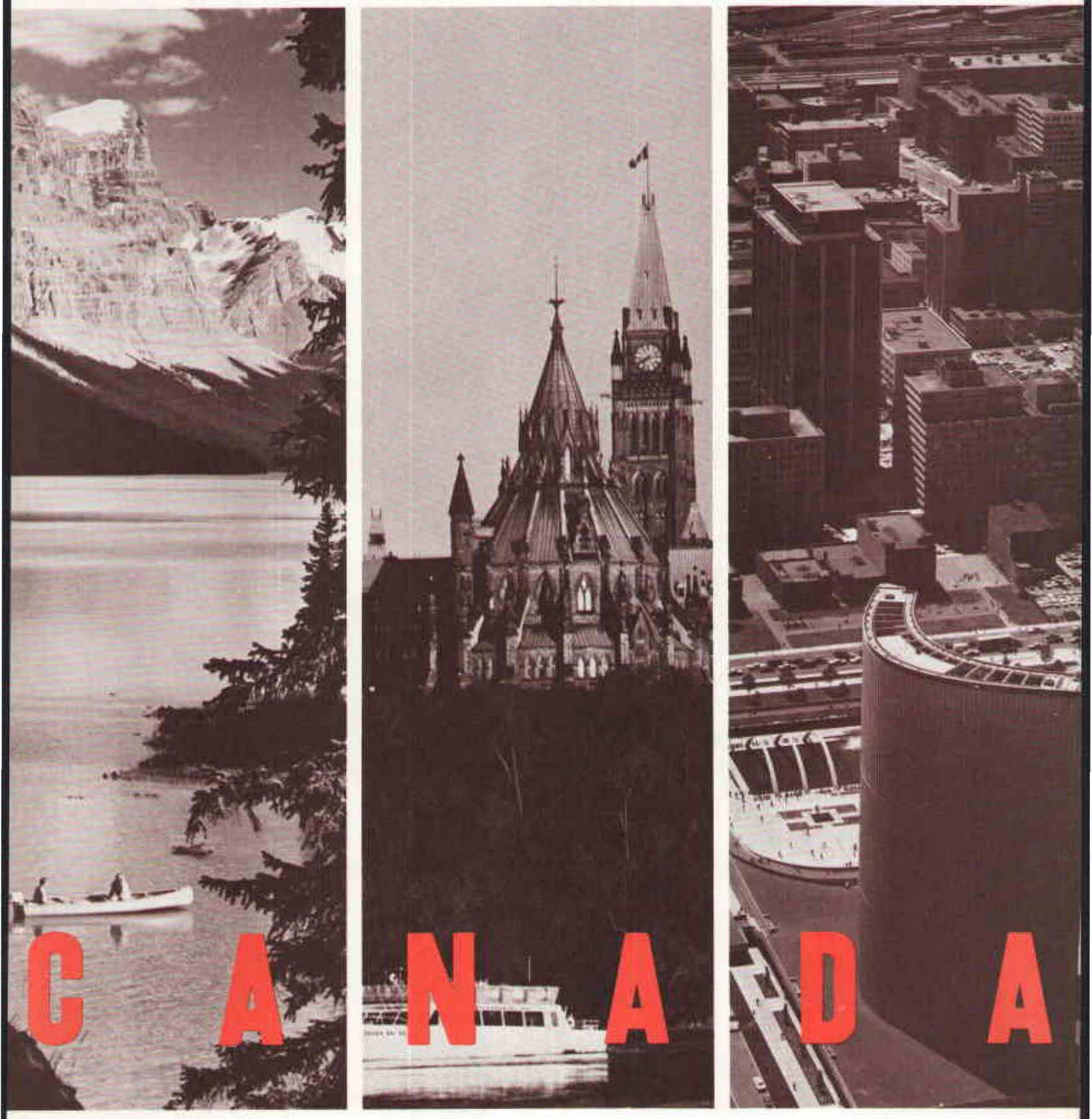
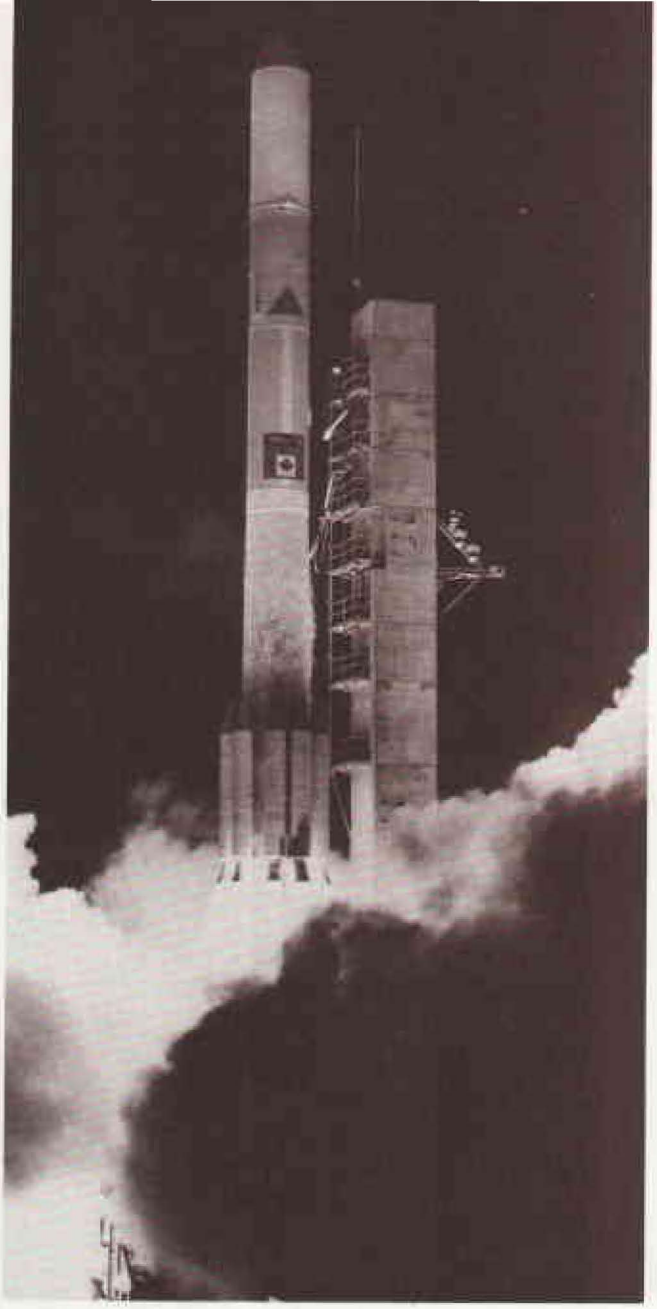


Measure

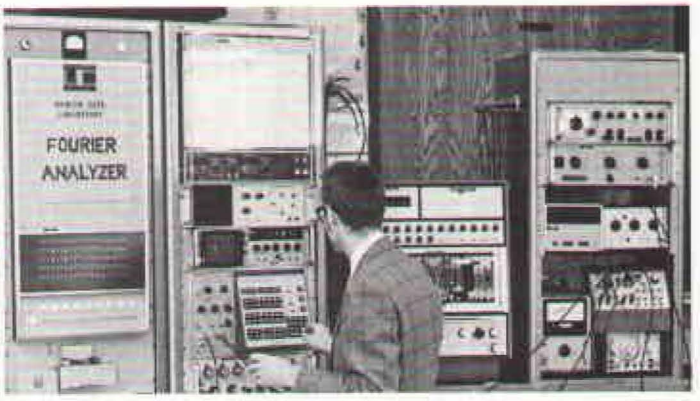
For the men and women of Hewlett-Packard/APRIL 1973



HP's wide, wider, widest

☐ There is surely something significant in the following facts: This month Canada will launch its second communcations satellite; by midyear—if all goes well with launch and injection into synchronous orbit—the world's first commercial domestic satellite will begin customer operations; meanwhile, the United States, which furnished the launch pad, rocket, satellite, and much of the ground-station equipment (including many HP products) was still debating what system it should choose for its own use from among some hotly competing proposals. In fact, there is a good chance that U.S. communcations companies will lease time from the so-called Telesat Canada project while they wait out the decision at home.

sales territory



While Canada's second Telesat satellite communications rocket blasts off (opposite page) this month, HP-equipped ground stations stand ready to take over control. On this page are seen views of some other HP installations serving Canada: a university time-share computer system, a Fourier analyzer system used in random-data analysis at a major university, and a patient monitoring system at a Quebec hospital.

There are many things that could be said about all that: take your pick. Certainly, one interpretation is that here are two neighbors who obviously get along rather well together, to the point where they are able to share much and support one another in many ways.

This is not to whitewash the differences that exist between the two nations. No question most Canadians would prefer to be less influenced by the economic and cultural waves that roll in from the south. But, given the population ratio of ten Americans for every Canadian, the present relationship is probably inevitable.

What, then, accounts for the over-riding goodwill that keeps them working together in neighborly fashion even when they disagree?

The best answer seems to be--simply--that they have much more in common than not. Both were explored and settled about the same time by much the same kinds of people. Both experienced great westward migrations of people in search of the then-limitless riches of the frontier. And both find themselves on very similar courses of political, social and economic development. The fact of the matter is that 90 percent of all Canadians live within 100 miles of the U.S. border; or, if you will, some of the largest segments of U.S. population and industry are concentrated near the Canadian border.

It's no wonder under these circumstances that the U.S. looks to Canada as a special kind of market—"foreign" in the sense that trade is controlled by agreements between the national governments, yet very much influenced by an understanding of the importance of partnership and interdependence.

The basic charter for Hewlett-Packard Canada, Ltd. is simple enough: Sell! To do this the organization is set up along lines very similar to a sales region in the United States. Headquarters are at Pointe Claire, a mixed light-industrial and residential area west of the Montreal airport. The office is also headquarters for the Quebec-district sales force. Offices in Halifax, Ottawa, Rexdale, Winnipeg, Edmonton, and Vancouver also serve at district centers.

One thing is very clear in looking at the map of Canada and the distribution of offices: the 200 or so staff members of HP Canada have a huge job in physically covering the territory. For a start, the country is a couple of hundred-thousand square miles larger than the U.S. Distances between sales and service calls are frequently measured in the hundreds of miles. Fortunately, flight service is excellent.

(continued)

CANADA

"In one day," said a field engineer, "it's possible to fly 450 miles to Saskatoon from Winnipeg, then to Regina 125 miles to the south, then back home. We have to cover a lot of ground because, with a few exceptions, we don't have large accounts. Mostly, we're selling ones and twos at a time so we have to be pretty mobile."

This is not an easy task during winters which can be very intimidating. In Edmonton or Winnipeg, for example, the temperature can drop as low as 72 below freezing. Tires freeze flat. Motor oil congeals unless fluidity is maintained by heat-bolt heaters.

"Nothing," the HP engineer avowed, "is worse than lugging a demo instrument around a university campus in 40-below weather."

And just in case that weather overtakes him on the highway he always equips his car with sleeping bag, snow chains, block and tackle, thermos of coffee, and an emergency ration of rum.

Then in summers the prairie temperature can soar to well over 100 degrees F.

But apparently these extremes of environment only serve to remind HP Canadians of the good things that are theirs most of the year.

"It's like a United Nations around here," commented Personnel's Ian Jackson. "People from all parts of the world have settled in Canada. If they can take the winters they'll generally stay on. I think a lot of it has to do with the feeling of openness of the country—the great size in relation to the number of people. Personal freedom is a big factor, too."

These observations were echoed by various HP Canada people: Sherif Alaily, an Egyptian-born, Swiss-educated data products field engineer in the Montreal office, said that in his opinion Canada presents the individual with more opportunity and challenge than older nations: "In Europe, where I worked a couple of years for IBM, the business environment seemed quite formal—highly structured in terms of who you can talk to and who you can't. Here it's much more relaxed. HP, too, is quite a different organization; they don't set everything out by the numbers every step of the way. There's a lot of room for personal initiative. And Canadians—like Americans—recognize the importance of the salesman. They respect him."

Melle Zegel, Dutch-born former Quebec area manager who has since transferred to HPSA in Geneva, noted that Canada has far fewer laws and regulations affecting the individual than most countries: "There's a strong strain of

Montage shows some HP Canadians on the job, plus some views of the great natural attractions that help make Canada such a desirable place to live.

frontier philosophy here that resists controls."

In spite of that philosophy, Canadians find themselves still very much in the vanguard of the late 20th century, which is to say they have the problems as well as benefits that come with an urbanized and industrialized society. Many of these problems are of the kind that lend themselves to technological treatment, with considerable potential for the involvement of HP products.

The national government, for example, just recently formed a Department of the Environment to measure pollution and then propose further legislation for its control. Some of the things this department will likely look at are paper and pulp mill discharges that have seriously harmed rivers, cities that dump sewage into the St. Lawrence Seaway, and mining operations that have denuded whole forests through the discharge of sulphur effluents. (Regarding mining itself, one story reports an Indian compaining that "white man first take beaver from forest. Then he take forest and leave rocks. Now he come back to take rocks.")

Medicine is another area of considerable interest. As in many other Commonwealth countries, it's socialized. One important effect for HP is that Canadian hospitals don't compete for patients the way private U.S. hospitals do. On the other hand, the government is more important when it comes to budgeting for new health-care facilities.

Other key markets include education, research, and—believe it or not—the railway system. In serving these markets, Canadian manager Ted Grunau and his people deal with some special situations. Competitors include not only the U.S. firms doing business in Canada but also a great representation of worldwide instrument makers. Then, in bringing products into Canada from the U.S., allowance has to be made for a delay of up to two weeks for customs clearance. In the end, customers will pay up to 35 percent more than U.S. prices because of import duties plus federal and provincial sales taxes.

Nevertheless, since Ted and a secretary opened the first office at Montreal in 1960, sales and sales growth of HP Canada have tracked rather closely with those of the U.S. sales regions—just as the national economies tend to do.

Inasmuch as sales have doubled every five years, that's not a bad track to run on.

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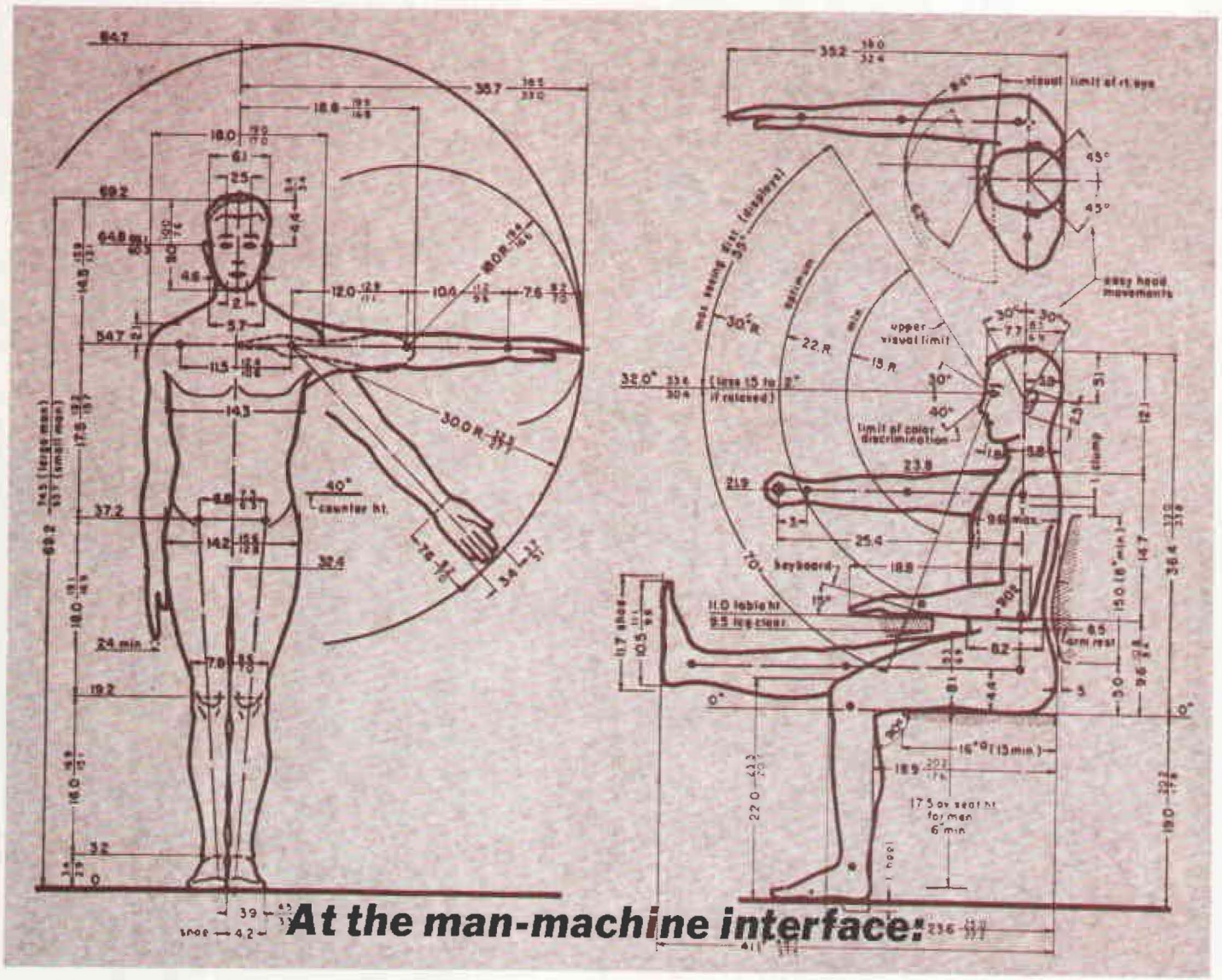


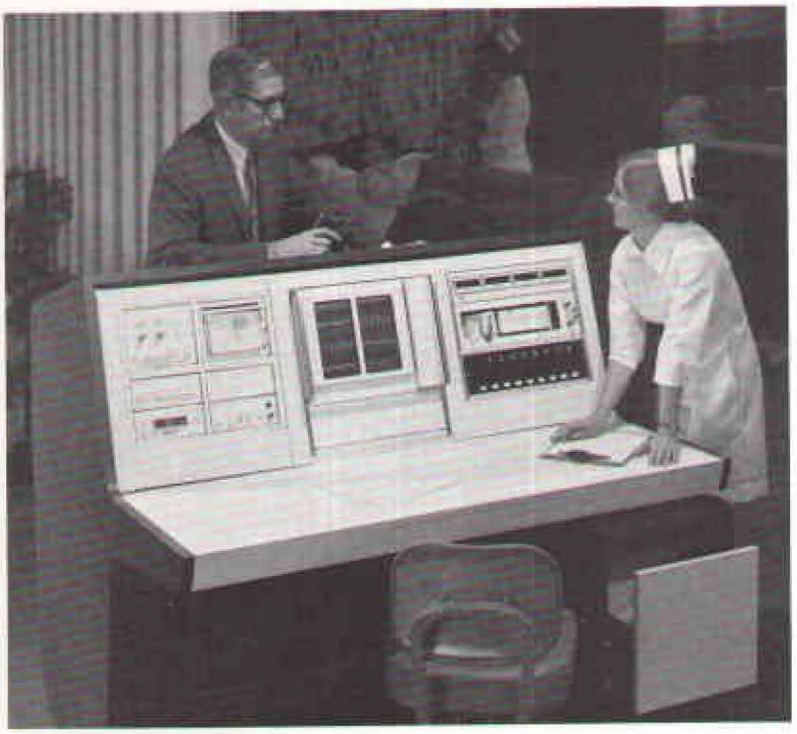
More than meets the eye

☐ In setting out to show what industrial designers do at Hewlett-Packard a peculiar question arises: Why expend a lot of words trying to describe what they do when—apparently—what they do is so self-evident, so highly visible?

Or is it?

Years ago, perhaps, the designer was basically an artist, a chap brought in to "dress up" a product whose essential features were already established by the dictates of manufacturing methods and materials. He might show them something about colors, how to use the company logotype, and how best to display an advertising message on the shipping package.

Where electronic instruments were concerned, the artist-designer began by doing some front-panel work—cleaning up the clutter and giving it some style. Gradually, he got a message through—that good design was also basic to the efficiency and safety with which an instrument was used. The artist emerged as a "human engineer" who con-



HP's first central station module for medical instrumentation represents much more than what designers call a "Batman" thing, that is, a purely futuristic design concept. According to Doug Ritchie, MED industrial designer, the new module is the direct result of feedback from hospital customers. As their use of HP instruments has increased, medical people have tried stacking and restacking these in efforts to create the most effective arrangement. They became increasingly concerned about the possibility of confusion and accident in the ofttimes hectic conditions of hospital emergencies. Architectural aesthetics have also become more important in the hospital environments, hence the fine-furniture look of the console as opposed to a machine-shop look. Another Central Station approach is that taken by a Neely–Corporate Industrial Design team that has been successfully offering designs customized to the individual needs of hospitals. While you're at it, take a look at the instruments in the central station. Gone is the Christmas-tree effect of lights in many colors. Distracting elements were subdued, giving prominence only to those features requiring the frequent vigilance of medical staffs. In the photo at left, Doug Ritchie examines an HP Torso Trainer, one of the more unusual design projects ever undertaken within the company.

cerned himself not just with the way an instrument appealed to the eye but also how the hand of the user interacted with the controls, and how the instrument fitted into its working environment.

Today, the interest, involvement and influence of some two dozen industrial designers throughout Hewlett-Packard extend far upstream in the development process. In some cases their work–or, rather, human engineering considerations–clearly dominates the end product. The pocket-calculator line is by now a classic case in this respect, having been designed from the "outside in" in order to meet the basic goal of squeezing many new functions into a shirt-pocket sized machine.

In other product areas the process of design change has been more evolutionary. The extent of change depends largely on how and where the products are used. The "traditional" HP instruments, for example, have been designed primarily for a laboratory environment where they are used by skilled technical people wanting the utmost in accuracy and reliability; industrial design efforts are aimed at enhancement of these requirements. At the same time, though, there's a definite trend toward the design of a line of test and measurement instruments much lower in cost though still of high performance. Computer products increasingly have taken on the finish and feel of sophisticated furniture in keeping with their use in commercial and institutional environments. Medical products, too, have moved steadily away from the stark, antiseptic look that came in with the discovery of germs; now the hospital look (and your bill) more nearly matches that associated with a deluxe hotel.

In several of these product areas the most exciting design concepts are still under development; may that always be the case at HP. Meanwhile, here's a look at a cross section of HP industrial designers with notable examples of their recent works:

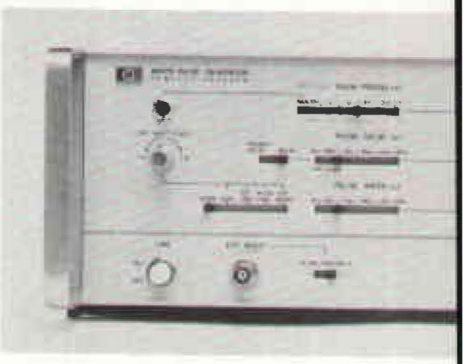
(continued)

Synergism is a word often applied to industrial designs that produce extra benefits. Put in a nickel and get back fifteen cents worth! A simple yet effective example of this came about with the design of a new oscilloscope probe, the 10014A, at Colorado Springs. Designer Andy Aré, who came to HP 13 years ago, looked at the existing probe and noted how it was made of costly precision tubing, and that the curved surface made it difficult to silk screen on the product identification. He came up with a design that included an aluminum extrusion cover and a die-cast frame. This helped eliminate a number of separate parts as well as operations such as the machining of nuts and the threading of cast parts. The identification nameplate was readily attached. Assembly became much simpler and quicker—just snap on the cover. Synergistic!

More than meets the eye

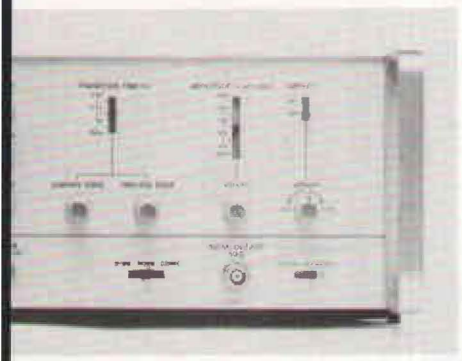
Working out ways of providing users with clear instructions is par for industrial designers. But how do they know if their message is as understandable in Liberia or Liechtenstein as it is in Loveland, Colorado? That was one of the intriguing design problems faced by Barry Mathes when working on the Loveland distance-measuring instrument a couple of years back. "We had all kinds of problems in trying to describe the controls with words," says Barry now. "These had meanings to engineers but not to others who would be using the DMI. So we turned to abstract symbolism—symbols such as the surveyor's symbol for a target. By making them as universal as possible and by varying them as to size and color, and relating them to the controls, I think we were successful. Acceptance has been very good."

For good reason, the aircraft industry has pioneered in the design of controls that pilots can read at a glance and readjust almost by instinct. In fact, in the other areas of industry they call them "aircraft controls." The controls on some of the new pulse generator products out of HP GmbH at Boeblingen borrow from this concept, employing horizontal slot controls where horizontal characteristics of waveform signals are involved, and vertical slots where features such as amplitude are defined. As the photograph of the new 8007B pulse generator shows, dialing knobs are still used, but chiefly for fine tuning. According to Joern Kos, engineering manager of pulse generators, the GmbH engineers and designers were among the first to make extensive use of the aircraft-switch concept for electronic instruments.



Remember those fun-filled pictures where you looked for the hidden images? If you look closely enough in these two views of the Corporate Industrial Design team you can find quite a few clues about some very interesting projects that will have an important influence on HP products of the future. The photograph at top right, for example, offers the following: On the table at left is a prototype of a new cabinet module for small instruments. The housing is plastic with a sprayed-on RF shield, and will provide a combination of strength and economy. On the table at right are larger aluminum cabinets that will be used for standard instrument lines. Both the small and standard cabinets were designed for instruments that will incorporate the ASCII compatible interface bus system developed recently by HP interface engineers. Industrial designers from a half-dozen HP divisions worked with Corporate Design on the new cabinets. Another project is represented by the tables themselves; attractive and sturdy, they can be fitted together like building blocks. The small cart on which the scope is mounted is designed to replace five different carts now used for this purpose. The goal is to create a modular line of supporting structures that serve a broad range of customer needs. Marv Haig, at left, is specifically assigned to that goal. Roy Ozaki, Rich Hoogner and Bob Macaw are occupied by the cabinet program.

In the lower picture, Jack Benson at left, makes a point about his specialty—corporate standards, particularly surface textures of materials—with Don Pahl and Al Inhelder who heads the Corporate Design department. Standard specs on color, texture and other exterior features of products are highly important in a company as decentralized but as interrelated as HP. On Don's desk are various samples of a new alphabet being designed to give a sharp readable image when reduced to the size needed to fit the small keys of instruments such as the hand-held calculators. In addition to initiating many notable standards and product designs for the company, including the HP-35, Corporate Design has provided a training base for most of the specialists who now practice the art and science of human engineering within the product divisions.



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They call it the "data systems" look: sharp, sophisticated, functional, modular. These are the qualities that HP industrial designers at the Cupertino plant have imparted to the appearance of the HP 3000, the company's first full-scale multipurpose computer system. From an exterior design point of view, the system started with existing hardware items such as the 2100 computer, various disc products, mag tape units, input/output devices, and the HP cabinet system. Bringing them together into an attractive and efficient design relationship has been a major project for designers Gerry Priestley, Kail Peterson and Roger Wilder. One basic change was modification of the cabinet system. "To give customers real flexibility in extending their system," said Gerry, "it was decided to stick with one-bay cabinets rather than two and three-bay cabinets. These singles can be bolted together into as large a system as the customer wants, and are easy to move or service. A lot of effort also went into meeting Underwriter Laboratories approval and IEC standards because the voltages used in data systems are much higher than for instrument systems."

More than meets the eye

The concept of instrument plug-ins was pioneered by HP. Now, the developers of the 9800-series desktop calculators have taken the concept a step further in seeking to extend operational capability and flexibility. They did this with plug-in function blocks on Read-Only-Memory units. One problem, though, was: when you've plugged in the ROM, how do you know what the keys of the keyboard mean in relation to your plugged-in program? This question poised an interesting challenge for all concerned, including Don Aupperle (left), industrial designer at Loveland, and Garry Paulson, the ME. Part One of the answer was to subdivide the keyboard physically according to areas controlled by the various ROMs (as many as three at a time). Part Two was to develop thin metal templates, fitting over these areas, that identified the keys as to the functions created by the ROMs. This combination of features helped give the 9810 and 9820 as much as six times the memory capacity as comparably priced units.

No less than innovators in other fields, industrial designers enjoy setting a trend with their creations. Here, Bernie Barke (left), and Dave Goelz of Santa Clara Division look back on the compact, portable, easy-to-open case designs they developed for the 5300 measuring system over a year ago. Still going strong at Santa Clara, the cabinet system has since been adopted by Loveland Division for a variety of instruments including the 3470 measurement system and the new low-cost 3311A function generator. According to Bernie, the 5300 system was a true team effort: he and Roger Lee (now of Data Systems) came up with the concept; Rick May, a mechanical engineer, along with Dave Goelz worked out the detailed design; Bill Anson, also an ME, developed the battery pack; Roy Ingham of Manufacturing Division was very helpful in working out manufacturing problems.

Microwave Division's new 8500A System Console brings together many capabilities that make life much easier and more efficient for users of computer-based automatic measurement systems. In doing this, though, it challenged the industrial design team with the classic problem of creating good visual compatibility and human interface out of many unlike and unrelated elements. First try was a stand-alone console—very attractive. But this failed to allow enough flexibility for customers who wanted to customize their system. So Yas Matsui (shown with Chuck Dodge and Dan Derby, all of Jack Magri's industrial design department) switched it to the Corporate cabinet rack—and did a very neat job of packaging the various items therein—with the eye-pleasing results pictured below.

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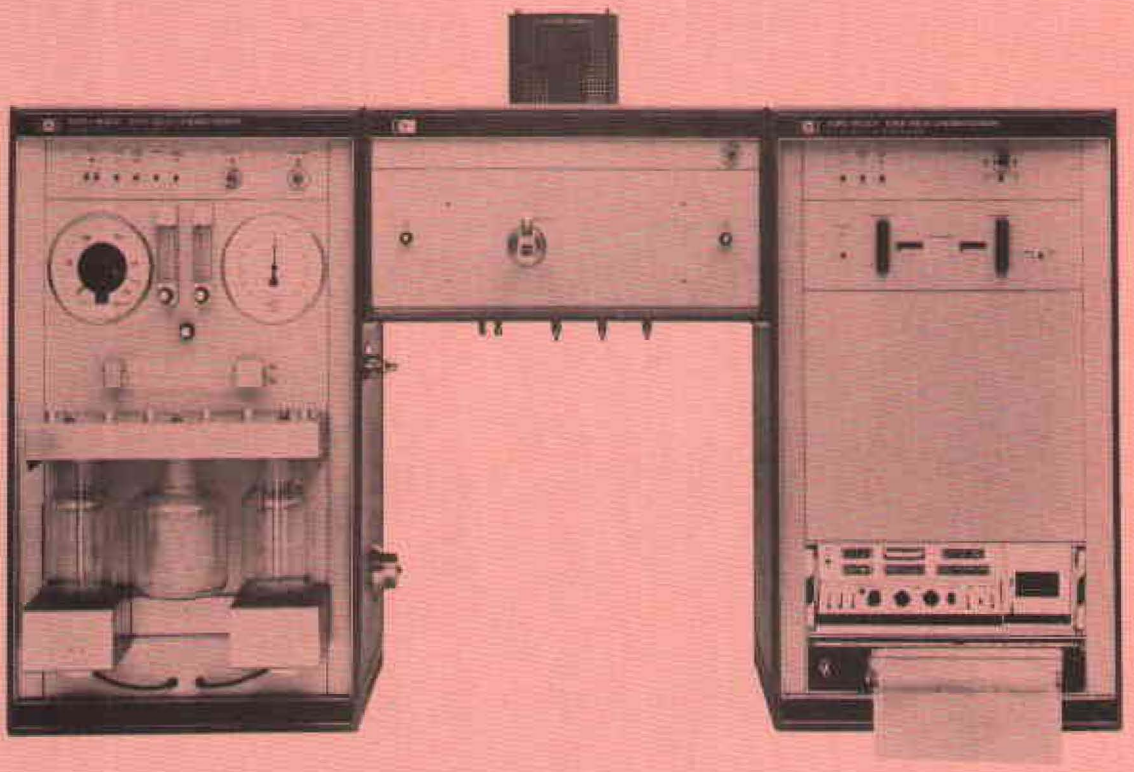
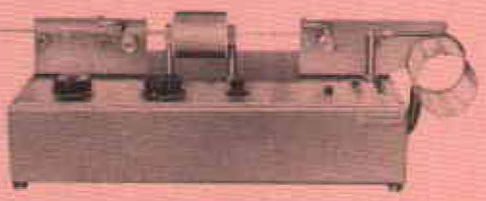
New lease on life for an older technology





Looking something like a desk is the HP Model 1010B high-speed liquid chromatograph brought to HP through the acquisition of Hupe & Busch whose founder, Dr. Klaus-Peter Hupe, will continue with the organization he started in 1963. Improvements in detection techniques have helped revive liquid chromatography as a major analytical method. Below is shown a glass-drawing machine for making capillary glass columns.

☐ An analytical process developed around the turn-of-the-century is the basis for HP's newest product line.

Liquid chromatography, first described by Russian botanist Mikhail Tswett in 1903, has resurfaced in recent years as a practical tool for chemical analysis of unknown samples.

HP acquired LC capabilities in January with the purchase of Hupe & Busch, a leading European manufacturer of analytical equipment with particular expertise in the field of liquid chromatography. Hupe & Busch, which has 35 employees, occupies 9,000 square feet of plant and office space on a 1.5 acre site in the Karlsruhe suburb of Groetzingen in the southern portion of the German Federal Republic.

Although still in its infancy commercially, liquid chromatography (LC) actually predates the more popular gas chromatography (GC) method in which HP is heavily involved. Botanist Tswett first used liquid-column chromatography to separate the colored pigments from plant material. The term chromatography, coined at that time, literally means "color writing." Since then, chromatography has been extensively applied to colorless materials.

It wasn't until 1949 that gas chromatography evolved, and it took several more years before serious work began in developing practical GC systems. This newer method proved more practical at the time than LC, however, and gas chromatography grew steadily in the '50s and '60s while the older liquid process languished. HP entered the GC field in 1965 with the acquisition of F&M Scientific Corporation, now the Avondale Division.

Early liquid chromatographs were rather cumbersome, required long analysis times and did not provide the accuracy needed in many applications.

Three recent developments have rekindled interest in the usefulness of liquid chromatography for analytical purposes. One was the development of column support materials having small, uniform particle diameter and controlled porosity. A second was the development of improved high-pressure pumps to move materials through the columns. A third was the development of high-sensitivity detectors to provide better analysis.

Hupe & Busch combines these new developments in its Model 1010B, which gives liquid chromatography speeds and efficiencies approaching those obtained by gas chromatography.

The main reason liquid chromatography is attractive is that it permits the chemical analysis of many more materials than is possible using gas chromatography. Of the organic chemicals discovered or synthesized to date, about 15 percent can be analyzed using gas chromatography. The remaining 85 percent require the more gentle separation mechanism of liquid chromatography.

This represents a significant market. Worldwide annual sales of LCs are expected to grow at about 20 percent per year to more than $20 million by 1977. In time, the market for liquid chromatographs will match that of gas chromatographs, according to industry estimates. Major customers of HP's new LC systems are chemical firms, pharmaceutical companies and universities. The outlook is also promising among medical researchers, and the most dramatic growth is seen in this area.

Dr. Klaus Peter Hupe founded his own firm in 1963 and was joined by Dr. Ulrich Busch in 1968 to form the company of Hupe & Busch. The company undertook its first studies in liquid chromatography in 1965 and delivered its first commercial systems in 1970. In addition to LCs, the company also manufactures a preparative gas chromatograph and a glass-drawing machine for making capillary glass columns used in gas chromatography. ☐

News in Brief

New York, N. Y. – For their "leadership in the development of electronic instruments, for creative management of an industrial activity, and for their unselfish public service," Bill Hewlett and Dave Packard have been jointly awarded the Founders Medal by the Institute of Electrical and Electronics Engineers (IEEE). The award was presented at the annual banquet held during the Institute's 1973 International Convention here, March 27–30.

HP was solidly represented at the IEEE product show staged in the New York Coliseum. The company's 2,000 square-foot display area was dominated by a 14-foot theme tower on which major product lines in electronic instrumentation, components, systems and calculators were graphically illustrated.

Featured HP products included the 543A microwave power meter, 5306/5311A 5-digit multimeter and D-A converter, 3311A function generator, 4265A universal bridge, 5082-4360 optically-isolated gate, 5082-4860 LED lamps with built-in resistors, and the 8558B spectrum analyzer.

HP people manning the both area reported lively interest in the new products and good overall attendance at the show.

Palo Alto – Several key changes have been announced in personnel management assignments.

L. A. Fulgham, personnel manager at San Diego Division, has joined Corporate Personnel as U.S. field marketing personnel manager. He replaces Larry Motzkus who became manager of the Corporate compensation and benefits program last January. Fulgham will also provide management development assistance to the Data Products Group.

Ken Capen, personnel manager at Santa Clara Division, will become Corporate equal employment opportunity manager. He replaces Swede Wild who is retiring at the end of this month after 29 years with the company.

Jim Phelps, manager of personnel for the Electronics Products Group and former personnel manager at the Medical Electronics Division, will rejoin MED as manufacturing manager at the Waltham plant. He succeeds Burt Dole who is heading operations and planning at the new Andover, Massachusetts, plant site.

Palo Alto – Dean Morton has been elected a vice president of Hewlett-Packard Company.

Morton has been general manager of the Medical Electronics Division in Waltham, Massachusetts since 1969. He joined HP's corporate marketing staff at Palo Alto in 1960, and advanced as an applications engineer in research and development, division product manager and marketing manager, and corporate sales manager.

Morton moved to Waltham in 1965 as MED's engineering manager, and was named medical products manager in 1968 and general manager the next year. He was graduated from Kansas State University in 1954 with a B.S.E.E. and received his M.B.A. from Harvard University in 1960.

Palo Alto – H. I. Romnes has been elected to the HP board of directors.

Romnes presently is a director and chairman of the executive committee of American Telephone and Telegraph Company. He formerly was chairman of the board, chief executive officer and president of AT&T, retiring from those positions in 1972.

Romnes joined the technical staff of Bell Telephone Laboratories in New York in 1928. He began with the engineering division of AT&T in 1935 and was named vice president, operations, in 1955.

In 1959, he was named president of Western Electric Company. He became vice chairman of the board of AT&T in 1964, president in 1965 and chairman of the board and chief executive officer in 1967.

A native of Stoughton, Wisconsin, Romnes received his B.S. degree in electrical engineering from the University of Wisconsin.

Loveland – Researchers who analyze data to generate histograms, or calculate mean and standard deviations, fit curves, or many other statistical calculations, now have a desktop calculator to do their jobs quickly, easily, and at lower cost. The new Hewlett-Packard Model 9805A Stat Calculator system solves most basic statistical calculations with one keystroke.

A built-in impact printer uses standard adding machine paper tape. Long lists of data entries and calculations are easily checked on its tape printout. Results are labeled for easy identification. A total of 10 digits plus the sign, and up to six places to the right of the decimal point can be printed.

From the president's desk

As you know, last year was an excellent year for the company, both in terms of growth in shipments, and improvement in our profit performance. You should all take particular pride in these achievements.

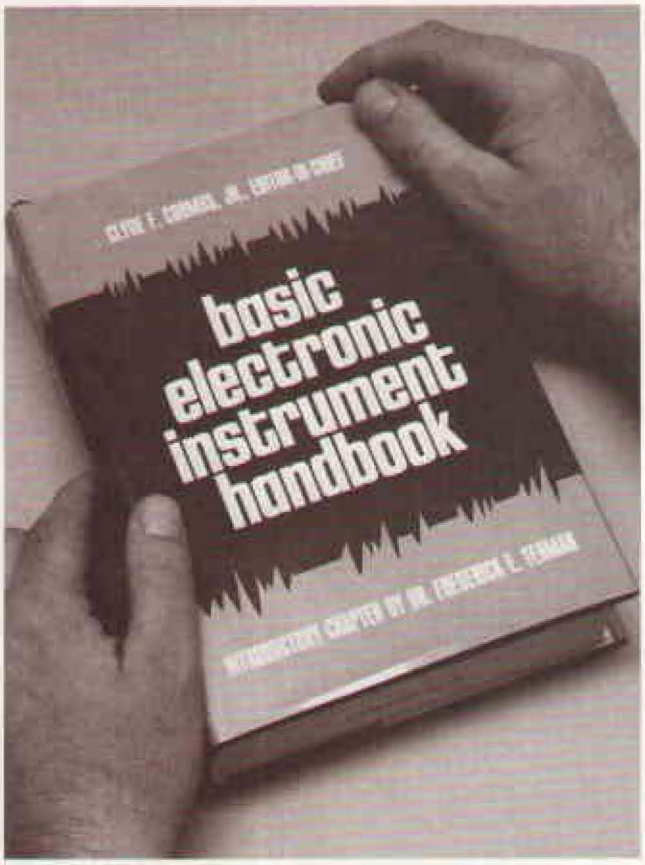
The very strong order trend which commenced about the beginning of last year has continued and it appears that we will see this trend extend at least through the rest of this year. Although we are all pleased with this resurgence of business, it does pose some difficult growth problems for the company. Last year's expansion in shipments just about took up all the slack in the system and, in addition, we brought in over 6,000 new people to the company worldwide.

We are, therefore, faced with trying to get a larger volume of production out of the same facilities we had in operation last year. Although we have a major construction program underway, the new space will not begin to materialize until the early part of next year. The problem of getting more shipments out of the same plant capacity is further compounded by the fact that we will have to employ an additional 4,000 to 5,000 people during the year to help us get the job done.

In this regard, it is very important that these new people understand the company. This is an area where all of you can help. There is a great body of knowledge and experience within the company about the "HP way." As these new people come aboard, it is absolutely essential that, 1) they are made to feel at home in a friendly environment, and 2) that every effort be made to let them understand how we really operate within HP. This is not a task that Dave and I can do alone. Nor is it a task that should be left to the division managers. It is a task that must be done by every member of the HP team.

It is going to be a real challenge to get this number of people settled and incorporated as a part of the total production team, and still keep a proper balance between shipments and orders. But it can be done if everyone pitches in.

Bill Hewlett



Once again, Hewlett-Packard people have contributed significantly to a book that promises to become a standard text in the electronics industry. The new book is the 836-page "Basic electronic instrument handbook" (McGraw-Hill Book Company, $28.50). Editor-in-chief was Clyde Coombs, Jr., manufacturing manager of the Advanced Products Division in Cupertino. Seven HP engineers and an HP director contributed chapters, and a director emeritus wrote the introduction. Coombs previously edited the "Printed Circuit Handbook," another in the McGraw-Hill series.

According to Editor Coombs, the new handbook covers the "other end" of the electronic spectrum from that of the Barney Oliver–John Cage book, "Electronic Measurements and Instrumentation," that appeared in 1971.Together, he said, these books could well be considered halves of a basic library on instrumentation.

The twelve sections of the new handbook include an introduction to instrumentation, fundamentals of electronic-measurement instruments, fundamentals of signal-generation instruments, using electronic instruments, instrumentation systems, circuit- and voltage-measurement devices, circuit-element measuring instruments, signal-generation instruments, frequency- and time-measurement instruments, recording instruments, special function instruments, and microwave passive devices.

HP-associated contributors include Larry Carlson of Loveland, Art Darbie of New Jersey, Harley Halverson of Microwave, Dexter Hartke of Santa Clara, Chuck House of Colorado Springs, Gene Mlezko of AMD, Lee Thompson of Loveland, Marv Willrodt of Santa Clara, as well as Director Francis Moseley and Director Emeritus Fred Terman.

As you can see, and as Coombs states in his preface, this is a book about electronic instruments and how they work—by some of the world's most knowledgable instrument people.

Measure

EDITOR
Gordon Brown

ART DIRECTOR
Tom Martin

CONTRIBUTING EDITORS — AUTOMATIC MEASUREMENT, Karen Langford • AVONDALE, Mark Whittier • COLORADO SPRINGS, Rita Randolph • CUPERTINO, Al Fitch • EASTERN SALES, Ellen Denova • HPA, Jean Ewings • HP BENELUX, Amsterdam, Hans Vinkenoog • Brussels, Yvette Andre • HP (CANADA), Ian Jackson • HP GmbH, Rudi Grever • HP FRANCE, Jacques Brugere • HP LTD., Steve Gwenstery, Norma Ramsell • Slough, Linda Jones • HP SCANDINAVIA, Sid Mahr • HP SINGAPORE, Philip Tang • HP S.A., Ralph Kreile • HP VGmbH, Fred Soastel • LOVELAND, Charlotte Holley • MANUFACTURING, Tom Lowden • MEDICAL ELECTRONICS, Jean Dietz • MICROWAVE, Joanne Engelhardt • MIDWEST SALES, Helen-Marie Brasche • MOUNTAIN VIEW, Ed Ilgen • NEELY SALES, Bob Neale • NEW JERSEY, Joe Skowronski • SAN DIEGO, L.A. Frigham • SANTA CLARA, Mattie Cope • SOUTHERN SALES, Regional-Atlanta area, Mattie Ferguson • Texas area, Helen Hobson • YHP, Yoshiharu Okada.

1501 Page Mill Road, Palo Alto, California 94304