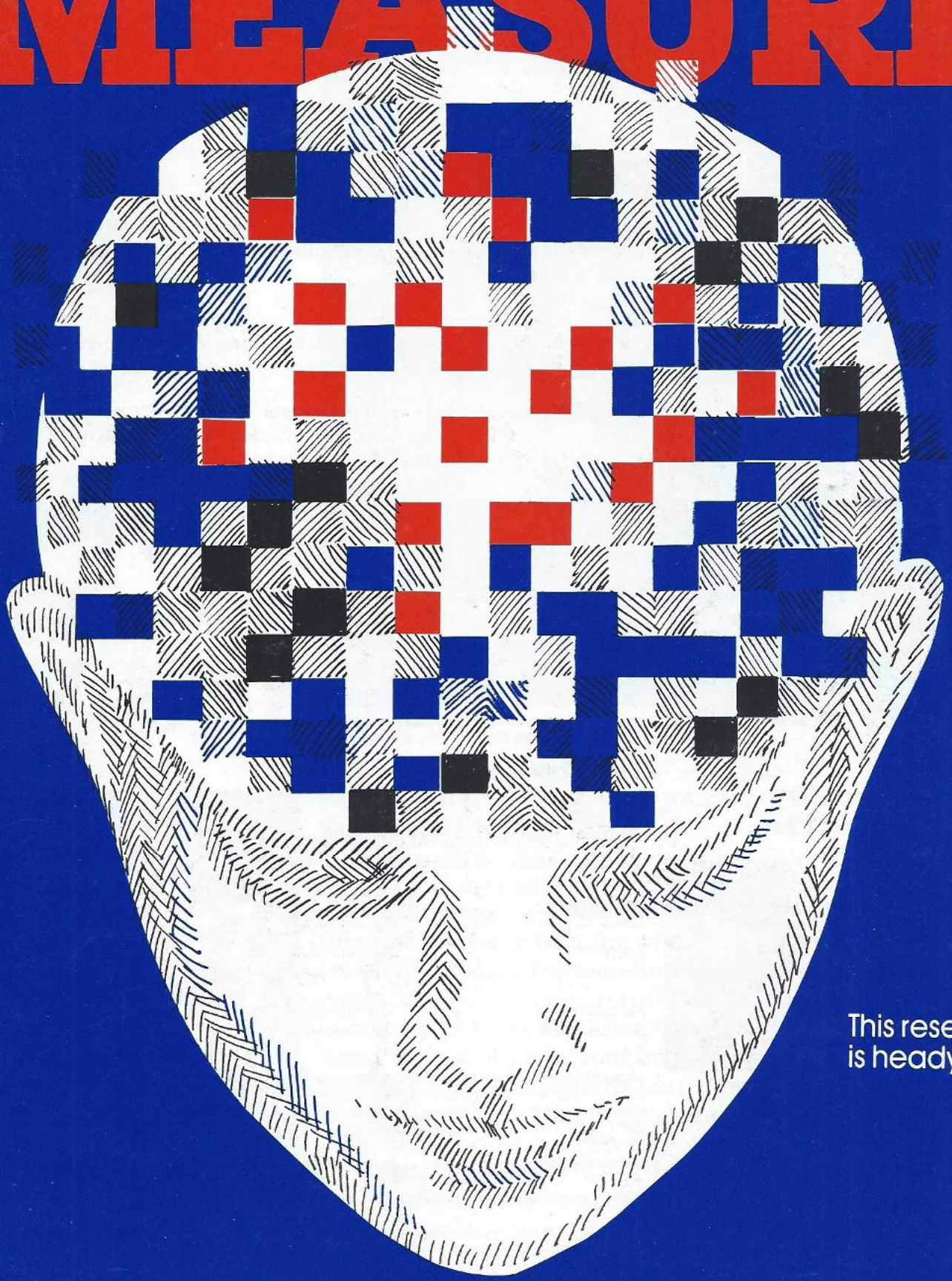
MEASURE



This research is heady stuff

For the people of Hewlett-Packard

March-April 1987

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HP technical equipment is helping researchers uncover the mysteries of the human brain by measuring its magnetic fields. Cover illustration by Annette Yatovitz.

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Mapping the mystery

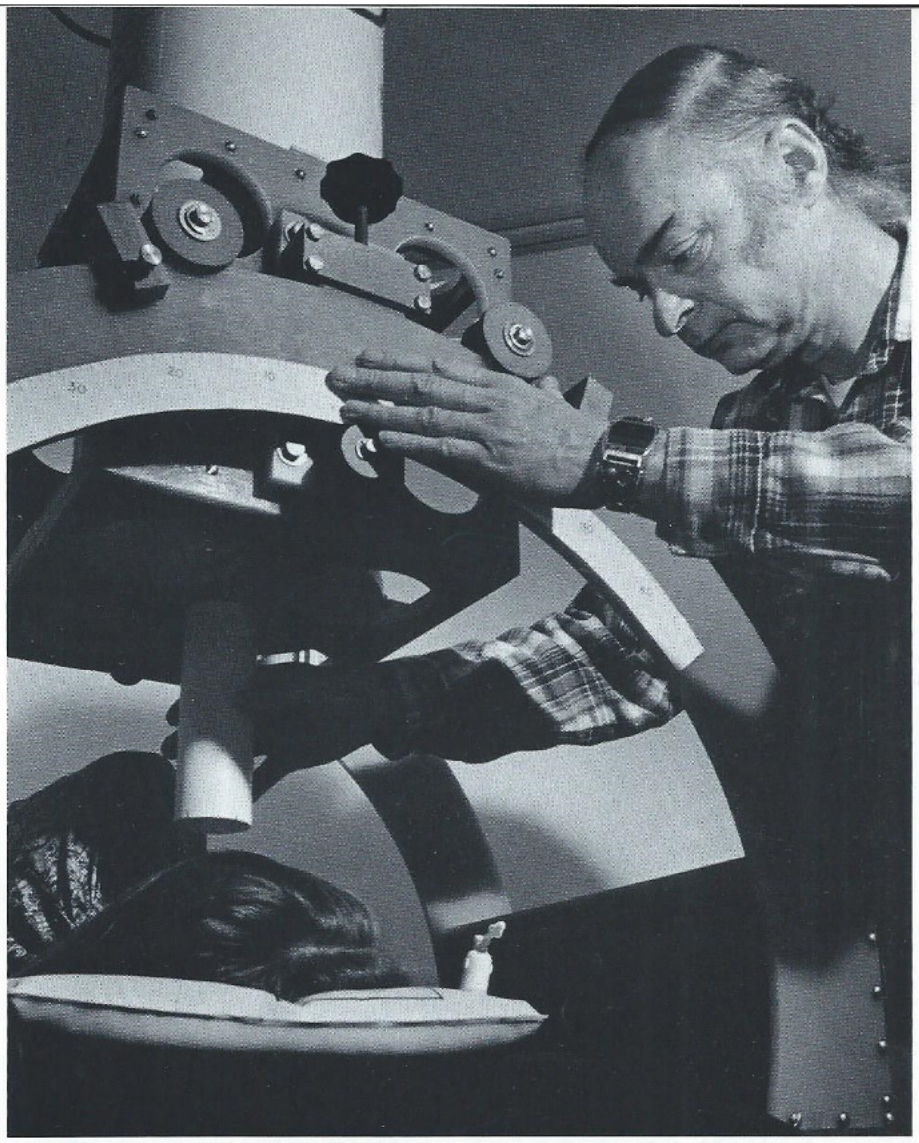
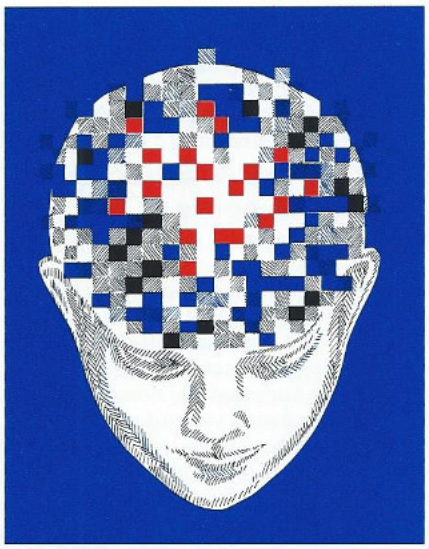


PHOTO COURTESY OF LOS ALAMOS LABORATORY

Dr. Ed Flynn studies the wonders of the human brain at Los Alamos National Laboratory, widely known as the birthplace of the world's first nuclear weapons.



Even as you read this article, your brain is sending out weak magnetic fields that are about one-billionth the strength of the earth's magnetic field.

With a computer-based technology he calls magneto-encephalography (MEG), Dr. Ed Flynn could measure those fields and determine what part of your brain the activity is coming from. In time, the nuclear physicist hopes his current research at Los Alamos National Laboratory in New Mexico will lead to a great deal more knowledge about how your brain works. . .and all from measuring those magnetic patterns that emerge as the brain's nerve cells "talk" to one another.

Dr. Flynn hopes his research will one day have clinical applications for doctors working with patients suffering from wide-ranging disorders including Alzheimer's disease, stroke, coma, parkinsonism, epilepsy, schizophrenia, multiple sclerosis, brain damage and chemical

Mapping the mystery

addictions. He's made plans to conduct MEG studies on two groups this year. One includes people who suffer from dyslexia, an impairment of the ability to read. In the other, he'll study a group of children, now 12 and 13 years old, who were born in comas. Even more futuristic applications may include measuring job performance and testing the brain's "overload" point, when it receives too much information and shuts down.

This research is being conducted with the help of HP equipment. Using HP 9000 Series 500 Models 520 and 550 technical computers with a host of HP peripherals, including Touchscreen personal computers, plotters, disc drives and graphics systems, Ed is following the brain's activities in series of tests. Biomagnetic Technologies, Inc. manufactures and sells the sensor devices, which interface with the HP system. BTi has sold the same set-up to New York University and the University of California at Los Angeles for their neuromagnetic research.

The Los Alamos testing takes place in the basement of the Life Sciences building in a shielded room built to offset the earth's powerful magnetic field. Devices called SQUIDS (Superconducting Quantum Interference Devices) have seven sensors each that are filled with super-cooled liquid helium. When pressed against a subject's head, these sensors measure the magnetic fields resulting from the brain's electrical activity. The information flows directly to the HP 9000 Model 520 in a nearby room.

With the sensors taking magnetic-field readings, the subjects are presented with different stimuli. Dr. Flynn has studied responses to tones, sounds at different levels in each ear, flashing lights, and a request for the subject to flick his or her finger. By constantly measuring the magnetic field, and mapping it out, Dr. Flynn says the signals in the brain can be "seen" before, during and after each stimulus. First, the brain will perceive the signal and register a desire to respond; then the brain sends a signal to the body (to flick a finger for instance); finally, the brain acknowledges that the command has been fulfilled (the finger has changed position). Though this whole process takes the brain only a few tenths of a second, each step is visible.

The end result is a fascinating record of when and where activities take place in the brain.

Dr. Flynn hopes such knowledge of the brain's activity will be helpful in clinical settings, and that's where his work is heading soon if funding is resolved. He is waiting for the go-ahead that will provide his Los Alamos National Laboratory research the boost of $1 million a year for a five-year joint effort with the Veteran's Administration Medical Center in Albuquerque and the University of New Mexico Hospital. The project will be based at the VA hospital.

An example he uses of how MEG research might be of clinical use concerns stroke patients. "We know from CT (computed tomography) scans that stroke victims lose use of part of their brain. But they relearn behaviors by using another part of their brain. If we could see what part, it might be stimulated to speed rehabilitation."

> ***The end result is a fascinating record of activity in the brain.***

With advanced tools, such as miniature versions of the SQUIDS to fit inside a helmet, brain activity might be measured in a variety of circumstances, Dr. Flynn says. He says a possible technology for more mobile sensors is a fiberoptic interferometer that could operate at room temperature. The U.S. Air Force is interested in studying pilots to see how they react under stress during flight. The Army is interested in objective ways to approach job recruitment for various jobs.

MEG is but one tool of many that are currently being used to scan the brain. Some fairly well-known medical methods include ultrasound, CT scans, magnetic-resonance imaging (MRI) and electroencephalography (EEG). These methods are used basically to locate tumors or brain diseases. Ed Flynn says MEG's most important contribution is that the technology goes beyond that to show function. "They tell you the anatomy of the brain and can say what the brain looks like. We see where the activity is, what the brain is doing. It adds the dimension of time."

A current technology used for brain scanning that offers much the same information as MEG is positron emission tomography (PET), invented at Washington University in St. Louis, Missouri, in the early '70s. Assistant Professor of Psychiatry Dr. Eric Reiman says PET provides regional information about the biochemical and physiological processes in the human living brain. These studies are based on the administration of a positron-emitting radiotracer, the use of a PET imaging system to record the distribution of radioactivity in the brain, and a mathematical model to convert the radioactivity into physiological information.

In some cases, studies can be as brief as 40 seconds and can be repeated as quickly as every 10 minutes, says Dr. Reiman. Individuals can then be studied before and during different cognitive tasks or before and during different drug challenges to understand the neurobiology of these tasks and challenges. This makes PET, says Dr. Reiman, an excellent tool for studying psychiatric disorders because of its ability to locate and map how the brain is functioning.

"We consider PET research to still be in its infancy," says Dr. Reiman. "And if PET research is an infant, we're just introducing the couple as far as MEG goes. The tools needed to accurately study minute regions of the brain instantaneously just do not exist yet."

> ***"Now, we're starting to get into some of the unknown."***

If MEG is successfully developed, says Dr. Reiman, important advantages will include its potential to look at much smaller regions of the brain than currently possible, to be able to measure the activity in milliseconds, and to do these things non-invasively. "With research tools like PET and MEG, we have tremendous potential for understanding how the human brain works."

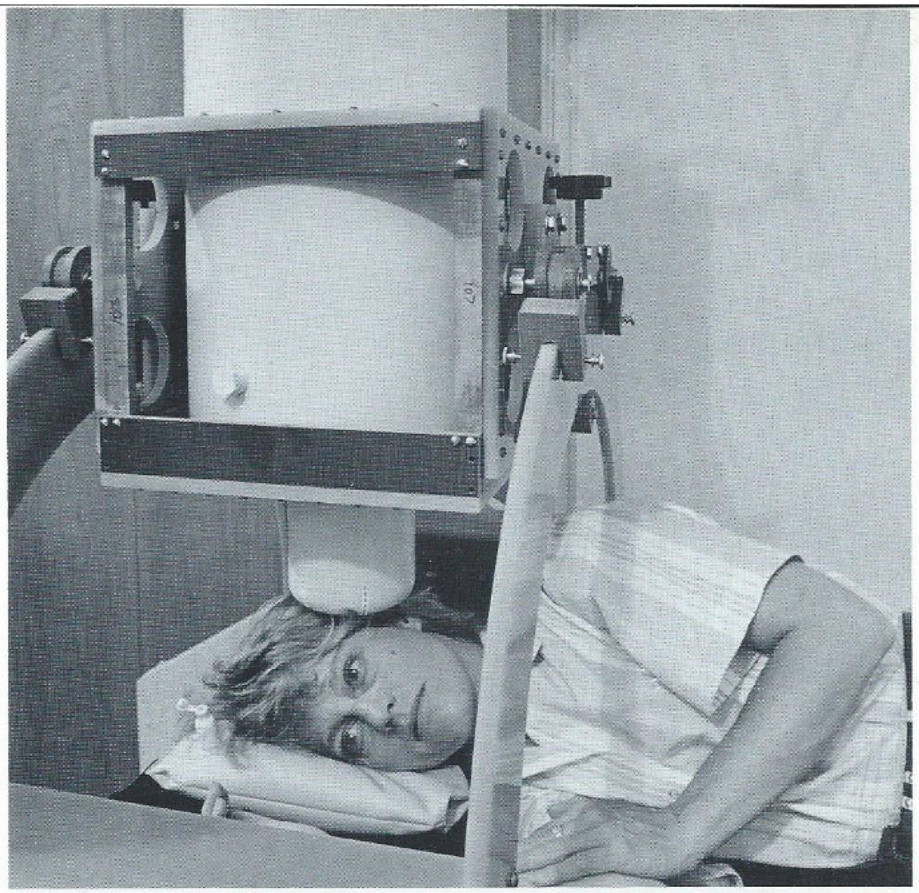


PHOTO COURTESY OF LOS ALAMOS LABORATORY

Seven supercooled SQUIDS pick up the magnetic fields generated from Los Alamos researcher Deborah Arthur's brain. At first, the researchers tested only each other.

Researchers at New York University are also using HP equipment in neuromagnetic research.

Drs. Lloyd Kaufman and Samuel J. Williamson conduct their research at New York's Bellevue Hospital and at Washington Square on the NYU campus. The neuromagnetometer they use at Bellevue has a total of 22 channels from which to take readings of the magnetic fields.

Drs. Kaufman and Williamson use the HP 9000 Model 550 to analyze the findings, as well as to interpret EEG charts for comparison. The Washington Square sensor was the prototype for the model Ed Flynn is using at Los Alamos.

Dr. Kaufman says David Cohen, then in Ohio and now at the Massachussetts Institute of Technology, was the first to use a similar technique to measure the magnetic fields of the brain. That was in 1967. But Drs. Kaufman and Williamson were the first to measure evoked reponses from subjects, and they published their first results in 1974.

"This technology is on the threshold of a very interesting phase," says Dr. Kaufman. "By using benchmarks, we've been studying things that were well known until this point, things that we could have charted without magnetic fields. Now, we're starting to get into some of the unknown."

Kaufman and Williamson have been studying some higher-order brain functions, including attention. They administer a series of tones to subjects, asking them to ignore one set because they will be asked to do something with the other set. They can see where that activity is coming from within the brain—the ability to block something out while concentrating. Their test results support one of the two very complete theories concerning attention that have been debated in psychological circles. One holds that we filter stimuli before conscious perception occurs (which these tests supported). The other theory holds that we filter after conscious perception.

Along the same lines, the two are now studying memory. It has been believed for a long time, Dr. Kaufman says, that humans are better able to recall things that can be easily visualized than they're able to recall abstract thoughts or ideas. He and Dr. Williamson hope to show what part of the brain is involved in evoking memory.

Dr. Kaufman thinks neuromagnetism's biggest advantage is being able to "tell the order in which things happen in the brain. Working with technologies such as MRI, which gives an image of the brain, we'll be able — ultimately—to produce a three-dimensional, functional map of a brain. Using PET, we could conceivably even map those silent parts of the brain by tracing cerebral flow. Using all three, we could show how the whole brain is organized."

Now, Kaufman says, scientists know something of the biochemistry of the brain, and the effects of major injuries and big tumors, but little about what goes on in between. That could change within the year, he hopes.

If their memory work bears fruit, they hope to start looking at diseases as soon as possible, especially dementias, such as Alzeimer's disease, as well as parkinsonism, epilepsy and psychiatric disorders. "Based on the eagerness of physicians at NYU to have access to this process, I'd say the program is really going to accelerate."

Where does he see this technology going? "Well, I've got my dreams or I wouldn't be working on it. But other experiments have failed."

The important thing is that any additional information helps. A large battery of tests is needed to study any disorder, and magnetic recordings could be a significant contribution to this battery of tests. "It's not going to be a cure or a treatment, but will be useful in the process. Many conditions, for example, can mimic Alzheimer's," says Kaufman. "A person can be institutionalized with symptoms that look like Alzheimer's, but really aren't. Maybe our readings, in conjunction with other tests, could rule out unfortunate circumstances like that."

Another area in which MEG might prove helpful to physicians, says Kaufman, is by providing a method to investigate pharmaceutical drugs and the effectiveness of dosages.

In the meantime, both Kaufmann and Flynn are looking to HP to develop even better and more powerful scientific tools: a graphics processor and software to convert their findings into three-dimensional illustrations; faster computing capabilities; more front-end power for the equipment, and continued support in high-tech standard laboratory measurement equipment.

They've got mysteries to unravel.

—Jean Burke

DAVE BARTRUFF

The South Gate area of Seoul, Korea, clearly shows how new growth has sprouted around traditional Korea as the country emerges as a world economic powerhouse.

Seoul mates

A foreigner doing business in the Republic of Korea will eventually deal with one of four major conglomerates that dominate the marketplace: Samsung, Daewoo, Hyundai or Lucky-Goldstar.

Hewlett-Packard Company teamed up with the Samsung Group.

The behemoth Samsung Group's affiliated company, Samsung Electronics Corporation (SEC), has served for years as Hewlett-Packard's representative in South Korea. A joint-venture agreement signed with SEC in September 1984 formed Samsung Hewlett-Packard, 55 percent-owned by HP.

It's a combination that joins two individually successful and powerful companies to operate in one of the most dynamic economies in the world today. Marketing Manager Sam Yu complains that the U.S. company name "Hewlett-Packard" trips on the Korean Hangul-speaking tongue and tells people to just call it "HP." However, joining forces with Samsung has made it easier for the joint venture to become a well-known and respected company. And that's important for doing business in Korea

(see story, page 9).

The Republic of Korea is emerging as one of the world's economic powerhouses, with GNP growth rates averaging 8 percent annually in the last 20 years. But it hasn't been magic or luck; it's the result of careful government planning and industries working toward the goal of becoming a developed nation with a standard of living equivalent to Europe's by 2000.

But to truly appreciate Korea's current success you must consider its past. Today's cosmopolitan Seoul, bustling to prepare to host Olympiad XXIV in 1988, was completely flattened during the Korean War, which ended in 1953. Koreans remember poverty and starvation to the point that even today the standard greeting is "Have you eaten?" or "Have you had lunch?" instead of "How are you?" This feisty nation has come a long way since then.

The South Korean peninsula has seen more than its share of bloodshed in just this century of its turbulent history. The Japanese ruled Korea from 1910 to the end of World War II, after which the Korean nation was divided into North Korea and South Korea by the 38th parallel. When industrial North Korea, under the Soviet Union's control, tried to reunite the country in 1950 by force, 16 countries helped them fight back. South Korea maintained its independence, but at an enormous price of human lives. And despite efforts at peaceful reconciliation with North Korea, and successful efforts to rebuild relations with Japan, the country still lives under the threat of war and fear of confrontation with the Communist bloc surrounding it. The particularly stout-hearted can tour the demilitarized zone that separates North and South Korea—dramatic proof of the very real threat of violence that is daily life in Korea.

Seoul, where 10 million of South Korea's 41 million people live, is a spread-out city with a compact center. The main arteries are wide boulevards crammed all hours of the day with small cars (99 percent of them made in Korea), and woe to the tourist who ventures into the labyrinthine maze of side streets that disappear into the rest of the city.

There is energy and confidence in the air here and Samsung Hewlett-Packard is part of it.

SHP is situated in four floors of the Samsung-owned Dongbang Life Insurance Building on Yoeuido Island across the Han River from downtown Seoul. It expanded to six floors in March, symbolic representation of the joint venture's growth. General Affairs Manager Chan Se Lee says it's on what is known as "Computer Street," with IBM two blocks down from SHP, and Sperry, DEC and five or six other computer companies nearby. Many businesses have shifted to the island, which also boasts the Far East's tallest building, a 62-story skyscraper. "This is the Manhattan of Korea," says Chan.

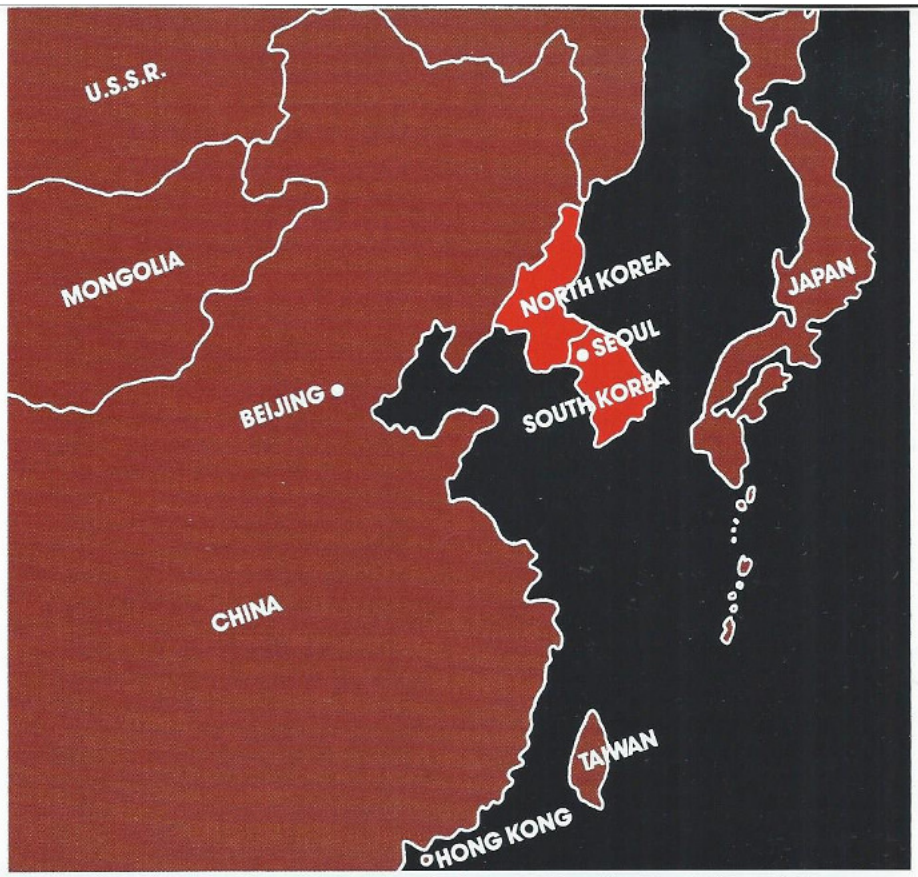
The joint venture fits in nicely with the Republic of Korea's long-term goals for national development, says Sam Yu. The government is interested in building an advanced industrial base that relies heavily on private initiatives, and all with a strong direction toward self-sufficiency. The government is emphasizing growths in productivity, research and development, and small

businesses. Resources are going into engineering education, and there are success stories in diverse industries ranging from steel and shipbuilding to advanced electronics, computer chips and biotechnology.

Sam says the overall Korean business profile begins with an export-driven mentality and highly motivated people. "Profit is not the first priority here," he says. "Koreans invest to boost employment rates and Korean companies borrow to grow." Manufacturing and service sectors dominate the GNP.

Sam is quick to discuss the emotional issue of protectionism and how he feels it has affected South Korean attitudes. "American officials look at Korean imports as a cause of the U.S. deficits. People here get upset because they feel falsely accused and think U.S. budget deficits are a U.S. problem from an over-valued dollar and decreased competitiveness. I think the United States lumps Korea together with Japan in the protectionism issue and that's unfair. Korea is easily 20 to 25 years behind Japan industrially and has a large debt. Japan's trade surplus with the U.S. is more than six times larger than Korea's. It's even more ironic that Korea has the same huge trade deficits with Japan as does the U.S. Most of the critical components in consumer electronics—VCRs, TVs, stereos and cars—come from Japan. A lot of Korean exports are Japan's exports dressed in *hanbok* (Korean traditional dress)."

General Manager George Cobbe has worked to combine the best of HP and Samsung during the joint venture's first years.



The Republic of Korea exists under the threat of war and fear of confrontation with the Communist bloc countries surrounding it. There has been much bloodshed in this century.

He draws further parallels between the two countries showing that Korea is certainly emulating Japan's success stories, but that the two are still far apart economically:

- When Japan hosted the Olympics in 1964, its per capita income was about $2,000. South Korea's per capita income in 1986 was $2,101, as preparations continued for the 1988 Olympics, even if the dollar value has been inflated.
- South Korea's population now is 41 million; Japan's is 120 million.
- HP's joint venture in Japan, Yokogawa-Hewlett-Packard, will be 25 years old this year and serves as a role model for SHP.

Sam says the surge for protectionism in the U.S. serves no one's interest, and would only result in higher prices and fewer choices for consumers.

SHP's five-year plan includes:

- Train and develop SHP people and implement the "SHP way," a blend of HP and Samsung's strong corporate philosophies. Personnel Manager Don Strom says Samsung is by nature a more formal company and part of that remains a part of SHP, where employees often use last names and titles to address each other. Mixing the best of both cultures is SHP's goal, he says. "It would be very bad to enforce a total 'HP way' here. I like to use the analogy that we've brought over a very small tree to plant in Korean soil. We want to graft onto it the ways of HP, Korea and Samsung so that it will grow into a large tree that includes a part of each. SHP's needs and expectations will then fit the Korean culture."
- Maintain and improve HP's relationship with the Samsung Group, delicate and unique in that Samsung is at once HP's joint-venture partner, strategic partner, supplier, major account and competitor.
- Broaden the customer base, targeting the large companies, especially the auto and telecommunication industries and the government of the Republic of Korea.
- Develop value-added channels.
- Become a leader in localization programs, including software-language localization, local manufacturing and producing entry-level HP 3000 computers and Vectra personal computers that speak Hangul.
- Build strategic relations with the government, associations, universities and the press to create a strong corpo-

Seoul mates

rate image.

- Participate in government's plans for computer-network projects.
- Strengthen SHP's International Procurement Operation under the direction of manufacturing and IPO manager Bob Flint, to complement HP's worldwide need for access to low-cost manufacturing resources.
- Build research and development and manufacturing value-added programs.
- Become a leader in selling integrated solutions, especially CIM.

SHP is shooting for growth rates of 30 to 35 percent during the 1990s. Far East Operations Managing Director Walt Sousa says he won't be surprised to see that happen. "The joint venture in Seoul has done exceptionally well since it started," says Walt. "It's been helped by many factors: recent low oil prices, low international interest rates, low inflation rates, the appreciation of the yen and the increasing support of the Korean government for foreign investments. But it's especially due to the aggressive efforts by all employees, including General Manager George Cobbe, despite the difficulties involved with starting up a joint venture."

The SHP factory at Anyang, a half-hour drive south of Seoul, had been rented and was operating when *Measure* visited in August 1986. The 15,000-square-foot factory has 23 employees, all technicians with two years of college.

The long-term goal for SHP's factory, says Bob Flint, is to offset imports and make products to sell in the local market. Projects under way already include production of a bilingual design terminal with a printer that speaks the Korean language, subcontracting products for U.S. divisions, producing HP 3000 kit assembly systems for the local market and power supplies for HP, and establishing Korea's International

The 10 Commandments for doing business in Korea

(These 10 Commandments were written by international business consultant Song-Hyon Jang, who represents a number of multi-national corporations in Korea. They are reprinted with permission.)

I. Thou shall always have a formal introduction.

It is most important and advisable to have a formal introduction to any person or company with whom you want to do business in Korea. Meeting the right people in a Korean company almost always depends on having the right introduction. Whenever possible, do obtain introductions rather than make contacts directly or just pop in on a Korean businessman. Use of the proper intermediary or go-between is desirable in your business meetings. If the person whom you wish to meet has respect for your intermediary, chances are he will have equal respect for you.

II. Thou shall not be without calling cards.

In Korea, every person has a distinctive place in an organizational hierarchy. No Korean businessman is comfortable until he knows what company the person he has just met is from or what his position in that company is. Therefore, the exchange of calling cards in Korea is very important as the exchange becomes a formal affair, and plays a very important role in introductions. Do have calling cards made prior to visiting Korean companies and have plenty of them ready at all occasions. After the exchange, you may place the cards on the table in front of you as you proceed with the meeting, using them for further reference.

III. Thou shall not assume everything you say in English is completely understood.

Remember that the real level of comprehension of many English-speaking Korean businessmen may not be as good as their courtesy implies. Their perception can be and often is surprisingly remote from what you think you are getting across to them. Cultural barriers are sometimes bigger than they may appear on the surface. Take pains to emphasize and repeat your key points for their understanding. Exchanging notes after meetings is very helpful for this purpose.

IV. Thou shall not push your position too hard.

Korean businessmen are believed internationally to be good negotiators. Be prepared to be patient, gentle but firm, and be as dignified as possible at a negotiating table. Do not try to push your position too hard. Sensitive issues and details may be skipped for future discussions, preferably by a go-between or by your staff, if available. Use of go-betweens can be very

Procurement Operation.

"The products we're manufacturing now are primarily for the local market, but we expect to generate substantial exports in the future," says Bob.

"Equally important will be the IPO efforts to access the local manufacturing resources to take advantage of low-cost, high-quality material to move through HP divisions around the world. With our local presence, we can teach quality along the way and control costs better. That's already happening with the HP Vectra and terminal monitors, which we've subcontracted to Samsung. We're also buying soft cases for instruments in Korea now."

Besides manufacturing, the other area the Republic of Korea government expects from multinational interests is an R&D presence for a transfer of technology, and Young Dae Kim manages SHP's efforts. He says the 22 employees are working on localization projects to adapt HP products to the Korean market, are beginning to develop proprietary product lines, and are looking for software opportunities.

SHP has a blueprint for success. The 25-century-old Confucian philosophy that hard work is virtuous has created a nation of people with much energy and enthusiasm for work. The January 19, 1987, *Business Week* states, "Korean managers work 70 to 80 hours a week, compared with 60 to 70 hours for Japanese and 50 for Americans." It's very common for SHP employees to work late into the evening, as well as Saturdays. They'll stay until business is finished—or at least until their supervisor leaves.

—*Jean Burke*

valuable, especially in delicate dealings where financial negotiations are involved. Allow sufficient time for your Korean counterparts. Their decisions are usually made collectively and often require more time than you may expect.

V. Thou shall build human relationships.

Legal documents are not as important as human rapport and relationships in Korea. Koreans do not like detailed contracts. They prefer and often insist that contracts be left flexible enough that adjustments can be made to fit changing circumstances. Therefore, it is very important to develop and foster good relationships based on mutual trust and benefit in addition to the business contract. To a Korean businessman, the important thing about a contract is not so much what is stipulated but rather who signed it and the fact that it exists.

VI. Thou shall not corner your partner, but praise him instead.

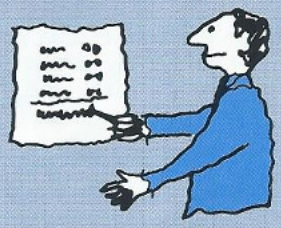
Koreans are extremely sensitive people. Never cause them to lose face by putting them in a difficult position. On the contrary, offer praise for their recently earned prosperity. Their state of good feelings or *kibun* can do wonders far beyond your expectations, and of course, you benefit from the good mood created.

VII. Thou shall entertain and be entertained.

Entertainment in Korea plays an important role in any business relationships. When offered, it should always be accepted, and in some way reciprocated in due time. Korean parties are often like drinking competitions. Your capacity of alcohol consumption may be one of the deciding factors that can lead to a successful business negotiation and relationship. The giving of small gifts is also an accepted practice and is recommended. Recently, golf has also become a more popular form of entertainment. Join the game as often as possible.

VIII. Thou shall try to know your counterpart.

Try to personalize all business relationships. An informal agreement with a trusted party can be considered far more secure than any written document. Try to find out as much about your Korean counterparts as possible: their family, status, hobbies, philosophies, birthdays, etc.



IX. Thou shall not apply Western logic.

Do not try to appeal too much to Western logic, but try instead to find "emotional common denominators." Emotional considerations and "face" are often far more important in dealing with Koreans.

X. Thou shall be aware and know what's going on.

Be aware of the fact that many changes are taking place at an unprecedented pace in current Korean society. With increasing affluence and the development of mass communication, the lifestyle of Korean consumers is changing rapidly. Changes in their fashions, diet habits, housing and mobility are so fast and profound that one has to take extreme care to have a proper grasp of the market. Accurate market research and other advice concerning future trends are prerequisites for success in this ever-changing land.

—*Song-Hyon Jang*

TOM UPTON

The plane truth about business travel

Someone, somewhere, started a myth years ago that business travel was glamorous and fun. Ha!

Remember your first business trip? The anticipation alone was enough to make you burst. Your co-workers were jealous—not because you got to go to Chicago, but because the boss let *you* escape.

Any notion that the trip would be fun disappeared the moment you set foot in the airport terminal. You found you were 26th in line behind a large woman carrying a yapping Chihuahua in a plastic box. The people at the ticket counter moved marginally faster than postal employees, but still slower than workers at the department of motor vehicles.

Although you were the sixth person to board the plane, the overhead bins were already crammed with briefcases, Hawaiian beach bags and overcoats. Your seatmate decided you should hear his life story and see all the dog-eared family pictures in his wallet. The projector broke during the in-flight movie, but that was OK because only one side of your headset worked anyway.

The flight attendant offered you a choice of fish, chicken or beef but added, "Don't worry if we run out of your first choice, because it all tastes the same anyway." When the food arrived, it bore little resemblance to anything you'd ever seen for sale in a grocery store.

You learned the hard way what millions before you had learned: Business travel is not glamorous or fun. In fact, business travel is only slightly more enjoyable than having a tooth pulled. And dentists, unlike airlines, are smart enough to use Novocain on their customers.

Why do we travel, and why is a company like HP willing to spend about $150 million a year on travel and entertainment expenses?

"In most instances, it's the best way to get the job done—to see a customer's site, to resolve a complex computer systems design problem or to recruit talented college students," says Ed Hogan, HP's newly named corporate travel manager.

But because business travel is such a big-ticket expense, it also comes under scrutiny, particularly when budgets are tightened. Most HP divisions cut travel expenses drastically in 1985 and 1986 as the company looked for ways to hold down its controllable costs. Travel was often limited to sales- or product-related trips.

Part of Ed's job today is to make sure the company gets the most bang for its travel buck. "A lot of people figure my job is to cut the amount of money the company spends on travel," says Ed. "I see my job as making sure the company gets the most value for the money it decides to spend each year — whether we're talking airline tickets, hotel rooms or car rentals."

Ed sees a time when, because of HP's volume purchases, the company will be able to negotiate its own special rates with certain airlines or hotel chains—lower than the "corporate rates" given to most any company.

If, for example, the company could guarantee that 70 percent of the HP people flying between San Francisco and Denver—"a city pair," in travel lingo—would use one particular airline, that airline would, in turn, offer a fare lower than any published fare. It would also come free of most of the advance purchase and cancellation restrictions that we, as consumers,

usually face.

But to arrange such deals, HP's travel manager needs data—lots of it. "Air fares by city pairs is so new and so sophisticated that few travel agencies can supply that information," says Ed, formerly a financial analyst for the Components Group.

That's why the first step in collecting that data has been to negotiate six regional contracts with some of the largest travel agencies in the U.S. who can supply reams of data to Ed. To date, HP has signed agreements with Lifeco Travel Services to serve California and Colorado manufacturing sites and Neely Sales offices; with Thomas Cook Travel for Massachusetts and Pennsylvania divisions and the Eastern Sales Region; and with IVI Travel for manufacturing sites in the Pacific Northwest. Similar arrangements are expected later this year for consolidating and managing travel arrangements in the Midwest and Southern sales regions, Canada, Europe and Asia.

The travel agencies selected for each region are now supplying reports to Corporate Travel that show HP's travel expenditures by airline, by dollar, by class of travel, by city pairs, by flight time of day, by hotel chains, by hotel site, by rental car firm, location and much more. There are even reports that tell which HP employees choose a more expensive airline over the least expensive flight—and why.

The company recently changed from American Express to Diners Club for company-sponsored credit cards issued to the most frequent HP travelers. The move, which has created a lot of headaches for HP travelers and for Ed, has also produced a major benefit.

"We've gotten lots of flak from HP people who've found that their Diners Club card isn't accepted as often as their American Express, particularly in U.S. restaurants," says Ed. "But the computer reports about our travel expenses that we now receive from Diners Club enhance the data we get from our travel agencies. These reports together should, in the long run, save the company tens of thousands of dollars."

Part of the savings should come from negotiations with hotel chains. Most are as anxious as airlines to corner a steady stream of customers. Business travelers fill 43 percent of North American hotel rooms on any given night.

Ed's department will soon issue an HP hotel directory that lists the most convenient places to stay near every HP site and in most major cities in the U.S. These hotels offer HP preferred rates. The directory also will list such special services as airport shuttles and conference rooms and other facilities.

The corporate travel department revised the company's travel policies and procedures to ask HP travelers to take advantage of low fares and discounts. "The main point of the policy is simple," says Ed. "An employee should have a good reason *not* to take the least expensive flight option or stay in a preferred hotel."

The revised document, which received the blessing of HP's Executive Committee in November, also recognizes that employees are entitled to keep the frequent-traveler bonuses they accumulate while on company business, but it precludes them from selecting flights or hotels on the basis of their membership in a particular company's promotional program.

HP is one of a growing number of companies that are paying increasing attention to their total travel program. Only a handful of firms in the U.S. are more sophisticated purchasers today—firms such as Du Pont, IBM, 3M and AT&T—because they started consolidating their travel purchases earlier than HP. "HP is in the second wave," says Ed, "but that still puts us in the top 10 percent in the country."

The major reason companies are becoming more aggressive in the travel world is that the travel industry itself is going through some major changes. Industry experts cite the 1978 deregulation of airline competition as the impetus for much of the change. Since 1978:

- The number of airlines in the U.S. increased from 43 to more than 180 today.
- The number of passengers doubled from 292 million to 415 million last year.

As air traffic has soared, so have its accompanying problems— such as delays. The 6.2 million flights in the U.S. last year put extra pressure on an already-busy air traffic control system.

(The number of controllers dropped from 16,300 to 14,700 when President Reagan fired striking members of the air traffic controllers union in 1981.)

New procedures have eased some of the congestion that controllers dealt with, but have angered frequent flyers in the process. In the past, airplanes stacked up in "holding patterns" above major airports, waiting for a spot to land. Now such delays, usually caused by bad weather or congestion at prime arrival and departure times, are taken in "gate holds" on the ground. That means the planes aren't allowed to leave until they can land promptly at their next stop. While this has lowered controllers' and pilots' blood pressure levels, it's raised them for passengers who miss connecting flights at hub airports like Denver and Chicago.

There's also a widespread mania for airline mergers that's creating a new kind of carrier—the megaline. Although there are more than 180 airlines in the U.S. today, the six largest airlines will control 75 to 80 percent of air travel by next year if all the proposed mergers are approved. These six huge carriers will probably then have the clout to start raising fares from today's bargain-basement levels, making corporate travel management an even more important function.

Industry analysts predict that air travel will continue to grow in the years ahead—current projections show 5 percent growth in each of the next four years. What that means for HP travelers is simple: longer lines, more delays and growing hassles.

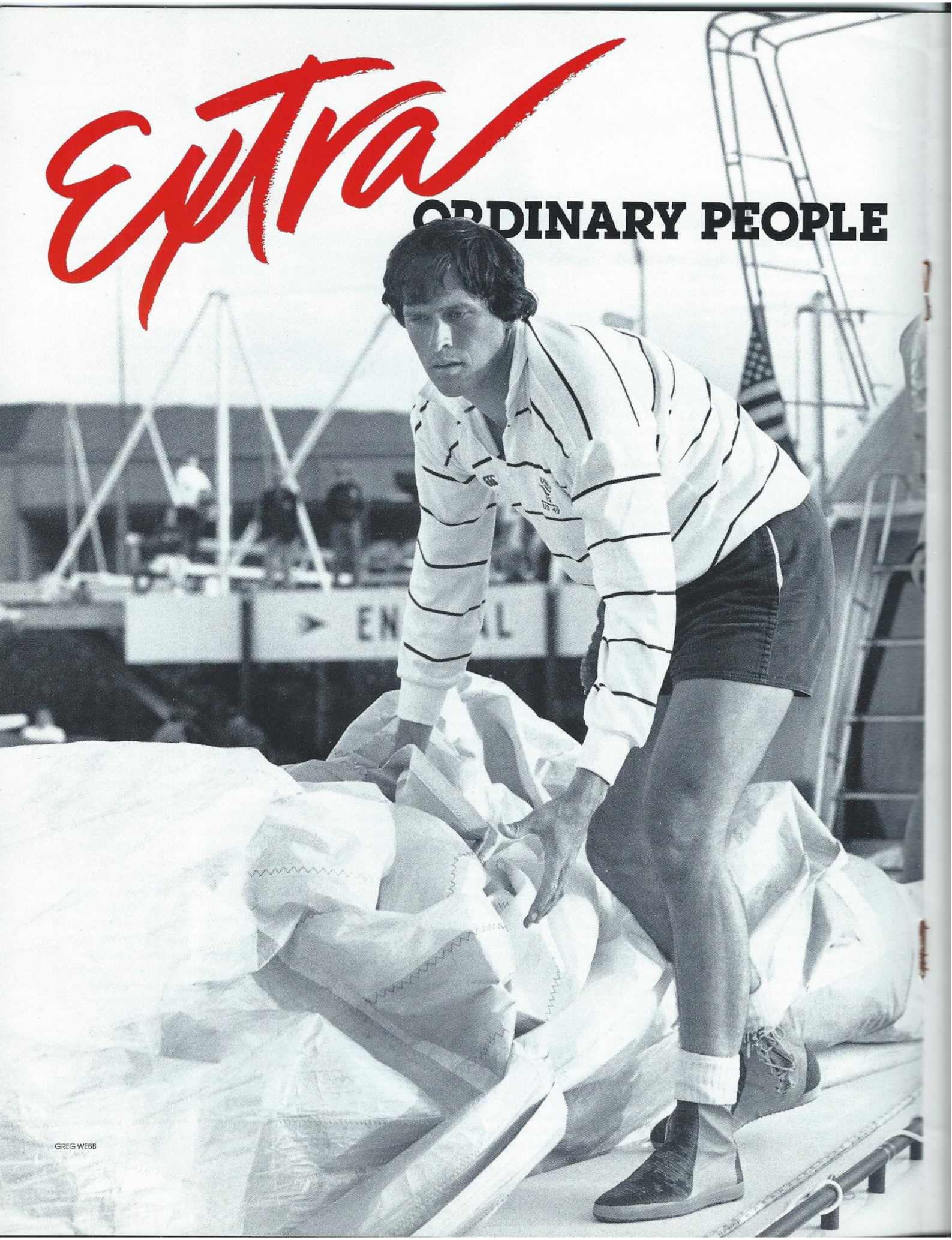
—Brad Whitworth

SAM FORENCICH, COURTESY OF THE PENINSULA TIMES-TRIBUNE

Just a normal day at San Francisco International Airport—congestion and delays are part of the joy of traveling.

Extra

ORDINARY PEOPLE



GREG WEBB

For Jeff Littfin, a California kid with sailing in his blood, the summer when he was 14 was a rite of passage into racing competition.

That summer he completed a sailing seminar given by San Francisco's St. Francis Yacht Club up in the Sacramento River delta. His folks rewarded him with a sleek little Laser—the teenaged sailor's equivalent to getting his own sports car.

That's when Jeff got serious about competitive racing—a passion which would lead one day to his crewing on the yacht *USA*, a semi-finalist in the 1987 America's Cup races in Australia. By the time he had a chance to live out such an impossible dream he was out of college, 25, and three years into a job at HP as a software engineer.

Now Jeff's back at his desk in the Information Technology Group's Software Language Lab in Cupertino after months away. He brings back memories of awesome physical effort, camaraderie with some of the best sailors in the world, and gear he got in trades with crews from other boats. (Most sought-after item: a Gucci jacket from the Italian boat.)

It all happened somewhat by chance, he says. "I just wanted to ride on a 12-meter yacht and I talked to some people. One thing led to another and I was invited to try out for the crew.

"I didn't intend to give up a year of my life for the America's Cup—it just worked out that way. And as I reflect on it, I wouldn't change a thing."

His love of sailing began when he was included as a five-year-old in outings on one of his family's boats. Jeff's dad sells yachts for a living and sailing is a routine part of life for all the Littfins. By the time he was eight, Jeff had his own El Toro, a sturdy, big-bottomed boat that won't tip over easily. He then raced Lasers during his high-school years until entering the land-locked University of California at Davis, where he played football instead.

After graduating with a degree in computer science and engineering, Jeff returned to the San Francisco Bay Area and joined HP. He promptly bought a lightweight J-24 and began racing it and crewing on other boats in local events. His watery path led back to the St. Francis Yacht Club, sponsor of a Big Boat Series in which Jeff sailed and the host club for the Golden Gate Challenge sponsoring the *USA*.

By the time Jeff heard scuttlebutt that crew members might be needed for the *USA*, he'd already built up some respectable racing credits, including taking part in two Congressional Cups in Long Beach, California. He took a chance and sent in a resumé with his sailing background.

As a plus, he mentioned his knowledge of computers, which would turn out to be significant for both the *USA* and Hewlett-Packard.

Jeff heard nothing for a long time. Then a chance conversation during a regatta led to an introduction to *USA* captain Tom Blackaller and a couple of sailing sessions as a test. Jeff, who is 6'2" and weighs 220 pounds, was offered a spot on the *USA* crew as a grinder. Handling the "coffee grinder" requires the strength of a weightlifter along with quick hand and arm reflexes to manipulate the winches during a sail change. He'd compete with three other grinders for two positions in a race.

"I didn't intend to give up a year of my life for this—it just worked out that way."

Should he go for it? Jeff talked over with his boss Dave Graham the pros and cons of putting his career on hold to join the *USA* crew—and work for $75 a week in order to maintain his amateur status. Emotionally, the only answer could be "yes," they agreed. This was a once-in-a-lifetime chance. HP would work out having a job for Jeff when he returned.

The 12-meter yacht competition is the ultimate in racing, Jeff explains. The multi-million-dollar yachts are considered a "development class" with endless design and sail adjustments encouraged within certain strict parameters. In simple terms, basic rules for the 12-meter class haven't changed since 1920: the length of the boat plus the sail area, divided by 2.37, must equal 12 meters. But every 12-meter must also have minimum deck weight and hull weight in pounds per square foot to keep total structural weight even among all the boats.

The fascination for designers is to balance these requirements—choosing the right combination of length and sail area to provide enough ballast to sail "right-side-up" in a breeze. For the 1987 America's Cup, the heavy seas and high winds of the race course in the Indian Ocean off Perth had to be taken into account.

In this year's race, computers came into their own as a tool for helping designers play with the possibilities for combining different hull shapes and sail configurations. And computers went right on board the yachts to collect actual racing data, which would then be analyzed by larger computers ashore.

A year ago April Jeff became a full-time crew member as the *USA* began practice runs in the Bay Area. "Somebody said the *USA* had more rock stars on it than any other boat," he says. "I was in some pretty incredible company." Many of the other crew members were veterans of 12-meter racing, with world championships and gold medals to their credit. He was on a steep learning curve, flabbergasted by the tactics, strategies and ways of using the boat that he observed.

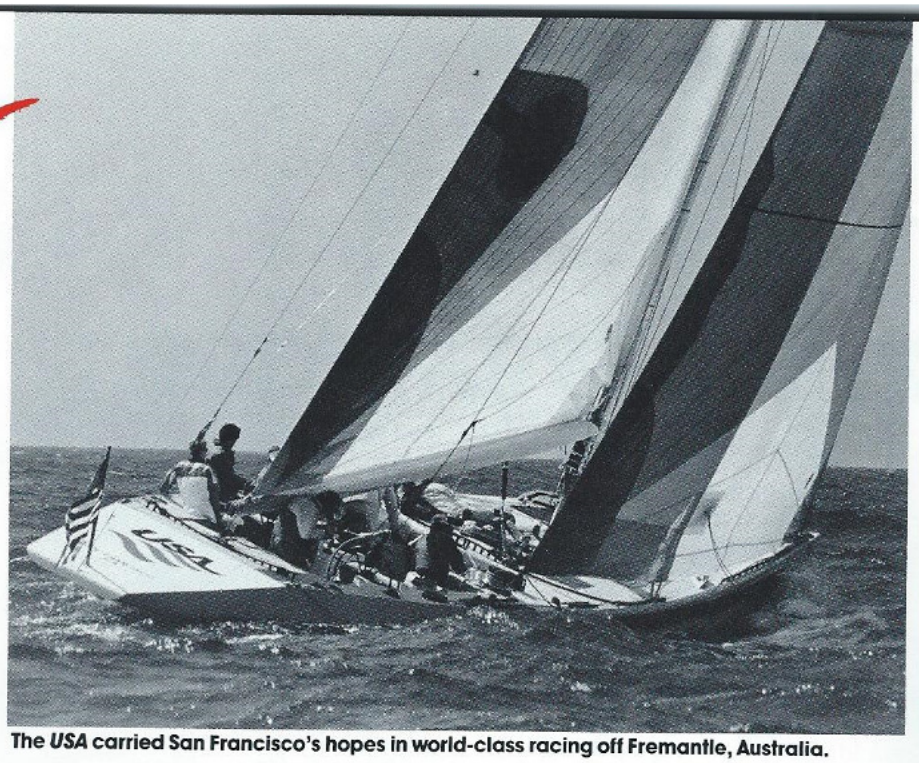
"But I was doing something completely different," he says. "It was both intense and relaxing at the same time."

He was also intrigued by the data-gathering side of the yacht's shakedown. In mid-August, a week before the *USA* would be shipped to Australia for the first round of races starting in September, Jeff called Dave Graham with a proposal. "I'd like to see us have HP equipment for its reliability and quality," he told Dave. "And I think we have a window here to make a substitution."

To support Jeff with the loan of HP computers, Dave phoned half a dozen HP entities for help. Within a few days, equipment on loan from Palo Alto, Cupertino, San Diego, Corvallis and Sunnyvale was assembled at the latter site by Don Roeder and Jeff Culley, who staged a successful demo for the syndicate. A Portable Plus personal computer would be linked to several Ockam instruments on board to collect data

HP software engineer Jeff Littfin had the adventure of a lifetime as a crew member on the 12-meter yacht *USA* in the America's Cup competition.

Extra ORDINARY PEOPLE



The *USA* carried San Francisco's hopes in world-class racing off Fremantle, Australia.

SOLUTIONS

during a race. The chief worry of the representative from the the Golden Gate Challenge was whether racing data could be easily transferred from the PC to the HP Vectra PC for number crunching and plotting operations after the race. A few seconds into the demo, pleasantly surprised, he asked, "Is that all there is to it?"

HP's offer of a loan was readily accepted. The yacht itself was already on the way to Fremantle by freighter so the HP equipment followed by air a week later. The critical new computer set-up had to be put in place with the first races just around the corner.

In Fremantle, Jeff lived in a crew house along with some 15 to 20 others. After several months of full-time sailing on San Francisco Bay he was back in the good condition required of a grinder, who must have plenty of wind and strength. He'd dropped some 15 pounds of weight in the beginning and then put it back on in muscle.

The *USA* was docked next to the French yacht, *French Kiss*. "We cheered when they won and they cheered for us," Jeff says. There wasn't much time for socializing other than an occasional barbecue with another boat crew—the *USA* crew had just one day off in their first two months in Fremantle. He missed HP France's party for all 10 syndicates using HP equipment, which brought together people from four U.S. rival syndicates, France, Italy, the U.K., Canada, New Zealand and one Australian defender.

On a racing day, the *USA* crew was up around 6 a.m. for an hour's workout of aerobics and stretches, followed by breakfast. Between 8 and 10 they got the boat ready, loading and rigging the 10 sails. Then the boat was put back into the water to be towed out to the race course for four hours of actual racing. Back at the dock somewhere around 5:30 to 7 p.m., the process was reversed. The boat was hauled out and the sails taken off and hung up to dry.

And since the crew members were workers as well as sailors, dinner might be followed by several more hours back at the boat, mending sails, wet-sanding the hull or fixing broken parts. To protect the unique design of the hull from competitors' view, a metal pen hid the yacht at all times that it was above the water line. (When docking, the yacht was maneuvered into the pen and a gate swung shut behind it.)

Jeff's own interest in the computer side of the operation meant additional night hours massaging and reviewing the data collected on board by electronic sensors and recorded on Portable Plus computers. At night the Vectra PC would evaluate data on boat speed, wind angle, wind velocity, angle of heel and rudder angle—sifting through and averaging it, looking at standard deviation, and drawing graphs for easier interpretation. All that information then went into a database for making changes to the boat for optimal configuration. The *USA*'s novel two-ruddered hull had been designed on a Cray super-computer.

> ***"Somebody said the USA had more rock stars on it than any other boat."***

As competition became more intense, Jeff was relieved of most of his computer activities to concentrate on sailing. He was tapped for about 90 percent of the races. World-class sailing can be punishing—one of the grinders on the *Stars & Stripes* was hurt while racing, and trainers kept all crew members taped and patched together.

The *USA* survived three cycles of round-robin races to make it into the semifinals in late December where it was defeated by the *Stars & Stripes*. That yacht, of course, went on to win the America's Cup trophy from Australia's *Kookaburra III*.

Television also came into its own in the 1987 America's Cup. The presence of cameras on board the yachts for the first time won a worldwide viewing audience for the races. Heavy media attention ashore, however, was just something to be endured. "The first time it's fun to be interviewed on TV, but then it gets old," Jeff says. "In my opinion, they're in the way."

What was great was his private cheering section. His proud folks, Dell and Betty Littfin, and his fiancée, Nancy Mace, came to Australia for the semifinals. "My parents could really identify with what I was doing," Jeff says.

With the elimination of the *USA* from contention, it was time to break operations, packing up the boat and the full machine-shop that had been brought along. But the secrecy surrounding the *USA*'s design hadn't ended—Jeff and the rest of the crew got up at 5:30 a.m. to get the boat ready for transporting. Three years from now the great 12-meter yachts and their indispensable computers will race again.

For Jeff Littfin, though, it's back to the regular world of HP and sailing his own J-24. He's already focusing on the J-24 nationals coming up soon on San Francisco Bay. A dream of taking part in world-class yacht racing has ended in high style—and there's a Gucci jacket in his closet to prove it.

—Betty Gerard

SAM FORENCICH, COURTESY OF THE PENINSULA TIMES-TRIBUNE

This man has trouble with the HP-15C calculator. He forgets to take it with him on business trips and then has to buy new ones. He owns five of them.

All in a day's work

It had been a long gray morning's wait for the stubborn fog to clear from the Eugene, Oregon, airport, and when we at last filed on board the flight to Chicago, I sighed in relief, ready to sit back and plunge into the thick paperback novel I pulled from my briefcase. I glanced perfunctorily at my seatmate, an elderly man in a black raincoat and Parisian beret. He looked vaguely familiar, but when one has traveled enough, ultimately everyone reminds you of someone you have met before.

Then I noticed it: the HP-15C on his lap, next to a yellow notepad bearing a column of figures.

"Excuse me," I said. "I don't mean to be rude, but I see you're using an HP calculator."

"Oh, yes," he replied.

"We design and manufacture those here in Corvallis."

"Ah! Well, it's quite good, you know. But I have a problem with them."

Here it comes, I thought: some fatal software bug or perverse reliability flaw.

"Yes, on these trips I keep forgetting mine—and then I have to buy a new one. I've got five so far!"

"We need more customers like you," I laughed, warming instantly to this old gentleman with the piercing eyes. "May I ask what you're using it for?"

"Oh, I'm indexing an X-ray diffraction pattern," he replied offhandedly. I couldn't believe my ears. "Good heavens! I've never before had the good fortune to be seated next to a fellow crystallographer on one of these long flights! Are you on the OSU faculty, or at the University of Oregon?"

"No, I'm from Palo Alto, but I came here for last night's lecture by Galbraith."

Suddenly, I realized who was seated next to me, and how pretentious—if not downright absurd—the "fellow crystallographer" remark had been. Of course! J. Kenneth Galbraith's presentation of the Ava Pauling Memorial Lecture! "Excuse me. . . are you Linus Pauling?"

"Yes, I am."

Here I was, sitting next to one of the founders of structural crystallography, the man whose textbooks and papers on structure determination and crystal chemistry had been my college bibles, the only winner of two individual Nobel prizes!

The next five hours were an enriching experience. Dr. Pauling discussed his current research into the recently discovered icosahedral metal alloy structures—at 85, he is still probing the edges of theoretical crystallography. The conversation then ranged over many topics: his childhood in the small town of Condon in central Oregon; his early studies of mineral structures; insights into the search for the structure of DNA; his two Nobel Prizes; and, of course, megavitamin therapy. Dr. Pauling was on his way to Toronto for a television interview on this last subject; he spends about one-third of his time traveling and lecturing. It was clear that, despite the controversy surrounding this issue, its chief advocate is certainly not suffering any harm from the practice.

How rapidly five hours can pass! All too soon we touched down at O'Hare airport and parted company. The experience, however, will remain vivid for many years.

And all because of an HP-15C.

—Paul Van Loan

(Paul Ross Van Loan is part of the HP R&D project team in Corvallis that developed the HP-15C. Due to an airline mixup with his reservation, he was flying first class when he met Linus Pauling, but says, "Linus is, of course, first class all the way.")

YOUR TURN

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

Missing the boat in China?

I found your story about China in the November-December *Measure* very interesting, especially the expression, "You can feel the change." That was my opinion when I visited there last summer. There is one more unmentioned problem in China. China has the world's greatest population. They have 1,037 million inhabitants compared to 239 million in the USA and 61 million in West Germany. And that's why the government of China chose to establish the one-child family. How about selling HP computers for controlling and registration of births?

FRIEDHELM BIRK
Bad Homburg, West Germany

I cannot find the words with which to express the sadness I felt after receiving the November-December *Measure*. I fail to see how transferring technology to Communist countries against which we are now spending more than $300 billion a year to defend ourselves is in the best interest of HP and the free world.

The bottom line is that when we transfer manufacturing knowledge and know-how to these countries, we are providing them with badly needed capital and revenue to help them retain their power and control over the people of those countries. Adding insult to injury, technology that was developed here to provide jobs for Americans is now being exported to Communist countries and along with that technology goes American jobs.

In your July-August issue, you made a big to-do about how flexible HP must be in the current competitive market. I wonder how many more American jobs are in the pipeline for exportation to Communist countries.

My heart goes out to people in the occupied countries. They want what all of us want—peace and freedom. They are not Communists. The true Communists can be found in those repressive governments that maintain their unwanted control through police-state tactics. By trading and granting low-interest loans to the governments of occupied countries, we are not helping the people of those countries. We are providing the tools and the means to help the Communist element remain in power. In essence, we who cherish freedom are providing the links to the chains that will keep others enslaved.

This was not an easy letter for me to write. I've seen work slow-downs at HP and fellow employees doing make-work projects. I could not help but wonder how many of them would be doing meaningful and constructive jobs if HP products were not being manufactured in Communist-occupied countries. Will a letter such as this result in my being terminated? I don't know. I am more concerned with the trend among large American companies that are being lured by the cheaper labor costs to continue exporting American jobs to Communist countries.

ROBERT J. MOUDRY
Santa Rosa, California

DAVE BARTRUFF

It was satisfying to read Jean Burke's cover story on HP's presence in the People's Republic of China. What impressed me most was her coverage of the differences in culture between the PRC and the U.S. Rather than describing them as "problems" to be overcome, she presented them—without judgment—simply as differences in the way things are done. From the article, it's clear that the CHP people are doing a good job of integrating the HP way within the Chinese culture. That is undoubtedly why CHP is doing so well.

JOE McCARTHY
Greeley, Colorado

Try NPR for commute relief

Compliments on your story about National Public Radio news, "Sound Investment." I discovered NPR news after I became a Hewlett-Packard employee. Since I have a 40-minute commute to the Roseville site, I listen to the radio quite a bit. Soon after I started making this commute, I happened to find NPR while scanning the dial and have been a loyal listener ever since. It's nice to know that the company I work for has the ability to recognize and reward the high caliber of news found on NPR.

I would also like to suggest that more divisions support their local NPR stations—perhaps by matching membership pledges made by HP employees.

RON ROWAN
Roseville, California

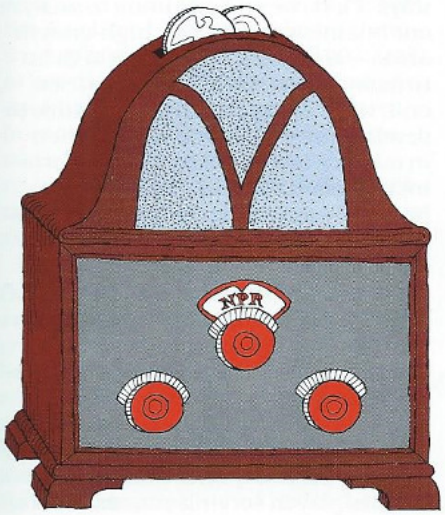
I really enjoyed "Sound Investment" in the November-December issue. National Public Radio has really come a long way and "All Things Considered" and "Morning Edition" are both superior news programs. Both my husband and I are avid listeners. Just recently we made a financial contribution to our local station (KSJN, St. Paul) and we were surprised and disappointed to find out that HP does not match employee contributions as many other companies do.

I think it's great the HP has made a $200,000 cash grant to NPR and I feel

proud when the credit is aired. However, local stations need listeners' financial support in order to purchase "All Things Considered" and "Morning Edition" from NPR.

HP could further help NPR by matching employee contributions. It would be great for employee rapport, too.

GALE SHORB
Shoreview, Minnesota



Shaking complacency

Bravo to Mike Cuevas and the other SPD street fighters. It was great to read about their motivational campaign in the November-December issue. Using a fun concept with skits and costumes is a great way to shake people out of complacency. Every HP employee must be aware of our competition and must make every effort to make HP competitive in all our marketplaces, and the SPD street-fighter campaign certainly brought that point home.

Motivating employees is one of the most important things any manager can do, and is an integral part of the HP way. Mike and his colleagues certainly *are* extraordinary.

LISA HARTMAN
Palo Alto, California

Are we losing it everywhere?

When I pick up something to read, I ask myself, "Do I expect to learn something from this that will help me or can I do anything about what I will read?" If the answer is "No," to each of these questions, I have no use in reading the material. Over the years, I have found *Measure* becoming less interesting to me.

In the last issue, the PRC article was much larger than I thought it should be. A small article mentioning some of what HP is doing in China would be adequate.

HP seems to be losing the "HP way." *Measure* also seems to be reflecting the same problem. There is a drying up of the spirit of HP. HP has meant to me a family environment and fun—both in what I have worked on and socially. As time goes on, I sense more of a faceless company that cares less about its people.

I would like to suggest more of a motivational slant to *Measure*. Engineering creativity is being stifled due to the emphasis on HP becoming "market-driven." We don't have donuts in the mornings, picnics at Little Basin or other fun social activities.

The bottom line is we seem to be losing it everywhere.

KEN HADOR
Palo Alto, California

Should HP avoid politics?

John Young appeared on NBC TV January 27 offering commentary on President Ronald Reagan's State of the Union address. I believe that any individual who is a recognized spokesperson for a non-political organization has a special obligation to refrain from publicly engaging in political analysis without explicit consensus endorsement from the people that are tacitly being represented by the speaker.

CHARLIE LISHERNESS
San Diego, California

One man's trash is another man's treasure

I recently viewed the videotape *Be Aware Before You Share*. In an increasingly competitive market, we cannot be too careful about guarding one of our most valuable assets: information.

I was therefore surprised to see such an expensive effort neglect the largest information leak most companies have: the trash can. "File 13," easily accessible, can contain more information in a single day than can be obtained otherwise in years.

Please publish this letter to remind everyone to "Consider the loss before you toss," or "The shredder would be better," or "Burn it before they learn it."

PAUL GOTTSCHALK
Austin, Texas

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 82,000 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.

LETTER FROM JOHN YOUNG

HP's president maps out the company's strategies for the year ahead.

BETTY GERARD

John Young talks with shareholders after the annual meeting in Cupertino, California.

At this past January's meeting of HP's general managers, we focused much of our discussion on two key goals for fiscal 1987—increasing HP's profitability and improving our market position in key businesses. Achieving these two simple yet fundamental business objectives will require the best efforts of everyone. I believe that if we address the following 10 issues effectively, we'll be well on our way toward meeting our goals.

Emphasize excellence in execution of our basic functions. In the past couple of years, we've focused much attention on reviewing our strategies and making sure we're organized and staffed to implement them effectively. This is the year to focus on execution of our basic business functions—marketing, R&D, manufacturing, field selling and administration. We need to make sure we understand customer and user needs and the markets we're competing in. We need to improve engineering productivity and reduce the time it takes to bring an HP product to market. We need to upgrade our manufacturing processes to build the best and most cost-competitive products possible. Chuck House of Corporate Engineering and Hal Edmondson of Corporate Manufacturing presented specific plans to achieve these goals at our engineering and manufacturing managers' meetings in December. Work to achieve those goals is under way.

We also need to make the most effective use of our sales and service people's time. With that goal in mind, we've introduced a major productivity program in the field—one that includes the use of portable computers by our field sales representatives. We're beginning to see encouraging results.

Finally, we need to administer our activities in a way that allows us to avoid bureaucracy, yet at the same time encourages the teamwork and information sharing necessary to succeed. We're operating in a very competitive environment, and there's no margin for error. There's no room for mediocrity, either.

Attain appropriate profitability from every major business. Many of the speakers at this year's management meeting described their goals of improving profit margins, and I liked the emphasis I heard. We've been through some difficult conditions in the past couple of years, but I don't want anyone to think that declining profit margins are inevitable or satisfactory. They're not. Of course, it's not reasonable to expect that every HP business will make the same level of profit contribution, since each operates in a different set of market conditions. During the year, Dean Morton and I will be reviewing each of our major businesses with its managers to formulate specific plans for mining its full profit potential.

Assess and respond to the growth environment. How fast will HP grow in the future? Will the electronics industry continue its tradition of very rapid expansion, or do the last two years indicate some change in our markets? Those are good questions, and some careful evaluation is required. However, one thing is certain: We cannot assume that growth will come as automatically—and effortlessly—as it has in the past. When telecommunications customers were replacing electro-mechanical devices with new electronics technologies—and when terminals or personal computers were less commonly used—our industry grew much faster than the customers it served. The market may not be saturated yet, but it's clearly maturing somewhat.

HP is responding to this issue in two ways. First, we're continuing to analyze our business to seek new high-growth areas—and there are enough of them to make life exciting for all of us. Second, we're doing everything possible to develop a strong and secure position in our current markets. Those efforts include consolidating our activities for maximum efficiency, providing new and better forms of service, stressing quality—in short, doing all that's required to build a loyal set of customers.

Use row-and-column concept to manage linkages. The previous issue of *Measure* had an explanation of rows and columns, which is a new way of visualizing the many roles different HP entities play in serving our customers. Some HP sites are internal suppliers—that is, they provide a product, technology or service that another part of the organization uses in some broader systems solution. Other organizations have lead responsibility for defining and meeting specific customer needs—more of a marketing or applications development role. The purpose of rows and columns is to help clarify those responsibilities and thus enable us to work more effectively as a team. I'm happy to report that we're making good progress.

Reap the rewards of the Spectrum program. In November we began the fiscal year by shipping our first Spectrum program computer—the HP 9000 Model 840, which runs our HP-UX operating system. This begins the pay-

10 Goals for 1987

1. **Emphasize excellence in execution of our basic functions.**
2. **Attain appropriate profitability from every major business.**
3. **Assess and respond to the growth environment.**
4. **Use row-and-column concept to manage linkages.**
5. **Reap the reward of the Spectrum program.**
6. **Organize and staff ourselves to be competitive.**
7. **Continue progress on making quality an HP advantage.**
8. **Maintain a worldwide perspective.**
9. **Make customer satisfaction everybody's business.**
10. **Nurture the satisfaction, growth and commitment of our people.**

off on HP's largest engineering investment ever. The delay we've experienced in tuning the MPE-XL operating system for the commercial system has been a disappointment, but it hasn't diminished our enthusiasm for the HP Precision Architecture. By the end of 1987, we'll have announced or shipped several more HP Precision Architecture machines. We're pleased with the feedback we've received from customers who've received the 840—many report the machine is operating faster than we'd specified. This year we'll also start to see the cost benefits of HP Precision Architecture's simplicity. It requires only one-fourth the number of parts of its predecessor models, and that reduced materials content will enable us to manufacture the machine at very competitive costs.

Organize and staff ourselves to be competitive. How many distinct HP entities should there be? How many levels of management? How can we ensure that each HP manager controls a wide enough sphere of activities to be both effective and accountable? At the same time, if we don't want managers to "build empires"—but instead, to create lean organizations and to work as a team with people who don't report to the same management— then what's the best way to determine pay ranges and performance? These are some of the questions we'll be addressing in the months ahead.

Continue progress on making quality an HP advantage. We've made a great deal of progress since we began our quality improvement efforts in 1979, and I'm convinced that we're on the forefront of what companies have done so far. But that's no reason to rest on our laurels. Our customers expect and deserve the highest quality from us. Our competitors are making their own quality advances. We have to accelerate HP's efforts and raise our own expectations. My goal this year is to drive total quality control (TQC) into every manager's daily routine as the best way of solving problems. When you improve the quality of your product or process, a lot of other things fall into place.

Maintain a worldwide perspective. This is an ongoing challenge, but one that becomes more important each year. Many of HP's growth markets are outside the U.S. We must ensure our access to these opportunities. In the months ahead we'll continue to develop the kinds of international relationships—joint ventures, alliances and cooperative efforts—that will enable us to participate successfully in international markets.

Sometimes this goal requires some trade-offs. For example, a business manager might prefer to do all his or her manufacturing in one location. Yet for the overall, long-term health of the company, it might be preferable to manufacture that same product at a number of international sites. We need everyone's commitment and cooperation to continuously assess and develop a truly worldwide presence that provides us all with a broader and stronger business base.

Make customer satisfaction everybody's business. Two to three years ago, we had an excellent, companywide training program on customer satisfaction. This year, we're going to give this emphasis further reinforcement with some ongoing training programs. Why? I've said it before but I'll say it again: Satisfying customers is the reason we're in business.

In addition to training for HP people, we're also working on ways to track customer satisfaction in a systematic way. Our new Customer Information Center, which is a single phone number for customer calls, is a good example. We intend to use the information we gather to provide all HP people with the insights they need to improve HP's ability to earn the respect, loyalty and enthusiasm of its customers.

Nurture the satisfaction, growth and commitment of our people. I list this issue last because it's the thought I want to leave you with. HP people are the true strength of this company. We have to do everything we can to make sure we all take pride in our jobs, see the potential to develop ourselves, and believe in HP's goals and directions. These are easy goals to articulate, but harder ones to achieve.

Here's where the importance of communication comes in. HP people have many questions about the changes they've seen in the past couple of years. They deserve answers—or at least an honest "We don't know," if that's the case. In the year ahead I hope every site and entity will take a good hard look at its communication efforts. Are there ways to identify what's on employees' minds? Do managers inform people of their business plans? Is the communication two-way? Is it regular? Is it timely? Is it honest? If the answer to any of those questions is "no," then we still have work to do if we're going to achieve our goal of nurturing our people, their growth and their commitment. If the answer is "yes," we can all succeed and have great satisfaction and enjoyment while doing it.

Extra MEASURE

BETTY GERARD

Ivan Otero, Gordon Gilstrap, Ida Ghirardi and Dwain Ison are part of an international team to devise a failure-tracking system.

A team on the fast track

The abbreviation for the new Defect Detection & Tracking System is DDT—but a better name might have been Fast Track. To get the job done in a hurry, an international project team of programmers and software engineers came together in Cupertino last April.

The Spectrum Manufacturing Council saw the need for a common failure-tracking system for all computer entities. Team members were tapped by their manufacturing managers for the project. Starting with just some floor space, they had to create a department, learn to work together, find out the needs of users, master a new programming language for the system— and provide a finished system by mid-November, 1986.

Everything was talked out and argued through ahead of time. Says project manager Gordon Gilstrap, who flies in each week from Fort Collins, Colorado, "You can't afford dead ends on a project this short."

On the team were Bernhard Sept (West Germany) Ida Ghirardi (France), Ivan Otero (Puerto Rico), Jim Benshoof (Colorado) and Californians Ray Connerley and Dwain Ison. Most of them will return to their own entities as local experts on the new system. Overall program manager is Jim Gruneisen, while Nancy Deakin is systems administrator.

By May DDT will be installed in the first five locations. It's now planned to give every HP manufacturing facility in the world the opportunity to use the new system to share information about part, process and design defects for products, assemblies, components and processes.

ANNUAL MEETING

Co-founder **Bill Hewlett** retired February 24 from the Hewlett-Packard board of directors, on which he served as vice chairman, and has become director emeritus.

Also retiring from the board was **Shozo Yokogawa**, president and chief executive officer of the Yokogawa-Hokushin Electric Corp. in Japan.

Shareholders approved three new directors: **Donald E. Peterson**, chairman of the board and chief operating officer of the Ford Motor Company; **Walter B. Hewlett** and **David Woodley Packard**, sons of the company co-founders and computer entrepreneurs.

A shareholder proposal that HP withdraw from South Africa was defeated by an 81 percent vote.

CHART CHANGES

In the Business Systems Sector, the name of the former Distributed Processing Business Unit has been changed to Commercial Systems BU. . . . **Klaus-Dieter Laidig** has added responsibility as general manager, Business Systems Sector Europe.

A new Colorado IC Division under **Mac Juneau** as general manager has been formed within the Circuit Technology Group. It comprises the former Fort Collins IC Division and the Loveland Tech Center (which are being consolidated) and the Colorado Springs Tech Center.

The Information Technology Group has formed a new High-Performance Systems Operation under **Peter Rosenbladt** as operations manager to develop a family of high-end systems using HP Precision Architecture. Activities of the former Information Hardware Operation have been reassigned.

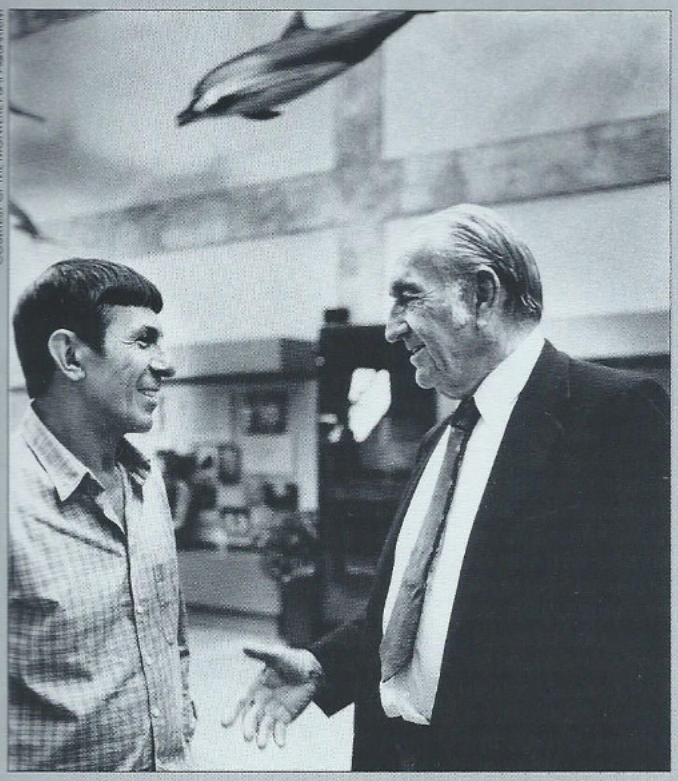
Peter Will is the new director of HP Labs' Manufacturing Research Center.

WORTH NOTING

A new Council on Competitiveness made up of business, labor and academic leaders will seek to create consensus in the private sector about what's needed to improve America's competitiveness. **John Young**, HP president and CEO, chairs the Council's executive committee.

HP is now one of 21 companies that are shareholders in the Microelectronics and Computer Technology Corporation in Austin, Texas. . . .HP is among 11 computer manufacturers supporting the X Window software system as a public windowing standard for the display of graphics information in a networked environment. . . . HP has acquired a minority equity position in Vestec Corporation in Houston, Texas, an analytical instrumentation firm. . . .HP has acquired Genentech's interest in HP Genenchem, a joint venture of the two companies.

COURTESY OF THE MONTEREY BAY AQUARIUM



Dave Packard gets a Vulcan handshake during the *Star Trek IV* filming at the Monterey Bay Aquarium.

A whale of a tale

Hewlett-Packard's high-tech "Trekkies" might have noticed something fishy about the recent feature film, *Star Trek IV*, especially if they've visited the Packard family's Monterey Bay Aquarium. Those who have been there know you can't see the San Francisco skyline across the bay from the aquarium no matter how clear a day it is, though that's how it's depicted in the movie, which places the aquarium in Sausalito.

The Monterey Bay Aquarium now is running an exhibit that explains this and other realities behind the illusions in the film. The exhibit features more than $250,000 in artifacts on loan from Paramount and Lucasfilm's Industrial Light and Magic.

Examples include miniature radio-operated whales made with a special "skin" of urethane, which took more than 100 hours to develop; a 16-foot "forced-perspective" model of the Golden Gate Bridge and, of course, phasers and communicators.

You can also learn how to fit whales into a five-foot-deep outdoor tidepool; what it took to "move" the aquarium from Monterey to the San Francisco area, and how to make a humpback whale that breaches and dives on cue.

Joining forces with Canon

On November 14, 1986, more than 10 million business and professional people read the news announcing the HP-Canon partnership. Four days later, the Canon Grand Fair exhibited the "Canon System 3000," a fully compatible and upgradable system to the HP 3000 family.

More than 30,000 people attended what turned out to be the largest single-vendor show in Japan. The audience included customers, dealers and Canon sales managers from all over.

Doug Chance, HP's senior vice president, Business Systems, was honored as

the key VIP guest throughout the opening. Doug was specially introduced to the audience prior to the demonstration of the Canon System 3000. The presidents from Canon, Inc. and Canon Sales joined Doug for the demonstration and hand-shaking ceremonies, pictured above.

They get a kick out of indoor soccer

Indoor soccer, explains HP's Mark Miloslavic, is not as sheltered as it sounds.

Granted, HP soccer enthusiasts who play during the winter months in an industrial indoor soccer league don't have to battle rain and mud.

But the green synthetic turf doesn't have the friction of real grass so the ball and game move much faster. Collisions can really hurt! And sliding on the tough turf can be like sliding on a scouring pad.

For some 30 HP people from the Cupertino, California, site who practice soccer together during lunch, the fast and emotional game of indoor soccer is worth the physical risks. Jorge Titenger played in the Youth World Cup for his native Peru and several players turned down pro soccer.

The indoor league plays in a building at the San Mateo County Exposition Center, using the practice field of a local pro soccer team. The eight-foot walls around the field are topped with fishnet to the ceiling. But since there's no netting overhead, you get two minutes in the penalty box if you kick the ball straight up and break a light.

LEE RODRIGUES

Geoff Ralston is the kicker during a game of indoor soccer.

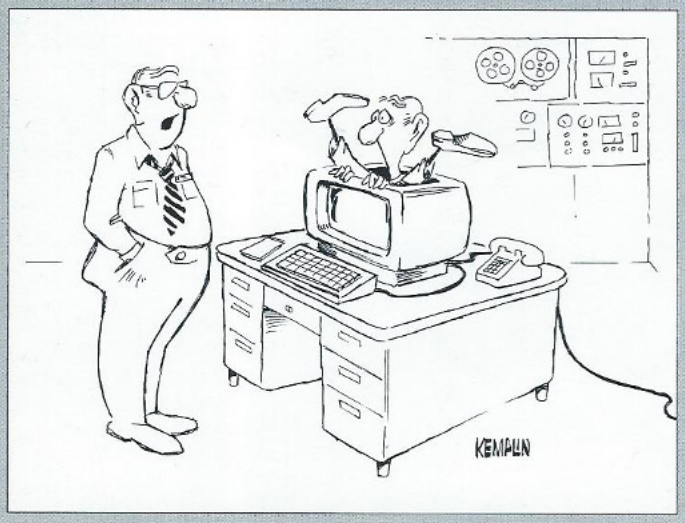
Extra MEASURE

Honors and play by the bay

In December, Hewlett-Packard brought its top 100 sales reps and district sales managers from around the world to Monterey, California, for three days of well-deserved rest and recognition. They're the first members of the President's Club, selected for their achievements in team-play, sales performance and customer satisfaction during the 1986 fiscal year.

The company's executive management and partners honored the 100 President's Club winners and partners with a black-tie award banquet at the Monterey Aquarium, sporting events and a presentation and discussion with David Packard.

It may provide a little motivation to sales reps and sales managers everywhere to know that the second annual President's Club event has already been scheduled for three days this December in sunny Palm Springs, California.



Think carefully now—exactly which buttons did you push?

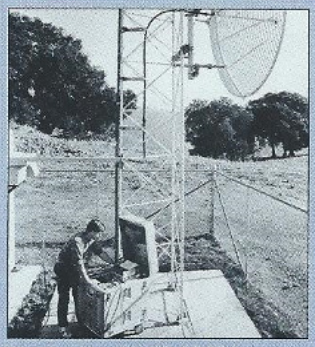
NEW PRODUCTS

The new HP DraftMaster family of three new plotters represents a major revision of the San Diego Division's drafting plotter line, replacing the 758X line. Greater intelligence lets a plotter think about what it will be doing before selecting and moving pens. Throughput is increased about 50 percent.

The HP LaserJet Series II printer from the Boise Division has 512 Kbytes of memory for such applications as desktop publishing. It's based on Canon's new LBP-SX printer engine. . . .The division has announced the HP LaserJet 2000 printer, the first high-volume (up to 20 pages per minute) laser printer targeted to multi-user needs.

The Boise Division also originated the HP ScanJet scanner, the company's first desktop-scanner. It is sold through the Greeley Division. The monochrome scanner can distinguish among 16 different levels of gray, providing high-quality images useful for desktop publishing.

All four divisions in the Information Networks Group contributed to a major introduction in February of 13 new products, four new networking solutions for specific business needs and integration of all four into a private wide-area network (WAN) based on the international X.25 standard. Colorado Telecom Division was also represented.



Phil Lorch with HP 8328A.

With the introduction of the transportable HP 8328A transmission-line test system, the Network Measurements Division is selling for the first time into the service part of the marketplace. The system is designed for testing and troubleshooting runs of coaxial cable and waveguide, and can determine the nature and location of faults on the line.

The Corvallis Workstation Operation offers a new X Window software package, HP 82320A, for the HP 9000 Series 300 technical computers. Application writers can easily create pop-up menus, panels, message boxes and field editors. . . .The Böblingen Instrument Division's HP 8180S IC design-verification system makes it possible to use the same data to design and test a chip.

Stanford Park Division's HP 8780A vector signal generator is the first off-the-shelf instrument that can generate wideband FM and digital modulations required to test many of today's advanced RF/microwave systems.

HEWLETT-PACKARD CORPORATE ORGANIZATION □ FEBRUARY 1987

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PARTING SHOT

VERN FISHER

Why is this man smiling?

Bill Hewlett, 73, insists his retirement in February as a director and vice-chairman of the Hewlett-Packard board is a "non-event." The media, along with his thousands of friends and admirers around the company, beg to differ. It's more like the end of an era.

News of his retirement attracted national attention and included stories featuring Bill's career and achievements, his unpretentious business style, and the company that he and David Packard created in 1939. He's part of what's become an American business legend.

HP people remember that Bill, ever the engineer, turned up at display booths and on the manufacturing floor to ask detailed questions about HP gear. Just recently, he dropped in to visit the Waltham plant because he was in the neighborhood—giving the commencement speech at his graduate school, MIT. And there were remembrances of Bill's unerring instinct for treating people with dignity and for operating an ethical business.

When asked at his retirement press conference which achievement meant the most to him, Bill said it was Hewlett-Packard's management style. In a career that includes the National Medal of Science, topping a long list of professional and civic honors and nine honorary doctorates, that's saying something.

"I'm really proud that we created a way to work with employees and let them share in the profits while still keeping control," he said. Of course, when things get tough, it's sometimes necessary to decree certain changes. He understands why people don't like that. "But they realize when the ship's in the middle of a storm, the captain better be up there."

What will Bill do now? He started his retirement with three weeks of skiing in Sun Valley, Idaho, and plans to continue his lifelong enjoyment of nature and the outdoors. "Life won't be that different than it was before. I'll come into the office one or two days a week. I do very little company business these days. I'll talk to people if they want to talk to me. I'll be around as director emeritus and things will go on as before."

—Betty Gerard

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