make better business decisions."

YOUR TURN

Measure readers share their views on matters of importance to employees.

Readin', writin' and computin'

An article in *The San Jose Mercury News* listed the personal computers available in Santa Clara County libraries. There were plenty of IBMs and Apples, but not a single HP computer. The survey even included Sunnyvale, home of the Personal Office Computer Division. Wouldn't it make sense for HP to donate some HP Touchscreens so the public has a chance to use them? It would be nice to show people the computer being made in their county.

LARRY ROSENBLUM
Sunnyvale

The Apples and IBMs you mention were purchased by individual libraries in Santa Clara County with federal funds through a program started by the California state librarian, who also dictated specifications, including a standard operating system and at least one hard disc. At the time, HP's PC was the HP 150 and it did not conform with those specs.

Local HP grants are decided by HP's Peninsula Contributions Committee, which includes all Bay Area sites, including POD. The committee receives many more requests for contributions that it can possibly make from its limited budget. To date, no libraries in the area have requested HP equipment, though dozens of other qualifying non-profit organizations have asked for and received HP equipment.

One concern of this committee in approving grants is that the receiving organization should be able to satisfactorily incorporate the equipment into its operations. In this case, PC users in the libraries are provided only minimal assistance since the library staff does not have adequate training to help neophyte users.

It's unlikely HP would take the initiative to make such grants without the libraries expressing interest and without their having the capability to help educate and assist users.

MARY ANNE EASLEY
Manager,
Corporate Public Relations Services
Palo Alto



EVERETT DARICO

Too pretty to call courageous?

The article written about Binh Rybacki in the May-June issue was very interesting and moving. I'm happy she is doing so well for herself and others.

John Monahan wrote that she was "too pretty" to call her a zealot, savior, heroine or saint. Binh is a courageous survivor. . . or is she too pretty to be called that also?

THERESA CORSICK
Cupertino

"E" before "y," except after "s"?

As one who enjoys reading *Measure*, I was interested in Mr. Hall's letter in the July-August issue about "disc vs. disk." But I was both enlightened and amused by the response. There may be some controversy generated over your spelling of "controversy!"

ROBERT J. GLASER, M.D.
HP Board of Directors
Menlo Park

He's got company

The dealer channel of distribution is becoming a larger portion of revenue for HP and it was rewarding to see such a well-written article in the July-August *Measure* about a successful HP personal computer dealer, Philip Engelhardt.

However, there is one statement in the article that needs to be corrected: "His Aviax Business Systems . . . is the only PC dealership in the world that sells HP products exclusively." In the Neely Southwest Area, there are two such exclusive dealerships and in the Neely Los Angeles Area there are at least four dealers that sell HP products exclusively. I am positive that there are other examples in other areas. It is fairly unusual to see these types of dealerships, but certainly there's not only one in the world!

RICK TESSITORE
Area Personal Computer Manager
Fullerton, California

Please send mail

What public issues affect HP people and their jobs? Do you disagree with something you've read in *Measure*? Send us your thoughts. We want to share your opinions and comments with more than 84,000 other employees.

If your letter is selected for publication, you'll receive a *Measure* T-shirt. (Be sure to send us a return mailing address and indicate your T-shirt size—unisex small, medium, large or extra-large.)

Address letters via company mail to Editor, *Measure*, Public Relations Department, Building 20BR, Palo Alto. Via regular postal service, the address is *Measure*, Hewlett-Packard Company 20BR, PO Box 10301, Palo Alto, CA 94303-0890. Try to limit your letter to 200 words. Please sign your letter and give your location. Names will be withheld on request.



Making each minute count

Sales force automation is getting HP reps out of the office and in front of their customers.

It's nothing personal, but the idea is to get HP sales representatives out of the office and keep them out.

It makes sense.

If sales reps are playing phone tag with customers, attending impromptu meetings, sitting in traffic or waiting for an appointment, they're not selling.

Today's sales reps have more products to sell than ever before. And each sale carries administrative needs, such as configuring solutions, planning implementation and communicating with the support team.

HP's sales reps typically spend about one-third of their time on these administrative tasks.

Beyond the paperwork, the HP sales force is faced with ever-increasing competition and mounting pressure to produce more for less and get answers to customers faster than ever.

Help is at hand.

U.S. Field Operations is automating HP's sales force to give sales reps more time to spend with customers; provide

Making minutes count

a competitive edge through the visible use of HP products; improve the sales force's knowledge of personal computers and office automation and to increase job satisfaction.

Since April, approximately 100 sales reps have participated in a pilot project using new productivity tools. Each participant was equipped with a Portable PLUS computer, a ThinkJet printer and access to a portable disc drive.

The system provides:

- MemoMaker, Time Management, Lotus® 1-2-3® and Executive Card Manager.
- electronic communication with other HP employees through HP Desk.
- access to their area's HP 3000 systems to check the status of their customers' orders and the price and availability of the products they sell.
- easy access to databases, which contain information on products, markets and third party solutions.

Preliminary data indicate the use of the productivity tools has increased customer contact time by more than 25 percent.

"As a result of this early success," says Ben Menold, project manager of the productivity program, "U.S. Field Operations has been given the go-ahead to equip all 2,000 sales reps in the U.S. with Portable PLUS computers by the end of FY 87.

In addition to the Portable PLUS computers, cellular car phones are also being investigated with a pilot group of sales reps. Approximately 70 sales reps are using the car phones in their jobs today.

In the second phase of the sales force automation, the emphasis will be on tools to help sales reps manage the sales process. They'll be able to track their customers as they move closer to making a purchase, and predict future sales with more accuracy.

Sales reps will also be using AdvanceMail, a program which allows them to send and receive HP Desk messages without a constant HP 3000 connection.

During the third phase of automation, qualified sales leads will be automatically sent to the sales reps'



Lesa Elliott, field coordinator for product marketing on the U.S. Field Operations project team, trains sales rep Sy Inwentarz, Paramus, New Jersey, on the Portable PLUS.

Portable PLUS computer. A central site will fulfill customer requests for product information. These leads will then be qualified by telemarketing reps. When the prospect is ready to buy, the "hot" lead will be sent to the sales rep that day.

Early response from the field about the sales automation program has been overwhelmingly positive.

"I believe HP sales people using the Portable PLUS PC will be HP's best advertising," says Bill Fritz in the Naperville, Illinois, sales office. "My customers are interested in it, and are asking for demos. They say it's the first time they've seen a computer manufacturer's rep really use the solutions that he sells."

"I've had a very positive change in the way I feel about my job," says Randy Melang in the Brookfield, Wisconsin, sales office. "I like HP's backing during an austere period."

Fred Tan, of the Rolling Meadows, Illinois sales office, returned a call to

the Measure office on his cellular telephone from Chicago's rush-hour traffic. He was on his way to class, and said he frequently takes advantage of the time difference to return phone calls to California after his day officially ends around 5 p.m. "Having this phone in my car has given me an additional one to two hours in every working day," he says. "I can catch people on the phone while I'm on the way to the office during that quiet morning time right after 8. Then we don't have to play phone tag."

Fred's customer is Northrop Corporation, a security and defense contractor with 11 locations in Chicago and about 6,000 employees. He says he spends about four days of the week at their offices. "They see a lot of me normally, so the new sales tools haven't really increased my amount of customer contact. What it's done is to make my time there 'quality time.'"

Fred says he's thrown out his old calendar and now relies solely on the Time



DAVE HEITMAN

In the communications center of the East Windsor Police Department, Roland Brower tries out the HP Portable PLUS that Joe Shupper carries with him. Joe, a horizontal sales rep in the Piscataway, New Jersey, office, finds that using the Portable PLUS enhances his own credibility.

Manager program to keep track of his days and the weeks ahead. He uses the Portable PLUS as a word processor from home, sending memos and information to his office. He uses the spreadsheet to monitor sales performance and determine sales cycles.

A real value of carrying the Portable PLUS computer with him, Fred says, is that it's been a real eye-catcher for his customer. "Northrop's sales force is interested in testing the units. They're always on the road."

Joe Shupper, horizontal sales rep in Piscataway, New Jersey, says using the Portable PLUS hasn't really changed his days significantly.

"What it does is improve HP's image. Carrying the Portable PLUS with me enhances my credibility and the company's. It puts us a step ahead of the competition in terms of professionalism."

Joe says that when he's out trying to get new business for HP, reaction is very positive toward use of the Portable

PLUS. Many people who have never purchased HP equipment don't understand the product or know that such a product is available, says Joe.

At the end of July, as he was closing a sale, he performed a cost justification for the customer using the Portable PLUS. "They were very impressed that I could just sit there in their office and quickly work it out," he says. "They decided to add a Portable PLUS to their purchase."

Fred Ricles is a value-added channel sales rep in the Englewood, Colorado, office. He works with Distributors Resources Company (DRC), a value-added reseller.

"The Portable PLUS PC has put me in a position where I don't have to spend nearly as much time on administrative work. This automates a lot of it. Order status and prices are right at my fingertips. I can use HP Desk from any place that has a telephone."

One area where he's really saved time, says Fred, is preparing imple-

mentation plans. He used to write them out long-hand to be reviewed by the customers. Now, the basic plan is in the Portable PLUS and he can fill in the implementation details.

His customers at DRC, Fred says, have become dependent on his new system as well. "They want to know the status of their orders on a daily basis for invoicing purposes. They can get a file from me now on that."

Fred says he gets much more done during the day now, which saves him evening and weekend hours he'd rather devote to his family.

And that's the key to sales force automation. It preserves a sales rep's most precious commodity—time.

Fred plans to keep his Portable PLUS. "If someone were to take it away from me now, I'd leave heel marks all the way from Englewood, Colorado, to Cupertino, California." **M** —Jean Burke

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LETTER FROM JOHN YOUNG

HP's president discusses the highlights and the significance of this year's Design Automation Conference.

Two years ago, when we formed the Design Systems Group, we announced our intention to provide leadership solutions for the fast-growing market for engineering work stations and computer-aided engineering and design applications. Now we have something to show for our efforts, as the reports of our participation in the 1986 Design Automation Conference (DAC) made clear.

"The eagerly anticipated HP announcement... exceeded in scope last year's standout announcement by archrival Tektronix," reported one trade journal. "HP is rolling up its sleeves and getting serious," summarized another. The *Electronic Engineering Times* headline said it all: "At DAC '86: HP Makes Its Big Pitch At Last."

At last. We started from behind in the computer-aided engineering and design marketplace, and we've taken our licks in the press for it. "Where's HP?" was the inevitable question. And now the answer is clear: HP is squarely—and firmly—positioned as a strong supplier of the kinds of capabilities that design engineers need. The Design Automation Conference was a measure of how far we've come, so let me give you some of its highlights.

Perhaps the most striking thing was the sheer size of our booth—more than six times bigger than the one we had in 1985. We showed an impressive array of \$5 million worth of equipment—real, shippable products, not "vaporware," as Bill Terry describes what is too often shown by some vendors.

In our engineering "platform"—the basic hardware and software upon which we build solutions—we had some notable additions, including:

- a technical Vectra, with 125 tested software programs;
- some working artificial intelligence applications;
- technical office automation products to facilitate the planning, documentation, and communications that can consume more than half an engineer's time;
- and finally, the high-end extension of our HP 9000 family, which is the series 840 based on our new HP Precision

Architecture. This will provide the computational power needed to free individual engineering work stations, as well as a central source for engineering databases, peripherals and communications.

On top of this engineering platform, we also showed a wealth of HP DesignCenter engineering products:

- a state-of-the-art system for printed circuit design, which Bill Terry describes as "a very big deal;"
- our new 64000-UX microprocessor development system that's been integrated to run as part of our DesignCenter solution;
- mechanical engineering packages for two-dimensional drafting and design, as well as structured test;
- and 1,100 software packages which have been developed by independent software vendors and other value-added parties to run on HP work stations.

But I'd like to suggest that it wasn't the breadth of capabilities that really set us apart. Instead, it was the integration, or linking, of applications.

"HP is squarely—and firmly—positioned as a strong supplier of the kinds of capabilities that design engineers need."

Our strategy has been to treat the design process as a whole—a series of closely connected, interactive steps. We know it does little good to speed up one point of the process if there are bottlenecks somewhere else along the line. Our customers' goal is to shorten the time between a good idea and shipping a quality product out the door. That means they need to solve a broad set of problems, not just a few. And they need to do so within a unified engineering environment.

That's why perhaps the most exciting part of our HP DesignCenter demonstration at DAC was when we announced six links we'd created between different parts of the design process—places where information

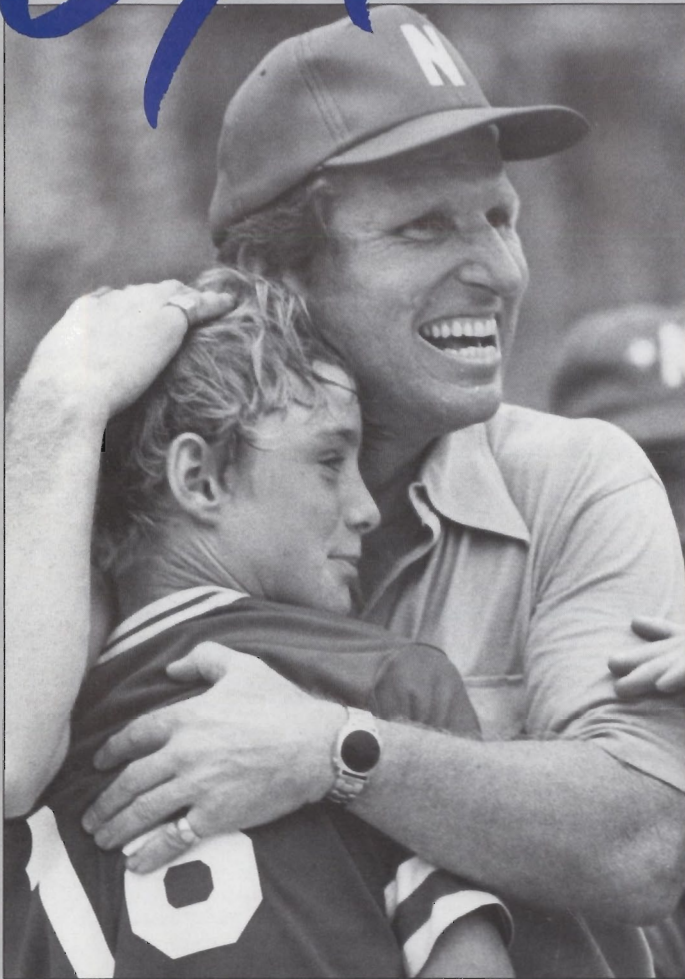
created at one stage would be automatically transferred to another that required it. For example, there were links between hardware and software design, between design and printed circuit board layout, and between design and our automatic PC board test equipment. Products from the Electronic Instruments, Manufacturing Systems and Peripherals groups were also involved in the demonstration. Bill Parzybok gave it high praise: "You couldn't tell that products came from different divisions. It all played together."

While we've accomplished a lot in a short time, much remains to be done. One thing on my list of priorities is to accelerate our own use of integrated engineering tools. The Loveland facility has just embarked on a project that should help accomplish this goal. There we're bringing electrical, mechanical and other internal information resources into one unified engineering system. This will be a model site. Its success will accelerate companywide progress in using our own design automation products as a competitive advantage. And when we do that, we will have a success story that will add further to our credibility in the marketplace.

So this year's theme is focus and follow-through. We must focus our resources on the directions we've already identified. We must follow through on the product enhancements, integration and field support required to reap the benefits of the investments we've already made. We're in an extremely tough marketplace. This is the year for effective implementation. This is the year to get results.



EXTRA TWEET



The picture tells the story

Bruce Brown, a production analyst in Waltham Division manufacturing, received honorable mention from the National Child Labor Committee for his many years of service to youth. He was nominated for the Lewis

Hines Awards for Service to Children and Youth.

For 30 years, Bruce has worked with children in his spare time, teaching arts and crafts, softball and track. The past 20 years he has been a coach, referee and member of the Natick Little League's Board of Directors.



We have to stop meeting like this

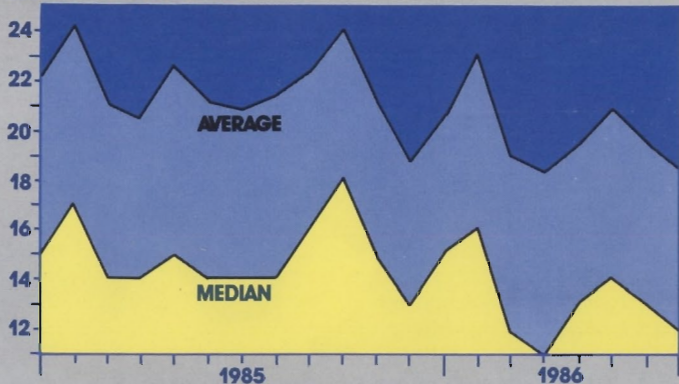
Unbeknownst to each other, two HP lab engineers—Ken Richter of Network Measurements Division in Santa Rosa and Milo Muterspaugh of Colorado Springs' Logic Systems Division—both entered the Sports Car Club of America Road Race, held in early June at Portland International

Raceway in Oregon.

Out of 300 competitors, these two HP lab engineers entered the same sports racing class in cars they had developed themselves. Milo and Ken each came from behind to finish first and second in their class.

They met for the first time in the victory circle. That's Milo displaying his first-place victory flag.

DAYS TURNAROUND TIME

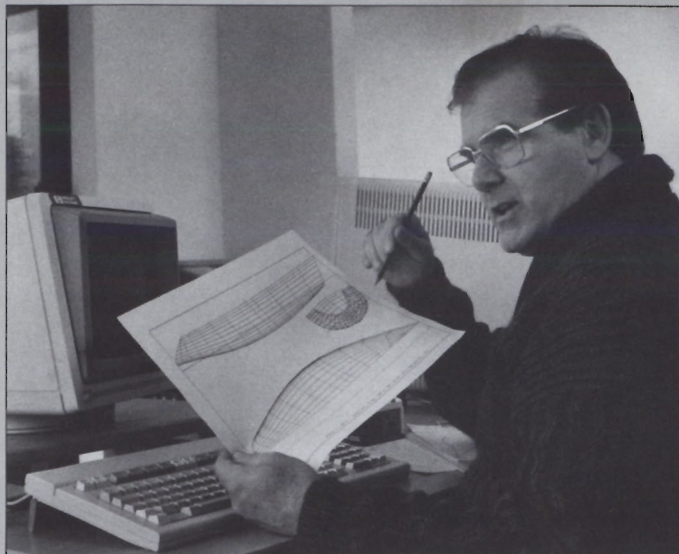


Hitting singles

"It's not like stepping up to the plate and hitting a home run," says Don Maston, who is managing a current campaign to cut the turnaround time of HP units returned to the seven U.S. service centers for repair or calibration. "It's a single here, a single there to keep those graphs coming down."

The "Seven/Eleven" cam-

paign is going after a seven-day median and an 11-day average turnaround for getting jobs in and out. Weekends are counted along with working days. The Rolling Meadows Center did hit a homer by suggesting that shipping paperwork be done along with repair work, rather than at the end. It saved a full day in the process.



Off and sailing

The America's Cup, yachting's big international competition, starts in October.

Anticipation is running high in Australia, the country that wrested the cup from the New York Yacht Club in 1983. A Sydney-based film company, Golden Dolphin Productions, has produced a six-hour mini-series called, *The Challenge*, scheduled to be shown in the U.K., U.S. and Australia in November.

Ben Lexcen (played by John Clayton in the film, shown in photo explaining a hull plot), who designed the *Australia II* and uses

an HP 9816, 7580 and an HP 9000 Series 320 on his ship, recommended the film company contact HP Australia for help with the show's computer scenes.

Glen Taylor, technical marcom specialist and Jeremy Bowcock, technical applications engineer, supplied the four work stations, peripherals, calculators and other props required on-set. During the shoot, Jerry coached actors and production staff in how to use the HP 9000. The end result was a starring role for HP computer systems, which had their normal-size labels replaced with much larger ones—for effect.

Well, you can't win them all

National pride overflowed when Argentina won this year's world soccer championship in Mexico.

HP Argentina's personnel manager Marcelo Iglesias sent an exuberant, asterisk-spangled HP Desk message to Corporate Public Relations's internal news service to forward worldwide.

"We are very happy to inform you that our national soccer team won the Mexico '86 World Cup soccer games, and that 'our' Diego Maradona was selected as the best soccer player in the world. Please join us in the celebration. . . ."



HP communicators around the world asked hopefully if "our" Maradona were indeed an HP employee. It seemed a long shot, but still? Marcelo has since set everyone straight. The "our" meant Argentina maintains a firm claim to Maradona, a native of Buenos Aires now playing in Italy.

Extra MEASURE

NEW SECTORS

The former Information Systems and Networks sector has now been split into two new sectors:

- The Systems Technology Sector under Executive Vice President **John Doyle** will focus on systems integration of core systems, ICs, networks and peripherals. It has the Peripherals, Information Networks, Information Technology and Circuit Technology groups.
- The Business Systems and Personal Computation sector under Senior VP **Doug Chance** includes the Personal Computer Group and activities from the former Information Systems Group (the Distributed Data Processing Business Unit and Office Systems BU and the Böblingen General Systems Division).

CHART CHANGES

The Medical Products Group has named **Menno Harms** to the new position of HPSA business manager to oversee all health-care activities, both manufacturing and sales, in Europe, Africa and the Middle East. The former Böblingen Medical Division has been restructured into separate programs and functions reporting to Harms. Also new: a Critically Ill Patient Monitoring/OB Care BU under GM **Ron Rankin**.

The former Cupertino IC Division is now a part of the Integrated Circuit Division and has relocated to the site of the

Santa Clara Division.

Group shifts: the Loveland Instrument Division has transferred to the Electronic Instruments Group. The Fort Collins IC Division joins the Circuit Technology Group (formerly called the Integrated Circuit Group).

NEXT PHASE

VP **Joel Birnbaum** has been named general manager of the Information Technology Group (ITG) and will head the continued development of a single-architectural design for all HP computer products.

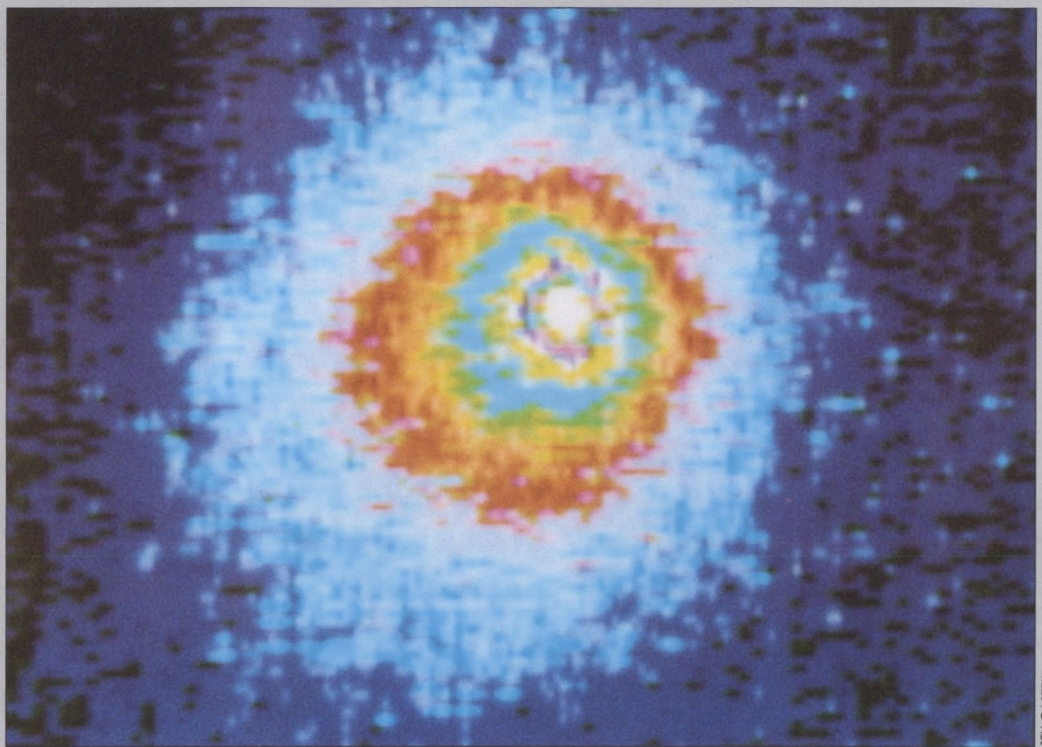
Three key staff functions have been created within the new Systems Technology sector to realize the full benefits made possible by the new HP Precision Architecture: **George Bodway** is director of Systems Program Planning, responsible for seeing that core computer products and technologies move efficiently from ITG to all HP computer groups. **Jim Bell** is director of Integrated Information Management, managing interfaces, networks and application standards activities for all HP systems products. **Dick Love** is computer manufacturing manager responsible for developing worldwide organizational and facility plans for all computer production.

A new Systems Business Management Council under Chief Operating Officer **Dean Morton** will set system-related priorities companywide and resolve issues that arise.

His photography is heavenly

Stu Casteel is accustomed to winning awards, but those are usually for video programs he works on as post-production specialist and technical director at HP-TV in Palo Alto.

Recently, he won first place and \$250 in the teleproduction category of *Television Broadcast* magazine's national contest, "Who Shot Halley?" Stu videotaped Halley's comet through a local college's 16-inch reflector telescope over a three-month period. He used an image-intensifier with a black-and-white surveillance camera attached to it. This still photo of his false-color work appeared in the July 1986 issue of the magazine.



STU CASTEEL

Comhghairdeas, Padraic, Daithi!

That's the Gaelic way to say congratulations to two Irish lads.

David Tracey and classmate Patrick Ryan, both studying electronics at University College Dublin, won the 1986 HP Ireland Award for the most innovative or original project in computing, electronic measurement, chemical analysis or medical electronics. The competition is open to third-year college students throughout the Republic of Ireland. For their project, they built a prototype home blood-glucose monitor using an enzyme electrode with a flexible microprocessor system. Initial results are encouraging. Because his father has diabetes, David knows the urgent need to have an efficient blood-sugar monitor at home.

Their prize, an HP Vectra PC, was presented on behalf of HP Ireland by the U.S. Ambassador, Mrs. Margaret Heckler.



BILL ERNOV

His tricks are a real treat

Some might say he's out of his gourd, but every Halloween George Hewitt, HP dealer sales rep in Purchase, New York, turns into the Great Pumpkin.

For eight years, George has delighted the children in his neighborhood with his spooky antics. He and his wife find a huge pumpkin—last year it was 250 pounds and three-and-a-half-feet tall—to gut, carve and equip with light and a two-way sound system

wired to an upstairs room.

As the little monsters approach the house, the pumpkin greets them and responds to their questions. George is listening and watching from a window above the front porch, hidden from view.

George says he goes to all this trouble because he likes "to see the smiles on the children's faces and hear them laughing. I like putting the fun back in Halloween."





BETTY GERARD

All HP runners won in this race

In Palo Alto, California, Hank Lawson, treasurer of the new HP National Running Club, had a particularly warm greeting for one small award winner at the Family Fun Run: "Miss Elly" Lawson, 2.

On July 12, 234 HP people and their families ran or walked the 5K (3.1 mile) course that began alongside the Corporate offices, wound around a nearby high school and up a final steep hill. Their efforts raised money that the club will use to help underwrite the personal expenses of HP runners throughout the

U.S. who compete in corporate meets. Organizer was club secretary Marj Moore.

While most of the people who took part in the club's first-ever fund-raising event were local, Chris Eberly from the Valley Forge, Pennsylvania, sales office was in the area for a training class and brought along his running gear. He came in third overall in the pack, right behind Dale Richard and Doug McLean who both work at the Cupertino site.

Kids eight years old and younger had their own abbreviated course. Miss Elly came in second in the race for girls five and under, to daddy's obvious delight.

Extra MEASURE



NEW HATS

Manuel Diaz has been named Latin America Region general manager, based in Mexico City...

George Glenday to GM, Neely Sales Region... **Hans Neilson** to New Zealand country GM.

Tom Rohrs to GM, Waltham Division... **Bob Tillman** to GM, Northwest IC Division... **Jay Richards** to operations manager, Information Software Operation.

WORTH NOTING

HP has been accepted for membership in the X/OPEN Group, an international organization of major computer-system suppliers. It is currently seeking worldwide agreement on adoption of an enhanced version of the UNIX® operating system. ...HP has acquired a minority interest in Natural MicroSystems Corporation of Natick, Massachusetts, a developer of voice-processing technologies.

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

NEW PRODUCTS

The San Diego Division's new HP DraftPro plotter (HP 7570) is the compa-



HP DraftPro

ny's first plotter designed especially for the low-priced PC-CAD market. It is compatible with most popular personal computers and requires a minimum amount of space. U.S. list price is \$5,400.

Office Talk is a voice-communication product for the HP Vectra PC and other IBM PC/AT compatibles. It uses voice-data technology developed by Natural MicroSystems (see "Worth Noting") for voice messaging and other functions. The firm will manufacture the software application and input/output card for HP. The Grenoble Personal Computer Division designed the software and will market Office Talk.

Queensferry Telecom Division's new HP 4947A transmission-impairment measuring set (TIMS) for the first time puts powerful trouble-shooting capabilities within reach of datacom operators on a budget. U.S. list price is \$7,900. The division has also introduced a new HP 37204A multipoint HP-IB extender that may be used to link IEEE 488 devices that are widely dispersed. It is the first of a new generation of HP-IB extenders.

The new HP 3235A HP-IB switch/test unit from the Loveland Instrument Division saves test-station developers from having to put together their own switching and test-system interfaces to get high performance. It routes signals between test equipment and a wide variety of devices under test.

A changing of the guard

When Don Hammond went to Bristol, England, in January 1984, he was the director and sole employee of HP Labs' Bristol Research Center—the first central research laboratory to be established outside of Palo Alto, California. The charter: to establish a first-class European research center in the information technologies.

As he returns to the U.S. to become acting director of HP Labs, Don is turning over the role of director to John Taylor, who has headed the center's Information Systems Lab with distinction since 1984. The center is already well on the way to its goal of three labs and 170 professionals



John Taylor, Don Hammond

by 1988—a second lab, focused on networked computer systems, was formed in July. Strong ties have been looped to U.K. and European universities. And HP's research presence in Europe was a strong factor in the company's recent acceptance for a RACE contract from the European Economic Community.

Good show!

Life on the road can be taxing

People in the United States don't usually try to devise ways to help out the Internal Revenue Service. But deep down, everyone knows the life of a tax auditor has got to be tough.

HP and Zenith will be making it a bit easier. Over the next year, HP will provide the IRS with up to 18,000 HP ThinkJet printers to use with Zenith portable computers for on-the-road auditors.

Dennis Hoff, of HP Vancouver Division marketing and OEM sales group, says the first shipment of 1,000 HP ThinkJets printers went out the door in early August. Dennis said the order was a great boost for HP manufacturing divisions in Singapore and Corvallis.



JOSEPH ALEXANDER

Maybe it's time to recruit

Hewlett-Packard in Fort Worth, Texas, recently loaned an HP 8566B spectrum analyzer and an HP 8642B synthesized signal generator to 15-year-old Jay Alexander. He needed the equipment to finish his project for the local science fair. He's sure he would have won the top prize at the fair, just as he did last year, if only Halley's comet had cooperated.

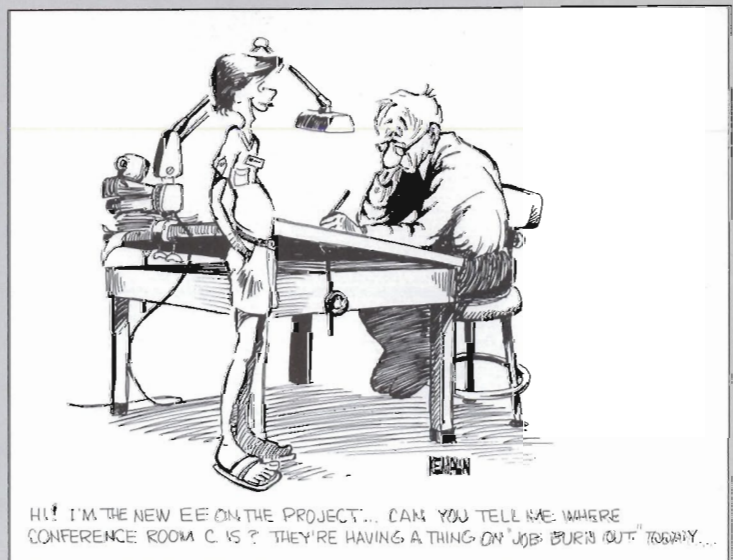
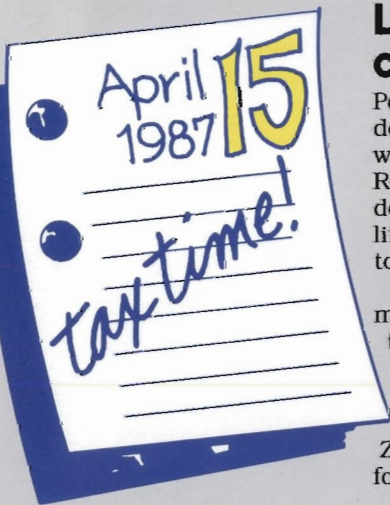
Jay set out to prove once and for all that the comet contains water. But by the time he got his equipment set up, Halley's comet had moved behind the sun and out of range of his radio antenna. Despite this setback, Jay still received a distinguished achievement

award from the Navy, a special recognition award from the Marines and a second place science award from Motorola Communications for his work. Scientists have since proven his theory. Jay's dream is to be the first to hear from life beyond Earth and to win a Nobel Prize by age 21.

A first-place title stayed in the family this year as younger sister Mischele, 14, took first place in her age class for using radio waves to listen to meteorites.

And brother Geoffrey, 11, took fourth place in the junior division with his project to monitor solar flares.

The proud parents are Joseph, a computer consultant and physics fanatic, and Rhonda Alexander.



HI! I'M THE NEW EEE ON THE PROJECT... CAN YOU TELL ME WHERE CONFERENCE ROOM C IS? THEY'RE HAVING A THING ON "JOB: BURN OUT" TODAY...

PARTING SHOT

The spinoff is good business for HP

U.S. Windpower started out with one HP 1000 A600 computer. Their entire Windplant now relies on a fleet of HP 1000s, HP 3000s, HP Touchscreen and Vectra personal computers. And more expansion is coming.

The wind power company in Livermore, California, currently uses four HP 1000s working with Apple personal computers to harness the wind for electricity, collecting data from their 2,300 wind turbines spread through the Altamont Pass.

The 26-square-mile area in the Altamont Pass is a perfect location for wind power companies because of strong summer winds created by the cool Pacific air being drawn to the Central Valley heat. About 75 percent of USW's annual power is produced during the summer, when wind speeds average 16 to 28 mph.

Within two years, says Wayne Johnson, computer systems manager at U.S. Windpower, the Apples will be gone. HP 1000s will be communicating directly with microprocessors in each wind turbine, performing real-time operational tasks and collecting production data. In 1988, remote Data Acquisition

Systems will replace the on-site control buildings. Each system will consist of two HP 1000s in a redundant configuration for tracking windmill operational status and power output.

The Data Acquisition Systems will be connected to two additional HP 1000s, storing wind speed and

energy production data and keeping records on maintenance and machine configuration.

Windplant work stations in the Livermore office will enable operators to monitor the status of the entire Windplant through a number of HP 320 systems.

The company's HP 3000s


perform manufacturing scheduling tasks and financial and payroll systems.

U.S. Windpower is the single largest producer of electricity in the industry, producing one-third of the industry total over the last four years.



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