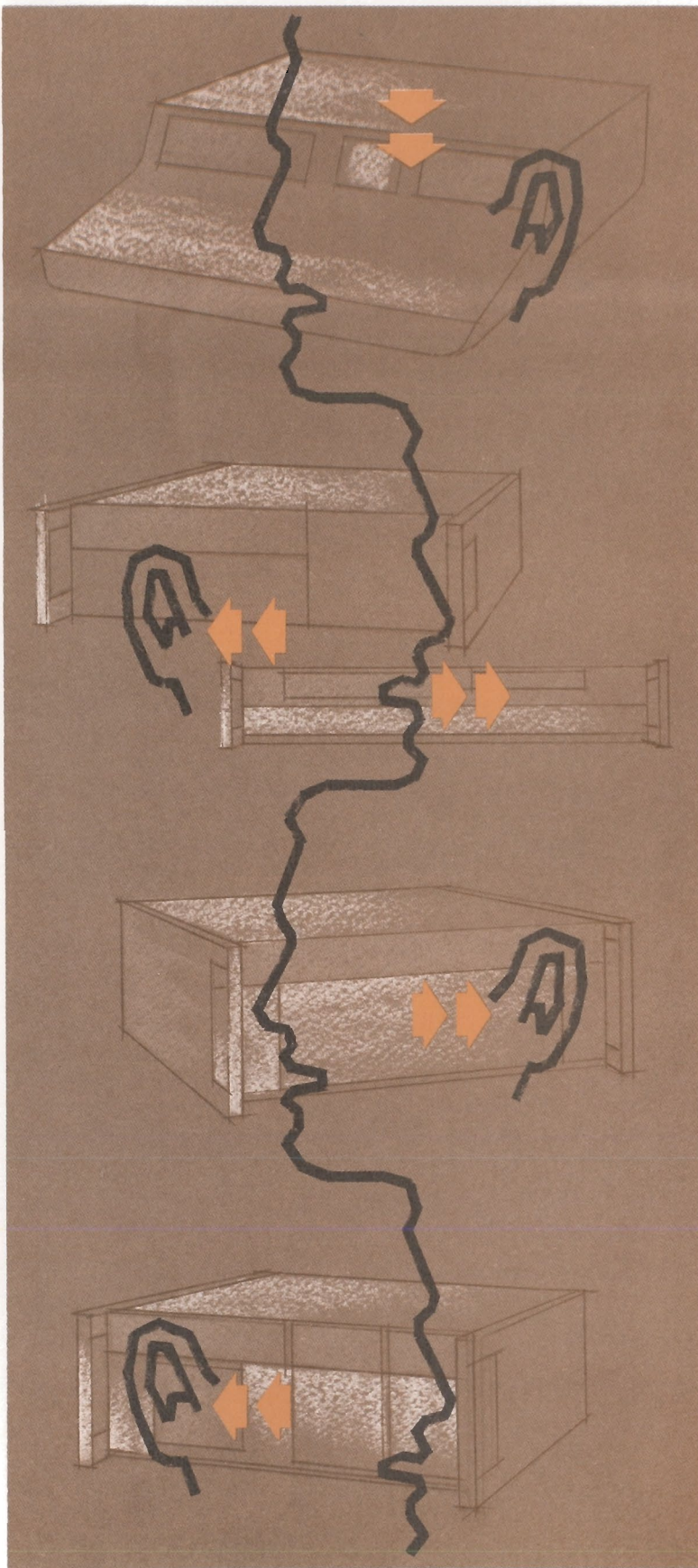


Measure

For the men and women of Hewlett-Packard November 1974

Heart of Heart,
pages 10-13



THE HP INTERFACE BUS—

*a long way down the road to
international agreement on
communications among
programmable instruments!*

□ To quote the HP news release of October 25, 1974, "the day has not yet arrived when anyone can simply plug together any desired combination of instruments and accessories to create a functioning instant system." Then it went on to say, however, that a long step in that direction has been taken with the HP Interface Bus which makes it possible to interconnect a wide variety of programmable instruments and devices, with a minimum of added engineering, to form complete systems.

O.K. But just what is "the HP Interface Bus"?

Is it a "product" as such? Don Loughry, the HP engineer (Corporate Engineering) who has had a key role in ushering the interface from concept to reality, says "Well, it's certainly the product of an agreement, first among HP divisions, and if all goes well, it will be an agreement among the 45 member nations of what is known as 'The International Electrotechnical Commission'. The 'bus' is a common path for the interchange of commands and measurement information among interconnected devices in an electronic measuring system. Of course agreement had to be reached

on such simple things as the number of wires in the interconnecting cables, and the kind of plug on each end. Much more important, though, was agreement on the way commands will be sent, acknowledged and executed, and the way measurement information will be exchanged. How the logic circuitry will work, that is. Now we are developing a growing family of instruments which can rather easily be connected together, because they are all programmed in the same way, so as to work together easily in almost any combination customers may desire."

Certainly it's logical to ask, "what kind of system? What might it do?" but the answer could fill many books. That's what's so great about the HP-IB (Hewlett-Packard Interface Bus). Things can go together in almost any way one might wish. Loveland's desktop calculators make first-rate "controllers," easily and quickly inter-

connected to instruments via the bus. One such system, acting under instructions recorded on a 9830A Calculator's tape cassette, is used to make automatic graphs of the performance of Santa Clara crystal oscillators, a difficult and exacting job, but a tedious one for human inspectors. Over a period of, perhaps, some days' time the calculator commands a precision frequency counter to make a measurement every so often. The information goes back to the calculator, which then figures out how far the crystal has drifted from some standard figure which it has stored; the calculator translates this information into instructions for an automatic HP plotter (the kind of recorder that draws graphs), which gradually creates a long-term graph from the data, actually drawing out on the paper the letters and numbers which correspond to various points on the line graph. From a small electronic clock-

calendar, the calculator can get the date and time of every measurement, and automatically put that information on the graph too. All the parts of the "system" are interconnected by the same standard cables, and all the parts respond to program commands in commonly-agreed ways, via the bus. It takes a good deal of skill to make programs that work well, and it takes electronic engineering talent to predict how all the parts will work together, but the actual putting together of the parts is pretty simple now; the time and cost of assembling such a system is greatly reduced. At the same time, Don cautions that it is not a "universal" interface, or a panacea for building all instrument systems. Most, maybe, but not all.

The history of the HP interface Bus is interwoven with various divisional product development programs as well as some corporate goals and programs. It goes

(continued)

An important stage in achieving an international instrument interface standard was reached at Bucharest, Romania, this September. There, the parent technical committee (TC 66, pictured below) of the International Electrotechnical Commission approved the latest draft proposal. In mid-1975 it will be up for a vote by the whole 55-nation IEC shown at right. HP's contribution to this standard has been significant.



back to the days in the latter '60s, when Bob Brunner, now Instruments Group marketing manager, began raising the question of how HP might achieve a common interface goal, a common way to program programmable instruments.

As it happened, several divisions were interested in this goal. An important date in these deliberations was December 7, 1971, the day representatives of many divisions met and established a combined set of detailed goals and objectives. Out of the meeting came an agreement and a commitment to go ahead on a common interface definition to serve the needs of many HP divisions.

This approach was soon to prove very important when the subject of an international interface standard emerged. Because HP is made up of many divisions, each with its own needs in such matters, the HP interface program in many ways closely paralleled that which could meet many of the requirements of the diversified worldwide electronics industry.

As it happened, the problem of standardizing the interface among various types of programmable measuring equipment was taken up by the International Electrotechnical Commission in 1972 on the initiative of the Germans. HP's interface formed the basis of the proposal made by the U.S.A. at a meeting of the IEC's measuring apparatus committee (Working Group 3) at Munich that year. Meeting this September in Bucharest, the parent technical committee (TC 66) approved the latest draft proposal which now awaits a formal vote by all member nations of the IEC in late 1975. On the national scene the IEEE is also evaluating a similar draft standard.

Meanwhile, products using the interface have begun to emerge with increasing frequency. Some of the current product examples are shown in the box on page 5. Eventually, many lines of HP programmable products will be included.

Reviewing this development, Don Loughry sees it as another—and prime—example of HP team effort. In particular, he credits Jerry Nelson of Loveland, Dave Ricci of Santa Clara, and Daryl Knoblock of Data Systems with major contributions

to the interface system design concepts. Marco Negrete of the Instruments Group, Dick Moore of San Diego, and Don Schulz at Loveland were also key participants as well as many other engineers throughout HP. Don himself anchored the program within HP, and is an active participant in several IEC and IEEE related standards bodies.

The international activity has been a great personal experience, according to Don. "It has been a privilege and opportunity to see and learn first-hand how people of different nations think—how they reflect the needs of their own people and react to the necessities of a common set of goals. Each individual contributed his own expertise and insight in arriving at a common solution.

"Certainly, we could have gone our own way with an interface system, strictly our own HP brand. There may even have been some short-term benefit in doing that. But in the long run it is fundamentally important for HP and our customers to be able to interconnect products from different parts of the world. While HP has a

very wide spectrum of products, there still are some things we don't offer.

"So the interface standard is a contribution by our industry in making it possible to put together more, new and versatile instrumentation systems.

"Now, while instrument systems are not the answer to all of the world's problems, still they can at least begin to address some of the basic problems we have—in terms of lowering the costs of measurement and in automating production.

"I believe the world can use some help in this respect. When you consider the tasks that instrument systems are now and will continue to be doing—highly repetitive remote monitoring of technical equipment, meticulous record-keeping, even making decisions on the basis of the observations and making correctional adjustments—these are tasks automatic machines can do as well as humans, but without the tedium. What the HP-Interface Bus is all about is making these automatic systems easier to build and much less costly, so they can be applied to far more tasks than ever before." □

***"...the interface standard is a contribution...
making it possible to put together more,
new and versatile instrumentation systems."***

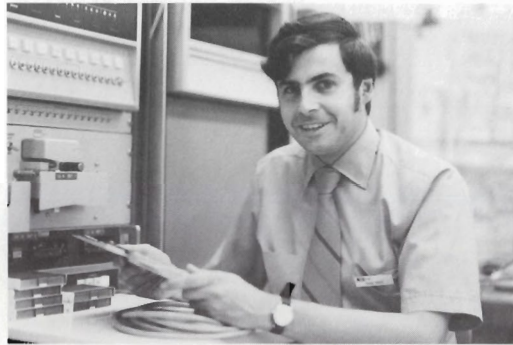


**Jerry Nelson
Loveland
Instrument Division**



**Don Loughry
Corporate Engineering**

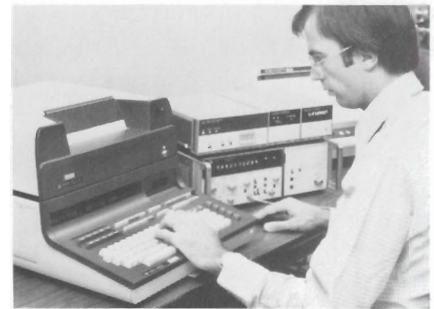
**Dave Ricci
Santa Clara Division**



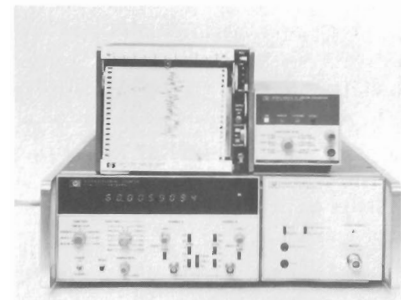
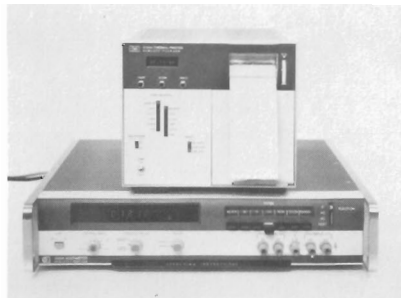
***Pictured here are some of the earliest applications
of the HP Interface Bus***



At left is the 3050B automatic data acquisition system from AMD, representing usage in a standard-type system, one which uses a scanner with multimeter and calculator for a low-cost solution to data gathering and data reduction.



Adjacent is seen the simplest kind of HP-IB application involving a single cable connecting two bus-programmable instruments. A two-cable system is represented at lower right, here involving a counter feeding data to a D-to-A converter which in turn feeds analog data to the strip recorder. Even more complex is the system shown above right: the calculator directs operations involving a digital clock, X-Y recorder and numeric display.



□

HP through the lens of

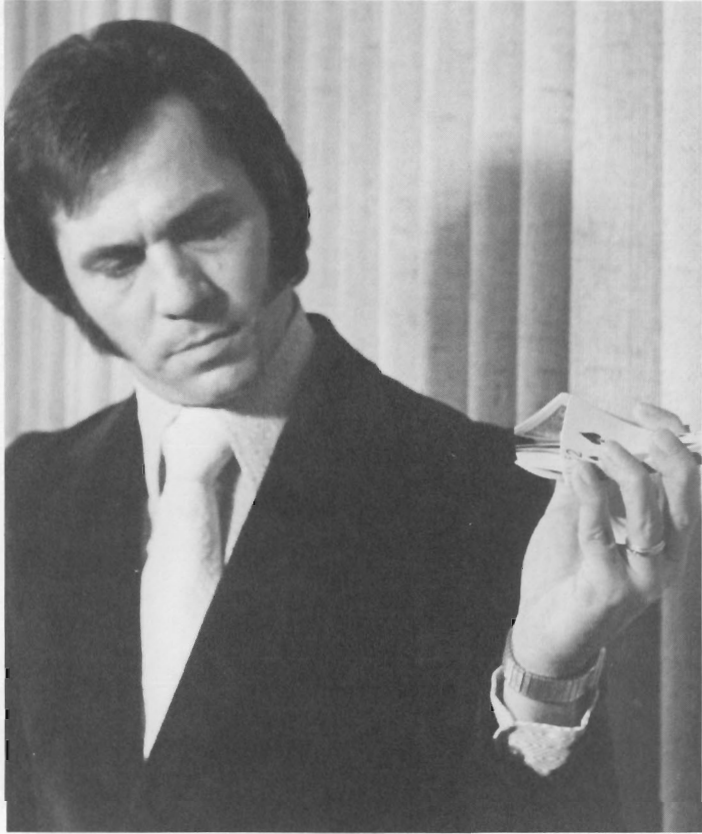
bringing into focus some of the events and achievements that help make the Hewlett-Packard world go 'round.



You might be excused for wondering if **Steen Harreschou**, Instruments sales manager in Denmark, has taken to foot as a way of calling on his Copenhagen customers. On the job Steen drives an 18-month-old Renault that originally cost some \$3,000 at the factory—but which actually cost HP \$10,000 to put on the road, due to import taxes and license fees that are still going upward! The taxes are designed to keep kronen from flowing out of the country. Steen, by the way, has discovered an effective way of deciding how good a Danish-based competitor is—by how much HP equipment they buy. Although there is no pure “electronics” industry in Denmark, there are a number of local producers of instruments that compete with HP products. Similar situations prevail in a number of European countries.

As the “New Europe” of high-rise apartment buildings and office complexes arises amidst a forest of construction cranes, thoughtful and adventurous people are seeking out older structures with a view to saving them. **Christian Ray**, special R&D technician at the Grenoble division, last year purchased such a dwelling, one that predates Napoleon III. Very sturdy if somewhat aged in its wiring and plumbing, the home comes complete with a cellar wine press and spring-fed horse trough. Christian expects to have lots of fun restoring the structure and adding a few modern conveniences.





Shuffling a deck of cards with one hand is not your average card player's routine. But then, **Bill Brunelli**, manager of Printed Circuit assembly at Loveland Division, is not an average player. Rather, he is one of that band of skilled deceivers known variously as "card mechanics," "card manipulators," or plain "card sharps!" Bill came by this ability through thousands of hours of practice, beginning as a magic-struck 12-year-old in the southern Colorado mining community of Trinidad. There, the poker players in his father's bar challenged and encouraged young Bill to new heights of prestidigitation. Nevada gamblers passing through town let him in on their secrets, including such swifities as "second decking"—dealing the card second from the top after having peeked at the top card (you'd never know how unless he showed you). All of which makes Brunelli a considerable threat in any game where he might get a chance to deal. Bill admits as much—but, he won't do it. Not only is he morally against cheating, but—frankly—he doesn't really enjoy playing card games. He will, however, put on a free show for a good cause. Thank you, Maestro Brunelli.

Is it possible that the proverbial thrift of the people of Scotland has something to do with the ingenuity of the bankers in making saving so convenient? Certainly, there is some evidence of such at HP's South Queensferry plant. Here the Bank of Scotland has installed a commercial bank facility right in the main building, offering twice-a-week service to HP people.

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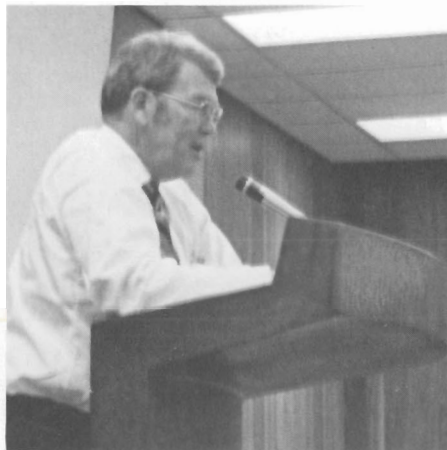
Set amidst the hills of Palo Alto is the recently purchased facility now being redesigned inside for occupancy by the LSI laboratory of HP Labs. The 88,000 square-foot building is set on a 25-acre site at 3500 Deer Creek Road, Palo Alto.

The building formerly housed the Fairchild Systems Technology Division which has moved to San Jose. HP's LSI lab was organized as a separate laboratory department earlier this year, with Bob Grimm as director and John Moll as technical director.



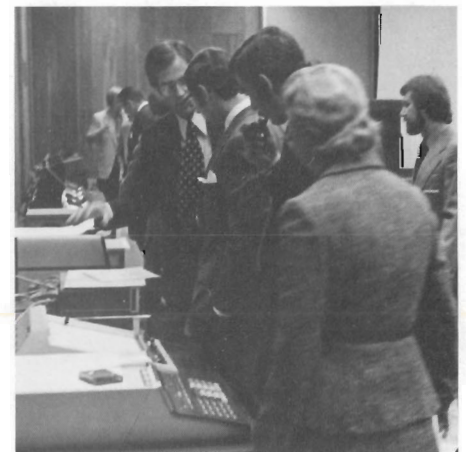
through the lens

A standing-room-only audience of more than 100 securities analysts plus some journalists occupied the 5M conference room at Stanford Park on October 9 to hear—and raise questions—about Hewlett-Packard's business prospects in 1975. President Bill Hewlett reviewed the overall corporate expectations, while executive vice presidents Ralph Lee and John Young discussed the outlook on a product-group basis. Shown is a general view of the meeting plus a look at the attention-getting exhibit of certain new products. These particular items were selected to represent important ways in which HP instruments and systems can offer customers new solutions to problems in improving productivity. During the course of the two-and-a-half hour meeting many topics were covered relating to the effects of economic events on the company's business. A few of these same subjects are touched on by Bill Hewlett in his letter on page 15.

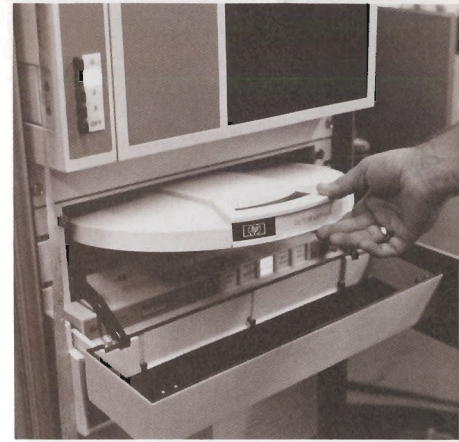
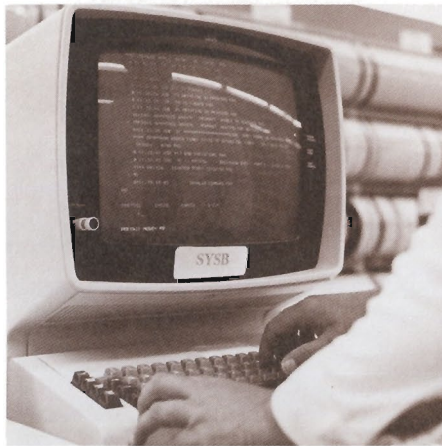




New HP sales office buildings are popping up like—like sales offices! Recent major additions constructed by HP include the new headquarters for HP Australasia near Melbourne, HP Canada's new headquarters near Toronto, new United Kingdom headquarters for HP Ltd. at Winnersh, and—as shown here—the Neely Sales Region's new northern area office at Santa Clara, California. In each case they replaced older, inadequate quarters. The new Neely facility is situated in the San Tomas Industrial Park, some 20 miles south of the former location in Palo Alto. The site is close to San Jose Airport and near key highway intersections. In addition to Neely people, the 80,000 square-foot building houses the freight consolidation activity of Intercontinental Operations.



Heart is ALL people



...well almost all



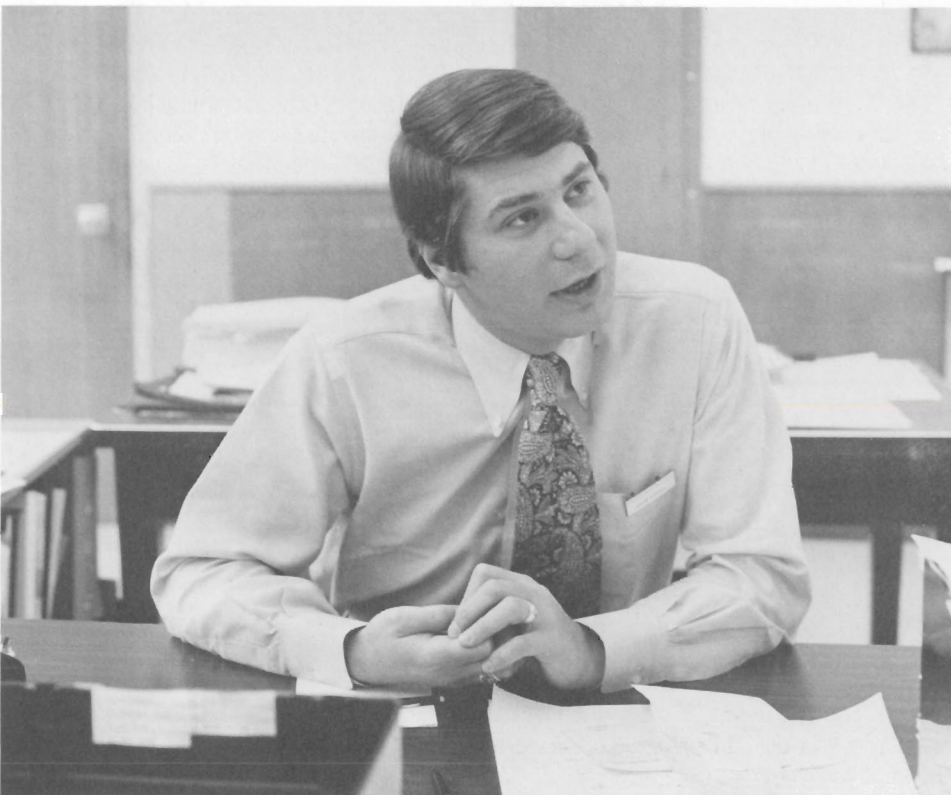
□ Upon learning that Cochise is to become part of the Hewlett-Packard organization, students of U.S. history might well wonder at this odd amalgamation of famed Apache warrior chief and high technology company.

Not to beat about the sage brush, "Cochise" turns out to be the code name for HP's new centralized and computerized system serving Europe's order processing organization. The name was bestowed by its European authors because, as they suggest, "the situation for order processing is probably very much like it was for Cochise back in the old days of the West, namely fighting at all lines and sides." Later this month, the Cochise system is scheduled to be hooked up to the parent "Heart" system that presently serves the U.S., Canada and Intercontinental Operations in Palo Alto.

By itself it's not that big a deal. But combined with the recent launching of a company-wide Heart training program plus the growing significance of the Heart system in company operations, yes, Heart-Cochise is today a very big deal.

At this point one may well wonder as to just what Heart-Cochise can do for order processing. What are the principal functions of the system? The Heart manual describes it as a highly automated system for transmitting orders, reporting on the status of orders, and initiating the various shipping and invoicing tasks. According to the system's architects in Corporate Marketing Services, a major distinction in all of this—compared with the previous system—is that Heart-Cochise works from a large order data base, giving it a high degree of flexibility in its operations and in providing a ready source for up-to-the-minute corporate statistics.

Yet, once again, it is clear how dependent such systems are on the people who use and support them. In fact, the dependence on people in order processing roles is greater than ever in spite of procedures that are quite a bit simpler than before. Why is this so? Let's take a look:



An intensive training program in the complexities of the Heart system was recently put into the field, as shown in these photographs from the Midwest and Southern sales regions. At top, Midwest's Carl Ingrassia discusses overall purpose of Heart which has just been presented on a videotape to order processing coordinators at the Skokie office. Next, SSR's training manager Dave Askeland reviews seminar problems with Mary Benson, Lucy Hart, Tony Wuest, and Scott Eanes at the Atlanta office. For a start the training will focus on new people, but eventually all OP hands will have had some training in Heart.

John Toppel, Heart systems analyst who spearheads the training program now underway, comments that "a lot has happened since our first training efforts at the time the Heart system first came up. We now recognize the need to provide continuous and comprehensive training in all phases of order processing. This means not only in the specific operating skills, but also an understanding of the extremely important role they play in the functioning of the entire corporation. So many vital responsibilities such as accounts receivable, market and sales forecasting, and customer relations, hinge on the proper use of the order processing system that we have to recognize the value of competent, well-trained coordinators. The new domestic training program and the Cochise training now going on in Europe will help achieve that goal."

(continued)

heart

Because Heart automatically reaches far into the Hewlett-Packard process of recording and fulfilling customer orders, an error made at the outset is multiplied and is difficult to retrieve. Accuracy is thus more critical than in the previous system. The Heart process starts in the regional and country order processing centers by coordinators such as **Elaine Coates** of Neely's Santa Clara office. The order itself may reach Elaine either by letter or phone. She will carefully check it for accuracy and consistency, then turn the vital information into a code useful to Heart's HP computers. In the course of this, Elaine will obtain catalog numbers and other data from the microfiche file on her desk. The simplicity of the system means OP coordinators can handle far more orders per day than in pre-Heart times.



A key product of the Heart system is the statistical picture it is able to offer, on a daily basis, according to Lynne Zinola, OP statistics supervisor at Santa Clara Division. "Knowing the total dollar volume of orders on a daily basis is a big improvement," she said. "In December, with the linking of Heart and Cochise, we will be able to break the order picture down into product lines. The product managers, as well as marketing and division managers, are very anxious to have that happen so they can get a worldwide view of sales almost immediately. From my own point of view, I'll be glad to see Cochise start because, until it does, we are operating two different systems."



After editing by the order processing supervisor, coded orders are entered onto magnetic tape by regional order entry coordinators. The taped data then is transmitted to the Corporate EDP center in Stanford Park at a certain time each day. Here, **Renee Boles**, foreground, and **Cheryl Reynolds** of Neely's Santa Clara office prepare for their late afternoon computer-to-computer hookup. Things can get rather hectic around the OP area as the deadline arrives, particularly on those days when customers tend to bunch their orders. OP supervisors look for cool heads, fast hands and accurate reporting at such times.



Years of effort in designing and programming the new corporate order processing system will reach a new high point as Fiscal 1975 gets underway. Shown discussing some of the problems in joining the U.S.-based Heart system to the Europe-based Cochise system are, clockwise from left: **Joe Parks** (systems analyst), **Allan Imamoto** (systems analyst), **Hal Eubanks** (systems analyst), **John Toppel** (systems analyst), **Hank Taylor** (Corporate Marketing Services manager), **Joe Myers** (European Systems and Communications manager), and **Jim Duggan** (systems analyst).

□

News in Brief

Palo Alto — A number of new assignments have been made by the Instrument, Computer Systems, and European organizations following the Corporate management restructuring announced in September. In addition, the Medical Group has further defined divisional responsibilities.

INSTRUMENT GROUP:

Marco Negrete is now group engineering manager, a new position designed to help manage the increasing interaction between product development programs of member divisions.

Bob Brunner is group marketing manager. Previously he was International marketing manager for the former Electronic Products Group. Working directly for the group marketing manager will be the sales managers of North America (Bob Rogers), Europe (David Baldwin), and InterCon (George Cobbe). In addition, Brunner will be responsible for group activities in service, advertising and training.

COMPUTER SYSTEMS GROUP:

Ben Holmes is group marketing manager, with a prime mission of unifying the field activities on a worldwide basis.

Dick Anderson has moved from AMD to Data Systems as general manager. The R&D, Marketing and Systems Software activities related to the 9600 system also are shifted from AMD to Data Systems as a means of providing a sharper focus to product line responsibilities.

Al Seely is the new general manager of AMD. The division will have responsibility for the 8500/9500 Systems product line, and for the time being will continue to hold production responsibility for the 9600 line.

Marketing manager for AMD is Roger Ueltzen.

Boise operations, having taken on R&D and Marketing functions, will now report as a division, with Ray Smelek as division general manager.

Finance manager for the new group is John Russell.

EUROPEAN OPERATIONS:

Tony Vossen, formerly Northern Sales Region manager, will become Customer Support manager, replacing Kurt Aeberli who is resigning at year end. Tony will also have responsibility for Parts Center-Europe, including the replacement parts

program and all international repair center activities at the European factories.

Fred Schroeder will become the new Northern Sales Region manager.

Directly representing the new product groups in Europe will be Heiner Blaesser for the Computer Systems Group, David Baldwin for the Instrument Group, and Jean Baillor for the Components Group.

MEDICAL PRODUCTS GROUP:

As of November 1, the Waltham and Andover operations will function as profit centers with full divisional responsibility. General managers are Lew Platt at Waltham and Burt Dole at Andover. Group marketing manager is Bob Hungate.

Geneva — The Secretariat of the European Physical Society (EPS) in Geneva has announced the establishment of the Hewlett-Packard Europhysics Award for Outstanding Achievement in Solid State Physics.

A prize of 20,000 Swiss francs (approx. \$7,000 U.S.) will be awarded each year by EPS to one or several physicists, without restriction as to nationality, thanks to an annual donation made to the Society by Hewlett-Packard S.A., the European headquarters organization of HP.

According to the charter "the award shall be given in recognition of a recent work by one or more individuals in the area of physics of condensed matter, specifically work leading to advances in the fields of electronic, electrical and materials engineering which, in the opinion of the Society's selection committee, represents scientific excellence."

The award will be presented by the EPS at an annual ceremony to a recipient selected by a committee of scientists.

The first award will be made on the occasion of the Third EPS General Conference in Bucharest in September, 1975.

Chicago — Two HP products are included among "the 100 most significant technical products" produced in the United States in the past year. Selected by a panel of scientists and engineers in an annual contest sponsored by Industrial Research Inc. were Loveland Instrument Division's new spectrum analyzer and Avondale Division's new 5830A keyboard-controlled gas chromatograph.



From the president's desk

This is traditionally the time when I have the chance to talk about the year just completed and the prospects for the year ahead. For the former, the view is very good. On the other hand, the prospects for the latter are unclear.

First, let me talk about our performance in fiscal 1974. It must be realized of course that we have not as yet closed our books, but we know within a reasonable tolerance what our overall performance will be. I can assure you that it was very good compared to fiscal 1973. This is probably best expressed by comparing earnings per share. In 1973 they were \$1.89, and this year they will be somewhere between \$2.80 and \$2.90. This is roughly a 50 percent improvement in earnings. Incidentally, coupled with better asset management, much of the earnings was used to reduce our short-term borrowings which fell from \$120 million early in the fiscal year to about \$40 million at the end of the year. This debt reduction has substantially strengthened the corporation and we were indeed fortunate to be able to achieve this result at a time when many companies were going further into debt.

Our shipments increased from \$661 million to approximately \$870 million, about a 31 percent increase. Thus, you can see that not only did we have a very good year for shipments, but also that all of you did an absolutely outstanding job in production efficiency.

We expect to know the exact level of our profit sharing by about the time this issue reaches you, and I know that you are all making mental estimates on what the profit sharing will mean to you personally. I don't know what the bonus percentage figure will be, but in making estimates it should be remembered that the number of employees eligible to participate in profit sharing will have increased somewhat since the first half.

But really, all of these numbers only tell about the past and give little indication about the future. The disturb-

ing part about the past year was the trend of incoming orders. If one compares each of the quarters in 1974 with their counterparts in 1973, one finds that the orders increase in the first quarter was 39 percent; 29 percent in the second quarter; 24 percent in the third quarter; and, a zero percent increase in the fourth quarter.

It is this declining rate of orders that causes the greatest concern to those of us who have responsibility for overall management of the company. The simple fact of the matter is that it appears that at a number of our divisions our ability to produce is exceeding the incoming order rate. Thus, we face very much the same problem that we had in the Spring of 1970, at which time we found it necessary to institute a plan of taking every other Friday off without pay.

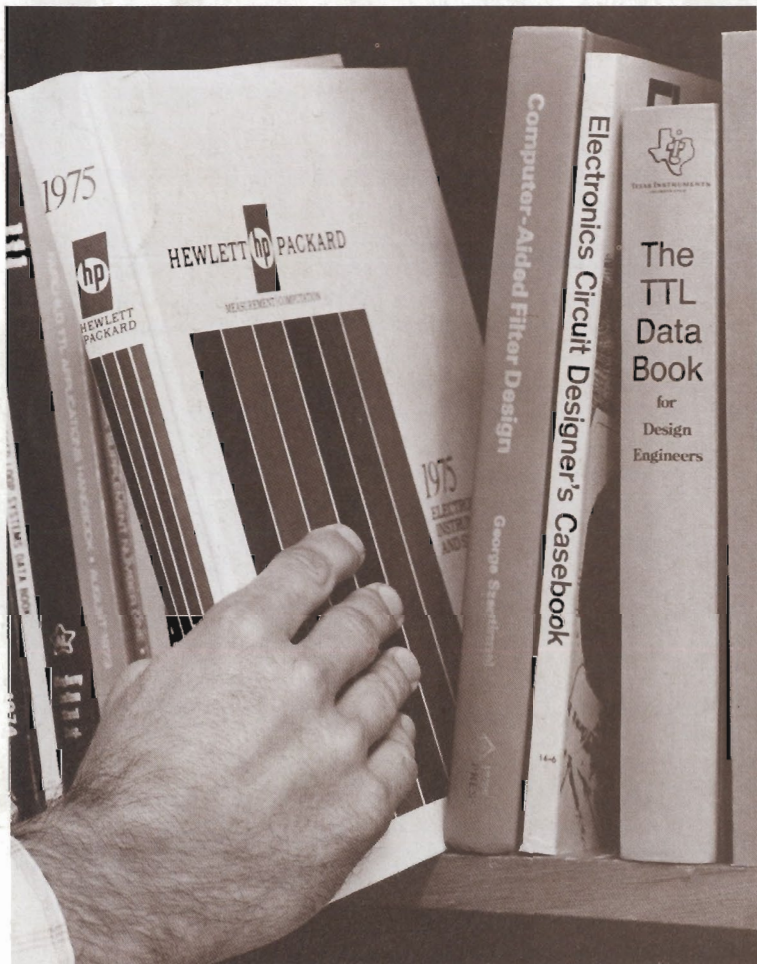
However, there are differences between then and now, and these differences are worthy of note. Back then, we had a long period of weak orders—this year, up until recently, we have had very strong orders. Back then, it appeared likely that the problem might persist for some time—today, it is not evident whether the current order shortage is a short-term phenomena, or one that is likely to last. In either case, however, then and now, we felt that we should try to bridge the gap by trying to maintain our work force intact by reduced work, rather than the more traumatic experience of wide scale layoffs. As many of you know, we have essentially had a hiring freeze for the last few months, and have made every effort to fill replacement vacancies by transfers. We will continue this policy, and indeed, will try to make it more attractive for people to move from one location to another to resolve employment unbalances.

The obvious question is, “how long will this business condition last?”—and that is a question that I cannot answer now. If the situation has not improved by Christmas we may need to take additional time off without pay during that period. However, I would expect that by the beginning of 1975 some of our new product programs should start to have an impact, and thus, even though the market may be soft, begin to improve our order picture. Needless to say, if any of you in those divisions currently affected by the order problem wish to work a shorter work period between now and the end of the year (subject to the approval of your supervisor), you are of course most welcome to do so.

I know this sounds like a discouraging picture, and people often misinterpret frankness for pessimism. I do not feel pessimistic. I believe that we have a strong outlook and that 1975 will be a reasonably good year. I do, however, expect a weak order pattern during the first quarter, and this is basically the problem we are attempting to solve by taking the three days off prior to Thanksgiving.

Bill Hewlett

Supersalesperson



Who do our customers consult most often?
 Who is it they generally first call on?
 And who puts the most information right
 at the customer's fingertips?

Why the HP catalog, that's who.

The latest version of this super sales representative came off the press recently and is now being distributed to customers around the world. A 572-page publication with a rainbow-like cover design, the 1975 catalog contains specifications and related information for over 900 instruments, calculators, computers and systems, of which 70 are new. At that, these 900 products represent chiefly the traditional measurement and computation lines; to include all of the more than 3,400 items appearing on the HP price list would have taken a 2,000-page catalog. As it is, medical, analytical, components, civil engineering and x-ray products, while briefly covered here, have their own catalogs. According to a survey of catalog users, the average copy will be used by three or four people about two or three times a month; most of these times the customer is looking to see if HP has some solution to offer for a particular problem in measurement or computation. That's what HP's business is all about.

Measure

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