Measure

For the men and women of Hewlett-Packard/FEBRUARY 1968

from the chairman's desk

Over the past 30 days or so, we have been holding a series of management meetings at various locations in the U.S. and Europe to review our company's progress during fiscal 1967 and to take a detailed look at our plans for fiscal 1968. In light of our performance for the first two months of fiscal 1968 (November and December), the latter area has taken on added importance.

It is apparent that the trend which started in the second half of fiscal 1967, that of not meeting shipment targets, is continuing. And, unfortunately, costs are not being reduced accordingly. As a result, our profit margin is unsatisfactory in many areas.

Our total corporate orders are holding up fairly well but the pattern of orders is changing. This has made it difficult to match shipments with orders in many divisions, and this situation is likely to continue. The other problem is that our expenses in research and development are not being controlled effectively in several of our large divisions.

Both of these problems will be improved by some adjustments among divisions. As an example, we are sure we can achieve a better balanced situation by the transfer of some people, particularly in the research and development area.

I am sure there are other areas, too, where we can lower our spending sights and get our operating profit level back up where it belongs. In fact I think it is safe to say that everyone of us can find ways to save a little money and still get our job done. All of us have a stake in this situation because the growth of our company and the fulfillment of our individual goals are directly affected. No matter what our position in the company, each one of us can contribute to reversing this trend.

We have the potential of a fine year ahead of us, and I am confident that with some extra effort we will see substantial improvements in all areas.

Beginning with this issue, MEASURE will publish a series of articles discussing some of the specific problems we are facing. The articles will emphasize the methods by which some of our manufacturing, marketing, engineering, and corporate groups are attacking these problems.

I hope you will read each of these articles and relate them to your own area of activity. There are many ways that we can improve our performance, and I am confident that each of you will search out ways to do your job more efficiently so that we can achieve this goal.

David Packard

With the exception of Merry Christmas, no words got more of a workout last December than Profit Sharing. When it wasn't being talked about, it was being thought about in terms of gifts, investments, holiday trips, payments, and vacations.

Profit sharing has been a part of Hewlett-Packard since the very first days of the company, and is an important part of the HP compensation package.

What is the profit sharing formula at HP?

Actually, for U.S. divisions (overseas locations vary considerably according to the many local traditions and legal requirements) the definition includes two major benefit programs. One is the twice-yearly cash distribution. The other is the deferred contribution that goes into the Retirement Profit Sharing Trust once each year. Both are very carefully formulated.

The cash sharing is based on 12 percent of total pretax profits. That is, the first distribution (in May) is 12 percent of the unaudited pretax profits for the first half of the fiscal year. The December distribution is based on 12 percent of the audited pretax profits for the second half, and takes into account any differences that may occur between the unaudited and audited first-half results. In both May and December, eligible employees share in proportion to base wages and salaries.

The retirement trust receives a company contribution of 10 percent of pretax profits shortly after the end of the fiscal year. The contribution is split 50-50 between fixed income investments, such as bonds, and an equity or common stock investment program.

Why a company plan, rather than division-by-division profit sharing?

There is such a high level of divisional cooperation and interchange — components and services for example —

(continued)

Profits: The reward of progress

TARGET FOR '68

Reduce Scrap

that it is right and realistic to regard the various segments of the company as interdependent. Moreover, in an industry where change is continuous, the single plan assures that people of those divisions whose performance may be temporarily impeded — through no fault of their own — will not be penalized.

Sharing, after all, is a key word.

• When the profit sharing announcement was made last December, it was a little disappointing. How did it happen that with an increase in profit level, individual shares were smaller than they had been the previous years?

One major cause was the trouble some divisions had getting shipments out the door. Unfortunately, they didn't — or couldn't — reduce costs to match. The effect was a reduction in profit margins.

Because of this and other factors, the dollar amount available to profit sharing increased only slightly over 1966, and there was a larger number of eligible employees to share these dollars.

The point, now, is not to lament 1967. It was in fact a good year, even if not as good as hoped. Rather, the need is to see what can be done to make 1968 a very good year.

What can be done, for example, in the areas of scrap and waste control, rework, warranties, workmanship and quality control, corporate overhead, supplies and parts, competition, productivity, obsolescence, targets, and inventories? How can we, individually and collectively, contribute to better performance in these problem areas?

Following is the first of a series of monthly articles which will explore company-wide efforts to find answers to these questions.

How to make mole hills out of mountains of scrap

☐ One of the fastest growing areas of the HP organization in 1967 was the scrap heap. This waste pile (not including such items as lost tooling and wasted operating and office supplies) rose 42 percent higher than the 1966 total. It was a case of unfortunate growth because it ran far ahead of growth in sales and production output, and helped put a damper on 1967 profits and profit sharing.

The figure – almost $3,000,000 in total scrap expense – included a hefty percentage of obsoleted parts and instruments, plus another big share resulting from parts and components classified as faulty.

The big question is: What can be done to reduce the scrap heap this year? The problem really is how to cut scrap costs without also cutting product quality and without spending too much time and money solving the problem.

Does any one have the answer?

All of the divisions and marketing service facilities recognize the problem of scrap and all are finding ways of dealing with it. One program that represents a very broad-scale approach is conducted by the Loveland Division. The Loveland approach got its start in 1966 when the division spotted the start of an upward trend in scrap accumulation. A decision was made to do something about it.

That "something" has taken the form of a program that has as a first step discouragement of waste throughout the production process. Without it, say the Loveland managers, the present scrap rate probably would have been almost double the 1965 rate.

"Good housekeeping on the production line is the starting point," according to Don Cullen, Loveland manager of manufacturing.

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Important first step in Loveland scrap control program is employee initiative in returning non-conforming items to stock. Joyce Bosse, at right above, receives photochopper from stockroom's Joanne Vanderwyk as a replacement for faulty item. Below, the defective photochopper is given electronic test for internal damage by Lou Fourtner of Incoming Inspection. This department has to decide if an item is worth repairing, if it should go back to the supplier, or to the scrap heap.

Starting production of a new instrument can have big impact on scrap rate unless ordering of parts is coordinated early in game. Here, John Christiansen, scheduler (right), reviews list of parts that Jack Anderson, R&D lab project leader, will require for new instrument.

"Everyone is encouraged to make the effort to turn in all faulty or non-conforming items to scrap so that these items don't just get lost or tossed aside as junk. There's a good chance a lot of it can be salvaged."

The dollar value of scrap is brought to everyone's attention at Loveland with exhibits that show how much an assembly or component cost the division. This graphic display of such items, many of them small but expensive, is a real eye opener for many people. The exhibits are kept right up to date.

Every item returned to stock with a non-conforming tag triggers the following possible actions:

- A replacement part is issued.
- The reject goes to Incoming Inspection which must decide on its fate.
- If it is hopeless, it gets discarded.
- If salvageable, it will be sent back for rework or, in certain cases, fixed right on the spot.
- It may be sent back to the manufacturer — often the case with components.
- If classed as obsolete, then other divisions are notified so transfer can be made.
- Meanwhile Kardex reports of all actions taken go to the division accounting office as the start of the all-important cost analysis and evaluation stages.

Scrap reports are processed through a computer, and a statistical picture emerges each month showing in detail all of the hows, whys and wherefores of scrap generation.

For example, when an engineer creates an engineering change order resulting in the obsolescence of components — not only those stocked at Loveland but also at other HP locations maintaining such parts for purposes of servicing — the scrap report quickly reveals the total effect of the change. And knowing that the costs of that change will be charged back against programs, the engineer is encouraged to check out the

Loveland system generates reports that enable Joe Phillips, production engineer at left, to ask Ken Caufman of accounting for detailed comparisons of costs involved in a contemplated production change. The data will help the engineer arrange most economical changeover.

possible effects in advance. It might mean, for example, that he will schedule a longer production run of the original instrument instead of making the change just now. This will help sop up many of the parts that otherwise would end as obsolescent scrap.

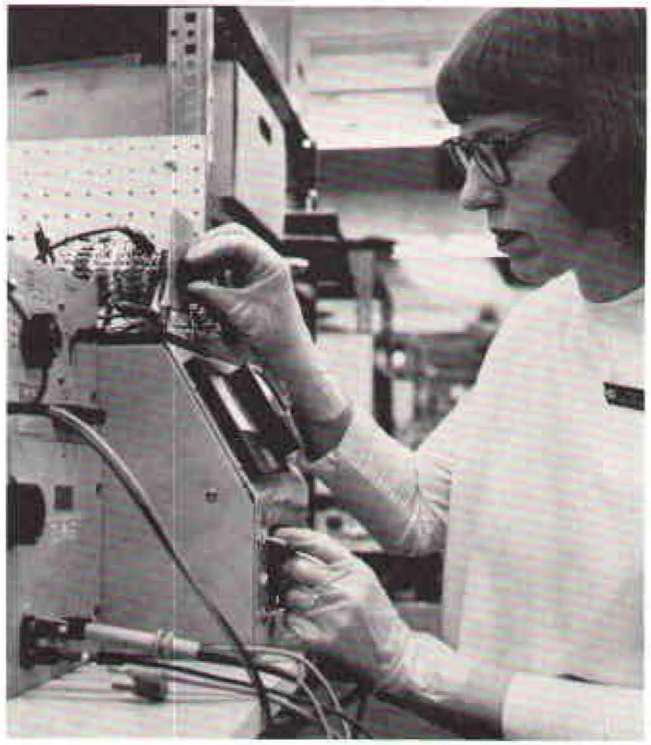
A further refinement of this approach takes place when new instruments are scheduled for production. Here, scrap is reduced by assigning an inventory control scheduler as a parts coordinator, as early as four to six months in advance of pilot runs. With his knowledge of sources and experience in ordering he is able to resist the temptation to order too much too soon — and to eliminate oversights.

Many other benefits are being realized by the Loveland program.

The performance and "yield" of parts from outside suppliers are carefully evaluated in relation to scrap, enabling the division to make a better judgment when purchasing. In addition, dollar value in the form of credit or replacement by suppliers is now much higher. Previously, a single failure may have seemed isolated and too insignificant to fuss with. But now that failures are accumulated and summarized over a period of time, their total effect becomes clear.

Cullen and his production associates plan to extend the scrap control program still further. Every production change will be analyzed in advance to compare the expected benefits against the scrap costs created by the change. Finally, every month a production team will review the actual pieces of scrap rejected on the line, "to minimize the quality guessing game and keep away from any runaway reject trends" as can happen when people try to second guess the quality assurance inspectors.

Regardless of the many ways scrap control programs can be designed, the Loveland team is proving that the key to success for any divisional effort still lies in the skill and care of the people on the line. □



An average of 125 switches are repaired each week by the Loveland switch shop, 20 percent of them already in the instrument. Above, Pat Reynolds detects faulty switch during test. This is taken directly to the shop for repair by Ruth Carra, below, without the need for paper work. Wherever possible the switch is repaired right in its instrument. If the switch is beyond economical repair, the usable parts are salvaged and cataloged for future use — picking up savings out of the wastebasket.

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☐ The way Victor Borge tells it, this inventor had his heart set on developing the perfect soda pop. He gave the name 1 UP to his first research effort, followed by 2 UP, etc. Finally, after years of work and expense, he reached the 6 UP stage. Unfortunately, this didn't taste right either — so in total despair he chucked the whole project.

The woeful tale is used here not to promote the "try, try, again" philosophy but rather to illustrate the fact that innovations — the big product ideas of industry and commerce — are anything but easy to come by.

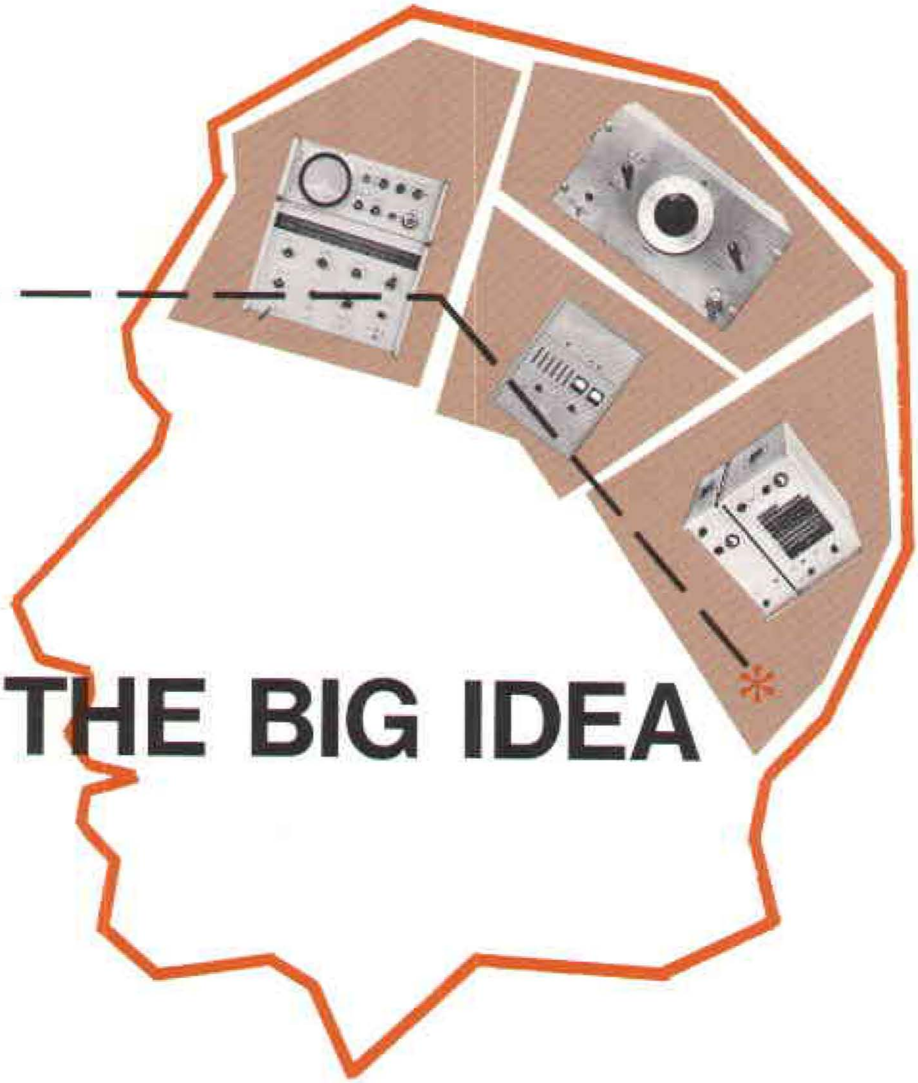
Yet the search goes on, because, for every 30 or 40 ideas that fizzle in the laboratory, along comes a 7 UP — or a light bulb, Nylon, skinless hotdog, the Klystron tube, new type audio oscillator, contact lenses, Teflon, the concept of electronic counters, TV dinners, fluid controls, and the many, many other ideas that have scored big successes in their markets.

The search goes on also because in some cases a point of saturation has been reached in the ability of a company to diversify, modify, and expand in the marketplace. In this situation, though, there is danger that the sheer necessity of coming up with a really smashing new product idea will lead a firm into costly crash programs or into markets which are not suited to its experience or organization.

How then does HP go about its search for big ideas?

One important requirement is to be tuned in to the many sources of creative scientific work. This implies continuing interest and cooperation in research programs conducted by universities, scientific institu-

The search for THE BIG IDEA



tions, and government laboratories. The company makes a special point of being close to the leading universities, both geographically and professionally. Inventors are another source, and hundreds of letters outlining their proposals are received each year.

The prime source, though, is within the company itself. Bringing forth ideas, in fact, is one of the essential functions of the senior scientific and engineering people and their departments. The inspiration for such ideas may come in the form of requests or suggestions by customers or, as in most cases, a new idea will emerge when a company scientist or engineer is given the chance to look over a proposal and contribute his professional viewpoint.

Besides leading to the creation of new technical possibilities, this review process also serves to evaluate ideas as to their potential profitability. Many ideas that are technically interesting and sound just do not make the grade at this point. Market demand may be too small. Development costs may look too high or, the idea may not readily fit the capability of the company's manufacturing or marketing organizations.

But the search goes on, and often it isn't so much a matter of specific product ideas but rather of staying alert to the mainstream of technology and adapting it to existing product lines.

As Bob Brunner, corporate engineering, notes: "There is the need for ever bigger ideas. But, these are not necessarily confined to the creation of new instruments and families of instruments.

"There's a change occurring in the basic character of the measuring instruments themselves as we take

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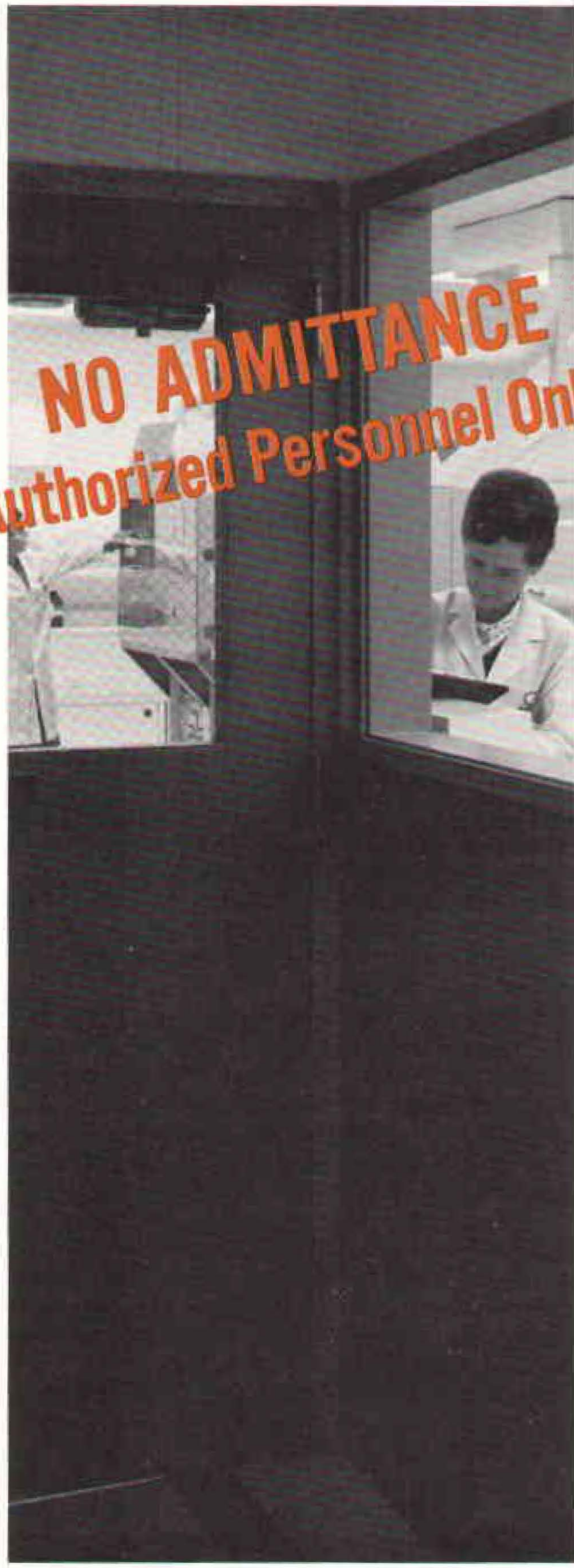
The search for THE BIG IDEA



advantage of the explosion in component and manufacturing techniques.

"And with the avalanche in measurement data has come considerable interest in how to gather it in the simplest and most meaningful way possible. Simplicity of operation and complete programmability of stimulus and measuring instruments are also goals.

"With regard to individual instrument trends, there are choices to make as to how much of the instrument function can or should be taken over by a general-purpose computer. It is likely that many computational processes can be done more directly and rapidly inside the instrument on either a digital basis or with pure analog circuitry."

Another approach to the big idea has been defined by one division manager as "contributions in scientific measurement that lead to multiple, profitable production."

Historically, there are numerous examples to go by. The 200A oscillator, HP's first instrument (see back cover), set a classic pattern in ideas which later was followed by such achievements as high frequency counters, frequency synthesizers, spectrum analyzers, sampling techniques, swept-frequency measurements, and other important concepts.

HP is very hopeful of making more such history in the near future. But, because of their confidential nature, it's too early to tell much about the instruments. In the medical field, however, among a broad spectrum of innovations are several which seem to hold special promise. Included are new methods that would simplify and improve routine measurements for cardiac output and blood oxygen levels. And among the few that can be mentioned in the electronics field are developments in bulk oscillation, injection luminescence devices, and laser applications.

Not all big ideas are easily spotted. Emery Rogers, Avondale division manager, recalls that gas chromatography existed in England for years as an experimental lab technique before someone (actually U.S. scientists) recognized its major potential for industry.

"Right now," he said, "the analytical field could use a breakthrough in the same order of magnitude as gas chromatography, something that would really spur the industry."

So the search goes on and on. □

News in brief

Palo Alto—HP Associates has developed a new type of high-performance diode with multi-million-dollar annual sales potential. The diode, a hybrid combining the superior performance of the hot-carrier diode and the best features of the PN junction diode, is priced at about one-fifth the cost of a comparable diode. Initial quantities are fulfilling a million-diode order for the Army.

Tokyo—Bill Doolittle, HP's vice president for international operations, has announced management changes instituted by Yokogawa-Hewlett-Packard directors. Doolittle said the realigned management structure "reflects the growing maturity of Y-HP and our desire to assign greater day-to-day operating responsibility to our Japanese associates." Mori Katakami has been elected managing director, working closely with President Shozo Yokogawa and having line responsibility for all operating departments of the company. George Newman and Karl Schwarz have been appointed assistants to the managing director and are members of the board of directors.

Palo Alto—HP has asked the U.S. Supreme Court to review its legal controversy with the General Accounting Office. Last November 15, an appellate court upheld the government's asserted right to examine HP cost records relating to four fixed-price contracts negotiated with the government. The company contends that Congress has not granted the Comptroller General such authority where regular government procurement procedures have relied on the established commercial market prices of the articles purchased.

Washington—FICA (Social Security) tax payments increase again this year. Although the tax rate remains unchanged at 4.4 percent, the tax is payable on the first $7,800 earned during 1968, up from $6,600 taxable last year. Thus the maximum tax is $343.20, compared with $290.40 last year, an increase of $52.80.

Edmonton, Alberta—HP Canada's Edmonton sales office has moved to 11745 Jasper Avenue.

Palo Alto—Stock purchase price for the quarter ending December 31 was $70.84, with the stock costing the employee $53.13 and the company $17.71.

Palo Alto—At their January 19 meeting, HP directors declared a regular semiannual dividend of 10 cents a share on the company's common stock. The dividend is payable April 15 to shareowners of record April 1.

People on the move

Corporate—Al Benjaminson, to physical electronics lab, HP Labs, from engineering staff, Palo Alto Division; Bill Sayre, to internal audit staff, corporate Finance, from finance manager, Paeco Division; Dave Swartz, to solid state lab, HP Labs, from R&D, F&T Division.

Avondale—Dave Solberg, to marketing staff, from product training, corporate Marketing.

F&T—Glenn DeBella, to frequency standards development, from counter plug-in development; Rolf Hofstad, to frequency standards development, from counter plug-in development; Tom Holden, to fabrication department, from tool engineering; Jim Koch, to nuclear marketing from nuclear engineering; Jim Stinehelfer, to manufacturing, from quality assurance.

HP Associates—Bill Lautner, to marketing staff, from product training, corporate Marketing.

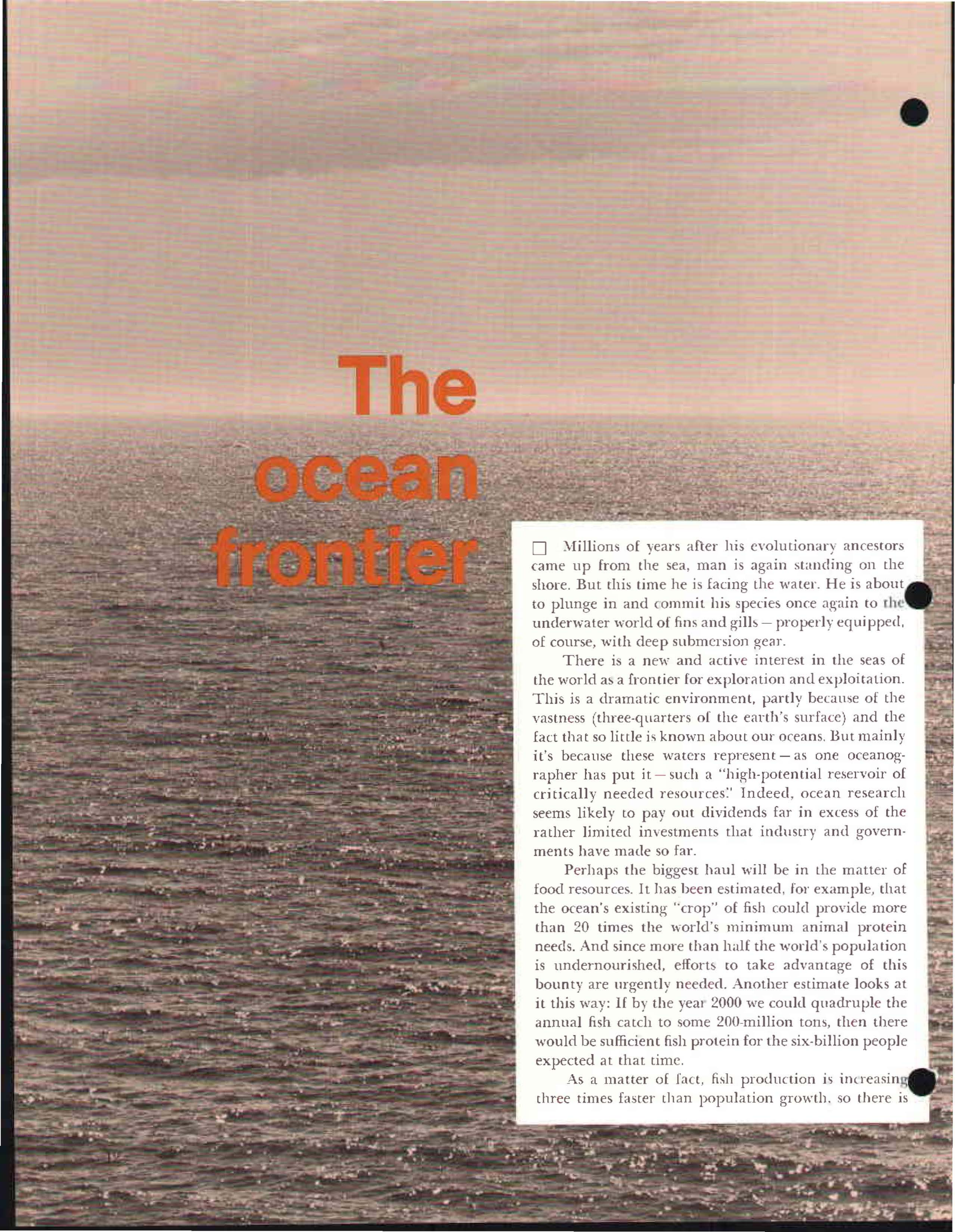
Microwave—John Bickmore, to special handling manager, from manufacturing supervisor; Pete Brink, to manufacturing information systems manager, from production control manager; Doug Chance, to production engineering manager, from production engineer; Bob Johnston, to section manager from printed circuit supervisor; Tom Lauhon, to production manager, from production engineering manager; Bob Leeper, to production engineering manager, from production engineer; Maurice McGrath, to production manager, from section manager; Rudy Moorehead, to production control manager, from production control supervisor; Will Morton, to special handling manager, from special handling engineer; Doug Scribner, to production engineering manager, from production engineer; Leo Stephens, to section manager, from manufacturing supervisor; Bill Stonas, to in-plant tool engineering, from tool engineering, F&T Division; Larry Stratford, to printed circuit supervisor, from production engineer.

Paeco—Bob Harwell, to finance manager, from internal audit staff, corporate Finance.

Palo Alto—Bill Abbott, to manufacturing manager, from manufacturing operations manager; Jerry Collins, to manager, instrument systems department, from manufacturing systems group; Craig Hamilton, to customer service, from Customer Service Center (Repair); Ed Miller, to manufacturing operations manager, from manufacturing engineering manager, Operations West; Frank Wheeler, to quality assurance manager, from manufacturing manager.

Waltham—Jim Peterson, to marketing staff, from product training, corporate Marketing.

Midwest Sales—Joe Parks, to accounting supervisor, from marketing staff, Mountain View Division.



The ocean frontier

□ Millions of years after his evolutionary ancestors came up from the sea, man is again standing on the shore. But this time he is facing the water. He is about to plunge in and commit his species once again to the underwater world of fins and gills — properly equipped, of course, with deep submersion gear.

There is a new and active interest in the seas of the world as a frontier for exploration and exploitation. This is a dramatic environment, partly because of the vastness (three-quarters of the earth's surface) and the fact that so little is known about our oceans. But mainly it's because these waters represent — as one oceanographer has put it — such a "high-potential reservoir of critically needed resources." Indeed, ocean research seems likely to pay out dividends far in excess of the rather limited investments that industry and governments have made so far.

Perhaps the biggest haul will be in the matter of food resources. It has been estimated, for example, that the ocean's existing "crop" of fish could provide more than 20 times the world's minimum animal protein needs. And since more than half the world's population is undernourished, efforts to take advantage of this bounty are urgently needed. Another estimate looks at it this way: If by the year 2000 we could quadruple the annual fish catch to some 200-million tons, then there would be sufficient fish protein for the six-billion people expected at that time.

As a matter of fact, fish production is increasing three times faster than population growth, so there is

Recent estimates place the available food fish resources at more than 20 times the world's minimum needs for protein. The problems are locating this bounty, catching and processing it economically, and then distributing it to needy areas. Here, a Scripps research vessel nets a sample of the minute marine organisms that form the first link in the ocean's food chain.

some hope of closing the nutrition gap. Some recent discoveries and developments may help bring this about: successful production of a "non-fishy" fish flour (FPC—fish protein concentrate) that can be processed from the millions of tons of fish that commercial fishermen still throw overboard as inedible trash; new fish spotting techniques such as underwater television, and aerial surveying that can locate areas rich in sea life; and, new underwater methods of cruising, diving, and working that give great new freedom of movement—including the possibility of creating oceanic farms.

Balanced against these hopeful developments, however, is the fact that we still don't know nearly enough about the ocean to take real advantage of our opportunities. Only a very small undersea portion of the ocean has been visited by man. And scientific exploration of earth's "last great frontier" has obviously taken second place to outer space programs.

Oceanographers are hoping that the tide now will turn in their favor. At research centers such as Woods Hole Oceanographic Institution in Massachusetts and Scripps Institution of Oceanography in California, strange-looking vessels laden with scientists and instruments are a common sight, preparing for missions on and under the oceans.

Some of their successes are already showing up on dinner tables around the world. Scripps' scientists in searching for the sardines that had suddenly disappeared from California waters in the early 1950s dis-

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Research vessel *Chain*, out of Woods Hole Institute of Oceanography, offloads HP 2116A computer after recent voyage to measure interacting ocean influences. The computer fared well in its seagoing laboratory.

Measurements of the chemical nutrients in seawater once done by hand at Scripps Institute of Oceanography's Institute of Marine Resources now speed through an HP 2010H data acquisition system.

ocean

covered vast quantities of other types of food fish that now are commercially caught (however they never did locate those slippery sardines). The U.S. Bureau of Fisheries also struck it rich just 18 months ago when, cruising in a research submarine at a depth of 170 feet off the Florida coast, it spotted scallop beds that just wouldn't quit – more than 1,200 square miles of them.

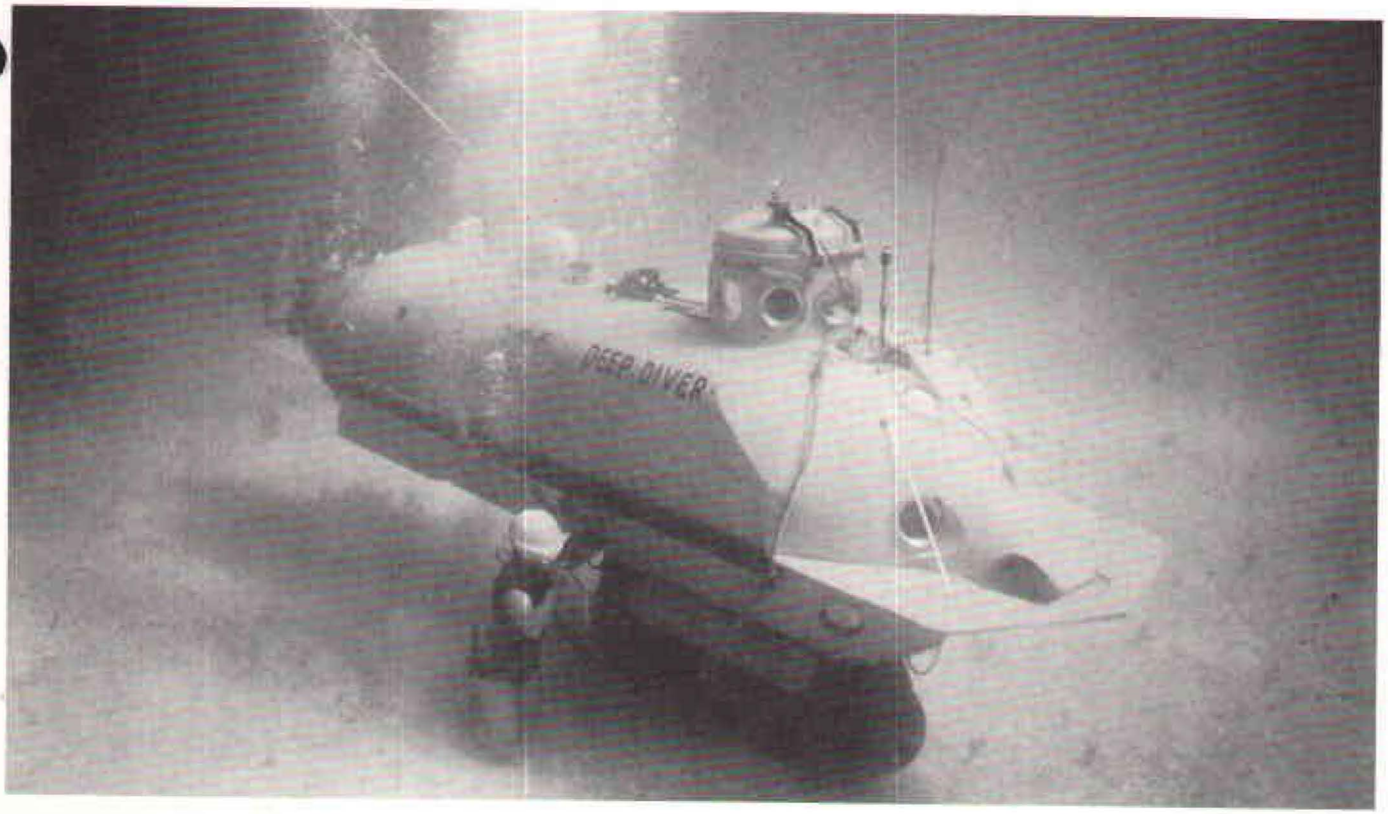
The oceanographer's research, though, goes far beyond these rather simple exercises in discovery. Just about every branch of science is represented in the field, and its concerns include not only food resources but also minerals, chemicals, biology, geology, navigation, engineering, petroleum, power production, salt water conversion, archeology, communications, pollution control, recreation, weather, and the law of the sea. To each of these, electronics is becoming of increasing importance as a necessary tool in the acquisition and processing of information.

Take the problem of getting meaningful material out of data that includes ocean surface temperature, ocean currents, earth's magnetic field and gravity, and, of course, correlating it with the position of the vessel making these measurements. That's what the research vessel *Chain* out of Woods Hole was doing last fall, using an HP 2116A computer. Unlike most computers which require special environmental controls, the 2116 was quite at home on the sea.

The measurement of chemical nutrients in seawater is another project of increasing complexity. At the Institute of Marine Resources on the Scripps campus, an HP 2010H data acquisition system was recently installed to simplify this chore that previously consumed many man-hours of computation.

HP gear is in widespread use at many oceanographic locations. Quartz-crystal thermometers, for example, probe to great depths at many research locations for accurate temperature information. And, at the University of Puerto Rico, the AEC is utilizing an HCN analyzer to study the food chain in a certain bay as a prelude to studies on the effects of radioactive isotopes.

Meanwhile, industry is making some very practical headway in developing the vessels and tools it will need to do a job of development. Last September, two divers were lowered in a submersible chamber to a depth of



frontier

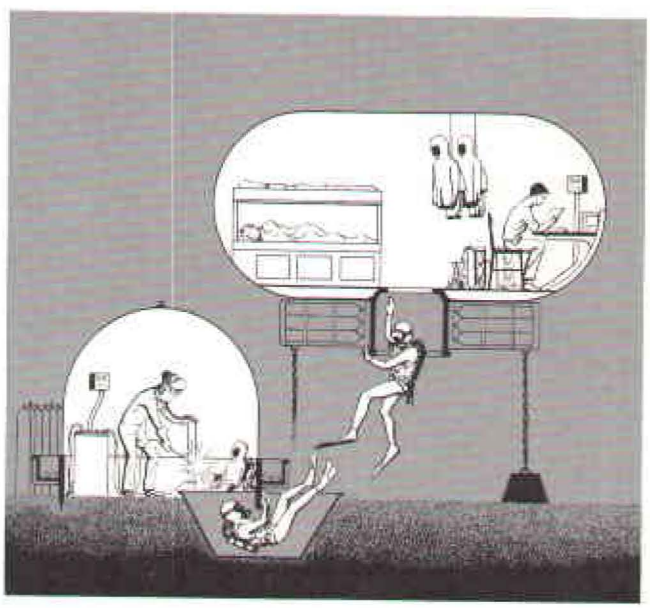
Industrial firms are racing to develop new deep submersion and underseas working systems. This diver has just exited from the *Deep Diver*, said to be the first operational submarine equipped with a "lock-out" chamber. The diver can reenter for decompression or to be moved to another work site. The sub was developed by Ocean Systems, Inc.

636 feet in the Gulf of Mexico. After allowing their body tissues to become pressure-saturated with a special breathing mixture, they swam away from the chamber and put in a total of six hours of open-sea work. It was a record at that depth and provided valuable data on man's abilities to work efficiently at such pressures (276 psi). The key to this success was the development of the necessary diving, breathing, working, and decompression apparatus.

Other recent successes include development of underwater welding, improved television and photography techniques, new drilling methods, and better communications systems.

In fact, in the absence of big aid programs (remember that Columbus required government support!), a growing roster of private companies is stepping onto the ocean stage. They fully expect their initiative and inventiveness will be amply rewarded by profits from the world's greatest treasure chest.

So, step by step, man really is going down to the sea again. But it seems unlikely to be John Masefield's "lonely sea." The traffic may get downright heavy. ☐



New techniques, such as the Union Carbide welding system depicted above, will be important if man is to find a comfortable and profitable place under the seas.

250,000 oscillators later...

A 29-year slice of HP history was spanned recently when a new, solid-state version of the company's first instrument, the 200A oscillator, was introduced. And it was only appropriate that President Bill Hewlett, inventor of the original instrument, should be in Loveland for the unveiling of the 204C. The new instrument is smaller, lighter, and much improved in performance, but the operating principles are exactly the same as the classic 1939 invention. The oscillator surely ranks as one of the company's all-time "big ideas," the pursuit of which is discussed on pages 8 through 10.

Measure

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