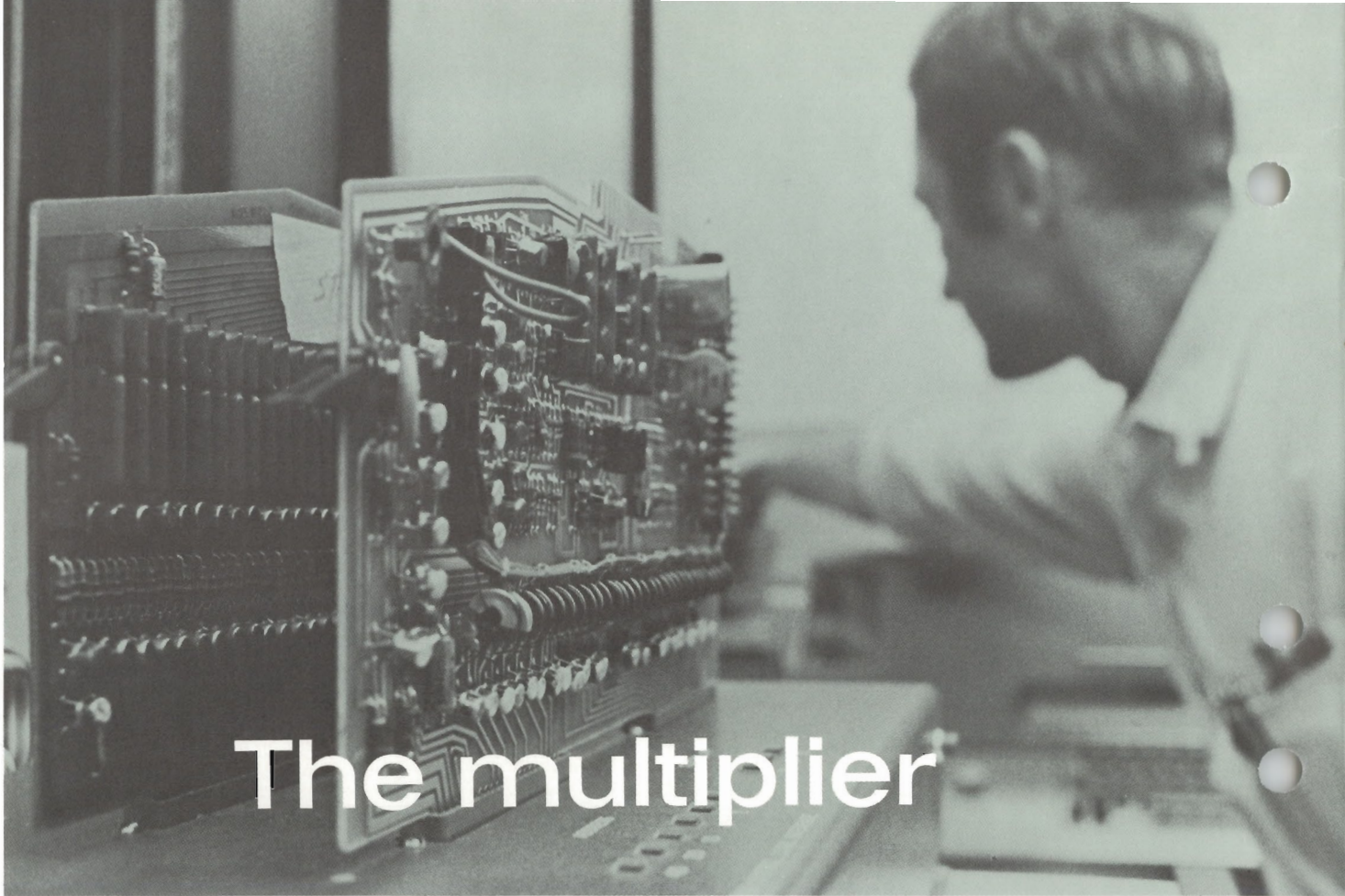


# Measure

For the men and women of Hewlett-Packard/MARCH 1970



# The multiplier

***Computerized test systems are much more than  
a fancy means of doing complex work:  
in the hands of HP people they are permitting  
projects not economically feasible before,  
creating new jobs, and helping production people  
do a better job of quality control.***

How should you react if your next new neighbor on the production line happens to be a computer, or rather a computerized test system? Should you regard it as an infallible mechanism that relieves the individual of responsibility for quality? Are you possibly dealing with a cybernetic cousin of "Hal," the computer that went mad in Arthur Clarke's "2001" space odyssey, biting the hand that oiled it? Or should you look on it as a friend, and call it "Sam" or "Sue," depending on the gender that comes to mind?

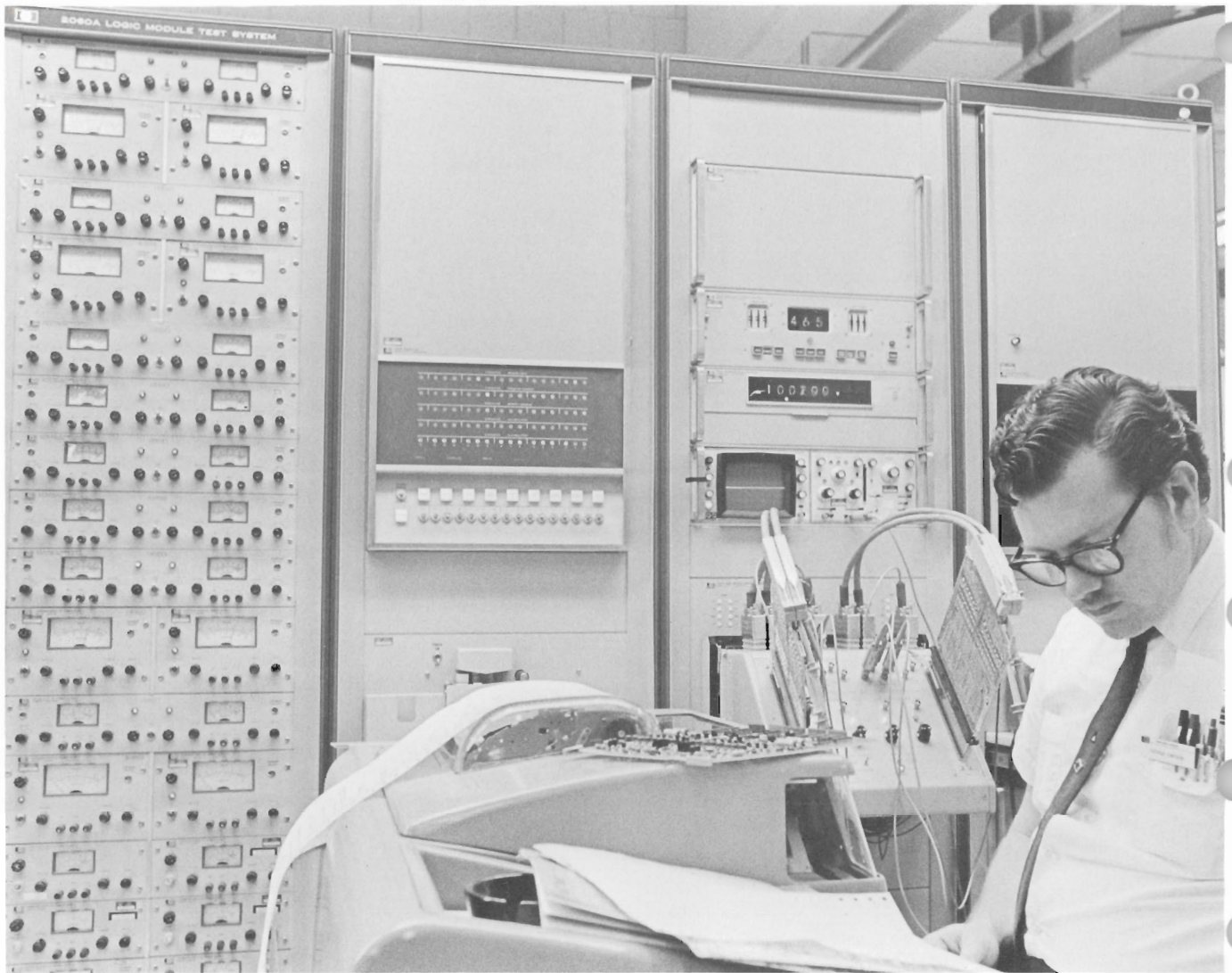
These questions are no longer just theoretical around Hewlett-Packard. More and more computerized test systems are being installed in the production processes, particularly those involving the more complex, high-density type of instruments and components—calculators, computers, circuit boards, integrated circuits, and micro-circuits as well as various passive devices.

Just what has been the HP experience with the new test systems? Reports from the divisions are very positive and reassuring: Computerized testing is creating new opportunities for the company, new opportunities for the individual, and a much closer relationship between the individual and standards of quality. The following photo reports are offered in evidence:

The multiple image photograph below of the printed circuit-board loading area at Loveland Division symbolizes the multiplying effect of computerized testing on the production of HP calculators. At left, test technician Bill Bowman uses network analyzer to check out a loaded board whose complexity is obvious (note also the cover photo of similar circuitry). Ordinary manual testing would have required an infinite and prohibitive amount of time," according to Harold Briggs, calculator production engineering manager. "Bill can test this board in just a few seconds. The system then tells him by teletype whether the board is OK or not. If it needs attention it is sent back up the line for detailed analysis and repair. Meanwhile, the information regarding failures is fed into a data bank from which reports are available to all production people on a week-to-week basis." Briggs says that people take a real interest in these reports—because they have pride in their work and want to know how to improve it if necessary. Bowman and the other technicians manning the two computer test stations learned their skills, including some programming capability, on the job.



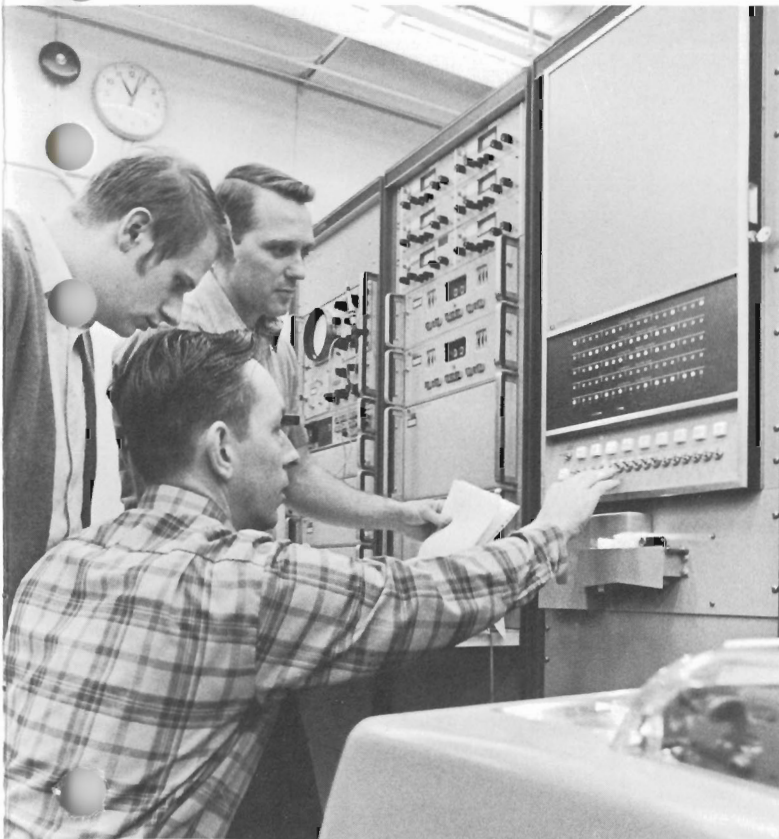
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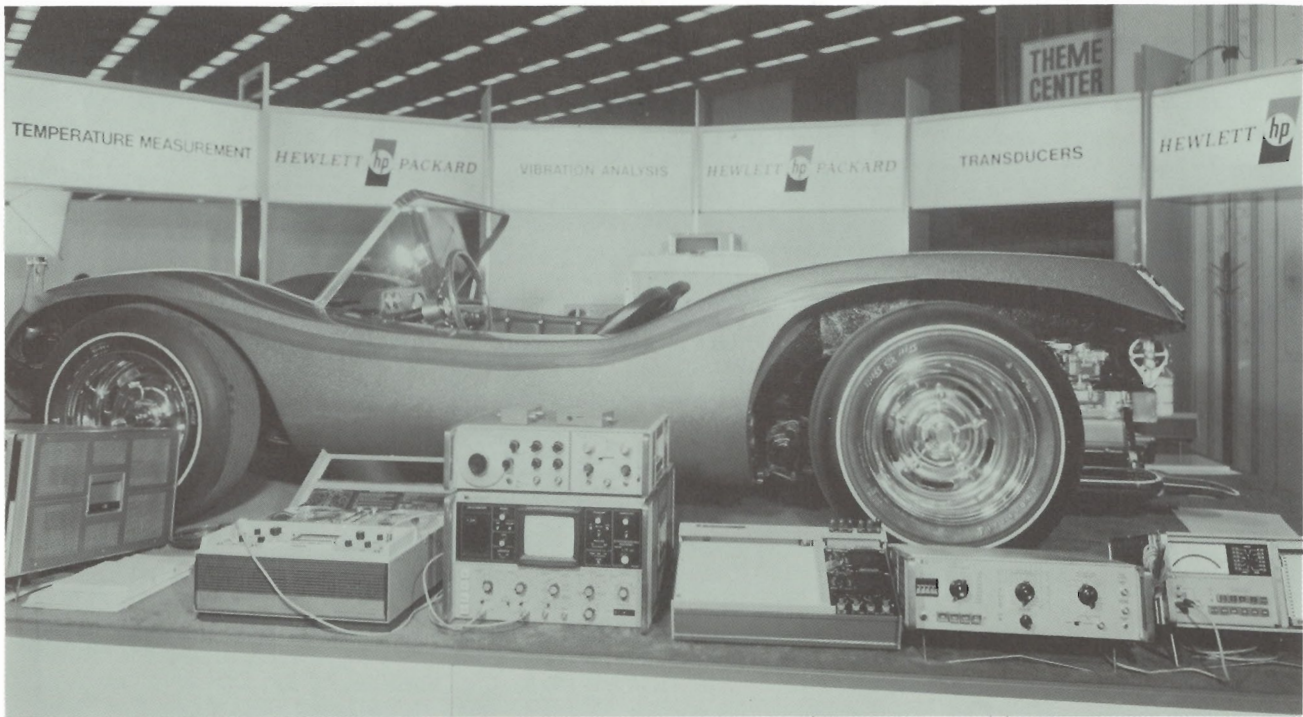
*More than 100,000 decisions a second are made by this HP 2060A logic module test system in determining whether a printed circuit off the Cupertino Division production line matches up in performance to a similar circuit known to be functioning properly. The comparator system, operated here by lead technician George Simpson, not only tells if a circuit is sick but also what its specific ailment is. The result is that Cupertino now can test and repair as many as 8,000 very complex boards each month—an impractical task with this volume by methods formerly available.*

**the multiplier**

*How do you test something you can barely see, such as an integrated circuit? The IC wafer Marsha Dennis of Santa Clara Division is handling has hundreds of them. Each needs individual testing. At present, all chips at Santa Clara are tested on automatic circuit testers. These will soon be joined by a computerized system which will increase the speed of testing and raise confidence in the final product. Although some jobs are necessarily affected by the introduction of computerized systems, retraining and expanding job opportunities invariably result. Even more dramatic, the whole new microcircuit program undertaken by George Bodway's team in Microwave Division was made possible by knowledge that computerized testing would be available. Today the microcircuit team is among the faster growing segments of the company's business.*



*Testing of conventional electronic instruments—faster and with greater reliability—is the goal of this system under development at Loveland Division. In addition, the system—still very much under wraps—is expected to meet definite customer needs outside Loveland and the company. Here, Art Minich (left) and fellow engineers at Loveland check a program. Not all instruments really lend themselves to computerized testing. But it becomes increasingly easier and more economical once hardware has been installed and software programming experience is gained.*



## A new kind of show

What in the world has come over Hewlett-Packard? There it was, exhibiting a slick looking blue dune buggy in Detroit's Cobo Hall, site of the 1970 Exposition by the Society of Automotive Engineers.

No, HP has not gone into the dune buggy business. But it has found itself sufficiently involved in the automotive engineering field that it now makes sense to tailor an exhibit to that industry's biggest annual show. As the photographs show, a very representative range of products and systems from almost all HP divisions were demonstrated at the show. The leased dune buggy in the center enabled the HP staffers manning the booth to demonstrate the products in relation to their customers' interests and applications.

While significant in itself, the SAE show was perhaps more noteworthy for HP as a prototype of other shows in the future. Increasingly, the company's traditional electronic products are being used by customers outside the electronics industry as they switch from mechanical measurement to the convenience and accuracy of electronic measurements.

Such customers are not unsophisticated in the use of electronic instrumentation. Far from it, according to the HP observers. But they are much less interested in the purely electronics aspects than in how it will help in their work.

So, no doubt there will be more such shows with a non-electronics central theme and more interesting exhibits as HP products find acceptance in a diversity of new markets.



The thrill of winter sports is well expressed by this trio of Medical Electronics Division tobogganers, part of a large contingent of Waltham people to tackle the slopes at New Hampshire's Wildcat Mountain.

The photographer failed to note whether Bob Erb (at the rear) along with Carol and Bob Marino came in for a soft landing; their expressions indicate several possibilities.



**For thousands of HP people,  
winter's ice and snow create a sporting challenge  
and an exhilarating change of pace . . .**

Just a generation or so ago, winter was a general disaster, a season of distress. Poets hailed the day when "winter's rains and ruins are over." Today, however, bumper strips exhort everyone to "THINK SNOW" and "STAMP OUT SUMMER!" The winter sports bug has obviously infected large segments of the population.

An informal survey showed this to be particularly true of various HP locations. Ski racks by the score were spotted at plant parking lots in the Eastern U.S., Colorado, and Northern California. Direct inquiries turned up a wide range of winter activities. International operations also acknowledged a strong interest in unusual winter athletics—with the notable exception of the Geneva office where apparently not one enthusiast could be found for any snow sport other than conventional downhill skiing. One might have expected this of San Diego Division—the "Surf & Turf Division." But Switzerland—holy sitzmark!

*(continued)*

What more classic setting for ice skating than the canals of the Netherlands? Hans Vinkenoog of the HP Benelux office sent this photograph along with the notation that "Skating is very popular here. Because of the flatness of the country, people make long trips in wintertime. The greatest national skating event is a contest among the eleven cities of Friesland, one of the northern Dutch provinces. The stretch leads along frozen canals, lakes, rivers and ditches and the length is over 120 miles. The best recommendation a young Frisian can get in his life is winning this 'Elfstedentoch.'" Though Hans didn't say so, the picture presumably includes some HP people or their families. Oh well, it's a great scene.



## snow ball



*Ski touring, by necessity one of the more ancient forms of snowmanship, is literally making large strides as a sport in the 1970s as people reach further afield for escape—particularly from those awful weekend ski-lift lines. Here Loveland's Nancy Sorensen applies hiking wax to son Jeff's skis during a jaunt in mountains that are just minutes away from home.*

*The photograph reproduced here doesn't do justice to the thrills that Jim Peters, Avondale Division R&D engineer, must feel as he and number 47 go through the paces of ice racing on Pennsylvania's Lake Ariel: "Accelerate to the verge of wheelspin on the straights coming into the corners between 60–70 mph. Brake as hard as possible and drift the rear of the car outwards and 'lean' in on the snow bank. On a properly executed turn a shower of snow spews up; which incidentally also prevents the closely following competitors from seeing anything. In essence, you should be on the border line of losing complete control of your vehicle throughout the entire race. Upon conclusion of this competition, the 25 drivers consult their reliable body-and-fender man for an estimate."*



*High in the Rockies, Elmer de Backer and cohorts from the CRT tool room at Colorado Springs Division bore through thick lake ice for some very good fishing. Their catch includes kokanee salmon and rainbow trout up to 18 inches taken from lake bottom after a lively struggle. The scene here is on "Eleven-mile Lake" at 9,600 feet elevation. The only safe way to reach such locations in winter is with an expedition of several front-wheel drive vehicles that can help each other. The cold is intense, but the trip is worth it if only because of the great fish feed that follows.*



For a man of his special enthusiasms, Alan Henshaw, mechanical engineer at Colorado Springs Division, has settled in the right place. There he coaches speed skating at the Broadmoor Club, teaches rock climbing, has climbed most of the higher peaks in the Rockies, skis avidly, and coaches the HP soccer team. "It helps keep me out of trouble," he says. Born in British India, Henshaw was raised in Scotland where he competed in the very popular speed skating leagues that abound in the United Kingdom. The photograph here was taken at an indoor meeting in Birmingham. Alan made it as far as the Olympic trials in 1950. He migrated to Canada in 1957, then to the U.S. and HP in 1960. At the Springs he has won club and state championships in 440 and mile races.

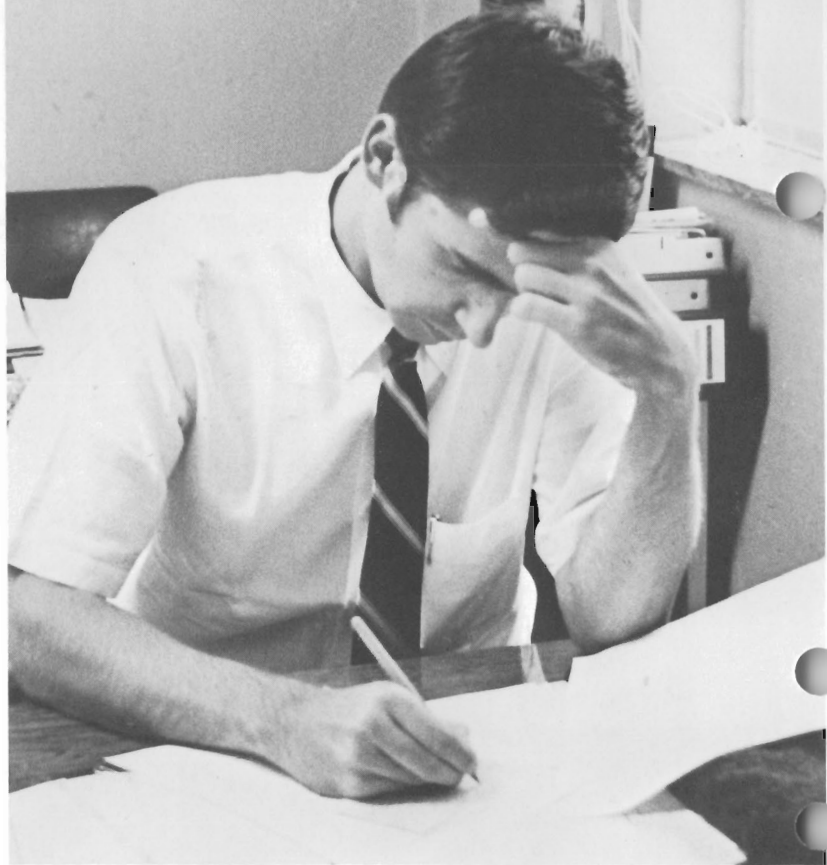


Motorcycle riding is not strictly a winter sport. But what does a young Scotsman do who doesn't play soccer, rugby, golf, curl or ski? He might find motorcycle trials a most interesting sport, as Archie Davis of the South Queensferry printed circuit area does here. It obviously gets him through the puddles and swift streams that are winter's chief contribution to the west coast of Scotland. The object of trials is to get from one place to another without touching feet to ground, stalling or falling off.



Skyline Ski Patrollers Ralph Eschenbach, left, of Microwave Division, and Rolf Fromm of Neely Palo Alto office, sharpen their first-aid mountain rescue skills with a willing victim. Other known Skyline HP members include Santa Clara's Joe Bourdet, and Neely field engineer Larry Amsden (who took this photo). Actually, between California and Colorado there is quite an HP clan of patrol members, a number of weekend ski instructors —and any number of victims, willing and otherwise.

# Latin America:



## A businessman's log

A cynical celebrity is said to have told reporters that he didn't care what they wrote about him so long as they used his name prominently—and spelled it correctly. Some of the 26 Latin American countries might be excused if they were to adopt this attitude. Gaining the attention of a preoccupied world and becoming recognized as having some significant influence in the affairs of the globe have not come easy to America south of the Rio Grande. A recent issue of FORTUNE magazine, for example, devoted much of its contents to the world economy but did not once mention Latin America or any of its members. A listing of the top 200 industrial companies outside the U.S. yielded four from Latin America, of which three are government operated petroleum firms. So what's really going on in this huge land mass and its 250 million people?

Recent reports, including the Rockefeller Report, suggest that the hemisphere is in danger of becoming an arena rather than a forum in the settlement of its many classic problems: poverty versus privilege, impacted population versus vast unused spaces, economic aspirations versus limited capital, change versus tradition, freedom versus authority.

Yet there are good signs for hope: the rapid growth of an economic middle class that is demanding orderly reform; an increasing awareness among institutions that

they must serve the needs of people; visionary projects such as the Hudson Institute's proposal that would transform the Amazon wilderness into a giant eco-center of hydroelectric power production, shipping and industry—and—hopefully—more sympathetic understanding by the U.S. of the ways it can practice partnership without paternalism.

Those are some of the main currents that swirl about and above any discussion of doing business in Latin America today. Businessmen learn to live with them. As one HP Intercontinental Operations executive put it: "If we panicked every time a government got tossed out of office or at every monetary crisis we would have left long ago." As it is, Hewlett-Packard is very much a part of the Latin American scene, with offices in five key cities and representatives in the other important centers.

Recently, an HP international marketing administrator—Neil Carlson—made a special trip to many of these offices. His objective was to present and discuss the new Intercontinental Operations organization under which they would thereafter operate, and to introduce himself in his new role as area manager for Latin America. In the interest of seeing these people, places and offices more or less as he saw them, MEASURE asked Neil to record a businessman's impressions of his journey:



Latin American countries because governments like to put their money into socially oriented projects such as hospitals and clinics.

urban areas, development rapidly tapers off once you leave Caracas. The professional practice of electronics is fairly advanced so we are looking mainly at normal growth in that market.



**Mexico City:** Flight from San Francisco uneventful. Always thankful for that. Spent Friday and Saturday visiting with Erick Montoya and the other HP staffers. It's now at 13 people including the new position of sales manager, operating out of a large leased apartment. Also met Tom Brietbart from our Palo Alto office and Rick Balda from Waltham who were here for the 25th Mexican Cardiography Conference. Medical market in Mexico looks tremendous. We have plenty of competitors, but Sanborn name is very strong here. The big trend is to intensive care units. Same is true in other

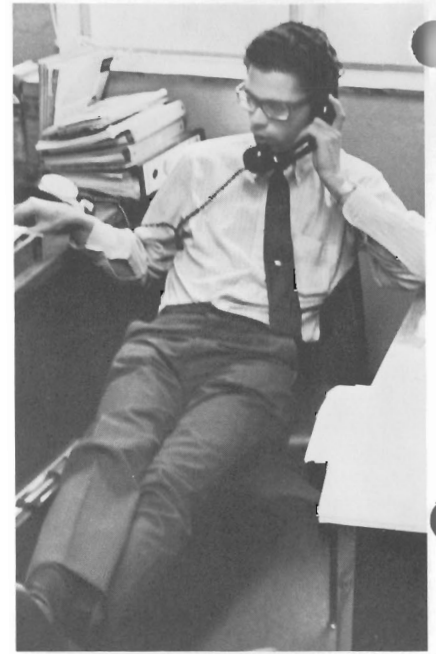


**Caracas:** Sunday flight to the Venezuelan capital. A bustling commercial center and expensive by hemisphere standards. Office is a house. Met with Mauricio Groshaus, the manager, and his staff—including Coral Sanchez, believed to be HP's only field sales woman. Coral sells analytical products. She's a native of Caracas, but was trained in the University of Michigan. Also met Mauricio's secretary, Carole Thompson, a U.S. girl living in Venezuela. As in so many of the continent's



**Rio de Janeiro:** Branch manager Setsuo Kida suggested I take a break after tight schedule and all-night flight. Brazilian beer is the best in the world, particularly when you can enjoy it sitting on the beach at Ipanema, watching the girls go by (yes—I'm single). Meet very few American tourists here, but strong European influence. Marvelous steak dinner plus wine for \$2. The various races here seem to

*(continued)*



## latin american log

live and mix in very good harmony—Indians, Negroes, Europeans, and Japanese.



**Sao Paulo:** Largest of the South American cities (more than 5 million people). Carlos Barbosa, manager of Hewlett-Packard do Brasil greeted me with news that they had just made an interesting data-products sale. He feels the data products and calculator markets in Latin America represent strong potential HP growth. Our existing offices and organization offer real competitive advantage. Customers know we are in business for the long haul and won't fold up when things level off. Noted curious fact probably typical

of Latin America: it is much easier to call New York or Palo Alto than neighboring Rio. This is because Brazil has installed an overseas satellite communications system. But it is planning to improve local communications and has purchased much HP gear in tuning up for new microwave systems.



**Buenos Aires:** Spent four days in Argentina. Although this country is four times the size of Texas, industrialization is quite concentrated, mostly between Buenos Aires and Rosario. Our one HP office is therefore sufficient. But, as in other Latin American markets, special arrangements have been made to represent the company in

various distant centers. Manager Luis Brennan, HP vice president Bill Little (there on his annual swing through Latin America) and I discussed the role of universities here. They are good customers. Some are better equipped than our U.S. schools. Most teach electrical engineering of the power production kind. However, job opportunities have not kept pace with education. Consequently, many Argentine engineers migrate north for opportunities—including HP offices.



**Santiago:** Exciting view of the Andes on flight from Buenos Aires to meet distributor people in Chile. Learned height of Aconcagua, highest



peak in Americas, is disputed. Argentina says 22,834 feet, while Chile says it's 23,081 feet (could the Pacific be lower than the Atlantic?).

**Lima:** Weekend meetings with our distributors in Peru. Noted that in HP people and distributors represented emerging middle class, one with a strong awareness of need for social change.

York, or LA to San Francisco. But others may require two-day wait between flights. Though Quito is almost right on the equator it's up in the highlands. Cool fog shrouds the area. Like so much of the continent, Ecuador has tremendous mineral resources that are still relatively undeveloped. But it leads the whole world in banana exports. Noted that in these agricultural regions there's lots of research done on insecticides and fertilizers—plenty of room for improving the use of HP's line of analytical products.

**Bogota:** Last leg of mission. Visited our Columbian distributors. As elsewhere, found general agreement that our new Intercontinental Operations should be able to give better support than the two previous smaller regions—more organizational services and more leverage in getting things done. Return via Miami, with the feeling that we have a very strong organization of people who believe in HP. They feel that what they and HP are doing will benefit their homelands, a very important feeling at this time.



**Quito:** Early morning flight to Ecuador because Quito airport closes 11 a.m. due to repairs. Flying and flight schedules generally good throughout whole South American trip. Some places it's as busy as Boston to New



**Palo Alto** — An important addition to the HP benefits program has been announced. The Board of Directors had approved raising the maximum amount that eligible employees may contribute to the purchase of HP stock under the stock-purchase plan. The new limit permits contributions of up to 10 percent of base pay. Previously, the limit was 6 percent. The company will continue to contribute 25 percent of the total purchase price of the stock purchased under the plan.

The change will be effective March 1. Participants wishing to take advantage of the increase must fill out a new Plan Application card. Others wishing to start their participation must also fill out the card and send it to the payroll department. Employees with twelve continuous months of full-time service are eligible for participation (See Bill Hewlett's letter on page 15 for his background comments on the program).

**Palo Alto** — The company is establishing a series of regional computer data centers throughout the United States and various overseas locations. Staffed by computer specialists and containing the latest HP computers, calculators and peripheral devices, the centers will be used primarily for customer support and product demonstration purposes. They will offer customers advice on the development of specialized computer programs, training in the use of the equipment and the opportunity to apply HP's wide assortment of computing instrumentation to the solution of special data processing problems.

Hewlett-Packard is the first producer of small-scale computers and instrument systems to establish data centers of this type.

Present locations for data centers include Paramus, New Jersey; Fullerton, California; Atlanta, Georgia; Skokie, Illinois; Slough, England; Milan, Italy and Geneva, Switzerland. Additional centers are planned for Australia, South America, Canada and Germany, as well as other locations in the United States.

**Palo Alto** — Bob Boniface has been elected vice president of HP marketing. He formerly was general manager of the Neely Western Sales Region. In his new corporate post, Boniface succeeds Noel Eldred, who has headed HP's marketing operations for 22 years and who was promoted to an executive vice president of the company in January, 1969. Succeeding Boniface as general manager of Neely is Phil Scalzo, previously manager of the region's operations in Southern California, Arizona, New Mexico and Hawaii.

**New York** — The Board of Directors of the Institute of Electrical and Electronics Engineers (IEEE) has elevated Noel Eldred, executive vice president of Hewlett-Packard, to the grade of Fellow. It is the highest attainable grade and is conferred only on persons of outstanding qualifications and achievements in their field. The IEEE citation named Eldred for his contributions in the design of radar equipment, transmitters and vacuum tubes, and for leadership in the marketing of electronic instrumentation.

## People on the move

**Corporate** — Al Dossola, to manager, Credit Union, from manager, administrative services; Marshall Johnson, government programs manager, marketing, from product manager, New Jersey Division, Berkeley Heights; Bill Taylor, to manager, administrative services, from order processing supervisor, Cupertino.

### Data Products Group

**Cupertino** — Bernard Levine, to materials engineer, hardware development services, from same position, manufacturing materials.

### Electronic Products Group

**Automatic Measurement** — Harvey Allen, to systems analyst, finance, from same position, information systems, Microwave; Jim Otts, to project control manager, from sales engineer, Microwave.

**HP Associates** — Gene Daniels, to services manager, manufacturing, from general manager, Paeco, Manufacturing.

**Manufacturing** — Richard Kahnberg, to documentation and procedures staff, from assembler, Microwave; Bill Nordskog, to systems programmer, manufacturing data, from same position, information systems, Microwave; Beth Payne, to systems programmer, manufacturing data, from same position, information systems, Microwave; Jerry Reaugh, to systems programmer, machining processes, from same position, information systems.

**Microwave** — Julius Botka, to associate

engineer, R&D, from same position, HP Associates.

**Santa Clara** — Tom Murphy, to manufacturing specifications supervisor, manufacturing systems, from same position, Microwave R&D; Bob Puette, to product manager, marketing, from systems analyst, Corporate marketing.

### Operations Group

**Avondale** — Bob Buchner, to Q.A. manager, from manufacturing engineering staff; Matt Whittier, to personnel manager, from Q.A. manager.

**Medical Electronics** — Bob Burnett, to operations manager, from production planning and control supervisor; Jack Carlozzi, to audio visual/product support engineer, from assembly wire and test manager; Keivan Towfigh, to engineering section leader, from engineering project leader, R&D Lab.

**International** — Peter Burt, to accounting manager, HP Ltd., South Queensferry, from systems analyst, information systems, Manufacturing; Clyde Coombs, to International Operations, from component operations manager, manufacturing, Cupertino; Richard Watts, to sales engineer, from same position, HP Ltd., South Queensferry.

### Sales Regions

**Eastern** — Christopher Boschen, to components sales manager, Paramus, from marketing staff, Microwave.

**Midwest** — Bill Hooven, to service representative, Cleveland, from manufacturing engineering staff, Avondale.

## From the president's desk

Last month you received a letter from me advising that the employee stock purchase plan was being modified to allow qualified employees to set aside up to 10 percent of base pay for the purchase of stock, rather than the six percent that has been in effect since the plan was originated 11 years ago.

Why the change? What factors influenced the decision?

Several months ago, a review was made of our entire employee benefit program, and some recommendations were presented to the Executive Council. Following the presentation, the Council adopted a number of revisions, and these were reported to you last November.

One recommendation that was not accepted at that time was the modification to the stock purchase plan. The reason for the rejection was two-fold. First there was concern that purchase of HP stock under the plan was not highly regarded by employees, that the company contribution was simply treated as additional compensation, and that stock acquired was quickly sold. Secondly, it was felt that purchases under the plan represented, in the long run, a dilution of earnings per share because of the issuance of additional stock to support the plan. Another consideration, of course, was that the modification would represent about a one percent increase in compensation and thus be an additional expense for the company.

Jim Phelps, head of personnel for the Electronic Products Group, along with some other people, believed that the first concern was unfounded. To prove their contention, questionnaires were sent out to some 300 randomly selected people in the Group. If eligible, they were asked if they participated in the plan, and if so, did they tend to sell or hold their stock?

There were 256 replies, with 83 percent saying they held their stock—a most remarkable record. Of those that had sold stock, the majority said they had used the money to help purchase a home. Nearly all of the respondents expressed a desire for an increase in the maximum deduction because they felt it was an excellent means of stimulating their savings.

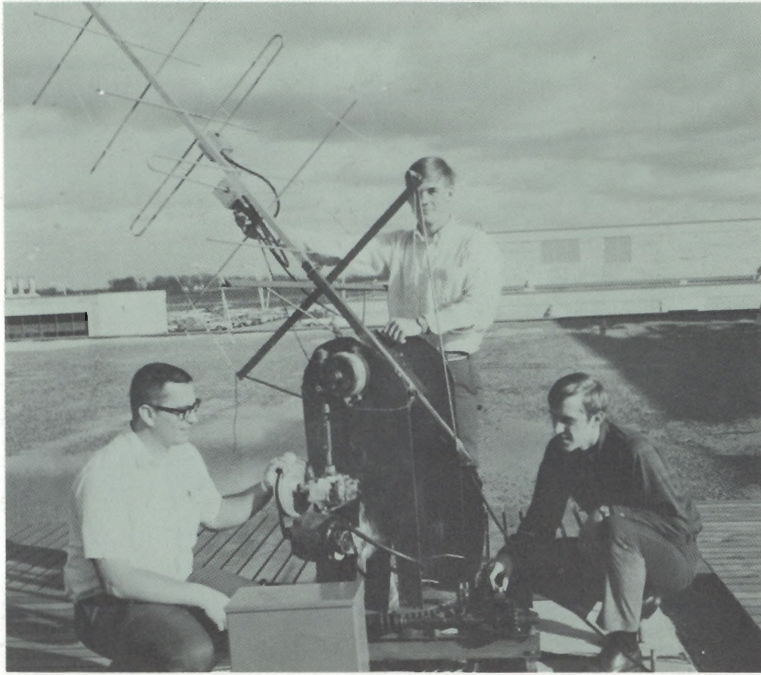
I was so impressed with the survey summary that I read all of the comments on the individual questionnaires. This convinced me that the importance of the stock purchase plan in terms of promoting employee savings as well as stock ownership in the company clearly indicated that we should review our earlier rejection. This was further reinforced when an analysis of our long term cash needs (which are met through borrowing) indicated that, contrary to previous views, the change would not result in a dilution of earnings per share, but rather would improve them. In view of these benefits, the increased payroll cost seemed justified.

Based on this evidence, the recommendation was made to the Board of Directors at their last meeting that the stock purchase plan be expanded. In support of the recommendation, the summary of the survey was distributed and read with interest by the Board members. Following a short discussion period, the modification of the plan was passed with strong endorsement.

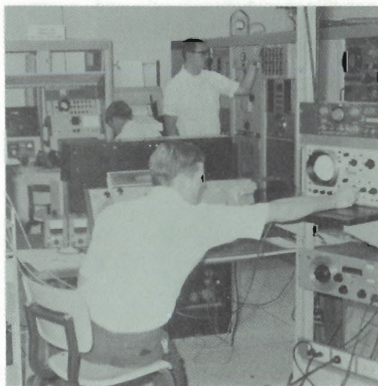
In the short time since the modification was announced, new authorization cards have been received from nearly 50 percent of eligible employees in the Peninsula area alone. Over 98 percent of these are increasing their deduction, most of them to the 10 percent level. This response certainly seems to bear out the decision made and the belief of those who supported it.



*Bill Hewlett*



## Man-made moon and sixpence ...



It's a long way from a Midwestern junk pile to a NASA weather satellite, but a group of Minnesota electronics students have found the shortest route.

What they've done at Mankato Area Vocational Technical Institute in North Mankato, Minn., is build a weather satellite receiving station . . . complete with an antenna constructed of scraps from a broken-down threshing machine, an old Maytag clothes washer, an assortment of nuts and bolts—and perhaps a rubber band or two. They also use a variety of HP gear to assist with display and recording functions, including a 197A oscilloscope and oscilloscope camera.

According to HP field engineer Jim Mathews of Midwest Sales, the students' homemade antenna is doing its job perfectly. Since mid-1969, it's been carrying the Mankato project a distance of 770 miles—the altitude of ESSA-8, a NASA satellite which the students track to receive the regularly-transmitted weather signals.

Basically, the students send out a "start" tone and signal pulses via the homespun antenna and transform the return signals into slow-scan television pictures of the cloud cover directly below the satellite. The inventive young men also have constructed the TV receiver.

You'd never classify the Mankato antenna as a state-of-the-art project, but it does show how far a little home-grown ingenuity can stretch a dollar—about 770 miles.

## Measure

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