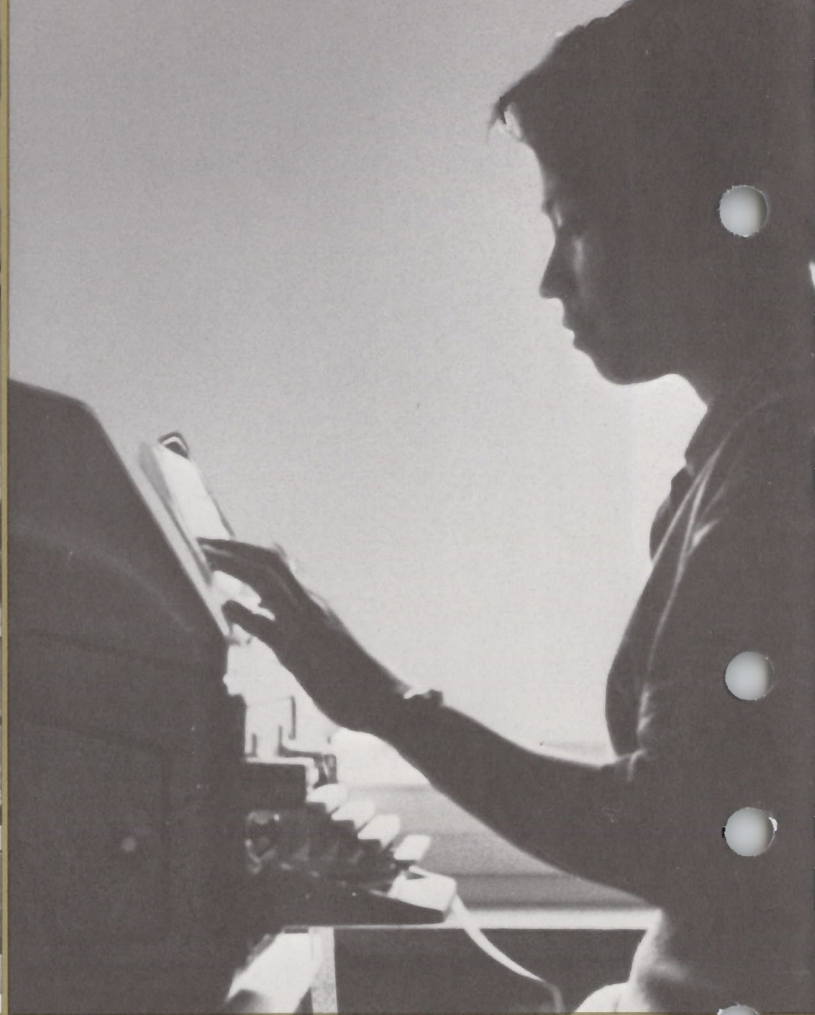
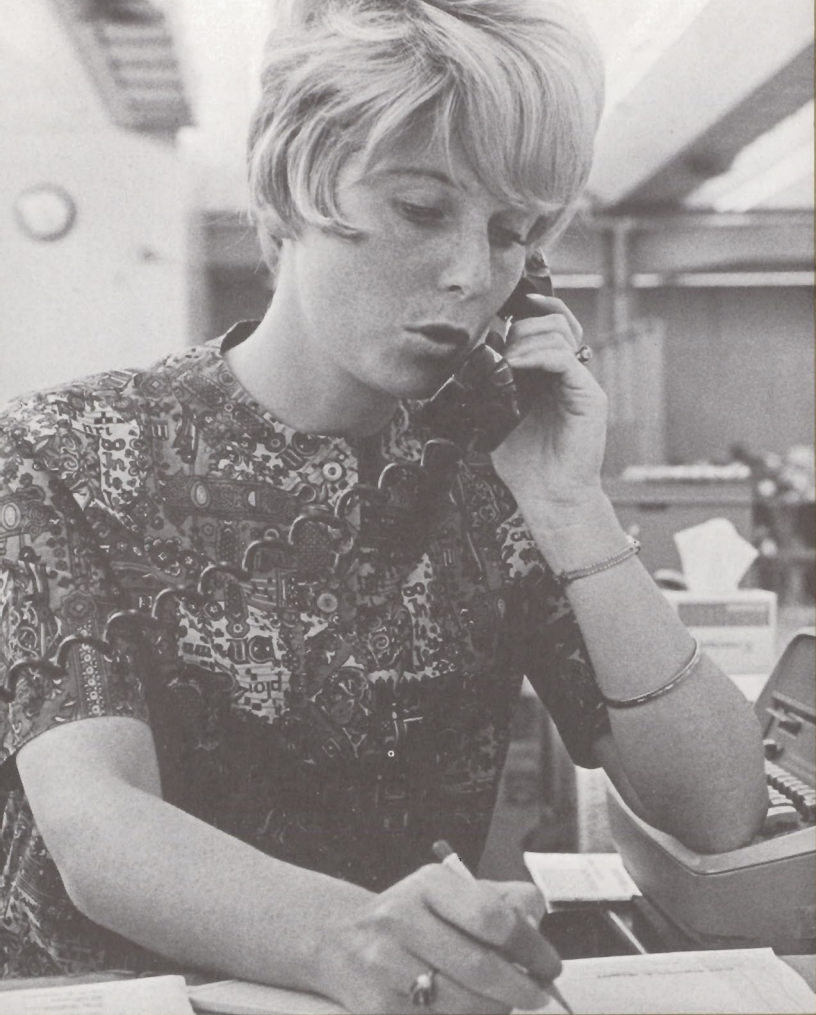
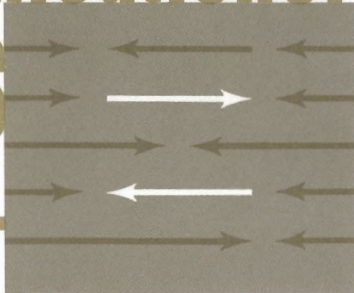


Measure

For the men and women of Hewlett-Packard/NOVEMBER 1967



Communications: HP's three- million- dollar nickel



□ Considering how smoothly it operates, HP's communications network must be fairly simple and basic. A customer calls a sales office to place an order. If it's a new instrument order, the sales office teletypes it via SOOPS (Sales Office Order Processing System). If the order is for a part, then it is transmitted via POPS (Parts Order Processing System). If there have been any questions concerning customer requirements or delivery, more likely several phone calls will be made over a WATS system (Wide Area Telephone Service). If the order originated in Europe it will first go to HPSA headquarters in Geneva via local TELEX (teletype), after which it will be placed on a DATEX (high-speed tape) for transmission to the U.S., where it will be relayed to the appropriate manufacturing division. In almost every case, the order will arrive at its intended destination the same day it was placed. Regardless of the point of origin or destination of the order, it will have been typed only once. A confirming message will be on its way the next day.

Among the many faces and facets of HP's communications network: Carol Armstrong, upper left; Lila Sebastian, upper right; Jean Smith, lower left; Judy Horder, lower right.

Obviously, then, the HP communications network is really a complex and highly sophisticated system. And it has to be if it is to provide the timely intercommunication required throughout HP.

There's no doubt about which communications method — other than face-to-face conversation — heads the list. Under 423 different telephone exchange numbers, the company uses approximately 6,000 individual phone instruments generating several hundred thousand out-of-area calls each month. The number of local free-dialing and in-plant calls is vastly greater than that, but no actual count is kept because no unit charges are involved.

For the most part, HP people use the phone to communicate with other members of the company. An analysis of toll charges shows that from 80 to 90 percent are for intra-company calls. This fact loses its surprise when you consider that large numbers of calls to customers and suppliers are placed on a local basis and thus do not show up as toll calls.

Although the phone obviously dominates, a great many of the company's more complex routine or long-distance messages flow via some 140 TWX and DATEX machines and other special devices linking all facilities and offices around the world. Last October 11, for example, the company's Stanford complex logged in 322 messages averaging 303 alphabet characters per message via these machines. The outgoing traffic amounted to 382 messages of 302 character average.

To speed up the flow of such messages between European sales offices and the U.S., HP helped pioneer in the use of high-speed data transmission. Known as DATEX, the system uses punched tape to send messages at the rate of 1,200 words a minute between the U.S. and the Geneva office. DATEX terminals at Rockaway and Palo Alto receive or send these rapid-fire communications and share in the job of gathering and distributing them for the divisions. Second only to Time-Life, Inc., in installing DATEX in Europe, HP has found the system a big money saver as well as speedy. For only \$20 it transmits four minutes of data across the Atlantic for what would previously have cost \$219 and have tied up several TELEX machines and operators for more than one hour.

Efficiency is certainly one of the watchwords in creating and maintaining the company's total communications network. With approximately \$3 million in carrier tolls and charges accumulated during the past year, there obviously is plenty to watch for.

According to Gene Doucette, corporate manager of communications systems, the company policy is to provide service solely on the basis of need.

"Some firms tend to equip employees according to their status. If a guy becomes an executive, then he's

(continued)

COMMUNICATIONS

going to get a 'princess' phone and a whole bunch of buttons and lights whether he needs them or not.

"Not so, here. Many people in HP have much more equipment than Dave Packard and Bill Hewlett — because they need it."

Another tradition is that people should be available for communications. Hence the paging system.

"We would like to come up with some paging system other than the audio intercom, perhaps a silent type using pocket devices so that other people would not be distracted. Portable plant phones are probably a couple of years away, but we will take a close look at them when they become available," said Doucette.

There will be other things to look at in the years just ahead. Nicholas Johnson, newest member of the Federal Communications Commission, says we are in the midst of a communications revolution.

"For example, communications systems may interconnect people and huge computers with stores of data on virtually any subject — law, medicine, or perhaps a single, nationwide system of 'commercial accounts' cleared and balanced by computer.

"Establishment of a broadband cable capability into most homes and businesses would permit two-way transmission of data, facsimile printing, teaching machines, picture telephones, and access to a variety of switched networks of similar receivers — as well as today's 'cable television'.

"We will probably see a greatly increased use of radio for business purposes — control of transportation units with increased safety, mobile telephones, and communications networks for a computer control of industrial processes."

A unique organization helps HP keep an eye on all such communication items, particularly where questions of efficiency and cost are involved. It goes by the name of TONG, bestowed only semi-humorously about nine months ago when an HP group questioned an item or two. The group, including Doucette as HP's only full-time communications analyst and consultant and Harold Petersen, who's responsible for service at the Stanford complex, liked the name. They thereupon translated TONG as "Telephone Octopus Neutralizing Group." Representatives of other local firms later joined them in exchanging ideas on communications techniques.

TONG members are apt to be heard questioning the need for all those hold buttons and lights that add to the cost of a phone. On a larger scale, they analyze and compare whole systems. A current project is examining whether HP should retain its WATS lines or

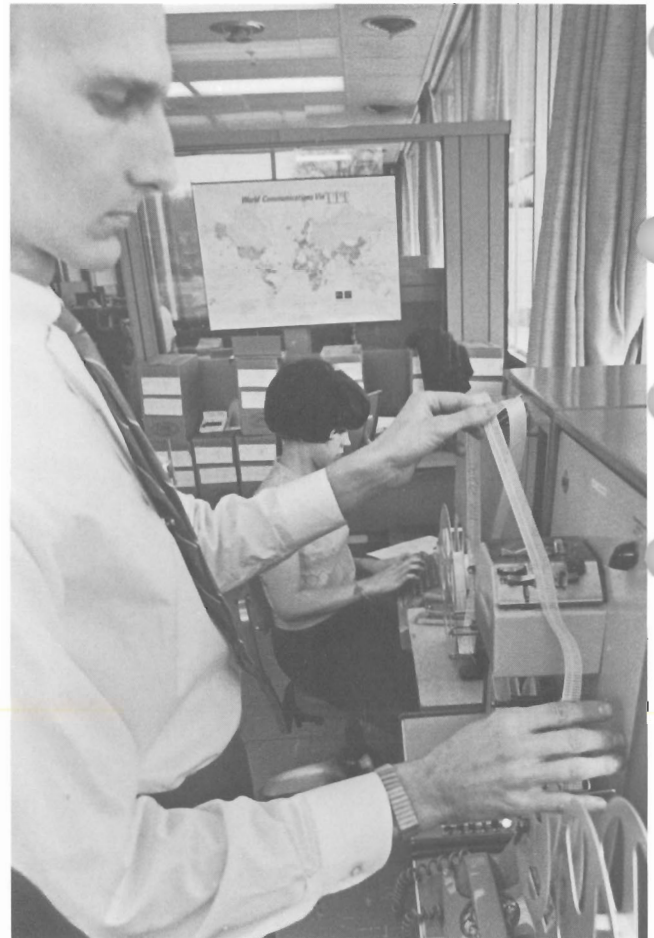
use regular long distance (lower rates went into effect November 1).

How has such vigilance paid off?

Doucette figures the company's communication system rates very high: "We're not ready yet for the private-line 'switched network' that some industrial giants use to link all their locations. That's a new order of magnitude in cost and need.

"But we compare very favorably with older organizations in our own league. Cost wise, our communications will be about 1.25 percent of sales in 1967 compared to the industry average of 1.6 percent.

"We like to stretch our network nickel — as long as it meets our communications needs." □



Messages received from Europe via high-speed punched tape are screened in Rockaway by Joe Chaston. Rockaway and Palo Alto are both distribution points for European messages divisions in the U.S. Known as DATEX, the system transmits 1,200 words a minute.

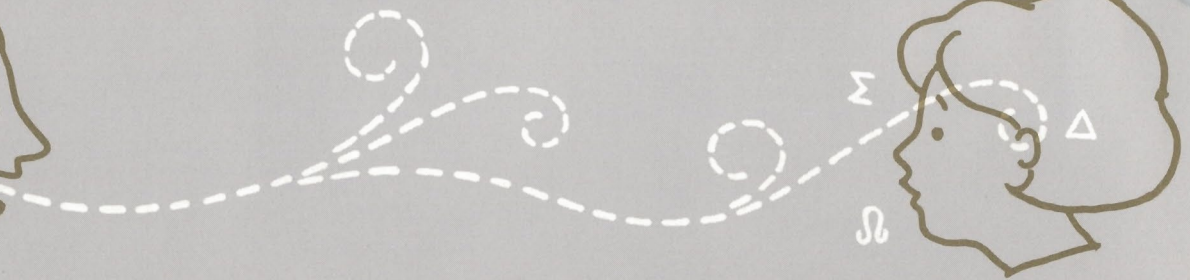


A variety of the most sophisticated communications equipment in existence is involved in POPS, HP's parts order processing system. Here Jennifer Bailes, central operator, works with a dataphone that links page-reading instruments at 23 company locations with Palo Alto's 360 computer, which prints out shipping instructions.



Gary Fisher, center, discusses plans for telephone changes in his corporate mail department with Gene Doucette, left, manager of corporate communications systems, and Harold Petersen, right, phone systems supervisor for Stanford complex.

Line Lingo (or, How's your HP vocabulary?)



Just about everybody in HP knows what a balometer is, naturally. And, of course the variable attenuator, or the double-balanced mixer, and even a BNC-to-Banana are everyday expressions. Yes! That being the case we can move on to the next lesson. This takes the form of a short quiz on HP "line lingo" – that picturesque language spoken by production employees. It is absolutely essential that you learn something of this language. Otherwise you may never recognize a "jumper stretcher" when you see one. Careers have been ruined for less!

1. "Spaghetti" is:

- A. A code name for the new network analyzer
- B. A wiring insulator
- C. Mandatory in company cafeterias

2. "Spiders" are:

- A. Trespassers
- B. Self-powered components
- C. 6- and 10-legged integrated circuits

3. "Chocolate drops" are found:

- A. In vending machines
- B. In bins holding small brown capacitors
- C. On housemothers' desks

4. "Jumpers" are:

- A. Worn on Wednesdays
- B. Wiring devices
- C. Participants in the HP Olympics

5. A "sugar joint" is:

- A. Where they keep the money
- B. A clinic for candy addicts
- C. A solder joint that has crystallized because of too much heat

6. HP "hose" is:

- A. Coaxial cable
- B. Stockings designed to match a "jumper"
- C. An underground company newspaper

7. "Jumper stretchers" are:

- A. Worn on alternate Wednesdays
- B. Mythical devices which newcomers are asked to locate
- C. Elastic tape measures

8. A "pigtail" describes:

- A. A never-ending spiral circuit
- B. The "ground" on a coaxial cable
- C. Pliers that enable the user to get a better grip on himself, particularly in the mornings.

9. To "scrunch" is to:

- A. Crimp a solderless terminal
- B. Sit on somebody's lunch by mistake
- C. Laminate layers of a PC board

10. "Mickey Mice" are:

- A. Squeaky transistors
- B. Microfarads
- C. Found in unsanitary sugar joints

11. "Bubbles" are:

- A. Product research and development schemes
- B. Coil-wound resistors of a certain shape
- C. Used to test leaky vacuum tubes

12. "Beauty spots" are:

- A. Located in all company recreational areas
- B. Areas masked during soldering
- C. Available on request to your supervisor

CORRECT ANSWERS:

12-B	9-A	6-A	3-B
11-B	8-B	5-C	2-C
10-B	7-B	4-B	1-B

More room to grow

**A portfolio of HP facilities
built during fiscal 1967**

Growth of physical facilities is usually a fairly reliable guide to the growth of a business. Judged on this basis, Hewlett-Packard has been keeping busy lately. The past fiscal year has been one of the most active in the company's history for expansion of its working space.

Eight new buildings have gone into service at various locations. Seven were newly constructed by HP, and the eighth is a relatively new building bought from another firm in Palo Alto. Altogether, the eight buildings contain 342,000 square feet of floor space — nearly eight acres under roof. These new additions bring the total available floor space at HP locations around the world to almost 60 acres! That's about five acres more space than New York's Pan Am building, the world's largest commercial office structure, has to offer. A photo roundup of the new facilities is presented on the following pages.

(continued)





COLORADO SPRINGS — The largest single HP building project in the past year — this 154,000-square-foot plant — more than doubles the space available to the Colorado Springs Division. Engineering and manufacturing facilities moved in last July, including activities housed in leased quarters at another Colorado Springs location. All of the division's activities are now consolidated on one 88-acre site in Pikes Peak Industrial Park.



LAS CRUCES, NEW MEXICO — The Las Cruces sales office, serving customers in southern New Mexico and El Paso County, Texas, moved into this new building in May. The 3,200-square-foot facility provides space for offices as well as product demonstrations and application seminars.

More room to grow



POINTE CLAIRE, QUEBEC — Occupied the first of the year, this new building near Montreal houses the sales offices of HP (Canada) Limited. The single-story, 12,000-square-foot building has a brick and glass exterior, topped by a bronze-colored fascia. It provides office, service, storage, and dining space.



PALO ALTO — This two-story, 10,000-square-foot building was purchased in September from a neighbor in the Stanford Industrial Park, the Addison-Wesley Publishing Company. HP takes possession this month, and will move International Operations from the main administration building into the new facility.





ATLANTA — HP's Southern Sales Region headquarters and Atlanta sales area offices are housed in this building, completed in March. The main floor has separate space for the two groups, with a central shared area providing reception, mail, shipping and receiving, and lunchroom facilities.



PALO ALTO — Completed in June, this new 30,000-square-foot addition to the headquarters complex in Stanford Industrial Park provides substantially more space for HP Laboratories, the corporate research and development group. Known as Building 1A, it is occupied by a staff of 200.



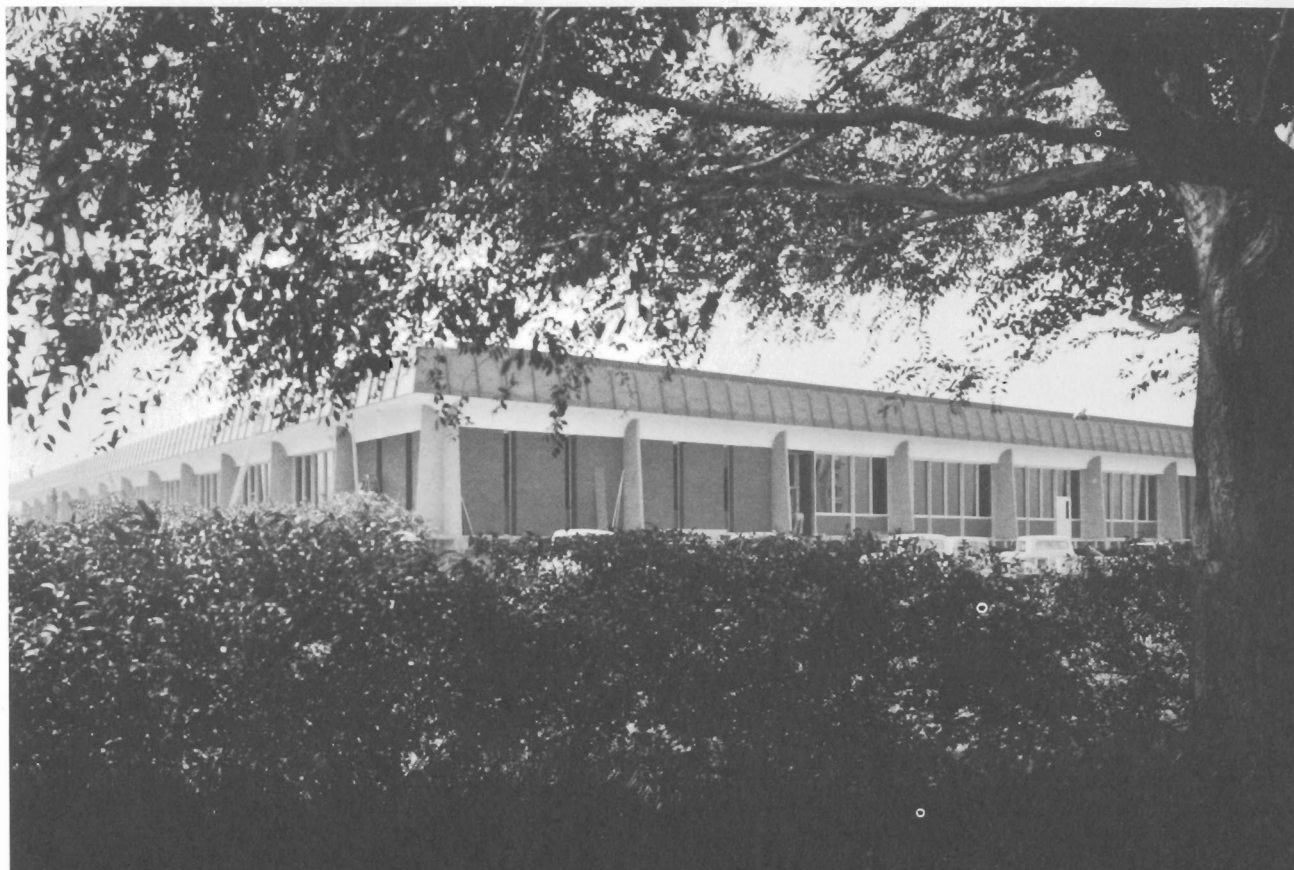
MOUNTAIN VIEW, CALIFORNIA — Delcon Division and Customer Service Center employees occupied their new 65,000-square-foot plant (at left) during fiscal 1967. The exterior features sandblasted panels of concrete with exposed creek pebbles. Twin building on the right was occupied by the Mountain View Division during fiscal 1966.



AVONDALE, PENNSYLVANIA—Administrative, marketing, research and engineering groups now occupy this addition at the Avondale Division, completed in May. The 48,000-square-foot building has an aluminum and glass curtain wall topped by vertical steel siding.



More room to grow



Another six HP buildings currently under construction will add approximately another six acres under roof in fiscal 1968.

HP Associates' 65,000-square-foot addition, building 11 (shown on this page), will be occupied early in fiscal 1968. HP's West German subsidiary, Hewlett-Packard GmbH at Boeblingen (near Stuttgart), is building a 65,000-square-foot addition to increase its plant space by 75 percent. Nearing completion in Paramus, New Jersey, is a 60,000-square-foot building that will serve as headquarters for the Eastern Sales Region, the New York area, and the New Jersey district. Construction began in August on a new home for the Texas area/Dallas district office. And two European sales subsidiaries are erecting new headquarters facilities; a 40,000-square-foot building near Geneva for Hewlett-Packard S.A., and a 22,700-square-foot building outside Paris for Hewlett-Packard France.

Meanwhile, studies are in progress to gauge the need for new facilities in other locations, in preparation for the anticipated growth of the company in the years ahead.

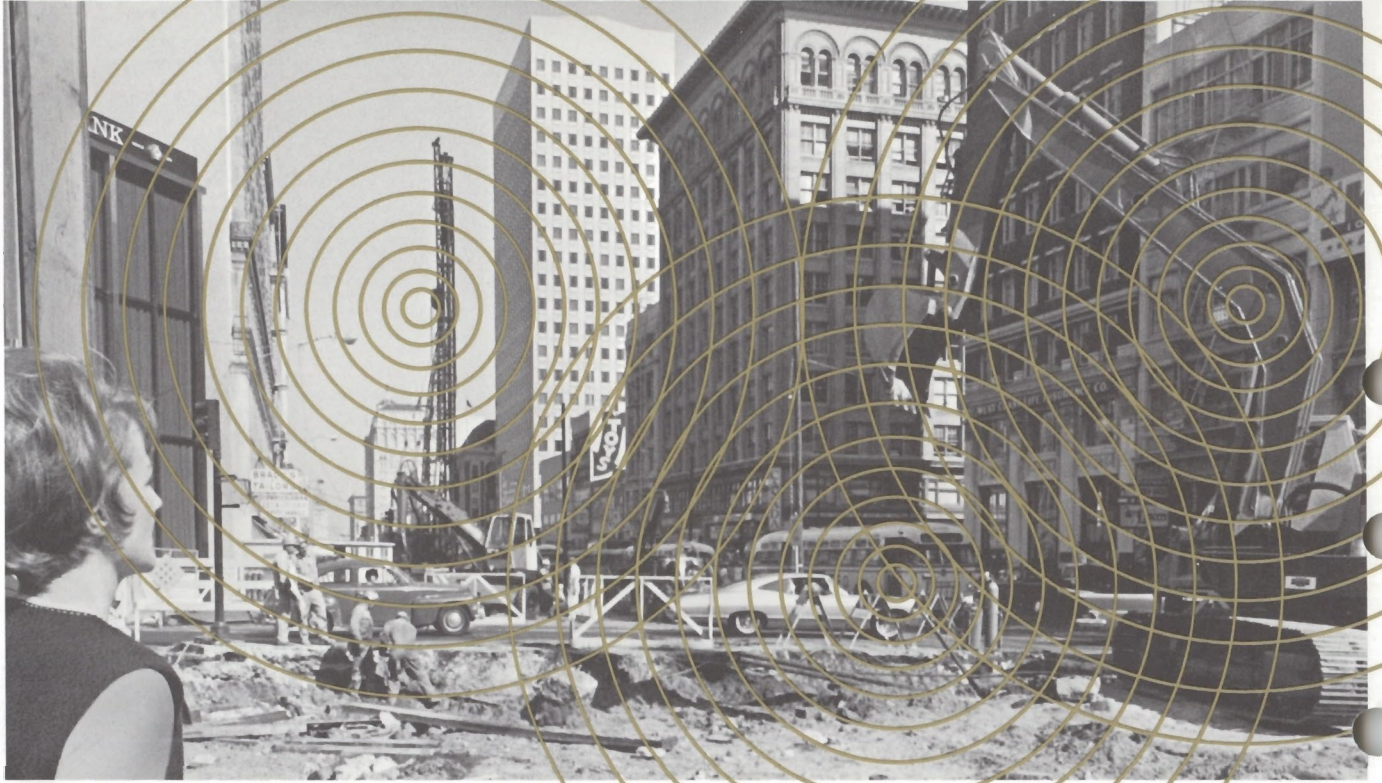
*Can anything be done to control the growing problem
of 'noise pollution' in our cities and skies?*

the inner space invaders

□ You *have* noticed how much noisier it is lately? Out there on the highways, in the suburbs, and the city centers? The experts are beginning to call it "noise pollution" — just like air and water pollution. They say it is going to get worse, quite a bit worse, unless we mend our ways and do something about it besides talk (which only adds to the problem).

Indeed, measurements prove there is more noise being made these days. Each new automatic appliance adds to the total noise production in a dwelling. Highly portable design has made the sounds of radio, television, and hi-fi/stereo universal. Each new vehicle and every new construction project adds to the crescendo. And overlaying everything is the roar of the jet, the inescapable signature of the age. Aiding and abetting the transmission of noise is the increasing architectural use of lightweight materials, thin walls, open floor plans, and large expanses of glass, plus noisy heating

(continued)



the inner space invaders

and air conditioning systems, and zoning regulations that restrict the height of your street-front fence.

Oddly, one of the peculiar aspects of dealing with noise as a problem is that, up to varying points, noise is a friendly thing, a very human and sociable phenomenon. It makes us feel in contact with others. Physiologists, in fact, say that we need some sound. Pure silence, they hold, would lead to isolation, withdrawal, and madness. Acoustical engineers make allowance for this need when designing sound control systems in a structure. They create a desirable level of "white noise" — sometimes known as "acoustical perfume" — either by introducing a background of music or by permitting work noises to flow freely. Cows, too, are known to produce better under the influence of music — provided it's not the Saber Dance or Bobby Dylan.

Noise as a problem is not new. The Roman writer, Juvenal, lamented that the noises of all-night roistering in the city caused many sick people of ancient Rome to perish from lack of sleep. An American doctor specializing in noise said recently that we may be in for a new type of illness which he calls "a chronic noise syndrome." Unexpected and disturbing noises such as sonic booms can trigger a variety of symptoms.

How much noise can you tolerate? Scientists now use phons and sones (more definitive in measurement value than the familiar decibel) as measures of loudness. As a point of reference, three phons is the lower limit of the ear's ability to hear. Riveting, the noisiest industrial sound, measures 130 phons, generally considered the limit of comfortable human hearing. So does machine-gun fire at close range. The jet's take-off is 140 phons, where hearing definitely leaves off and pain begins, while a space rocket zooms to the intolerable height of 175 phons. Further down the scale, busy traffic registers around 70, while breathing produces 10 phons.

Legal tolerance limits have been established in various parts of the world. California has an industrial code requiring ear protection if noise reaches 95 to 110 phons, depending on frequency and duration. A city ordinance in Geneva, Switzerland, states that car doors must be closed quietly. Building codes in New York require that a structure have the effect of lowering the noise of a jet takeoff by 45 phons. A committee of the American Standards Association presently is studying the whole problem of tolerance limits.

According to Leo L. Beranek, a leading U.S. acoustician, determining how much noise is tolerable is not an easy matter. Beranek notes, for example, in an

article in the December 1966 issue of *Scientific American* that annoyance is often linked to fear. Persons living near airports do not necessarily become used to the sound of jets. Instead, through fear of crashes, they become increasingly sensitive to takeoff noises, particularly at night. People who live near busy highways often show similar agitation at traffic noise, because they have fears of their children being involved in accidents. In their case, though, the days are worse than the nights, when the children are safely in bed.

But there are real limits, social as well as scientific. The social end of the tolerance scale apparently was reached in New York not long ago when all of the tenants of one new high-rise apartment vacated their building overnight in protest against noise. New York landlords have also become used to the sight of apartment hunters using transistor radios to test the acoustics from one floor to another.

Estimates are that more than 18 million Americans suffer from some degree of deafness. In most cases this has been brought about by the gradual breakdown of the tiny fibers inside the ear that receive the sound signals and transmit them to the aural nerves. Usually, the fibers that specialize in high frequency reception are the first to wear down, and the more use, the more wear.

HP's new loudness analyzer, Model 8051A developed at the Boeblingen plant in West Germany, is the first scientific measuring instrument that takes into account the complexity of the human ear. It measures sound the way it is heard inside the human ear. To a listener, for example, a loud noise will tend to cancel out or mask a softer sound of comparable frequency. The 8051A makes allowance for this and other characteristics of human hearing, and so has wide application in noise tolerance analysis as well as other sonic studies.

The critical nature of such research is clearly indicated in the private and public concern over development of the supersonic transport plane (the SST). Boeing, Lockheed, Federal agencies, and others are fully aware of the stakes involved in solving the problem of sonic boom. Their success in this area will determine to a large extent the future direction for aviation.

Actually, the noise researchers may already have discovered something of significance far beyond their own studies. In finding that rats exposed to loud noises reproduce at much lower rates, the researchers appear to have opened up the possibility that perhaps the sonic boom may be the long-sought answer to the population boom. □

News in brief

Palo Alto—International Operations recently chalked up the two largest orders in its history: a \$705,000 order for Mountain View Division's 3030 digital tape units from the Swedish industrial giant, Saab, and a \$450,000 multi-division order from Mexico's Secretary of Communications and Transport. Saab will use the tape units, which represent Mountain View Division's largest-ever order for 3030s, in conjunction with Datasab computers it manufactures. Instrumentation being shipped to Mexico will support new microwave communications networks spanning Mexico.

Paramus, New Jersey—Next month offices of the Eastern Sales Region under Carl Cottrell, the New York area under Milt Lichtenstein and the New Jersey district under Stu Yellen will move into their new headquarters here; concurrently the temporary region office at Fort Lee, New Jersey, and the Englewood, New Jersey, district office will close. Eastern Sales Region also announced the closing November 1 of the Camp Hill, Pennsylvania, sales office, with its territory now served by the West Conshohocken, Pennsylvania, district. Additionally, in January the Region plans to establish a district office under Bark Bush in Cherry Hill, New Jersey, a Camden suburb. The Cherry Hill district will market all three HP product disciplines and will maintain a service facility at its office at 1050B North Kings Highway.

Waltham, Massachusetts—The Sanborn Division has been renamed the Waltham Division, effective November 1, in accordance with the company's policy to

name its divisions geographically when practicable. Already so designated are the Avondale, Colorado Springs, Loveland, Mountain View, Palo Alto, and Rockaway Divisions.

Palo Alto—Corporate Marketing has established two new sections: corporate systems engineering, under Bob Grimm, and corporate systems marketing, under Dan O'Rourke, whose new section includes the government program sales function that he formerly headed. The new corporate systems sections assist customers who need automatic and semi-automatic instrumentation systems that combine measuring instruments from several divisions, and instruments in special cabinets and cases for ruggedness and portability.

Colorado Springs—HP has been named "vendor of the month" for August by Westinghouse Electric Corporation under the error-free performance program of its Defense and Space Center. In a ceremony here on October 12, a commemorative plaque was presented to Bill Terry, Colorado Springs Division general manager; Ray Demere, Loveland Division general manager; and Paul Guercio, Baltimore district manager. The award stemmed largely from a \$300,000 rush order for ruggedized 180A oscilloscopes and plug-ins from Colorado Springs as well as for distortion analyzers, oscillators and voltmeters from Loveland.

Sydney—HP Australia's Sydney branch office has relocated to 61 Alexander Street in the Sydney suburb of Crows Nest, New South Wales.

Pasadena—John Brown, Moseley Division marketing manager, has been promoted to division general manager. Succeeding Brown as division marketing manager is Neely's Ben Holmes.

People on the move

Corporate—John Knobel, to product training, corporate Marketing, from production staff, Microwave.

Deleon—Harold Humphrey, to R&D, from printed circuits, Frequency & Time; Nestor Small, to quality control, from quality assurance, Frequency & Time.

F&T—George Berry, to sales engineer (Neely area), from marketing staff; Joe Bourdet, to product manager, synthesizers and time standards, from sales engineer (Neely area); Bob Green, to tool engineering, from manufacturing engineering, Paeco; Hi Hayashi, to advertising and sales promotion, from corporate Manufacturing Engineering.

Loveland—Don Knight, to data processing, from corporate Management Services.

HP Associates—Howard Borden, to solid state display, from solid state lab, HP Labs.

Harrison—Ed Hughes, to advertising and promotion, from advertising and promotion manager, Avondale.

Microwave—Dave Gildea, to R&D staff, from production engineering staff; George Hoffschmidt, to marketing staff, from production staff; Larry Rayher, to marketing staff, from corporate Management Services.

Mountain View—Dick Brockett, to tool engineering, from same position, Microwave.

Eastern Sales Region—Stan Davis, to medical staff engineer (Burlington), from product training, corporate Marketing.

Neely Sales Region—Roger LeBold, to staff engineer (North Hollywood), from marketing staff, Microwave; Jim Macrie, to senior staff engineer (Palo Alto), from marketing staff, Microwave.



from the chairman's desk

The end of the fiscal year is a time for taking stock, for reviewing our performance over the past twelve months, and for determining how we can do a better job over the next twelve and on into the future.

By almost every standard, 1967 was one of the most interesting years in the history of the company. It was a period of growth and change, one in which we were reasonably successful in meeting new challenges, in broadening and diversifying our activity, and in building strength for the long-term future.

Although specific figures for the year are not yet available, our incoming orders were in the neighborhood of \$250 million, just about matching the target we set for ourselves at the beginning of the year. Shipments lagged somewhat behind and will fall in the \$240-245 million range, slightly below our earlier estimates. Our profit for the year will also be below target; however, it will be at a reasonably good level and well ahead of last year.

The gap between orders and shipments has increased because we are now selling a larger proportion of more complex instruments and systems. For example, most of our computer sales involve additional instruments which work together as a system. In the medical field, this is also true of our sophisticated patient monitoring equipment, for which there is a steadily increasing demand. In these and many other areas we cannot ship the equipment as soon after receipt of an order as in the case of a counter, oscillator, or voltmeter.

Because our instruments are becoming more complex, manufacturing and quality control is becoming more difficult. I am very pleased to see that this part of the job is being done very well. Our costs are staying well in line, and the delay between orders and shipments is only a transitional problem.

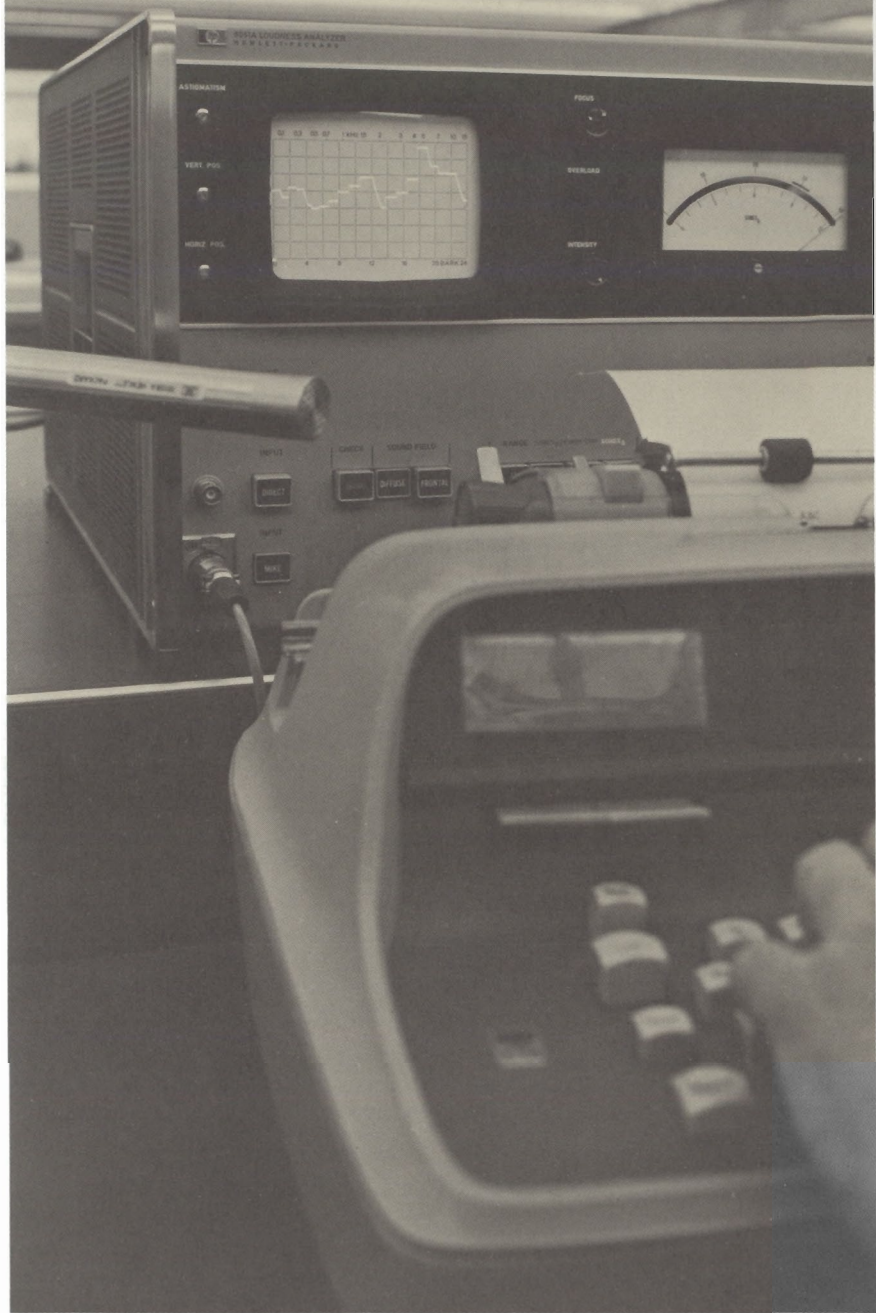
We have experienced over the last few years some important changes in our marketing program. With our broader product line has come involvement in new markets and with customers whom we did not already serve. This has included medical customers, chemical customers, data processing customers, and many others. We have already moved toward more specialization in our marketing program, but we do not yet have the problem entirely in hand, and its solution is one of our prime objectives for 1968. This objective is to maintain the excellent marketing program we have in our traditional areas and build equivalent strength which we can apply to areas which are new to us.

Clearly we have our work to do in 1968. There are important challenges for each of us in every part of the company. We must continue to reexamine everything we do and keep searching for better ways to accomplish our work. This means 1968 will be another year of progress for all of us if we each resolve to make it so.

David Packard

Now hear this...

Because of the complexity of the human ear, it has been extremely difficult to measure with accuracy the loudness of many sounds. Now the HP 8051A loudness analyzer, developed at the company's plant in West Germany, makes it possible, for the first time, to measure sounds the way they are actually heard within the human ear. The importance of establishing standards of human tolerance to the many sounds that bombard the ear with increasing frequency and power is discussed on pages 11-13.



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